



Sub-frames and Suspension

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Issue record sheet

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Introduction

To enable the desired ride and handling characteristics of the respective models to be obtained, variations in the suspension components used are necessary. These variations fall mainly into three model groups.

Silver Spirit and Silver Spur.

Corniche, Corniche II, and Bentley Continental.

Mulsanne, Mulsanne S, Bentley Eight, and Turbo R.

In some instances the differences are not visibly evident and can only be confirmed by the component part number. The components affected are as follows.

Front suspension

Front sub-frame mounts

Visual appearances are identical but the rubber hardness differs.

Types identifiable by the part number moulded into the rubber of the mount.

Suspension dampers

Visual appearances are identical but the damping characteristic differs.

Types identifiable by the part number located at the base of the damper body.

Stabilizer and links

A visually larger diameter stabilizer is fitted to all Bentley models except the Bentley Continental. The rubber mounts for this stabilizer have a larger bore and are produced from a different hardness of rubber.

Different links and mounting bolts to those on the other models are also used (see fig. H5-5) when this larger stabilizer is fitted.

Rear engine mounts

Visual appearances of the rubber section of the mounts are identical but the rubber hardness differs. The harder rubber mounts are fitted to all Bentley and Corniche models. These mounts are also fitted to 1988 and 1989 model year Silver Spur and 1989 model year Silver Spirit cars conforming to a Canadian and USA specification, and to cars conforming to Australian, Austrian, Japanese, Swedish, and Swiss specifications from vehicle identification numbers (VIN)

Silver Spirit

* SCAZSO2A9KCX24804 *

Silver Spur

* SCAZNO2A3KCH24761 *

On all 1989 model year cars an engine roll stop plate and buffer is incorporated in the design of the mounts (see fig. H3-11).

Sub-frame tie-bars and stabilus dampers

On all cars other than the Corniche, Corniche II, and Continental models tie-bars are fitted between the sub-frame and the body longeron (see fig. H3-6). Small

dampers are also fitted between the sub-frame and the engine to stabilize engine movement. Both of these items are situated at the rear of the sub-frame on each side of the engine.

Rear suspension

Rear crossmember mounts

The crossmember mounts are visually identifiable by the size of the voids in the rubber of the mounts.

Final drive crossmember mount

The mount used is the same for all models.

Rear stabilizer and links

A visually larger diameter stabilizer is fitted to all Bentley models except the Bentley Continental. The rubber mounts for this stabilizer have a larger bore.

Different links to those used on the other models are also used (see fig. H9-6) when this larger stabilizer is fitted.

Front sub-frame and suspension

Introduction

This section describes the removal of the front sub-frame, engine, and torque converter transmission as one unit. Details for removal of the engine only are given in Chapter E.

Before removal, reference should also be made to Chapter C and Chapter G. These chapters give details of the procedures necessary to discharge the air conditioning refrigeration system and depressurize the hydraulic braking and levelling systems. On cars fitted with an exhaust gas emission control system, reference should also be made to publication TSD 4737 Engine management systems.

The following operations are the basic requirements for removal of the sub-frame as a complete unit. It should be noted that the operations given relate to varying types of engine and car model. Modifications may also have been introduced as a result of improvements to the vehicle. Always ensure that all relevant looms, pipes, hoses, etc. are disconnected prior to raising the body from the sub-frame and engine unit.

When disconnecting hose and pipe connections, suitable blanks should always be fitted to prevent the ingress of foreign matter and the loss of lubricants and fuel. Ensure that hose and pipe routes and clipping positions are noted prior to removal.

Front sub-frame, engine, and torque converter transmission – To remove

1. Reverse the car onto a ramp and chock the rear road wheels.
2. Fit car protection kit RH2662, wing covers RH2684, and wing cover liners RH2685 onto the car.
3. Discharge the air conditioning refrigeration system as described in Chapter C.
4. Depressurize the hydraulic systems as described in Chapter G.
5. Drain the engine cooling system as described in Chapter L.
6. Switch on the ignition and move the gear range selector lever to the neutral position. Switch off the ignition.

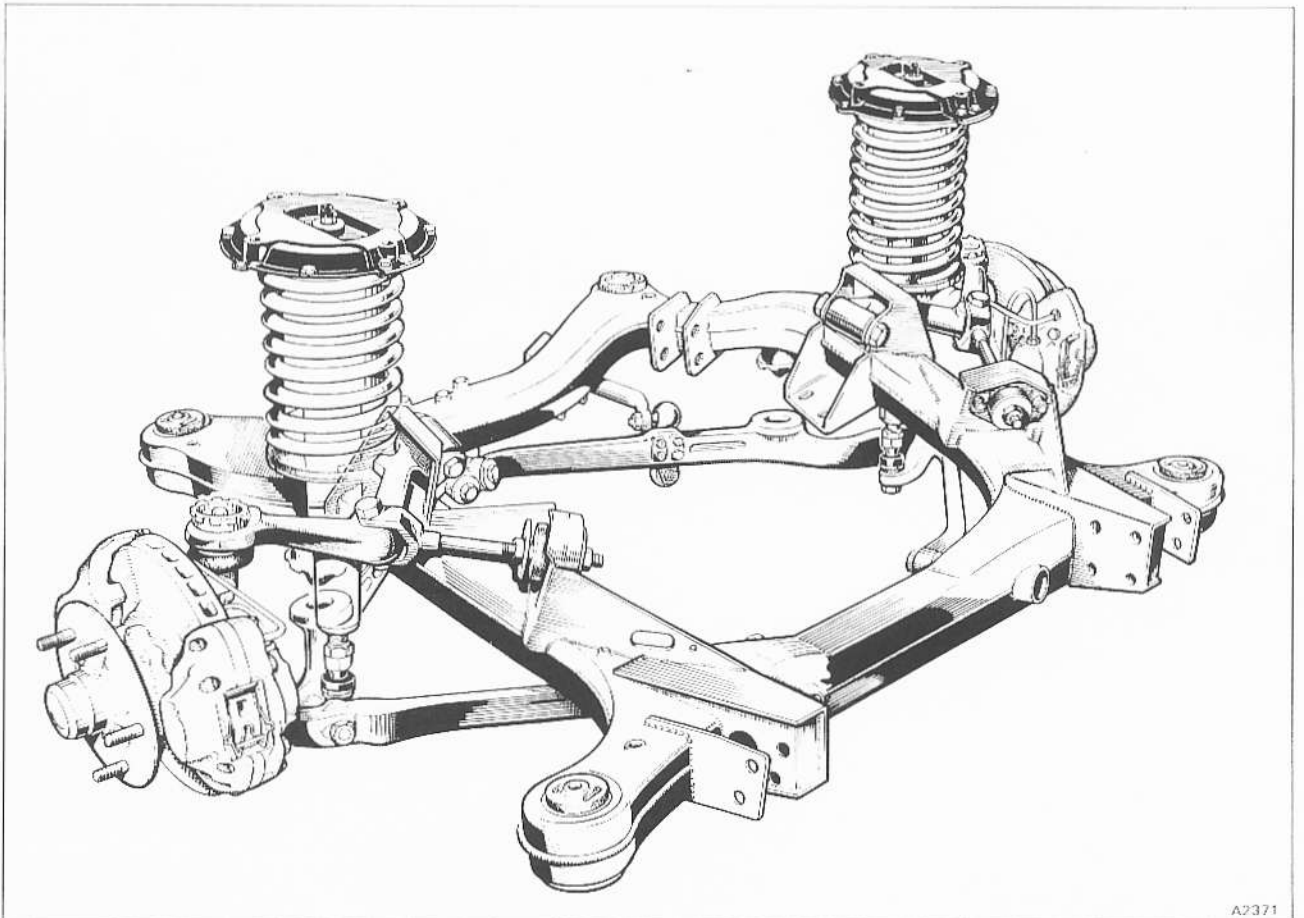


Fig. H3-1 Front sub-frame and suspension assembly



7. Disconnect the battery.
8. Remove the bonnet as described in Chapter S.
9. Remove the radiator top and bottom hoses.
10. Remove the engine fan as described in Chapter L.
11. Disconnect the heater tap feed and return hoses from the crankcase. On 1989 model year cars also disconnect the coolant expansion return hose.
12. Disconnect the two refrigeration pipes situated adjacent to the refrigerant compressor (see fig. H3-2).
13. Clamp the hydraulic system reservoir to brake pump hoses to prevent reservoir drainage, then disconnect the hoses from the pump inlet pipes. Fit blanks to the pipe ends.
14. Disconnect the steering pump and steering rack to oil cooler hoses. Allow the oil to drain into a container.
15. Remove the air intake duct. On cars fitted with an exhaust emission control system also remove the air pump feed hose.
16. On Bentley Turbo R cars remove the air dump (recirculation) pipe and the turbocharger intake adapter (see fig. H3-3). Blank off the turbocharger to prevent the ingress of foreign matter. On 1989 model year cars also

disconnect the turbocharger to intercooler duct.
17. Disconnect the body to engine fuel hoses; also disconnect the evaporative loss canister hose if applicable.

Note The fuel supply line may contain pressurized fuel. When disconnecting this line an absorbent cloth should be placed around the joint and the pipe nut carefully slackened to release the pressure.

18. Disconnect the accumulator to body hoses. On Bentley Turbo R cars these hoses are situated on the left-hand side of the engine compartment adjacent to the rear engine mount.

19. Disconnect the accelerator down rod from the equalizer linkage. Remove the setscrews securing the equalizer bracket to the body, and the equalizer pivot bolt. Remove the equalizer bracket.

20. On Bentley Turbo R cars, disconnect the hydraulic mineral oil low pressure return hoses.

21. Disconnect the sub-frame to body hydraulic braking system hoses. On cars fitted with antilock braking, disconnect the electrical connections from the sensors

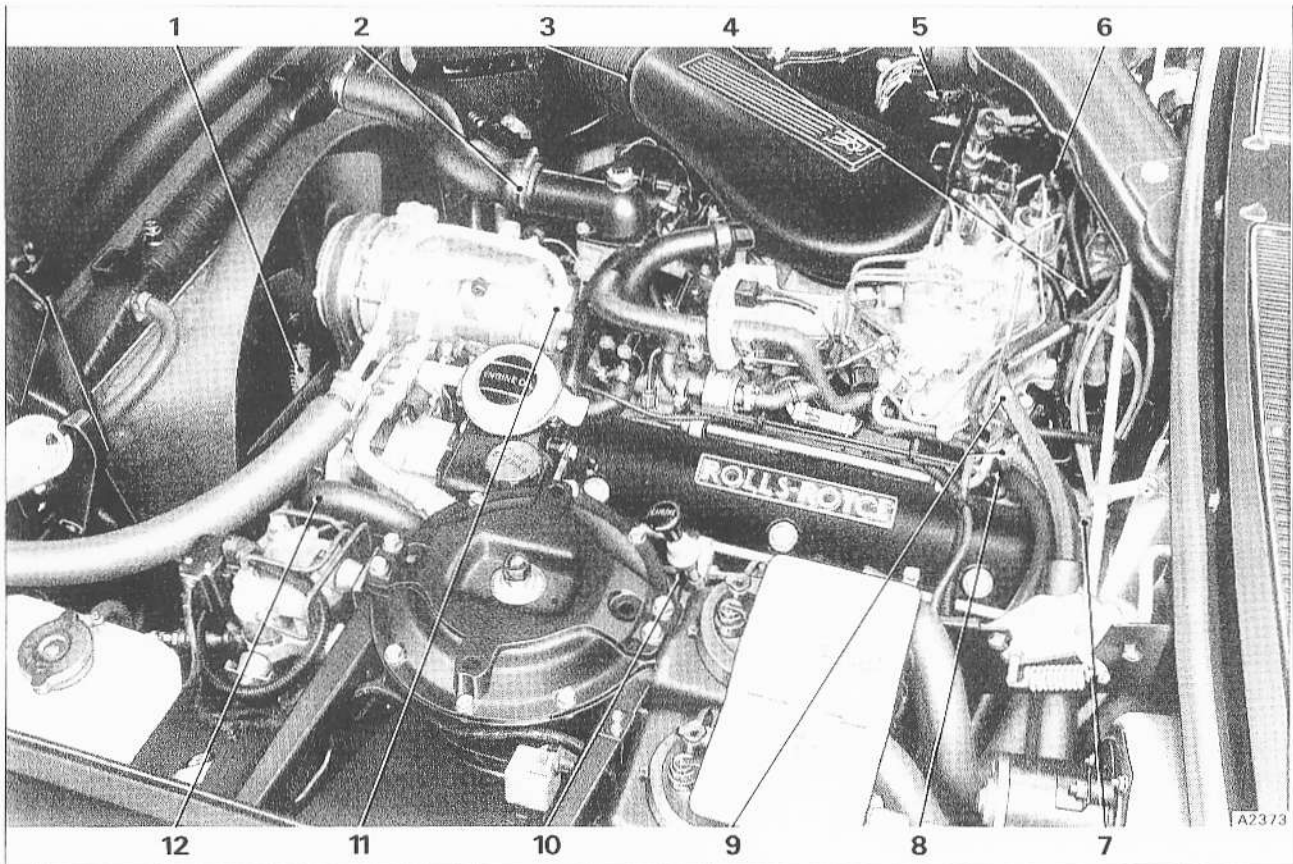


Fig. H3-2 Component disconnection points

- | | |
|--------------------------|---|
| 1 Viscous fan | 8 Fuel pipes |
| 2 Radiator top hose | 9 Front and rear brake pump supply pipes |
| 3 Air intake duct | 10 Electrical connections |
| 4 HT lead | 11 Refrigerant pipes |
| 5 Electrical connections | 12 Heater hose, steering pump hose and radiator bottom hose |
| 6 Accelerator linkage | |
| 7 Heater hose | |

