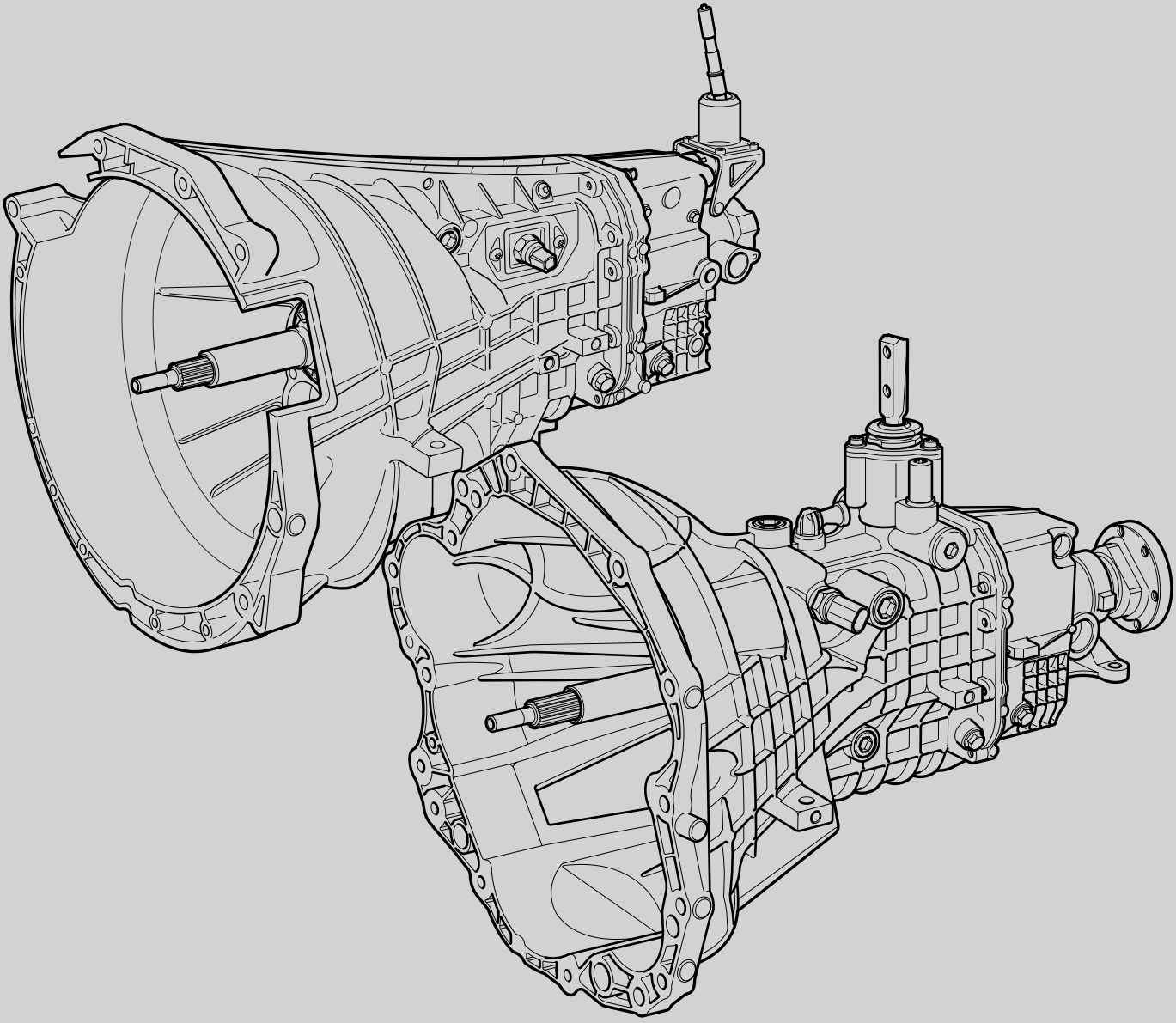
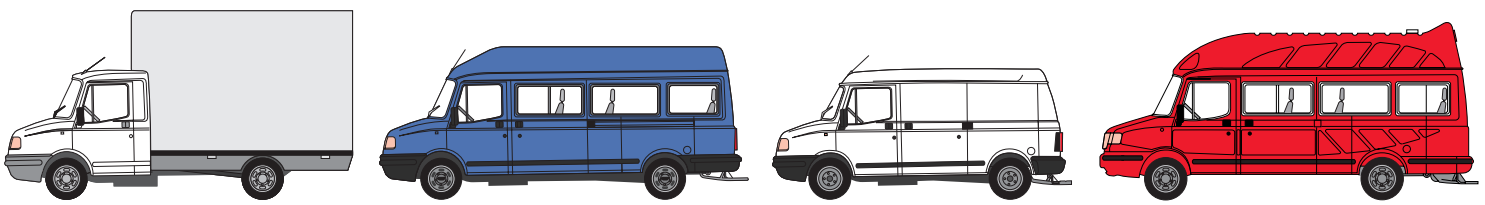
SERVICE WORKBOOK

MT75 & MT75 Single Rail Gearboxes





MT 75 & MT75 SINGLE RAIL GEARBOXES

Service Workbook

This Service Workbook covers the MT 75 and MT 75 Single Rail gearboxes, fitted to LDV Convoy Diesel and Bi-fuel models from September 1996. The workbook is primarily designed to assist skilled technicians in the efficient repair and maintenance of this gearbox, but can also be used as a reference workbook for training purposes.

This Service Workbook should always be consulted prior to servicing or repair work.

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LDV Limited
Training & Publications
Bromford House
Drews Lane
Birmingham
B8 2QG

MVP105601GB 01/02

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INTRODUCTION

WARNINGS and **CAUTIONS** are given throughout this Service Workbook in the following form:

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

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

NOTE: This calls attention to methods which make a job easier to perform.

REFERENCES

References to the left and right hand side in this Service Workbook are made when viewing the vehicle from the rear.

To reduce repetition, operations covered in this Service Workbook do not always include reference to testing the vehicle after repair. It is essential that work is inspected and tested after completion and, if necessary, a road test of the vehicle is carried out, particularly where safety related items are concerned.

GENERAL PRECAUTIONS

1. The gearbox is heavy; whilst removing or fitting, it is recommended that the weight of the gearbox is taken on a suitable cradle jack.
2. Whilst removing or fitting a gearbox, do not allow it to 'hang' on its input shaft as damage may be caused.
3. When carrying out a gearbox overhaul, always take care not to chip gear teeth when meshing them.
4. Prior to dismantling a gearbox, ensure the work area and tools are clean to avoid dirt ingress to bearings, joint surfaces etc.
5. Do not work under the vehicle when supported only by a jack; always use safety stands.
6. When disconnecting the vehicle battery, always disconnect the earth return (negative) cable first, and then the positive cable. On twin battery installations, disconnect both earth return (negative) cables first, and then the positive cables. Reconnecting is the opposite of the above.

REPAIRS AND REPLACEMENTS

When replacement parts are required, it is essential that only genuine LDV Parts are used.

TECHNICAL DATA

Type / fitment

MT 75	– Fitted from September 1996 on Convoy models with EN or ET diesel engine, 2.5 DI (FSD) engines and Bi-fuel engine.
MT 75-V184	– Single rail gearbox. Fitted to Convoy model with 2.4 Duratorq diesel engine.
Gears	– 5 forward, 1 reverse.
Synchromesh	– All gears.

Ratios

	MT 75	MT 75 single rail
1st	4.17:1	3.87:1
2nd	2.24:1	2.08:1
3rd	1.47:1	1.36:1
4th	1.00:1	1.00:1
5th	0.82:1	0.76:1
Reverse	3.76:1	3.49:1

MAINTENANCE

– Check / top up gearbox oil level at recommended service intervals.

GEARBOX OIL CAPACITY

1,3 litres (2.29 pints) dry fill.
Oil drain and filler plugs located on left hand side of the gearbox.

RECOMMENDED LUBRICANTS

Gearbox oil	– Type ATF + FM – Ford Specification WSD-M2C200-C
Clutch release mechanism and pivots	– Multipart BBU 8454
Driven plate / input shaft splines	– Multipart Lithium Grease EP3 Esso Univex N3 Mobil Milux EP3 Shell Alvania R3 Shell Alvania Grease G3 Texaco Regal Starfak Premium 3

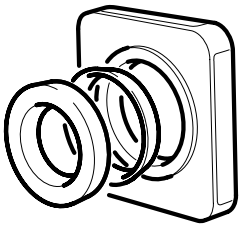
ADHESIVES AND SEALANTS

NOTE: Always follow manufacturers' instructions for use.
NOTE: Surfaces must be **clean and dry** before application.

BBU 9314	– Application	• Degreaser for casing joint faces
1270836	– Application	• All casing joint faces
Loctite 242	– Application	• Bolts, allen screws etc. • Interlock welch plugs

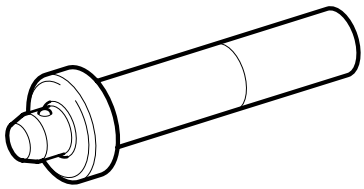
SPECIAL TOOLS

0480042 (370) *



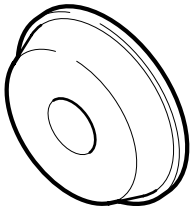
Base Plate

0499809 (18G 134)



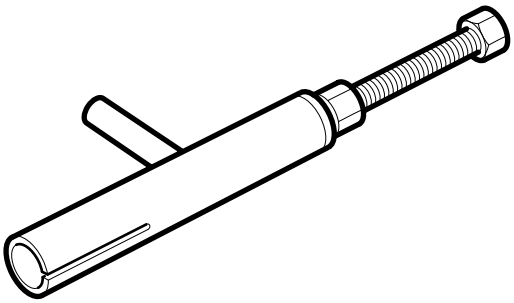
Universal drive handle

0480045 (GKN 550–7)



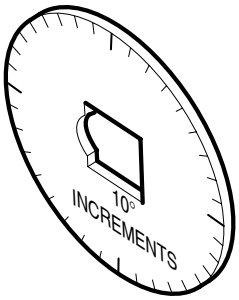
Bearing replacer adaptor

0499915 (18G 1431B)



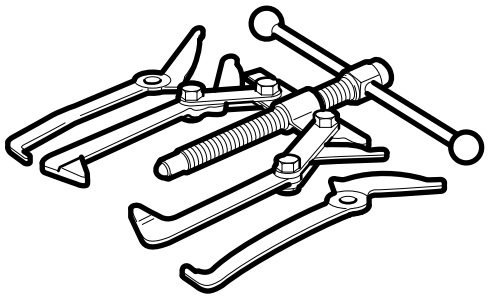
Replacer

0480080 (LST 122)



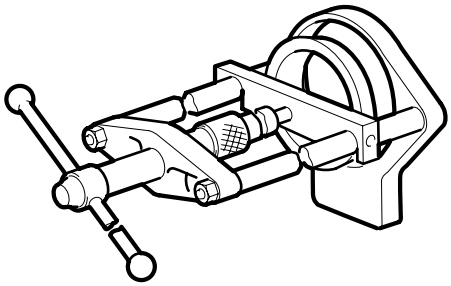
Angular torque gauge

1210511 (18G 2)



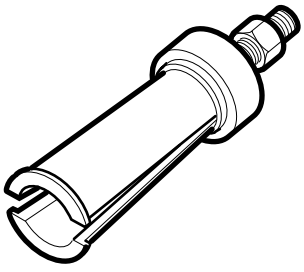
Universal puller

0484820 (18G 47) *



Hand press

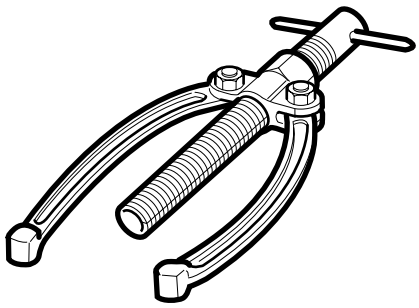
1210517 (1.30/5)



Extractor adaptor

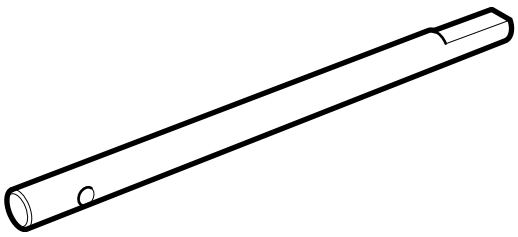
* 0480042 (370) base plate is an alternative to 0484820 (18G47) for use with a hydraulic press.

1210518 (1.36/1)



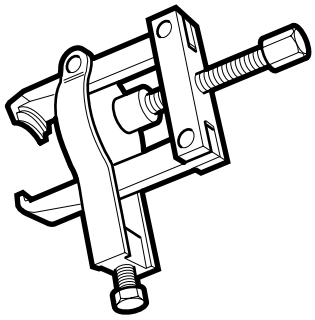
Bearing extractor

16-047 *



Auxiliary shaft

16-056

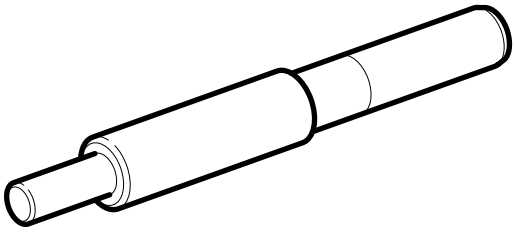


Puller

LDV 118

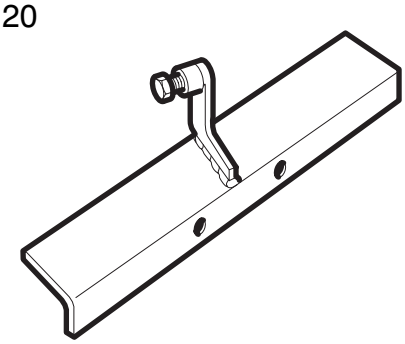
Heavy duty flange holder

LDV 119



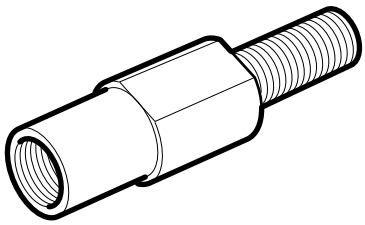
Clutch plate mandrel

LDV 120



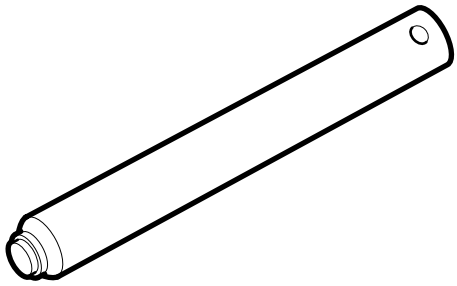
Gearbox mounting bracket

LDV 121



Adaptor, mainshaft fitting

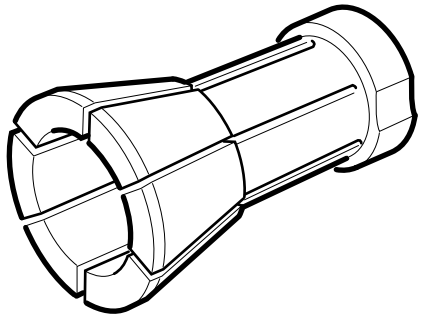
LDV 122 *



Installer, sealing plug

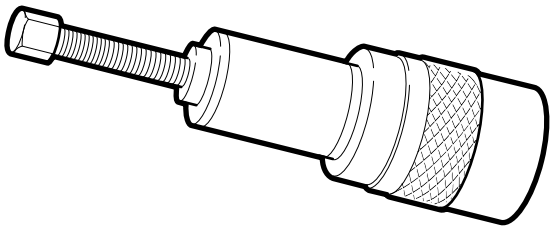
* Not required for single rail gearbox

LDV 123



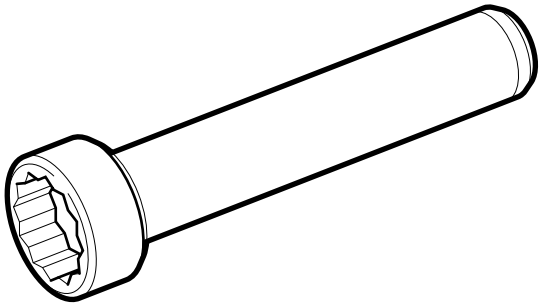
Collet for LDV 124

LDV 124



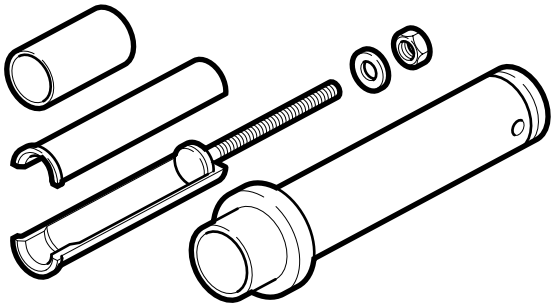
Remover (basic tool)

LDV 125



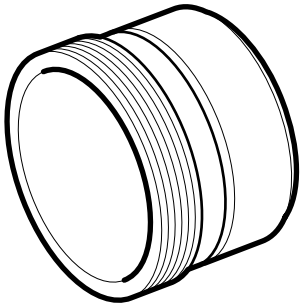
Socket for guide sleeve

LDV 126



Remover/installer

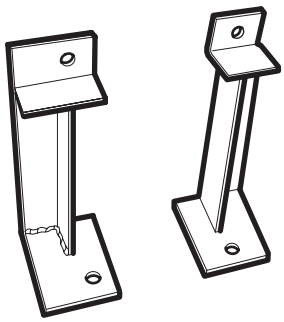
LDV 127



Adaptor for LDV 126

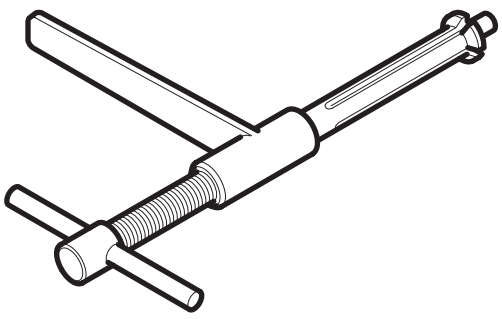
New tools for single rail gearbox

LDV 181



Mounting bracket adaptor

23-036A



Bearing remover

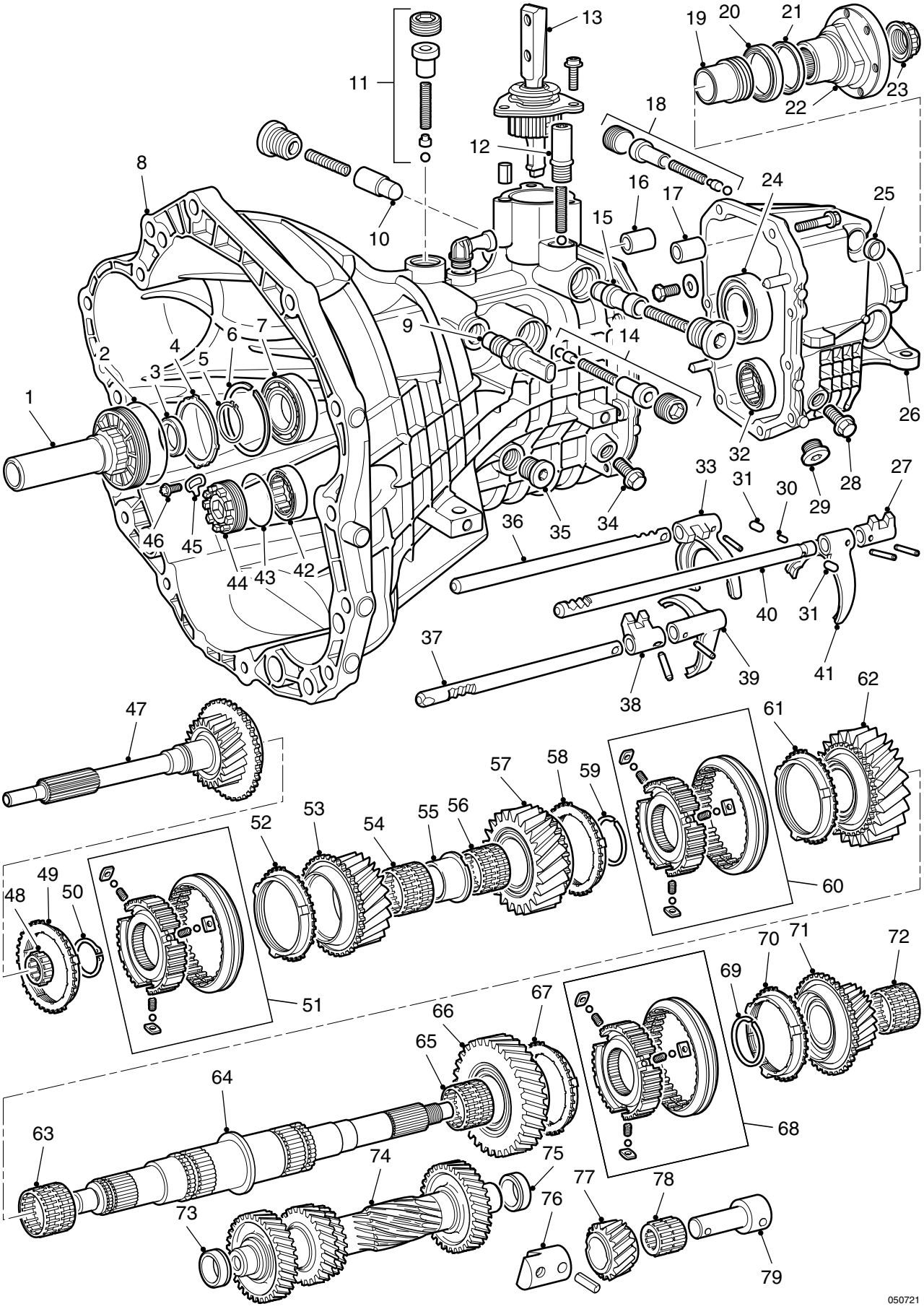
TORQUE WRENCH SETTINGS MT75

		Nm
Output flange nut (nut can only be used once)		200
Front housing to rear housing		24
Reverse idler shaft bolts		32
Input shaft guide sleeve		250
Layshaft front bearing retainer	Stage 1	24
	Stage 2	Undo 80°
	Stage 3	Tighten 20°
	Check torque	min. 6
Layshaft bearing retainer locking plate		25
Selector shaft detent plugs		24
Reverse light switch		14
1st/2nd bias plunger securing plug		24
5th/reverse bias plunger securing plug		24
Reverse detent cap		14
Oil drain and filler plugs		35
Mainshaft rear bearing bolts		24
Gearbox to adaptor bolts		41–55
Gearbox to strut bolts		41–55
Adaptor to gearbox bolt		7–10
Dust shield to adaptor screw		7–10
Adaptor to engine bolts		90–120
Propshaft to gearbox bolts		71–95
Gearbox mounting bracket to gearbox nuts		41–55
Gearbox mount to bracket nuts		71–95

TORQUE WRENCH SETTINGS – MT75 Single rail

		Nm
Output flange nut (use once only)		200
Front to rear housing		24
Reverse idler shaft bolts		32
Input shaft guide sleeve		250
Layshaft front bearing retainer	Stage 1	24
	Stage 2	Undo 80°
	Stage 3	Tighten 20°
	Check torque	min. 6
Layshaft bearing retainer locking plate		25
Oil drain and filler plugs		35
Mainshaft rear bearing bolts		24
Selector gate bolts		10
Reverse light switch bolts		12
Selector shaft locking plate bolt		14
Selector detent securing plug		24
Gear lever / selector shaft coupling bolt		13
Gear lever bracket bolts		25

MT 75 GEARBOX COMPONENTS



Key to MT 75 Gearbox Components

1. Input shaft guide sleeve
2. 'O' ring
3. Oil seal
4. Thrust washer
5. Circlip
6. Snap ring
7. Input shaft bearing
8. Front housing
9. Reverse light switch
10. Gear lever bias, 1st/2nd
11. Selector shaft detent, 3rd/4th
12. Gear lever detent, reverse
13. Gear lever
14. Selector shaft detent, 5th/reverse
15. Gear lever bias, 5th/reverse
16. Selector shaft bush (3 off)
17. Selector shaft bush (3 off)
18. Selector shaft detent, 1st/2nd
19. Speedometer drive gear
20. Oil seal
21. Dust seal
22. Drive flange
23. Nut
24. Mainshaft bearing
25. Interlock plug
26. Rear housing
27. 3rd/4th selector
28. Reverse idler shaft securing bolt
29. Drain plug
30. Interlock pin
31. Interlock plunger
32. Layshaft rear bearing
33. 1st/2nd selector fork
34. Reverse idler shaft securing bolt
35. Filler/level plug
36. 1st/2nd selector shaft
37. 5th/reverse selector shaft
38. 5th/reverse selector
39. 5th/reverse selector fork
40. 3rd/4th selector shaft
41. 3rd/4th selector fork
42. Layshaft front bearing
43. 'O' ring
44. Layshaft bearing retainer
45. Lock plate
46. Lock plate securing screw
47. Input shaft
48. Pilot bearing
49. 4th gear baulk ring
50. Circlip
51. 3rd/4th synchro unit
52. 3rd gear baulk ring
53. 3rd gear
54. 3rd gear bearing
55. 3rd gear bush
56. 2nd gear bearing
57. 2nd gear
58. 2nd gear baulk ring
59. Snap ring
60. 1st/2nd synchro unit
61. 1st gear baulk ring
62. 1st gear
63. 1st gear bush
64. Mainshaft
65. Reverse gear bearing
66. Reverse gear
67. Reverse gear baulk ring
68. 5th/reverse synchro unit
69. Snap ring
70. 5th gear baulk ring
71. 5th gear
72. 5th gear bearing
73. Layshaft front bearing inner track
74. Layshaft
75. Layshaft rear bearing inner track
76. Reverse idler shaft mounting
77. Reverse idler gear
78. Reverse idler gear bearing
79. Reverse idler gear spindle

GEARBOX REMOVE & REFIT

Tool required: Clutch plate mandrel LDV 119 (if clutch is removed).

1. Disconnect the battery(s), negative cable(s) first.
2. Release the gear lever gaiter and select a gear.
3. Remove 2 bolts to release the gear lever.

   Seal the gear lever aperture to prevent the ingress of dirt into the gearbox.
4. Temporarily make correlation marks on the gearbox and prop shaft flanges, then remove the 4 flange securing bolts.
5. Separate the exhaust downpipe from the silencer.
6. Disconnect / detach:
   - speedometer cable,
   - reverse light switch connector (and cut cable tie),
7. To detach the clutch cable;
   - pull out the cable boot and capture the retaining clip,
   - detach the inner cable from the release lever,
   - release the retainer securing the outer cable to the engine adaptor plate.
8. Detach the earth strap.
9. Position a suitable cradle jack under the gearbox, and support its weight.
10. Release the gearbox crossmember by removing the centre mounting bolt and the 4 bolts securing it to the chassis.
11. ⚠ **WARNING: Support the propshaft to avoid personal injury when it disconnects from the gearbox flange.**

    NOTE: Ensure hoses and cables are not trapped whilst lowering the cradle jack.

    Slowly lower the cradle jack, allowing the propshaft to disengage from the gearbox flange, until the rear of the engine is low enough to gain access to the clutch housing bolts.
12. Support the engine securely under the sump, protecting it with a wooden block.

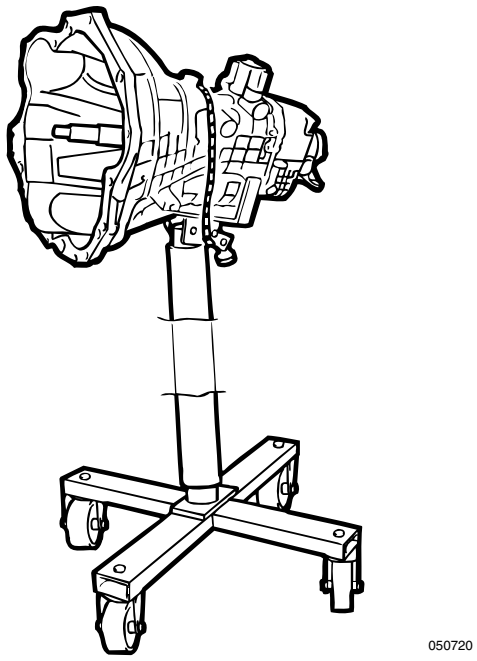


Fig.1 Gearbox on hydraulic cradle jack.

13. Note the **CAUTION** statement below before removing all the clutch housing bolts.

    Remove the clutch housing securing bolts and withdraw the gearbox

CAUTION: Removal / installation damage

If the gearbox is not fully supported at all times during removal and refitting, its weight may then be held by the centre of the clutch driven plate, causing buckling or distortion.

Consequently, after a nominal mileage, the driven plate will break up and give complete clutch failure.

