






# Chapter 6 Clutch

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## Degrees of difficulty

<b>Easy</b> , suitable for novice with little experience		<b>Fairly easy</b> , suitable for beginner with some experience		<b>Fairly difficult</b> , suitable for competent DIY mechanic		<b>Difficult</b> , suitable for experienced DIY mechanic		<b>Very difficult</b> , suitable for expert DIY or professional	
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## Specifications

Type	Single dry plate with diaphragm spring, cable-operated	
Clutch pedal travel	140 mm	
Friction plate diameter		
1124 cc and 1360 cc models:		
Valeo clutch	181.5 mm	
Luk clutch	180 mm	
1580 cc, 1761 cc and 1905 cc models	200 mm	
1998 cc models	215 mm	
Torque wrench settings	Nm	lbf ft
Pressure plate retaining bolts	20	15
Clutch pedal pivot bolt	25	18

### 1 General information

The clutch consists of a friction plate, a pressure plate assembly, a release bearing and the release mechanism; all of these components are contained in the large cast-aluminium alloy bellhousing, sandwiched between the engine and the transmission. The release mechanism is mechanical, being operated by a cable.

The friction plate is fitted between the engine flywheel and the clutch pressure plate, and is allowed to slide on the transmission input shaft splines. It consists of two circular facings of friction material riveted in position to provide the clutch bearing surface, and a spring-cushioned hub to damp out transmission shocks.

The pressure plate assembly is bolted to the engine flywheel, and is located by three dowel pins. When the engine is running, drive is transmitted from the crankshaft, via the flywheel, to the friction plate (these components being clamped securely together by the pressure plate assembly) and from the friction plate to the transmission input shaft.

To interrupt the drive, the spring pressure must be relaxed. On the models covered in

this manual, two different types of clutch release mechanism are used. The first is a conventional "push-type" mechanism, where an independent clutch release bearing, fitted concentrically around the transmission input shaft, is pushed onto the pressure plate assembly. The second is a "pull-type" mechanism, where the clutch release bearing is an integral part of the pressure plate assembly, and is lifted away from the friction plate.

On models with the conventional "push-type" mechanism, at the transmission end of the clutch cable, the outer cable is retained by a fixed mounting bracket, and the inner cable is attached to the release fork lever. Depressing the clutch pedal pulls the control cable inner wire, and this in turn rotates the release fork by acting on the lever at the fork's upper end, above the bellhousing. The release fork then acts on the release bearing, pressing it against the fingers at the centre of the pressure plate diaphragm spring. Since the spring is held by rivets between two annular fulcrum rings, the pressure at its centre causes it to deform so that it flattens, and thus releases, the clamping force it exerts at its periphery, on the pressure plate.

On models with the "pull-type" mechanism, at the transmission end of the clutch cable,

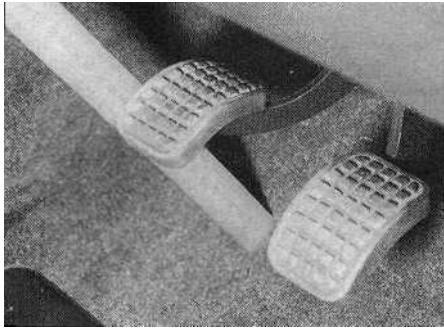
the inner cable is attached to a fixed mounting bracket, and the outer cable acts against the release fork lever. Depressing the clutch pedal pulls the outer cable towards the fixed end of the inner cable, and this in turn rotates the release fork by acting on the lever at the fork's upper end, above the bellhousing. The release fork then lifts the release bearing, which is attached to the pressure plate springs, away from the friction plate, and thus releases the clamping force exerted at the pressure plate periphery.

As the friction plate facings wear, the pressure plate moves towards the flywheel; this causes the diaphragm spring fingers to push against the release bearing, thus reducing the clearance which must be present in the mechanism. To ensure correct operation, the clutch cable must be regularly adjusted.

