Exhaust system

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Issue record sheet 1

April 1985

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Exhaust gas poisoning and First aid

Danger — Exhaust gas

Inhaling exhaust gas is dangerous.

If it is necessary to run the engine inside a building, always ensure that the exhaust gas is suitably piped to the outside.

First aid — Burns

Before commencing work on the exhaust always ensure that the system is not hot.

In the event of a skin burn, cold clean water should be run over the affected area and if necessary, a dry dressing temporarily applied.

A medical centre or doctor should be consulted as soon as possible after administering this emergency treatment.

Exhaust manifolds

Exhaust manifolds - To remove

1. Disconnect the battery and ensure that the normal workshop safety precautions are carried out.
2. Support each downtake pipe just forward of the front silencers.
3. Remove the clamps from around the downtake to manifold joint on 'A' and 'B' bank. Free both joints.
4. Detach the two choke stove pipes from the unions located on 'B' bank manifold (see fig. Q2-1). On cars fitted with a fuel injection system, detach the exhaust gas recirculation (E.G.R.) feed pipe from the manifold.

   Blank off the pipes to prevent the ingress of dirt.
5. Remove the setscrews and distance pieces securing the manifolds to the cylinder heads, withdraw the manifolds.
6. Discard the gaskets fitted between the manifolds and the cylinder heads.
7. Blank off the ports in the cylinder heads to prevent the ingress of dirt and other foreign matter.

Exhaust manifolds — To inspect

1. Using medium grade emery cloth, lightly dress the manifold to downtake pipe joint.
2. Remove any scale on the manifold (to cylinder head) joint faces.
3. Check for distortion of the manifold (to cylinder head) joint faces using a straight edge.
4. Minor distortions can be corrected by rubbing the manifold joint faces across the cutting surface of medium grade emery cloth. The emery cloth should be secured on its smooth side to a surface table.

Note

It is important that the manifold (to cylinder head) joint faces are flat, clean and square.

Exhaust manifolds — To fit

To fit the manifolds reverse the procedure given for their removal, noting the following points.

1. Ensure that all joint faces are free from scale and emery dust before assembly.
2. Lubricate all joint threads to ensure that the threads do not bind.
3. Smear the spherical seating faces and the grooves in the spherical clamps with either graphite lubricant or an assembly compound to assist in correct alignment.
4. All nuts and bolts should be tightened to the correct torque figure (see Chapter P). Manifold setscrews must be tightened evenly, starting at the centre and working outwards.
5. After the engine has been run sufficiently to reach normal operating temperature, the manifold setscrews and spherical joint clamp bolts should be checked and if necessary, again tightened to the correct torque figure (see Chapter P).

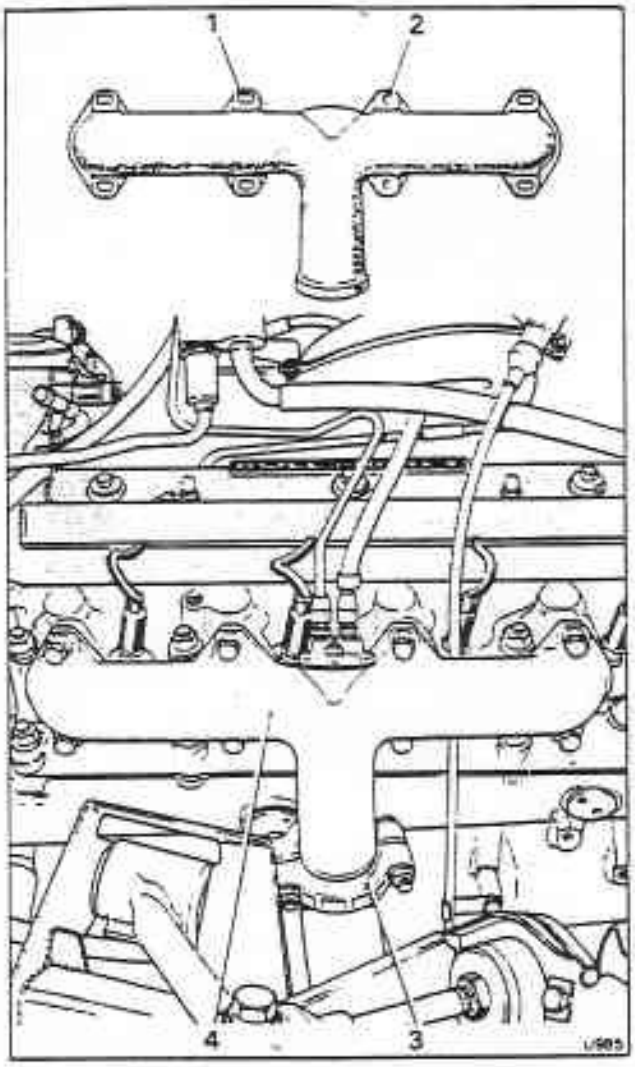


Fig. Q2–1 'B' bank exhaust manifold
- 1 Elongated hole
- 2 Location hole
- 3 Spherical clamp
- 4 Exhaust manifold

Exhaust manifolds

Mulsanne Turbo and Bentley Turbo R

Exhaust manifolds - To remove

1. Disconnect the battery and ensure that the normal workshop safety precautions are carried out.
2. Support the downtake pipe forward of the front silencers.
3. Remove the clamps from the exhaust manifolds, securing the connecting pipe between 'A' and 'B' banks. Free the joints and remove the pipe.
4. Remove the nuts securing the turbocharger assembly to 'A' bank manifold. Collect the washers and then remove the turbocharger assembly. Take care not to damage the machined faces between the turbocharger and manifold.
5. Remove the wastegate assembly from 'A' bank manifold (see fig. Q2/1-1). Discard the 'O' ring.
6. Remove the setscrews and distance pieces securing the manifolds to the cylinder head after first bending back the tabs of the lock-plates. Withdraw the manifolds, then remove and discard the lock-plates.
7. Discard the gaskets fitted between the manifolds and the cylinder heads.
8. Blank off the ports in the cylinder heads to prevent the ingress of dirt and other foreign matter.