Refit

CAUTION: Installation damage

During gearbox installation, the clutch driven plate splines can be damaged by poor alignment of the input shaft. Burrs made on the splines will restrict the sliding movement of the driven plate, creating clutch drag and difficult gear selection.

14. Check the alignment of the clutch driven plate with tool LDV 119, and re-align if necessary.
15. Sparingly apply the recommended grease to the gearbox input shaft splines.
16. Engage a gear (if not already selected), then lift the gearbox with the cradle jack and, ensuring correct alignment, engage the input shaft in the clutch.

    Ensuring the gearbox is not allowed to 'hang' on the clutch, push it fully into position. Secure with the clutch housing bolts and tighten them to the correct torque.
17. Slowly raise the rear of the gearbox, and at the same time engage the propshaft onto the flange, aligning the correlation marks made prior to removal.
18. Fit the crossmember, tightening the 4 chassis mounting bolts to the correct torque.
19. Fit the centre mounting bolt, tightening it to the correct torque.

    Remove the lifting cradle.
20. Fit and tighten the propshaft flange bolts.
21. Refit the clutch cable and its retainer. Fit the boot, ensuring the clip is correctly located.
22. Connect the reverse light switch, and secure the cable with a cable tie.
23. Connect the speedometer cable.
24. Connect and secure the exhaust silencer to the down pipe.
25. With the vehicle level, check the gearbox oil level. Top up if necessary with the specified oil.
26. Fit the gear lever and secure with 2 bolts.

    Select neutral.
27. Fit the gear lever gaiter.
28. Operate the clutch pedal to set the cable.
29. Connect the battery(s) positive cable(s) first.

MT75 GEARBOX OVERHAUL

Tools required: LDV 118, LDV 120, LDV 121, LDV 122, LDV 123, LDV 124, LDV 125, LDV 126, LDV 127, 16-047, 16-056, 1210511 (18G 2), 0499809 (18G 134), 0480045 (GKN 550-7), 1210517 (1.30/5), 1210518 (1.36/1), 0484820 (18G 47) or 0480042 (370), 0499915 (18G 1431B), 0480080 (LST 122).

GEARBOX DISMANTLE

1. Drain the gearbox fluid, and clean off the exterior.
2. Fit mounting bracket LDV 120 to the rear housing, using the 2 crossmember mountings and the gearbox drain plug hole.
   Secure the bracket in a vice so that the gearbox is in a horizontal plane.

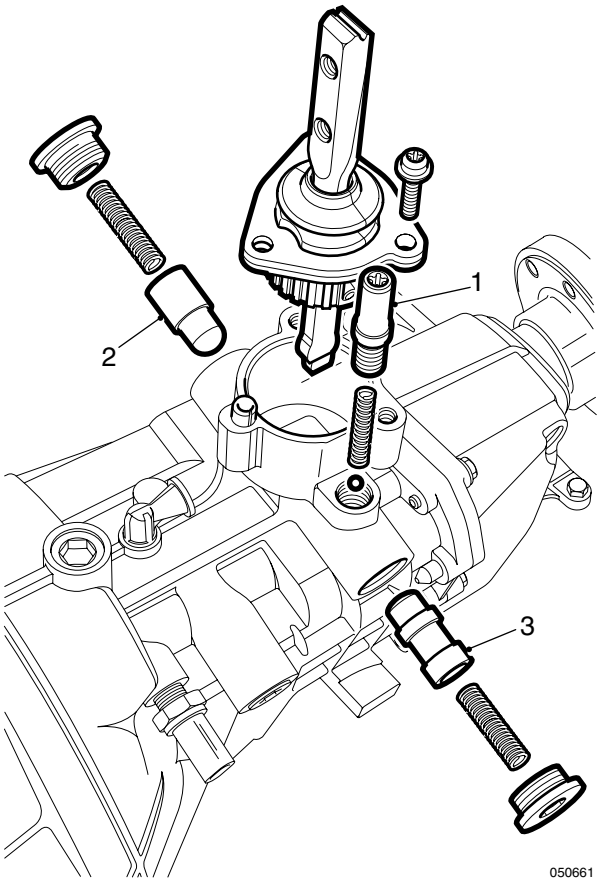


Fig.1 Gear lever detents
1. Reverse detent
2. 1st/2nd bias
3. 5th/reverse bias

3. Position the gear lever in neutral and remove:
   - Gear lever.
   - Reverse detent cap, spring and ball.
   - 1st/2nd bias plug, spring and plunger.
   - 5th/reverse bias plug, spring and plunger.
4. Remove the speedometer driven gear.

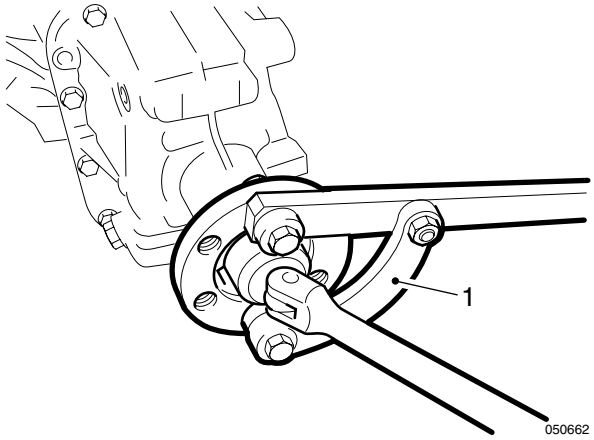


Fig.2 Removing flange nut
1. Tool LDV 118

5. Use 2 bolts to attach tool LDV 118 to the output shaft flange, and remove and discard the securing nut.

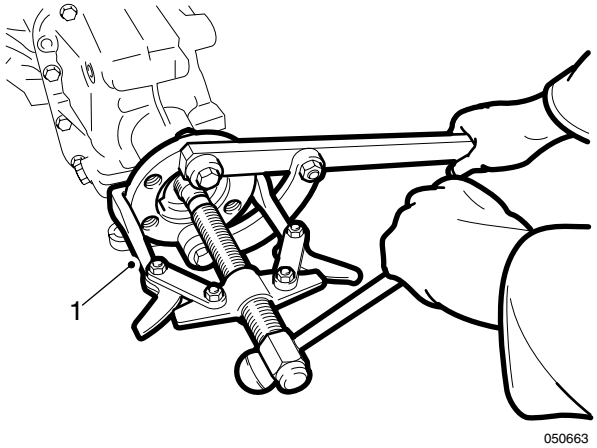


Fig.3 Removing flange
1. Tool 1210511 (18G 2)

6. Pull off the flange using tool 1210511 (18G 2) with a suitable thrust button positioned over the end of the output shaft.
   - Remove and discard the dust seal.
   - Remove and discard the oil seal.
   - Remove the speedometer drive gear.

7. Remove the clutch release bearing and clutch release lever.

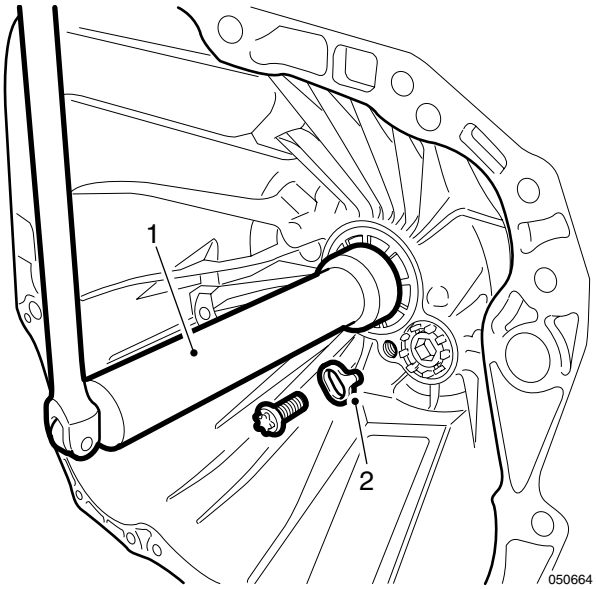


Fig.4 Removing input shaft guide sleeve

1. Tool LDV 125
2. Layshaft bearing retainer lock plate

8. Remove the layshaft bearing retainer lock plate.

9. Use tool LDV 125 to remove the input shaft guide sleeve.

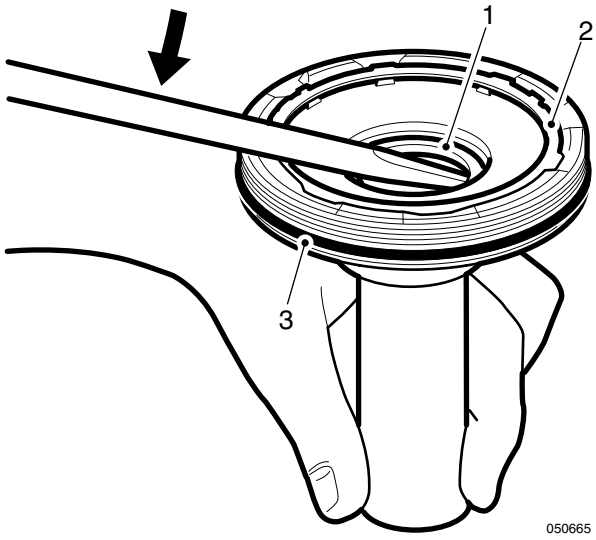


Fig.5 Input shaft guide sleeve

1. Oil seal
2. Bearing thrust washer
3. 'O' ring

10. Remove from the guide sleeve:
    - thrust washer.
    - 'O' ring
    - oil seal, taking care not to damage the seal location.

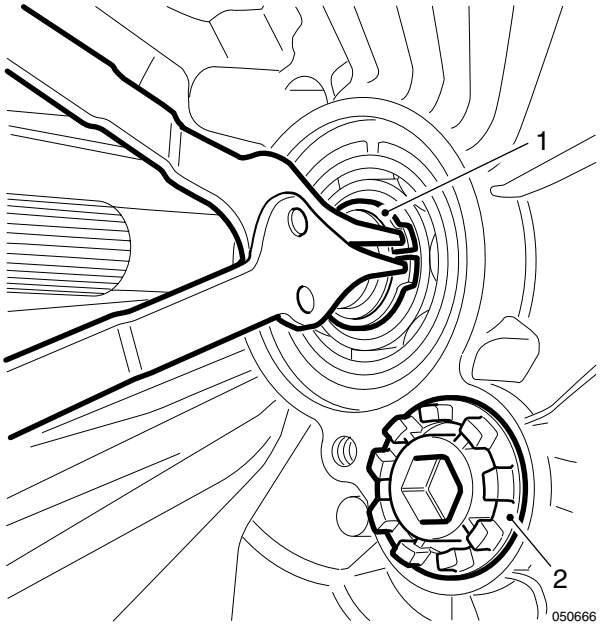


Fig.6

1. Circlip
2. Layshaft bearing retainer

11. Remove the circlip retaining the input shaft bearing to the shaft.

12. Use a 17 mm allen key to remove the layshaft front bearing retainer.

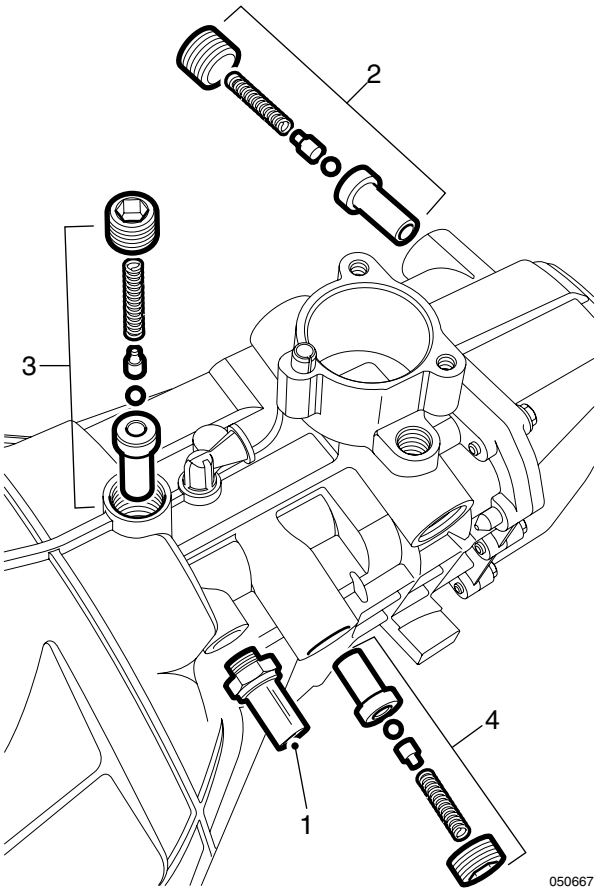


Fig.7 Selector shaft detents

1. Reverse light switch
2. 1st/2nd detent
3. 3rd/4th detent
4. 5th/reverse detent

13. Remove the 3 selector shaft detent plugs, springs, seats, balls and sleeves, noting their original positions and maintaining them in sets.

14. Remove the reverse light switch.

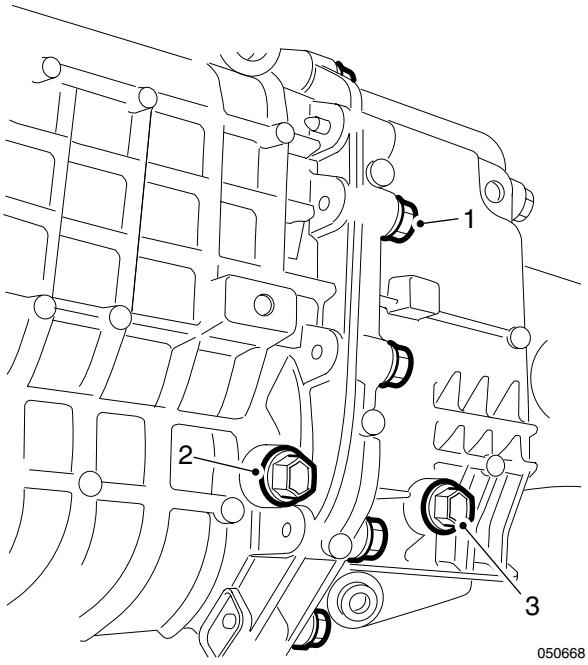


Fig.8

1. Housing bolts
2. Reverse idler shaft front securing bolt
3. Reverse idler shaft rear securing bolt

15. Remove the reverse idler shaft front securing bolt (coloured blue), and slacken the reverse idler shaft rear securing bolt (coloured blue).

16. Remove the 10 bolts securing the housings.

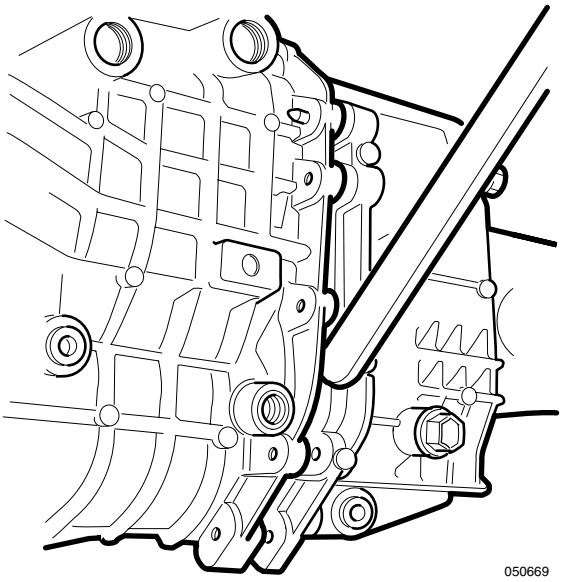


Fig.9 Separating the two housings.

17. **CAUTION: Only apply levers at the reinforcing ribs.**
    The two housing halves have adhesive sealant on their mating faces. Carefully use levers to 'break' this sealant.

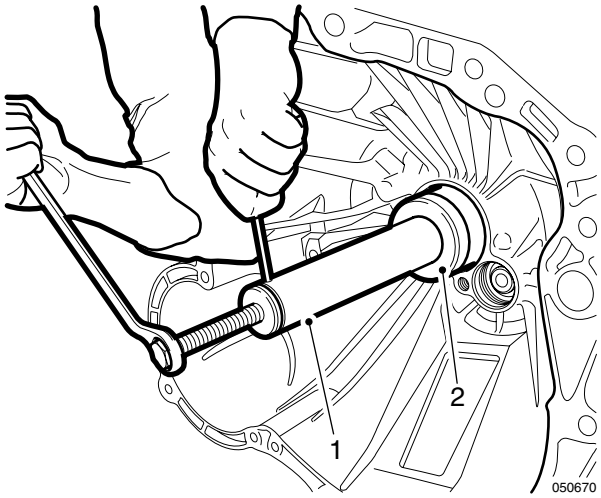


Fig.10 Pulling off the front housing
1. Tool LDV 126
2. Tool LDV 127

18. To remove the front housing:

    Fit tool LDV 126 over the input shaft and fit tool LDV 127, ensuring it is screwed fully into the guide sleeve threaded hole.

    CAUTION: Do not apply excessive pressure to the input shaft as this could cause internal damage. If necessary use levers to help pull off the housing, but do not damage the sealing faces.
    Turn the centre screw to pull off the housing. If necessary, prevent tool LDV 126 from turning by fitting a holding bar in the tool as illustrated.

19. Remove the magnet from the rear housing. Clean after inspecting it for evidence of debris which may assist any fault diagnosis to be carried out.

20. Re-mount the gearbox in a vertical plane, input shaft uppermost.

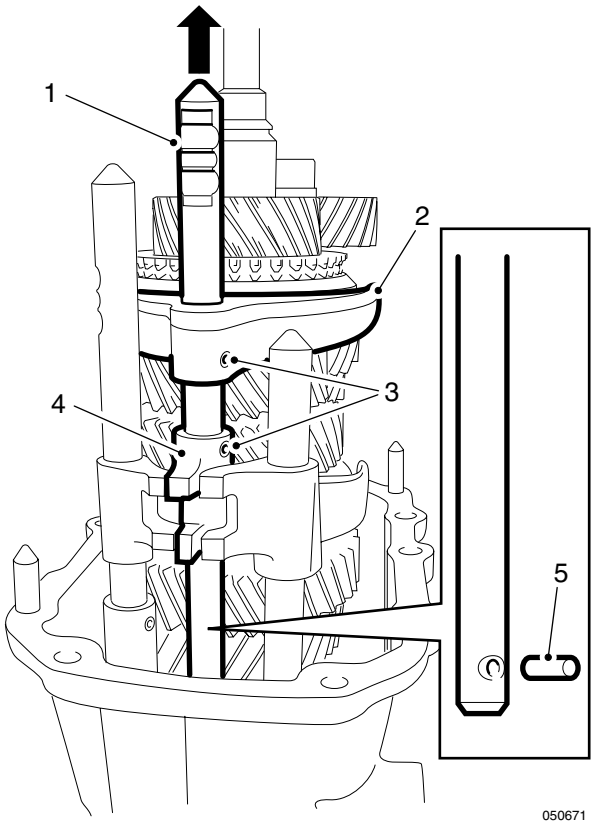


Fig.11 Removing 3rd/4th selector shaft

1. 3rd/4th selector shaft
2. 3rd/4th selector fork
3. Roll pins
4. 3rd/4th selector
5. Interlock pin

21. Suitably supporting the 3rd/4th selector shaft, drive out the roll pins securing the selector fork and the selector to it.

    Carefully withdraw the shaft, capturing the selector, and the interlock pin from the cross drilling in the shaft.

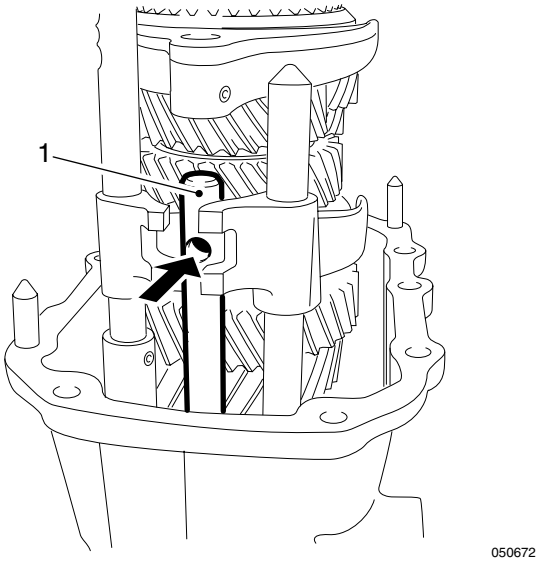


Fig.12 Fitting dummy selector shaft

1. Tool 16-047

22. Fit dummy shaft tool 16-047 in place of the 3rd/4th selector shaft, positioning it with the hole (arrowed) facing outwards.

    NOTE: This is to ensure that the flats on the other end of the shaft allow the 2 interlock plungers remaining in the housing to clear their respective selector shafts.

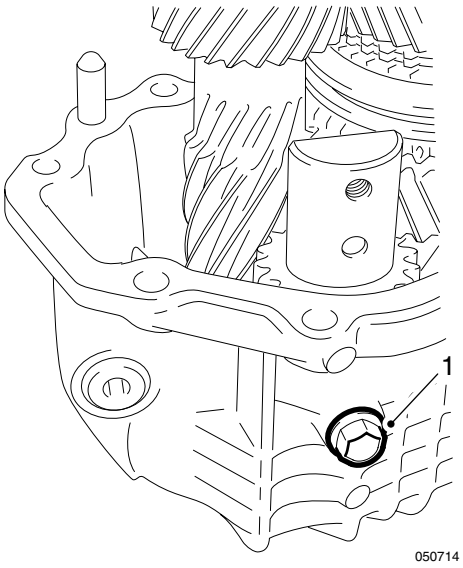


Fig.13

1. Reverse idler shaft retaining bolt

23. Remove the second bolt (coloured blue) retaining the reverse idler shaft.

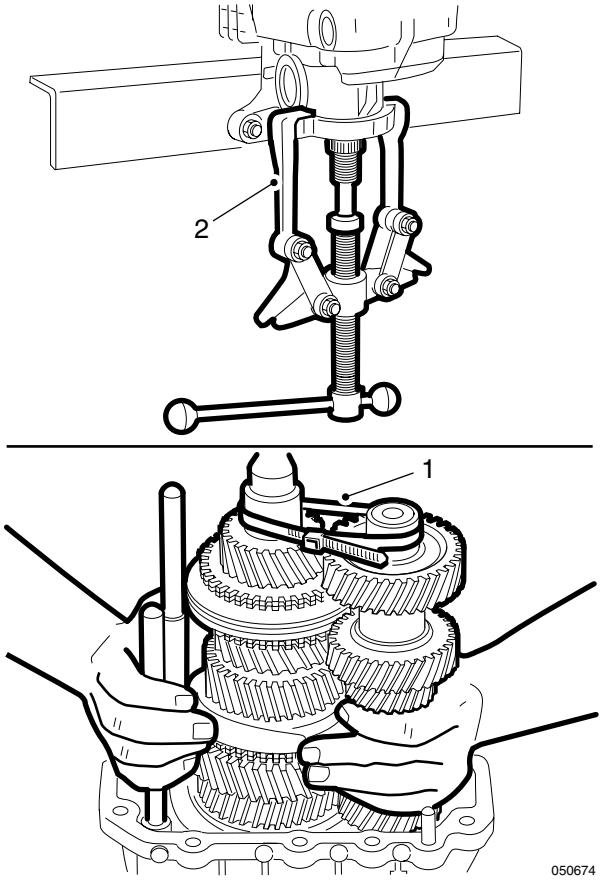


Fig.14 Removing geartrain.

1. Cable tie
2. Tool 1210511 (18G 2)

24. To assist removal of the geartrain, loosely fit a cable tie around the front of the layshaft and the input shaft as illustrated.

25. **CAUTION: Press the shaft out carefully, while checking that the layshaft, selector shafts and reverse idler are moving freely from their locations.**

    Press the mainshaft out of the housing using tool 1210511 (18G 2) and a suitable thrust button. Ensure the feet of tool 1210511 are located behind the lugs on the housing, and that it will press squarely onto the mainshaft.

26. Lift out the geartrain assembly.

    Note the positions of the selector shafts before removing them. Remove the cable tie and separate the layshaft from the mainshaft.

    Remove the input shaft; capture the pilot roller bearing on the nose of the mainshaft, and the 4th gear baulk ring.

INSPECTION

The gearbox has now been dismantled into the following sub-assemblies:

Front housing
Rear housing
Input shaft / Mainshaft
Layshaft
Reverse idler shaft
Selectors

The following instructions will assist in the inspection of these sub-assemblies, and describe the procedures to dismantle them to their component parts as required.

NOTE:

- Use soft jaws for all operations carried out in a vice.
- Note the original positions of synchro units, baulk rings, bearings etc for re-assembly in the same location if not being renewed.
- Clean all components prior to inspection.
- Old sealant on casings etc. can be removed using a suitable solvent.

FRONT HOUSING

NOTE: The layshaft bearing and its track are paired and must not be mixed with the rear bearing.

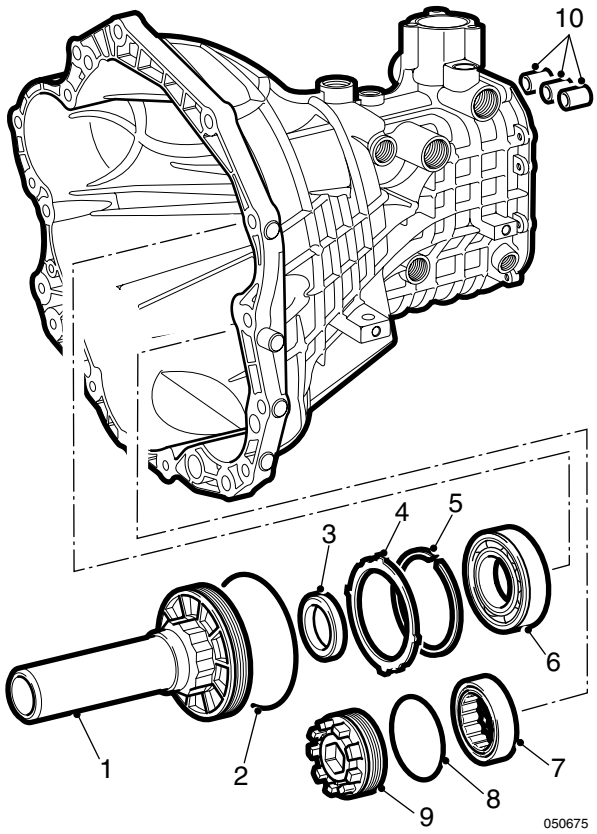


Fig.15 Front housing

1. Input shaft guide sleeve
2. 'O' ring
3. Seal
4. Thrust washer
5. Snap ring
6. Input shaft bearing
7. Layshaft front bearing
8. 'O' ring
9. Layshaft bearing retainer
10. Selector shaft bushes

1. Inspect the sealing face with the rear housing for damage, distortion etc.
2. Inspect the selector shaft bushes for signs of wear, scoring or damage.
   If renewal of any bush is required, tap a thread into the bush and use a suitable tube and bolt to draw the bush out.
   Carefully drift the new bush into position level with the housing. Check that the appropriate selector shaft can move freely in the bush.

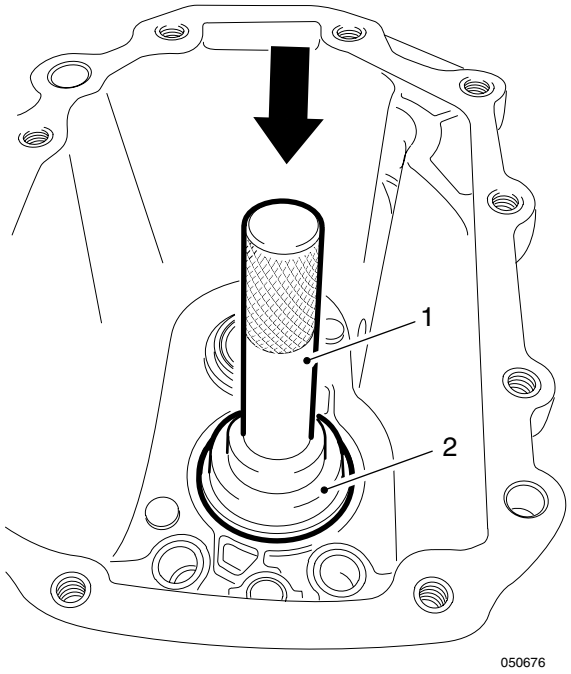


Fig.16 Removing input shaft bearing

1. Tool 0499809 (18G 134)
2. Tool 0480045 (GKN 550–7)

3. **CAUTION: Do not damage the housing.**

   Ensuring the tool is positioned centrally, press out the input shaft bearing towards the clutch housing, using 0499809 (18G 134) and 0480045 (GKN 550–7).

   Remove the snap ring.

   CAUTION: Do not damage the threads in the housing.
   To fit the replacement bearing, fit the snap ring and press it into position from the clutch side using the same tools as for removal.

