

- (4) Inspect the new element for shipping or storage damage. Do not use the element if it has been damaged. Do not use the element without a gasket.
- (5) Clean the body with a damp, lint-free cloth. Fit the gasket and element into the body and secure with the wing nut.
- (6) Fit the baffle into the dust cup.

- (7) Fit the dust cup to the body and secure with the clamp.

- (8) Reset the indicator to show green by pressing the button (5) on top of the indicator.

**NOTE**

Do not attempt to service a faulty indicator - fit a new one.

# SECTION CONTENTS LIST

## SECTION H

### TRANSMISSION SYSTEM

SUB-SECTION	DESCRIPTION	PAGE
H1	GEARBOX	H1.1
H2	TRANSFER BOX	H2.1
H3	CLUTCH SYSTEM	H3.1
H4	PROPELLER SHAFTS	H4.1
H5	SPECIAL WORKSHOP TOOLS	H5.1

## SUB-SECTION CONTENTS LIST

### SUB-SECTION H1

#### GEARBOX

SUB-SUB-SECTION	DESCRIPTION	PAGE
H1.1	DESCRIPTION AND SPECIFICATIONS	H1.3
H1.2	FAULT DIAGNOSIS AND CORRECTIVE ACTION	H1.7
H1.3	REMOVAL AND REPLACEMENT PROCEDURES	H1.9
H1.4	OVERHAUL PROCEDURES	H1.41
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**SUB-SUB-SECTION CONTENTS LIST**

**SUB-SUB-SECTION H1.1**

**DESCRIPTION AND SPECIFICATIONS**

<b>CHAPTER</b>	<b>DESCRIPTION</b>	<b>PAGE</b>
1	DESCRIPTION OF THE GEARBOX	H1.5
2	GEARBOX SPECIFICATIONS	H1.6

H1.3

## SUB-SUB-SECTION H1.1

### CHAPTER 1

#### DESCRIPTION OF THE GEARBOX

##### GENERAL

1. The transmission of power from the engine is achieved by a unique gearbox/transfer box assembly. From the clutch the drive is first taken to the main four speed gearbox. At the near end of the gearbox a transfer box is attached, which transmits the drive through an idler to the propeller shaft drive units. The gearbox/transfer box is fitted between the clutch bell housing and rear axle.

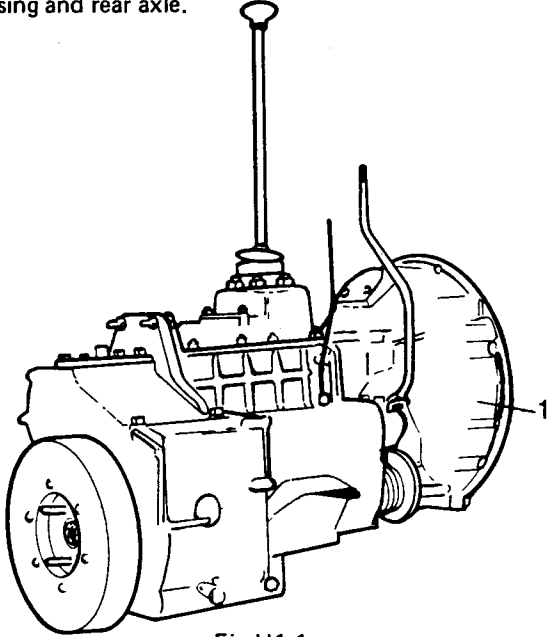


Fig H1.1

2. Refer to Fig H1.1. The gearbox/transfer box is bolted to the bell housing (1) and mounted to the chassis with rubber mountings. The idler wheel has two gears of different diameters and by means of a sliding gear on the output shaft, a high or low ratio can be added to the four speeds of the main gearbox. The forward output shaft drives the front wheels and this can be connected or disconnected by means of a dog clutch on the output shaft, to give 2 and 4 wheel drive.

## SUB-SUB-SECTION H1.1

### CHAPTER 2

## GEARBOX SPECIFICATIONS

### INTRODUCTION

- The specifications for the gearbox are given in the following tables:

TABLE H1.1 - GENERAL DATA

TABLE H1.2 - TORQUE SPECIFICATIONS

TABLE H1.1 - GENERAL DATA

ITEM	DESCRIPTION
Type .....	Single helical constant mesh with synchro-mesh on all forward speeds
Ratios: Top .....	Direct
Third .....	1,497: 1
Second .....	2,22: 1
First .....	3,65: 1
Reverse .....	4,06: 1
Adjustments and Measurements:	
On the 1st, 2nd and 3rd mainshaft gears end float should be .....	0,10 to 0,15 mm
Layshaft bearing nip .....	0,0 to 0,10 mm
Separation of rear cover to bearing .....	0,0 to 0,10 mm
Separation of front cover to primary shaft bearing .....	0,0 to 0,10 mm
End float of bearing fitted on primary shaft .....	0,0 to 0,5 mm
End float of transfer box double intermediate gear .....	0,10 to 0,20 mm
End float of high gear in transfer box .....	0,10 to 0,20 mm
Rolling resistance of output shaft of transfer box, measured with spring balance .....	0,90 to 1,80 kg
Free length of 4 wheel drive selector shaft spring .....	70 mm
Free length of high and low selector shaft spring .....	182 mm

TABLE H1.2 - TORQUE SPECIFICATIONS

ITEM	TORQUE (N.m)
Mainshaft transfer gear nut .....	130 to 170
Flywheel housing to clutch housing nuts .....	25 to 30
Fixing screws for register plate to clutch housing .....	5 to 10
Fixing nuts for power take off cover .....	12 to 17
Fixing nuts for power take off housing .....	20 to 30
Fixing nuts for mainshaft rear oil seal housing .....	20 to 30
Front output shaft casing to transfer box nuts .....	12 to 17
Speedometer drive housing to transfer box nuts .....	20 to 30
Clutch housing to gearbox nuts .....	60 to 75
Gearbox mounting nuts .....	30 to 45
Fixing screw clutch lever to pivot .....	7 to 10
Fixing screw clutch housing front cover .....	20 to 25
Fork retainer cover screws to gearbox .....	20 to 25
Front and rear output shaft flange nuts .....	110 to 120
Speedometer drive housing nuts .....	13 to 18
Fixing nuts for transmission brake drum to flange .....	20 to 30

## SUB-SUB-SECTION H1.2

### FAULT DIAGNOSIS AND CORRECTIVE ACTION

#### INTRODUCTION

1. This Sub-sub-section deals with fault diagnosis and corrective action for the gearbox. In Table H1.3, a list of symptoms, the probable cause and the necessary remedial action is given. It should be noted that the Table is not exhaustive and faults may occur which are not listed. Should the Table fail to give an indication of a fault, the suspected components should be removed for closer inspection and/or overhaul.

**TABLE H1.3 - GEARBOX FAULT DIAGNOSIS CHART**

SYMPTOM	POSSIBLE CAUSE	REMEDY
Gearbox noisy in neutral	Insufficient oil in gearbox. Incorrect grade of oil. Primary pinion bearing worn. Constant mesh gears worn.  Layshaft bearings worn.	Top up as necessary. Drain and replenish. Renew bearing. Renew primary pinion and layshaft. Renew bearings.
Gearbox noisy in all gears except top	Layshaft, mainshaft or primary pinion bearings worn. Constant mesh gears worn.	Renew bearings.  Renew primary pinion and layshaft.
Gearbox noisy in one gear only	Worn or damaged gears or bearings.	Renew gears and/or bearings.
Gearbox noisy in all gears	Worn bearings on primary pinion, mainshaft or layshaft.	Renew bearings.
Oil leaks from gearbox	Gearbox over-filled with lubricating oil. Loose or damaged drain or level plugs.  Obstructed breather. Joint washer damaged, incorrectly fitted or missing.  Oil seals damaged or incorrectly fitted.  Cracked or broken gearbox casings.	Rectify oil level with vehicle standing on level floor. Tighten plugs. If damaged, fit new plugs and joint washer as required. Clean breather. Fit new joint washer with general purpose grease smeared on both sides. Fit new oil seal with 'Hylomar' SQ32M sealing compound smeared on the outside diameter. Fit new casings.
Difficulty in engaging forward gears	Weak springs or worn parts in synchromesh units. Worn selector forks and/or interlock pins. Faulty clutch operation; clutch fluid leakage.	Renew faulty parts.  Renew components as necessary. Check clutch master and slave cylinders. Renew clutch components as necessary.
Difficulty in engaging reverse gear	Reverse gear bearings worn or damaged. Faulty clutch operation, clutch fluid leakage.	Renew bearings and shaft as necessary. Check clutch master and slave cylinders. Renew clutch components as necessary.

TABLE H1.3 - GEARBOX FAULT DIAGNOSIS CHART - CONTINUED

SYMPTOM	POSSIBLE CAUSE	REMEDY
Difficulty in disengaging forward gears	Synchromesh cones worn; damaged gear dogs. Distorted or damaged splines.	Renew faulty parts. Renew components as necessary.
Difficulty in disengaging reverse gear	Reverse gear seized on shaft.	Renew parts as necessary.
Gear lever going into reverse too easily and not into first	Weak reverse stop hinge plate spring.	Renew the spring.
Transfer of oil between main gearbox and transfer gearbox	Faulty 'O'-ring seal on reverse idler shaft.	Renew seal.
	Faulty mainshaft oil seal. Obstructed main gearbox breather.	Renew seal. Clean breather.
Oil leakage from gearbox to bell housing	Faulty joint washer/s on gearbox front cover and oil pump.	Renew joint washer/s.
	Faulty oil seal, primary pinion to front cover.	Renew oil seal.
	Damaged or porous gearbox front cover.	Renew front cover.
Transfer gearbox noisy	Insufficient oil in transfer box. Incorrect grade of lubricating oil.	Replenish. Drain and replenish with the correct grade oil. Adjust as required.
	Excessive end float on intermediate gears assembly. Worn components in gearbox differential unit. Worn bearings in intermediate gears assembly.	Renew components. Renew bearings.



