

# Chapter 6

## Clutch, transmission and driveshafts

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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	
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### Specifications

#### Clutch

Type . . . . .	Single dry plate with diaphragm spring. Cable operated
Friction plate diameter	
Except BX Turbo . . . . .	200 mm
BX Turbo . . . . .	215 mm
Lining thickness . . . . .	7.7 ± 0.3 mm
Release bearing type . . . . .	Sealed ball
Pedal free play . . . . .	Not applicable
Pedal travel:	
Visa . . . . .	120.0 mm minimum
BX . . . . .	130.0 to 150.0 mm

#### Manual transmission

Type . . . . .	Four or five forward speeds and one reverse, synchromesh on all forward gears
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#### Designation and type:

Pre 1989 models:		BE1 (BM61) 5-speed				
Visa Van . . . . .		BE1 (BM60) 4-speed or BE1 (BL04) 5-speed				
Visa 17D and 17RD . . . . .		BE1 (BL03) 5-speed				
BX 17D . . . . .		BE1 (BL04) 5-speed or BE1 (BL62) 5-speed				
BX 19D and 19RD . . . . .						
1989 - on models:		BE 3/4				
4-speed . . . . .		BE 3/5				
5-speed . . . . .						
Ratios (overall):		<b>BM60</b>	<b>BM61</b>	<b>BL03</b>	<b>BL04</b>	<b>BL62</b>
1st . . . . .		3.31:1	3.31:1	3.31:1	3.31:1	3.31:1
2nd . . . . .		1.88:1	1.88:1	1.88:1	1.88:1	1.88:1
3rd . . . . .		1.15:1	1.15:1	1.28:1	1.28:1	1.28:1
4th . . . . .		0.80:1	0.80:1	0.97:1	0.97:1	0.97:1
5th . . . . .		-	-	0.76:1	0.76:1	0.76:1
Reverse . . . . .		3.33:1	3.33:1	3.33:1	3.33:1	3.33:1
Final drive . . . . .		3.59:1	3.81:1	4.19:1	3.94:1	4.06:1
Oil type/specification . . . . .		Gear oil, viscosity SAE 75W/80W				
Oil capacity (depending on model) . . . . .		2.0 ± 0.2 litres				

## Automatic transmission

Type .....	Four forwards and one reverse gear	
Designation .....	ZF 4 H P14	
Ratios (overall):	Up to 1988	From 1988
1st .....	0.564	0.606
2nd .....	0.321	0.344
3rd .....	0.234	0.251
4th .....	0.174	0.186
Reverse .....	0.663	0.711
Final drive ratio .....	51/59	49/51
Oil type/specification .....	Dexron II type ATF	
Oil capacity (drain and refill) .....	2.5 litres	

## Driveshafts

Type .....	Solid shaft with inner tri-axe joints and outer six-ball constant velocity joints	
Grease capacity:		
Inner (tri-axe) joint .....	150 grams	
Outer (CV) joint .....	100 grams	

## Torque wrench settings

	Nm	lb ft
Driveshaft nut .....	250	185
Engine-to-transmission bolts .....	40	30
Left-hand engine mounting nut .....	35	26
Left-hand engine mounting stud to transmission .....	35	26
Right-hand driveshaft intermediate bearing retaining bolts .....	10	7

## 1 Description - general

Clutch components are virtually identical to those used in petrol-engined models. However, on models with BE3 transmissions, instead of the clutch release fork pivoting on a ball stud, a pivot shaft is used (see illustration). Refer to the main manuals for replacement details.

A BE1 type manual transmission is fitted. On Visa models the procedures for the five-speed version are described in the Visa main manual. The differences applicable to the four-speed transmission are described in

this Chapter. For BX models the procedures are identical to those for the BL type transmission given in the BX Main Manual.

The BE3 transmissions progressively replaced the BE1 transmissions from the beginning of 1989, the main difference being in the gearshift components. The driver will notice that reverse gear is now in the same plane as 2nd and 4th gears - opposite 5th gear, when applicable - and the lifting collar below the gear knob for selecting reverse gear is now obsolete.