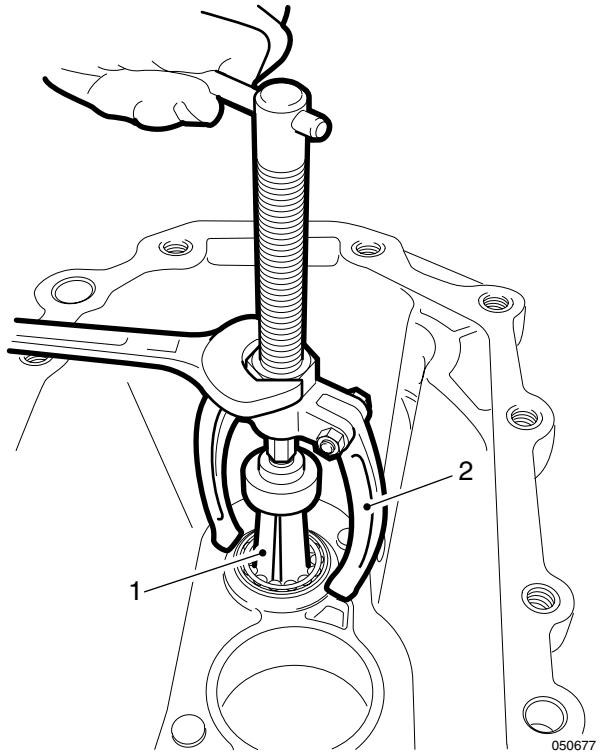


Fig.17 Removing layshaft bearing

1. Tool 1210517 (1.30/5)
2. Tool 1210518 (1.36/1)

4. **CAUTION: Do not damage the thread in the housing.**

   Remove the layshaft front bearing using tools 1210517 (1.30/5) and 1210518 (1.36/1).

   NOTE: Even if the bearing does not require renewal, it must be pulled at least 2 mm rearwards from its fitted position prior to reassembly (see fig.18).

   NOTE: If the layshaft bearing requires renewal, its inner track (on the layshaft) must be changed also (see ‘Layshaft’).

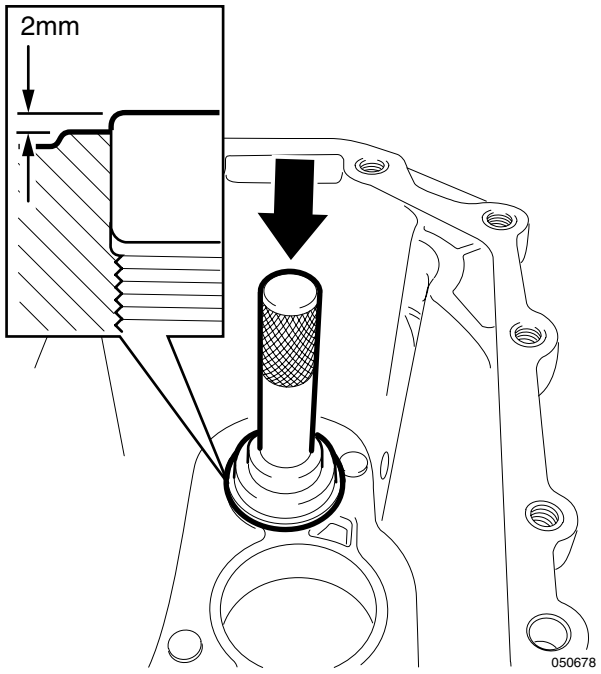


Fig.18 Layshaft bearing position

To fit the bearing, use suitable adaptors (e.g. 0499809 (18G 134) and 0480045 (GKN 550-7) and press it in from the geartrain side until it projects by approximately 2 mm as illustrated.

NOTE: It must not be pressed in flush; the final positioning of the bearing is made during re-assembly.

REAR HOUSING

NOTE: The layshaft bearing and its track are paired and must not be mixed with the front bearing.

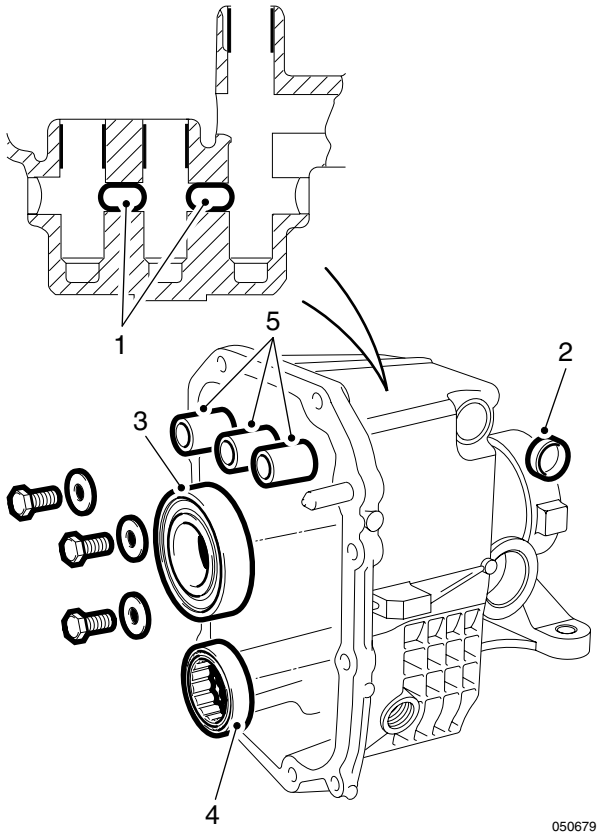


Fig.19 Rear housing

1. Interlock plungers
2. Welch plug
3. Mainshaft bearing
4. Layshaft rear bearing
5. Selector shaft bushes

1. If required, remove both welch plugs and extract the 2 interlock plungers. Examine for wear or damage.
   NOTE: If the plungers are not removed, the housing must be handled with considerable care not to dislodge them.

2. Inspect the sealing face with the front housing for damage, distortion etc.

3. Inspect the selector shaft bushes for signs of wear, scoring or damage.

   If renewal of any bush is required, tap a thread into the bush and use a suitable tube and bolt to draw the bush out.

   Carefully drift the new bush into position level with the housing. Check that the appropriate selector shaft can move freely in the bush.

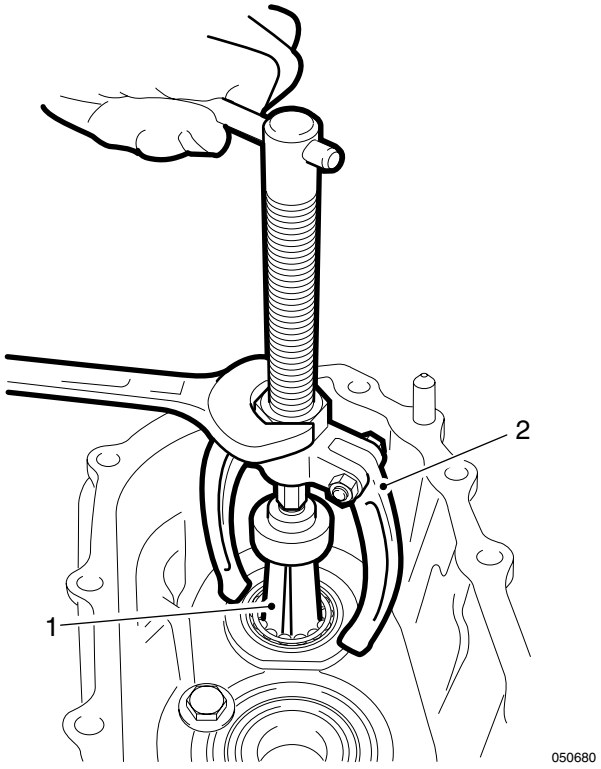


Fig.20 Removing layshaft rear bearing

1. Tool 1210517 (1.30/5)
2. Tool 1210518 (1.36/1)

4. If required, the layshaft rear bearing can be removed using tools 12105171 (.30/5) and 1210518 (1.36/1).

   NOTE: If the layshaft bearing requires renewal, its inner track (on the layshaft) must be changed also (see 'Layshaft').

   To fit the bearing, press fully into the housing using 0499809 (18G 134) and 0480046 (GKN 550–7).

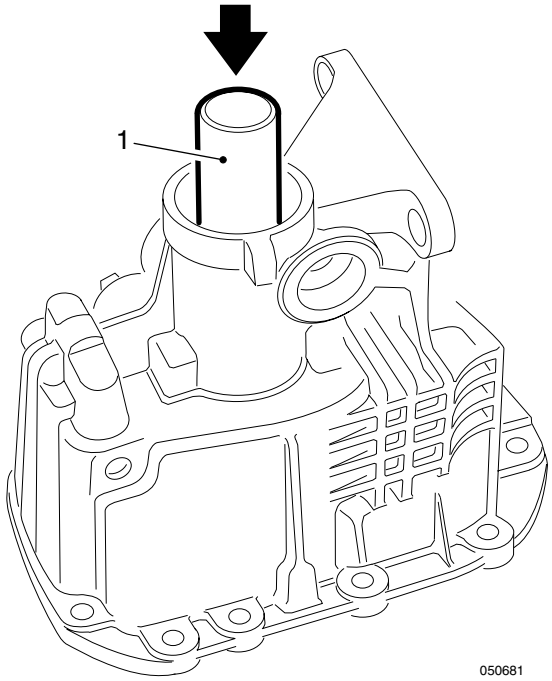


Fig.21 Removing mainshaft bearing

1. Tool 0499809 (18G 134)

5. To remove the mainshaft bearing:

   CAUTION: Do not damage the housing.
   Remove the 3 securing bolts and washers.
   Press out the bearing using tool 0499809 (18G 134).

   To fit the bearing:
   Position it with its shrouded side to the front, and press in fully using 0499809 (18G 134) and 0480046 (GKN 550–7).
   Secure with the 3 bolts and washers.

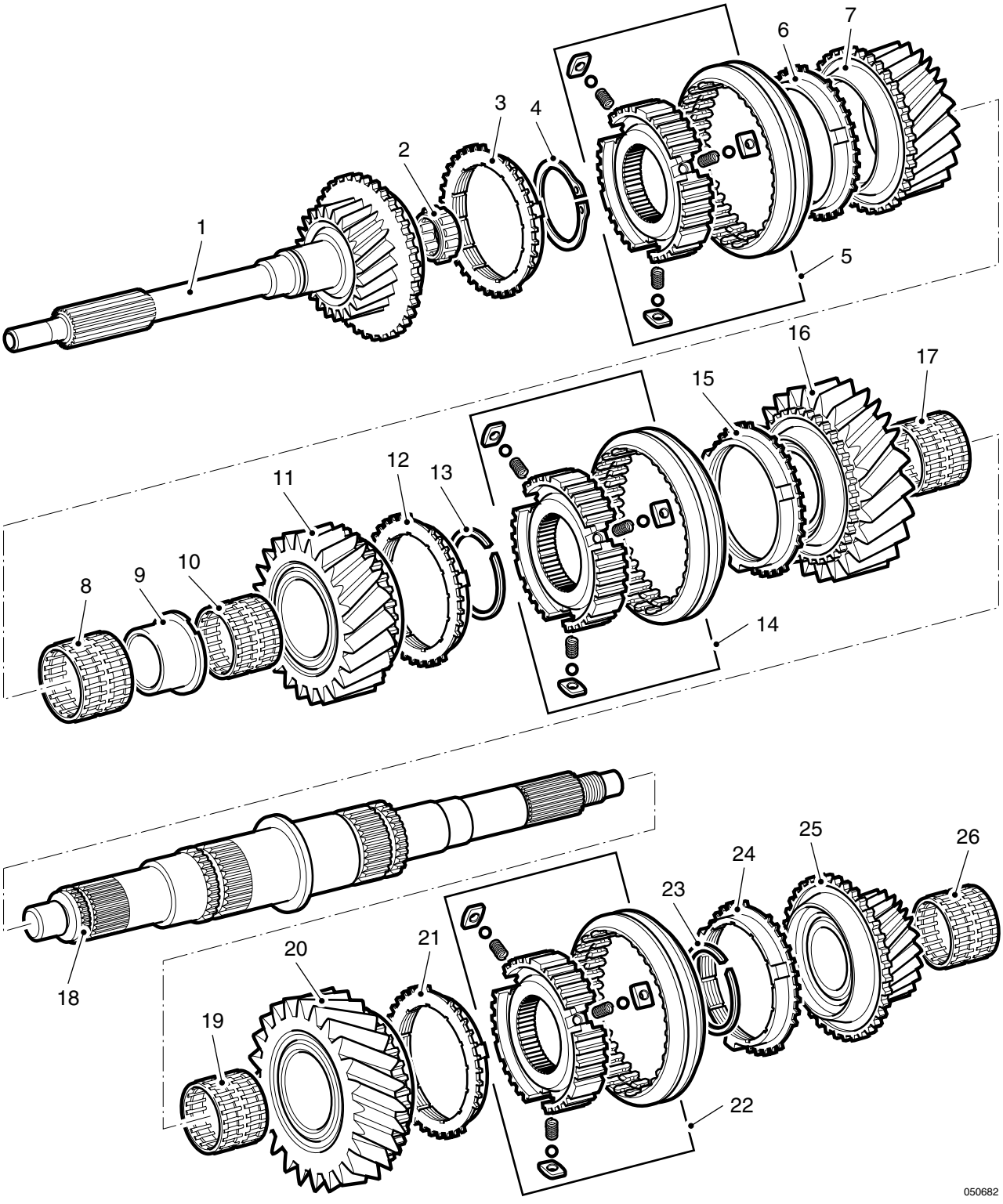


Fig.22 Mainshaft assembly

1. Input shaft
2. Pilot bearing
3. Baulk ring
4. Circlip
5. 3rd/4th synchro unit
6. Baulk ring
7. 3rd gear
8. 3rd gear bearing
9. 3rd gear bush
10. 2nd gear bearing
11. 2nd gear
12. Baulk ring
13. Snap ring
14. 1st/2nd synchro unit
15. Baulk ring
16. 1st gear
17. 1st gear bearing
18. Mainshaft
19. Reverse gear bearing
20. Reverse gear
21. Baulk ring
22. 5th/reverse synchro unit
23. Snap ring
24. Baulk ring
25. 5th gear
26. 5th gear bearing

MAINSHAFT/INPUT SHAFT

Mainshaft Dismantling

Before dismantling, note the following:

Some synchro units and bearings are identical and must be marked for correct re-assembly.

Keep each baulk ring with its gear.

Mark the synchro units to identify their locations.

During dismantling, mark the relative positions of the synchro hubs with their sleeves to ensure rebuild in the same location.

NOTE: Throughout this overhaul procedure, reference is made to the use of handpress 0484820 (18G 47).

Alternatively, base plate 0480042 (370) can be used with a hydraulic press.

1. Remove:
   - 5th gear
   - 5th gear baulk ring
   - 5th gear needle roller bearing.
2. Remove the circlip securing 3rd/4th synchro unit.

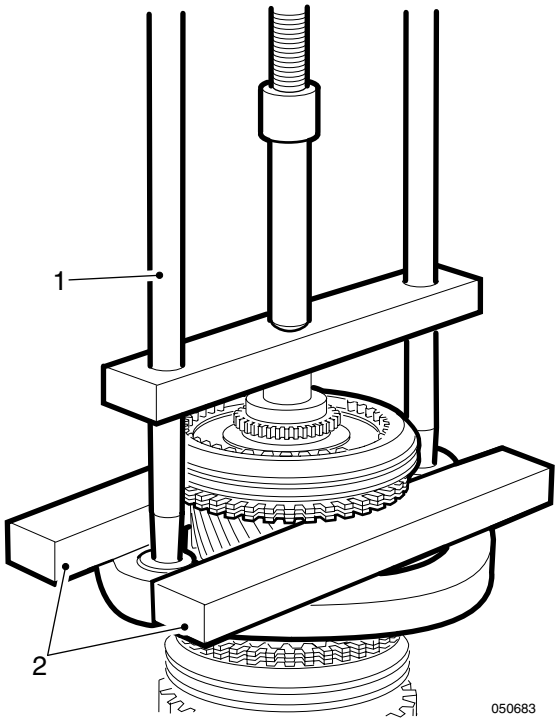


Fig.23 Removing 3rd/4th synchro unit
1. Tool 0484820 (18G 47)
2. Press bars

3. ⚠ **WARNING: Do not allow synchro units to come apart during removal as there is a danger of injury from springs, balls, shifting plates etc.**

   Remove 3rd/4th synchro unit.

   If the synchro unit is tight on the mainshaft, press it off using handpress 0484820 (18G 47) with suitable press bars positioned under 3rd gear dog teeth.

4. Remove:
   - 3rd gear baulk ring
   - 3rd gear
   - 3rd gear needle roller bearing.

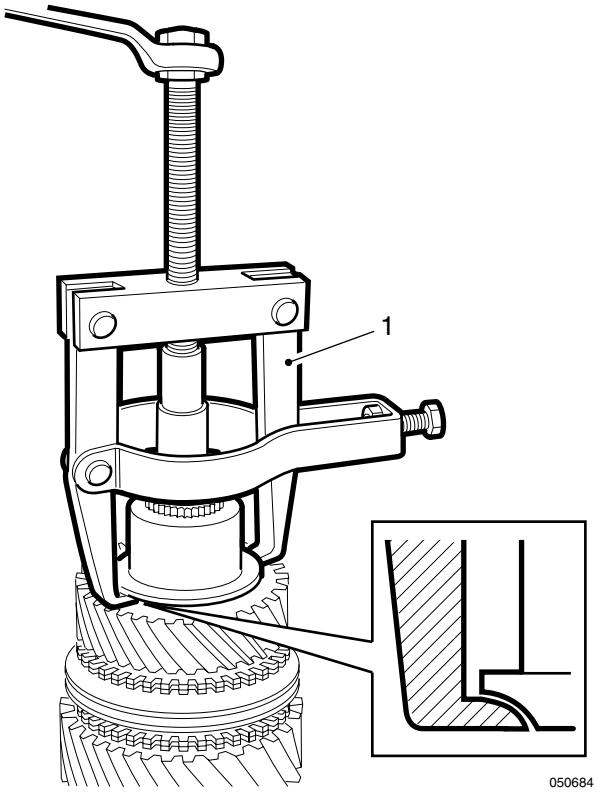


Fig.24 Removing 3rd gear bush
1. Tool 16-056

5. Locate the feet of tool 16-056 in the recesses in the 3rd gear bearing bush flange (see inset), and pull off the bush.

6. Remove:
   - 2nd gear
   - 2nd gear needle roller bearing
   - 2nd gear baulk ring.

7. Remove the snap ring securing 1st/2nd synchro unit.

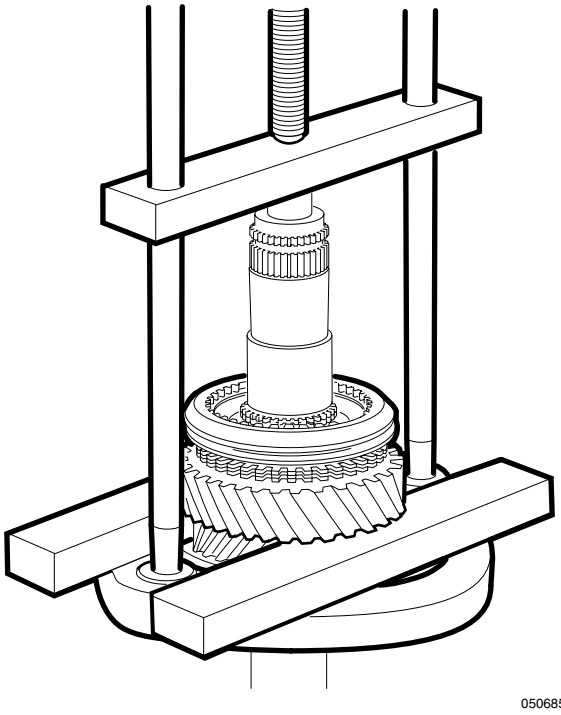


Fig.25 Removing 1st/2nd synchro unit

8. Remove the synchro unit.

   If the synchro unit is tight on the mainshaft, press it off using handpress 0484820 (18G 47) with press bars under 1st gear.

9. Remove:
   - 1st gear baulk ring
   - 1st gear
   - 1st gear needle roller bearing

10. Remove the snap ring securing 5th/reverse synchro unit.

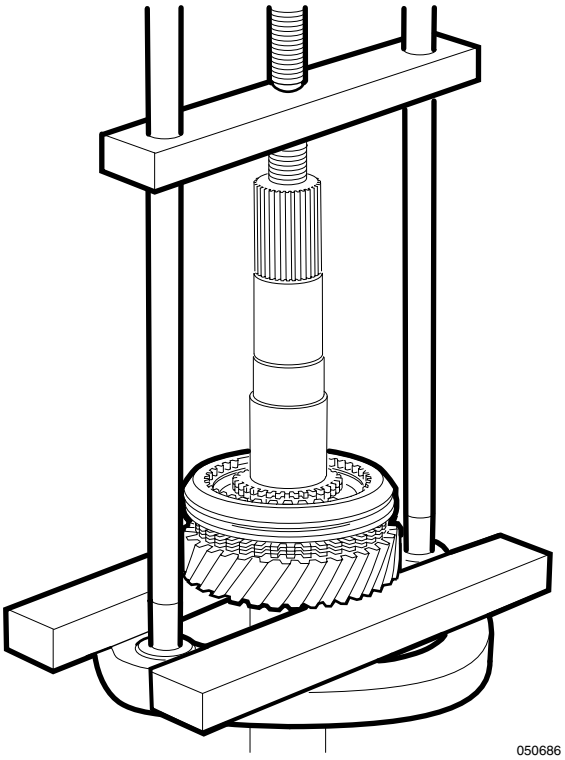


Fig.26 Removing 5th/reverse synchro unit

11. Remove the synchro unit.

    If the synchro unit is tight on the mainshaft, press it off using tool 0484820 (18G 47) with press bars under reverse gear.

12. Remove:
    - reverse gear baulk ring
    - reverse gear
    - reverse gear needle roller bearing.

Mainshaft Component Inspection

Mainshaft

Inspect:

- All splined areas for wear.
- All bearing running surfaces for wear, damage or signs of overheating.

Gears and Bearings

Inspect:

- Gear teeth for blueing, chips, wear etc., including dog teeth.
- Wear on bearing surfaces and thrust faces.
- Wear on needle roller bearings and on 3rd gear bearing bush.

NEEDLE ROLLER BEARING IDENTIFICATION

Three diameters of bearing are used:

- 1st and reverse gear bearings have the largest diameters and are identical in length.
- 2nd and 3rd gear bearings have the same, smaller diameter but 3rd is slightly longer.
- 5th gear bearing has the smallest diameter.

Baulk rings

Keep each baulk ring with its gear.

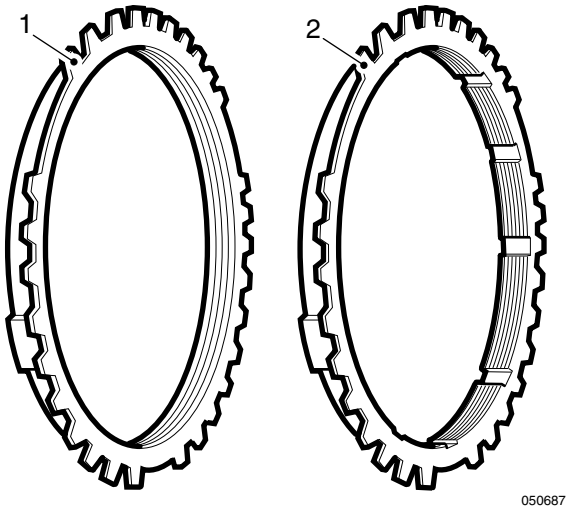


Fig.27 Baulk rings

1. 1st, 2nd, 3rd gear baulk ring
2. 4th, 5th, reverse gear baulk ring

Two types of baulk ring are fitted and can be identified as follows:

1st, 2nd, 3rd gear baulk rings:

- The cone face is molybdenum coated and has a coarse scroll machined in it.

4th, 5th, reverse gear baulk rings:

- The cone face is not coated; it has a fine scroll and slots are machined across the scrolled face.

Inspect for wear, and if in doubt compare with a new baulk ring.

When fitted on the cone face of its gear, a clearance must exist between the baulk ring and the dog teeth face.

Synchro Units

Mark each hub relative to its sleeve (if not already done).

⚠ **WARNING: IT IS RECOMMENDED THAT THIS OPERATION IS CARRIED OUT WEARING SAFETY GLASSES, AND WITH THE ASSEMBLY CONTAINED WITHIN A STRONG TRANSPARENT PLASTIC BAG.**

Carefully push the hub part-way through the sleeve to check the spring detent loading. If in doubt, compare with a new assembly.

If too low, suspect the shifting plates, balls, springs or sleeve could be worn.

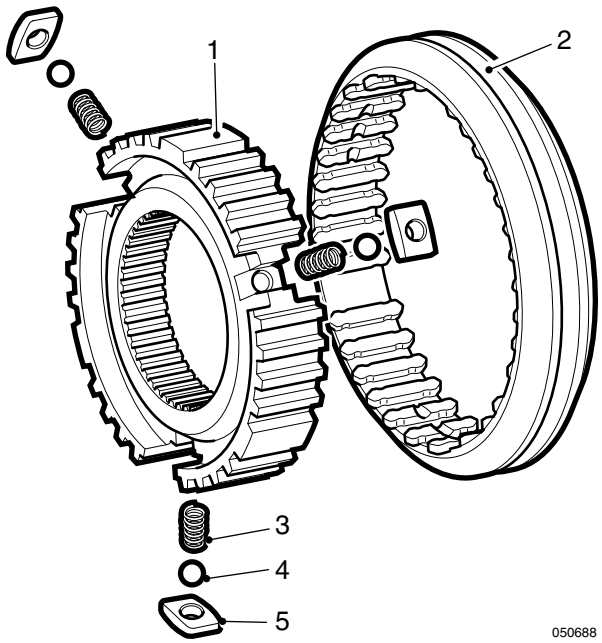


Fig.28 Synchro assembly

1. Synchro hub
2. Synchro sleeve
3. Spring
4. Ball
5. Shifting plate

Dismantle the assembly, still within the plastic bag, by pressing the hub fully out of the sleeve.

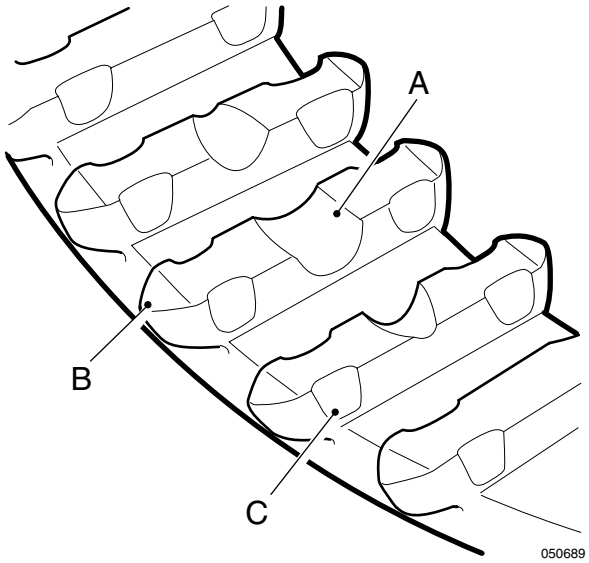


Fig.29 Synchro sleeve wear points

SLEEVE WEAR POINTS

'A' Ball/shifting plate locations
'B' Points of teeth
'C' Inside corners of teeth

Examine for wear, paying particular attention to the points illustrated.

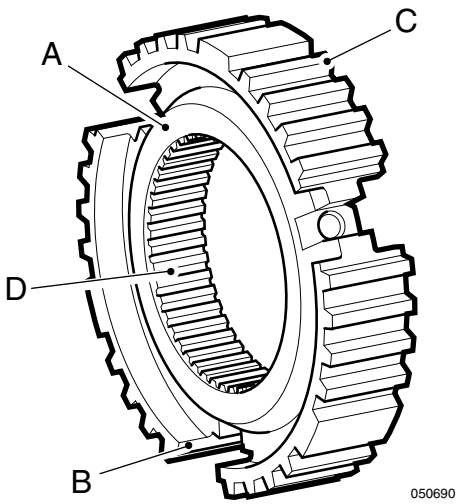


Fig.30 Synchro hub wear points

HUB WEAR POINTS

'A' Gear thrust faces
'B' Shifting plate slots
'C' Teeth
'D' Splines

Examine for wear, paying particular attention to the points illustrated.

Fit the hub into the sleeve and check for excessive 'rock', indicating wear on the splines.

Re-assemble all serviceable synchro units. Align the marks made during dismantling, and ensure the springs, balls and shifting plates locate correctly.

