

Propeller shaft

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Propeller shaft

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Propeller shaft

Introduction

Two types of propeller shafts are fitted to this series of motor cars, either a single piece type or a rubber jointed type.

It should be noted that the single piece type propeller shaft must always be fitted to the Bentley Mulsanne Turbo.

The single piece propeller shaft incorporates a harmonic damper. A universal joint is fitted to each end of the shaft and the whole assembly is dynamically balanced to 0.09 gm/mm (0.125 oz/in) at a speed of 3000 rev/min.

If the propeller shaft assembly is dismantled and new universal joints fitted the shaft should be rebalanced after assembly. If required, a fully balanced assembly can be obtained as a service exchange unit.

The rubber jointed type propeller shaft has a rubber flexible coupling fitted to each end of the shaft together with a spigot plate. The spigot plate fits into a centralizing bush/lip seal which is an interference fit in the shaft.

The propeller shaft is balanced prior to assembly to 0.09 gm/mm (0.125 oz/in) at a speed of 3000 rev/min without the flexible rubber coupling arrangement fitted.

The fitting of this type of shaft necessitated modifications to the removable part of the centre body crossmember. Also, to suit the rubber flexible coupling arrangement, a new type of transmission output flange and final drive pinion flange are fitted.

On some of the earlier cars that have the rubber jointed propeller shaft fitted, it was found that additional clearance between the transmission output flange/rubber flexible coupling and the propeller shaft tunnel was necessary. This clearance was achieved by fitting a spacer plate 3,175 mm (0.125 in) thick under the front engine mount as shown in figure F1-1. On some cars it was found necessary to fit two plates.

On Silver Spur cars for countries other than North America and Japan from the following vehicle identification number *SCAZN000XECH09429* including *SCBZNOT09ECH09395* and *SCAZN0002ECH09425* a different bush/seal is fitted. These propeller shafts fitted with the different bush/seal can be identified by a band of white paint around the propeller shaft tube.

Single piece propeller shaft

Propeller shaft - To remove

1. Drive the car onto a ramp and carry out the usual workshop safety precautions.
2. On cars conforming to a Japanese specification, remove the exhaust system grass-fire shields from the

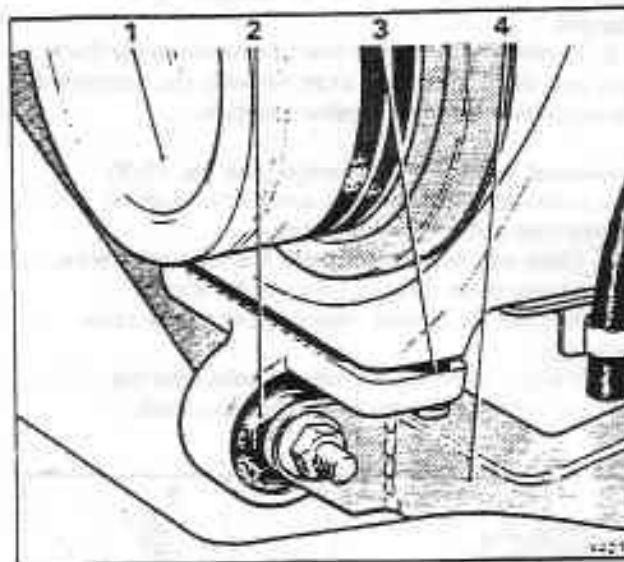


Fig. F1-1 Front engine mounting and spacer(s)

- 1 Crankshaft pulley
- 2 Front engine mount
- 3 Spacer plate(s) 3,175 mm (0.125 in) thick
- 4 Front engine crossmember

area around the intermediate silencer.

3. Remove the two mounting bolts securing the front vibrashock exhaust mounting bracket to the centre body crossmember (see fig. F1-2).
4. Ensure that the parking brake is in the off position.
5. Unhook the parking brake return spring from the operating lever.
6. Remove the front cable mounting bracket situated on the front face of the centre body crossmember (see fig. F1-2).
7. Disconnect the front exhaust silencer heat shield from the centre body crossmember.
8. Remove the bolts securing the rear brake cable abutment bracket to the body.
9. On cars fitted with catalytic converters, remove the small heat shield protecting the brake cable end rubbers.
10. Remove the securing bolts from both sides of the centre body crossmember section and free the assembly. The centre section, together with the parking brake pivot mounting brackets and lever should be moved to the side of the car, but must be suitably supported to avoid any strain or kinking of the parking brake cables. Under no circumstances should the centre body crossmember be allowed to hang on the parking brake cables.
11. Switch on the ignition. Using the gear range

selector lever engage the neutral position. Switch off the ignition.