situated on each front yoke. The brake pad wear wires should also be disconnected.

22. Disconnect the two transmission oil cooler pipes from the bottom of the radiator assembly. Allow any transmission fluid to drain into a container.

23. Remove the two flexible engine oil filter to engine oil cooler pipes (see fig. H3-5). Allow any engine oil to drain into a container. On Bentley Turbo R cars remove the cooler pipes clamp situated on the right-hand longeron.

24. On cars fitted with an exhaust emission control system, disconnect the oxygen sensor electrical connection situated in the right-hand corner of the engine compartment.

25. Dependent on the type of exhaust system fitted, remove the section adjacent to the transmission unit together with any heat shields or grass fire shields. Refer to Chapter Q for details. On 1989 model year Bentley Turbo R cars also disconnect the compliance mount cooler duct situated behind the right-hand compliance assembly.

26. Disconnect the parking brake front cable from the equalizer assembly. Release the outer cable from its securing bracket on the centre body member. Detach the cable clip and move the cable away from the transmission.

27. Disconnect the propeller shaft from the transmission unit as described in Chapter F.

28. On left-hand drive cars, remove the accelerator cross-shaft.

29. On right-hand drive cars, remove the accelerator lever securing bolt and slide the lever along the pivot shaft; away from the transmission.

30. Disconnect the body to sub-frame earth braid situated adjacent to the right-hand rear sub-frame mount.

31. On cars fitted with tie-bars at the rear of the sub-frame (see fig. H3-6), disconnect the tie-bars from the body.

32. Remove the two bolts securing the steering link to the steering column.

33. Remove the gear change actuator from the transmission unit. Move the actuator to a suitable position and tie it to the underside of the car body.

34. Disconnect all the relevant electrical connectors and clipping points to release the engine looms. Refer to figures H3-7 and H3-8 for details.

35. Remove the front road springs as described in Section H4. Fit the wooden support blocks (see fig. H3-9) between the bump stops and the lower triangle levers. Lower the car onto its wheels, ensuring that the wooden blocks remain in position.

36. Ensure that all the relevant components have been disconnected and that any component that will prevent the raising of the car body off the sub-frame and engine unit has been removed. The sub-frame mounting bolts should not be removed at this stage.

37. Lower the ramp to the ground. Carefully push the car forward off the ramp, until the front of the car overhangs the ramp sufficiently to allow the ramp to be raised without any crossbeam or part of the ramp fouling the transmission unit (see fig. H3-10). Place

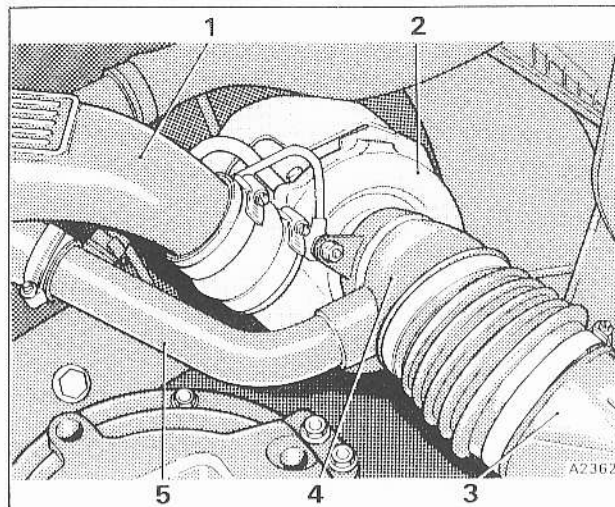


Fig. H3-3 Air intake (Bentley Turbo R prior to 1989 model year)

- 1 Air intake elbow
- 2 Turbocharger
- 3 Air intake filter housing
- 4 Turbocharger intake adapter
- 5 Dump pipe

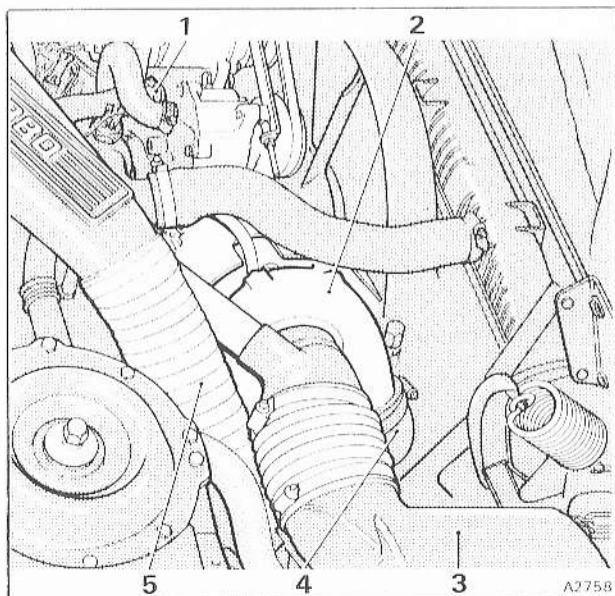


Fig. H3-4 Air intake (Bentley Turbo R 1989 model year)

- 1 Air pump feed hose
- 2 Turbocharger
- 3 Air intake filter housing
- 4 Air duct to intercooler
- 5 Air intake from intercooler

blocks beneath the front road wheels to maintain the car in a horizontal plane.

38. Position sill blocks beneath the car body sills as far forward as possible to maintain the body on the ramp in the horizontal position (see fig. H3-10).

39. To prevent any possibility of the body pivoting forward when the ramp is raised, secure the rear of the



car to the ramp by passing ropes over the final drive crossmember. Position the ropes on each side of the axle case and suitably secure them to the ramp. This can be achieved for example, by placing a suitable steel bar across the underside of the ramp and securing the ropes to the bar. **Do not use** the rear sub-frame tubes to secure the car.

40. Place a jack beneath the rear crossmember of the front sub-frame and also beneath the front triangle lever mounting bracket (see fig. H3-10).

41. Carefully remove the bolts and setscrews securing the front sub-frame mounts to the body.

42. Ensure that all relevant components have been disconnected or removed and that clearance between the sub-frame and engine unit, and the car body has been obtained.

43. Slowly raise the ramp, thus lifting the body off the sub-frame and engine unit. During this operation, continuous observations should be made to ensure that clearance is maintained and that hose and loom connections between the body and the sub-frame and

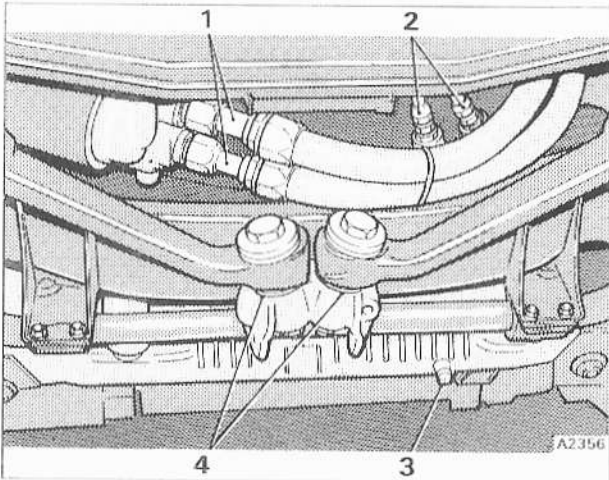


Fig. H3-5 Engine and transmission oil cooler pipes

- 1 Engine oil filter to cooler pipes
- 2 Transmission unit oil cooler pipes
- 3 Radiator drain plug
- 4 Lower triangle lever shims

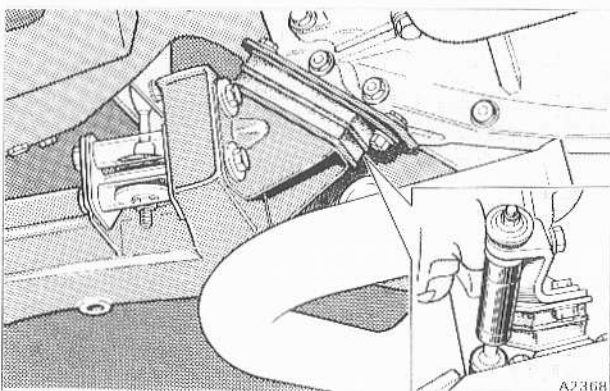


Fig. H3-6 Sub-frame to longeron tie-bar
Inset – Engine stabilus damper

engine unit have not been overlooked. When the body is clear of the engine, raise the ramp and carefully wheel the sub-frame and engine unit from beneath the car.

44. Lift the sub-frame and engine unit onto a suitable stand.

Engine and torque converter transmission – To remove from the sub-frame

1. Remove the exhaust system downtake pipes from the engine exhaust manifolds.
2. Disconnect the steering pumps supply hose from the steering rack. Allow any oil to drain into a container.
3. On cars fitted with the small dampers adjacent to the rear engine mounts, disconnect the top of the dampers from the transmission adapter plate.
4. To lift the engine and transmission unit from the sub-frame, utilize the lifting eyes provided. One eye is situated in the refrigerant compressor mounting bracket at the front of the engine and two eyes on the engine mounting plate at the rear of the engine.
5. Using an overhead hoist, take the weight of the engine and transmission on the slings. Always ensure before taking the full load that the slings are not in positions that may cause damage to the engine components.
6. Disconnect the front and rear engine mounts.
7. Carefully check that nothing will impede the removal of the engine, then, lift the engine and transmission unit from the sub-frame. Note the position and quantity of all packing plates that may be fitted to the engine mounts.
8. If the front engine mount crossmember or the rear engine mount brackets are to be removed, co-relation marks should be made between the components and the sub-frame. These marks will enable the crossmember and mounting brackets to be correctly positioned and the engine to be centralized in the sub-frame when assembly is carried out. The location and thickness of the washers should also be noted before they are removed.

Engine and torque converter transmission – To fit into the sub-frame

Fit the engine and transmission unit by reversing the removal procedure noting the following.

1. If new rear engine mounts are fitted, always ensure they are of the correct type. Two types of rubber are used and although they are visually the same the hardness rating of the rubber used is different. Always identify the mounts by the part number. For further information refer to Section H2.
2. Attach the front and rear engine mounts, together with any packing plates that may have been removed, to the engine. Do not tighten the bolts at this stage.
3. Lower the engine and transmission unit into position and fit the bolts securing the engine mounts to the sub-frame. Tighten all the engine mount bolts.
4. As shown in figure H3-11 the distance between the front engine mount stop plate and the bracket must be set at between 1,5 mm and 2,2 mm (0.060 in and 0.090 in) when all the operations are completed.