### 2 Clutch - adjustment

- 1 The clutch adjustment is checked by measuring the clutch pedal travel.
- 2 Ensure that there are no obstructions beneath the clutch pedal. Depress the clutch pedal fully to the floor, and measure the distance that the centre of the clutch pedal





**2.2 To check clutch adjustment, measure the clutch pedal travel as described in text**

pad travels through, from the at-rest position to the floor (**see illustration**). If this is less than the distance given in the Specifications at the start of this Chapter, adjust the clutch as follows.

**3** The clutch cable is adjusted by means of the adjuster nut on the transmission end of the cable. On some models, access to the locknut is limited and, if required, the air cleaner duct or housing component can be removed or disconnected to improve access. Refer to Chapter 4 for further information.

**4** Working in the engine compartment, slacken the locknut from the end of the clutch cable. Adjust the position of the adjuster nut, then re-measure the clutch pedal travel. Repeat this procedure until the clutch pedal travel is as specified (**see illustration**).

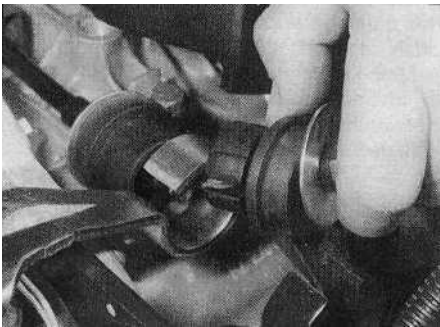
**5** Once the adjuster nut is correctly positioned, and the pedal travel is correctly set, securely tighten the cable locknut. Where necessary, refit any disturbed air cleaner duct/housing components as described in Chapter 4.

### 3 Clutch cable - removal and refitting

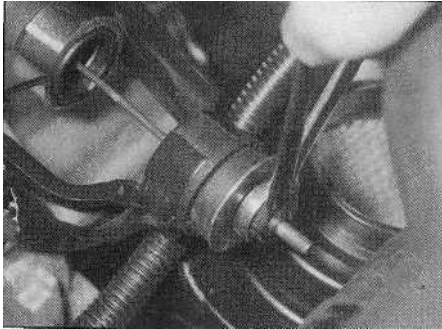


#### Removal

**1** Working in the engine compartment, fully slacken the locknut and adjuster nut from the end of the clutch cable. On some models,



**3.2b ... and outer cable end fittings from the release lever and mounting bracket**



**2.4 Adjusting the clutch cable (air cleaner duct removed for clarity)**

access to these nuts is limited and, if required, the air cleaner duct or housing component can be removed or disconnected to improve access. Refer to Chapter 4 for further information.

**2** Release the inner cable and outer cable fittings from the clutch release lever and mounting bracket, and free the cable from the transmission housing (**see illustrations**).

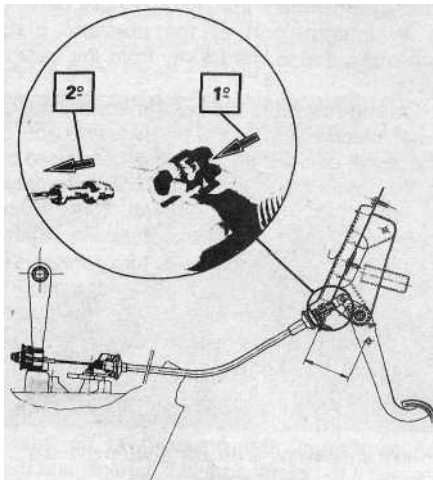
**3** Working inside the vehicle, release the fasteners by turning them through a quarter of a turn, and remove the driver's side lower facia panel. Remove the heater duct which is situated behind the panel.

**4** Release the facia felt undercover retaining clips, and peel back the material to gain access to the upper end of the clutch pedal.