12. Raise a rear wheel of the car to enable the propeller shaft to be turned.

13. Correlate the propeller shaft flanges to the final drive pinion flange and the transmission output flange.

14. Support the propeller shaft and remove the bolts and nuts from the front and rear propeller shaft flanges.

15. Remove the propeller shaft by lowering the front end and then moving the shaft forward and downward through the rear crossmember aperture.

Universal joint - To dismantle (see fig. F1-3)

If a universal joint cannot be serviced it must be dismantled and a new joint fitted.

1. Clean and remove any paint from the yoke eyes.

2. Correlate the flanged yokes to the shaft.

3. Remove the circlips retaining the needle roller bearings.

4. Using a nylon mallet, tap the yoke until the bearing races are driven out of the yoke eyes.

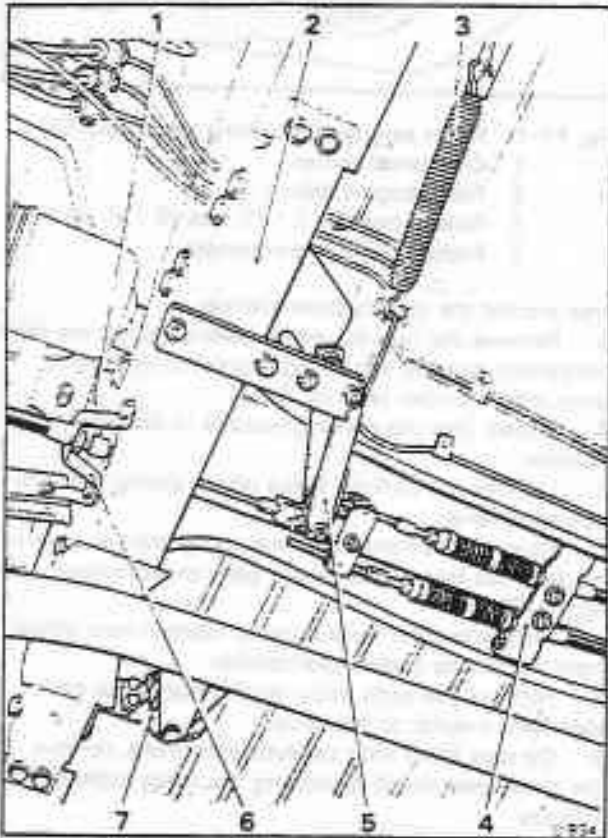


Fig. F1-2 Centre crossmember and parking brake linkage

- 1 Propeller shaft flange bolts
- 2 Removable centre body crossmember
- 3 Return spring
- 4 Abutment bracket
- 5 Operating lever
- 6 Mounting bracket - Front brake cable
- 7 Vibrashock mounting bracket

Universal joint - To assemble

1. Insert the crosspiece and seals into the yoke eyes. Hold the crosspiece centrally, then carefully press the needle roller bearing assemblies into the yoke eyes until it is possible to fit the circlips. If this is found difficult to accomplish due to pressurization, release the grease nipple situated between two of the crosspiece trunnions thus allowing the trapped air to bleed.

2. Fit the circlips.

3. If necessary tighten the grease nipples.

Propeller shaft - To fit

Reverse the procedure given for removal noting the following.

1. The joint faces must be clean and free from damage. Torque tighten the flange bolts to the torque figures quoted in Chapter J.

All other nuts and bolts must be torque tightened in accordance with the figures quoted in Chapter P.

2. Before fitting the exhaust system reference should be made to Chapter Q.

3. Check the parking brake operation and adjust if necessary (see Chapter G).

Rubber jointed type propeller shaft

Propeller shaft - To remove

1. Carry out Operations 1 to 12 inclusive as described under the heading Propeller shaft - To remove (single piece propeller shaft).