Exhaust manifolds - To inspect

1. Using medium grade emery cloth, lightly dress the manifold to connecting pipe joint faces.
2. Remove any scale on the manifolds (to cylinder head) joint faces.
3. Check for distortion of the manifold (to cylinder head) joint faces using a straight edge.
4. Minor distortions can be corrected by rubbing the manifold joint faces across the cutting surface of medium grade emery cloth. The emery cloth should be secured to a surface table.

Note

It is important that the manifold (to cylinder head) joint faces are flat, clean, and square.

Exhaust manifolds - To fit

To fit the manifolds, reverse the procedure given for their removal, noting the following.

1. Ensure that all joint faces are free from scale and emery dust before assembly.
2. Smear the spherical seating faces and the grooves in the spherical clamps with either graphite lubricant or an assembly compound. This will assist in correct alignment.
3. All machined faces should be checked for flatness.

Important

Under no circumstances should exhaust sealant (Firegum, etc.) be used between the exhaust manifolds and the turbocharger assembly.

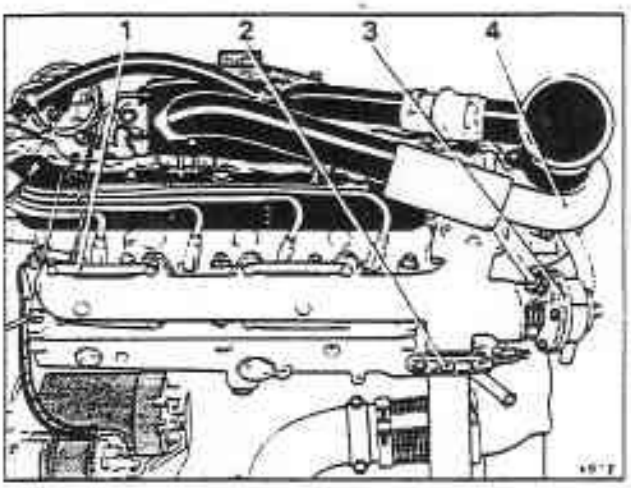


Fig. Q2/1-1 'A' bank exhaust manifold

1 Manifold setscrew lock-plate
2 Connecting pipe clamp
3 Wastegate assembly
4 Turbocharger assembly

4. Ensure that a new 'O' ring is fitted to the wastegate assembly.
5. Ensure that new lock-plates are fitted to the manifold securing setscrews.
6. All nuts and bolts should be tightened to the correct torque figures (see Section Q5 and Chapter P). Manifold setscrews must be tightened evenly, starting at the centre and working outwards (i.e. from side to side).
7. After the engine has been run sufficiently to reach normal operating temperature and has been allowed to cool, the manifold setscrews and spherical joint clamp bolts should be checked for tightness. If necessary, tighten to the torque figures given in Section Q5 and Chapter P.
8. Ensure that the tabs of the manifold lock-plates are bent over.
9. If the turbocharger assembly mounting studs have to be replaced, refer to Section Q5.

Exhaust pipes and silencers

(except cars built to the Japanese and North American specifications)

Introduction

The pipes and silencers form a six box twin exhaust system with an interconnecting balance pipe. Cars produced to the Australian specification have an additional exhaust gas recirculation (E.G.R.) system connection on the balance pipe (see fig. Q3-1).

Exhaust pipes and silencers - To remove

The exhaust system comprises a number of individual sections. The sections can be removed and replaced without the necessity of having to disturb the complete system.

1. Drive the car onto a ramp.
2. Disconnect the battery and ensure that the normal workshop safety precautions are carried out.
3. Raise the ramp.

Tailpipe finishers

4. Unscrew the worm drive clip securing the tailpipe finisher to the exhaust and withdraw the finisher. Repeat this operation to the other tailpipe finisher.

Rear silencer assemblies

5. Locate the exhaust system joint situated to the rear of the intermediate silencer assembly.
6. Unscrew the two nuts from the 'U' clamp, collect the washers and clamping bar. Withdraw the 'U' bolt.
7. Support the weight of the intermediate silencer.
8. Temporarily support the weight of the rear silencer assembly.
9. Unscrew the two setscrews securing the rear silencer assembly to the mounting bracket.
10. Locate the exhaust system mounting bracket adjacent to the road wheel drive-shaft. Unscrew the nut securing the exhaust to the mounting bracket, collect the washer and withdraw the bolt. Collect the washer fitted under the head of the bolt.
11. Twist the pipe to 'break' the joint seal, remove the temporary support and withdraw the rear silencer assembly.
12. Repeat Operations 5 to 11 inclusive to remove the other rear silencer assembly.

Intermediate silencer assemblies

13. Ensure that the weight of the intermediate silencer assembly is temporarily supported.
14. Support the weight of the front silencer assembly.
15. Unscrew the setscrew from the bottom of the forward exhaust mounting (see fig. Q3-1).
16. Unscrew the two nuts from the spherical clamp situated behind the front silencer assembly. Collect the washers and free the joint. Withdraw the two bolts and both halves of the clamp.
17. Discard the temporary support and withdraw the intermediate silencer assembly. Collect the sealing ring from the joint as the silencer assembly is withdrawn.
    Label the sealing ring for identification purposes.
18. Repeat Operations 13 to 17 inclusive to the other intermediate silencer assembly.

Front silencer assemblies

19. Ensure that the weight of the front silencer assembly is temporarily supported.
20. Support the weight of the downtake pipe.
21. Unscrew the two nuts from the spherical clamp situated forward of the front silencer assembly. Collect the washers and free the joint. Withdraw the two bolts and both halves of the clamp.
22. Discard the temporary support and withdraw the front silencer assembly. Collect the sealing ring from th joint as the silencer assembly is withdrawn.
    Label the sealing ring for identification purposes.
23. Repeat Operations 19 to 22 inclusive to the other front silencer assembly.