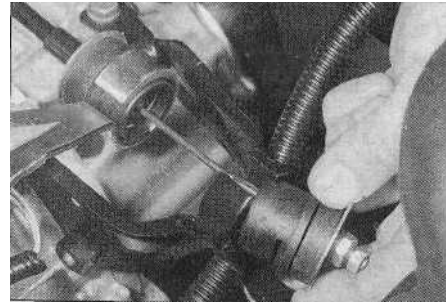
**5** Depress the metal retaining clip, and free the inner cable from the plastic retainer fitted to the upper end of the clutch pedal (**see illustration**).

**6** Return to the engine compartment, and withdraw the cable forwards through the bulkhead, releasing it from any relevant retaining clips and guides. Note its correct routing, and remove it from the vehicle.

**7** Examine the cable, looking for worn end



**3.5 Depress the clutch pedal retainer clip (1) and release the inner cable end fitting (2) from the pedal**



**3.2a Slacken the clutch cable locknut and adjuster nut, then free the inner cable end fittings...**

fittings or a damaged outer casing, and for signs of fraying of the inner wire. Check the cable's operation; the inner wire should move smoothly and easily through the outer casing.. Renew the cable if it shows signs of excessive wear or any damage.



**A cable that appears serviceable when tested off the car may well be much heavier in operation when in its working position**

#### Refitting

**8** Apply a thin smear of multi-purpose grease to the cable end fittings, then pass the cable through the engine compartment bulkhead.

**9** From inside the vehicle, engage the inner cable with the plastic retainer on the clutch pedal, and check that it is securely retained by the metal clip. Clip the felt undercover back into position, then refit the heater duct, ensuring it is correctly located at both ends, and install the lower facia panel.

**10** Refit the plastic locating collar to the release lever, and ensure the rubber spacer is correctly located on the transmission end of the outer cable.

**11** Ensuring that the cable is correctly routed and retained by all the relevant retaining clips and guides, pass the lower end through the release lever/mounting bracket (as applicable) and engage the inner cable. Refit the rubber spacer and flat washer to the end of the inner cable, and screw on the adjuster nut and locknut.

**12** Adjust the clutch cable as described in Section 2.

### 4 Clutch pedal - removal and refitting

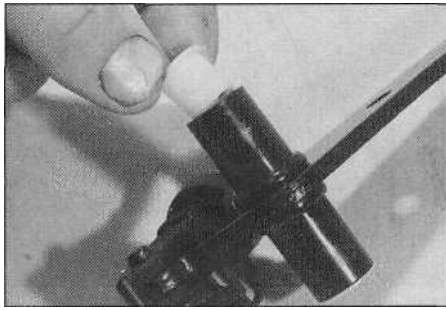


#### Removal

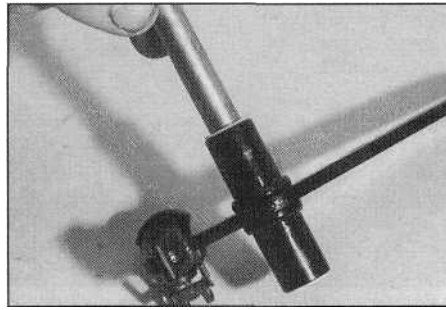
**1** Remove the pedal bracket assembly from the vehicle, as described in Chapter 9.

**2** With the pedal bracket assembly on the bench, slacken the nut, withdraw the clutch pedal pivot bolt, and separate the pedal and bracket. Slide the pivot bush and spring off the

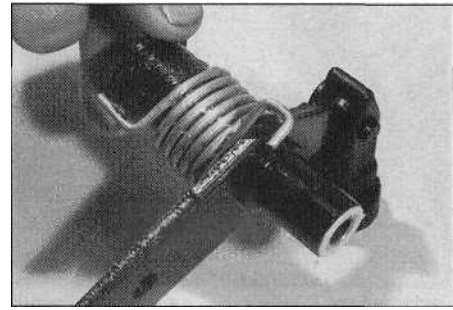




**4.4a Press the pivot bushes into the pedal bore...**



**4.4b ... then insert the spacer ...**



**4.4c ... and refit the pedal spring**

left-hand end of the pedal, and remove the spacer and pivot bushes from the pedal bore.

