

# Chapter 7 Part A:

## Manual transmission

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### Degrees of difficulty

Easy, suitable for  
novice with little  
experience



Fairly easy, suitable  
for beginner with  
some experience



Fairly difficult,  
suitable for competent  
DIY mechanic



Difficult, suitable for  
experienced DIY  
mechanic



Very difficult,  
suitable for expert DIY  
or professional



### Specifications

#### General

Type .....

Manual, five forward speeds and reverse. Synchromesh on all forward speeds

#### Designation:

1.6 litre models .....

RS5F31A

2.0 litre models .....

RS5F32A

#### Torque wrench settings

##### Engine-to-transmission fixing bolts:

1.6 litre models:

Bolts less than 30 mm long .....

19

14

Bolts 30 mm long, and longer .....

35

26

2.0 litre models:

Bolts less than 45 mm long .....

35

26

Bolts 55 mm long, and longer .....

75

55

##### Gearchange linkage components:

Selector rod front pivot bolt .....

16

12

Selector rod rear pivot bolt .....

21

15

Support rod-to-transmission bolt .....

42

31

Support rod-to-gear lever retaining plate nuts .....

14

10

Support rod rear mounting bracket nuts .....

14

10

Support rod-to-rear mounting bracket nut .....

25

18

Gaiter retaining plate nuts .....

5

4

##### Left-hand engine/transmission mounting:

Through-bolt .....

49

36

Mounting-to-transmission bolts .....

49

36

Neutral switch .....

19

14

Oil drain plug .....

29

21

Oil filler/level plug:

1.6 litre models .....

29

21

2.0 litre models .....

15

11

Rear engine/transmission mounting:

Through-bolt .....

69

51

Mounting bracket retaining bolts .....

69

51

Reversing light switch .....

19

14

6 From inside the vehicle, lift out the gear lever and retaining plate, and recover the small rubber gaiter from the base of the lever. If necessary, slacken and remove the retaining nuts, then lift off the retaining plate and remove the main gear lever gaiter from the vehicle.

8 Inspect all the linkage components for signs of wear or damage, paying particular attention to the pivot bushes and selector rod universal joint, and renew worn components as necessary. Renew the rubber gaiters if they are split or badly perished.

### Refitting

9 Refitting is a reversal of the removal procedure, applying a smear of multi-purpose grease to the gear lever pivot ball and bushes, and to the selector rod rear pivot bolt. Tighten all the linkage nuts and bolts to their specified torque settings (where given).

## 4 Oil seals - renewal



### Driveshaft oil seal

1 Chock the rear wheels of the car, firmly apply the handbrake, then jack up the front of the car and support it on axle stands. Remove the appropriate front roadwheel.

2 Drain the transmission oil as described in Chapter 1.

3 Working as described in Chapter 8, free the inner end of the driveshaft from the transmission, and place it clear of the seal, noting that there is no need to unscrew the driveshaft retaining nut; the driveshaft can be left secured to the hub. Support the driveshaft, to avoid placing any strain on the driveshaft joints or gaiters.

4 Carefully prise the oil seal out of the transmission using a large flat-bladed screwdriver (see illustration).

5 Remove all traces of dirt from the area around the oil seal aperture, then apply a smear of grease to the outer lip of the new oil seal, and locate it in its aperture. Drive the seal squarely into position, using a suitable tubular drift (such as a socket) which bears



4.4 Using a large flat-bladed screwdriver to lever out a driveshaft oil seal

only on the hard outer edge of the seal. On 1.6 litre models, drive the seal into position until it seats against its locating shoulder. On 2.0 litre models, position the seal as shown in the accompanying illustration (see illustrations).

6 Refit the driveshaft as described in Chapter 8. 7 Refill the transmission with the specified type and amount of oil, as described in Chapter 1.

### Input shaft oil seal

8 To renew the input shaft seal, the transmission must be dismantled. This task should therefore be entrusted to a Nissan dealer.