Balance pipe

On cars produced to the Australian specification it wil be necessary to detach the exhaust gas recirculation (E.G.R.) take-off pipe lower joint before continuing (refer to the appropriate section of Chapter U).

24. Unscrew the two nuts from the 'U' clamp situatec on the left-hand side of the balance pipe. Collect the washers and the clamping bar. Withdraw the 'U' bolt.
25. Unscrew the two nuts from the spherical clamp situated on the right-hand side of the balance pipe. Collect the washers and free the joint. Withdraw the two bolts and both halves of the clamp.
26. Twist the balance pipe to free the sliding joint an then withdraw the pipe. Collect the sealing ring from the spherical joint.

Downtake pipes

27. Ensure that the weight of the downtake pipes is temporarily supported.
28. Locate the downtake pipe to exhaust manifold joint. Unscrew the two nuts from the joint clamp. Collect the washers and free the joint. Withdraw the two bolts and both halves of the clamp.
29. Discard the temporary support and withdraw th downtake pipe.
30. Repeat Operations 27 to 29 inclusive to the oth downtake pipe.

Exhaust pipes and silencers – To fit

To assemble, reverse the procedure given for removal noting the following points.

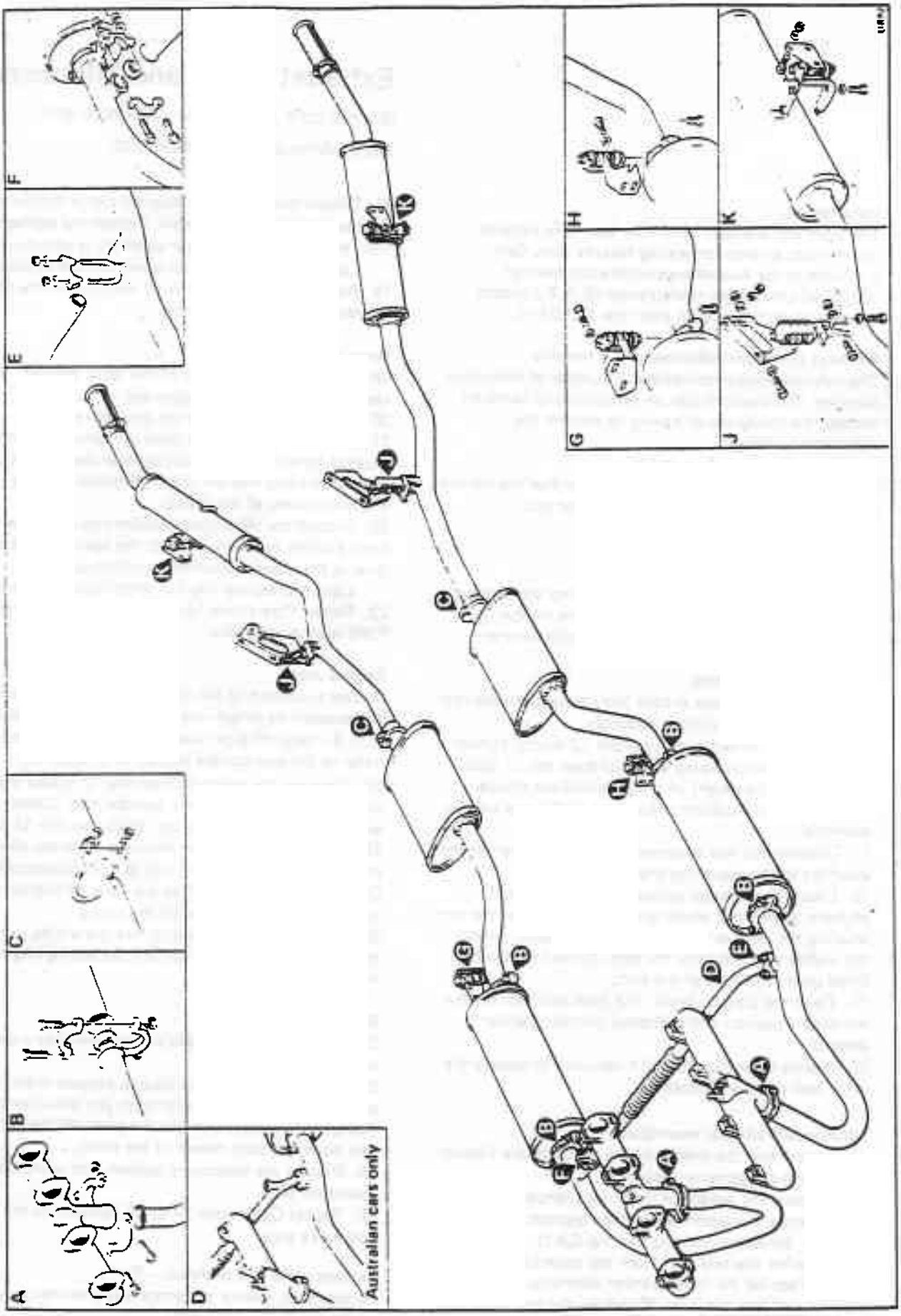


Fig. 03–1 Exhaust system

Exhaust pipes and silencers

Mulsanne Turbo and Bentley Turbo R

Introduction

The pipes and silencers form a three box, twin exhaust system. The single downtake pipe leads into a twin pipe system with twin intermediate silencers and a dual rear silencer (see fig. Q3/1-1).

Exhaust pipes and silencers - To remove

The exhaust system comprises a number of individual sections. The sections can be removed and replaced without the necessity of having to disturb the complete system.

1. Drive the car onto a ramp.
2. Disconnect the battery and ensure that the normal workshop safety precautions are carried out.
3. Raise the ramp.

Rear silencer assembly

4. Locate the joints situated to the rear of the intermediate silencer assemblies.
5. Remove the nuts from the two 'U' clamps, collect the washers and clamping bars. Withdraw the 'U' bolts.