On 1989 model year cars the distance between the

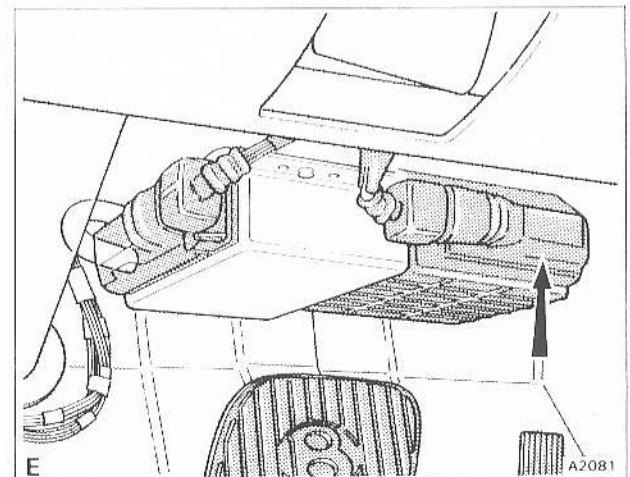
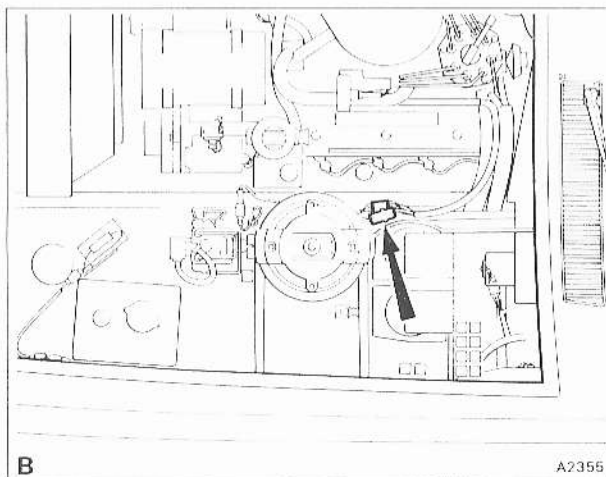
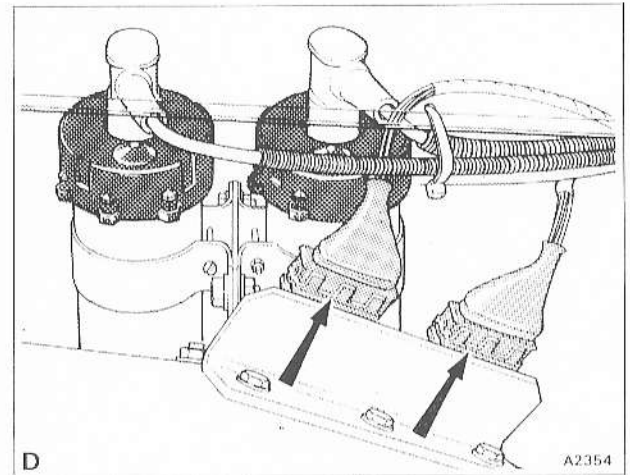
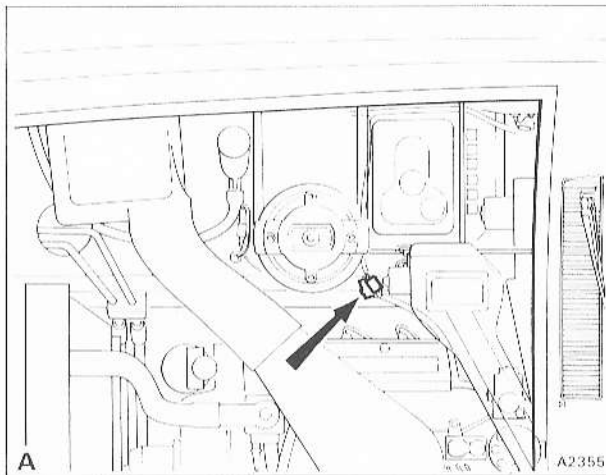
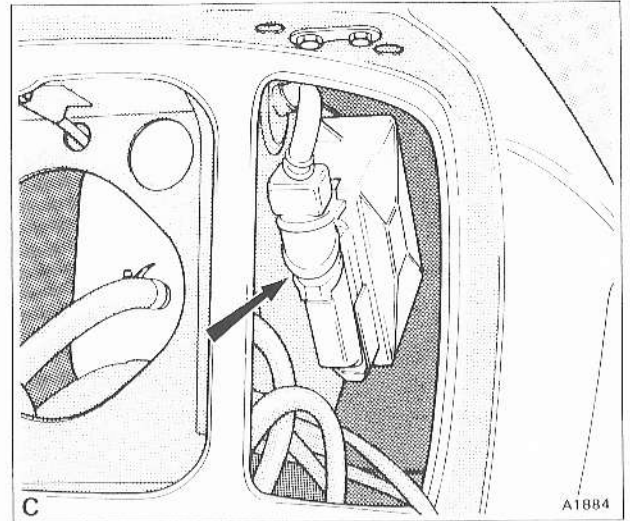
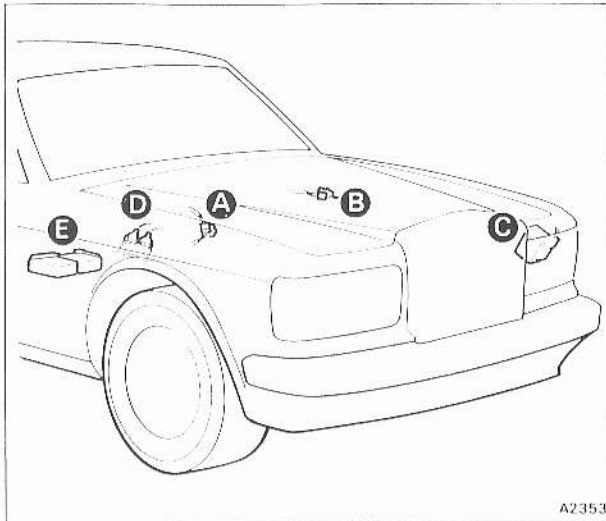


Fig. H3-7 Electrical disconnection points (Cars prior to 1989 model year)

- A Loom block and end connectors
- B Loom block and end connectors
- C Boost control ECU (Bentley Turbo R only)
- D Ignition amplifier connectors (Bentley Turbo R only)
- E Electronic control unit connectors (Bentley Turbo R only)

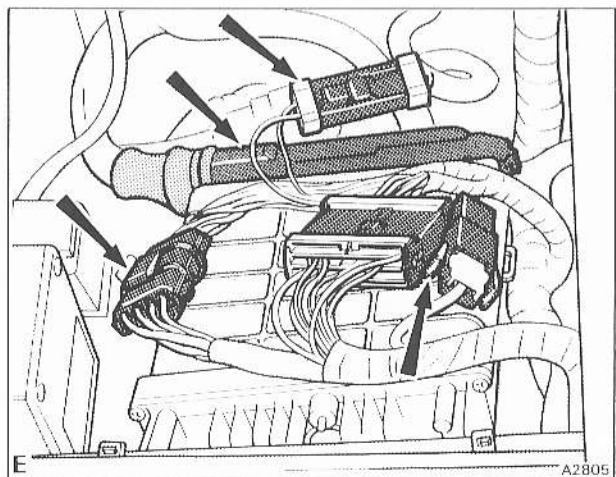
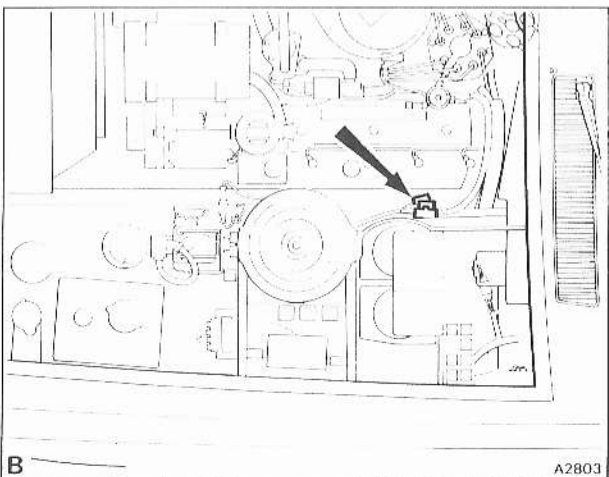
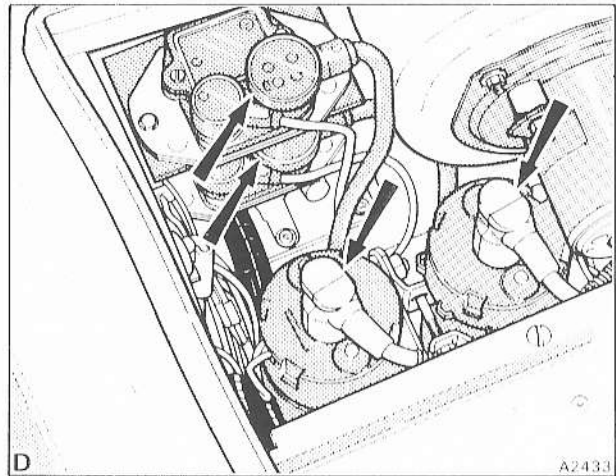
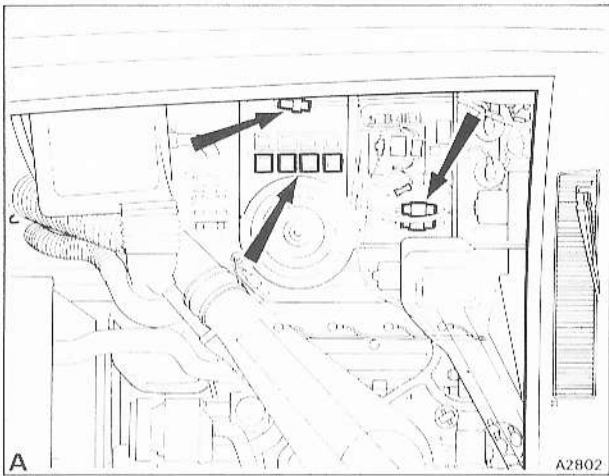
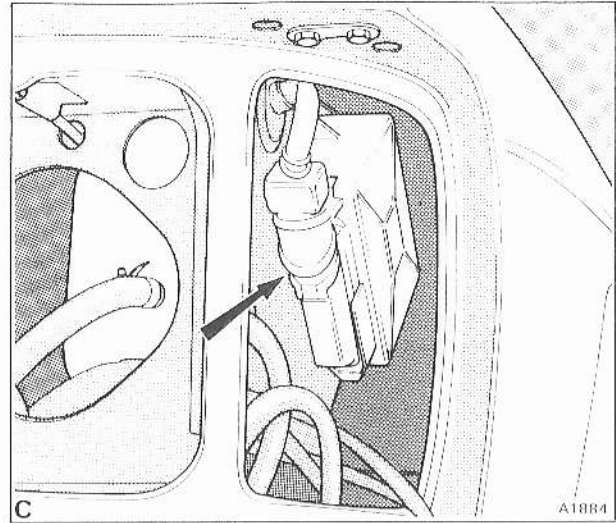
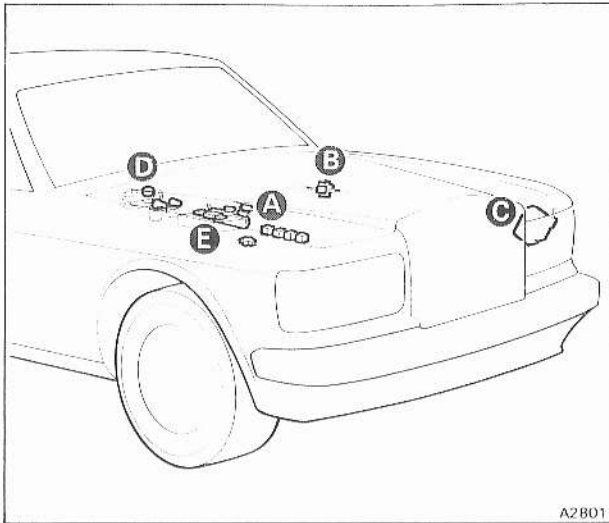


Fig. H3-8 Electrical disconnection points (1989 model year cars)

- A Loom block, end connectors, and relay mounts
- B Loom block and end connectors
- C Boost control ECU (Bentley Turbo R only)
- D Ignition amplifier and coil connectors (Bentley Turbo R only)

- E Electronic control unit and loom block connectors (Bentley Turbo R only)

engine roll stop plate and buffer on each rear engine mount must be set to between 4,0 mm and 5,5 mm (0.158 in and 0.216 in). To carry out this operation, first slacken the top securing bolts on the mount to be adjusted. Using a soft metal drift, carefully tap the top plate of the mount until the correct setting is obtained then torque tighten the bolts.