### Selector shaft oil seal

9 Apply the handbrake, then jack up the front of the car and support it on axle stands (see *Jacking and Vehicle Support*). Drain the transmission oil as described in Chapter 1, or be prepared for some oil loss as the seal is removed.

10 Slide back the transmission selector rod rubber gaiter, to reveal the roll pin (see illustration).

11 Using a hammer and suitable punch, tap out the roll pin (tap out the small inner pin first, followed by the larger outer pin) then free the selector rod from the transmission. Discard the roll pin; a new one should be used on refitting.

12 Remove the rubber gaiter, then carefully lever the selector shaft oil seal out of position and slide it off the shaft.

13 Before fitting a new seal, check the selector shaft's seal rubbing surface for signs



4.5a Tap the new seal into position using a suitable tubular drift, such as a large socket

of burrs, scratches or other damage which may have caused the seal to fail in the first place. It may be possible to polish away minor faults of this sort using fine abrasive paper, but more serious defects will require the renewal of the selector shaft.

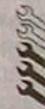
14 Apply a smear of grease to the new seal's outer edge and sealing lip, then carefully slide the seal along the selector rod. Press the seal fully into position in the transmission housing.

15 Refit the rubber gaiter, making sure that it is correctly seated on the seal.

16 Engage the selector rod with the shaft. Align the pin holes, and tap the new roll pins into position.

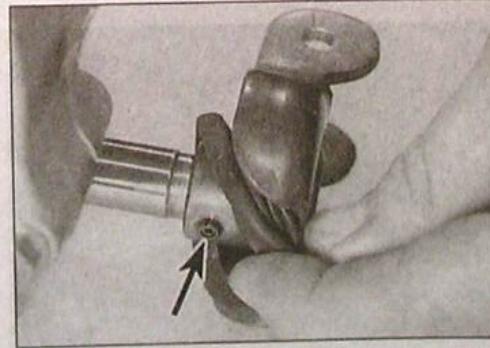
17 Lower the vehicle to the ground, and top-up/refill (as applicable) the transmission oil as described in Chapter 1.

## 5 Neutral switch - testing, removal and refitting

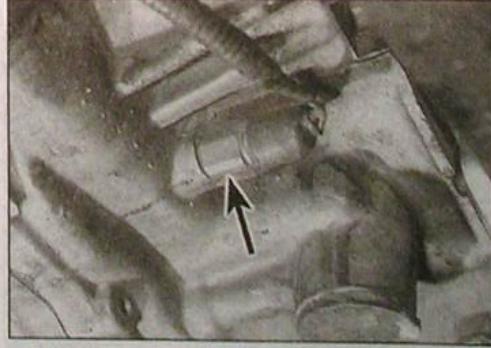


### Testing

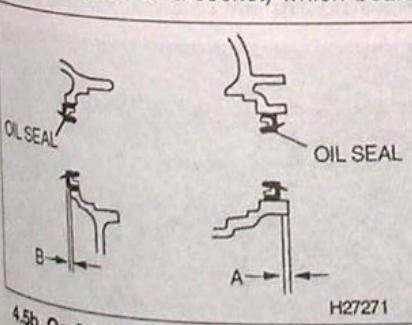
1 A neutral switch is fitted to all models with a catalytic converter, the switch is one of the many fuel system switches/sender units (see relevant Part of Chapter 4), and is screwed into the base of the transmission on its right-hand side (see illustration). **Note:** Do not confuse the neutral switch with the reversing light switch, which is screwed in to the left-hand side of the transmission.