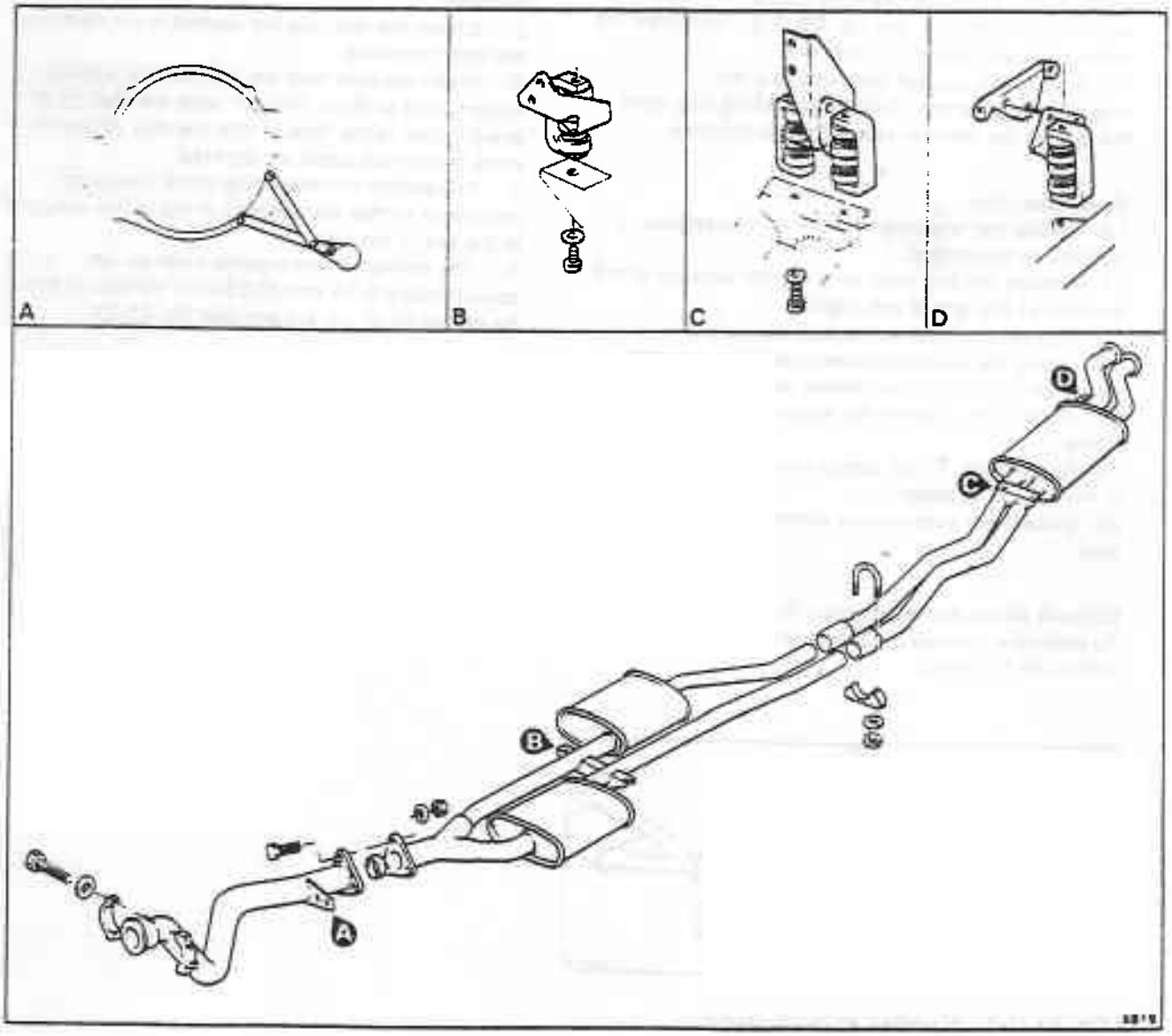


Fig. Q3/1-1 Exhaust system Mulsanne Turbo and Bentley Turbo R

6. Support the weight of the intermediate silencers.
7. Temporarily support the weight of the rear silencer assembly.
8. Remove the setscrew securing the rear silencer assembly to the rear mounting bracket. Collect the washer.
9. Locate the exhaust system mounting bracket forward of the rear silencer assembly. Remove the two setscrews securing the exhaust to the mounting bracket. Collect the washers.
10. 'Break' the joint seal. Then, remove the support and withdraw the rear silencer assembly.

Intermediate silencer assembly

11. Ensure that the weight of the intermediate silencer assembly is temporarily supported.
12. Support the weight of the downtake pipe.
13. Remove the setscrews securing the exhaust to the mounting brackets between the intermediate silencers. Collect the washers.
14. Remove the nut(s) from the clamp forward of the intermediate silencers (see fig. Q3/1-2). Withdraw the setscrew(s) and collect the washers.
15. Discard the support and withdraw the intermediate assembly. Collect the sealing ring from the joint as the silencer assembly is withdrawn.

Downtake pipe

16. Ensure that the weight of the downtake pipe is temporarily supported.
17. Remove the two nuts securing the exhaust to the brackets at the rear of the engine.
    Remove the bolts and collect the washers.
18. Locate the downtake pipe to exhaust manifold joint. Remove the two setscrews securing the outer half of the clamp. Collect the washers and free the clamp.
19. Remove the 'T' bolt clamp connecting the exhaust to the flexible bellows.
20. Discard the support and withdraw the downtake pipe.

Exhaust pipes and silencers - To fit

To assemble, reverse the procedure given for removal, noting the following.