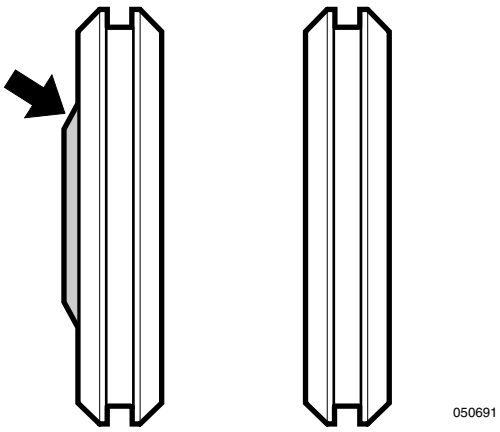


Fig.31 3rd/4th synchro unit

NOTE: 1st/2nd and 5th/reverse synchro units are identical. 3rd/4th synchro hub has a larger boss (arrowed) on one side which is positioned towards 3rd gear on assembly.

Input Shaft

Examine:

- Clutch splines for wear.
- 4th gear and dog teeth for wear, chips and blueing.
- Synchro cone for wear and damage.
- Pilot bearing and bearing location for wear.

Mainshaft Assembling

CAUTION: When fitting synchro units, always ensure alignment of the shifting plates and the corresponding bosses on the baulk rings.

NOTE: Ensure thorough cleanliness at all times, and lubricate components with the specified oil before fitting.

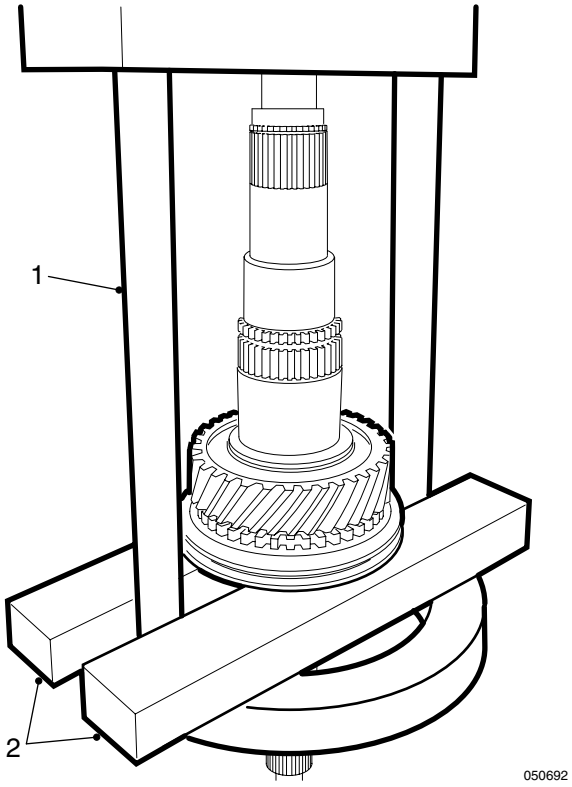


Fig.32 Fitting 5th/reverse synchro unit

1. 0484820 (18G 47)
2. Press bars

1. Fit to the rear of the mainshaft:
   - reverse gear needle roller bearing
   - reverse gear
   - reverse gear baulk ring
   - 5th/reverse synchro unit; if refitting original unit, ensure it is fitted the correct way round. If tight, press fully onto the shaft using handpress 0484820 (18G 47) and suitable press bars.

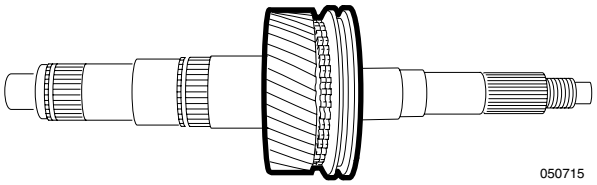


Fig.33 Fitted position of reverse gear and 5th/reverse synchro unit

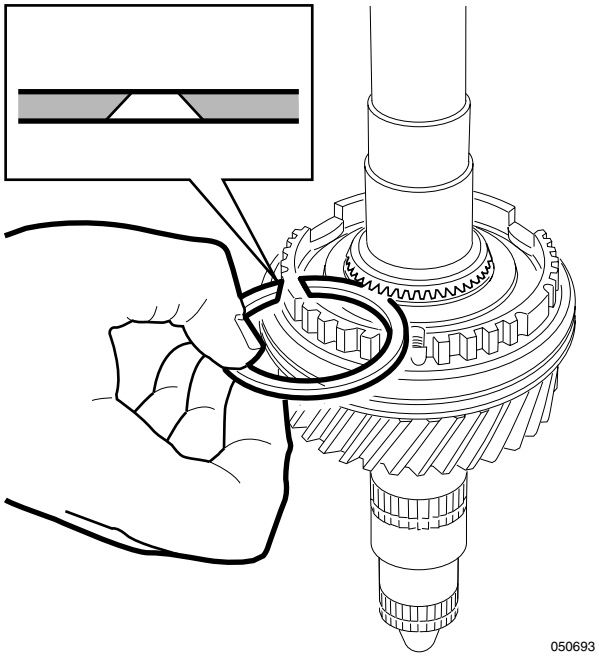


Fig.34 Selecting snap ring.

2. Four different thicknesses of snap ring are available to secure 5th/reverse synchro unit:
   - 2,03 mm
   - 2,07 mm
   - 2,11 mm
   - 2,15 mm

   Place each snap ring as illustrated and select the thickest that will fit in the groove to eliminate any play.

   Fit the snap ring the correct way round (see inset illustration).

3. Fit to the front of the mainshaft:
   - 1st gear needle roller bearing,
   - 1st gear,
   - 1st gear baulk ring (molybdenum coated),
   - 1st/2nd synchro unit. If tight, press fully onto the shaft using handpress 0484820 (18G 47) and suitable press bars.

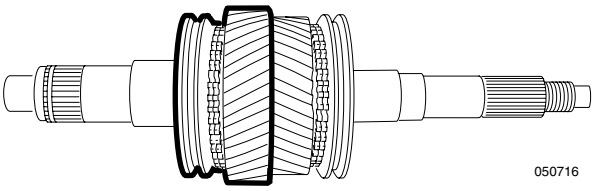


Fig.35 Fitted position 1st gear and 1st/2nd synchro unit

4. Select the correct snap ring to eliminate any play and fit it the correct way round.

   Snap ring availability:

   2,03 mm
   2,07 mm
   2,11 mm
   2,15 mm

5. Fit:
   - 2nd gear baulk ring (molybdenum coated),
   - 2nd gear needle roller bearing,
   - 2nd gear.

6. ⚠ **WARNING: The bush will be hot; do not allow hands to contact it.**

   Heat the 3rd gear bush to approximately 100°C, and slide it onto the mainshaft as far as the shoulder.

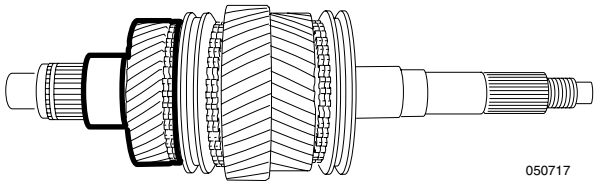


Fig.36 Fitted position of 2nd gear and 3rd gear bush

7. Fit:
   - 3rd gear needle roller bearing,
   - 3rd gear,
   - 3rd gear baulk ring (molybdenum coated),
   - 3rd/4th synchro unit, larger boss towards 3rd gear.

   CAUTION: Check alignment of baulk ring.
   If tight, press fully onto the shaft using handpress 0484820 (18G 47) and suitable press bars and tube.

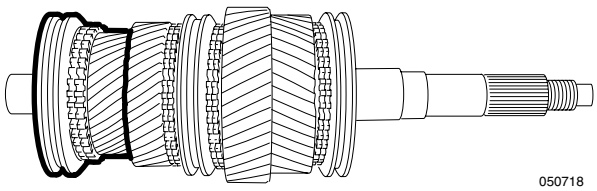


Fig.37 Fitted position of 3rd gear and and3rd/4th synchro unit

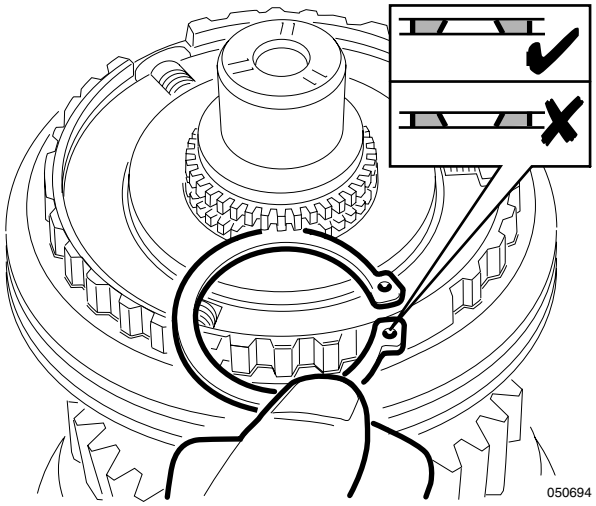


Fig.38 Selecting circlip

8. Select the correct circlip to eliminate any play and fit it the correct way round.

   Circlip availability:
   - 1,99 mm
   - 2,03 mm
   - 2,07 mm
   - 2,11 mm
   - 2,15 mm
   - 2,19 mm

9. Fit to the rear of the mainshaft:
   - 5th gear needle roller bearing,
   - 5th gear baulk ring,
   - 5th gear.

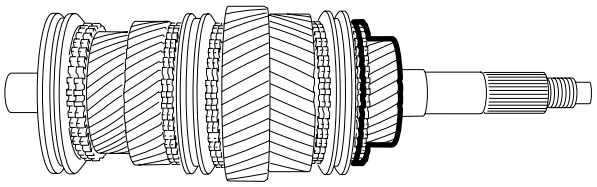


Fig.39 Fitted position of 5th gear

10. Fit:
    - pilot bearing,
    - 4th gear baulk ring,
    - input shaft.

LAYSHAFT

Inspect:

- Gear teeth for wear, chips and damage.
- Bearing inner tracks for wear, blueing and damage.

  NOTE: If either bearing track has to be renewed, its corresponding bearing in the housing must be renewed also.

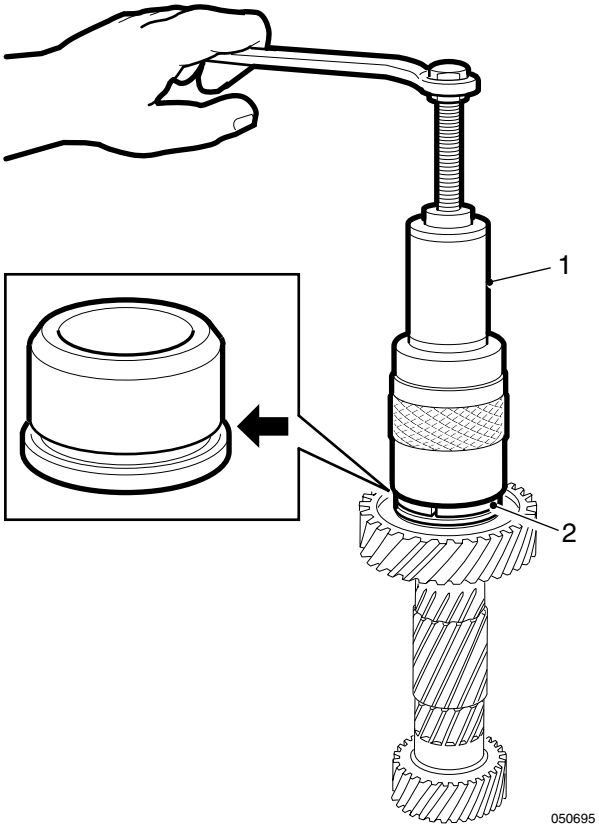


Fig.40 Removing layshaft bearing

1. LDV 124 2. LDV 123

Both layshaft bearing tracks can be removed using tools LDV 123 and LDV 124, making sure the flange on LDV 123 locates correctly in the groove in the bearing track (arrowed).

To fit the bearing tracks:

⚠ **WARNING: The bearing tracks will be hot; do not allow hands to contact them**

either – heat to approximately 100°C and slide into place,

or – select a suitable size tube and press into place.

REVERSE IDLER SHAFT

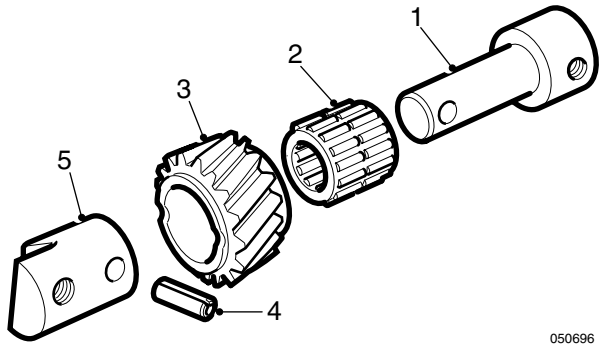


Fig.41 Reverse idler shaft

1. Spindle
2. Needle roller bearing
3. Reverse idler gear
4. Roll pin
5. Mounting

Dismantle the assembly by driving out the roll pin.

Check:

- Gear teeth for wear, chips and damage.
- Bearing for wear.
- Bearing spindle for wear.

When re-assembling:

- Ensure the larger boss on the gear is towards the shoulder on the spindle.
- Ensure the fitted position of the roll pin is central.

SELECTORS

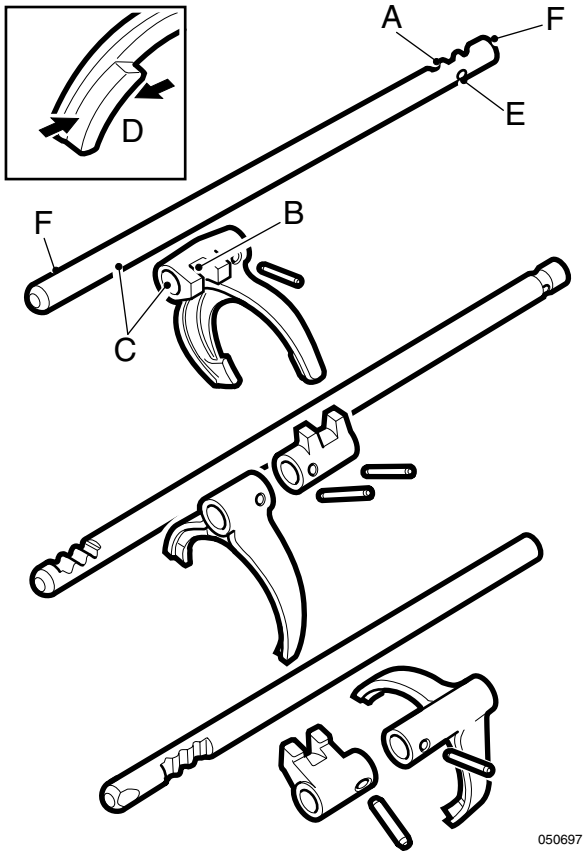


Fig.42

Examine each selector assembly in turn for wear, scoring, damage etc, paying particular attention to:

'A' Detent locations
'B' Selectors
'C' Wear between shaft/fork/selector
'D' Fork thrust faces
'E' Interlock locations
'F' Bush locations

GEARBOX REASSEMBLY

1. Secure the rear housing in a vertical plane.
2. If the two interlock plungers were not removed from the rear housing, check that they remain correctly located and that the hole in the end of the dummy selector shaft 16-047 in the central shaft bore is pointing outwards.

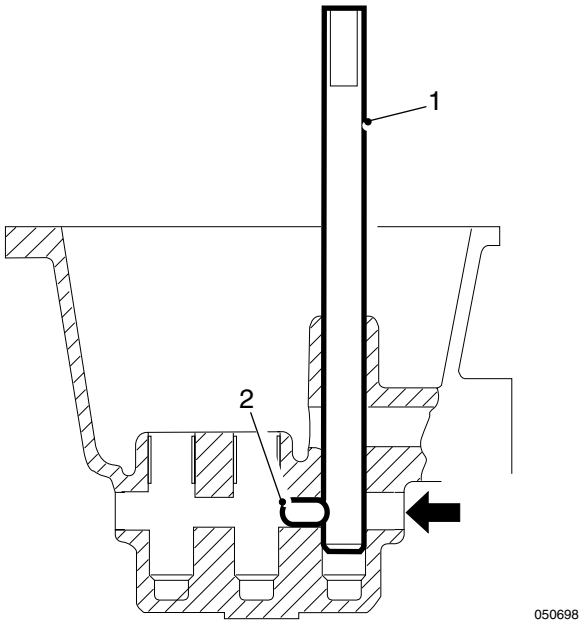


Fig.43 Fitting the interlocks

1. Tool 16-047
2. Interlock plunger

3. If the interlock plungers were removed, fit them as follows:
   - Fit tool 16-047 to either of the selector shaft outer bores, hole end into the housing, and turn the tool until the hole aligns with the plunger bore.
   - Smear an interlock plunger with petroleum jelly and push it through the hole in tool 16-047 until it is positioned as shown in the illustration.
   - Fit the tool in the other outer shaft bore, and fit the other plunger in the same way.

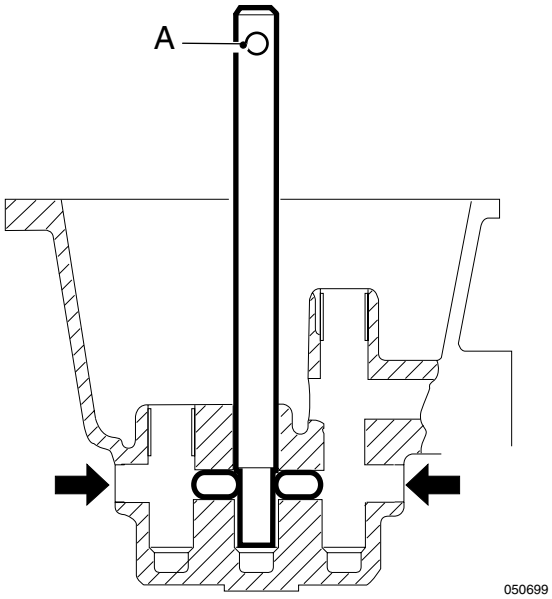


Fig.44

- Refit the tool in the centre selector shaft bore the other way round, and turn it until the hole 'A' is pointing outwards.
- Push both plungers inwards against the flats on the tool as illustrated.

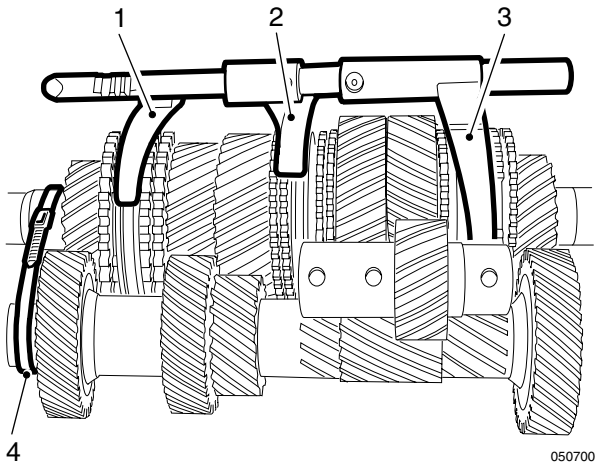


Fig.45 Geartrain

1. 3rd/4th selector fork
2. 1st/2nd selector fork
3. 5th/reverse selector fork
4. Cable tie

4. Mesh the layshaft into the mainshaft / input shaft assembly, and secure at the front end with a cable tie as before.
   Locate the 1st/2nd and 5th/reverse selectors in their synchro units, and position the 3rd/4th selector fork in its synchro unit.

5. Lower the complete geartrain assembly into the rear housing and, at the same time, locate the reverse idler shaft, spindle boss end downwards.

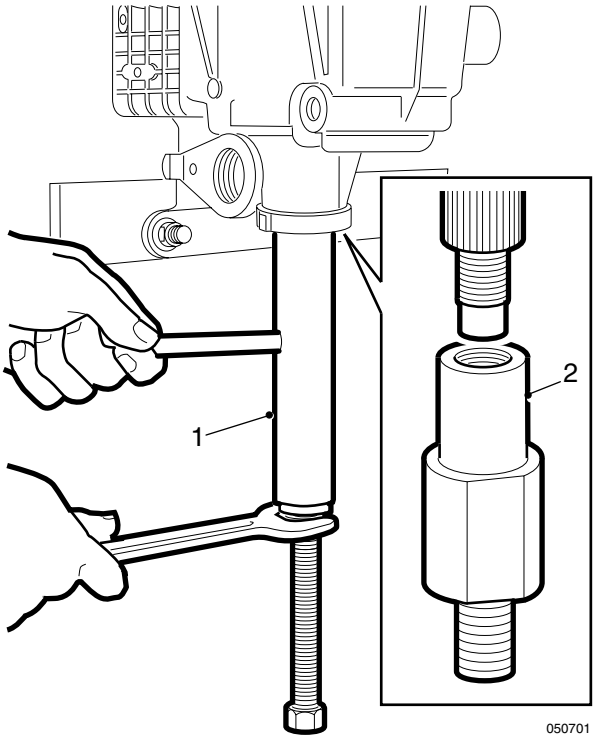


Fig.46 Pulling mainshaft into rear housing

1. 0499915 (18G 1431B)
2. LDV 121

6. To pull the mainshaft into the rear bearing, screw tool LDV 121 onto the rear of the shaft, and then screw tool 0499915 (18G 1431B) onto LDV 121.

   Turn the centre screw of tool 0499915 (18G 1431B) to pull the mainshaft fully into position, noting the following important points at frequent intervals during the fitting operation to avoid jamming:

IMPORTANT:

- Ensure the mainshaft is pulled in squarely.
- Ensure both selector shafts enter their respective bores, and remain free throughout.
- Ensure the layshaft enters its bearing and remains free throughout.

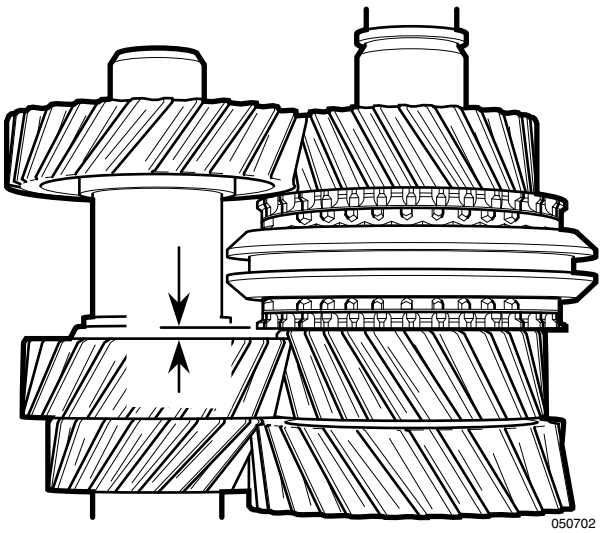


Fig.47

- Check that the gap (arrowed) between 3rd layshaft gear and 3rd gear dog teeth never reduces to zero.
- Check that the reverse idler assembly remains in its correct location without jamming.
- Ensure that the 3rd/4th selector fork remains between the two shafts.

Remove tools 0499915 (18G 1431B) and LDV 121.

7. Fit the speedometer drive (gear end to the rear).
   Fit a new rear oil seal, lip side inwards.

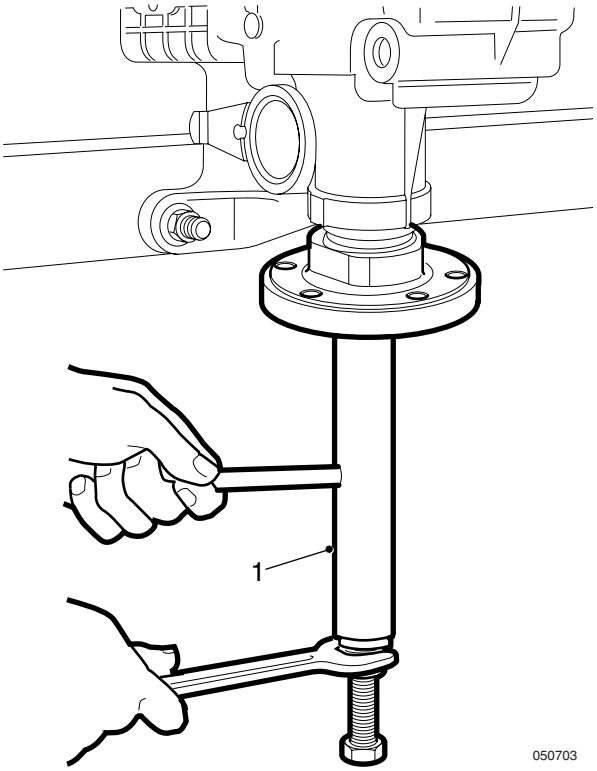


Fig.48 Pressing flange onto mainshaft
1. 0499915 (18G 1431B)

8. Fit a new dust seal over the rear flange seal journal, and position the flange on the mainshaft.
   Press the flange onto the shaft using tools 0499915 (18G 1431B) and LDV 121 as before.
   Remove the tools.

9. Fit flange holding tool LDV 118 to the flange using 2 bolts.
   Apply Loctite 242 to the threads of a new securing nut, then fit and tighten it to 200 Nm.

   Remove tool LDV 118.

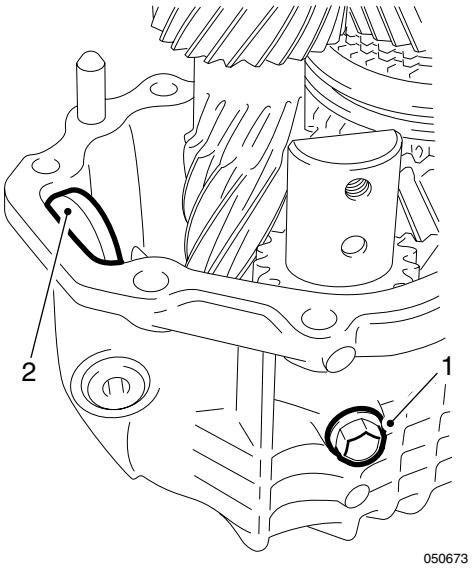


Fig.49
1. Reverse idler shaft bolt
2. Magnet

10. Fit the magnet.

11. Fit the reverse idler shaft bolt (coloured blue), tightening it finger tight.

12. Remove the cable tie from the front of the geartrain.

13. Remove the dummy selector shaft 16–047.

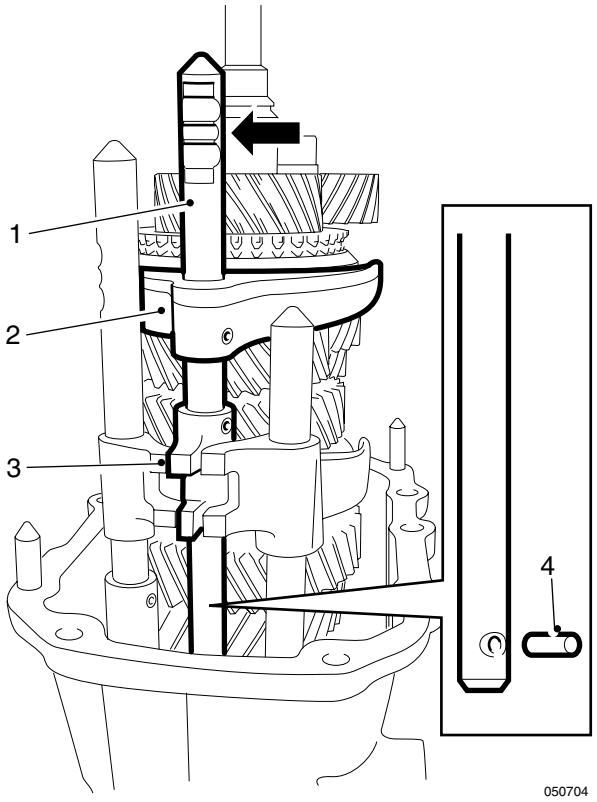


Fig.50 3rd/4th selector shaft
1. 3rd/4th selector shaft
2. 3rd/4th selector fork
3. 3rd/4th selector
4. Interlock pin

14. Locate the interlock pin in its bore in the 3rd/4th selector shaft, and secure in position with petroleum jelly.

15. Position the 3rd/4th selector and fit 3rd/4th selector shaft through 3rd/4th selector fork and 3rd/4th selector.

    Turn the shaft until the detent grooves (arrowed) are facing outwards and the roll pin holes in the fork and the selector align.

    Support the shaft while drifting in the roll pins to secure the fork and the selector.
    NOTE: Ensure that the fitted roll pins are located centrally and cannot foul other parts of the selector mechanism.