## SUB-SUB-SECTION CONTENTS LIST

### SUB-SUB-SECTION H1.3

#### REMOVAL AND REPLACEMENT PROCEDURES

CHAPTER	DESCRIPTION	PAGE
1	GEARBOX - REMOVAL AND REPLACEMENT	H1.11
2	SPEEDOMETER DRIVE ASSEMBLY - REMOVAL AND REPLACEMENT	H1.14
3	MAIN GEARBOX LEVER - REMOVAL AND REPLACEMENT	H1.15
4	SELECTOR FORKS AND SHAFT - REMOVAL AND REPLACEMENT	H1.16
5	CLUTCH WITHDRAWAL MECHANISM - REMOVAL AND REPLACEMENT	H1.17
6	CLUTCH BELL HOUSING - REMOVAL AND REPLACEMENT	H1.21
7	CLUTCH BELL HOUSING - FITTING NEW HOUSING	H1.22
8	PRIMARY SHAFT BEARING - REMOVAL AND REPLACEMENT	H1.24
9	PRIMARY SHAFT - REMOVAL AND REPLACEMENT	H1.25
10	GEARBOX REAR OIL SEAL RETAINER - REMOVAL AND REPLACEMENT	H1.26
11	GEARBOX REAR OIL SEAL RETAINER - FITTING NEW RETAINER	H1.28
12	MAINSHAFT REAR OIL SEAL - REMOVAL AND REPLACEMENT	H1.29
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14	REAR MAIN SHAFT BEARING - REMOVAL AND REPLACEMENT	H1.32
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16	MAIN SHAFT AND LAYSHAFT - REMOVAL AND REPLACEMENT	H1.35
17	GEARBOX LAYSHAFT - FITTING NEW LAYSHAFT	H1.36
18	LAYSHAFT BEARINGS - FITTING NEW BEARINGS	H1.37
19	SPEEDOMETER CABLE - REMOVAL AND REPLACEMENT	H1.39

#### NOTE

For speedometer removal see Sub-section O5

## SUB-SUB-SECTION H1.3

### CHAPTER 1

#### GEARBOX - REMOVAL AND REPLACEMENT

##### NOTE

If the vehicle is not stationed over a pit the gear lever must be removed before the gearbox can be withdrawn (see Sub-sub-section H1.3, Chapter 3 for gear lever removal).

##### REMOVAL

1. To remove the gearbox from the vehicle:

- (1) Remove the floor tunnel (see Sub-section M3, Chapter 5).
- (2) Drain the gearbox lubricating oil (see Sub-section H1.5).

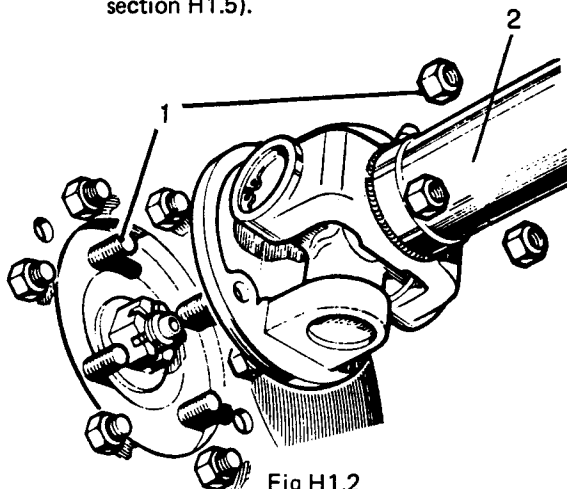


Fig H1.2

- (3) Refer to Fig H1.2. Remove the rear propeller shaft fixings (1) at the transmission brake.
- (4) Move aside the shaft (2).

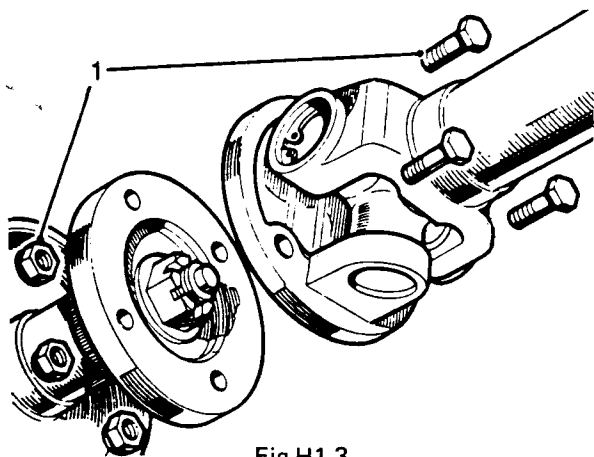


Fig H1.3

- (5) Refer to Fig H1.3. Remove the front propeller shaft fixings (1) at the front output coupling.
- (6) Move aside the shaft.

##### NOTE

If the vehicle is fitted with any optional equipment driven from the gearbox, this must be disconnected at the gearbox.

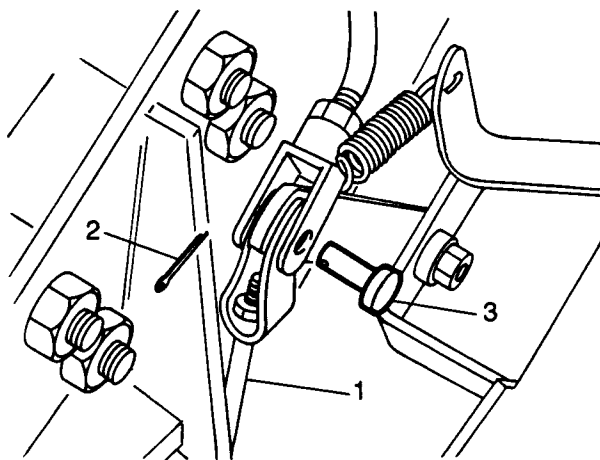


Fig H1.4

- (7) Refer to Fig H1.4. Disconnect the handbrake expander rod (1) by removing the split pin (2) and pulling out the clevis pin (3).

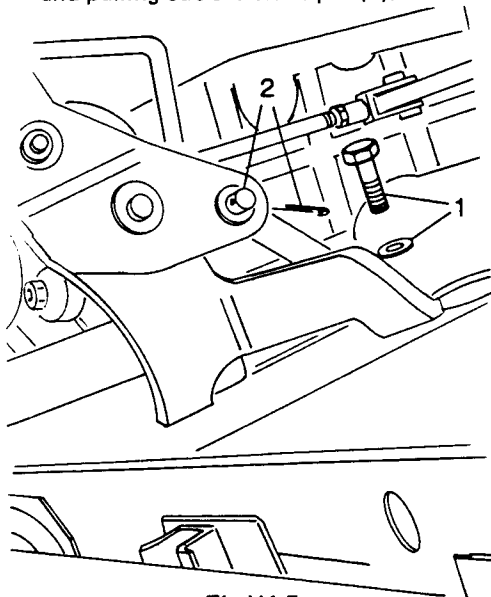


Fig H1.5

- (8) Refer to Fig H1.5. Remove the brake lever fixings (1) and the relay fixings (2).
- (9) Remove the brake lever and the relay mechanism.

- (10) Disconnect the speedometer cable from the gearbox (see Sub-sub-section H1.3, Chapter 19).

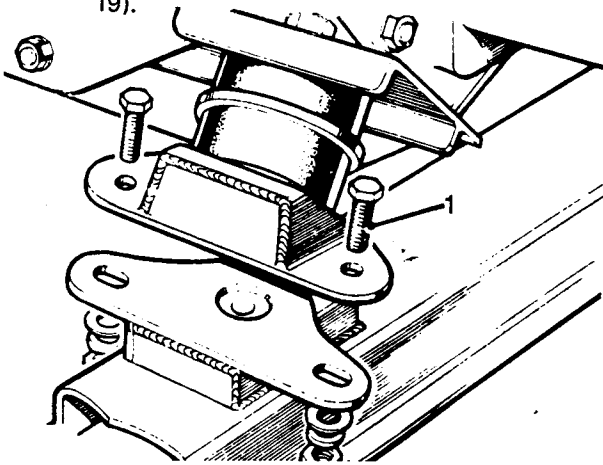


Fig H1.6

- (11) Refer to Fig H1.6. Remove the fixings (1) from the two rear mountings for the gearbox.

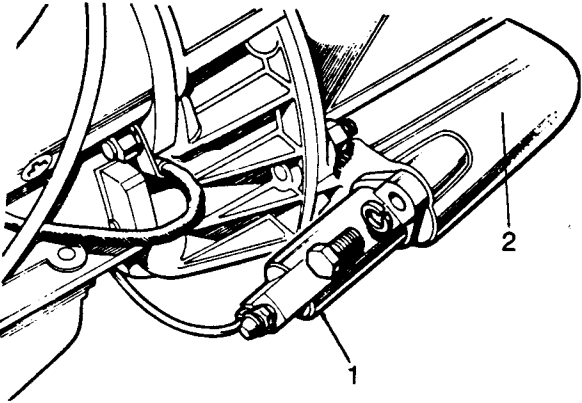


Fig H1.7

- (12) Refer to Fig H1.7. Remove the clutch slave cylinder (1) from the bell housing (2) (see Sub-sub-section H3.4, Chapter 3).
- (13) Jack up the rear of the engine with a 25 mm thick block of wood between the flywheel housing, to retain the engine in position when the gearbox is removed.
- (14) Place a suitable sling around the gearbox and tension it sufficiently to take the weight.
- (15) Remove the remaining fixings securing the bell housing to the flywheel housing.
- (16) Remove the gearbox rear mounting cross-member fixings to chassis and remove the cross-member.
- (17) Carefully withdraw the gearbox rearwards clear of the clutch and lower beneath the vehicle.

## REPLACEMENT

2. Replace the gearbox as follows:

- (1) Place a suitable sling around the gearbox and raise it to the level of the flywheel housing.

- (2) Ease the gearbox towards the flywheel housing ensuring that the splined shaft engages with the splines in the clutch driven plate. It may be necessary to put the gearbox into fourth gear and turn the rear propeller shaft flange to achieve this.

- (3) Fit and secure the gearbox rear mounting cross-member.

- (4) Replace the fixings securing the bell housing to the flywheel housing.

- (5) Replace the clutch slave cylinder (see Sub-sub-section H3.4, Chapter 3).

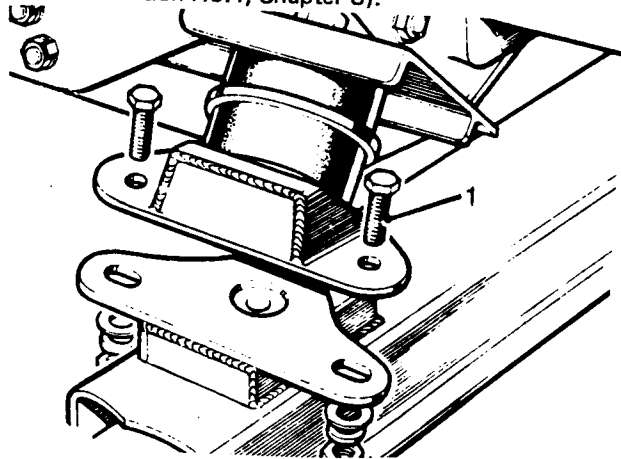


Fig H1.8

- (6) Refer to Fig H1.8. Replace the fixings (1) for the two rear mountings for the gearbox.