4.10 Selector rod end fitting is retained by a dual-roll pin arrangement (arrowed)



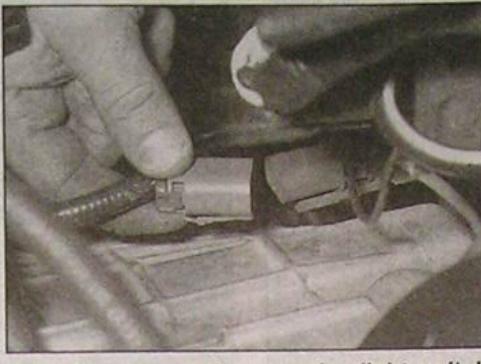
5.1 The neutral switch (where fitted) is screwed into the right-hand side of the transmission (arrowed)



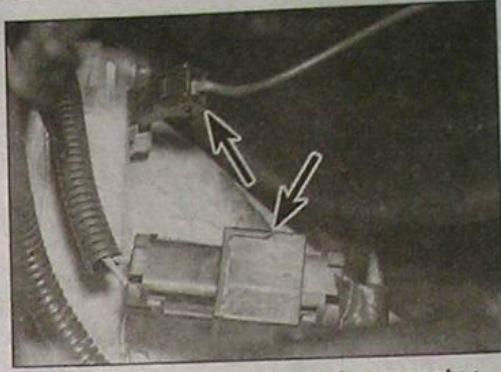
4.5b On 2.0 litre models, ensure that the oil seals are positioned as shown  
Right-hand side seal (A) - 5.9 to 6.1 mm  
Left-hand side seal (B) - 0.5 mm or less



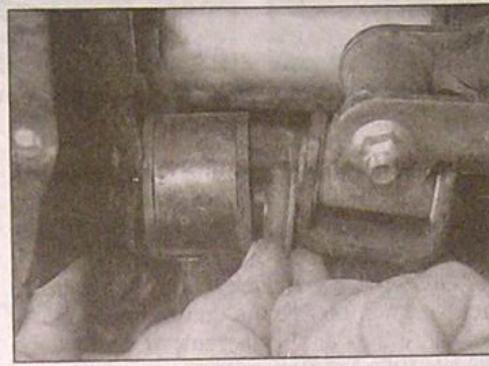
8.6 Free the clutch cable from the release lever, and position it clear of the transmission



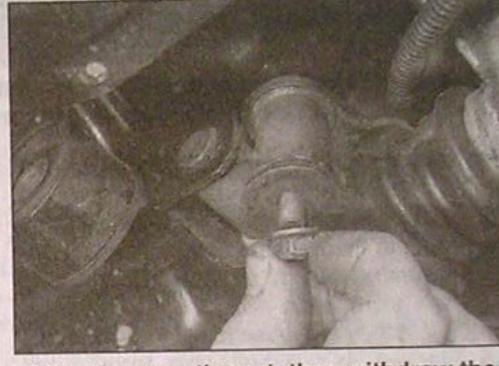
8.7a Disconnect the reversing light switch wiring connector...



8.7b ... and neutral switch connector (where fitted) then detach the earth lead(s) from the transmission housing (arrowed)



8.8a Unscrew the bolt and recover the washer securing the gearchange linkage support rod to the mounting bracket



8.8b Unscrew the nut, then withdraw the pivot bolt...

## 8 Manual transmission - removal and refitting



### Removal

- 1 Apply the handbrake, then jack up the front of the car and support it on axle stands (see *Jacking and Vehicle Support*). Remove both front roadwheels. Undo the retaining screws, and remove the plastic undershields from beneath the engine/transmission, and the covers from underneath both wheel arches.
- 2 Drain the transmission oil as described in Chapter 1, then refit the drain and filler/level plugs and tighten them to their specified torque settings.
- 3 Remove the battery and starter motor as described in Chapter 5A.
- 4 If necessary, to improve access to the top of the transmission, remove the air cleaner housing inlet duct as described in the relevant Part of Chapter 4.
- 5 Remove the exhaust system front pipe as described in the relevant Part of Chapter 4.
- 6 Slacken the clutch cable locknut and knurled adjuster nut, then free the cable end



8.8c ... and free the selector rod from the transmission



8.9 Disconnect the breather hose from the top of the transmission

fitting from the release lever, and the outer cable fitting from its mounting bracket (see illustration).

7 Disconnect the wiring connectors from the reversing light switch and, where applicable, from the neutral switch. Disconnect the earth lead(s) from the top of the transmission housing (see illustrations). Free the wiring from any relevant retaining clips, and position it clear of the transmission.