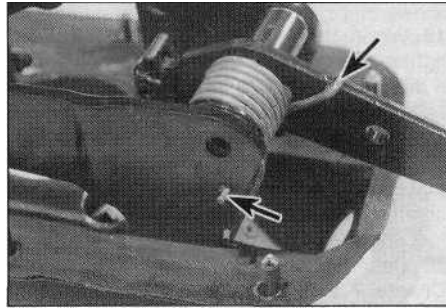
**3** Carefully clean all components, and renew any that are worn or damaged; check the bearing surfaces of the pivot bushes and spacer with particular care; the bushes can be renewed separately if worn.

### Refitting

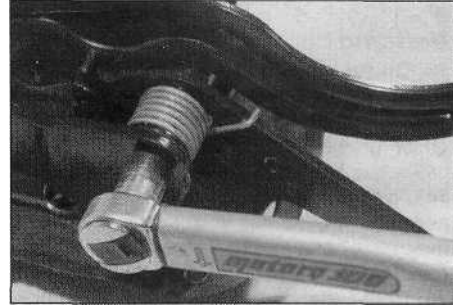
**4** Press the pivot bushes into the pedal bore, then apply a smear of multi-purpose grease to their bearing surfaces, and slide in the spacer. Install the spring and pivot bush on the end of the pedal pivot, ensuring that the inner end of the spring is correctly hooked over the pedal (see illustrations).

**5** Refit the pedal to the bracket, ensuring that the outer end of the pedal spring is correctly located in the slot on the pedal mounting bracket, and install the pivot bolt. Refit and tighten the pivot bolt nut (see illustrations).

**6** Check that the pedal pivots smoothly, then refit the pedal bracket assembly to the vehicle as described in Section 14 of Chapter 9.



**4.5a Refit the pedal to the bracket, ensuring that the spring is correctly engaged in the bracket, and hooked over the pedal (arrowed)**



**4.5b Install the pedal pivot bolt, and tighten it to the specified torque**

**2** Before disturbing the clutch, use chalk or a marker pen to mark the relationship of the pressure plate assembly to the flywheel.

**3** Working in a diagonal sequence, slacken the pressure plate bolts by half a turn at a time, until spring pressure is released and the bolts can be unscrewed by hand.

**4** Prise the pressure plate assembly off its locating dowels, and collect the friction plate, noting which way round the friction plate is fitted.

### Inspection

**Note:** Due to the amount of work necessary to remove and refit clutch

components, it is usually considered good practice to renew the clutch friction plate, pressure plate assembly and release bearing as a matched set, even if only one of these is actually worn enough to require renewal. It is also worth considering the renewal of the clutch components on a preventive basis if the engine and/or transmission have been removed for some other reason.

**5** Remove the clutch assembly.

**6** When cleaning clutch components, read first the warning at the beginning of this Section; remove dust using a clean, dry cloth, and working in a well-ventilated atmosphere.

**7** Check the friction plate facings for signs of wear, damage or oil contamination. If the friction material is cracked, burnt, scored or damaged, or if it is contaminated with oil or grease (shown by shiny black patches), the friction plate must be renewed.

**8** If the friction material is still serviceable, check that the centre boss splines are

unworn, that the torsion springs are in good condition and securely fastened, and that all the rivets are tight. If any wear or damage is found, the friction plate must be renewed.

**9** If the friction material is fouled with oil, this must be due to an oil leak from the crankshaft left-hand oil seal, from the sump-to-cylinder block joint, or from the transmission input shaft. Renew the seal or repair the joint, as appropriate, as described in Chapter 2 or 7, before installing the new friction plate.