- (7) Reconnect the speedometer cable (see Sub-sub-section H1.3, Chapter 19).

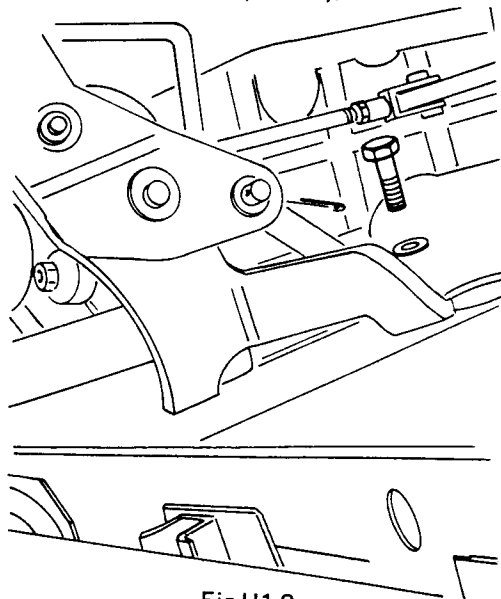


Fig H1.9

- (8) Refer to Fig H1.9. Replace the brake lever and relay mechanism.

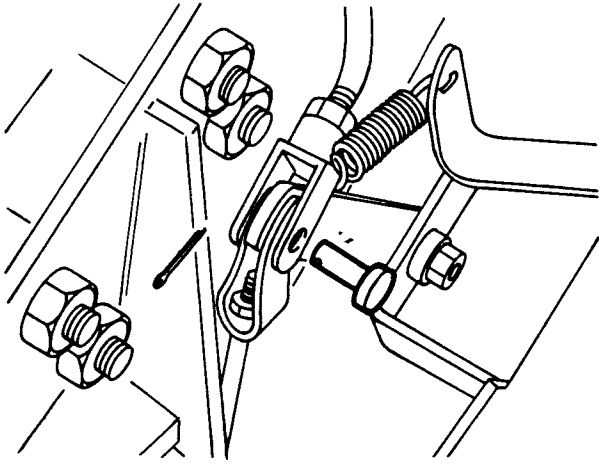


Fig H1.10

(9) Refer to Fig H1.10. Reconnect the handbrake expander rod.

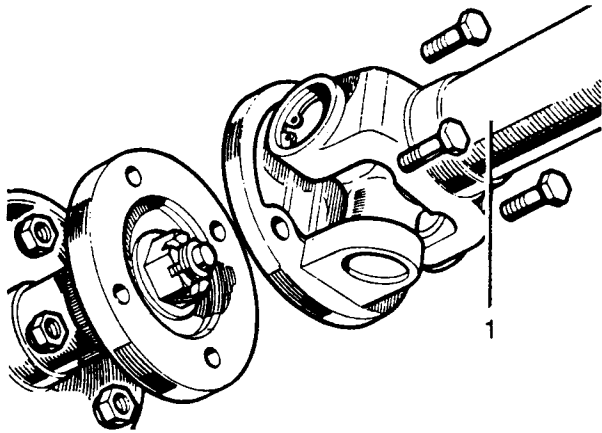


Fig H1.11

(10) Refer to Fig H1.11. Refit the front propeller shaft (1).

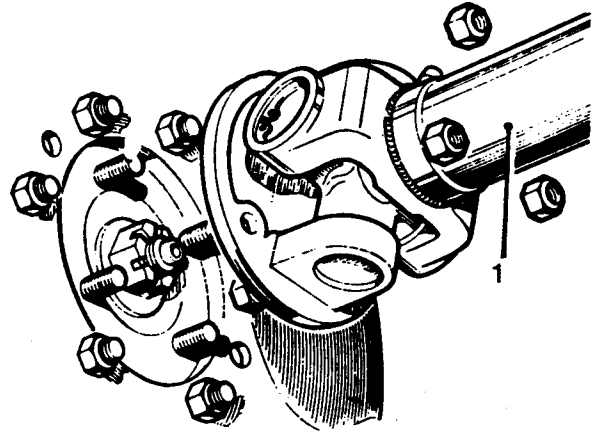


Fig H1.12

(11) Refer to Fig H1.12. Refit the rear propeller shaft (1).

(12) Refill the gearbox with the correct grade of lubricating oil (see Sub-section H1.5).

(13) Replace the floor tunnel (see Sub-section M3, Chapter 5).

## SUB-SUB-SECTION H1.3

### CHAPTER 2

#### SPEEDOMETER DRIVE ASSEMBLY - REMOVAL AND REPLACEMENT

##### REMOVAL

1. To remove the assembly:

- (1) Drain the oil from the transfer box (see Sub-section H2.5).
- (2) Remove the transmission brake (see Sub-sub-section K2.4, Chapter 2).

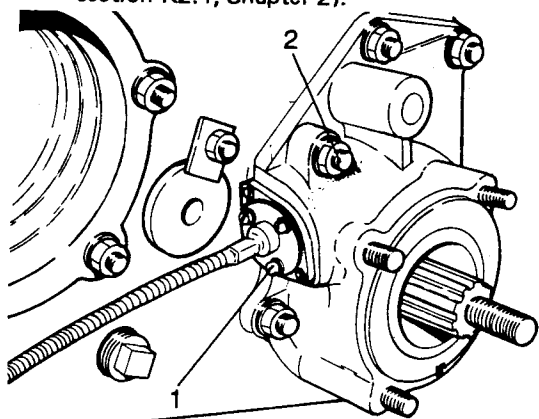


Fig H1.13

(3) Refer to Fig H1.13. Remove the fixing of the speedometer cable plate (1) and disconnect it from the gearbox.

(4) Remove the fixing from the speedometer cover (2).

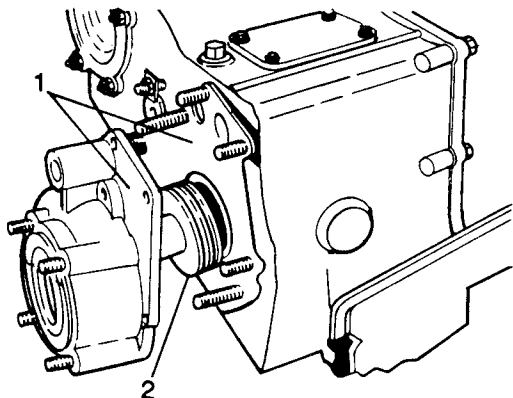


Fig H1.14

(5) Refer to Fig H1.14. Remove the speedometer cover (1) together with the shims.

(6) Remove the speedometer drive (2).

##### REPLACEMENT

2. To refit the speedometer drive assembly:

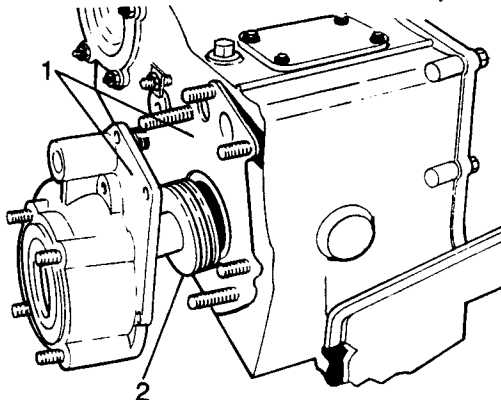


Fig H1.15

(1) Refer to Fig H1.15. Replace the speedometer drive (2).

(2) Fit the speedometer cover together with its shims (1).

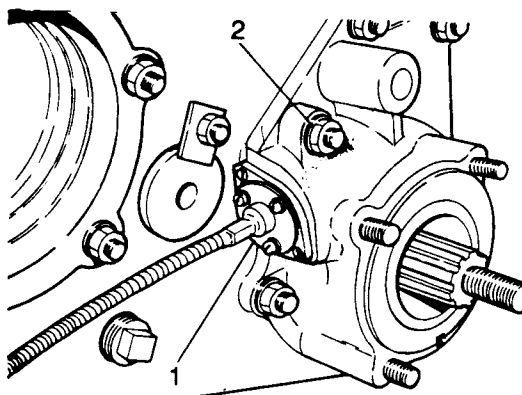


Fig H1.16

(3) Refer to Fig H1.16. Refit the speedometer cover cover fixings (2).

(4) Refit the speedometer cable plate (1) to the gearbox.

(5) Replace the transmission brake (see Sub-sub-section K2.4, Chapter 2).

(6) Refill the transfer box with the correct grade of oil (see Sub-section H2.5).

## SUB-SUB-SECTION H1.3

### CHAPTER 3

#### MAIN GEARBOX LEVER - REMOVAL AND REPLACEMENT

##### REMOVAL

1. To remove the main gearbox lever:

(1) Set the gear lever to neutral.

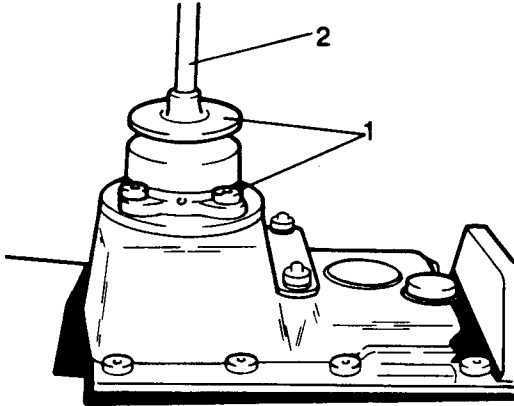


Fig H1.17

(2) Refer to Fig H1.17. Remove the gear lever dust cover and fixings (1).

(3) Remove the gear lever (2) together with its support bracket.

##### REPLACEMENT

2. Replace the gear lever as follows:

(1) Impregnate the selector finger with general purpose grease.

(2) Fit the selector finger into fork grooves.

(3) Apply sealing compound to the support and housing mating faces.

(4) Fit the support and secure with the four nuts and washers.

(5) Fit the dust cover.