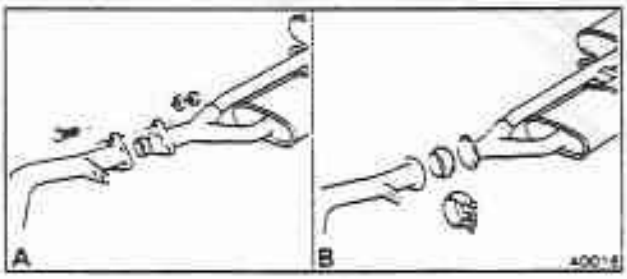


Fig. Q3/1-2 Modified exhaust clamp
A Original type
B Hymatic type

Prior to assembly

1. Ensure that the sliding joints are a good fit in their respective stub pipes to allow for adjustment.
2. The sealing ring and pipes must be thoroughly clean and free from scale. If necessary, these can be lightly dressed with fine emery cloth.
3. To enable correct alignment of components during assembly, ensure free movement of all joints. This can be achieved by lightly smearing the sealing rings, pipe flares, and the grooves in the spherical joint clamps with either graphite lubricant or Neverseez assembly compound.
4. Two types of clamp are fitted forward of the intermediate silencers (see fig. Q3/1-2). Therefore, if the Hymatic type is fitted, refer to Section Q5 for the special torque tightening figures.

Upon assembly

1. The parts should be loosely assembled and then manoeuvred to give the best alignment (free from possible fouls), before the joints and mounts are tightened.
2. Ensure the tailpipes are located in the centre of the body moulding.
3. When the pipe runs are satisfactory, apply a sealant such as Holts Firegum onto the ends of all straight tube joints. Ensure that the slits down the sides of the stub pipes are covered.
4. The clamps on the sliding joints should be positioned so that the opening in the clamp is opposite to the slot in the pipe.
5. The resilient metal mounts must be set approximately 6.35 mm (0.250 in) forward to allow for expansion of the system (see fig. Q3-2).

Prior to assembly

1. Ensure that the sliding joints are a good fit in their respective stub pipes to allow for adjustment.
2. All sealing rings and pipes must be thoroughly clean and free from scale. If necessary, these can be lightly dressed with fine emery cloth.
3. To ensure free movement of the joints for correct alignment of the components when assembling, the sealing rings, pipe flares and grooves in the spherical joint clamps should be lightly smeared with either a graphite lubricant or 'Neverseez' assembly compound.
4. Apply either lubricant or assembly compound to the clamp bolt threads before assembly.

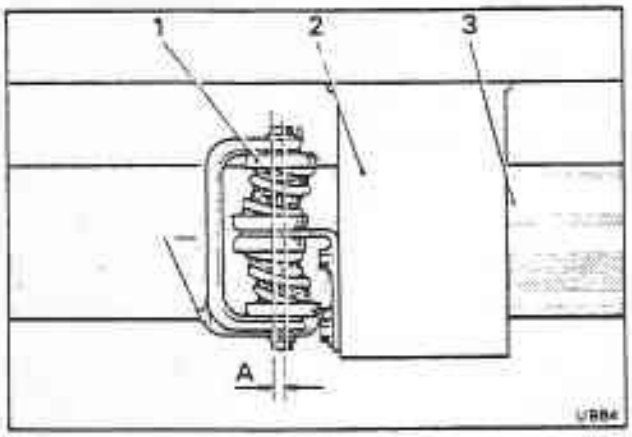


Fig. Q3–2 Exhaust mount pre-load
1 Spring mount
2 Body crossmember
3 Exhaust pipe
A 6,35 mm (0.250 in)

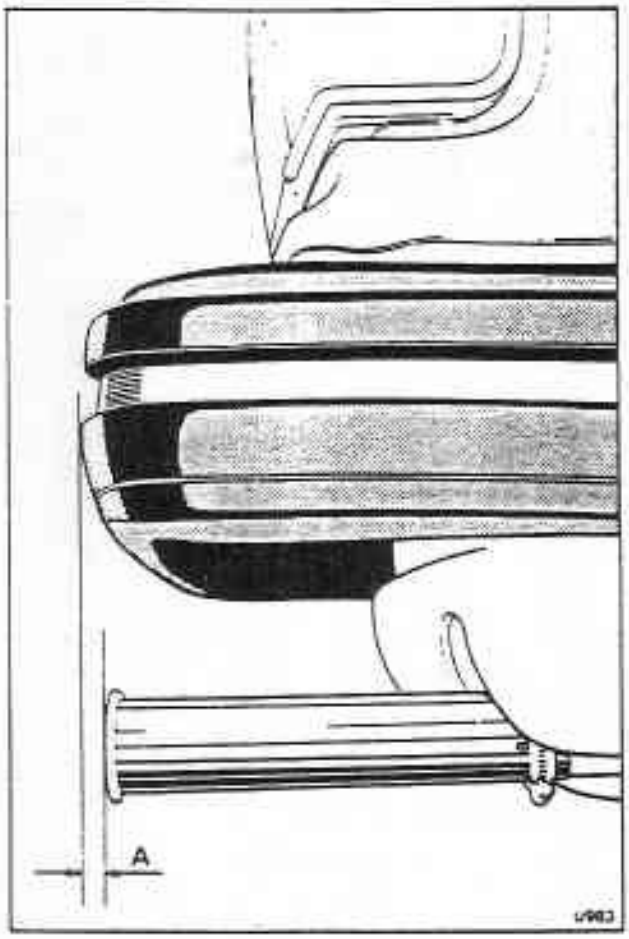


Fig. Q3–3 Tailpipe finisher setting
A 15 mm (0.60 in)

Upon assembly

1. The parts should be loosely assembled and then manoeuvred to give the best alignment (free from possible fouls), before the joints and mounts are tightened.
2. Set the pipes behind the intermediate silencers equidistant about the centre line of the car.
   Ensure that the tailpipes and finishers lie in the centre of each rear body moulding.
3. When the pipe runs are satisfactory, apply a sealant such as Holts Firegum into the ends of all straight tube joints, ensure that the slits down the sides of the silencer stub pipes are covered. (Holts Firegum can also be smeared on the inside of the sliding joints).
4. The clamps on the sliding joints should be positioned so that the opening in the clamp is opposite to the slot in the pipe.
5. The resilient metal mounts must be set approximately 6,35 mm (0.250 in) forward to allow for expansion of the system (see fig. Q3-2).
6. Ensure that the triangle bracket on the intermediate mount is vertical.
7. Set the tailpipe finishers 15 mm (0.60 in) in from the outer edge of the bumper (see fig. Q3-3).