**10** Check the pressure plate assembly for obvious signs of wear or damage; shake it to check for loose rivets or worn or damaged fulcrum rings, and check that the drive straps securing the pressure plate to the cover do not show signs (such as a deep yellow or blue discoloration) of overheating. If the diaphragm spring is worn or damaged, or if its pressure is in any way suspect, the pressure plate assembly should be renewed.

**11** Examine the machined bearing surfaces of the pressure plate and of the flywheel; they should be clean, completely flat, and free from scratches or scoring. If either is discoloured from excessive heat, or shows signs of cracks, it should be renewed - although minor damage of this nature can sometimes be polished away using emery paper.

**12** Check that the release bearing contact surface rotates smoothly and easily, with no sign of noise or roughness. Also check that the surface itself is smooth and unworn, with no signs of cracks, pitting or scoring. If there is any doubt about its condition, the bearing must be renewed. On clutches with a "pull-type" release mechanism, this means that the complete pressure plate assembly must also be renewed.

### 5 Clutch assembly - removal, inspection and refitting



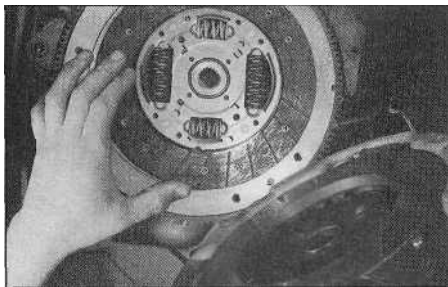
**Warning:** Dust created by clutch wear and deposited on the clutch components may contain asbestos, which is a health hazard. **DO NOT blow it out with compressed air, or inhale any of it. DO NOT use petrol or petroleum-based solvents to clean off the dust. Brake system cleaner or methylated spirit should be used to flush the dust into a suitable receptacle. After the clutch components are wiped clean with rags, dispose of the contaminated rags and cleaner in a sealed, marked container.**

**Note:** Although some friction materials may no longer contain asbestos, it is safest to assume that they do, and to take precautions accordingly.

### Removal

**1** Unless the complete engine/transmission unit is to be removed from the car and separated for major overhaul (see Chapter 2), the clutch can be reached by removing the transmission as described in Chapter 7, Part A.





**5.14** Ensure the friction plate is fitted the correct way around, then install the pressure plate

### Refitting

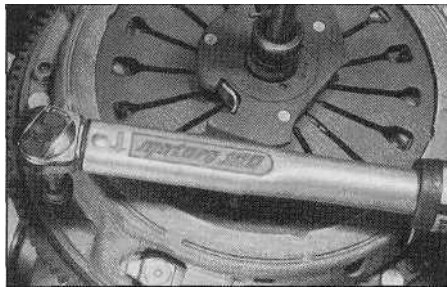
**13** On reassembly, ensure that the bearing surfaces of the flywheel and pressure plate are completely clean, smooth, and free from oil or grease. Use solvent to remove any protective grease from new components.

**14** Fit the friction plate so that its spring hub assembly faces away from the flywheel; there may also be a marking showing which way round the plate is to be refitted (see illustration).

**15** Refit the pressure plate assembly, aligning the marks made on dismantling (if the original pressure plate is re-used), and locating the pressure plate on its three locating dowels. Fit the pressure plate bolts, but tighten them only finger-tight, so that the friction plate can still be moved.

**16** The friction plate must now be centralised, so that when the transmission is refitted, its input shaft will pass through the splines at the centre of the friction plate.

**17** Centralisation can be achieved by passing a screwdriver or other long bar through the friction plate and into the hole in the crankshaft; the friction plate can then be moved around until it is centred on the



**5.18** Once the friction plate is centralised, tighten the pressure plate retaining bolts to the specified torque

**18** When the friction plate is centralised, tighten the pressure plate bolts evenly and in a diagonal sequence to the specified torque setting (see illustration).

**19** Apply a thin smear of molybdenum disulphide grease to the splines of the friction plate and the transmission input shaft, and also to the release bearing bore and release fork shaft.