## SUB-SUB-SECTION H1.3

### CHAPTER 4

#### SELECTOR FORKS AND SHAFTS - REMOVAL AND REPLACEMENT

##### REMOVAL

1. To remove the selector forks and shafts:
  - (1) Remove the cab floor and gearbox tunnel (see Sub-section M3, Chapter 5).
  - (2) Remove the main gear level (see Sub-sub-section H1.3, Chapter 3).

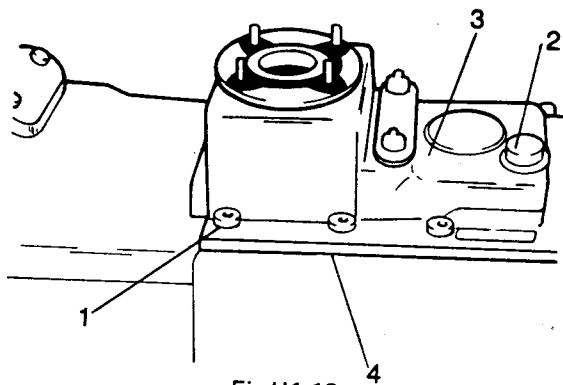


Fig H1.18

- (3) Refer to Fig H1.18. Remove the selector fork and shaft cover fixings (1).
- (4) Remove the plug (2) or reverse switch on special gearboxes.
- (5) Remove the cover (3), shafts and forks.

##### CLEANING

2. Remove the gasket (4) and carefully clean the rest of the sealing compound from the surfaces of the casing and fork cover.

##### REPLACEMENT

3. Replace the selector forks and shafts: (Fig H1.18 still applies).
  - (1) Fit a new gasket (4), applying a film of sealing compound, Hermetical 600, on both faces.
  - (2) Fit the selector forks, shafts and cover (3), taking the precaution of joining the reverse selector fork with the actuating lever.
  - (3) Fit the assembly with its nuts and washers (2), tightening them to a torque of 20 to 25 N.m.
  - (4) Fit the plug (1) or reverse switch as necessary.
  - (5) Fit the main gear lever (see Sub-sub-section H1.3, Chapter 3).
  - (6) Start up the engine and check to see that the gears are selected without difficulty.
  - (7) Fit the gearbox tunnel and cabin floor (see Sub-section M3, Chapter 5).

## SUB-SUB-SECTION H1.3

### CHAPTER 5

#### CLUTCH WITHDRAWAL MECHANISM - REMOVAL AND REPLACEMENT

##### DISMANTLING

1. First drain all oil from the gearbox (see Sub-sub-section H1.5).
2. To dismantle the clutch withdrawal mechanism:
  - (1) Remove the gearbox assembly from the vehicle (see Sub-sub-section H1.3, Chapter 1).

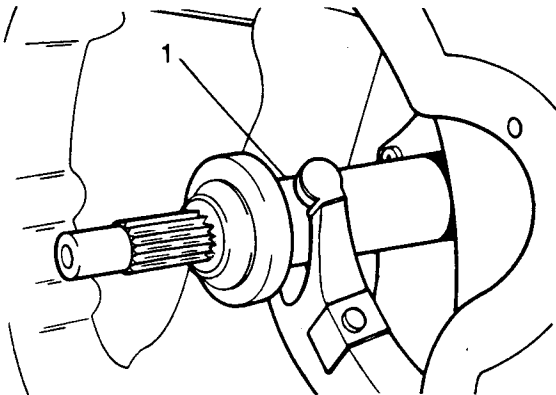


Fig H1.19

- (2) Refer to Fig H1.19. Remove the plastic clip (1) to separate the withdrawal bearing from the clutch mechanism.

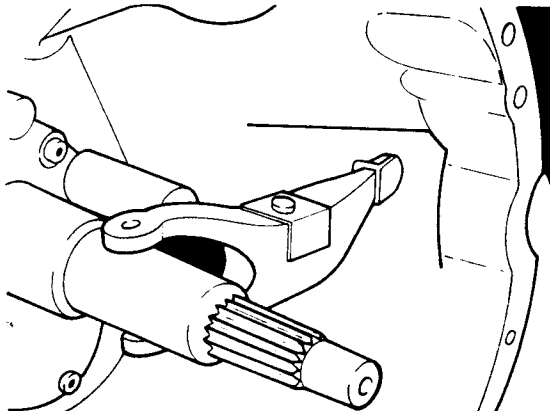


Fig H1.20

- (3) Refer to Fig H1.20. Remove the bolt, washer and clip to separate the clutch lever from its supporting pivot.

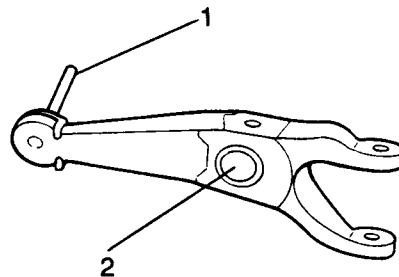


Fig H1.21

- (4) Refer to Fig H1.21. Separate the push rod (1) from the clutch lever by releasing the plastic clip.
- (5) Remove the supporting bush (2) from the pivot.

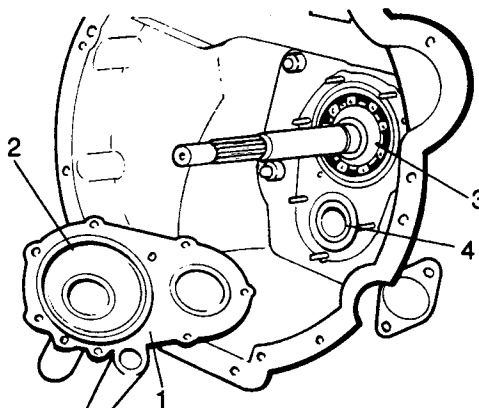


Fig H1.22

- (6) Refer to Fig H1.22. Remove the front cover (1) together with its gasket, removing first the fixing elements.
- (7) Remove the adjusting washers from the bearing of the primary shaft (3) and the front bearing of the layshaft (4) for its ultimate fitting.

##### NOTE

Washers (3) and (4) may come away with the front cover (1).

##### INSPECTION

3. Inspect as follows:
  - (1) Check all parts to see if there is wear or damage, paying special attention to the cover oil seal and the contact surface of the primary shaft.



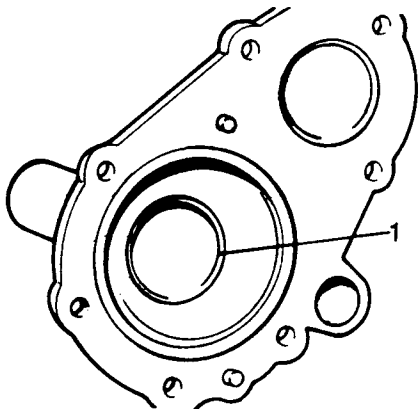


Fig H1.23

(2) Refer to Fig H1.23. Remove the oil seal (1) which is housed in the inside of the cover.

(3) Fit a new oil seal in the cover. The spring must be towards the operator and apply oil SAE 90 EP on the spring lip.

**REASSEMBLY**

**NOTE**

If the old cover is to be replaced, proceed as in para 4. If a new cover is to be fitted go to para 5.

4. To reassemble using the original cover:

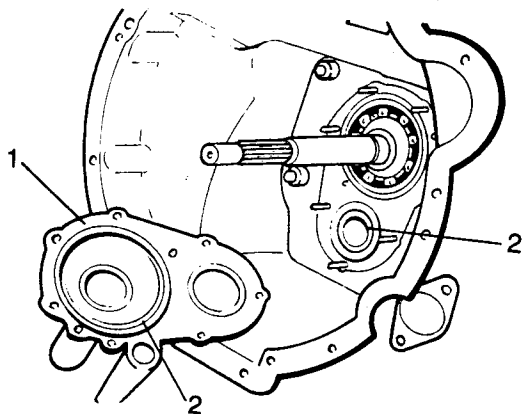


Fig H1.24

(1) Refer to Fig H1.24. Apply a film of Hermetical 600 on both faces of the gasket (1).

(2) Position the bearing adjusting washers of the primary shaft and the front bearing of the layshaft (2).

(3) Fit the cover and tighten the nuts to a torque of 20 to 25 N.m.

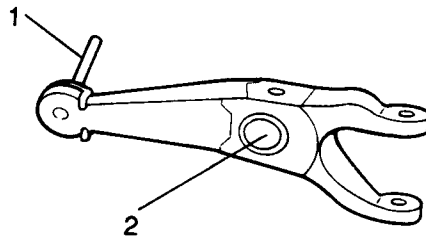


Fig H1.25

(4) Refer to Fig H1.25. Replace the supporting bush (2) in the pivot.

(5) Fit the push rod (1) to the clutch lever and secure with the plastic clip.

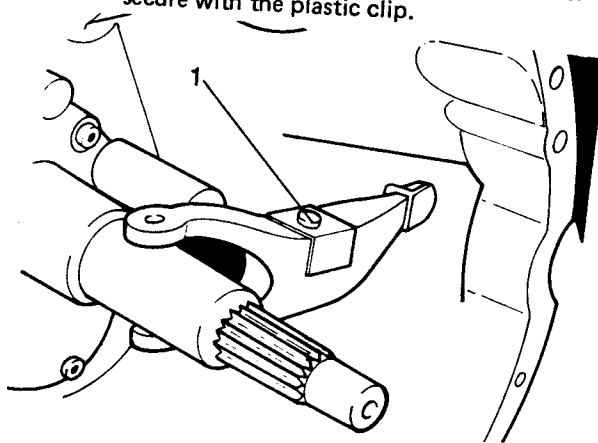


Fig H1.26

(6) Refer to Fig H1.26. Replace the bolt, washer and clip (1) holding the clutch lever to its supporting pivot.

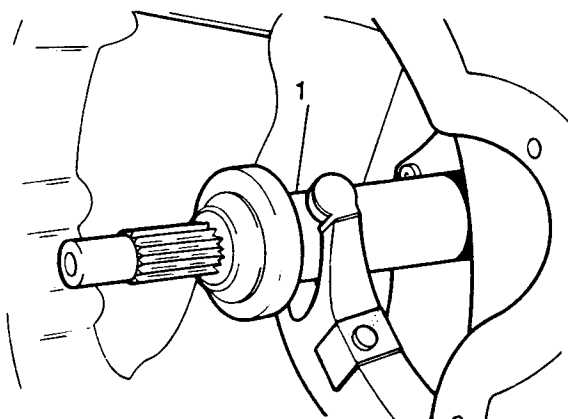


Fig H1.27

(7) Refer to Fig H1.27. Refit the clutch mechanism to the withdrawal bearing and secure with the plastic clip (1).