## 2 Manual transmission - removal and refitting

the balance weight and the return spring (see illustrations).

9 Disconnect the gearchange control rods (and cable if fitted).

10 Pull out the rubber cotter and disconnect the speedometer cable. Position it to one side.

11 Remove the left-hand front roadwheel.

12 Unbolt the inner shield from the wheel arch (where fitted).

13 Disconnect the wiring from the reversing lamp switch.

14 Disconnect the front track control arms from the stub axle carriers and, on BX models, unscrew the nut and separate the left-hand link rod from the anti-roll bar.

15 Have an assistant pull the left-hand strut outwards while the left-hand driveshaft is levered from the differential side gear. Hold the strut outwards with a block of wood.

16 On BX models manufactured before July 1984 the left-hand differential side gear must be supported using a dowel, preferably wooden. If this precaution is not taken, the side gears may become misaligned when the right-hand driveshaft is removed.

17 Loosen the two nuts retaining the right-hand driveshaft intermediate bearing in the bracket bolted to the rear of the cylinder block and turn the bolt heads through 90° to release the bearing.

18 Have an assistant pull the right-hand wheel outwards while the right-hand driveshaft is removed from the differential side gear. Hold the wheel and strut out with a block of wood.

19 Position a piece of thin board over the radiator to protect it from possible damage.

20 Remove the starter motor.

21 On BX models unbolt the hydraulic



1.1 Clutch release pivot shaft - BE3 transmission

## Removal

1 Jack up the front of the vehicle and support on axle stands (see "Jacking and vehicle support"). Also jack up the rear of the vehicle and support on axle stands so that the vehicle is level.

2 Remove the air cleaner (Chapter 4).

3 Remove the battery and its tray.

4 Unscrew the drain plug(s) and drain the transmission oil into a container. On completion refit and tighten the plug(s).

5 Unbolt the earth cable from the transmission.

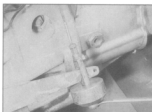
6 Unbolt the high pressure pump on BX models from the transmission, leaving the lines attached. Remove the vacuum pump completely on Visa models (Chapter 7).

7 Unbolt the cable guide where fitted.

8 Disconnect the clutch cable and position it to one side. Recover the pushrod and, if fitted,



2.8A Clutch cable and lever return spring



2.8B Removing the balance weight from the clutch cable



2.8C Feeding the clutch cable through the bracket

pressure regulator from the transmission leaving the pressure lines attached.

**22** Unbolt and remove the transmission-to-engine lower cover.

**23** Support the engine under the sump with a trolley jack and block of wood.

**24** Unscrew the nut from the left-hand engine mounting and remove the rubber mounting.

**25** On Visa models unbolt the support bracket.

**26** Unscrew the left-hand mounting stud from the transmission.

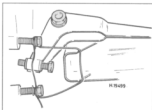
**27** Lower the engine two or three inches, or on BX models until it touches the crossmember.

**28** Unscrew and remove the four engine-to-transmission bolts.

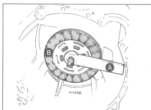
**29** Lift the transmission directly from the engine keeping it horizontal until clear of the clutch, then lower it to the ground.

### Refitting

**30** Refitting is a reversal of removal, but before lifting the transmission onto the engine, temporarily hold the clutch release arm in position using wire as shown (see illustration). Remove the wire after fitting the mounting bolts. Make sure that the two dowels are in place on the mating face of the transmission. When fitting the left-hand mounting stud apply locking fluid to its threads before tightening to the specified torque. Tension the hydraulic pump or vacuum pump drivebelt, referring to Chapter 1 of this manual for Visa models or the main BX model manual. Refill the transmission with oil as described in Chapter 1.



2.30 Using two bolts and wire to hold the clutch release arm while refitting the transmission



3.2 Tool for locking the transmission input shaft

Lever (A) welded to old clutch disc (driven plate) (B)

**3** With the input and output shaft nuts slackened continue as described for the five-speed transmission.

### 3 Manual transmission - dismantling and reassembly

#### Dismantling

**1** The four-speed and five-speed manual transmissions differ only in respect of the 5th gear and its associated components.