2. Correlate the propeller shaft rubber flexible

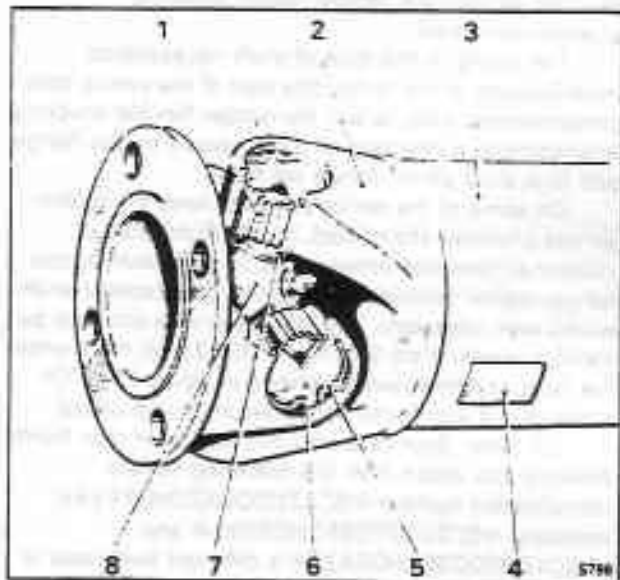


Fig F1-3 Propeller shaft universal joint

- 1 Needle roller bearings
- 2 Yoke
- 3 Centre tube
- 4 Balance weight
- 5 Circlip
- 6 Bearing retainer
- 7 Rubber seal
- 8 Cruciform

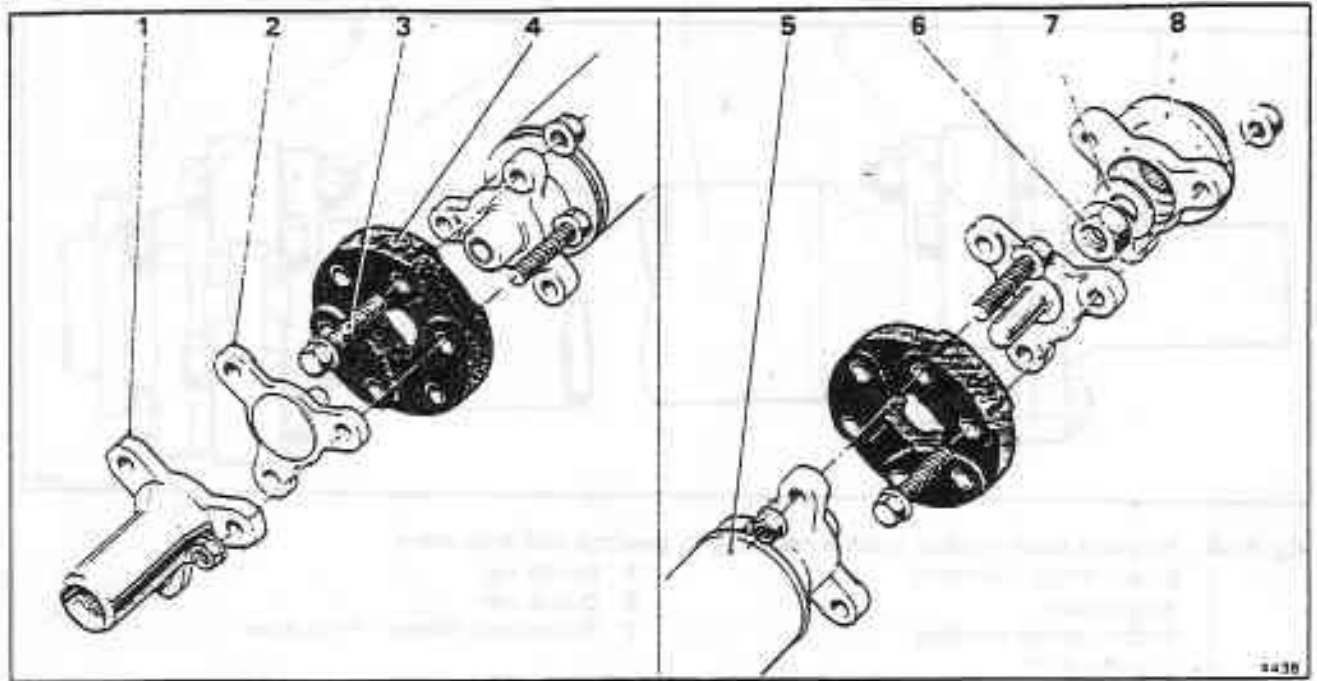


Fig. F1-4 Propeller shaft/rubber flexible couplings - Gearbox and final drive

- | | |
|----------------------------|-------------------------------------|
| 1 Output flange - Gearbox | 5 Propeller shaft |
| 2 Spigot plate | 6 Nut |
| 3 Durluk bolt | 7 Washer |
| 4 Rubber flexible coupling | 8 Pinion drive flange - Final drive |

couplings/spigot plates to the final drive pinion flange and to the transmission output flange.