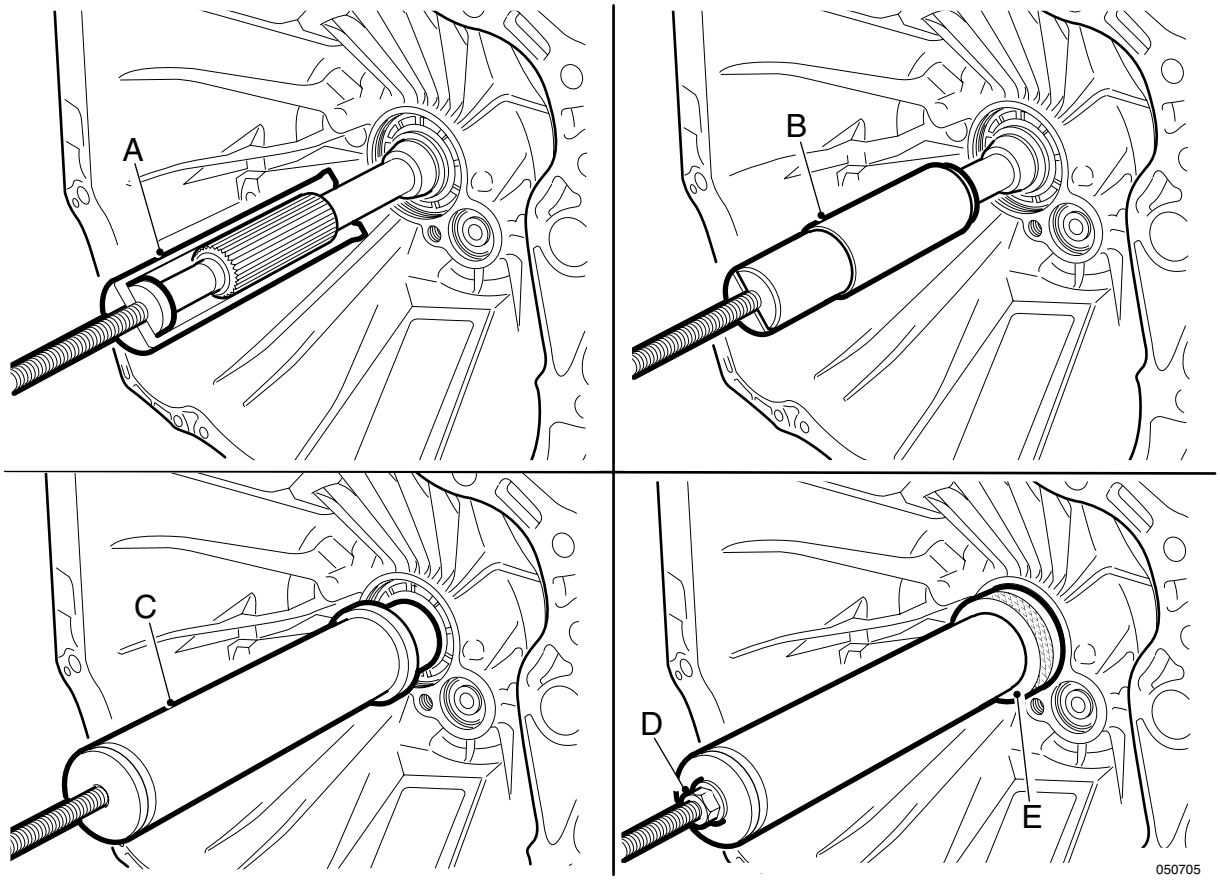


Fig.51 Fitting front housing

16. To fit the front housing:
    - Use degreasing agent Pt No. BBU 9314, then dry thoroughly the mating faces of the front and rear housings.
      Apply sealant Pt No. 1270836 in a continuous bead on the mating face and around the bolt holes of the rear housing.
    - Locate the housing over the geartrain.
    - To fit tools LDV 126 and LDV 127:
      A. locate the two halves of the puller behind the input shaft splines,
      B. fit the securing collar,
      C. remove the centre screw from the outer tube and position the tube over the puller,
      D. fit the washer/nut on the centre thread.
      E. fit LDV 127, screwing it into the front housing.
    - **CAUTION: Ensure the layshaft is guided into its bearing in the housing.**
      Holding the tube with a suitable tommy bar, tighten the centre nut to pull the input shaft fully through the input shaft bearing.

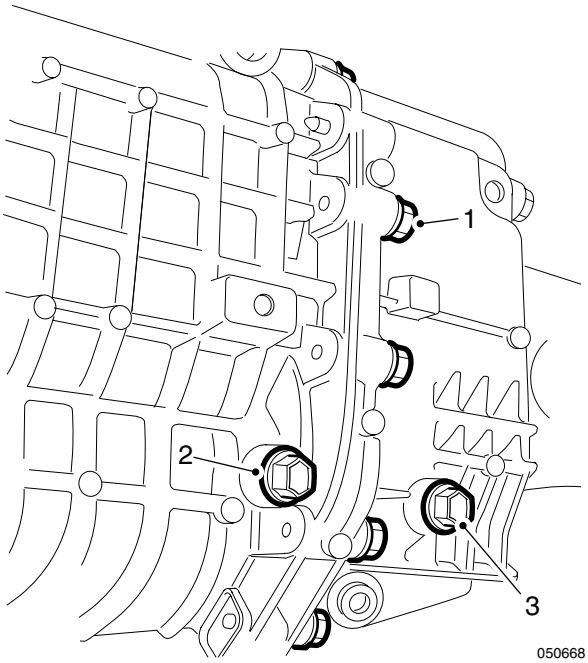


Fig.52

1. Housing bolts
2. Reverse idler shaft front securing bolt
3. Reverse idler shaft rear securing bolt

17. Fit two housing bolts diagonally and draw the two halves together.
    Remove tools LDV 127 and LDV 126.

    Fit the remaining 8 housing bolts and tighten them all to the correct torque – 24 Nm.

18. Fit the remaining reverse idler shaft bolt (coloured blue).
    Tighten both bolts to 32 Nm.

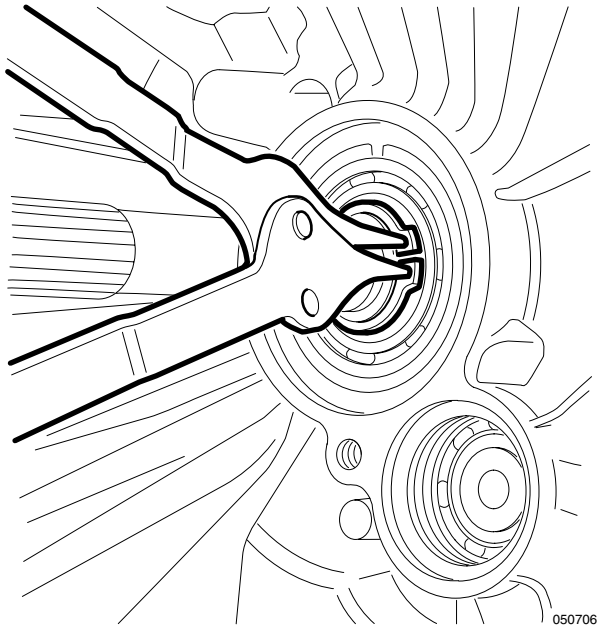


Fig.53 Fitting input shaft circlip

19. A range of input shaft circlips are available:

Thickness:	2,26 mm
	2,30 mm
	2,34 mm
	2,38 mm
	2,42 mm

    Select a circlip to eliminate any free play, and fit it the correct way round.

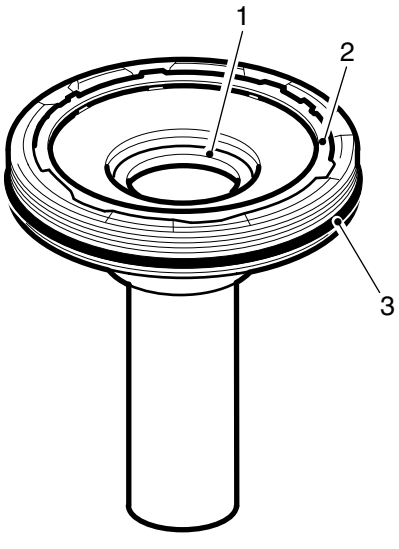


Fig.54 Input shaft guide sleeve

1. Oil seal
2. Bearing thrust washer
3. 'O' ring

20. Fit to the guide sleeve:
    - thrust washer,
    - new 'O' ring,
    - new oil seal, lip side outwards.

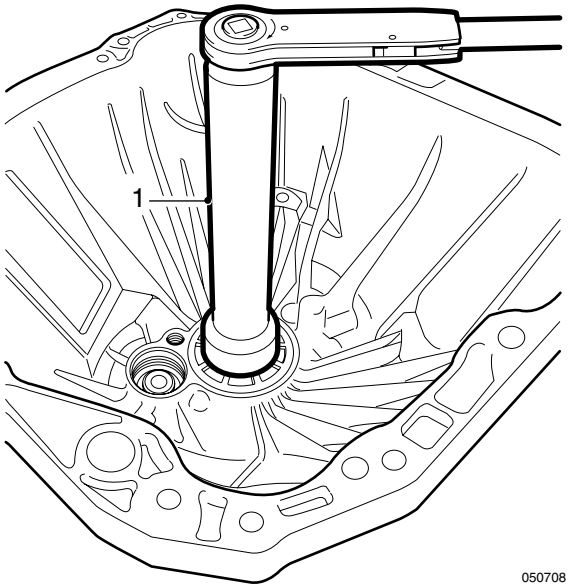


Fig.55 Fitting guide sleeve

1. Tool LDV 125

21. Lightly lubricate the threads of the guide sleeve with grease, then carefully fit the sleeve over the input shaft, making sure the oil seal is not damaged by the splines.

    Screw into the front housing and tighten to 250 Nm using tool LDV 125.

22. Fit the layshaft front bearing retainer as follows:

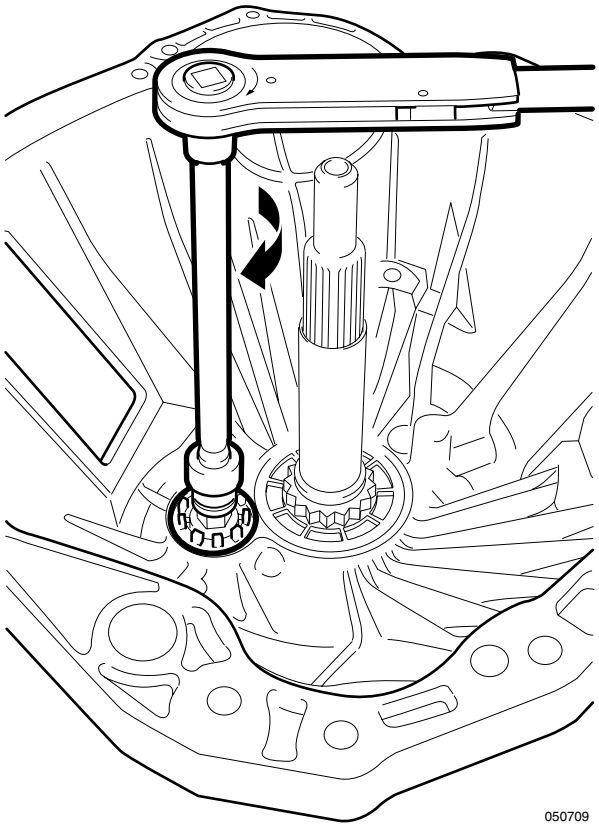


Fig.56

a. Fit a new 'O' ring, lightly lubricate the threads with grease, then tighten the retainer into the housing to a torque of 24 Nm.

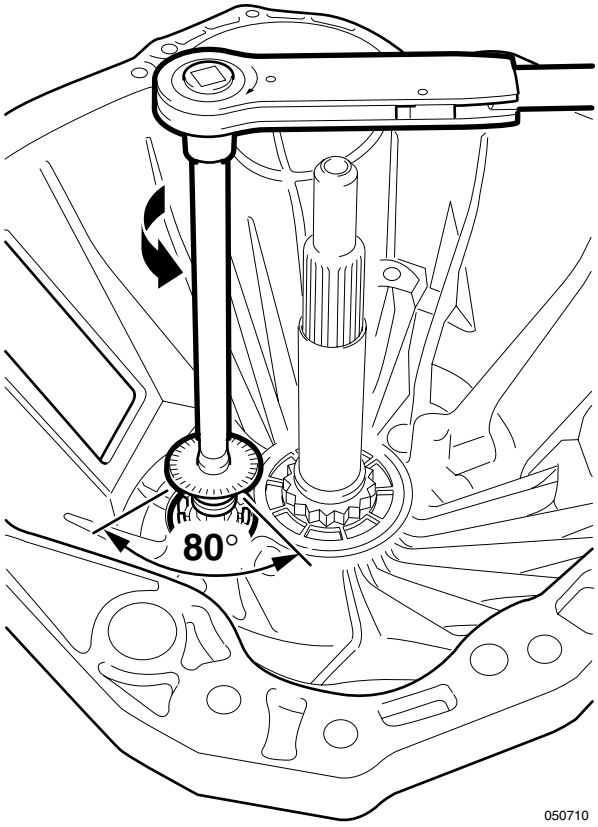


Fig.57

b. Slacken the retainer by 80°.

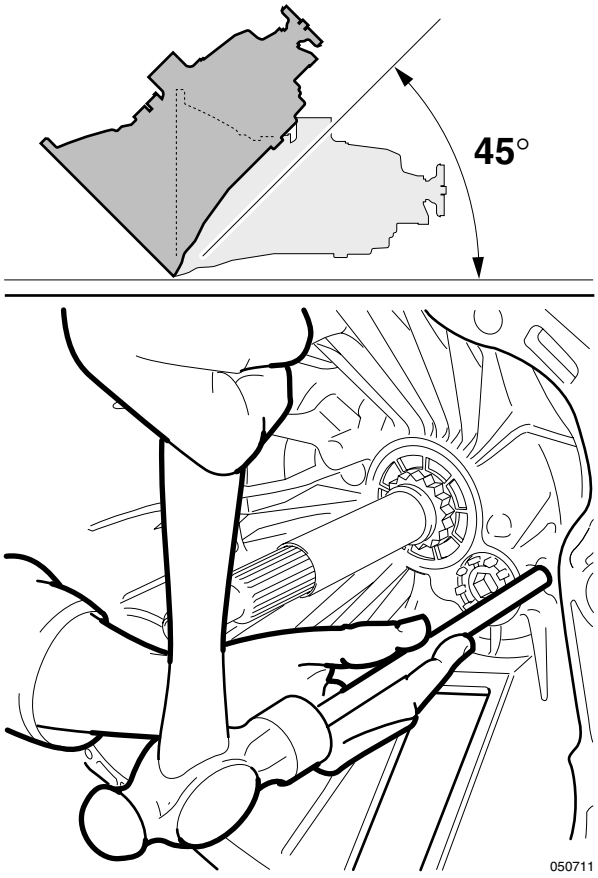


Fig.58

c. Remove the gearbox from the vice and lay it on the bench, tilting the clutch housing downwards at least 45°.

d. Using a brass drift, strike two blows on each of the housing lugs as illustrated to position the bearing.

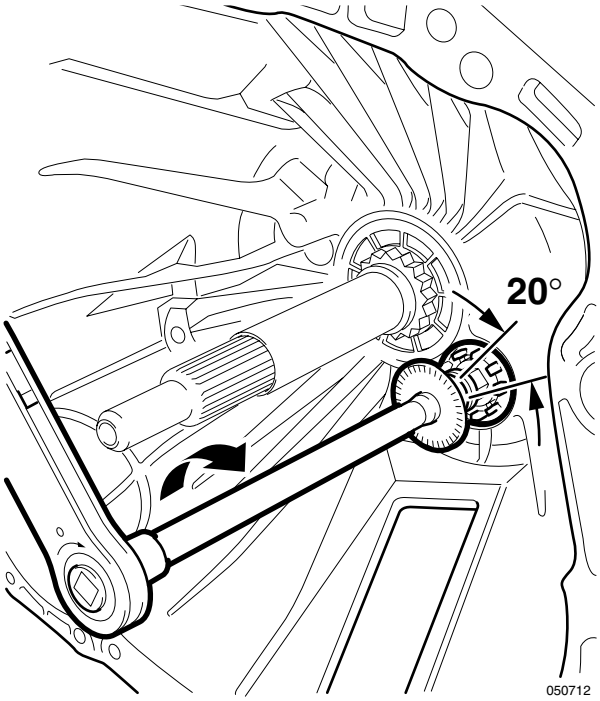


Fig.59

e. Tighten the retainer by 20°.
CAUTION: This operation must achieve a minimum tightening torque of 6 Nm.
If this minimum torque is not obtained, repeat operations ‘a’ to ‘e’.

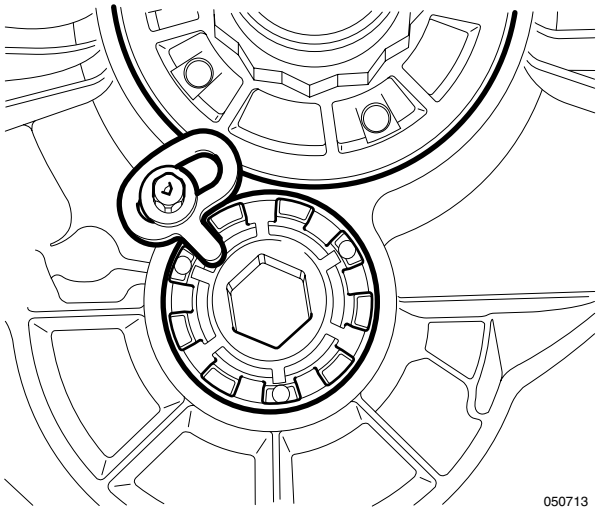


Fig.60 Locking plate

23. Fit and secure the locking plate, positioning it to cover both the input shaft guide sleeve flange and the layshaft retainer.

24. Fit the clutch release lever and release bearing.

25. Sparingly apply RTV sealant to two new interlock plugs and tap them into position using tool LDV 122.

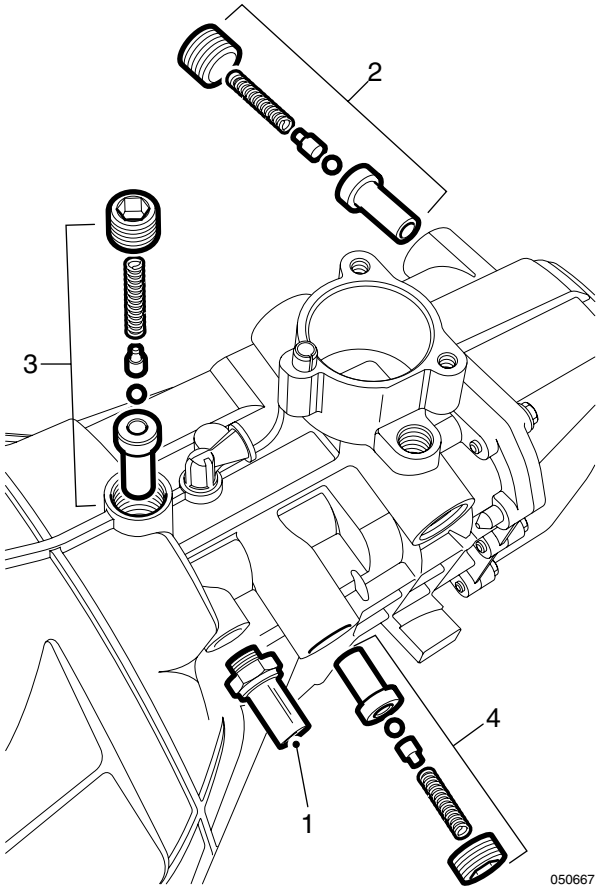


Fig.61 Selector shaft detents

1. Reverse light switch
2. 1st/2nd detent
3. 3rd/4th detent
4. 5th/reverse detent

26. In turn, fit each selector shaft detent sleeve, ball, seat and spring. Apply Loctite 242 to the threads on the securing plug and tighten it to 24 Nm.

27. Apply Loctite 242 to the threads of the reverse light switch, and tighten it to 14 Nm.

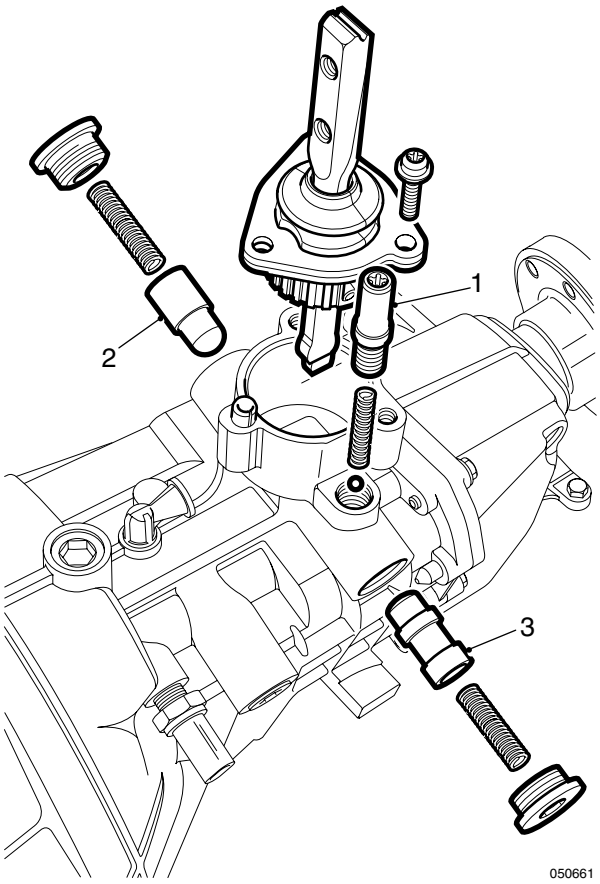


Fig.62 Gear lever detents

1. Reverse detent
2. 1st/2nd bias
3. 5th/reverse bias

28. Fit in turn the 1st/2nd and 5th/reverse bias plunger and spring. Smear the threads of the securing plug with Loctite 242 and tighten to 24 Nm.

29 Fit the reverse detent ball and spring. Smear the threads of the cap with Loctite 242 and tighten to 14 Nm.

30. Fit the gear lever.

31. Fit the speedometer driven gear.

32. Remove the mounting bracket and refit the oil drain plug, tightening it to 35 Nm.

MT75 SINGLE RAIL GEARBOX

REMOVE / REFIT

Tool required: Clutch plate mandrel LDV 119 (if clutch is removed)

Remove

1. Disconnect the battery(s), negative terminal(s) first.

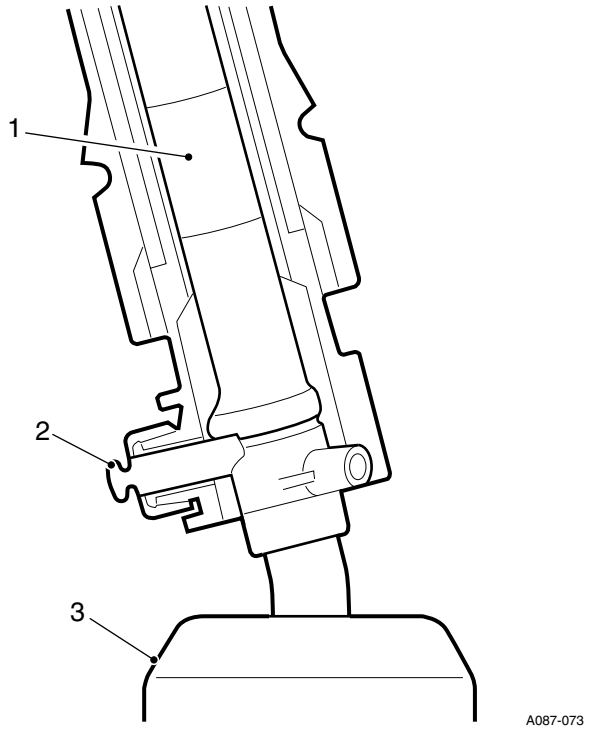


Fig.1 Removing gear lever
1. Gear lever
2. Retaining pin
3. Stub lever housing

Inside the cab:

2. To remove the gear lever, lift the rubber gaiter and pull out the lock pin to release it from the stub lever.

3. Remove the floor sponge packing noting the position marking 'FRONT'.

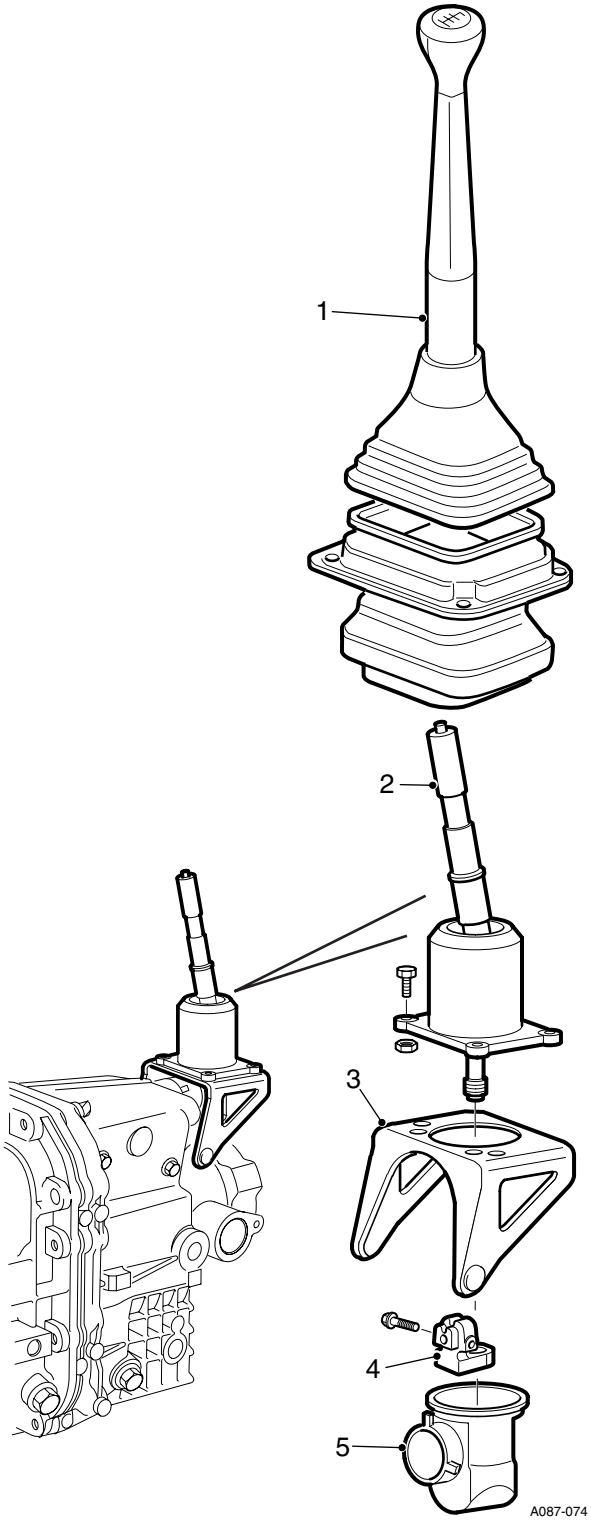


Fig.2 Gear lever mounting
1. Gear lever
2. Stub lever assembly
3. Stub lever mounting bracket
4. Coupling
5. Boot

4. Remove the bolts securing the stub lever assembly to its mounting bracket. Detach the assembly noting its two locating tongues for re-assembly. Note the bush located on the lever.

Under the vehicle:

5. Slacken the propshaft centre bearing bolts.

6. Make temporary correlation marks on the propshaft and gearbox flanges for alignment during refitting. Remove the flange retaining bolts and secure the front of the shaft to one side.

7. Disconnect the wiring harness connectors – vehicle speed sensor (VSS), reverse light switch, tachometer (if fitted).

   Unclip the harness from the gearbox.

8. Release the clutch hydraulic cylinder by rotating it anti-clockwise through 90°. Secure it to one side.

9. Securely support the rear of the engine between the sump and the flywheel housing on a suitable jack.

10. Remove the bolts securing the steering damper to the axle.

11. Detach the track rod from the right hand steering arm and secure to one side.

12. Slacken the starter motor securing bolts.

13. Remove the gearbox crossmember and mount plate.

14. Support the gearbox on a hydraulic cradle jack.

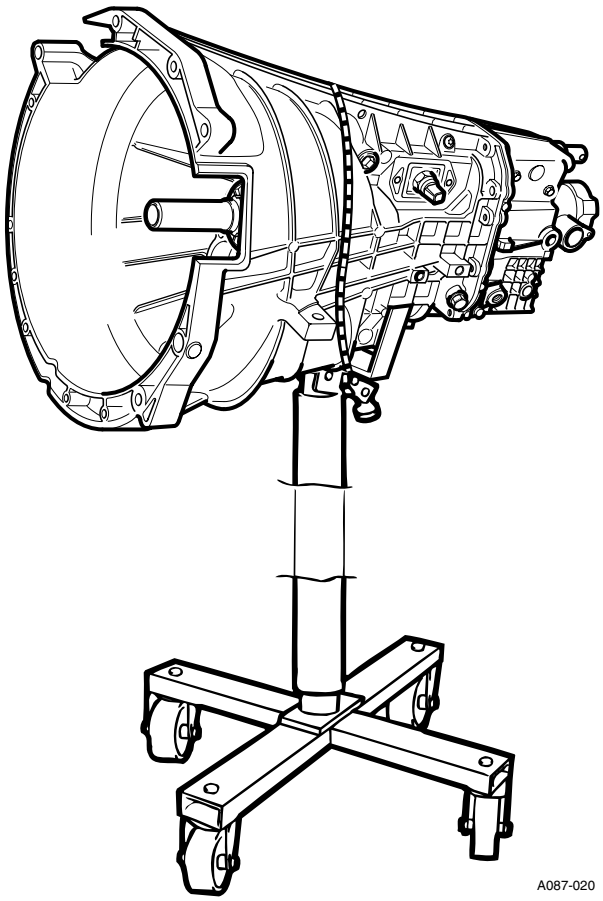


Fig.3 Gearbox on hydraulic cradle jack

15. Note the CAUTION statement below before removing the gearbox securing bolts.

    Remove the gearbox to engine securing bolts (note the two longer bolts fitted from the engine side in the 2/3 o'clock position).