**2** To remove the components the input and output shafts must be locked before unscrewing the end nuts. The best way to do this is to engage a gear then immobilise the input shaft using an old clutch disc to which a metal bar has been welded (see illustration). It is unwise to attempt to grip the input shaft splines with any other tool as damage may be caused.

#### Reassembly

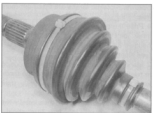
**4** When reassembling the transmission use the same method described in paragraph 2 to tighten the shaft nuts. Remember to stake the nuts after tightening them.

#### 4 Driveshaft rubber bellows - removal and refitting

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#### Removal

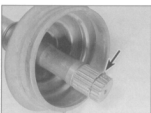
**1** With the driveshaft removed (refer to the relevant manual for petrol-engined models for



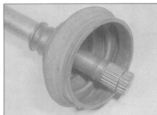
4.1 Plastic straps on the outer rubber bellows



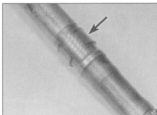
4.2 Removing the rubber bellows from the outer joint housing



4.3 Driveshaft outer joint retaining circlip (arrowed)



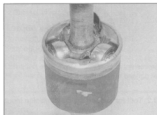
4.4A Removing the outer rubber bellows from the driveshaft



4.4B Plastic seating (arrowed) for the outer rubber bellows



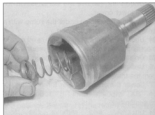
4.6 Removing the inner rubber bellows



4.7 Separating the driveshaft and rollers from the inner joint housing



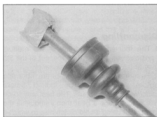
4.8 Left-hand driveshaft with rollers retained with adhesive tape



4.9 Removing the pressure pad and spring from the inner joint housing



4.11 Injecting grease into the inner joint housing



4.12 Inner rubber bellows located on the driveshaft



4.15A Tighten the metal clip. . .



4.15B ... and bend it back under the buckle

removal procedure) loosen the clips on the outer rubber bellows. If plastic straps are fitted cut them free with snips (see illustration).

2 Prise the bellows large diameter from the outer joint housing (see illustration), then tap the centre hub outwards using a soft metal drift to release it from the retaining circlip. Slide the outer joint complete from the driveshaft splines.

3 Extract the circlip from the groove in the driveshaft (see illustration).

4 Prise off the rubber bellows. If necessary remove the plastic seating from the recess in the driveshaft (see illustrations).

5 Loosen the clips on the inner rubber

bellows. If plastic straps are fitted cut them free.

6 Prise the bellows large diameter from the inner joint housing and slide the rubber bellows off the outer end of the driveshaft (see illustration).

7 Mark the driveshaft and inner joint housing in relation to each other then separate them, keeping the rollers engaged with their respective spigots (see illustration).

8 Clean away the grease then retain the rollers using adhesive tape (see illustration).

9 Remove the pressure pad and spring from inside the inner joint housing (see illustration).

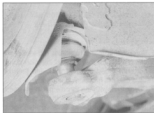
## Refitting

- 10 Clean away the grease then begin reassembly by inserting the pressure pad and spring into the inner joint housing with the housing mounted upright in a soft-jawed vice.
- 11 Inject half the required amount of grease into the inner joint housing (see illustration).
- 12 Locate the new inner rubber bellows halfway along the driveshaft (see illustration).
- 13 Remove the adhesive tape and insert the driveshaft into the housing.
- 14 Inject the remaining amount of grease in the joint.
- 15 Keeping the driveshaft pressed against the internal spring, refit the rubber bellows and tighten the clips. Metal type clips can be tightened using two pliers, by holding the buckle and pulling the clip through. Cut off the excess and bend the clip back under the buckle (see illustrations).
- 16 Fit the plastic seating in the driveshaft recess and refit the new rubber bellows small diameter on it.
- 17 Refit the circlip in the driveshaft groove.
- 18 Inject the required amount of grease in the outer joint then insert the driveshaft, engage the splines, and press in until the circlip snaps into the groove.
- 19 Ease the rubber bellows onto the outer joint, and fit the two clips, tightening them as previously described.