(8) Refit the gearbox to the vehicle (see Sub-sub-section H1.3, Chapter 1) and refill with the correct grade of oil.

5. When replacing the front cover a new adjustment of the primary shaft bearing must be made. To re-assemble using a new front cover:

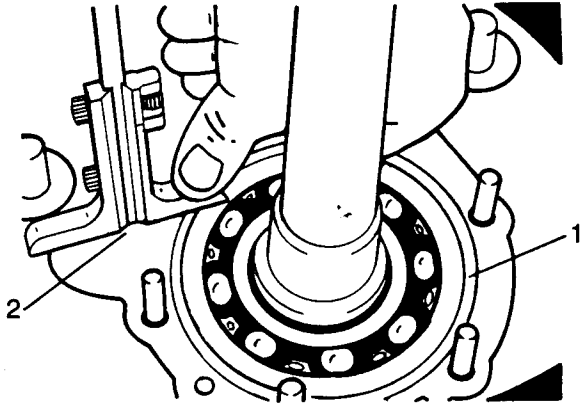


Fig H1.28

- (1) Refer to Fig H1.28. Make sure that the spring ring (1) for the primary shaft bearing butts up against the inside frontal face of the clutch housing.
- (2) Measure the part that overlaps the exterior track of the bearing, relative to the frontal interior face of the clutch housing (2).

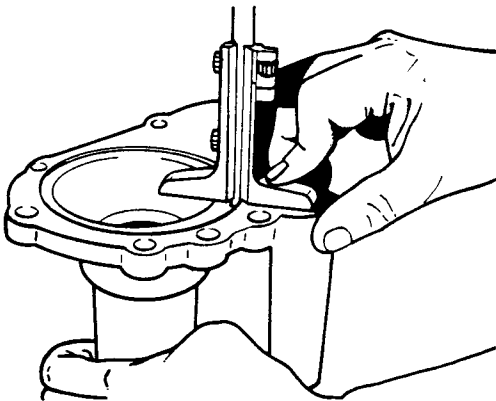


Fig H1.29

- (3) Refer to Fig H1.29. Measure the depth of the housing for the exterior track of the bearing, in the front cover, taking into account that this cover must have the gasket fitted.

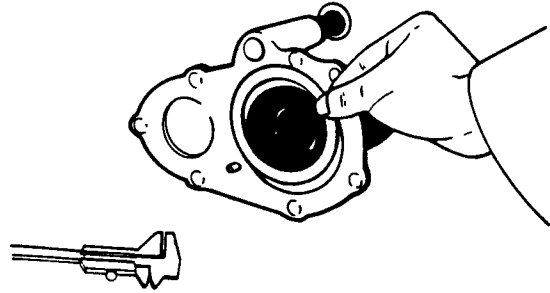


Fig H1.30

- (4) Refer to Fig H1.30. The difference between the measurements taken in steps (2) and (3) must be made up by the adjusting washers. The washers' thickness must be the calculated difference plus up to 0,10 mm, this being the maximum load which must be given to the bearing.

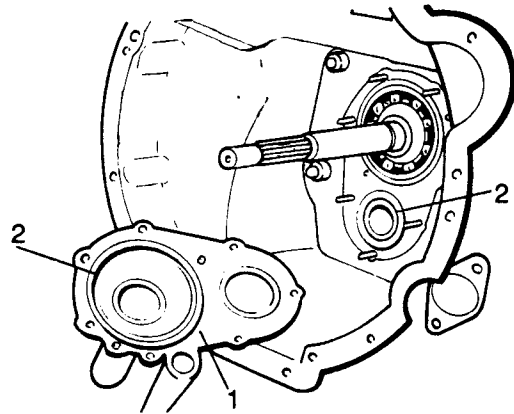


Fig H1.31

- (5) Refer to Fig H1.31. Apply a film of Hermetical 600 on both faces of the gasket (1).
- (6) Position the bearing adjusting washers (2) of the primary shaft and the front bearing of the layshaft.
- (7) Fit the cover and tighten the nuts to a torque of 20 to 25 N.m.

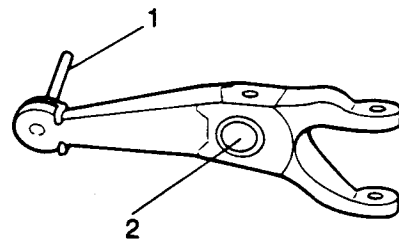


Fig H1.32

- (8) Refer to Fig H1.32. Replace the supporting bush (2) in the pivot.

- (9) Fit the push rod (1) to the clutch lever and secure with the plastic clip.

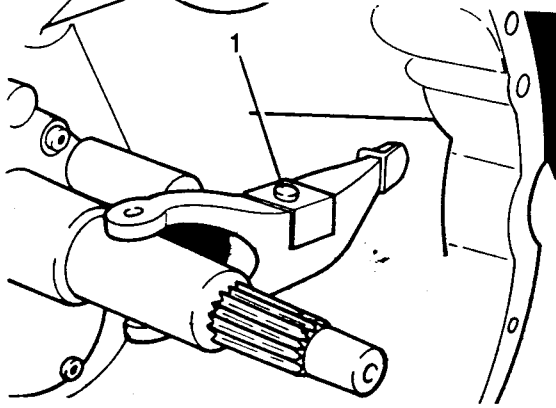


Fig H1.33

- (10) Refer to Fig H1.33. Replace the bolt, washer and clip (1) holding the clutch lever to its supporting pivot.

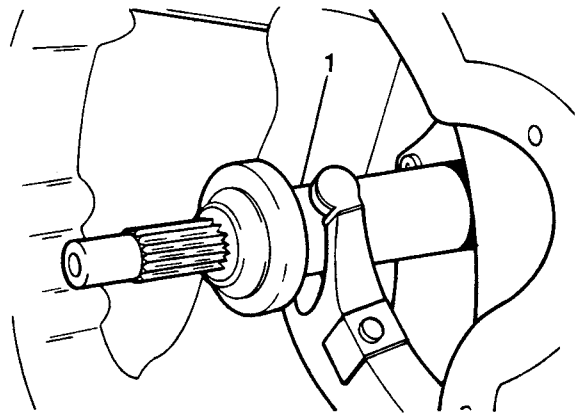


Fig H1.34

- (11) Refer to Fig H1.34. Refit the clutch mechanism to the withdrawal bearing and secure with the plastic clip (1).
- (12) Refit the gearbox to the vehicle (see Sub-sub-section H1.3, Chapter 1) and refill with the correct grade of oil.

## SUB-SUB-SECTION H1.3

### CHAPTER 6

#### CLUTCH BELL HOUSING - REMOVAL AND REPLACEMENT

##### REMOVAL

1. Before the bell housing is removed:
  - (1) Drain the oil from the gearbox (see Sub-sub-section H1.5).
  - (2) Remove the gearbox from the vehicle (see Sub-sub-section H1.3, Chapter 1).
  - (3) Remove the clutch withdrawal mechanism (see Sub-sub-section H1.3, Chapter 5).
  - (4) Remove the adjusting washers of the primary shaft bearing and the front layshaft bearing.

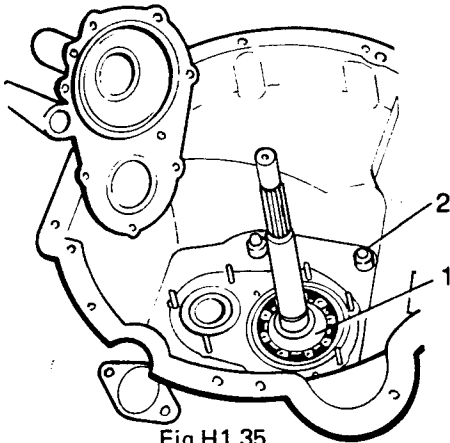


Fig H1.35

- (5) Refer to Fig H1.35. Remove the spring ring and washer (1) that holds the bearing into position on the primary shaft.
- (6) Remove the nuts and washers (2) that retain the clutch bell housing to the gearbox housing.

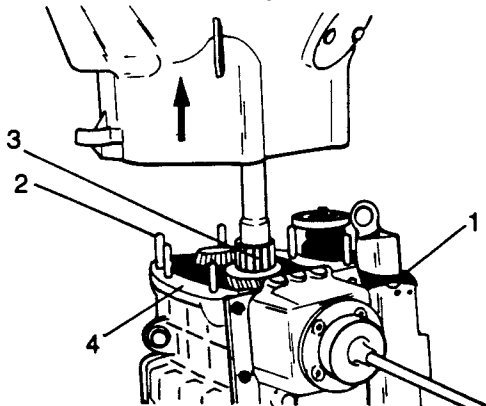


Fig H1.36

- (7) Refer to Fig H1.36. Position the complete gearbox unit (1) perpendicular with the clutch housing upwards.

- (8) Knock upwards with a plastic mallet the clutch housing until the casing together with the primary shaft bearing frees itself from the fixing studs (2).
- (9) The nucleus of gears plus the primary shaft gears (3) will remain perfectly housed in the gearbox housing.
- (10) Replace the gasket (4) if this shows signs of damaged and apply a film of Hermetical 600 on both faces.

##### REPLACEMENT

2. Replace the clutch bell housing as follows:

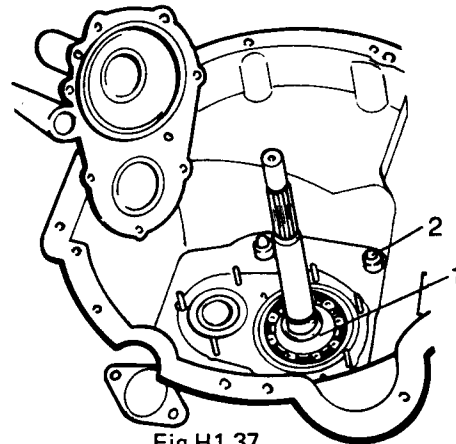


Fig H1.37

- (1) Refer to Fig H1.37. Fit the clutch housing, and tighten the nuts (2) up to a torque of 60 to 75 N.m.
- (2) Fit the washer and spring ring (1) which fixes the bearing to the primary shaft.
- (3) Install the adjusting washers.
- (4) Replace the clutch withdrawal mechanism (see Sub-sub-section H1.3, Chapter 5).
- (5) Refit the gearbox to the vehicle (see Sub-sub-section H1.3, Chapter 1) and refill with the correct grade of oil.