3. Support the propeller shaft and remove the Durlok bolts from the final drive and transmission coupling flanges.

4. Unscrew the Durlok bolts securing the rubber coupling to the rear end of the propeller shaft. Then, carefully remove the spigot plate and rubber coupling.

5. Remove the propeller shaft by lowering the front end and then moving the shaft forward and downward through the rear crossmember aperture.

6. If necessary, unscrew the bolts securing the rubber coupling to the front end of the propeller shaft and carefully remove the spigot plate and rubber coupling.

Rubber flexible coupling(s) - To inspect or renew (see fig. F1-4)

It is not possible to inspect a rubber coupling in position, therefore it is necessary to remove the propeller shaft.

When inspecting or renewing a rubber coupling the following points should be noted.

1. Remove the propeller shaft as described under the heading Propeller shaft - To remove (Rubber jointed type).
2. Inspect the coupling(s) for damage and renew if necessary.
3. Fit the propeller shaft as described under the heading Propeller shaft - To fit (Rubber jointed type).

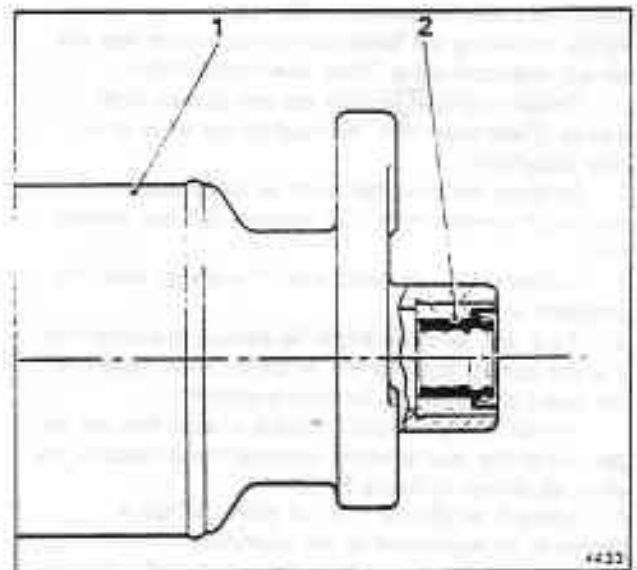


Fig. F1-5 Propeller shaft, centring bush/lip seal assembly (Flexible coupling)

- 1 Propeller shaft.
- 2 Centring bush/lip seal sub-assembly

Spigot plate(s) - To inspect or renew (see fig. F1-4)

It is not possible to inspect a spigot plate in position, therefore it is necessary to remove the propeller shaft.

When inspecting or renewing a spigot plate the following points should be noted.