## 5 Driveshaft oil seals - removal and refitting

### Removal

- 1 Jack up the front of the vehicle and support on axle stands (see "Jacking and vehicle support"). Apply the handbrake on Visa models or chock the rear wheels on BX models.
- 2 Unscrew the drain plug(s) and drain the transmission oil into a container. On completion refit and tighten the plug(s).
- 3 Disconnect the front track control arms from the stub axle carriers (see illustration), and, on BX models, unscrew the nuts and separate the link rods from the anti-roll bar.
- 4 Have an assistant pull the left-hand wheel outwards while the left-hand driveshaft is levered from the differential side gear. Hold the strut outwards with a block of wood.
- 5 On BX models manufactured before July 1984 the left-hand differential side gear must be supported using a dowel, preferably wooden. If this precaution is not taken, the side gears may become misaligned when the right-hand driveshaft is removed.
- 6 Loosen the two nuts retaining the right-hand driveshaft intermediate bearing in the bracket bolted to the rear of the cylinder block and turn the bolt heads through 90° to release the bearing.
- 7 Have an assistant pull the right-hand wheel



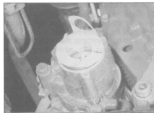
5.3 Disconnecting a front track control arm (BX model)



5.8 Levering a driveshaft and oil seal from the transmission



5.11A The right-hand driveshaft oil seal is supplied with a protector



5.11B Right-hand driveshaft oil seal installed ready for driveshaft refitting



5.12 Refitting the right-hand driveshaft



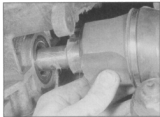
5.14 Right-hand driveshaft rubber dust seal

- outwards while the right-hand driveshaft is removed from the differential side gear. Hold the strut out with a block of wood.
- 8 Using a screwdriver lever the oil seals from the transmission (see illustration).

### Refitting

- 9 Clean the oil seal seatings in the transmission.
- 10 Press the new left-hand oil seal squarely into the transmission until flush using a block of wood.
- 11 The new right-hand oil seal is supplied with a protector to be used when fitting the driveshaft. First remove the protector and

- press the oil seal squarely into the transmission until flush using a block of wood. Refit the protector having applied a little grease to the seal lips (see illustrations).
- 12 Insert the right-hand driveshaft while guiding the intermediate bearing in the bracket (see illustration).
- 13 Pull out the protector and discard it. The protector is split so that it will pass over the driveshaft.
- 14 Slide the rubber dust seal next to the oil seal (see illustration).
- 15 Refit and tighten the intermediate bearing bolts.



**5.16 Refitting the left-hand driveshaft**

**16** Apply a little grease to the left-hand oil seal lips then insert the left-hand driveshaft (see illustration).

**17** Reconnect the front track control arms to the stub axle carriers and, on BX models, reconnect the anti-roll bar links.

**18** Lower the vehicle to the ground and refill the transmission with oil as described in Chapter 1.

## 6 Kickdown cable (automatic transmission) - adjustment

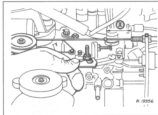


**1** Before attempting to adjust the kickdown cable, make sure that the fuel injection pump is correctly timed and adjusted, and that the throttle cable is functioning correctly.

**2** Check that, with the throttle pedal released, the kickdown inner cable at the pump is free of tension without being slack. There should be a clearance of 0.5 to 1.0 mm between the lug on the cable and the tip of the adjuster. Slacken the adjuster locknuts, and turn the adjuster if necessary until the setting is correct.

**3** Have an assistant depress the throttle pedal as far as, but not beyond, the kickdown point. In this position, measure the distance from the lug to the adjuster tip "X" (see illustration). It should be 39 mm.

**4** Have the assistant depress the pedal to the floor, and re-measure the lug-to-adjuster



**6.3 Kickdown cable adjustment**

*For X see text*

distance. Now it should be 47 mm.

**5** If either of the last two values were incorrect, reposition the kickdown cable end within the limits of the adjustment slot on the pump lever.