## SUB-SUB-SECTION H1.3

### CHAPTER 7

#### CLUTCH BELL HOUSING - FITTING NEW HOUSING

##### REMOVAL

1. To replace the bell housing first carry out the following:
  - (1) Remove the bell housing (see Sub-sub-section H1.3, Chapter 6).
  - (2) Remove the cover, forks and selector shafts (see Sub-sub-section H1.3, Chapter 4).

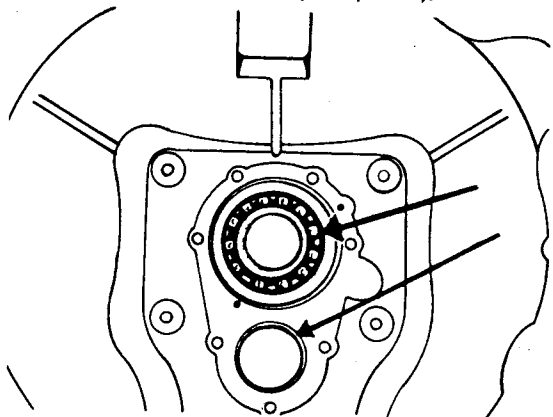


Fig H1.38

- (3) Refer to Fig H1.38. Remove the primary shaft bearing together with its plastic ring and the conical bearing track from the front part of the layshaft.

2. Make ready the new bell housing:

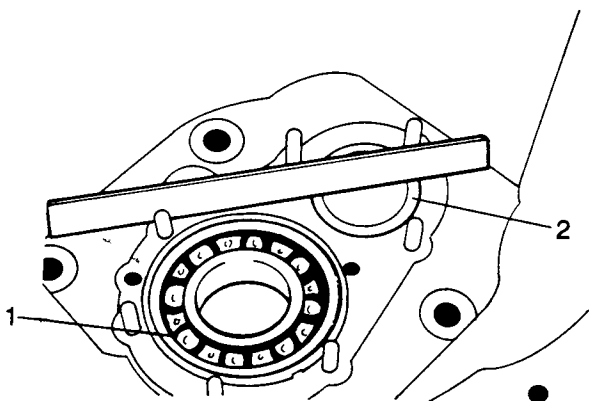


Fig H1.39

- (1) Refer to Fig H1.39. Fit the primary shaft bearing (1) in such a way so that the plastic ring butts against the frontal face of the casing.
- (2) Fit a new outer track of the front conical bearing (2) of the layshaft, in such a way that this is level with the inner front face of the clutch housing.

##### REPLACEMENT

3. To fit the new clutch bell housing:
  - (1) Apply a film of Hermetical 600 to both faces of the gasket.
  - (2) Fit the clutch housing to the gearbox casing and tighten the nuts to a torque of 60 to 75 N.m.

##### NOTE

When the clutch housing is replaced, the adjusting washer for the front layshaft bearing must be calculated as follows:

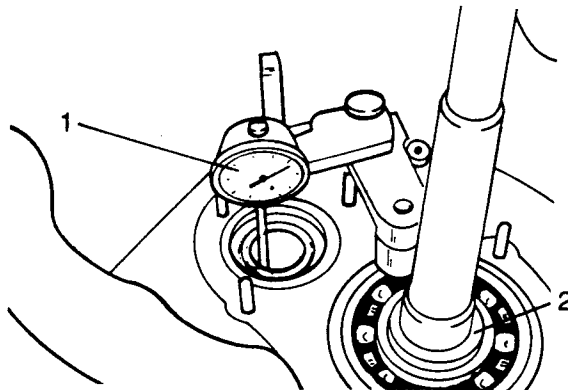


Fig H1.40

- (3) Refer to Fig H1.40. Fit the dial gauge (1) part No. 18G191 on its support so that the needle makes contact with the layshaft.
- (4) Fit the washer and the spring ring (2) that fixes the bearing to primary shaft.

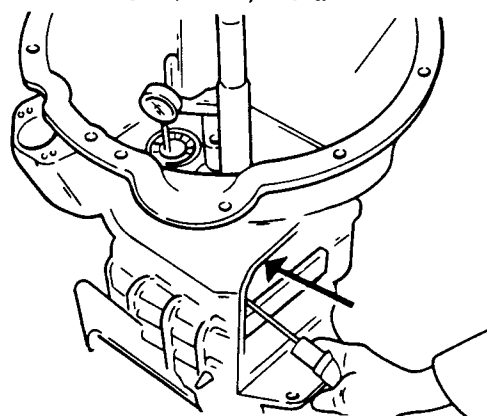


Fig H1.41

- (5) Refer to Fig H1.41. Use a screwdriver to lever the constant gear of the layshaft (1) sliding this upwards and downwards to measure the end play on the dial gauge.

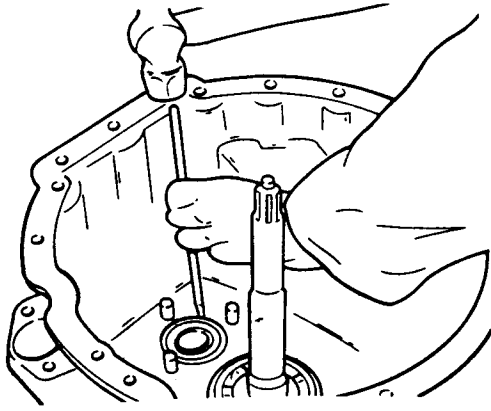


Fig H1.42

- (6) Refer to Fig H1.42. The outer track of the front bearing (1) of the primary shaft must be adjusted until there is no play (0) and at the same time check that the shaft turns with no load.

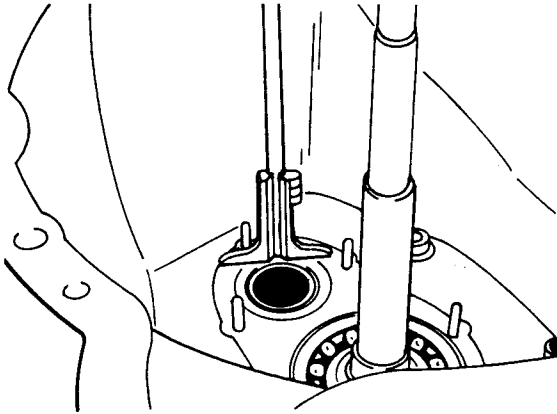


Fig H1.43

- (7) Refer to Fig H1.43. Measure the depth of the track relative to the front inner surface of the clutch housing.

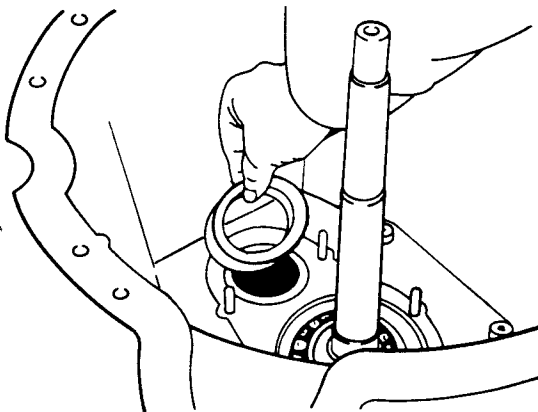


Fig H1.44

- (8) Refer to Fig H1.44. Calculate the thickness of washers required according to the measurement obtained in step (7) plus 0,10 mm. This is the load the bearing must have.

- (9) Fit the cover assembly, shafts and selector forks (see Sub-sub-section H1.3, Chapter 4).
- (10) Fit the bearing washers of the primary shaft, which were removed before, and those of the front bearing of the layshaft which were calculated in step (8).
- (11) Fit to the new casing the register plate of the old casing.
- (12) Fit the clutch withdrawal mechanism (see Sub-sub-section H1.3, Chapter 5).
- (13) Fit the complete gearbox assembly to the vehicle (see Sub-sub-section H1.3, Chapter 1).
- (14) Fill the gearbox assembly with oil.

## SUB-SUB-SECTION H1.3

### CHAPTER 8

#### PRIMARY SHAFT BEARING - REMOVAL AND REPLACEMENT

##### REMOVAL

1. To remove the primary shaft bearing:
  - (1) Drain the oil from the gearbox (see Sub-section H1.5).
  - (2) Remove the gearbox assembly from the vehicle (see Sub-sub-section H1.3, Chapter 1).
  - (3) Remove the clutch withdrawal mechanism (see Sub-sub-section H1.3, Chapter 5).
  - (4) Remove the clutch housing (see Sub-sub-section H1.3, Chapter 6).

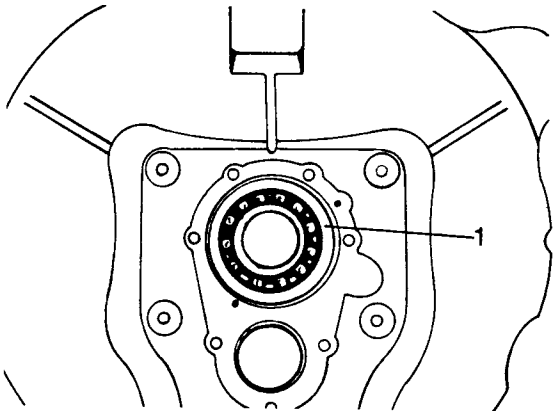


Fig H1.45

- (5) Refer to Fig H1.45. Remove the primary shaft bearing (1).

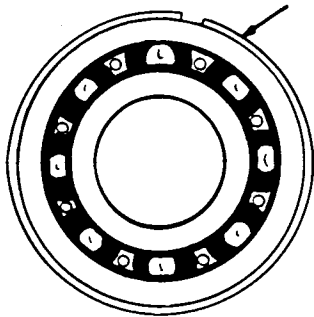


Fig H1.46

- (6) Refer to Fig H1.46. Remove the bearing spring ring.

##### REPLACEMENT

2. Replace the primary shaft bearing as follows:
  - (1) Fit the spring ring onto the new bearing.
  - (2) Fit the new bearing into the clutch housing.
  - (3) Fit the clutch housing (see Sub-sub-section H1.3, Chapter 6).
  - (4) Carry out the adjusting washer calculation for the primary shaft bearing as in Sub-sub-section H1.3, Chapter 5, para 5, steps (1) to (4).
  - (5) Fit the calculated adjusting washer in the bearing housing of the primary shaft, in the cover and fit those of the front layshaft bearing.
  - (6) Replace the clutch withdrawal mechanism (see Sub-sub-section H1.3, Chapter 5).
  - (7) Replace the gearbox assembly (see Sub-sub-section H1.3, Chapter 1) and fill with the correct grade of oil.