8 Slacken and remove the nut and pivot bolt securing the gearchange linkage selector rod to the transmission, and the bolt and washer securing the support rod in position. Free both rods, and position them clear of the transmission (see illustrations).

9 Disconnect the breather pipe from the top of the transmission housing (see illustration).

10 Unscrew the knurled retaining ring, and

disconnect the speedometer cable from the transmission. On later models, disconnect the speedometer sensor wiring connector.

11 Working as described in Chapter 8, free the inner end of each driveshaft from the transmission, and place the ends clear of the transmission. Note that there is no need to unscrew the driveshaft retaining nuts - each driveshaft can be left secured to the hub. Support the driveshafts, to avoid placing any strain on the driveshaft joints or gaiters.

12 Place a jack with interposed block of wood beneath the engine, to take the weight of the engine. Alternatively, attach a hoist or support bar to the engine and take the weight of the engine (see illustration).

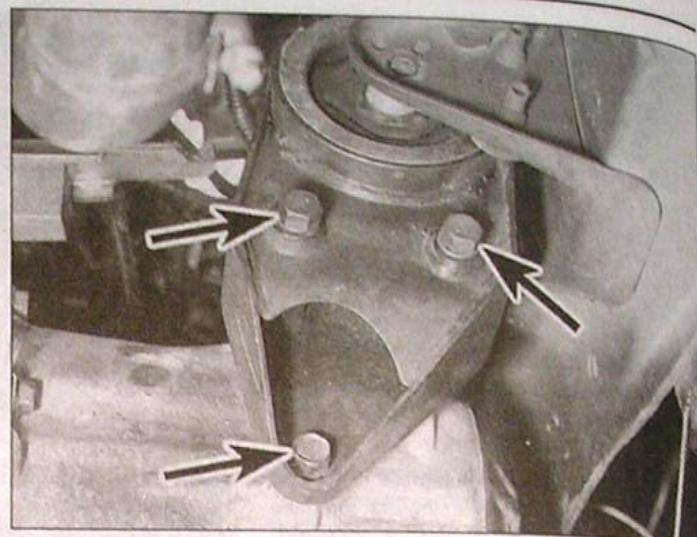
13 Place a jack and block of wood beneath the transmission, and raise the jack to take the weight of the transmission.



8.12 Using an engine support bar to support the engine whilst the transmission is removed



8.14a Slacken and remove the through-bolt, then undo the three mounting retaining bolts (two arrowed) ...



8.14b ... and remove the left-hand mounting assembly from the transmission

14 Slacken and remove the through-bolt from the left-hand engine/transmission mounting. Undo the three bolts securing the mounting to the transmission, and manoeuvre the mounting out of position. Recover the rubbers from each side of the mounting bracket, if they are loose (see illustrations).

15 Slacken and remove the through-bolt from the rear engine/transmission mounting. Undo the bolts securing the mounting bracket in position, and manoeuvre it away from the engine/transmission. On 2.0 litre models, recover the stopper ring which is fitted between the mounting bracket and mounting (see illustrations).

16 With the jack positioned beneath the transmission taking the weight, slacken and remove the remaining bolts securing the transmission housing to the engine. Note the correct fitted positions of each bolt (and the relevant brackets) as they are removed, to use as a reference on refitting - the bolts are of different lengths. Note that it may be necessary to raise the transmission slightly to gain access to the lower bolts.

17 Make a final check that all necessary components have been disconnected, and are positioned clear of the transmission so that they will not hinder the removal procedure.

18 Move the trolley jack and transmission to the left to free it from its locating dowels. Keep the transmission fully supported until the input shaft is free of the engine.

19 Once the transmission is free, lower the jack and manoeuvre the unit out from under the car. If they are loose, remove the locating dowels from the transmission or engine, and keep them in a safe place.