    Remove the gearbox.

    CAUTION: Remove / refit damage
    Do not allow the gearbox to 'hang' on the engine during removal. If the gearbox is not fully supported at all times during removal and refitting, its weight may then be held by the spigot bearing in the crankshaft and by the centre of the clutch driven plate, causing damage, buckling or distortion.

    In consequence, after a nominal mileage, the driven plate will break up and give clutch failure.

Refit

Refitting is the reverse of the removal instructions, noting the following:

- Use tool LDV 119 to align the driven plate when fitting the clutch; ensuring accurate alignment by checking that the tool can be **rotated freely by hand after** tightening the pressure plate bolts.
  Poor alignment can cause damage to the splines on the gearbox input shaft during fitment, creating clutch drag and difficult gear selection.
- Sparingly lubricate the input shaft splines with a recommended grease.
- Do not allow the gearbox to 'hang' on the clutch during fitment. Remember the CAUTION given above.

  Push the gearbox fully into position, and fit and tighten the securing bolts immediately to the correct torque.
- Align the correlation marks made during removal, before securing the propshaft to the gearbox flange using new bolts.

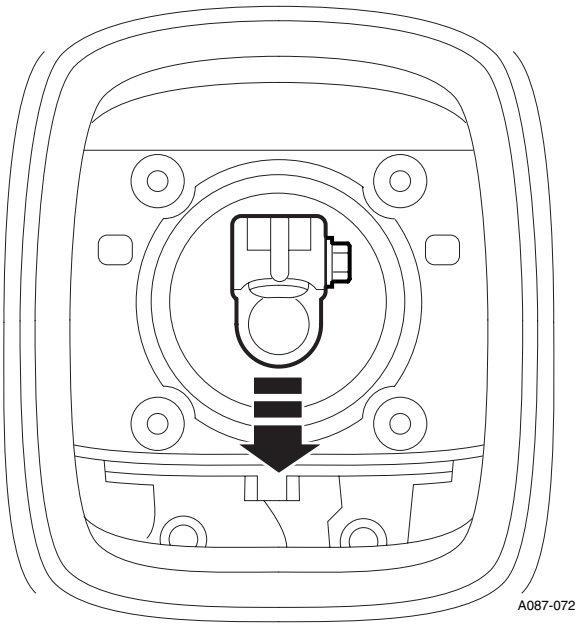
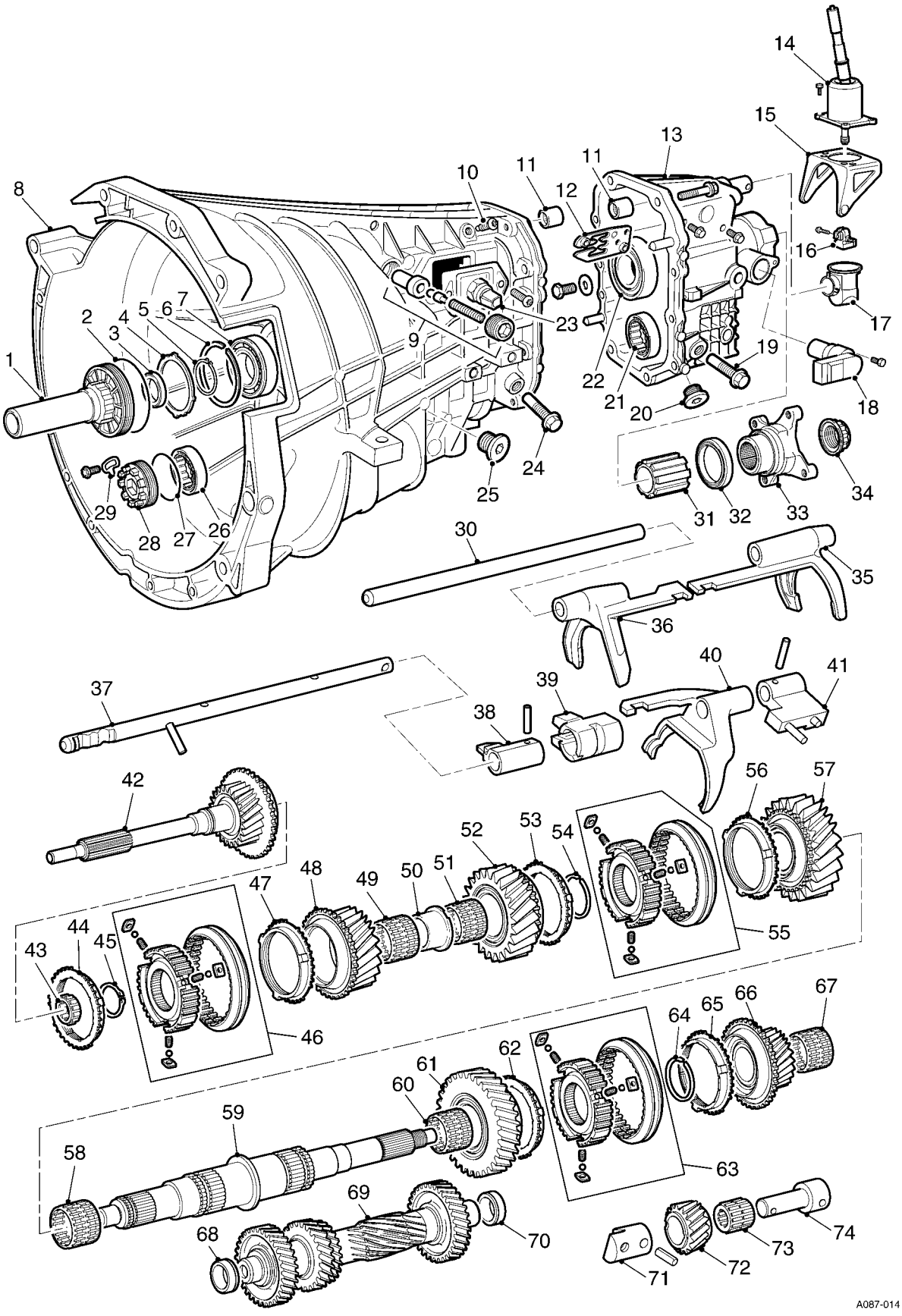


Fig.4 Selecting 3rd gear

- **IMPORTANT**: Select 3rd gear before fitting the stub lever assembly.
  NOTE: The selector shaft must be pulled fully to the rear and the clamp bolt must remain horizontal. Failure to do this may result in difficult gear changing.
- When refitting the stub lever assembly, lightly lubricate the lever bush with grease.
- After fitment, fill / top up the gearbox oil to the filler / level plug, using the specified oil. Ensure the vehicle is level before checking.
- Connect the battery(s), positive cable(s) first.

MT75 SINGLE RAIL GEARBOX COMPONENTS



Key to MT75 Single Rail Gearbox Components

1. Input shaft guide sleeve
2. 'O' ring
3. Oil seal
4. Thrust washer
5. Circlip
6. Snap ring
7. Input shaft bearing
8. Front housing
9. Selector detent
10. Selector shaft locking sleeve bolt
11. Selector shaft bearing
12. Selector gate
13. Rear housing
14. Stub lever assembly
15. Stub lever support bracket
16. Coupling
17. Boot
18. Vehicle speed sensor (VSS)
19. Reverse idler shaft rear securing bolt
20. Drain plug
21. Layshaft rear bearing
22. Mainshaft bearing
23. Reverse light switch
24. Reverse idler shaft front securing bolt
25. Filler/level plug
26. Layshaft front bearing
27. 'O' ring
28. Layshaft bearing retainer
29. Lock plate
30. Auxiliary selector shaft
31. Vehicle speed sensor ring
32. Oil seal
33. Drive flange
34. Nut
35. 5th/reverse selector fork
36. 3rd/4th selector fork
37. Main selector shaft
38. Selector finger
39. Locking sleeve
40. 1st/2nd selector fork
41. Gearchange finger
42. Input shaft
43. Pilot bearing
44. 4th gear baulk ring
45. Circlip
46. 3rd/4th synchro unit
47. 3rd gear baulk ring
48. 3rd gear
49. 3rd gear bearing
50. 3rd gear bush
51. 2nd gear bearing
52. 2nd gear
53. 2nd gear baulk ring
54. Snap ring
55. 1st/2nd synchro unit
56. 1st gear baulk ring
57. 1st gear
58. 1st gear bush
59. Mainshaft
60. Reverse gear bearing
61. Reverse gear
62. Reverse gear baulk ring
63. 5th/reverse synchro unit
64. Snap ring
65. 5th gear baulk ring
66. 5th gear
67. 5th gear bearing
68. Layshaft front bearing inner track
69. Layshaft
70. Layshaft rear bearing inner track
71. Reverse idler spindle mounting
72. Reverse idler gear
73. Reverse idler gear bearing
74. Reverse idler gear spindle

MT75 SINGLE RAIL GEARBOX OVERHAUL

Tools required: LDV 118, LDV 119, LDV 120, LDV 121, LDV 123, LDV 124, LDV 125, LDV 126, LDV 127, LDV 181, 16-056, 1210511 (18G 2), 0499809 (18G 134), 0480045 (GKN 550-7), 1210517 (1.30/5), 1210518 (1.36/1), 0484820 (18G 47) or 0480042 (370), 0499915 (18G 1431B), 0480080 (LST 122), 23-036A.

GEARBOX DISMANTLE

1. Drain the gearbox oil, and clean off the exterior.
2. Remove the clutch release bearing and release lever.
3. Remove:
   - gear lever support bracket,
   - vehicle speed sensor (VSS),
   - tachograph sensor (if fitted).

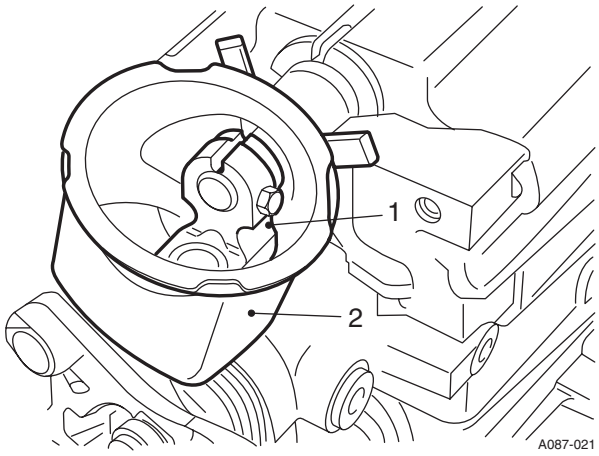


Fig.1 Gear lever coupling
1. Coupling
2. Sleeve boot

4. Select neutral. Remove the gear lever coupling and boot.
5. Fit mounting bracket LDV 120 and adaptors LDV 181, and secure in a vice.

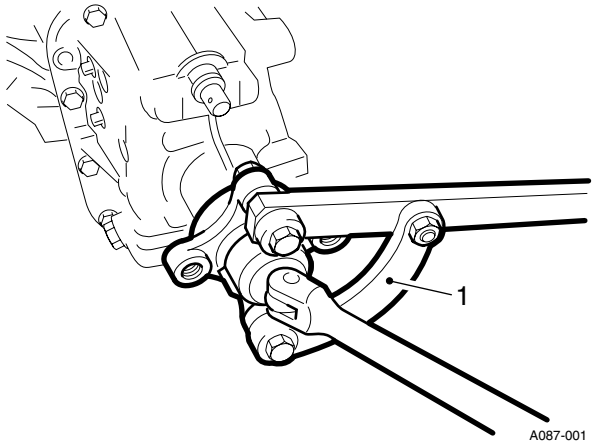


Fig.2 Removing flange nut
1. Tool LDV 118

6. Use 2 bolts to secure tool LDV 118 to the output shaft flange; remove and discard the flange nut.

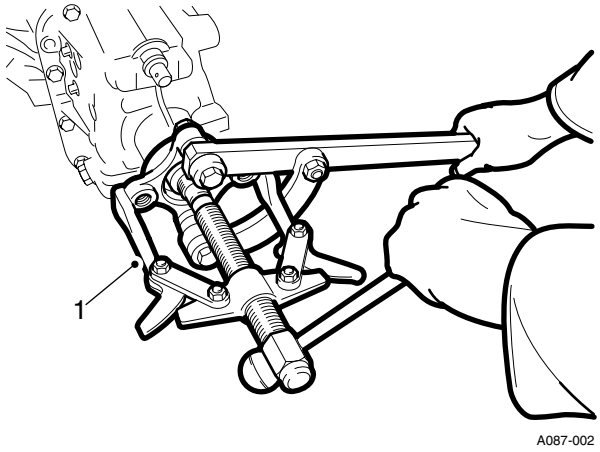


Fig.3 Removing flange
1. Tool 1210511 (18G 2)

7. Pull off the flange using tool 1210511 (18G 2) with a suitable thrust button over the end of the output shaft.

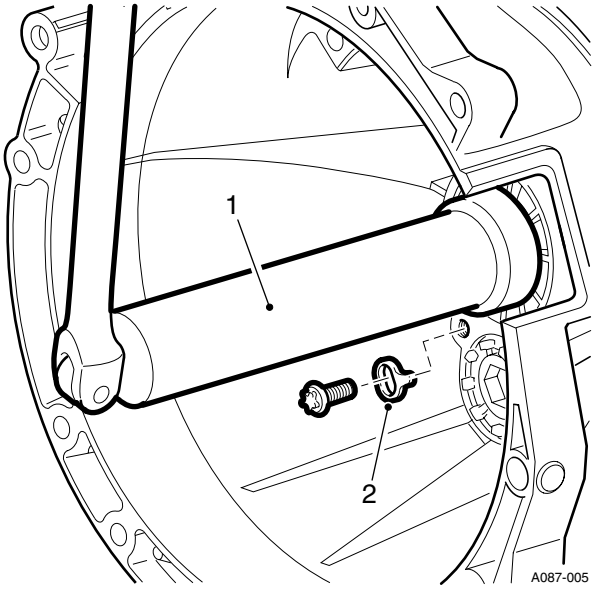


Fig.4 Removing input shaft guide sleeve

1. Tool LDV 125
2. Layshaft bearing retainer lock plate

8. Remove the layshaft bearing retainer lock plate.

9. Use LDV 125 to remove the input shaft guide sleeve.

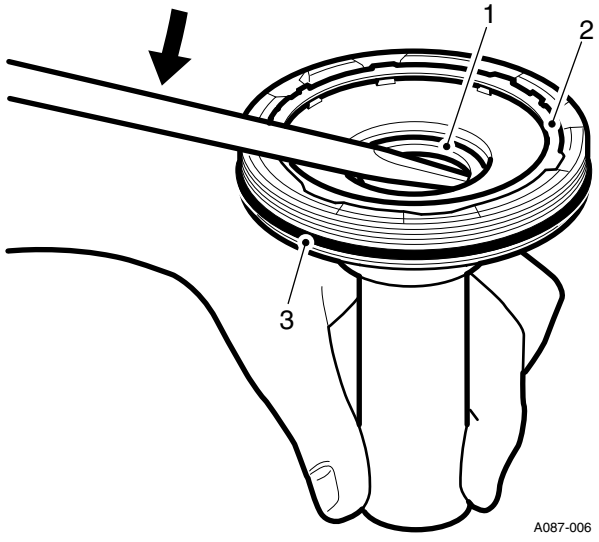


Fig.5 Input shaft guide sleeve

1. Oil seal
2. Bearing thrust washer
3. 'O' ring

10. Remove from the guide sleeve:
    - thrust washer,
    - 'O' ring,
    - oil seal, taking care not to damage the seal location.

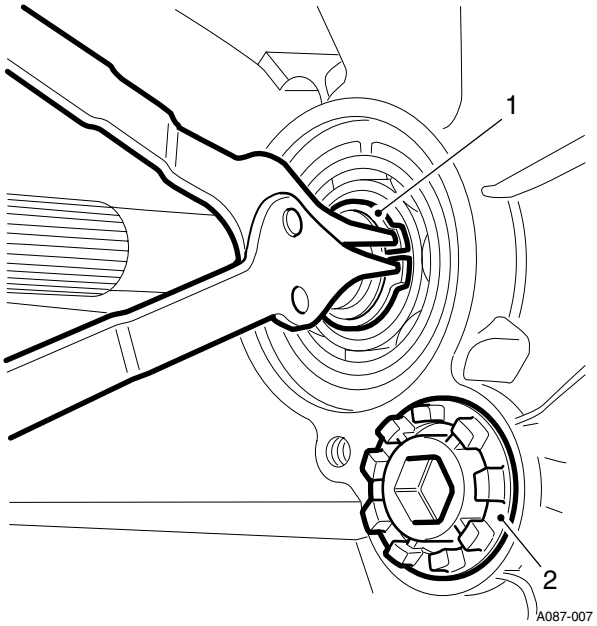


Fig.6

1. Circlip
2. Layshaft bearing retainer

11. Remove the circlip retaining the input shaft bearing to the shaft.

12. Use a 17 mm allen key to remove the layshaft front bearing retainer.

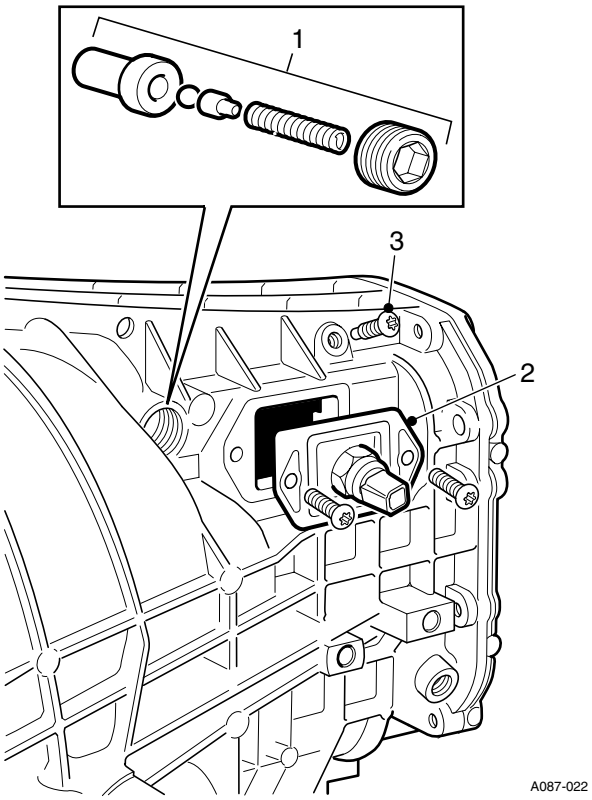


Fig.7

1. Selector detent
2. Reverse light switch
3. Selector shaft locking sleeve bolt

13. Remove:
    - selector detent components (see illustration),
    - selector shaft locking sleeve bolt,
    - reverse light switch, complete with its mounting plate.

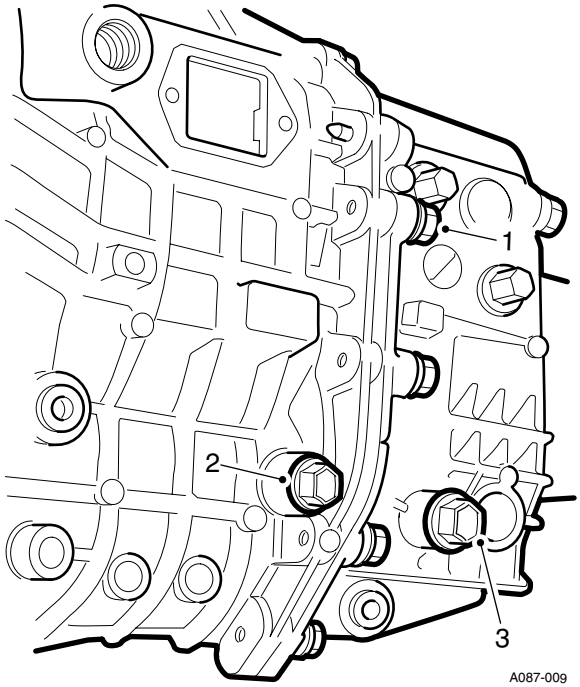


Fig.8

1. Rear housing bolts
2. Reverse idler shaft front securing bolt
3. Reverse idler shaft rear securing bolt

14. Remove the reverse idler shaft front securing bolt (coloured blue), and slacken the reverse idler shaft rear securing bolt (coloured blue).

15. Remove the 10 bolts securing the rear housing.

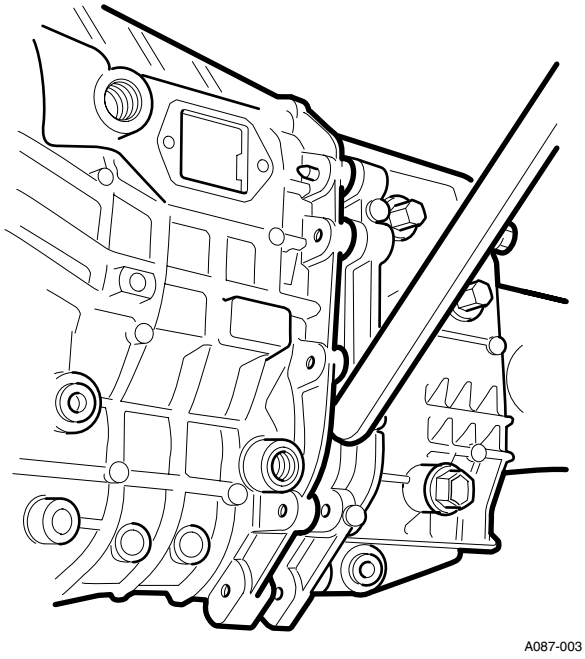


Fig.9 Separating the two housings.

16. **CAUTION: Only apply levers at the reinforcing ribs.**
    The two housing halves have adhesive sealant on their mating faces. Carefully use levers to 'break' this sealant if necessary.

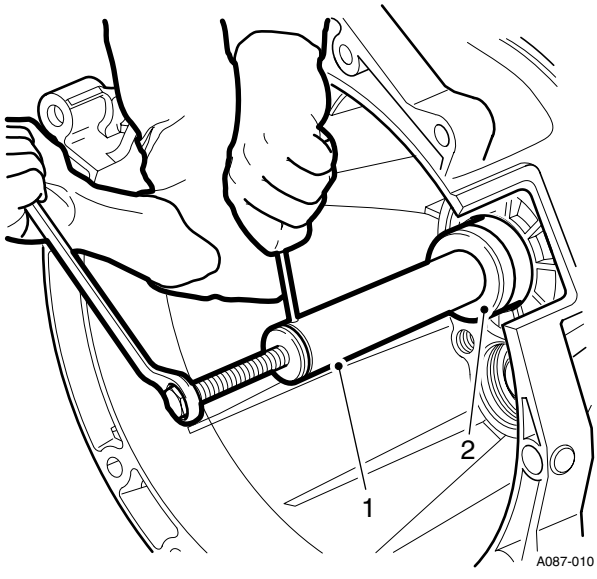


Fig.10 Pulling off the front housing

1. Tool LDV 126
2. Tool LDV 127

17. To remove the front housing:

    Fit tool LDV 126 over the input shaft and fit tool LDV 127, ensuring it is screwed fully into the guide sleeve threaded hole.

    CAUTION: Do not apply excessive pressure to the input shaft as this could cause internal damage. If necessary use levers to help pull off the housing, but do not damage the sealing faces.
    Turn the centre screw to pull off the housing. If necessary, prevent tool LDV 126 from turning by fitting a holding bar in the tool as illustrated.

18. Remove the magnet from the rear housing. Clean after inspecting it for evidence of debris which may assist any fault diagnosis to be carried out.

19. Re-mount the gearbox in a vertical plane, input shaft uppermost.

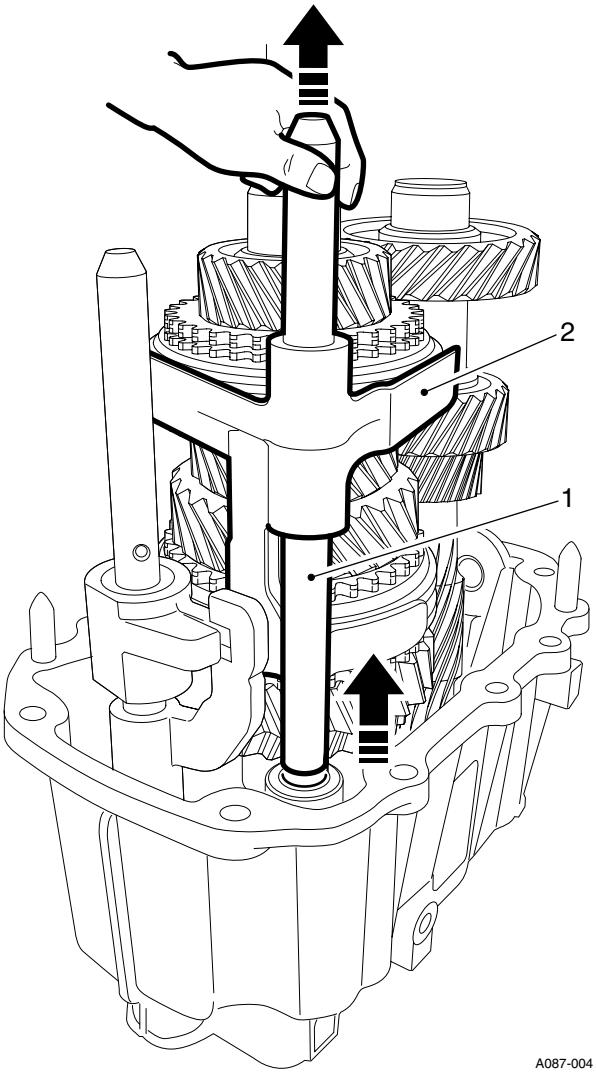


Fig.11 Removing auxiliary selector shaft

1. Auxiliary selector shaft
2. 3rd/4th selector fork

20. Check that the selector forks remain in the neutral position.

    Note the position of the selector shafts and forks for ease of reassembly.

    Pull out the auxiliary selector shaft and remove 3rd/4th selector fork.

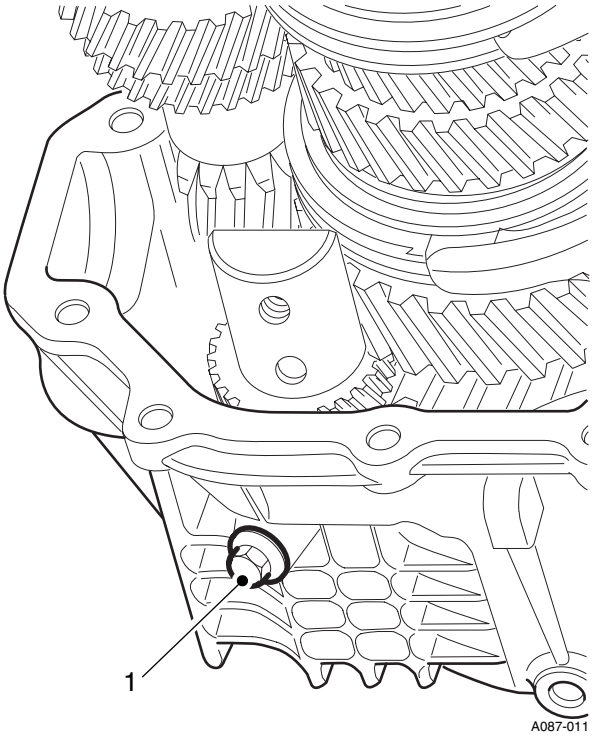


Fig.12

1. Reverse idler shaft rear retaining bolt

21. Remove the reverse idler shaft rear retaining bolt (coloured blue).

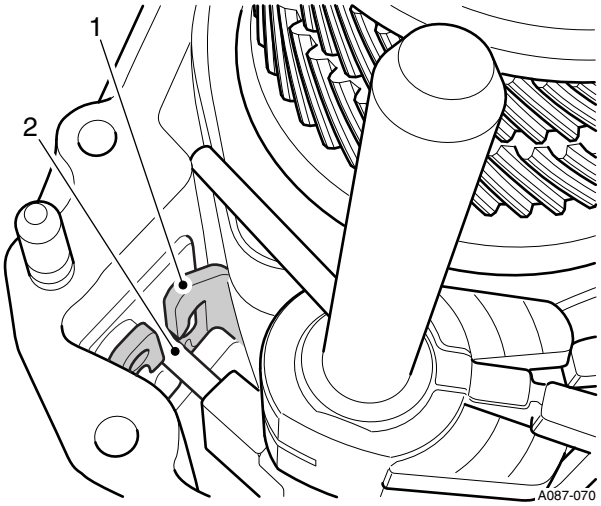


Fig.13 Aligning selector finger

1. Selector gate
2. Selector finger

22. To remove the geartrain assembly:
    - **CAUTION: Failure to align the selector finger may result in damage**.

      Check that the selector shaft is in the neutral position, and that the selector finger aligns with the slot in the selector gate.
    - To assist removal of the geartrain, loosely fit a cable tie around the front of the layshaft and the input shaft as illustrated.
    - **CAUTION: Press the shaft out carefully, while checking that the layshaft, selector shaft and reverse idler are moving freely from their locations, and that the selector finger remains in alignment**.