## SUB-SUB-SECTION H1.3

### CHAPTER 9

#### PRIMARY SHAFT - REMOVAL AND REPLACEMENT

##### REMOVAL

1. Remove the primary shaft as follows:
  - (1) Drain the oil from the gearbox (see Sub-sub-section H1.5).
  - (2) Remove the gearbox assembly from the vehicle (see Sub-sub-section H1.3, Chapter 1).
  - (3) Remove the clutch withdrawal mechanism (see Sub-sub-section H1.3, Chapter 5).
  - (4) Remove the clutch housing (see Sub-sub-section H1.3, Chapter 6).
  - (5) Select 4th gear.

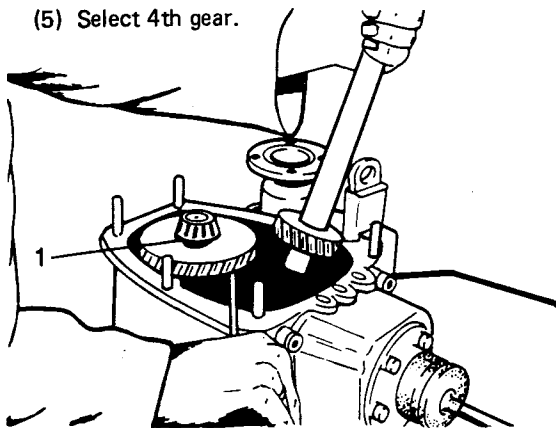


Fig H1.47

- (6) Refer to Fig H1.47. Move the layshaft upwards and to one side and remove the primary shaft (1).

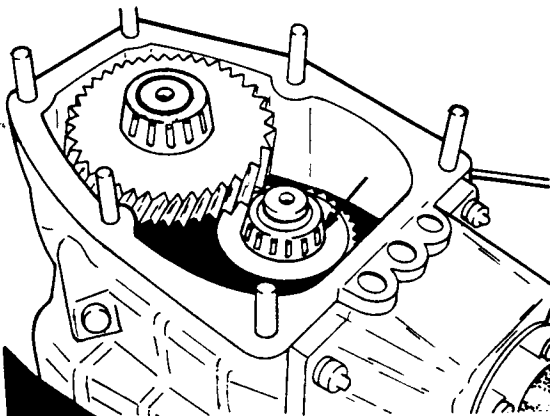


Fig H1.48

- (7) Refer to Fig H1.48. Remember that the roller bearing, where the main shaft rests and centres itself, must remain on the end of the above mentioned shaft.

##### REPLACEMENT

2. To replace the primary shaft:
  - (1) Fit the new primary shaft in the same manner that the old shaft was removed. Check that it is perfectly housed and that it turns freely.
  - (2) Fit the clutch housing (see Sub-sub-section H1.3, Chapter 6).

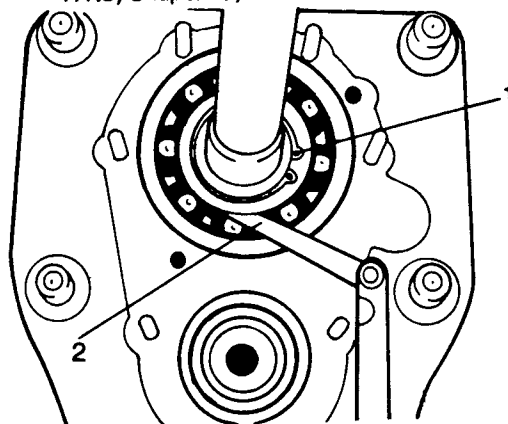


Fig H1.49

- (3) Refer to Fig H1.49. Fit the primary bearing adjusting washers and the spring ring (1).
- (4) Check the end play of the primary shaft bearing (2) with feeler gauges which should be between 0 and 0,5 mm. If not, select the correct washer.
- (5) Fit the clutch withdrawal mechanism (see Sub-sub-section H1.3, Chapter 5).
- (6) Refit the gearbox to the vehicle (see Sub-sub-section H1.3, Chapter 1) and fill it and the transfer box with the correct grade of oil.



## SUB-SUB-SECTION H1.3

### CHAPTER 10

#### GEARBOX REAR OIL SEAL RETAINER - REMOVAL AND REPLACEMENT

##### REMOVAL

1. To remove the retainer:
  - (1) Drain the oil from the gearbox (see Sub-sub-section H1.5).
  - (2) Remove the gearbox assembly from the vehicle (see Sub-sub-section H1.3, Chapter 1).
  - (3) Remove the transmission brake (see Sub-sub-section K2.4, Chapter 2)
  - (4) Remove the double intermediate pinion from the transfer box (see Sub-sub-section H2.3, Chapter 3).
  - (5) Remove the transfer box (see Sub-sub-section H2.3, Chapter 2).
  - (6) Remove the selector shafts, forks and cover assembly (see Sub-sub-section H1.3, Chapter 4).
  - (7) Select two speeds to stop the main shaft from turning.
  - (8) Release the transfer gear nut locking washer.

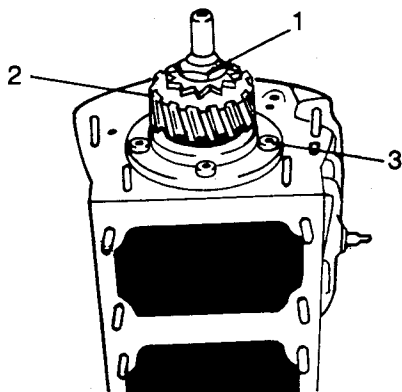


Fig H1.50

- (9) Refer to Fig H1.50. Unscrew the transfer gear nut (1) using special tool 600300.
- (10) Remove the transfer gear (2).
- (11) Remove the oil seal retainer bolts/nuts (3).

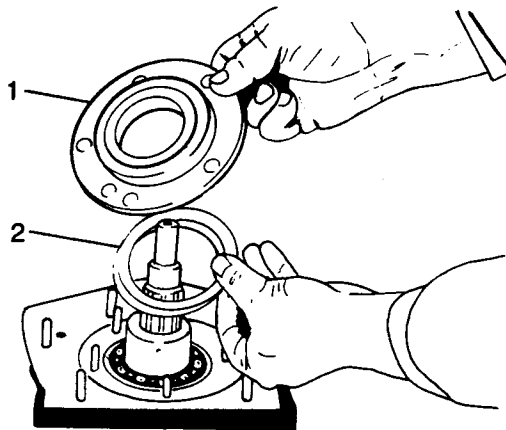


Fig H1.51

- (12) Refer to Fig H1.51. Remove the oil seal retainer (1) and the adjusting washers (2) of the main shaft rear bearing, taking special care not to alter the thickness of these washers.

##### REPLACEMENT

2. Replace the oil seal retainer as follows:
  - (1) Inspect the condition of the gasket, replacing it if necessary and clean off the rest of the sealing compound which could remain on the mating surfaces of the cover and the transfer box casing. Apply a film of Hermetical 600 to both faces of the gasket and locate this in position.

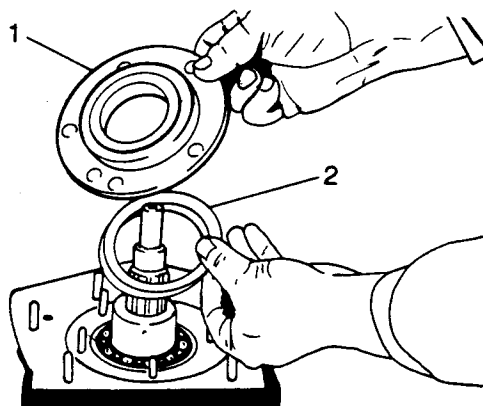


Fig H1.52

- (2) Refer to Fig H1.52. Fit the cover (1) with the adjusting washers (2) for the rear main shaft bearing and put a film of SAE 90 EP oil on the lips of the oil seal.
- (3) Fit the cover fixing nuts and tighten to a torque of 20 to 30 N.m.
- (4) Fit the transfer gear with its nuts and tighten this to a torque of 130 to 170 N.m.

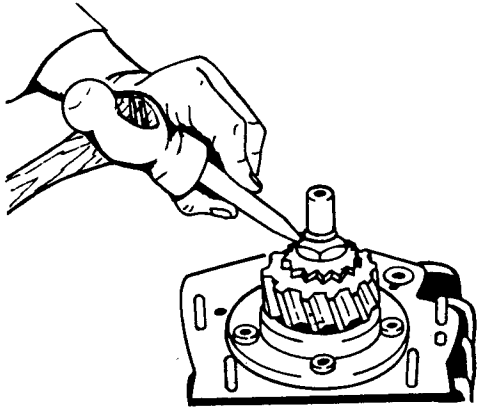


Fig H1.53

- (5) Refer to Fig H1.53. Lock the transfer gear nut with the lock washer, bending this over so that it fits into the groove in the threaded portion of the main shaft.

**NOTE**

If the lockwasher is damaged or does not ensure that it will lock the nut securely, replace it with a new one.

- (6) Put the two gears which were selected in para 1, step (7) into neutral.
- (7) Replace the selector shafts, forks and cover assembly (see Sub-sub-section H1.3, Chapter 4).
- (8) Replace the transfer box (see Sub-sub-section H2.3, Chapter 2).
- (9) Replace the double intermediate pinion on the transfer box (see Sub-sub-section H2.3, Chapter 3).
- (10) Refit the transmission brake (see Sub-sub-section K2.4, Chapter 2).
- (11) Replace the gearbox assembly (see Sub-sub-section H1.3, Chapter 1) and fill with the correct grade of oil.

## SUB-SUB-SECTION H1.3

### CHAPTER 11

#### GEARBOX REAR OIL SEAL RETAINER - FITTING NEW RETAINER

##### REMOVAL

1. Remove the old oil seal retainer as detailed in Sub-sub-section H1.3, Chapter 10).

##### FITTING THE NEW RETAINER

2. A new seal must be fitted to the new retainer (see Sub-sub-section H1.3, Chapter 12).
3. The thickness of the adjusting washers must be calculated and washers of this thickness must be used when reassembling the unit.