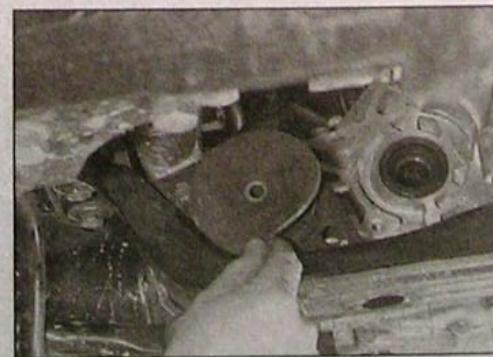
#### Refitting

20 The transmission is refitted by a reversal of the removal procedure, bearing in mind the following points:

- Apply a little high-melting point grease to the splines of the transmission input shaft. Do not apply too much, otherwise there is a possibility of the grease contaminating the clutch friction plate.
- Ensure that the locating dowels are correctly positioned prior to installation.
- Insert the transmission-to-engine bolts into their original locations, as noted on removal. Tighten all nuts and bolts to the specified torque (where given).
- Renew the driveshaft oil seals using the information given in Section 4.
- On completion, refill the transmission with the specified type and quantity of lubricant as described in Chapter 1.



8.15a Remove the rear engine/transmission mounting bracket ...



8.15b ... and, on 2.0 litre models, recover the rubber stopper ring from the mounting

## 9 Manual transmission overhaul - general information

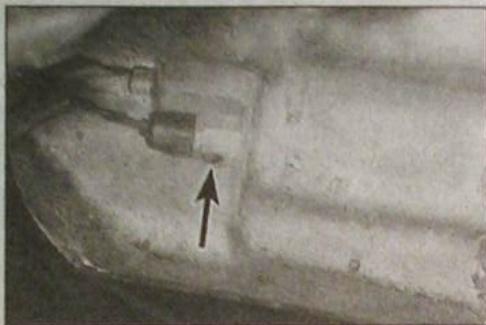
Overhauling a manual transmission is a difficult and involved job for the DIY home mechanic. In addition to dismantling and reassembling many small parts, clearances must be precisely measured and, if necessary, changed by selecting shims and spacers. Internal transmission components are also often difficult to obtain, and in many instances, extremely expensive. Because of this, if the transmission develops a fault or becomes noisy, the best course of action is to have the unit overhauled by a specialist repairer, or to obtain an exchange reconditioned unit.

Nevertheless, it is not impossible for the more experienced mechanic to overhaul the transmission, if the special tools are available, and the job is done in a deliberate step-by-step manner so that nothing is overlooked.

The tools necessary for an overhaul include internal and external circlip pliers, bearing pullers, a slide hammer, a set of pin punches, a dial test indicator, and possibly a hydraulic press. In addition, a large, sturdy workbench and a vice will be required.

During dismantling of the transmission, make careful notes of how each component is fitted, to make reassembly easier and accurate.

Before dismantling the transmission, it will help if you have some idea which area is malfunctioning. Certain problems can be closely related to specific areas in the transmission, which can make component examination and replacement easier. Refer to the *Fault finding* Section at the rear of this manual for more information.



6.1 The reversing light switch (arrowed) is screwed into the left-hand side of the transmission

2 To test the switch, trace the wiring back from the switch to its connector, which is on top of the transmission. Disconnect the wiring connector, and use a multi-meter (set to the resistance function) or a battery-and-bulb test circuit to check that there is continuity between the switch terminals only when the transmission is in neutral. If this is not the case, and there are no obvious breaks or other damage to the wires, the switch is faulty and must be renewed.

### Removal

3 Apply the handbrake, then jack up the front of the car and support it on axle stands (see *Jacking and Vehicle Support*). Drain the transmission oil as described in Chapter 1, or be prepared for some oil loss as the switch is removed.