Exhaust pipes, silencers, grass-fire shields

(cars built to the Japanese and North American specifications)

Introduction

The pipes and silencers form a five box, twin exhaust system (four silencer boxes and one catalytic converter).

Note

Refer to the appropriate Chapter U, Emission Control Systems for additional information relating to the exhaust system.

Cars produced to the Japanese specif grass-fire shields fitted beneath the major exhaust system as shown in figure Q4-1.

Cars produced to the North American specification have a grass-fire shield fitted catalytic converter as shown in figure Q4-

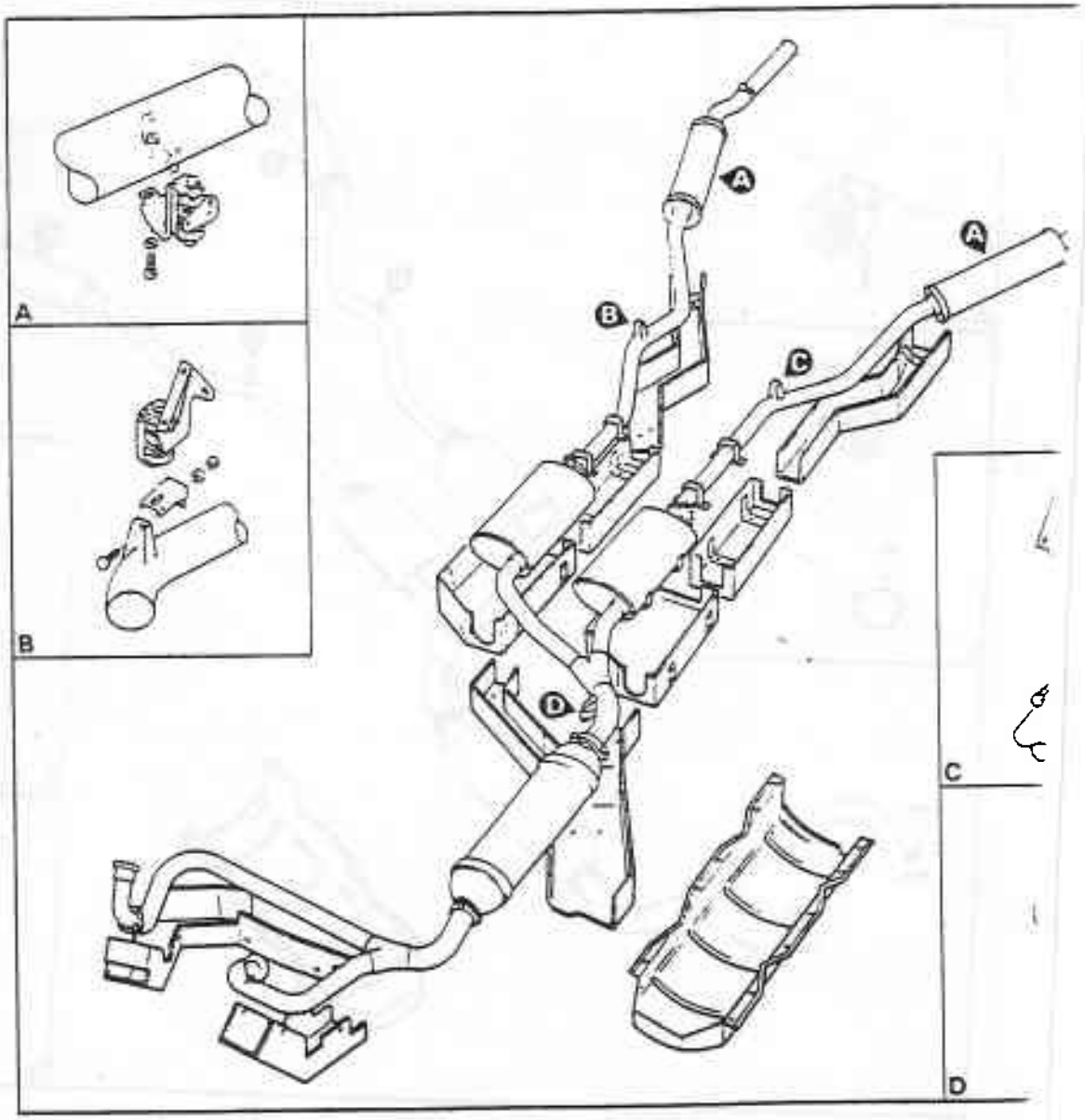


Fig. Q4-1 Exhaust system and grass-fire shields Silver Spirit, Silver Spur, Mulsanne (ex Corniche *(cars conforming to a Japanese specification)*

Grass-fire shields - To remove and fit

1. *On cars conforming to a Japanese specification,* start by removing the grass-fire shields from beneath the intermediate silencers. Then, work outwards, forwards and rearwards.
2. *On cars conforming to a North American specification,* remove the shield fitted beneath the catalytic converter.
3. Check that the shields are in good condition and that no breaks or cracks have occurred in the mesh.

If damage to a shield has occurred, the shield must be discarded and a new one fitted.

4. Replace the shields by reversing the procedure for removal, noting the following.
5. Refer to figure Q4-1 for details of cars produced to the Japanese specification.
6. Refer to figure Q4-2 for details of cars produced to the North American specification.

Note

On cars conforming to the Japanese specification, ensure that a minimum gap of 5 mm (0.20 in) is maintained between the grass-fire shields and the exhaust system.

Exhaust pipes and silencers - To remove

The exhaust system comprises a number of individual sections. The sections can be removed and replaced without the necessity of having to disturb the complete system.

1. Drive the car onto a ramp.
2. Disconnect the battery and ensure that the normal workshop safety precautions are carried out.
3. Raise the ramp.