**20** Refit the transmission as described in Chapter 7 Part A

### 6 Clutch release mechanism - removal, inspection and refitting

**Note:** Refer to the warning concerning the dangers of asbestos dust at the beginning of Section 5.

#### Removal

**1** Unless the complete engine/transmission unit is to be removed from the car and separated for major overhaul (see Chapter 2), the clutch release mechanism can be reached by removing the transmission only, as described in Chapter 7, Part A.

**2** On models with a conventional "push-type" release mechanism, unhook the release bearing from the fork, and slide it off the input shaft. Drive out the roll pin, and remove the release lever from the top of the release fork shaft. Discard the roll pin - a new one must be used on refitting.

**3** On both types of clutch, depress the retaining tabs, then slide the upper bush off the end of the release fork shaft. Disengage the shaft from its lower bush, and manoeuvre it out from the transmission. Depress the retaining tabs, and remove the lower pivot bush from the transmission housing.

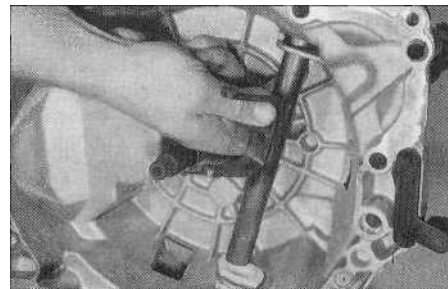
#### Inspection

**4** Check the release mechanism, renewing any component which is worn or damaged. Carefully check all bearing surfaces and points of contact.

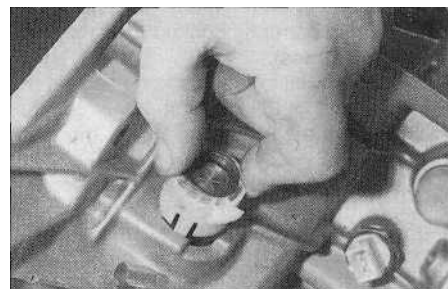
**5** When checking the release bearing itself, note that it is often considered worthwhile to renew it as a matter of course. Check that the contact surface rotates smoothly and easily, with no sign of noise or roughness, and that the surface itself is smooth and unworn, with no signs of cracks, pitting or scoring. If there is any doubt about its condition, the bearing



**6.7a** Clip the lower pivot bush into position in the transmission housing ...



**6.7b** ... locate the release fork shaft in the lower bush ...



**6.7c** ... and slide the upper pivot down the release fork shaft, and into position in the transmission housing - BE3 transmission shown

must be renewed. On models with a "pull-type" release mechanism, this means that the complete pressure plate assembly must be renewed, as described in Section 5.

#### Refitting

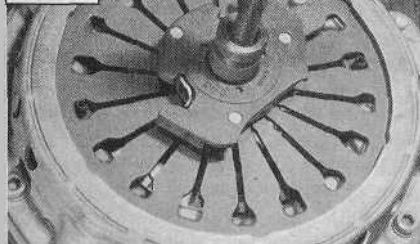
**6** Apply a smear of molybdenum disulphide grease to the shaft pivot bushes and the contact surfaces of the release fork.

**7** Locate the lower pivot bush in the transmission, ensuring it is securely retained by its locating tangs, and refit the release fork. Slide the upper bush down the shaft, and clip it into position in the transmission housing (see illustrations).

**8** On models with a conventional "push-type" release mechanism, refit the release lever to the shaft. Align the lever with the shaft hole, and secure it in position by tapping a new roll pin fully into position. Slide the release bearing onto the input shaft, and engage it with the release fork.

**9** Refit the transmission as described in Chapter 7, Part A.

### TOOL TIP



A clutch-aligning tool can be used to eliminate the guesswork when fitting a friction plate; these can be obtained from most accessory shops). A home-made aligning tool can be fabricated from a length of metal rod or wooden dowel which fits closely inside the crankshaft hole, and has insulating tape wound around it to match the diameter of the friction plate splined hole.