5. When fitting the small dampers adjacent to the rear engine mount, the dampers should be fitted with the rod downwards. Fit the two tapered rubbers either side of the bracket on the rear engine mounting plate. Ensure the taper points downwards with the large cup washer on top. The two smaller cup washers and rubbers fit on each side of the sub-frame bracket.

Note These dampers are not fitted to two door models.

Engine, torque converter transmission, and sub-frame – To fit into the car

Fit the engine, torque converter transmission, and sub-frame to the body by reversing the removal procedure noting the following.

1. If new sub-frame mounts are fitted, ensure they are of the correct type. Two types of mount are used and although they are visually the same, the hardness rating of the rubber used is different. Always identify the mounts by the part number which is moulded into the rubber of the mount. For further information refer to Section H2.
2. The sub-frame mounting points in the body have a limited amount of movement to allow the sub-frame to be centralized. Ensure that the plain bobbin (front mounts) and the threaded bobbin (rear mounts) are free in the longeron prior to fitting the sub-frame.
3. Inspect all relevant pipes and hoses prior to fitting the sub-frame into the body. Renew any that show signs of deterioration or damage.
4. When fitting the sub-frame to the body mounting points, ensure that the main bearing washer for each mount is in position. Any additional washers that may have been fitted in order to correct individual variations of the mounting points should also be fitted in their respective positions.
5. With the engine and sub-frame positioned in the engine compartment, assemble the rear steady brackets onto the rear mount centre setscrews together with any washers previously removed. Pass the setscrews through the sub-frame mounts and screw them into the threaded body mount bobbins. Fit the bolts, nuts, and washers which secure the steady brackets to the body. Fit the front mounting bolts and steady brackets in a similar manner. Do not tighten the mounting bolts at this stage.

Note If during dismantling, the upper nut from the front mounting stud is removed, it must be torque tightened onto the stud to the standard torque figure quoted in Chapter P before locating the stud through the body longeron.

6. Centralize the sub-frame by utilizing the movement in the body mounting bobbins. To check the sub-frame position, diagonal and parallel measurements should be taken between the jig location points situated on the front and rear sub-frames (see fig. H3-14). With the sub-

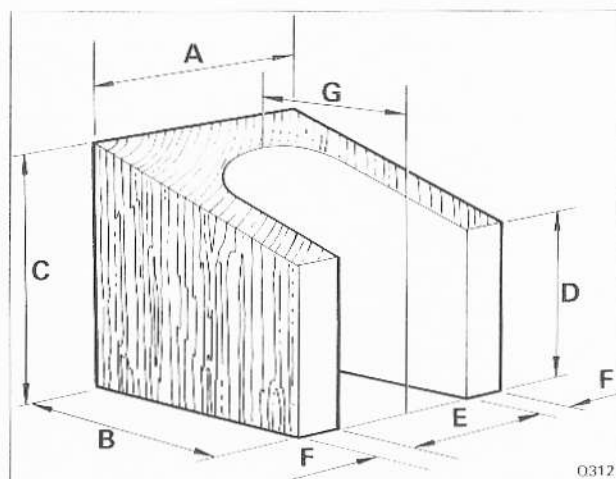


Fig H3-9 Wooden support block

- A 76 mm (3.0 in)
- B 76 mm (3.0 in)
- C 76 mm (3.0 in)
- D 51 mm (2.0 in)
- E 38 mm (1.5 in)
- F 19 mm (0.75 in)
- G 57 mm (2.25 in)

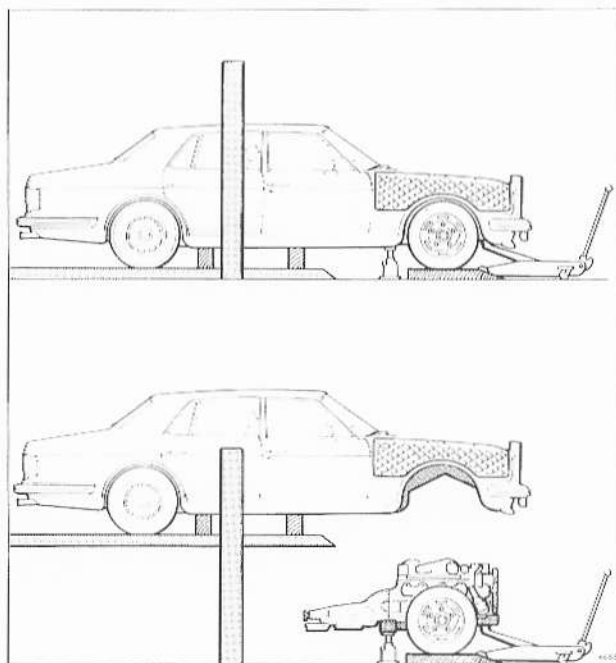


Fig. H3-10 Sub-frame, engine and transmission unit removal

frame centralized torque tighten the sub-frame mount bolts and setscrews.

7. Assemble the sub-frame to body tie-rods and set them to the length shown in figure H3-13. Four compression washers are fitted to each tie-rod on Rolls-Royce cars and six compression washers to Bentley cars.

Note Tie-rods are not fitted to two door models.

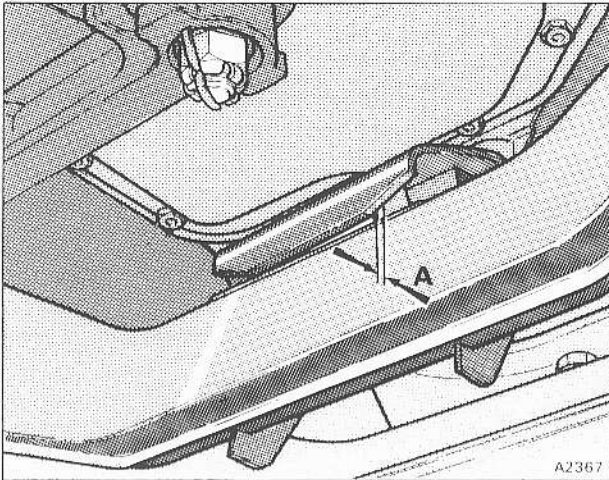


Fig. H3-11 Front engine mount setting
A 1,5 mm to 2,2 mm (0.060 in to 0.090 in)

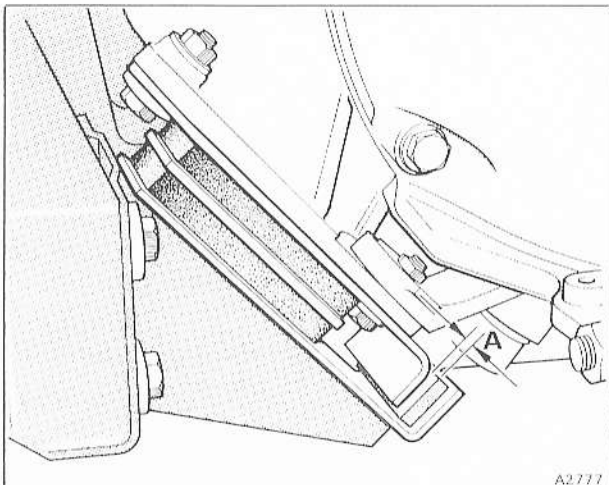


Fig H3-12 Rear engine mount setting
(1989 model year cars)
A 4,0 mm to 5,5 mm (0.158 in to 0.216 in)

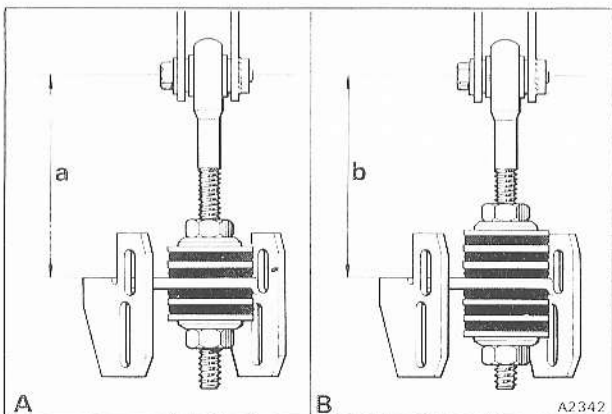


Fig H3-13 Sub-frame to longeron tie-bar setting
A 81,8 mm to 82,9 mm (3.22 in to 3.26 in)
(Rolls-Royce four door cars)
B 78,8 mm to 80,0 mm (3.10 in to 3.15 in)
(Bentley four door cars)

8. Connect the tie-bar assemblies to the longerons and sub-frame. Do not tighten the bolts and setscrews at this stage.
9. Connect the steering column ensuring that the road wheels and the steering wheel are in the straight ahead position. Refer to Chapter N for details.
10. Fit the exhaust system components as described in Chapter Q.
11. Torque tighten all the relevant nuts, bolts, and setscrews, except those on the tie-rods. Always refer to the special torque figure section of the respective component chapter and to Chapter P for the correct torque requirements.
12. Ensure that all hose connections have been completed and that they are routed and clipped correctly.
13. Fill the engine coolant system and check the engine, torque converter transmission, and steering pump oil levels as described in their respective chapter.
14. Bleed the hydraulic systems as described in Chapter G.
15. Charge the refrigeration system as described in Chapter C.
16. Check all components for leaks and ensure that the necessary clearances have been obtained.
17. Ensure the ride height of the car is correct as described in Section H7.
18. With the car height correct torque tighten the bolts and setscrews securing the sub-frame to longeron tie-rods (see Operations 7 and 8) to the figures quoted in Section H13.
19. Check that the distance between the front engine mount stop plate and the bracket is between 1,5 mm and 2,2 mm (0.060 in and 0.090 in). Adjust if necessary. On 1989 model year cars, also check that the rear engine mounts are set at between 4,0 mm and 5,5 mm (0.158 in and 0.216 in) as shown in Figure H3-12.

Sub-frame mount – To remove

The sub-frame mounts can be renewed with the sub-frame in position.

1. Position the car on a ramp.
2. Apply the parking brake and chock the rear wheels.
3. Support the car body with sill blocks.
4. Fit spring retention tool RH8809 onto the road spring nearest to the mount being renewed. Adjust the tool until sufficient pressure is applied to support the road spring pressure.

Warning Always examine the spring retention tool components for signs of thread wear or damage prior to its use. Renew any part of the tool that may be liable to fail under spring load. It is recommended that the use of the tool is restricted to a maximum of 200 applications.

5. Position a jack to support the sub-frame as near as possible to the mount being renewed.
6. Disconnect the tie-rod (if fitted) from the longeron when renewing a rear mount.
7. Remove the bolts securing the mounting point steady bracket to the body.
8. Remove the centre setscrew or bolt (dependent upon whether it is a front or rear mount) from the mount.