Tailpipe finishers

4. Unscrew the worm drive clip (if fitted) securing

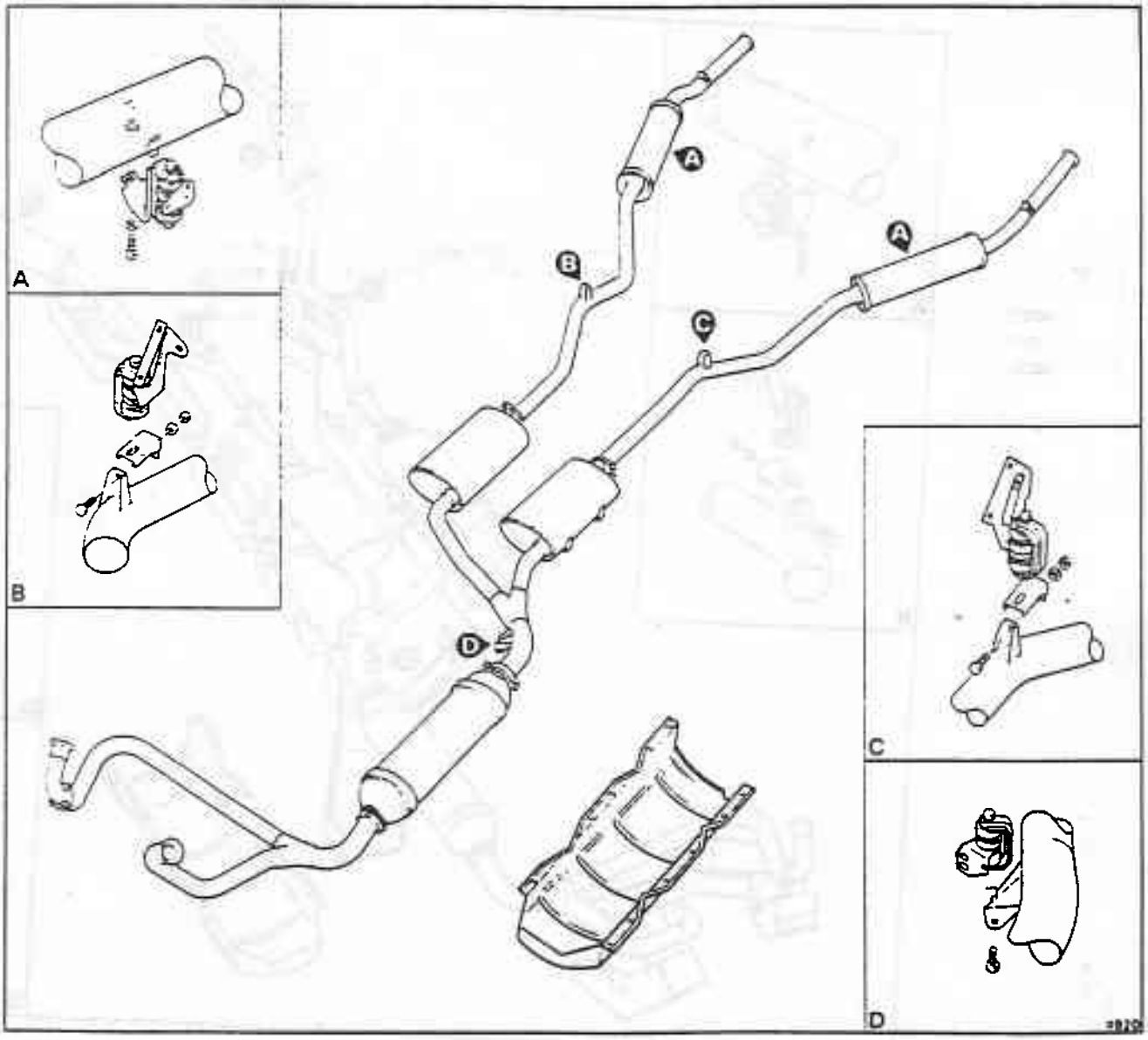


Fig. Q4-2 Exhaust system and grass-fire shield Silver Spirit, Silver Spur, Mulsanne (excluding Turbo), and Corniche *(cars conforming to a North American specification)*

the tailpipe finisher to the exhaust and withdraw the finisher. Repeat this operation to the other tailpipe finisher.

Rear silencer assemblies

5. Locate the exhaust system joint situated to the rear of the intermediate silencer assembly.
6. Remove the two nuts from the 'U' clamp, collect the washers and clamping bar. Withdraw the 'U' bolt.
7. Support the weight of the intermediate silencers.
8. Temporarily support the weight of the rear silencer assembly.
9. Remove the two setscrews securing the rear silencer assembly to the rear mounting bracket. Collect the washers.
10. Locate the exhaust system mounting bracket adjacent to the road wheel drive-shaft. Remove the nut securing the exhaust to the mounting bracket, collect the washer and withdraw the bolt. Collect the washer fitted under the head of the bolt.
11. Twist the pipe to 'break' the joint seal. Remove the support and withdraw the rear silencer assembly.
12. Repeat Operations 5 to 11 inclusive to remove the other rear silencer assembly.

Intermediate silencers assembly

13. Ensure that the weight of each intermediate silencer assembly is temporarily supported.
14. Support the weight of the catalytic converter assembly.
15. Remove the setscrew securing the exhaust to the mounting bracket just rearward of the catalytic converter. Collect the washer.
16. Remove the two nuts from the spherical clamp situated behind the catalytic converter. Collect the washers and free the joint. Withdraw the two bolts and both halves of the clamp.
17. Remove the support and withdraw the intermediate silencers assembly. Collect the sealing ring from the joint as the silencer assembly is withdrawn.

Label the sealing ring for identification purposes.

Catalytic converter

Remove the catalytic converter as described in Chapter U.