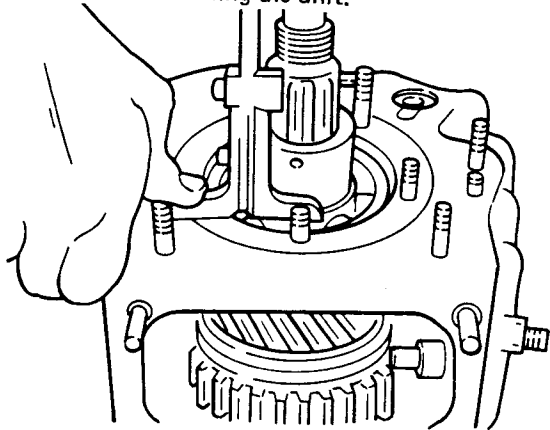


Fig H1.54

- (1) Refer to Fig H1.54. Measure the depth of the bearing outer track relative to the plane of the casing, taking into account that the gasket must be fitted.

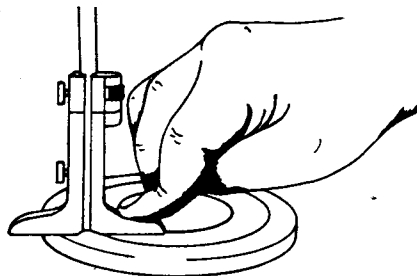


Fig H1.55

- (2) Refer to Fig H1.55. Measure the height of the overlap of the cover, which should maintain the bearing in position.
- (3) The difference between the measurements taken in steps (1) and (2), plus 0,10 mm (maximum permitted load for this bearing) is the thickness of the required washer(s).
- (4) Fit the oil seal retainer (see Sub-sub-section H1.3, Chapter 10) using washers of the thickness calculated above.

## SUB-SUB-SECTION H1.3

### CHAPTER 12

#### MAIN SHAFT REAR OIL SEAL - REMOVAL AND REPLACEMENT

##### REMOVAL

1. To remove the oil seal:
  - (1) Remove the gearbox rear oil seal retainer (see Sub-sub-section H1.3, Chapter 10).

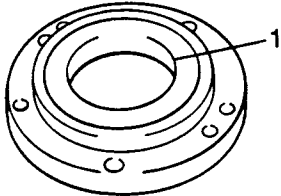


Fig H1.56

- (2) Refer to Fig H1.56. Remove the oil seal (1).

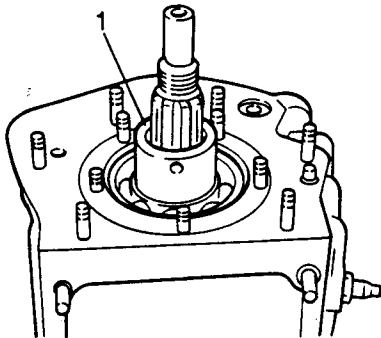


Fig H1.57

- (3) Refer to Fig H1.57. Using special tool RO1004 remove the spacer bush (1) and inspect the outer surface for wear produced by the oil seal. If this exists, a new spacer bush must be fitted.

##### REPLACEMENT

2. Replace the oil seal as detailed below:

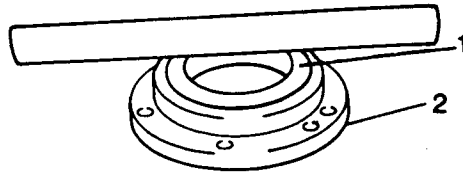


Fig H1.58

- (1) Refer to Fig H1.58. Fit the new oil seal (1) in the cover (2) in such a way so that the rear part is level with the rear part of the cover.
- (2) Fit the spacer bush, leaving the extractor holes towards the outside.
- (3) Apply a film of SAE 90 EP oil on the lips of the oil seal.
- (4) Refit the gearbox rear oil seal retainer (see Sub-sub-section H1.3, Chapter 10).

## SUB-SUB-SECTION H1.3

### CHAPTER 13

#### GEARBOX HOUSING - REMOVAL AND REPLACEMENT

##### REMOVAL

1. To remove the gearbox housing:

(1) Remove the gearbox rear oil seal retainer (see Sub-sub-section H1.3, Chapter 10).

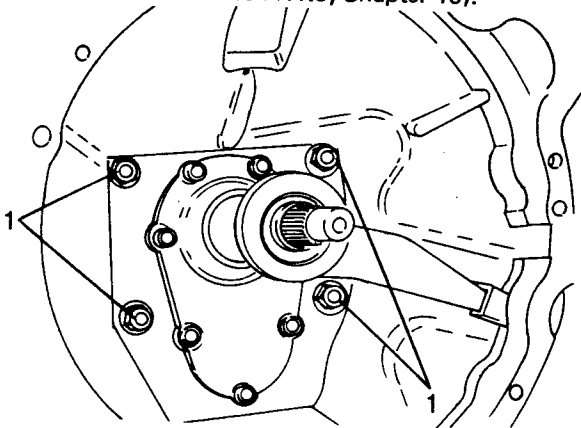


Fig H1.59

(2) Refer to Fig H1.59. Remove the fixing nuts (1) that retain the clutch housing to the gearbox housing.

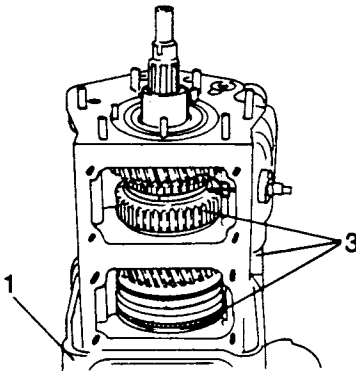


Fig H1.60

(3) Refer to Fig H1.60. Position the gearbox assembly vertically with the clutch housing (1) downwards.

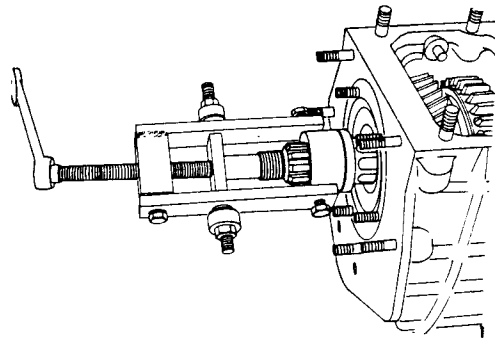


Fig H1.61

(4) Refer to Fig H1.61. Using special tool RO1004 remove the spacer bush (2).

(5) Remove the gearbox, casing, sliding it upwards and taking care not to disturb the 1st, 2nd, 3rd and 4th synchro units ((3) on Fig H1.60).

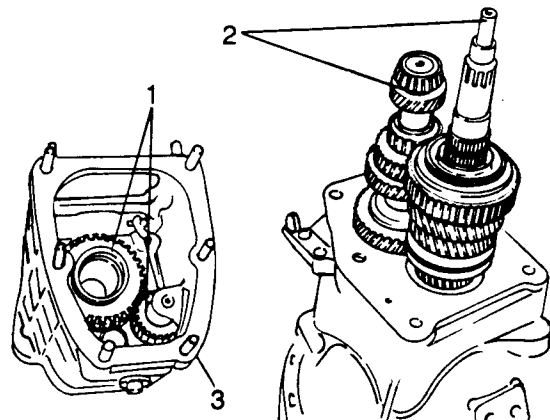


Fig H1.62

(6) Refer to Fig H1.62. On removal of the housing, 1st speed gear (1) will have to be removed at the same time, since this interferes with reverse pinion which also comes out with the housing.

(7) The main shaft and layshaft assemblies (2) will remain positioned on the clutch housing, in their working positions.

##### REPLACEMENT

2. Replace the gearbox housing as follows:

(1) Inspect the joint washer (3) and if this is damaged fit a new one, applying a film of sealant on both surfaces, after cleaning them thoroughly.

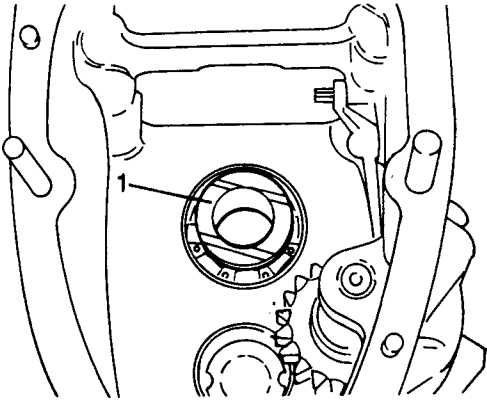


Fig H1.63

- (2) Refer to Fig H1.63. Fit the axial adjusting washer (1) on the bearing, in such a way that the oil grooves face inwards.

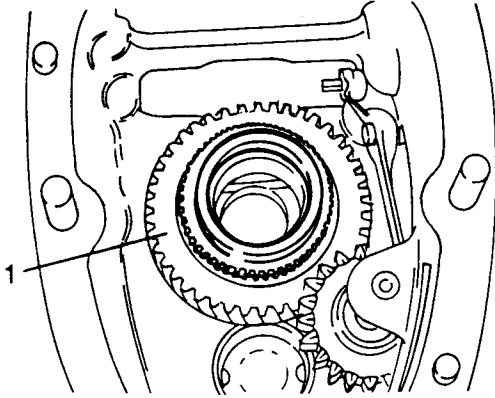


Fig H1.64

- (3) Refer to Fig H1.64. Fit 1st speed gear (1) on the washer, and the friction cone facing inwards.

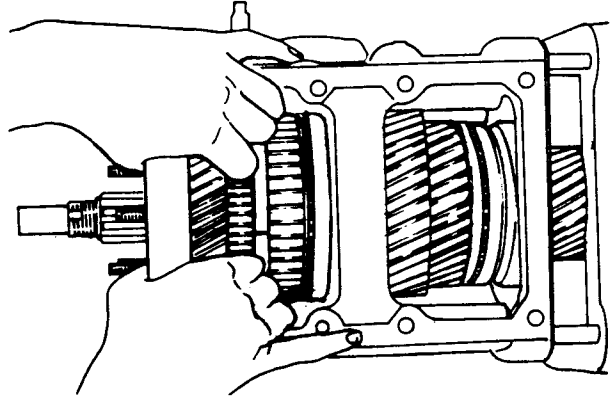


Fig H1.65

- (4) Refer to Fig H1.65. Hold the gearbox casing and at the same time maintain the 1st gear in position as well as the adjusting washers. Introduce the casing so that the studs enter in the holes of the clutch housing. The 1st speed gear and the washer should be introduced without difficulty on the main shaft.
- (5) Fix the clutch housing to the gearbox casing with nuts, and tighten them to a torque of 60 to 75 N.m.
- (6) Replace the gearbox rear oil seal retainer (see Sub-sub-section H1.3, Chapter 10).