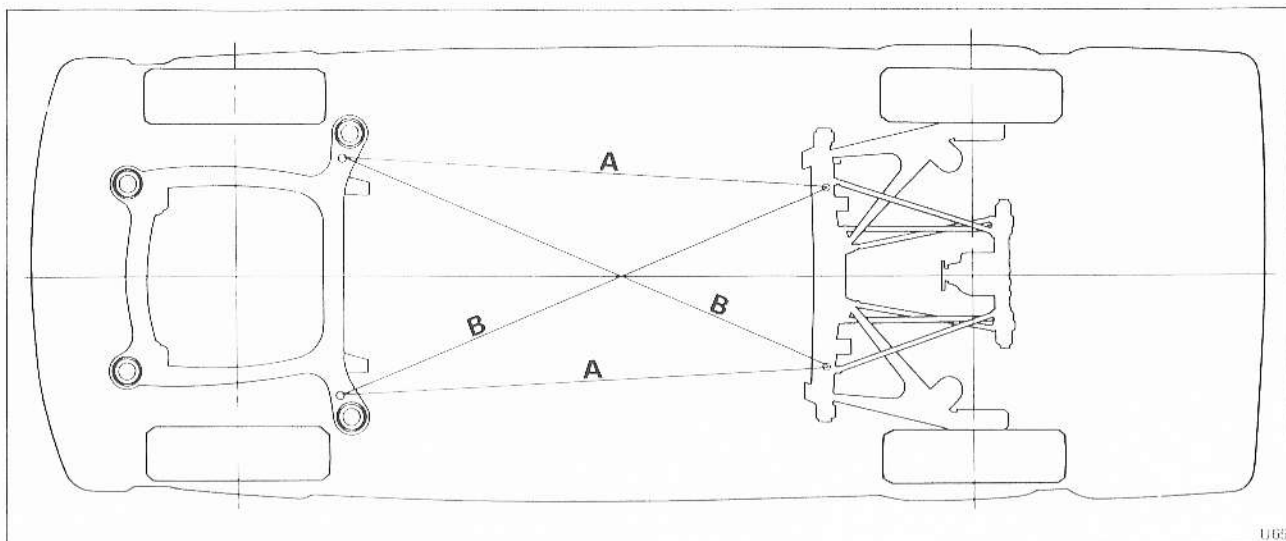


Fig H3-14 Sub-frame alignment
Measurements to be equal within 1,60 mm (0.062 in)

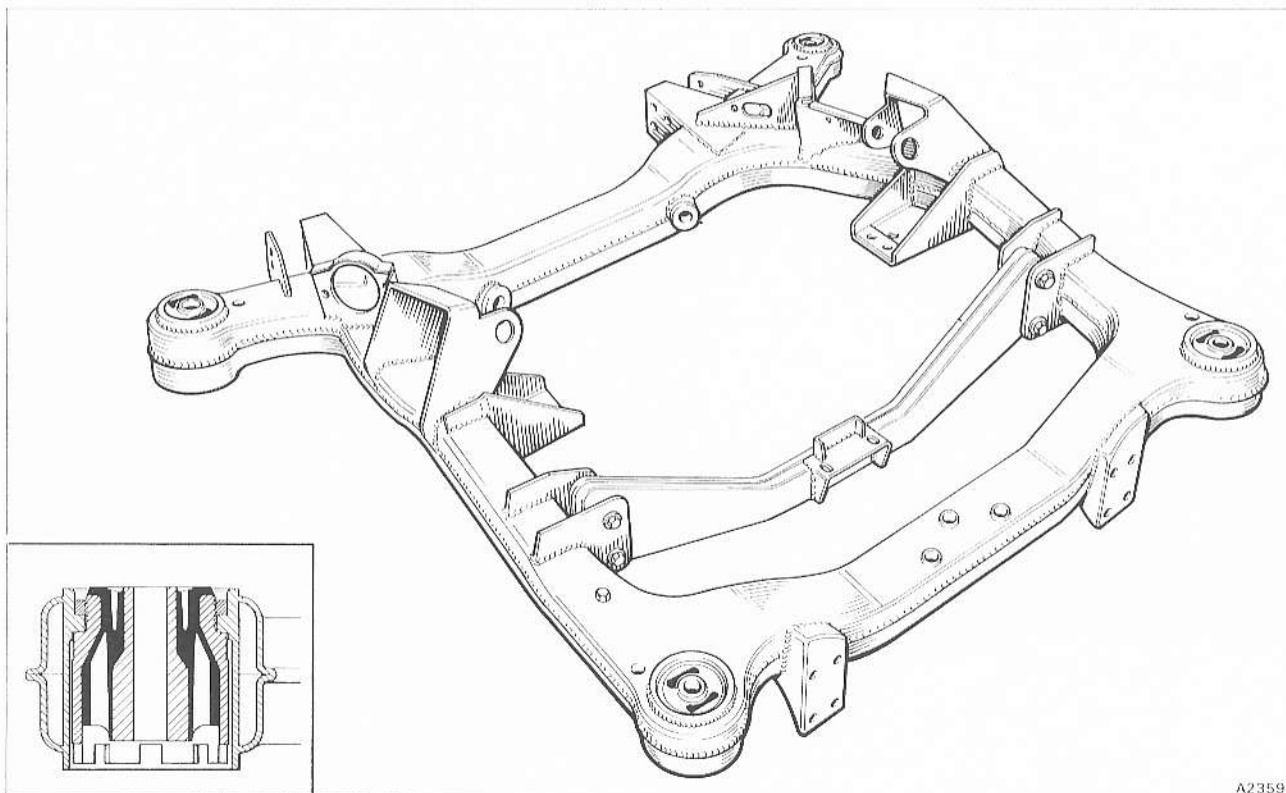


Fig. H3-15 Front sub-frame assembly
Inset – Sub-frame mount

Note the position and quantity of spacing washers that are fitted.

9. Carefully lower the jack situated beneath the sub-frame until sufficient clearance is obtained between the mount and the longeron to gain access to the mount locking ring.
10. Using spanner RH8576 to restrain the lock-ring;

unscrew the mount using spanner RH7774 on the lower castellations of the mount and withdraw the mount.

Sub-frame mount – To fit

If new mounts are being fitted always ensure they are of the correct type. Two types of mount are used and although they are visually the same, the hardness rating



of the rubber used is different. Always identify the mounts by the part number which is moulded into the rubber of the mount. For further information refer to Section H2.

1. Ensure that the bore and upper face of the sub-frame, the threads and faces of the lock-ring, and the threads of the mount are clean.
2. Apply Molytone C grease to the threads of the mount. Ensure that the top three or four threads are completely covered. Do not use mineral based greases as they can have a detrimental effect on the rubber of the mount.
3. Insert the mount into position in the sub-frame and fit the lock-ring in the upper well. Screw the mount into the lock-ring. Adjust the lock-ring such that, when the rubber mount is tightened to the figure quoted in Section H13, the slots in the moulded rubber are at right-angles to the centre line of the car (see fig. H3-15).
4. Secure the sub-frame to the body by reversing the removal procedure. Ensure that all nuts and setscrews are torque tightened to the figures quoted in Section H13 and Chapter P.

Front shock dampers, road springs, and damper ball joints

Introduction

The shock dampers (see fig. H4-1) are of the sealed unit type and no servicing is required. In the event of a damper becoming faulty, it should be discarded and a new damper fitted.

Dampers of varying damping characteristics are fitted dependent on the car model. It is important therefore to ensure that dampers of the correct type are fitted when replacement is required.

If only one damper requires renewal the new damper must be of the same type and rating as the damper remaining on the car. In the event of a matching damper becoming obsolete and therefore unobtainable both dampers should be renewed.

Important Each damper contains nitrogen gas under pressure. Under no circumstances should it be subjected to undue force. Do not clamp the damper in a vice.

If the road spring support collar has seized to a faulty damper, the collar should be discarded with the damper. Do not attempt to hammer the collar from the damper.

When using the spring retention tools RH8809 and RH7909 on cars fitted with pressed steel spring plates (see fig. H4-1), it will be necessary to use the adapter plate RH12053.

Front road spring and damper – To remove

1. Drive the car onto a ramp; apply the parking brake and chock the rear wheels.
2. Fit the support plate halves of the road spring retention tool RH8809, around the lower section of the damper and secure them together.

Insert the four long studs of the tool through the upper spring plate and screw them securely into the tool support plate. Fit the special nuts, thrust races, and washers to the top of each stud.

Warning Always examine the spring retention tool for signs of thread wear or damage prior to its use. If you have doubts concerning any parts of the tool and their ability to withstand spring load you should renew those parts.

Always take extreme care when handling a road spring in a compressed condition.

3. Evenly tighten the four spring retention tool nuts to retain the road spring in its compressed condition.
4. Support the front of the car body on sill blocks.
5. Remove the bolts securing the upper spring plate to the body spring tower. Use hand pressure on the spring plate to counteract any damper lift and to allow removal of the bolts.
6. Remove the split pin, castellated nut, and washer securing the damper ball pin assembly to the lower triangle levers. Using a suitable extractor, release the

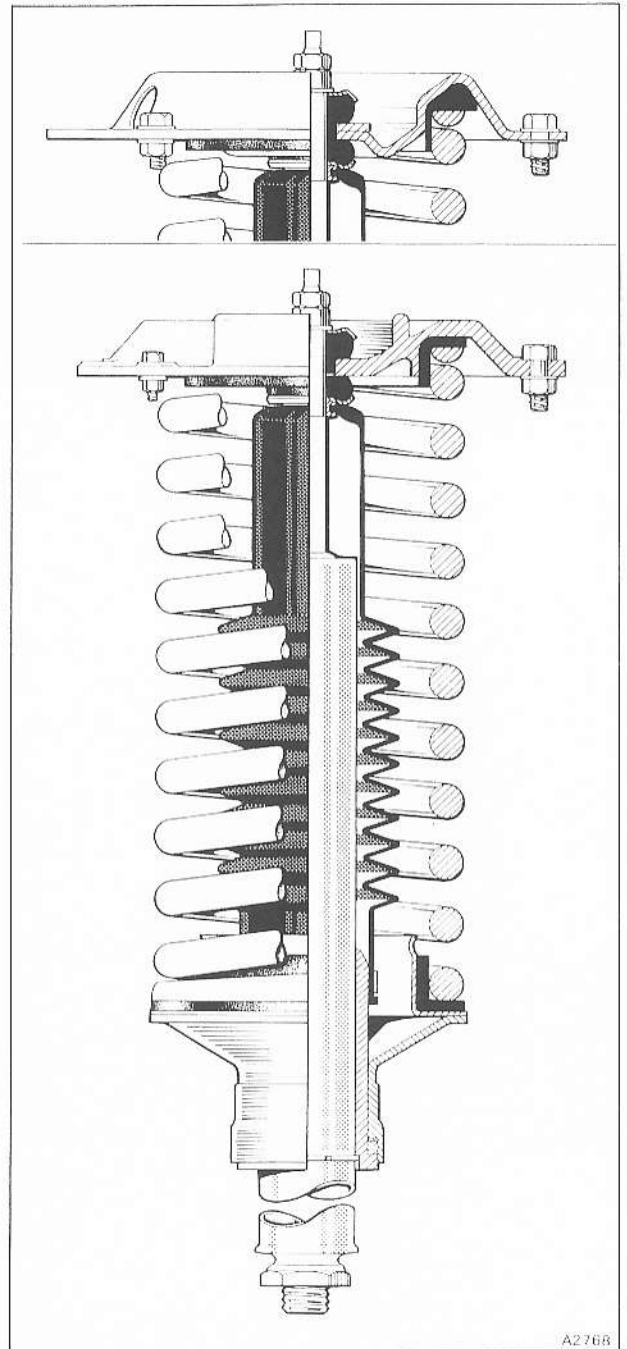


Fig. H4-1 Front road spring and shock damper assembly

Inset – Pressed steel spring plate arrangement

ball pin taper from the triangle levers. Leave the taper loosely in position to support the damper.