4 Trace the switch wiring back to its connector, and disconnect it from the main harness.

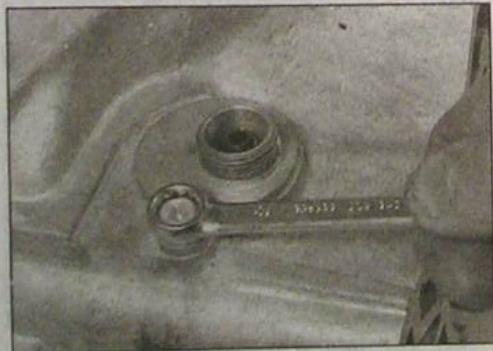
5 Unscrew the switch from the transmission, and remove it. Plug the transmission housing aperture, to minimise oil loss (if the transmission has not been drained) and to prevent dirt entry.

### Refitting

6 Remove all traces of sealant from the threads of the switch, and apply a smear of fresh sealant to them.

7 Remove the plug from the switch aperture in the transmission, and screw the switch into position.

8 Tighten the switch to the specified torque, and reconnect the wiring connector.



7.3a Unscrew the retaining bolt...

9 Lower the vehicle to the ground, and top-up/refill the transmission oil (as applicable) as described in Chapter 1.

## 6 Reversing light switch - testing, removal and refitting



### Testing

1 The reversing light circuit is controlled by a plunger-type switch that is screwed into the base of the transmission on its left-hand side (see illustration). **Note:** Do not confuse the reversing light switch with the neutral switch, which is screwed in to the right-hand side of the transmission. If a fault develops in the circuit, first ensure that the circuit fuse has not blown.

2 To test the switch, trace the wiring back from the switch to its connector, which is on top of the transmission. Disconnect the wiring connector, and use a multi-meter (set to the resistance function) or a battery-and-bulb test circuit to check that there is continuity between the switch terminals only when reverse gear is selected. If this is not the case, and there are no obvious breaks or other damage to the wires, the switch is faulty and must be renewed.

### Removal

3 Apply the handbrake, then jack up the front of the car and support it on axle stands (see *Jacking and Vehicle Support*). Drain the transmission oil as described in Chapter 1, or be prepared for some oil loss as the switch is removed.

4 Trace the switch wiring back to its connector, and disconnect it from the main harness.

5 Unscrew the switch from the transmission, and remove it. Plug the transmission housing aperture, to minimise oil loss (if the transmission has not been drained), and to prevent dirt entry.

### Refitting

6 Remove all traces of sealant from the threads of the switch, and apply a smear of fresh sealant to them.

7 Remove the plug from the switch aperture in the transmission, and screw the switch into position.



7.3b ... and withdraw the speedometer drive assembly (shown with transmission removed for clarity)

8 Tighten the switch to the specified torque, then reconnect the wiring connector and check the operation of the circuit.

9 Lower the vehicle to the ground, and top-up/refill the transmission oil (as applicable) as described in Chapter 1.

## 7 Speedometer drive - removal and refitting

### Removal

1 Apply the handbrake, then jack up the front of the car and support it on axle stands (see *Jacking and Vehicle Support*). The speedometer drive is situated on the rear of the transmission housing, next to the inner end of the right-hand driveshaft.

2 Unscrew the knurled retaining ring, and disconnect the speedometer cable from the speedometer drive. On later models, disconnect the speedometer sensor wiring connector.

3 Slacken and remove the retaining bolt, and withdraw the speedometer drive and driven pinion assembly from the transmission housing, along with its O-ring (see illustrations).

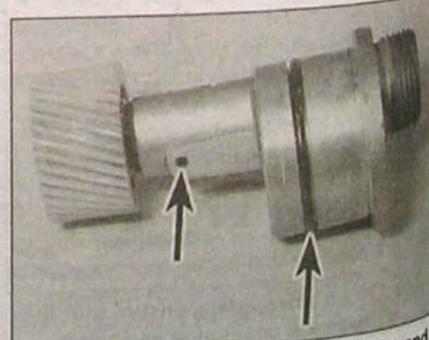
4 If necessary, tap out the retaining pin, then slide the pinion out of the housing and recover the thrustwasher (see illustration). The oil seal can then be removed from the housing.

5 Examine all components for signs of damage, and renew if necessary. Renew the housing O-ring as a matter of course. Note that the thrustwasher is available in various thicknesses - measure the thickness of the original, and quote this when ordering a new one.