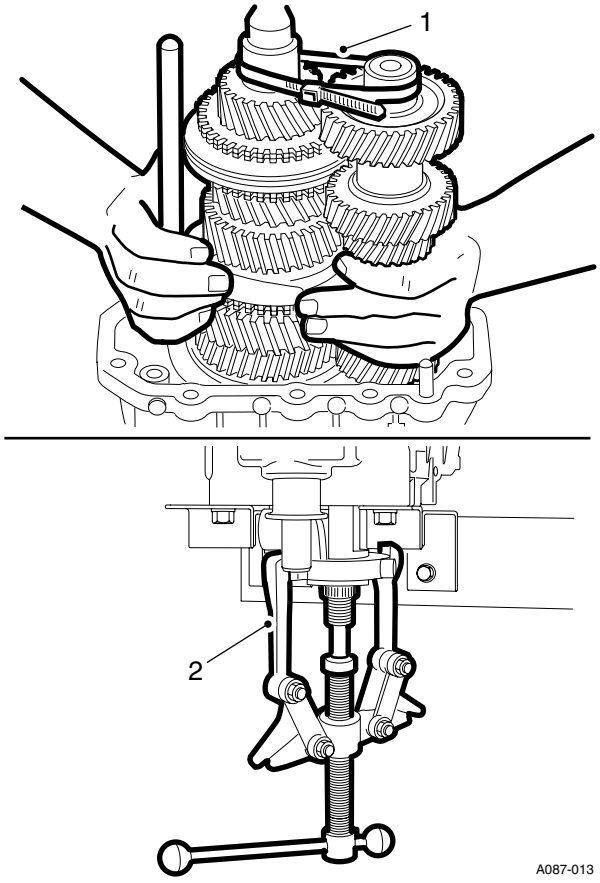


Fig.14 Removing geartrain.

1. Cable tie
2. Tool 1210511 (18G 2)

    Press the mainshaft out of the housing using tool 1210511 (18G 2) and a suitable thrust button. Ensure the feet of tool 1210511 are located behind the lugs on the housing, and that it will press squarely onto the mainshaft.
    - Lift out the geartrain assembly, together with the main selector shaft and the reverse idler gear assembly.

23. Remove the cable tie and separate the layshaft from the mainshaft. Remove 5th / reverse selector fork.

24. Remove the input shaft; capture the pilot roller bearing on the nose of the mainshaft, and the 4th gear baulk ring.
    Remove the main selector shaft assembly, and 1st/2nd selector fork.

INSPECTION

The gearbox has now been dismantled into the following sub-assemblies:

Front housing
Rear housing
Input shaft / Mainshaft
Layshaft
Reverse idler shaft
Selectors

The following instructions will assist in the inspection of these sub-assemblies, and describe the procedures to dismantle them to their component parts as required.

NOTE:

- Use soft jaws for all operations carried out in a vice.
- Note the original positions of synchro units, baulk rings, bearings etc for re-assembly in the same location if not being renewed.
- Clean all components prior to inspection.
- Old sealant on casings etc. can be removed using a suitable solvent.

FRONT HOUSING

NOTE: The layshaft bearing and its track are paired and must not be mixed with the rear bearing.

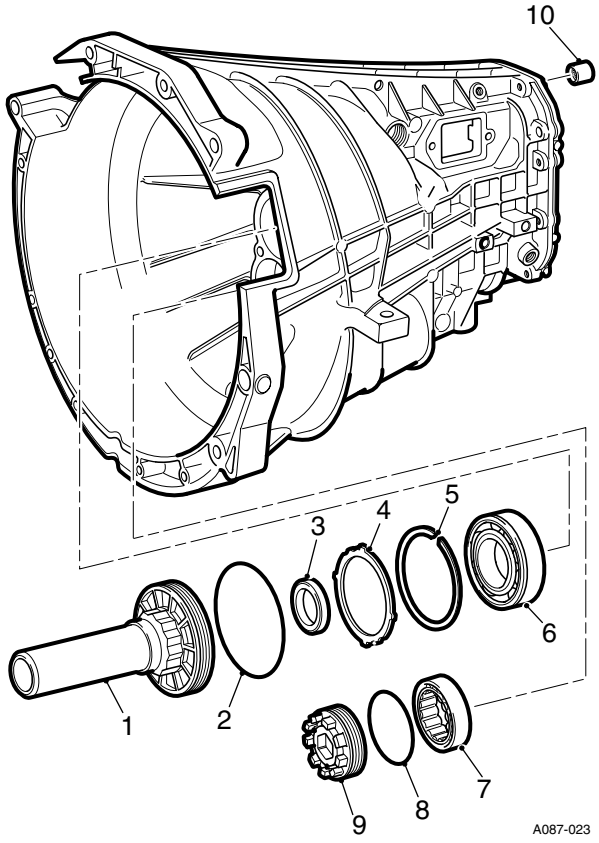


Fig.15 Front housing

1. Input shaft guide sleeve
2. 'O' ring
3. Seal
4. Thrust washer
5. Snap ring
6. Input shaft bearing
7. Layshaft front bearing
8. 'O' ring
9. Layshaft bearing retainer
10. Main selector shaft bearing

1. Inspect the sealing face with the rear housing for damage, distortion etc.
2. Inspect the main selector shaft bearing for signs of wear or damage.

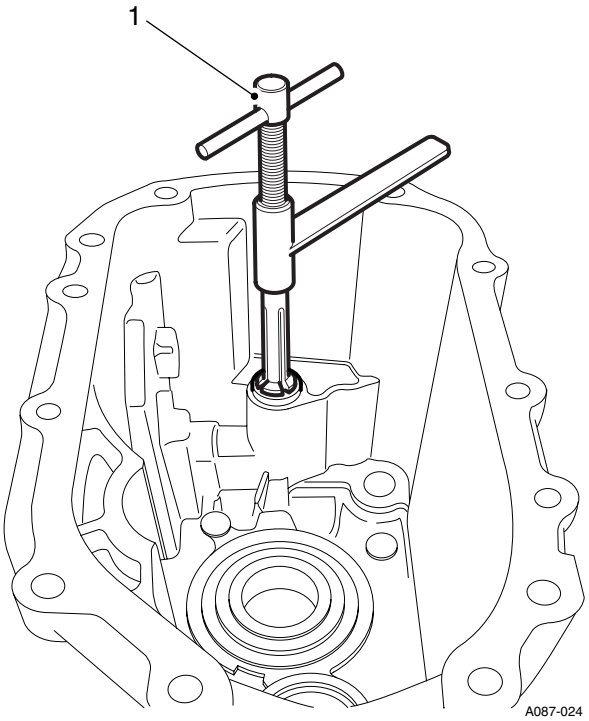


Fig.16 Removing selector shaft bearing

1. Tool 23-036A

If renewal is required, extract the old bearing using tool 23-036A and a suitable rod 63 mm in length inserted through the bearing into the housing to support the tool.

Press the new bearing into position level with the housing. Check that the main selector shaft can move freely in it.

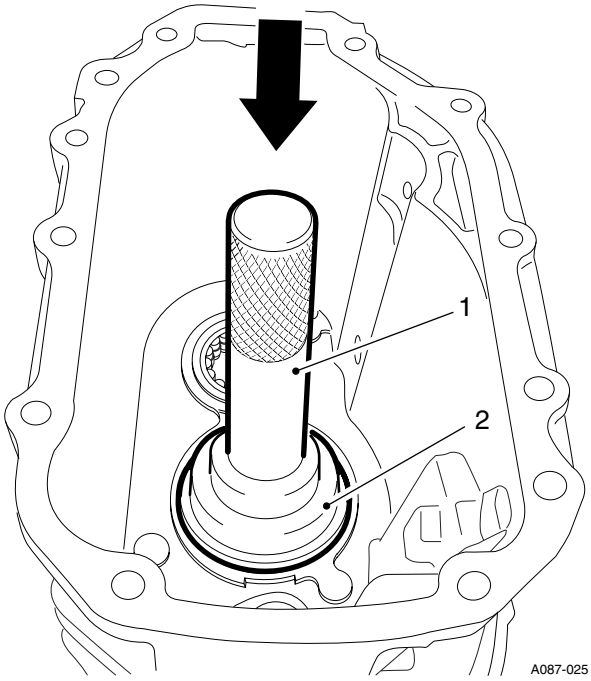


Fig.17 Removing input shaft bearing

1. Tool 0499809 (18G 134)
2. Tool 0480045 (GKN 550-7)

3. **CAUTION: Do not damage the housing.**
Ensuring the tool is positioned centrally, press out the input shaft bearing towards the clutch housing, using 0499809 (18G 134) and 0480045 (GKN 550-7).

Remove the snap ring.

CAUTION: Do not damage the threads in the housing.
To fit the replacement bearing, fit the snap ring and press the bearing into position from the clutch side using the same tools as for removal.

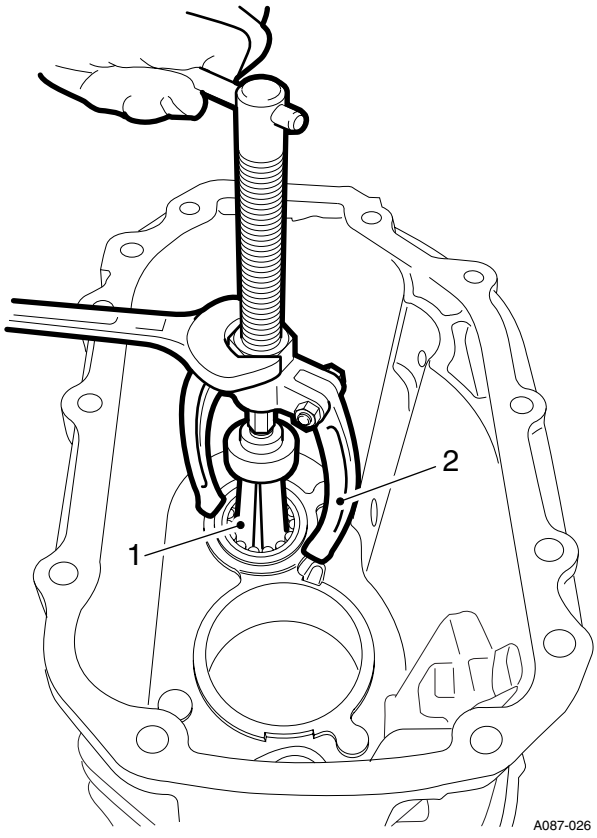


Fig.18 Removing layshaft bearing

1. Tool 1210517 (1.30/5)
2. Tool 1210518 (1.36/1)

4. **CAUTION: Do not damage the thread in the housing.**

   Remove the layshaft front bearing using tools 1210517 (1.30/5) and 1210518 (1.36/1).

   NOTE: Even if the bearing does not require renewal, it must be moved at least 2 mm rearwards from its fitted position prior to reassembly (see fig.19).

   NOTE: If the layshaft bearing requires renewal, its inner track (on the layshaft) must be changed also (see 'Layshaft').

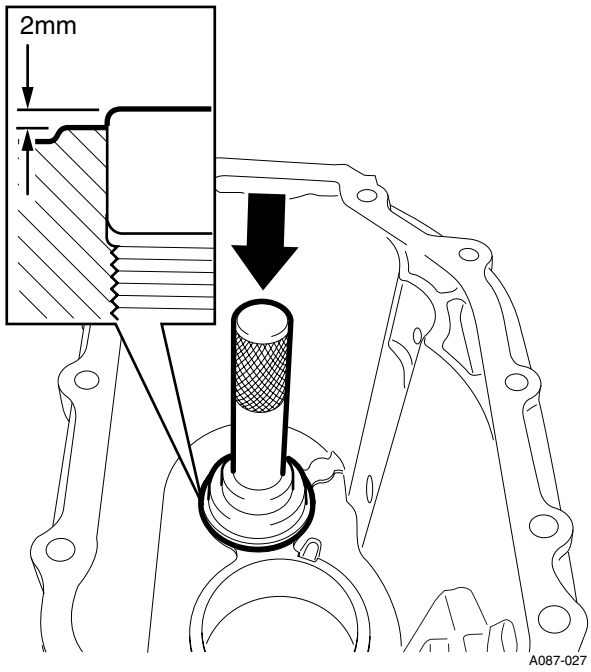


Fig.19 Layshaft bearing position

To fit the bearing, use suitable adaptors (e.g. 0499809 (18G 134) and 0480045 (GKN 550-7) and press it in from the geartrain side until it projects by approximately 2 mm as illustrated.

NOTE: The bearing must not be pressed in flush; its final positioning is made during re-assembly.

REAR HOUSING

NOTE: The layshaft bearing and its track are paired and must not be mixed with the front bearing.

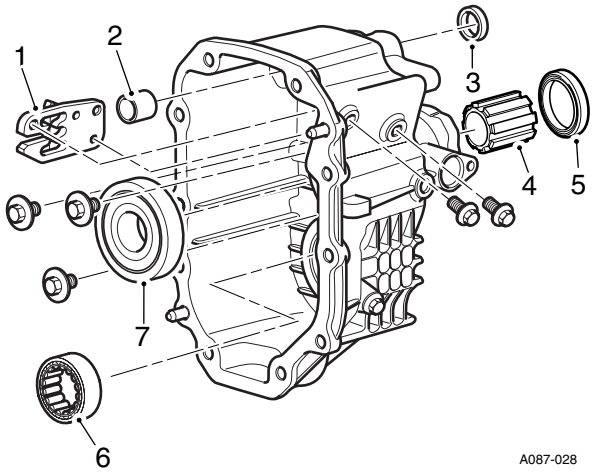


Fig.20 Rear housing

1. Selector gate
2. Selector shaft bearing
3. Selector shaft seal
4. Vehicle speed sensor (VSS) ring
5. Mainshaft rear oil seal
6. Layshaft bearing
7. Mainshaft bearing

1. Inspect the sealing face with the front housing for damage, distortion etc.

2. Inspect the selector gate, but do not disturb unless it is worn or damaged. If it has to be renewed, **new securing bolts must be used**.

3. Remove and discard the mainshaft rear oil seal. Remove the speed sensor ring.

4. Prise out and discard the selector shaft oil seal.

   Inspect the selector shaft bearing for wear / damage.

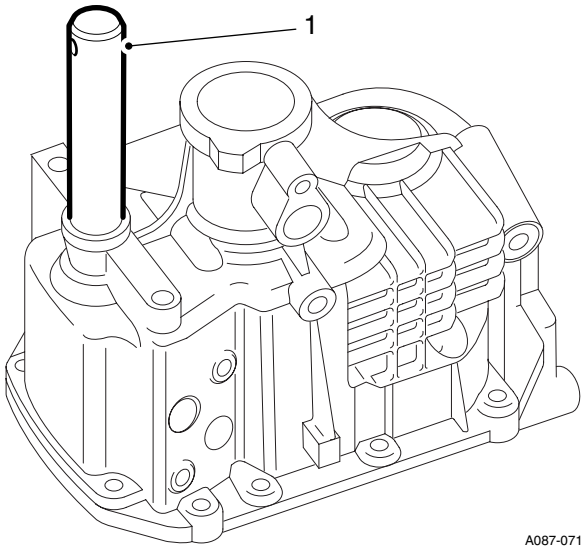


Fig.21 Fitting selector shaft bearing

1. LDV 119

If the bearing requires renewal it can be pressed out. Press in the replacement bearing from the outside using LDV 119, until it is flush with the shoulder which locates the oil seal.

Apply grease to the lip of a new seal before fitting it.

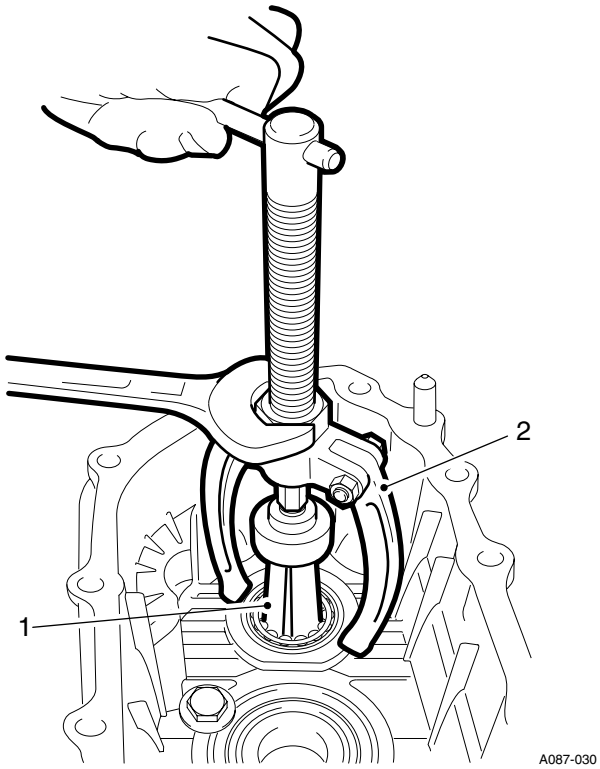


Fig.22 Removing layshaft rear bearing
1. Tool 1210517 (1.30/5)
2. Tool 1210518 (1.36/1)

5. If required, the layshaft rear bearing can be removed using tools 12105171 (1.30/5) and 1210518 (1.36/1).

   NOTE: If the layshaft bearing requires renewal, its inner track (on the layshaft) must be changed also (see 'Layshaft').

   To fit the bearing, press fully into the housing using 0499809 (18G 134) and 0480046 (GKN 550–7).

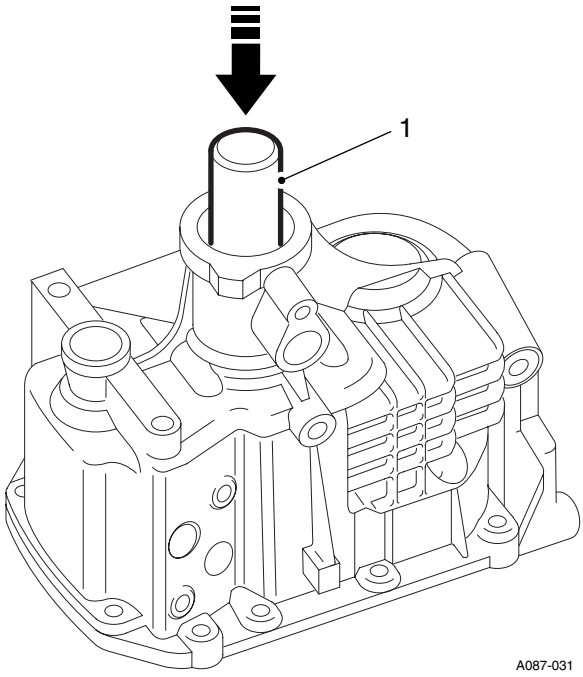


Fig.23 Removing mainshaft bearing
1. Tool 0499809 (18G 134)

6. To remove the mainshaft bearing:

   CAUTION: Do not damage the housing.
   Remove the 3 securing bolts and washers.
   Press out the bearing using tool 0499809 (18G 134).

7. To fit the mainshaft bearing:

   Position it with its shrouded side to the front, and press in fully using 0499809 (18G 134) and 0480046 (GKN 550–7).

   Secure with the 3 bolts and washers.

MAINSHAFT / INPUT SHAFT

Mainshaft and input shaft overhaul procedures are the same as MT 75 except for baulk ring instructions which are as follows:

Baulk Rings

The five baulk rings are identical.

During dismantling keep each baulk ring with its gear.

Inspect for wear and, if in doubt, compare with a new baulk ring.

When fitted on the cone face of its gear, a clearance must exist between the baulk ring and the dog teeth face.

CAUTION: Baulk rings must be soaked in oil before fitting, otherwise they can be damaged the first time they are used.

LAYSHAFT

Layshaft overhaul is identical to MT 75.

REVERSE IDLER SHAFT

Reverse idler shaft overhaul is identical to MT 75.

SELECTORS

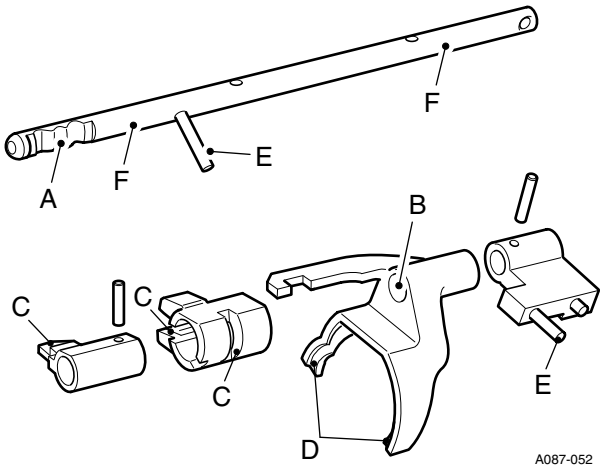


Fig.43 Selector component wear points

- 'A' Detent locations
- 'B' Selectors
- 'C' Wear between shaft/fork/selector
- 'D' Fork thrust faces
- 'E' Fingers
- 'F' Bearing locations

Examine each component as indicated in the illustration for wear, scoring, damage etc.

Repeat the inspection as applicable on the auxiliary shaft and on 3rd/4th and 5th/reverse selector forks.

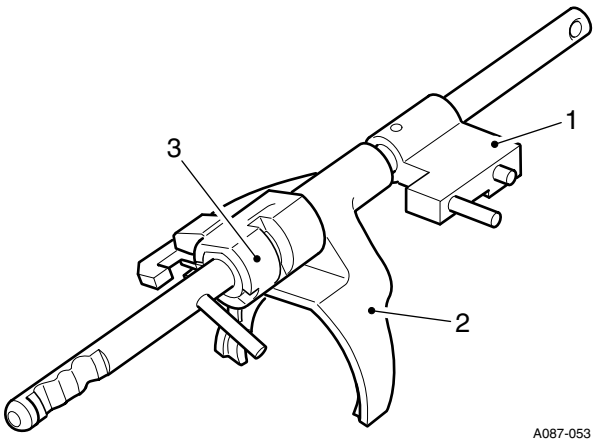


Fig.44 Main selector shaft assembly

1. Gearchange finger
2. 1st/2nd selector fork
3. Locking sleeve

If the main selector shaft requires dismantling, proceed as follows.

Drift out the rear roll pin and remove:

- gearchange finger,
- 1st/2nd selector fork,
- locking sleeve.

Drift out the front roll pin to remove the selector finger.

Reassembly is done in the reverse procedure, but note the following:

- Lubricate all sliding components.
- When fitting the front roll pin (securing the selector finger) **it must not protrude, otherwise it will obstruct free movement of the locking sleeve.**

GEARBOX REASSEMBLY

1. Secure the rear housing in a vertical plane.

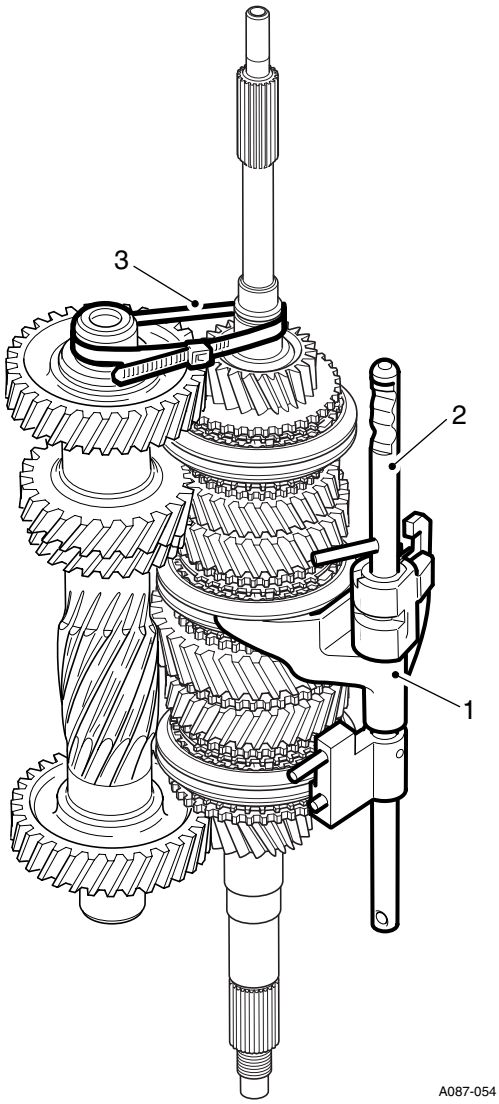


Fig.45 Geartrain
1. 1st/2nd selector fork
2. Main selector shaft
3. Cable tie

2. Mesh the layshaft into the mainshaft / input shaft assembly, and secure at the front end with a cable tie as before.

3. Position the main selector shaft assembly on the mainshaft assembly, locating 1st/2nd selector fork in 1st/2nd synchro assembly.

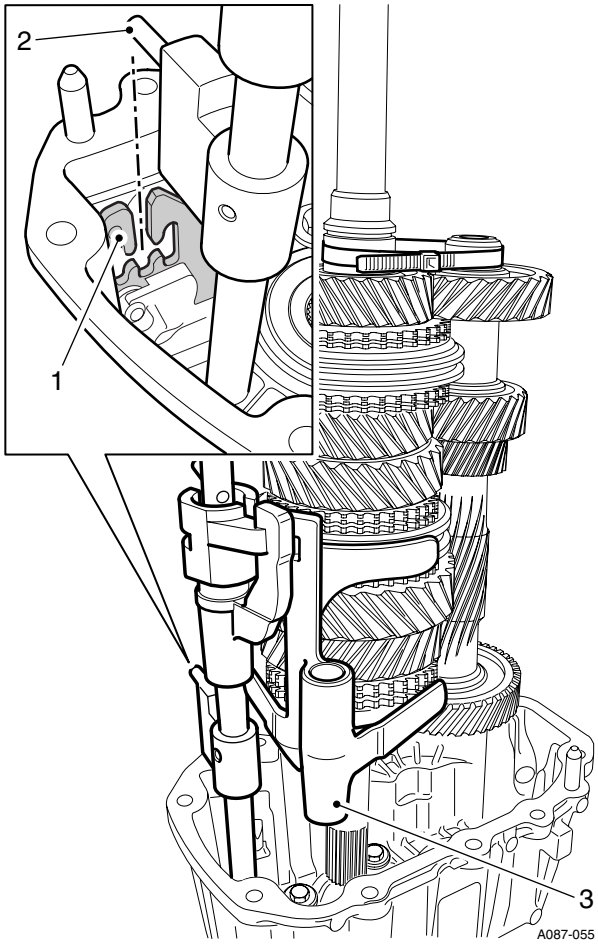


Fig.46 Fitting geartrain
1. Selector gate
2. Selector finger
3. 5th/reverse selector fork

4. Locate 5th/reverse selector fork in 5th/reverse synchro assembly.

5. Lower the geartrain assembly into the rear housing, ensuring the selector finger aligns with the slot in the selector gate.

   Locate the reverse idler shaft, spindle boss end downwards, and the reverse idler gear.

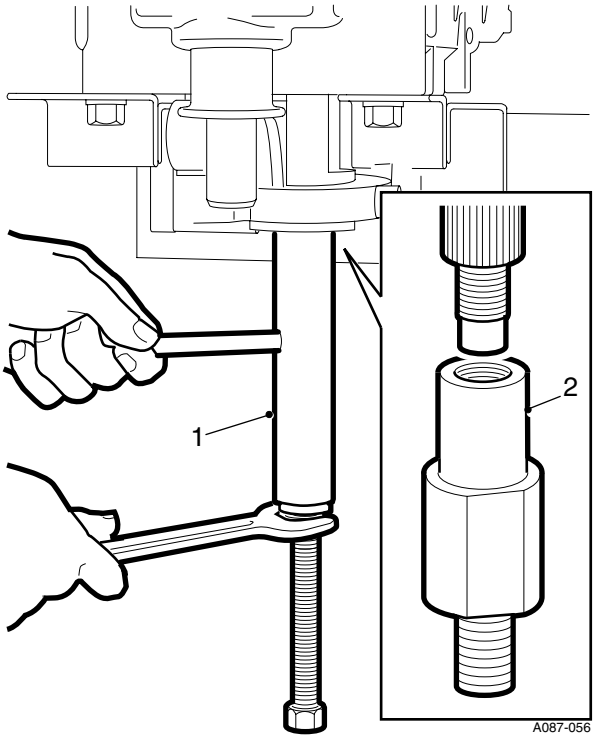


Fig.47 Pulling mainshaft into rear housing.