1. Remove the propeller shaft as described under the

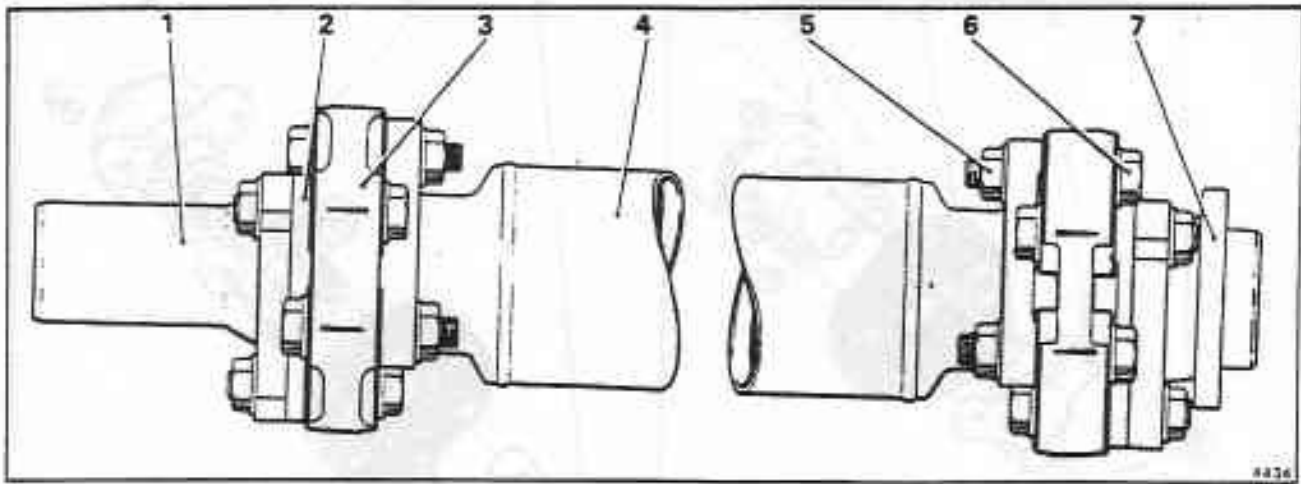


Fig. F1-6 Propeller shaft/rubber flexible coupling to gearbox and final drive

- | | |
|----------------------------|-------------------------------------|
| 1 Output flange – Gearbox | 5 Durlok nut |
| 2 Spigot plate | 6 Durlok bolt |
| 3 Rubber flexible coupling | 7 Pinion drive flange – Final drive |
| 4 Propeller shaft | |

heading Propeller shaft – To remove (Rubber jointed type).

- Inspect the spigot plate(s) and renew if necessary.
- Fit the propeller shaft as described under the heading Propeller shaft – To fit (Rubber jointed type).

Centring bush/lip seal(s) – To renew

Before renewing the bush/lip seal(s) ensure that the correct replacement is fitted, see Introduction.

Certain types of bushes are pre-packed with grease, these must not be washed out prior to or after assembly.

- Remove the propeller shaft as described under the heading Propeller shaft – To remove (Rubber jointed type).
- Withdraw the centring bush/lip seal(s) from the propeller shaft.
- Fit a new centring bush/lip seal(s), ensuring that it is the correct type for the propeller shaft, note that the bush/seal must be an interference fit.

When fitting the bush/seal(s) ensure that the lip portion of the seal is facing towards the outside of the shaft as shown in figure F1-5.

- Apply 5 ml (0.175 fl oz) of Shell Retinax A grease or its equivalent to the bush/seal.
- Fit the propeller shaft as described under the heading Propeller shaft – To fit (Rubber jointed type).

Propeller shaft – To fit

Reverse the procedure given for removal noting the following.

- Durlok nuts and bolts have serrations under the heads which act as a ratchet to eliminate anti-clockwise rotation. During removal damage to the flange faces and Durlok components may have been incurred. Therefore, inspect all faces for damage and rectify as necessary.
- If removed, fit the front spigot plate, together with

the rubber coupling, to the propeller shaft prior to fitting the shaft to the car.

Align the rubber coupling to the propeller shaft ensuring that the arrows moulded into the circumference of the coupling are positioned as shown in figure F1-6.

Fit the bolts through the rubber coupling into the propeller shaft ensuring that they are inserted in the direction of the arrows.

It is recommended that before securing the bolts to the propeller shaft that the remaining bolts are fitted through the rubber coupling ensuring that they are also fitted in the direction of the arrows.

Smear a small amount of grease onto the spigot locating pin prior to fitting the spigot to the propeller shaft.

- When fitting the propeller shaft to the car fit the rear spigot plate/rubber coupling in the same manner as that described for the front spigot plate/rubber coupling (see Operation 2).

4. All joint faces must be clean and free from damage. Torque tighten the Durlok nuts and bolts, to the figures quoted in Section F2.

All other nuts and bolts must be torque tightened in accordance with the figures quoted in Chapter P.

- Before fitting the exhaust system reference should be made to Chapter Q.

6. Check the parking brake operation and adjust accordingly (see Chapter G).

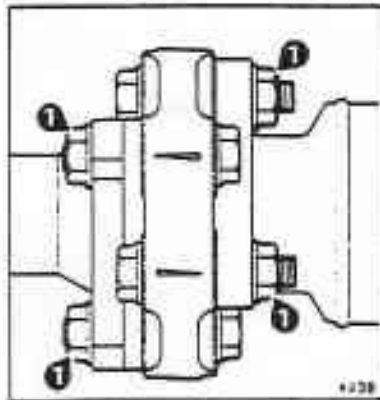
Special torque tightening figures

Introduction

This section contains the special torque tightening figures applicable to Chapter F.

For standard torque tightening figures refer to Chapter P. Components used during manufacture of the vehicle have different thread formations (metric, UNF, UNC, etc.). Therefore, when fitting nuts, bolts and setscrews it is important to ensure that the correct type and size of thread formation is used.

Section F1



Ref.	Component	Nm	kgf m	lbf ft
1	Flexible rubber coupling assembly	89 – 94	8,9 – 9,6	65 – 70