6 If the driven pinion is worn or damaged, also examine the drive pinion in the transmission housing for signs of wear or damage. To renew the drive pinion, the transmission must be dismantled and the differential gear removed. This task should therefore be entrusted to a Nissan dealer.

### Refitting

7 Where necessary, press the new seal into the housing. Apply a smear of multi-purpose grease to the driven pinion shaft, and slide on the thrustwasher. Insert the driven pinion into the housing, and secure it in position with the retaining pin.



7.4 Speedometer drive pinion roll pin and housing O-ring (arrowed)

## 1 General information

The transmission is contained in a cast-aluminium alloy casing bolted to the engine's left-hand end, and consists of the gearbox and final drive differential, often called a transaxle.

Drive is transmitted from the crankshaft via the clutch to the input shaft, which has a splined extension to accept the clutch friction plate, and rotates in sealed ball-bearings.

From the input shaft, drive is transmitted to the output shaft, which rotates in a roller bearing at its right-hand end, and a sealed ball-bearing at its left-hand end. From the output shaft, the drive is transmitted to the differential crownwheel, which rotates with the differential case and planetary gears, thus driving the sun gears and driveshafts. The rotation of the planetary gears on their shaft allows the inner roadwheel to rotate at a slower speed than the outer roadwheel when the car is cornering.

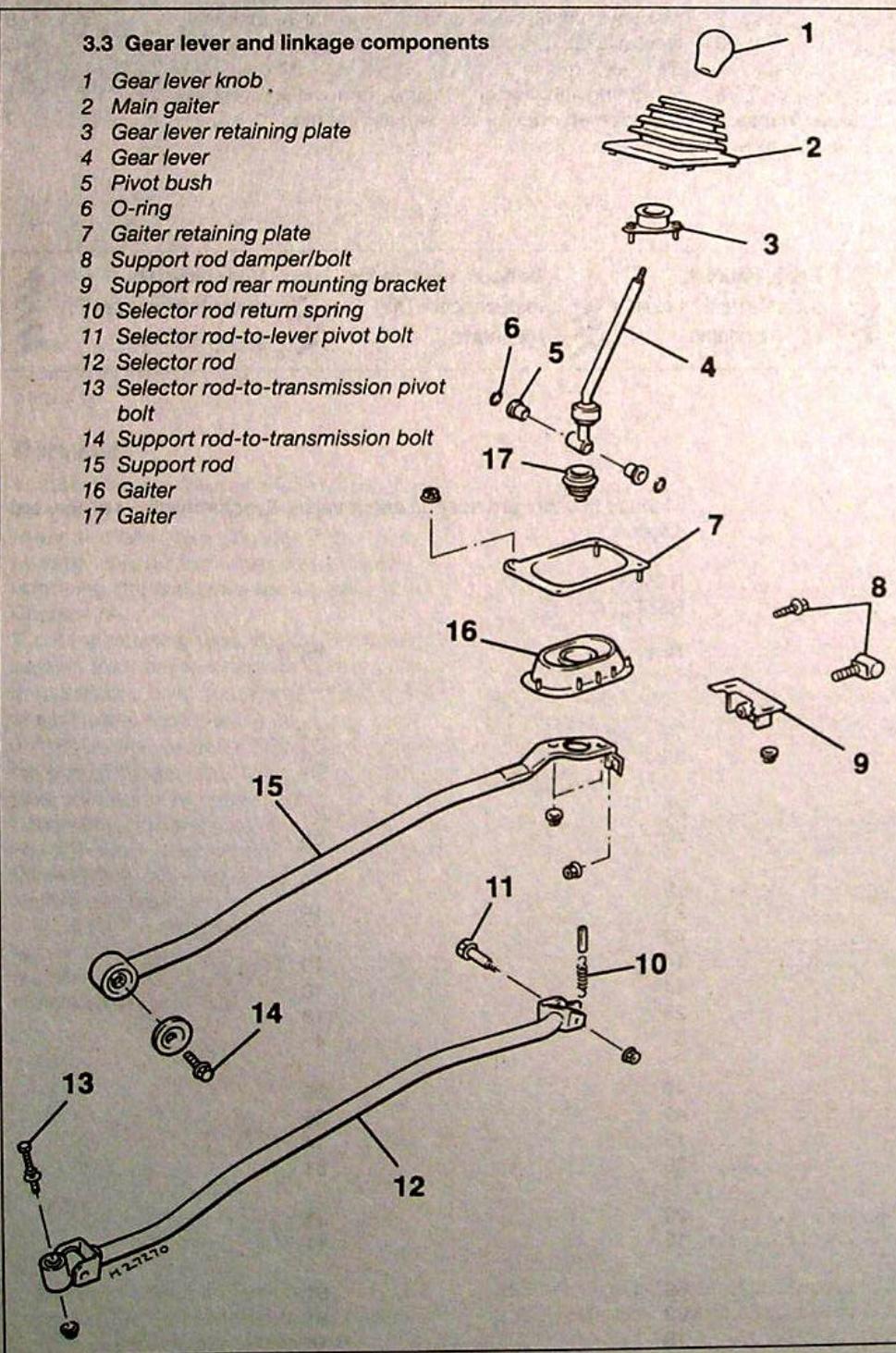
The input and output shafts are arranged side by side, parallel to the crankshaft and