1. 0499915 (18G 1431B)
2. LDV 121

6. Pull the mainshaft into the rear bearing as follows:
   - Temporarily fit the speed sensor ring (inside splined end to the rear).
   - Screw tool LDV 121 onto the rear of the shaft, and then screw tool 0499915 (18G 1431B) onto LDV 121.
   - Turn the centre screw of tool 0499915 (18G 1431B) to pull the mainshaft fully into position, noting the important points below at frequent intervals during the fitting operation to avoid jamming:

   IMPORTANT:
   - Ensure the mainshaft is pulled in squarely.
   - Ensure the selector finger remains aligned in the gate, and the selector shaft enters its bearing in the housing.
   - Ensure the layshaft enters its bearing and remains free throughout.

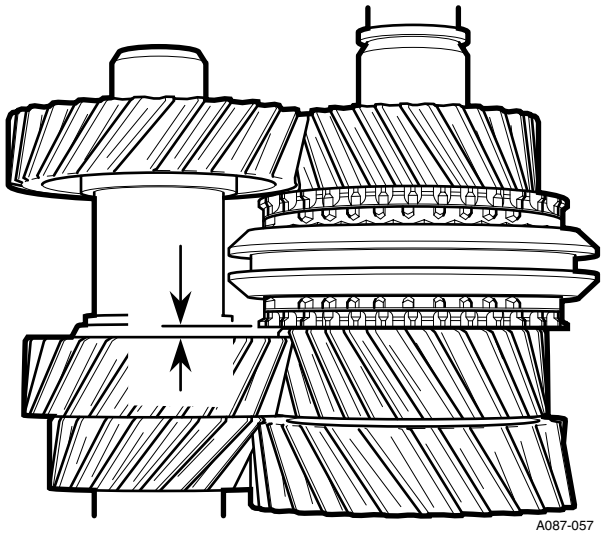


Fig.48

- Check that the gap (arrowed) between 3rd layshaft gear and 3rd gear dog teeth never reduces to zero.
- Check that the reverse idler assembly and the selector assemblies remain in their correct locations without jamming.

Remove tools 0499915 (18G 1431B) and LDV 121. Remove the speedometer sensor ring.

Check that all gears/shafts are able to turn/slide freely.

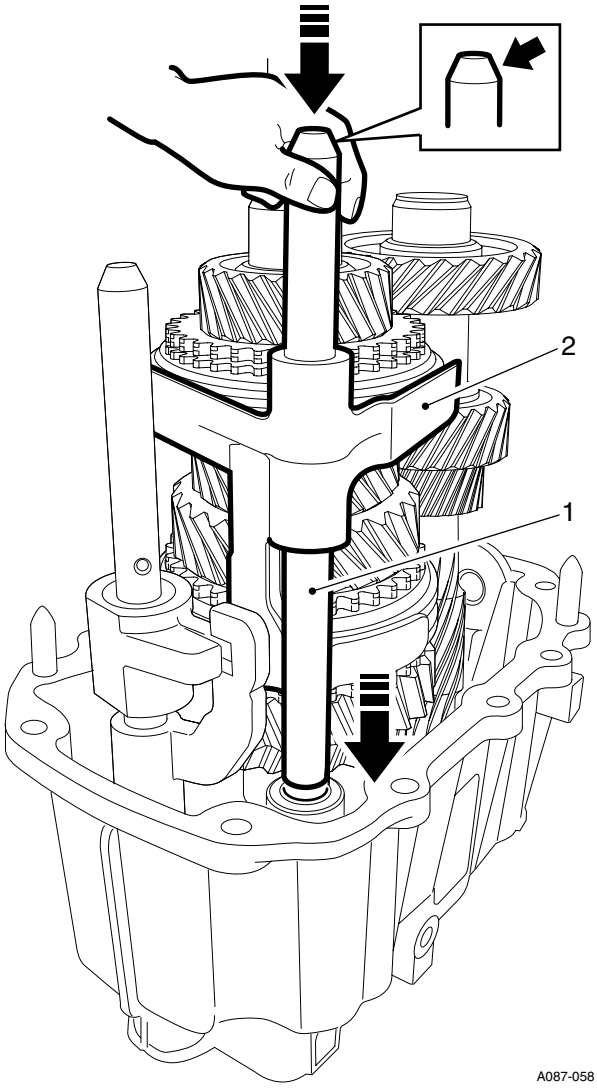


Fig.49 Fitting auxiliary selector shaft
1. Auxiliary selector shaft
2. 3rd/4th selector fork

7. Locate 3rd/4th selector fork into the 3rd/4th synchro assembly. Fit the shaft through 3rd/4th and 5th/reverse selector forks, making sure the chamfered end of the auxilliary selector shaft is to the top (see illustration inset). Locate the shaft in its bore in the housing.

8. Fit the speed sensor ring (inside splined end to the rear).

9. Lubricate the lips of a new rear oil seal with grease, then fit it with the smaller diameter lip inwards.

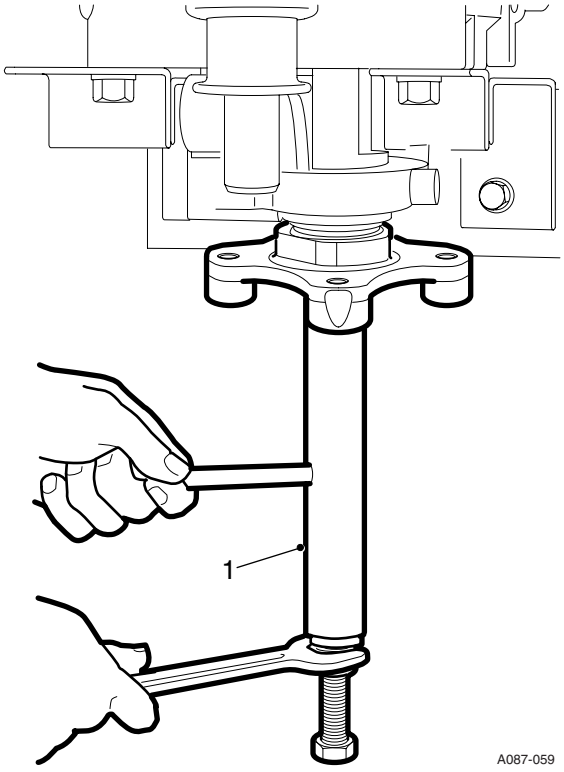


Fig.50 Pressing drive flange onto mainshaft
1. 0499915 (18G 1431B)

10. Fit the drive flange on the mainshaft, and press it into position using tools 0499915 (18G 1431B) and LDV 121. Remove the tools.

11. Fit flange holding tool LDV 118 to the flange using 2 bolts.
Apply Loctite 242 to the threads and mating surface of a new securing nut, then fit and tighten it to 200 Nm.
Remove tool LDV 118.

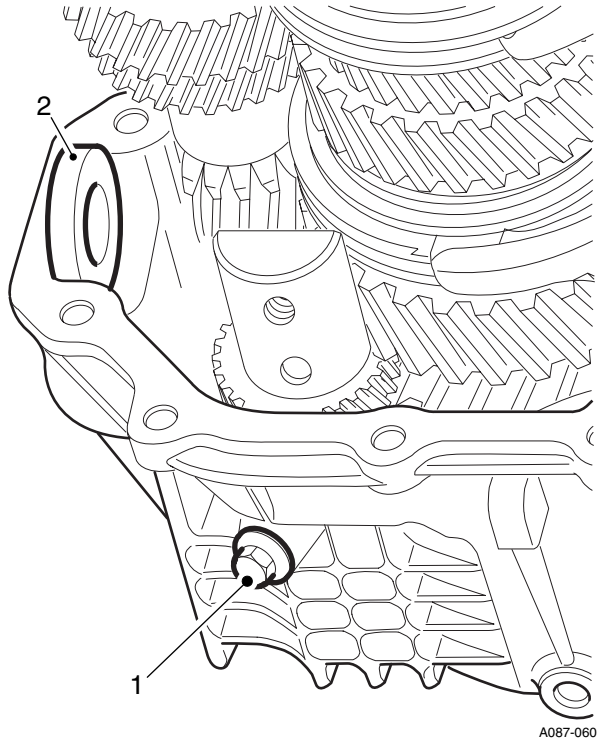


Fig.51

1. Reverse idler shaft bolt
2. Magnet

12. Fit the magnet.

13. Fit the reverse idler shaft rear retaining bolt (coloured blue), tightening it finger tight.

14. Remove the cable tie from the front of the geartrain.

15 Before fitting the front housing, note that the layshaft front bearing must be positioned to project rearwards by 2 mm (see section ‘Front Housing’).

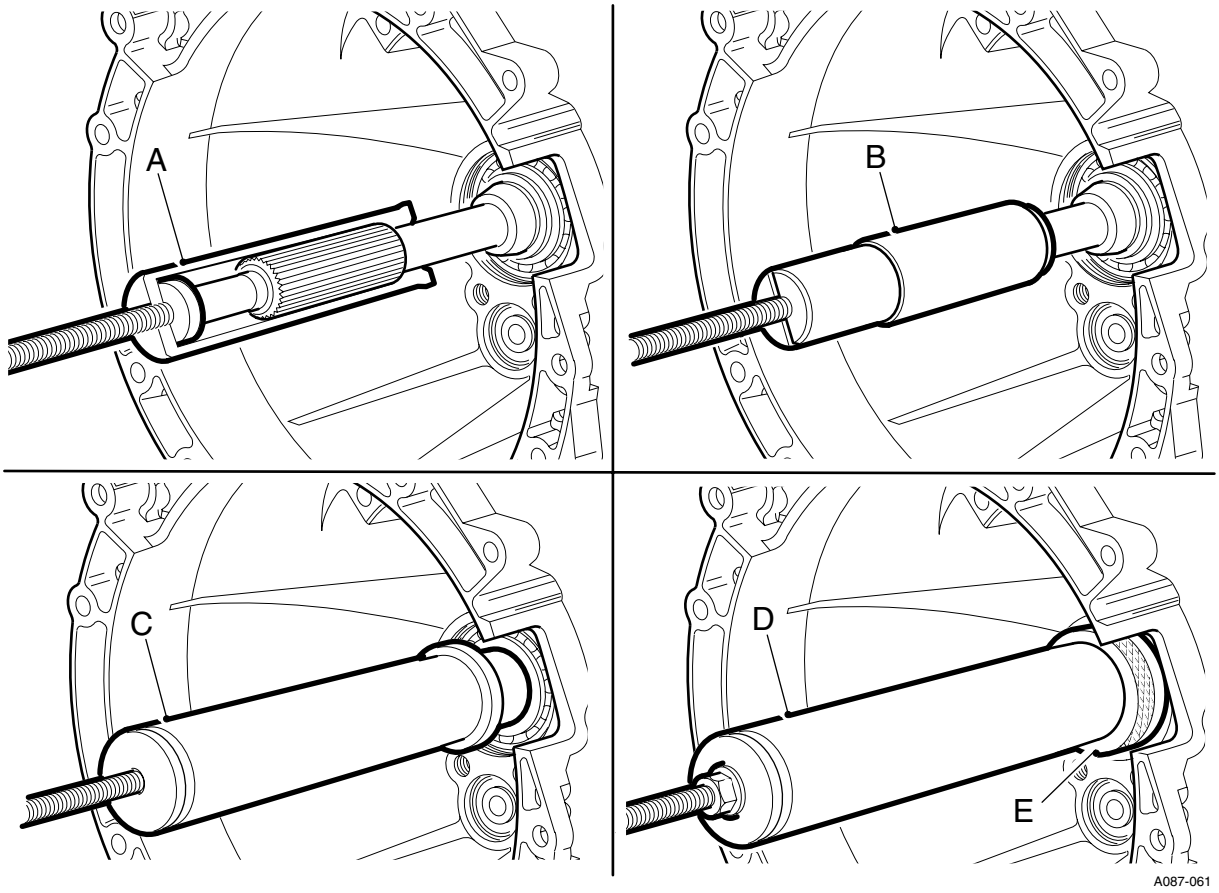


Fig.52 Fitting front housing

16. To fit the front housing:
    - Use degreasing agent Pt. No. BBU 9314 on the mating faces of the front and rear housings, then thoroughly dry them.
    - Apply sealant Pt. No. 1270836 in a continuous bead on the mating face and around the bolt holes of the rear housing.
    - Locate the housing over the geartrain.
    - **CAUTION: Ensure the layshaft and selector shafts are guided into their bearing locations in the housing.**

      Fit tools LDV 126 and LDV 127 as follows:

      A. locate the two halves of the puller behind the input shaft splines,

      B. fit the securing collar,

      C. remove the centre screw from the outer tube and position the tube over the puller,

      D. fit the washer/nut on the centre thread.

      E. fit LDV 127, screwing it into the front housing.

    - While observing the above caution, hold the tube with a suitable holding bar and tighten the centre nut to pull the input shaft fully through the input shaft bearing.
    - Remove the tools.

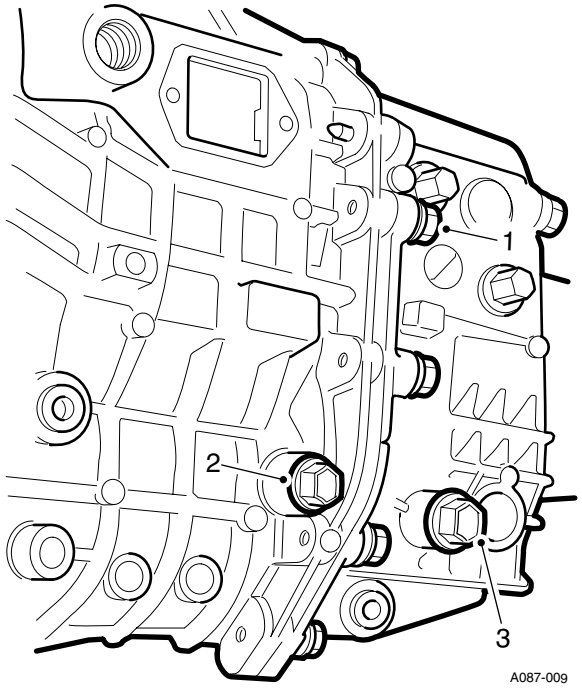


Fig.53

1. Housing bolts
2. Reverse idler shaft front securing bolt
3. Reverse idler shaft rear securing bolt

17. Fit two housing bolts diagonally and draw the two halves together.

    Fit the remaining 8 housing bolts and tighten them all to the correct torque – 24 Nm.

18. Fit the reverse idler shaft front securing bolt (coloured blue).

    Tighten both idler shaft securing bolts to 32 Nm.

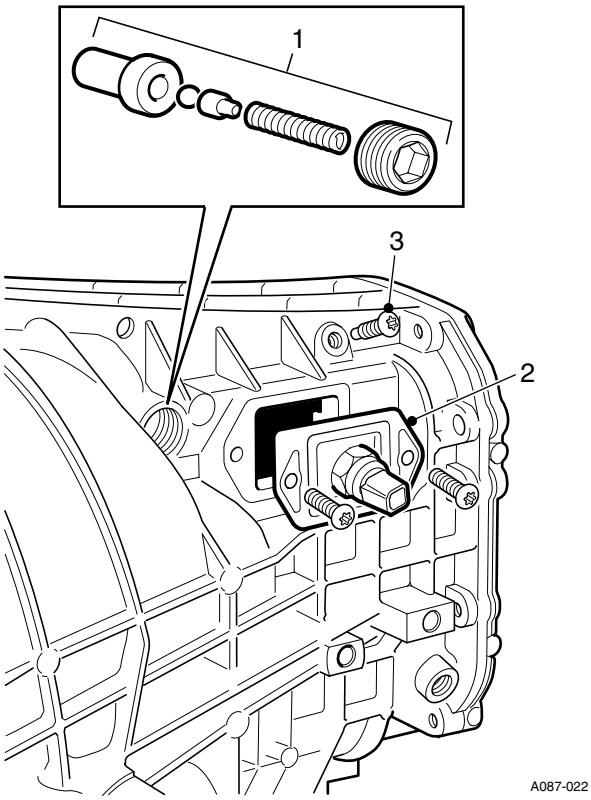


Fig.54

1. Selector detent
2. Reverse light switch
3. Selector shaft locking sleeve bolt

19. Fit the selector shaft locking sleeve bolt; tighten to 14 Nm.

20. **CAUTION: Check the reverse light switch gasket. If it is loose or damaged, fit a new switch assembly.**
    Fit the reverse light switch assembly, tightening the bolts to 12 Nm.

21. Apply sealant to the threads of the detent securing plug. Fit the detent components and tighten the plug to 24 Nm.

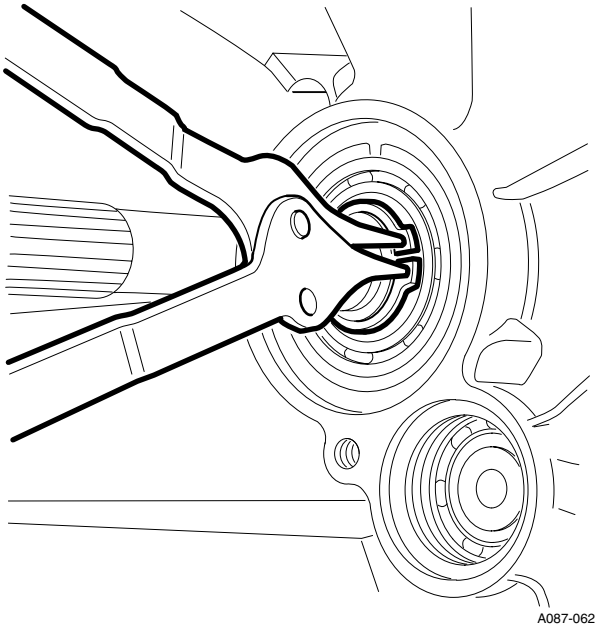


Fig.55 Fitting input shaft circlip

22. Two input shaft circlips are available:

    Thickness: 2,26 mm
    2,42 mm

    Select a circlip to eliminate any free play, and fit it the correct way round.

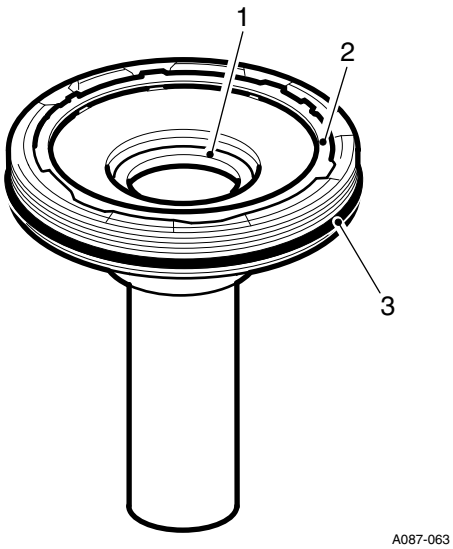


Fig.56 Input shaft guide sleeve

1. Oil seal
2. Bearing thrust washer
3. 'O' ring

23. Fit to the guide sleeve:
    - thrust washer,
    - new 'O' ring,
    - new oil seal, lip side outwards.

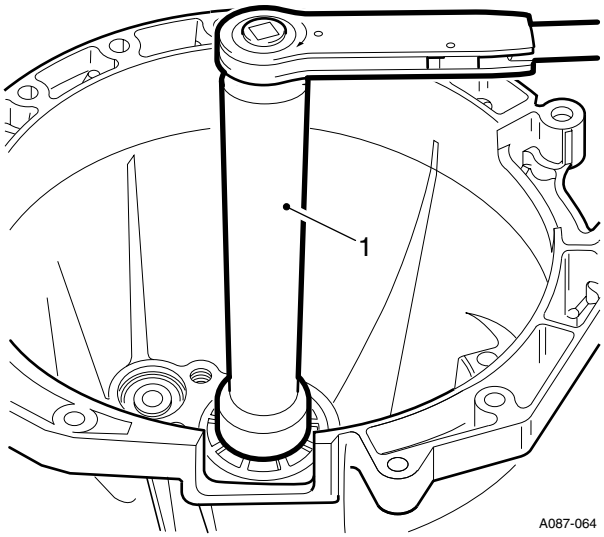


Fig.57 Fitting guide sleeve

1. Tool LDV 125

24. Lightly lubricate the threads of the guide sleeve with grease, then carefully fit the sleeve over the input shaft, making sure the oil seal is not damaged by the splines.

    Screw into the front housing and tighten using tool LDV 125 to 250 Nm.

25. Fit the layshaft front bearing retainer as follows:

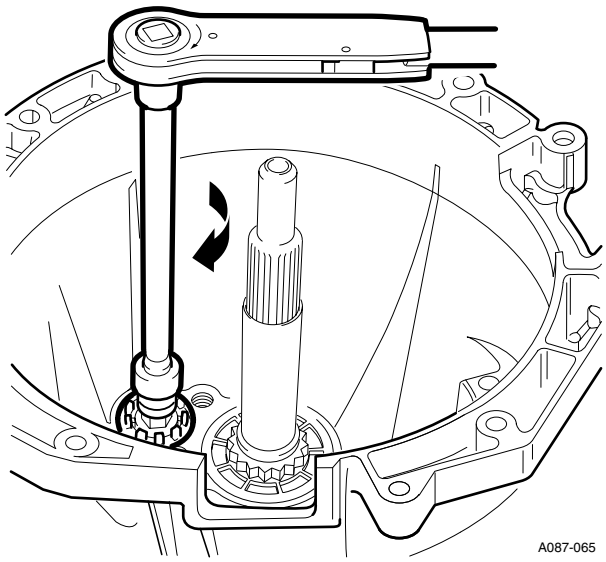


Fig.58

a. Fit a new 'O' ring, lightly lubricate the threads with grease then tighten the retainer into the housing to a torque of 24 Nm.

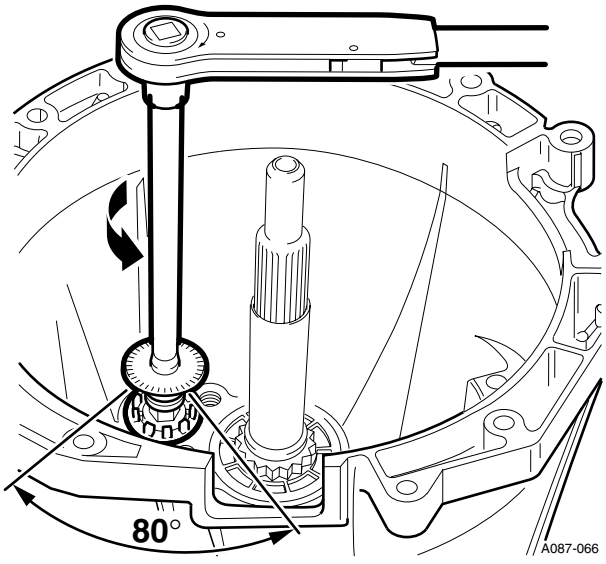


Fig.59

b. Slacken the retainer by 80°.

c. Remove the gearbox from the vice and lay it on the bench, tilting the clutch housing downwards at least 45°.

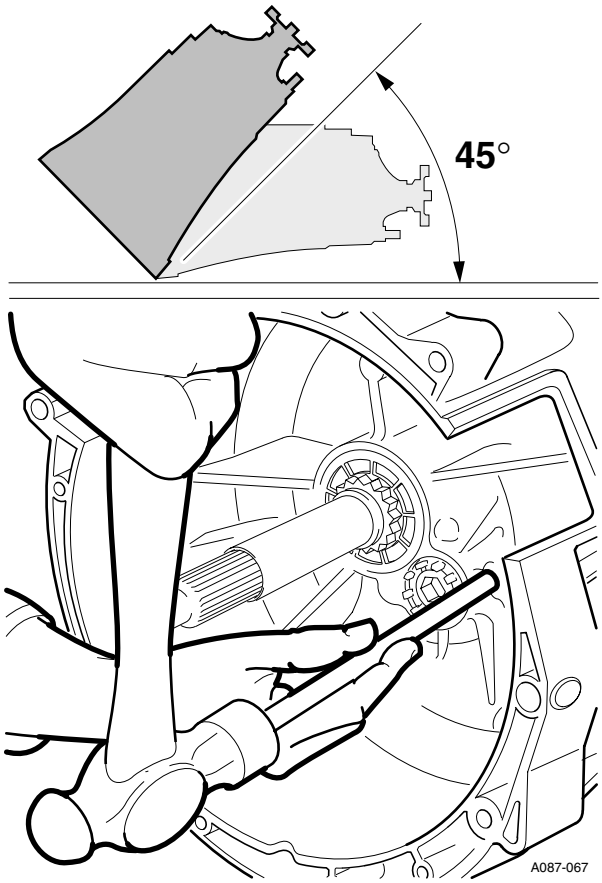


Fig.60

d. Using a brass drift, strike two blows on each of the housing lugs as illustrated to position the bearing.

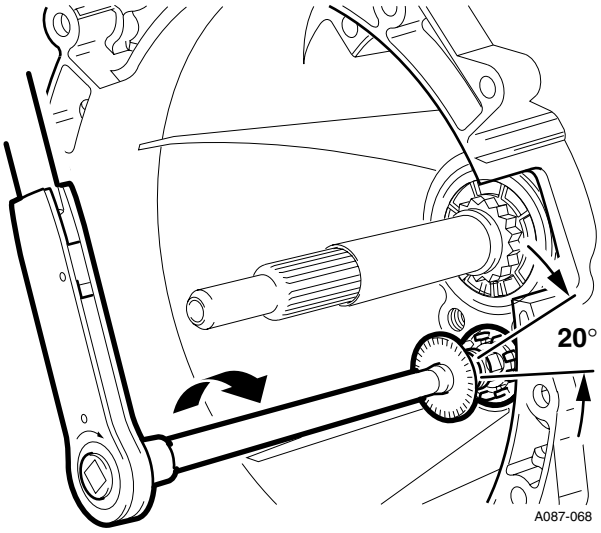


Fig.61

e. Tighten the retainer by 20°.
CAUTION: This operation must achieve a minimum tightening torque of 6 Nm.
If this minimum torque is not obtained, repeat operations ‘a’ to ‘e’.

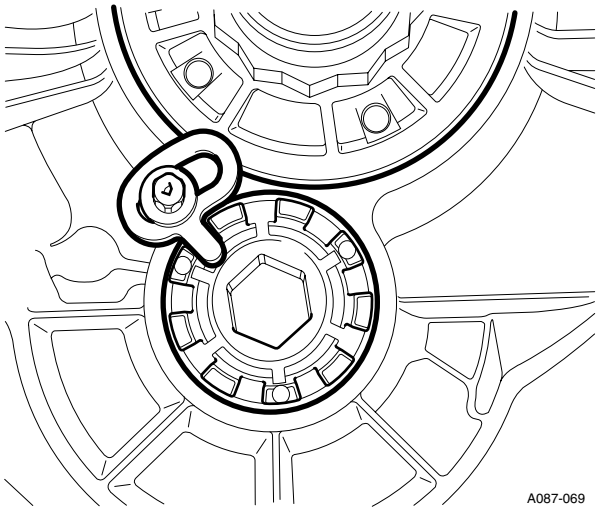


Fig.62 Locking plate

26. Using a new bolt, fit and secure the locking plate, positioning it to cover both the input shaft guide sleeve flange and the layshaft retainer.

27. Lubricate and fit the clutch release lever and release bearing.

28. Remove the mounting brackets.

29. Apply Hylomar and refit the oil drain plug, tightening it to 35 Nm.

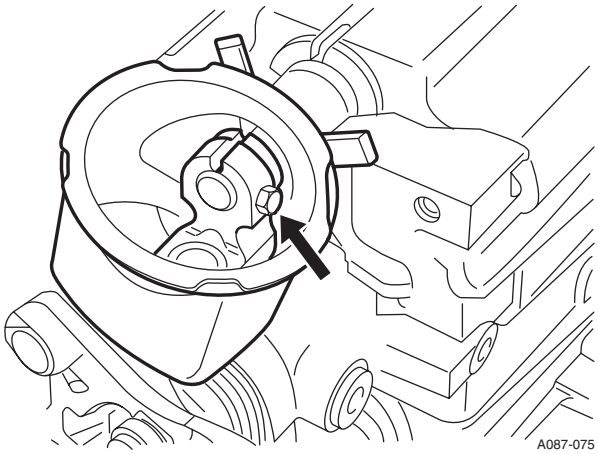


Fig.63 Gear lever coupling

30. Locate the gear lever coupling boot, and fit the coupling. Apply Loctite to its securing bolt (arrowed) and tighten to 13 Nm.

31. To fit the gear lever support bracket:
    - Tighten its retaining bolts to 25 Nm.
    - Locate the coupling boot to the support bracket.

32. Fit the vehicle speed sensor.

    Fit the tachograph sensor (if fitted).

Part Number MVP105601GB