7. Carefully lift the road spring and damper assembly from the car.

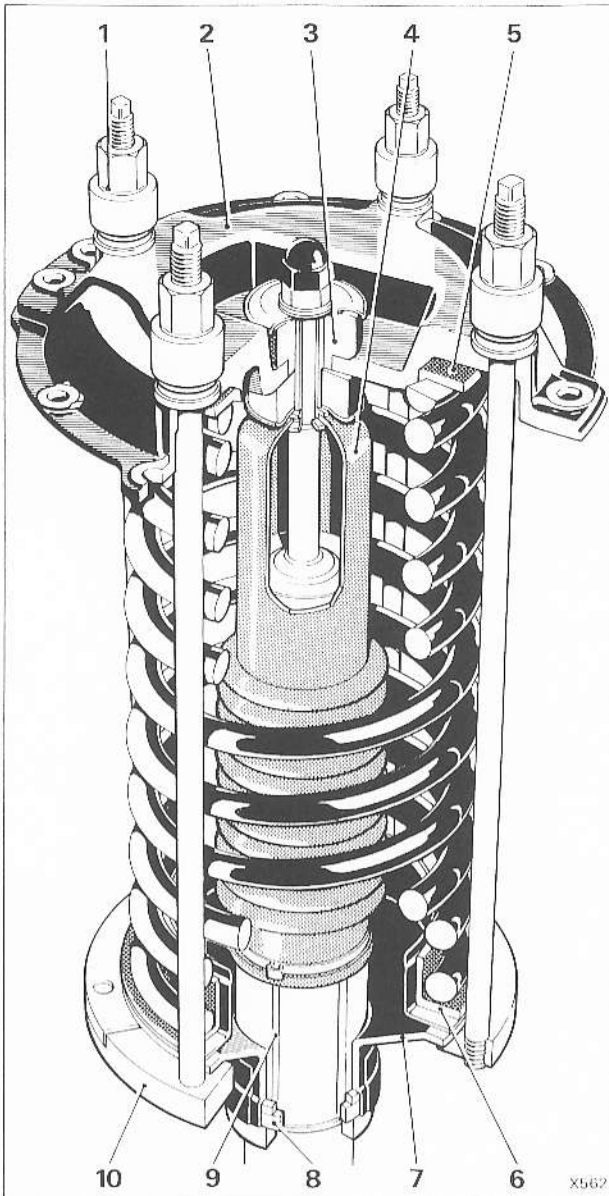


Fig. H4-2 Spring retention tool in position

- 1 Nut and thrust race
- 2 Upper spring plate
- 3 Damper mounting rubbers
- 4 Convoluted rubber sleeve
- 5 Spring seat
- 6 Spring seat
- 7 Spring support plate
- 8 Spring support plate collets
- 9 Spring support collar
- 10 Tool support plate

Place the complete assembly into spring compression tool RH7909. Fit and secure the top plate of the tool to retain the spring (see fig. H4-3).

8. Remove the nuts securing the damper to the upper spring plate cover. Collect the rubber mount and washers. Withdraw the damper from the spring support plate and collar.

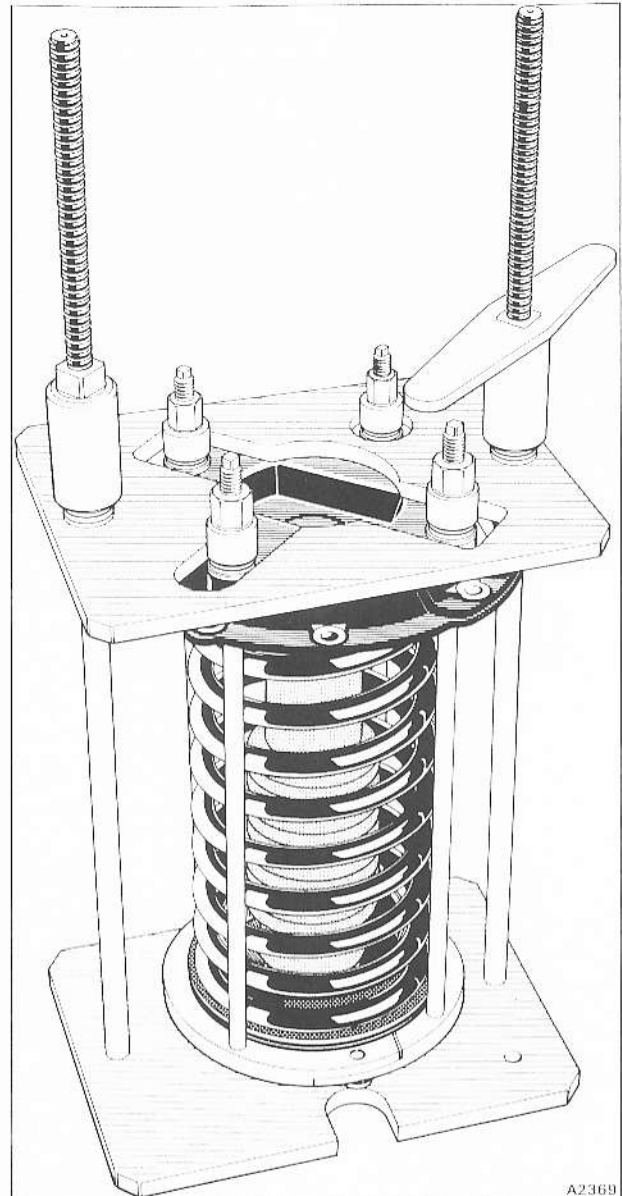


Fig. H4-3 Spring compression tool

Note Care should be taken to avoid damaging the convoluted rubber sleeve situated between the spring plate collar and the upper damper mount (see figs. H4-1 and H4-2) during damper withdrawal. The sleeve will prevent the collar being withdrawn from the spring support plate. In the event of the collar having seized to the damper then carefully release and lift the spring from the spring support plate as described in the following operations.

9. To release the spring from the retention tool compress the spring until the spring load is relieved from the retention tool, allowing the removal of the four retaining nuts.

Measure the distance between the two plates of the spring compression tool to facilitate assembly.

Evenly release the two nuts on the compression tool until the spring is fully released.

Examine all the components for serviceability and renew as necessary.

Front road spring and damper – To fit

Fit the road spring and damper by reversing the removal procedure. The road spring and damper can be assembled as a bench operation as follows.

1. Ensure that all the components are in a serviceable condition. Renew any components that are faulty.
2. Insert the support collar through the spring support plate. Fit the convoluted cover onto the neck of the collar together with a securing band. Ensure that a distance of 19 mm (0.750 in) exists between the shoulder of the collar and the bottom face of the support (see fig. H4-4). Fasten the cover to the collar with the securing clip using tool RH9733.
3. Using a small amount of Loctite Superbonder or equivalent adhesive secure the location washer into the top of the damper cover. Also secure the damper mounting rubber and washer to the underside of the upper spring plate. This operation is to assist assembly and ensure correct component location.
4. Place the road spring and its associated components (see fig. H4-3) into spring compression tool RH7909. Compress the spring to the measurement taken on removal.
5. Fit the washer onto the damper stem then insert the damper into the spring assembly. Ensure that all the components are correctly located (see fig. H4-1). Fit the top mount rubber, distance piece, cup washer, and plain washer onto the damper stem. Fit and torque tighten the retaining nut and lock-nut.
6. Fit the spring support plate collets around the damper collar. Carefully release the spring compression tool, thus allowing the damper collar and collets to be drawn into the spring support plate. Do not completely remove the spring compression tool.

Note The original thickness of collets should be used if the original spring is fitted. When selecting new collets, use the minimum number required to obtain the correct setting and always fit the thickest collets at the bottom of the selection (see fig. H4-2).

For spring poundage information refer to the chart on page H4-4.

7. Fit spring retention tool RH8809 to the spring assembly to retain the spring in its compressed condition. Remove compression tool RH7909.
8. Fit the ball joint assembly to the damper.
9. Fit a new gasket to the body spring tower and carefully lower the spring and damper assembly into the body.
10. Locate the damper ball joint taper into the triangle levers. Fit and torque tighten the castellated nut and insert a new split pin.
11. Bolt the upper spring plate to the body.
12. Carefully release and then remove the spring retention tool. Ensure that the collets are correctly entered into the spring support plate during removal.
13. Remove all jacks and support blocks.

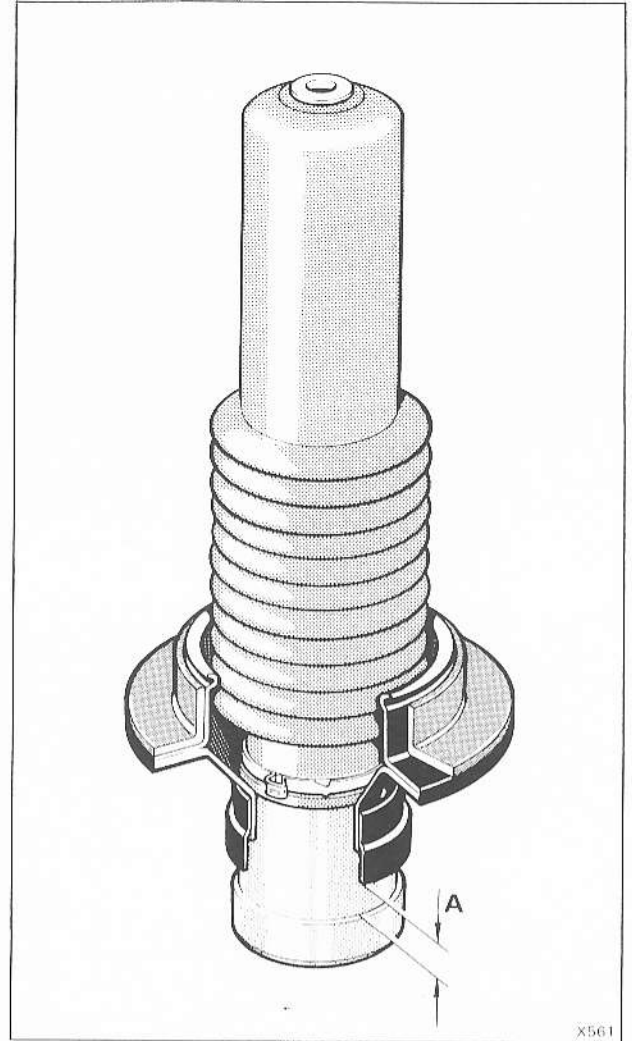


Fig. H4-4 Spring support plate, collar, and sleeve assembly

A 19 mm (0.75 in)

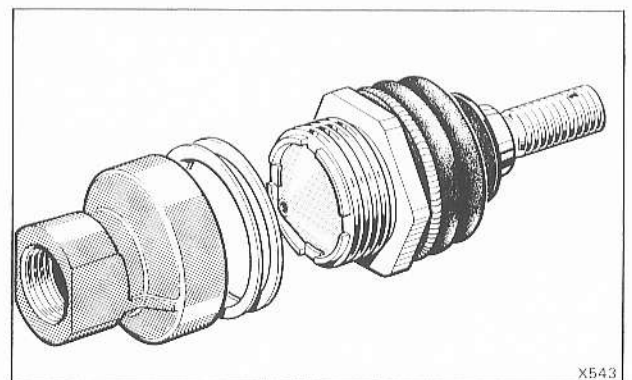


Fig. H4-5 Damper ball joint assembly

14. After fitting the spring and damper assembly, remove the car from the ramp and drive it back and forth to allow the assembly to settle.