driveshafts, so that their gear pinion teeth are in constant mesh. In the neutral position, the output shaft gear pinions rotate freely, so that drive cannot be transmitted to the crownwheel.

Gear selection is via a floor-mounted lever and selector rod mechanism. The selector rod causes the appropriate selector fork to move to lock the gear pinion to the synchro-hub. Since the synchro-hubs are splined to the output shaft, this locks the pinion to the shaft so that drive can be transmitted. To ensure that gear changing can be made quickly and quietly, a synchromesh system is fitted to all forward gears, consisting of baulk rings and spring-loaded fingers, as well as the gear pinions and synchro-hubs; the synchromesh cones are formed on the mating faces of the baulk rings and gear pinions.

### 3.3 Gear lever and linkage components

- 1 Gear lever knob
- 2 Main gaiter
- 3 Gear lever retaining plate
- 4 Gear lever
- 5 Pivot bush
- 6 O-ring
- 7 Gaiter retaining plate
- 8 Support rod damper/bolt
- 9 Support rod rear mounting bracket
- 10 Selector rod return spring
- 11 Selector rod-to-lever pivot bolt
- 12 Selector rod
- 13 Selector rod-to-transmission pivot bolt
- 14 Support rod-to-transmission bolt
- 15 Support rod
- 16 Gaiter
- 17 Gaiter



## 2 Gearchange linkage - general information

If a stiff, sloppy or imprecise gearchange leads you to suspect that a fault exists within the linkage, first remove and dismantle it completely. Check it for wear or damage as described in Section 3, then reassemble it, applying a smear of multi-purpose grease to all bearing surfaces.

If this does not cure the fault, the car should be examined by an expert, as the fault must lie within the transmission itself. No adjustment of the linkage is possible.

## 3 Gearchange linkage - removal and refitting

### Removal

- 1 Remove the centre console as described in Chapter 11.
- 2 Apply the handbrake, then jack up the front of the car and support it on axle stands (see *Jacking and Vehicle Support*).
- 3 From underneath the vehicle, using a pair of pliers, unhook the spring securing the rear of the selector rod to the support rod (see illustration).
- 4 Slacken and remove the nuts, and withdraw the pivot bolts securing the selector rod to the gear lever and transmission. Remove the selector rod from underneath the vehicle, and recover the O-rings and bushes from the base of the gear lever.
- 5 Unscrew the bolt and washer securing the support rod to the transmission housing. Slacken and remove the nuts securing the rear of the support rod and the support rod bracket to the underside of the vehicle, and manoeuvre the rod and bracket assembly out of position. If necessary, undo the retaining nut, and separate the support rod and mounting bracket.