15. Check the car ride height as described in Section H7 if a new road spring has been fitted.



Front spring loading chart

	Right-hand spring			Left-hand spring		
	N	kgf	lbf	N	kgf	lbf
Right-hand drive cars						
Silver Spirit, Mulsanne, Mulsanne S, and Bentley Eight	8007	817	1800	7940	810	1785
Silver Spur	8251	842	1855	8096	826	1820
Corniche, Corniche II, and Bentley Continental	8340	851	1875	8340	851	1875
Bentley Turbo R (prior to 1989 model year)	8518	869	1915	7985	814	1795
Bentley Turbo R (Long Wheelbase prior to 1989 model year)	8629	880	1940	8096	826	1820
Bentley Turbo R (1989 model year)	8830	900	1985	8251	842	1855
Bentley Turbo R (1989 model year fitted with catalyst exhaust system)	8964	914	2015	8341	851	1875
Bentley Turbo R (Long Wheelbase 1989 model year)	8919	910	2005	8341	851	1875
Bentley Turbo R (Long Wheelbase 1989 model year fitted with catalyst exhaust system)	8986	917	2020	8474	864	1905
Left-hand drive cars (other than those conforming to a Canadian and USA specification)						
Silver Spirit, Mulsanne, Mulsanne S, and Bentley Eight	7940	810	1785	8007	817	1800
Silver Spur	8096	826	1820	8251	842	1855
Corniche, Corniche II, and Bentley Continental	8340	851	1875	8340	851	1875
Bentley Turbo R (prior to 1989 model year)	8452	862	1900	8050	821	1810
Bentley Turbo R (Long Wheelbase prior to 1989 model year)	8563	873	1925	8251	842	1855
Bentley Turbo R (1989 model year)	8763	894	1970	8319	849	1870
Bentley Turbo R (1989 model year fitted with catalyst exhaust system)	8897	908	2000	8408	858	1890
Bentley Turbo R (Long Wheelbase 1989 model year)	8852	903	1990	8408	858	1890
Bentley Turbo R (Long Wheelbase 1989 model year fitted with catalyst exhaust system)	8986	917	2020	8496	867	1910
Left-hand drive cars (Conforming to a Canadian and USA specification)						
Silver Spirit, Mulsanne, Mulsanne S, and Bentley Eight	8050	821	1810	8117	828	1825
Silver Spur	8207	837	1845	8274	844	1860
Corniche II and Bentley Continental	8496	867	1810	8496	867	1910
Bentley Turbo R	8897	908	2000	8408	858	1890
Bentley Turbo R (Long Wheelbase)	8986	917	2020	8496	867	1910

Equivalent load from packing collets									
Packing thickness	mm	1,63	3,25	4,88	6,35	7,98	9,60	11,23	12,70
	in	0.064	0.128	0.192	0.250	0.314	0.378	0.442	0.500
Spring load increase	N	53	107	165	214	267	320	374	427
	kgf	5,44	10,89	16,78	21,77	27,22	32,66	38,10	43,54
	lbf	12	24	37	48	60	72	84	96
Packing thickness	mm	14,33	15,95	17,58	19,05	20,67	22,30	23,93	25,40
	in	0.564	0.628	0.692	0.750	0.814	0.878	0.942	1.00
Spring load increase	N	480	534	587	636	690	747	801	850
	kgf	48,99	54,43	59,87	64,86	70,31	76,20	81,65	86,64
	lbf	108	120	132	143	155	168	180	191

Note When selecting packing collets always use the minimum number necessary to obtain the correct thickness.
A packing thickness of 6,35 mm (0.250 in) will increase the height of the car by approximately 9,5 mm (0.375 in)

Damper ball joint – To remove

1. Carry out Operations 1 to 3 inclusive of Front road spring and damper – To remove.
2. Remove the split pin, castellated nut, and washer securing the ball joint.
3. Using extractor tool RH8100 release the ball joint taper from the triangle levers.
4. Raise the front of the car until the ball joint taper clears the ball pin carrier. Remove the ball joint from the damper.
5. Unscrew the ball pin assembly from its housing, taking care not to damage the protective rubber boot. Collect the pre-load adjustment shims (see fig. H4-5).
6. Examine the ball joint for wear.

Damper ball joint – To assemble and fit

1. Ensure that the components are in a serviceable condition.
2. Hold the ball joint housing in a vice. Screw the new ball pin assembly into the housing without fitting the pre-load shims. Fit and lock together two nuts onto the ball pin (see fig. H4-6).
3. Carefully tighten the ball joint into the housing until a torque of between 5,7 Nm and 9,0 Nm (0,58 kgf m and 0,92 kgf m, 50 lbf in and 80 lbf in) is required to rotate the ball pin. This torque figure should be measured after the ball pin has been rotated through four complete revolutions and with the ball pin in its vertical position.
4. Measure the gap between the ball joint face and the housing face.
5. Remove the ball joint from the housing and fit shims, equivalent to the gap previously measured, onto the ball joint.
6. Fit the ball joint and shims to the housing and torque tighten the assembly to between 163 Nm and 176 Nm (16,6 kgf m and 18,0 kgf m, 120 lbf ft and 130 lbf ft).
7. Check that the torque required to rotate the ball pin is within the limits given in Operation 3. If necessary make adjustments by increasing or decreasing the shim thickness to obtain the correct torque reading.
8. Apply CASCO MLF 13 adhesive to the threads on the bottom of the damper. Fit the ball joint assembly

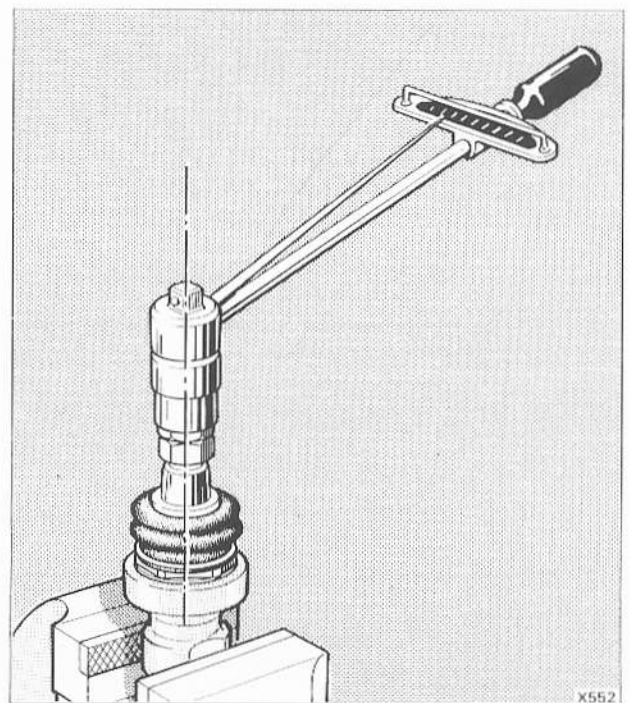


Fig. H4-6 Checking the ball joint pre-load

onto the damper. Torque tighten to between 95 Nm and 108 Nm (9,7 kgf m and 11 kgf m, 70 lbf ft and 80 lbf ft).

9. Secure the ball joint to the triangle levers and complete the operations by reversing the removal procedure.

Compliance assembly, triangle levers, suspension ball joints, and stabilizer

Lower triangle levers – To remove

1. Ensure the gear range selector lever is in the park position and apply the parking brake.
2. Remove the wheel trim from the respective wheel and slacken the wheel nuts.
3. Jack up the front of the car and place sill blocks beneath the front end of the body sills.
4. Remove the road wheel.
5. Place a jack under the lower triangle levers and jack up the suspension to partially compress the road spring. Ensure that the body is still supported by the sill blocks.
6. Fit the support plate halves of the road spring retention tool RH8809 around the lower section of the damper and secure them together.

Insert the four long studs of the tool through the upper spring plate and screw them securely into the tool support plate.

Note On cars fitted with pressed steel spring plates the adapter plate RH12053 should be placed onto the spring plate prior to inserting the four studs.

Warning Always examine the spring retention tool for signs of thread wear or damage prior to its use. If you have doubts concerning any parts of the tool and their ability to withstand spring load you should renew those parts.

Fit the special nuts, thrust races, and washers to the top of each stud (see fig. H4-2).

7. Evenly tighten the retaining tool nuts until the road spring is fully supported.
8. Slacken the bolts securing the lower triangle levers to the sub-frame pivot bushes (see figs. H5-1 and H5-2).
9. Disconnect the stabilizer bar from the front triangle lever as described under Front stabilizer bar – To remove.
10. If removal of the ball pin carrier is required, carry out Operations 11 to 13 inclusive.
11. Remove the split pin and castellated nut securing the front shock damper ball joint. Using a suitable extractor tool release the ball joint taper. Lower the triangle levers to allow the taper to be withdrawn from the ball joint carrier.
12. Support the hub assembly with a jack.
13. Remove the split pin and castellated nut securing the lower suspension ball joint to the yoke. Using a suitable extractor tool release the ball joint taper.
14. Remove the dowel bolt and the setscrew securing the triangle levers to the ball pin carrier. Collect the carrier.
15. Remove the bolts from the triangle lever pivot bushes and remove the triangle levers. Collect the shims if fitted (see fig. H5-1).

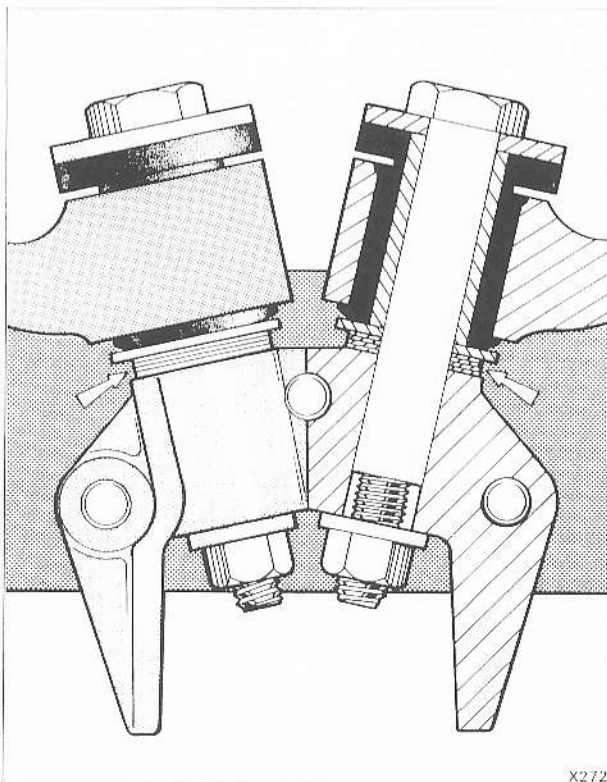


Fig. H5-1 Front triangle lever mount (shims arrowed)

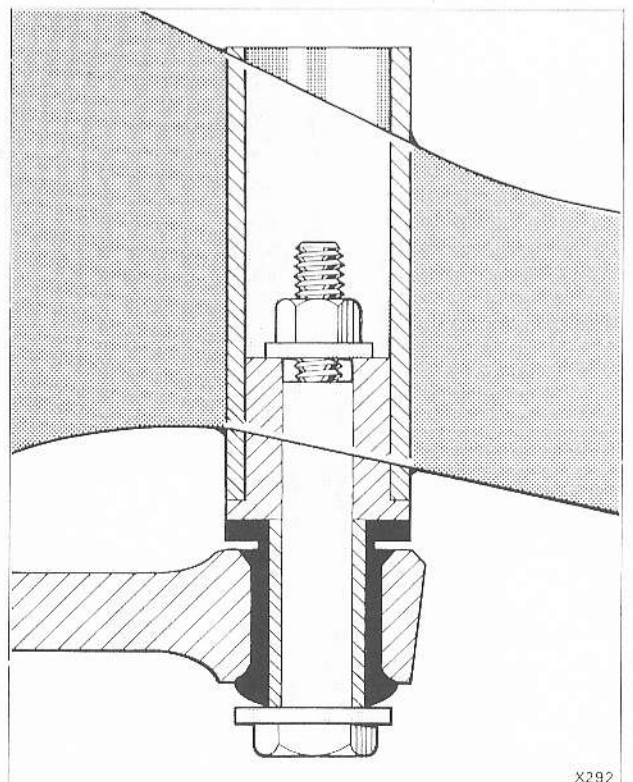


Fig. H5-2 Rear triangle lever mount



16. Examine the pivot bushes for serviceability and renew if necessary.

Lower triangle pivot bushes – To renew

1. Remove the lower triangle levers as described under Lower triangle levers – To remove.
2. To remove the bushes press them out of the triangle levers.
3. Fit the new bushes as follows.

Using Esso Flexon 876 or Gulf Par 125P to lubricate the bush press the bush into the triangle lever.

The bushes should be pressed in so that the large diameter buffer section of the bush faces rearwards when the lever is fitted to the car (see figs. H5-1 and H5-2).

Lower triangle levers – To fit

Fit the triangle levers by reversing the removal procedure noting the following.

1. Assemble the front triangle lever onto the bearing housing as shown in figure H5-1. Do not tighten the nut or fit the shim washers at this stage.
2. Assemble the rear triangle lever onto the sub-frame as shown in figure H5-2. Do not tighten the nut.
3. Fit the ball pin carrier between the triangle levers. Fit and torque tighten the dowel bolt and setscrew to between 82 Nm and 88 Nm (8,3 kgf m and 9,0 kgf m, 60 lbf ft and 65 lbf ft) and 116 Nm and 122 Nm

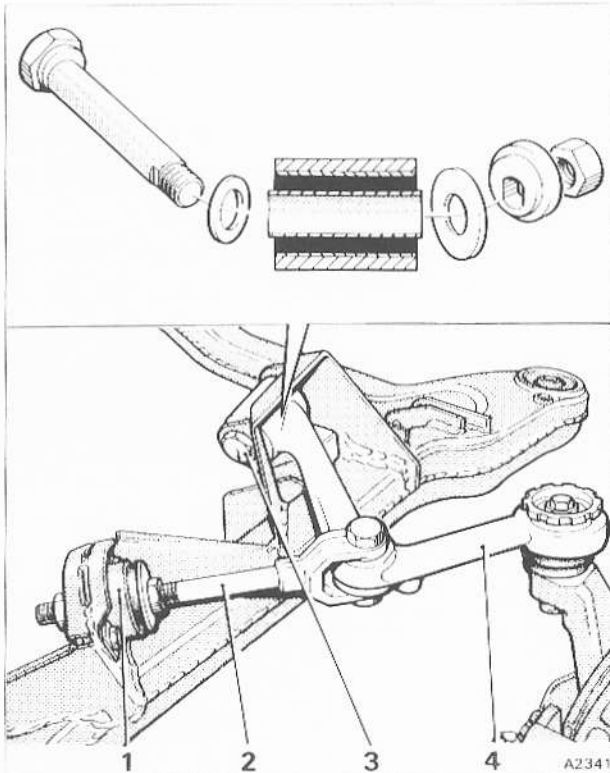


Fig. H5-3 Compliance assembly

- 1 Compliance mount
- 2 Compliance rod
- 3 Pivot bolt
- 4 Compliance lever

(11,7 kgf m and 12,4 kgf m, 85 lbf ft and 90 lbf ft) respectively. Do not attach the damper ball joint to the carrier.

4. Set the triangle levers in their normal ride position (see Section H7).
5. Torque tighten the rear triangle lever nut to between 57 Nm and 61 Nm (5,8 kgf m and 6,2 kgf m, 42 lbf ft and 45 lbf ft).
6. Remove the nut from the front triangle lever pivot bolt. Apply sufficient pressure to the two washers on the pivot bush to ensure they are in contact with the centre distance tube of the bush.
7. Measure the distance between the bearing housing and the inner washer (see fig. H5-1). Select the number of shims required to fill this distance, rounding up or down to the nearest shim.
8. Fit the shims into position then fit the washer and nut to the pivot bolt. Torque tighten the nut to between 57 Nm and 61 Nm (5,8 kgf m and 6,2 kgf m, 42 lbf ft and 45 lbf ft).

Note The fitting of these shims ensures that no axial pre-load is applied to the rubber pivot bushes.

Compliance lever – To remove

1. Carry out Operations 1 to 7 inclusive as described under Lower triangle levers – To remove.
2. Remove the split pin and castellated nut retaining the upper ball pin.
3. Support the hub with a jack and using a suitable extractor release the ball pin taper from the yoke.
4. Remove the bolt securing the compliance rod jaw to the compliance lever.
5. Note the position of the arrow on the compliance lever pivot bolt (see fig. H5-3). Remove the bolt and withdraw the lever from the sub-frame bracket. Collect the special washers.
6. Examine the rubber bushes and ball joint for serviceability and renew as necessary.

Compliance lever – To fit

Fit the compliance lever by reversing the removal procedure noting the following.

1. Ensure that the eccentric adjustment components on the compliance lever pivot are correctly located in the sub-frame bracket (see fig. H5-3). Turn the bolt until the arrow is in the position noted on removal.
2. Check the wheel caster and camber as described in Section H7.

Compliance rod mount – To renew

1. When renewing the compliance mount adjacent to the starter motor the battery must be disconnected.
2. On Bentley Turbo R cars, remove the heat shield from around the compliance mount.
3. Remove the nut and large washer from the rear of the compliance mount. **Do not** disturb the position of the outer nut. If this nut is undisturbed, it should not be necessary to check the caster and camber settings after completion of the mount renewal operations.
4. Remove the two bolts securing the compliance mount to the sub-frame and withdraw the mount.
5. Remove the bolt securing the compliance rod jaw

- to the lever. Examine the bush for serviceability and renew if necessary.
- Fit the new compliance mount and components by reversing the removal procedure. Ensure that the large washer is fitted with the concave side towards the mount.
 - Torque tighten the nuts to the figures quoted in Section H13.
 - If the position of the outer compliance rod nut has been moved the caster and camber should be checked as described in Section H7 and adjusted as necessary.

Suspension ball joints – To renew

Prior to commencement of the following operations, the spring retention tool RH 8809 should be fitted as described in Operations 1 to 7 inclusive of Lower triangle levers – To remove.

Upper ball joint (see fig. H5-3)

- Using the tube spanner RH 7775 remove the locking ring from the top of the ball joint.
- Remove the split pin and castellated nut from the ball pin.
- Support the hub with a jack and using a suitable extractor release the ball pin taper from the yoke.
- Fit the extractor tool RH 7768 onto the compliance lever and carefully press the ball joint out of the lever.
- Carefully place the new ball joint into position on the underside of the compliance lever. Using the extractor tool RH 7768 as the insertion tool draw the ball joint into the lever.
- Fit and torque tighten the locking ring to between 203 Nm and 237 Nm (20,7 kgf m and 24,2 kgf m, 150 lbf ft and 175 lbf ft).
- Complete the assembly by reversing the removal procedure.

Lower ball joint (see fig. H5-4)

- Depressurize the hydraulic braking system as described in Chapter G.
- Disconnect the brake hose(s) from the rear of the front hub. Fit blanks to the hoses and pipes.
- Disconnect the brake pad wear and anti-lock braking electrical connections (if fitted) from the hub assembly.
- Remove the split pin and castellated nut from the track rod end. Using extractor tool RH 9710 release the ball pin taper from the side steering lever.
- Remove the split pin and castellated nut from the upper ball pin.
- Support the hub with a jack and using a suitable extractor release the upper ball pin taper from the yoke.
- Remove the split pin and castellated nut from the lower ball pin.
- Using a suitable extractor release the lower ball pin taper from the ball pin carrier. Lift the yoke and hub assembly from the car.
- Remove the ball joint assembly and housing from the yoke.
- Remove the ball joint from the housing and collect the shim washers.
- Thoroughly clean the housing and shim washers.

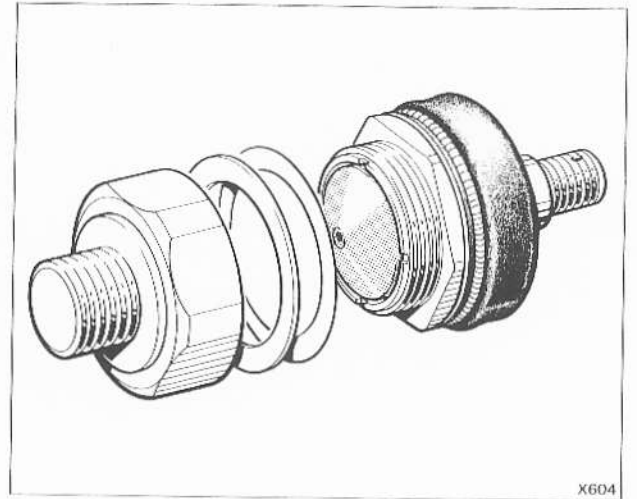


Fig. H5-4 Lower ball joint assembly

- Enter the new ball joint into the housing without fitting the shim washers. Fit and lock together two nuts onto the ball pin.

Note The ball joint is supplied as a complete assembly and is pre-packed with lubricant.

- Carefully tighten the ball joint into the housing until a torque of between 14,1 Nm and 19,8 Nm (1,4 kgf m and 2,0 kgf m, 125 lbf in and 175 lbf in) is required to rotate the ball. This torque figure should be measured after the ball pin has been rotated through four complete revolutions, and with the ball pin in its vertical position.
- Measure the gap between the ball joint face and the housing.
- Remove the ball joint from the housing and fit shims, equivalent to the gap previously measured, onto the ball joint.
- Fit the ball joint and shims to the housing and torque tighten the assembly to between 339 Nm and 406 Nm (34,6 kgf m and 41,5 kgf m, 250 lbf ft and 300 lbf ft).
- Check that the torque required to rotate the ball pin is within the limits given in Operation 12. If necessary make adjustments by increasing or decreasing the shim thickness to obtain the correct torque reading.
- Apply CASCO MLF 13 adhesive to the threads of the housing then fit the ball joint assembly into the yoke. Torque tighten to between 190 Nm and 216 Nm (19,4 kgf m and 22,1 kgf m, 140 lbf ft and 160 lbf ft).
- Fit the yoke and hub assembly by reversing the removal procedure.

Front stabilizer – To remove

- Remove the nuts and washers securing the stabilizer links to the triangle lever brackets and stabilizer bar.
- Using extractor tool RH 8080 separate the tapers of the stabilizer links from their locations. Remove the links.
- Remove the setscrews and washers securing the stabilizer bar mounts to the sub-frame.
- Remove the brackets and stabilizer bar. Collect any

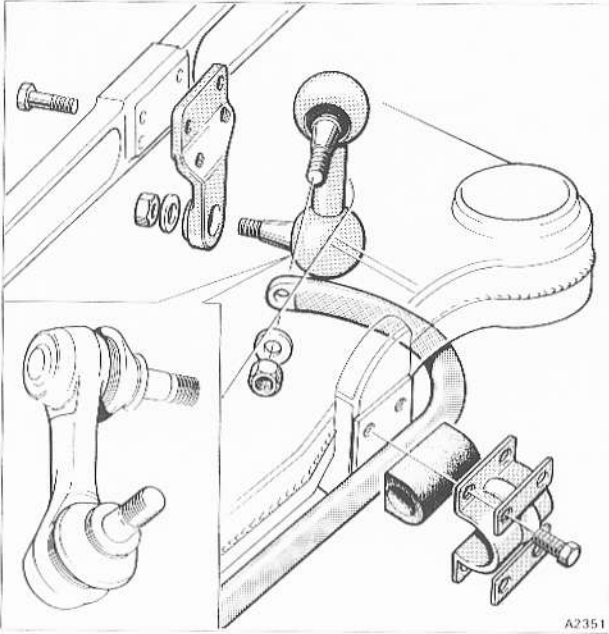


Fig. H5-5 Front stabilizer components
Inset-Link fitted to Bentley cars other than
Continental

packing from between the rubber mount and sub-frame
(see fig. H5-5).

5. Examine the rubbers of the mounts and links for
serviceability and renew as necessary.

Front stabilizer – To fit

Fit the stabilizer by reversing the removal procedure
noting the following.

1. Set the suspension triangle levers to the normal ride
position.
2. Attach the stabilizer links to the triangle levers and
the stabilizer. Do not tighten the securing nuts.
3. Fit the stabilizer to the sub-frame without forcing
the clamping brackets into position. Ensure that the
packing (if fitted) is located between the sub-frame and
the stabilizer mount.
4. Torque tighten the setscrews and link nuts to the
figures quoted in Section H13.