Downtake pipes

18. Ensure that the weight of the downtake pipes is temporarily supported.
19. Disconnect the electrical connection from the oxygen sensor mounted forward of the catalytic converter.

Remove the oxygen sensor from the exhaust pipe as described in Chapter U.

20. Locate the downtake pipe to exhaust manifold joint. Remove the nut(s) from the joint clamp. Collect the washer(s) and free the joint. Withdraw the bolt(s) and the clamp (see fig. Q4-3).
21. Repeat Operation 20 to the other downtake pipe.
22. Remove the support and withdraw the downtake pipe assembly.

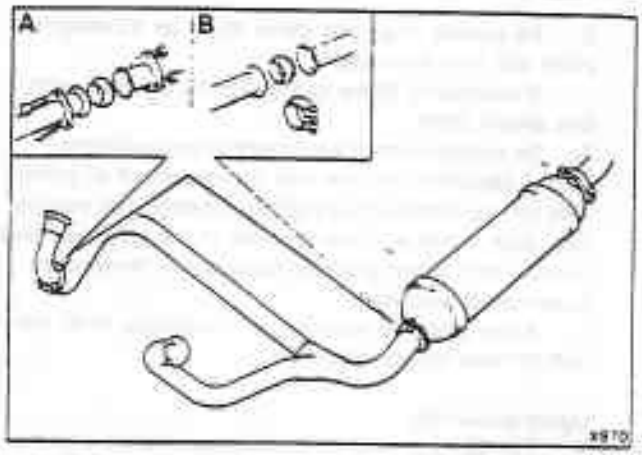


Fig. Q4-3 Modified exhaust clamps
A Cars produced prior to 1984
B Cars produced from 1984

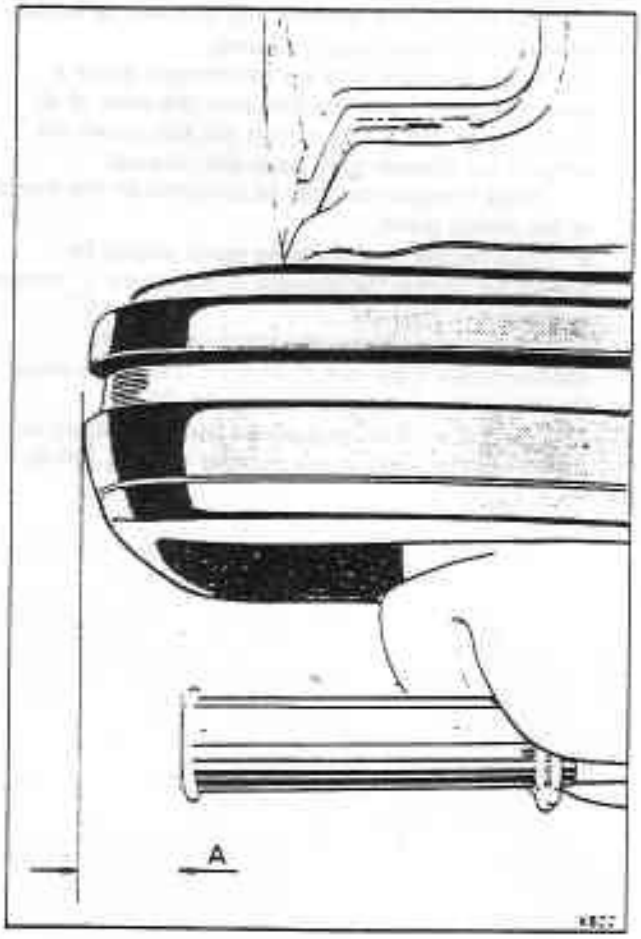


Fig. Q4-4 Tailpipe finisher setting
A 65 mm (2.560 in)

Exhaust pipes and silencers - To fit

To assemble, reverse the procedure given for removal, noting the following.

Prior to assembly

1. Ensure that the sliding joints are a good fit in their respective stub pipes to allow for adjustment.

2. All sealing rings and pipes must be thoroughly clean and free from scale.

If necessary, these can be lightly dressed with fine emery cloth.

3. To enable correct alignment of components during assembly, ensure free movement of all joints. This can be achieved by lightly smearing the sealing ring, pipe flares, and the grooves in the spherical joint clamps with either graphite lubricant or Neverseez assembly compound.

4. Apply graphite lubricant or Neverseez to all clamp bolt threads before assembly.

Upon assembly

1. The parts should be loosely assembled and then manoeuvred to give the best alignment (free from possible fouls), before the joints and mounts are tightened.

2. Set the pipes behind the intermediate silencers equidistant about the centre line of the car.

Ensure that the tailpipes and finishers lie in the centre of each rear body moulding.

3. When the pipe runs are satisfactory, apply a sealant such as Holts Firegum onto the ends of all straight tube joints. Ensure that the slits down the sides of the silencer stub pipes are covered.

Holts Firegum can also be smeared on the inside of the sliding joints.

4. The clamps on the sliding joints should be positioned so that the opening in the clamp is opposite to the slot in the pipe.

5. The resilient metal mounts must be set approximately 6,35 mm (0.250 in) forward to allow for expansion of the system (see fig. Q3-2).

6. Set the tailpipe finishers 65 mm (2.560 in) in from the outer edge of the bumper (see fig. Q4-4).

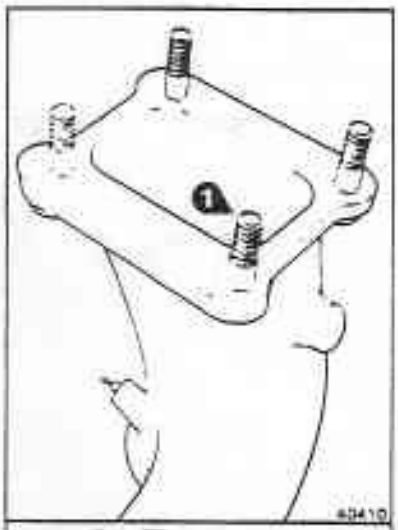
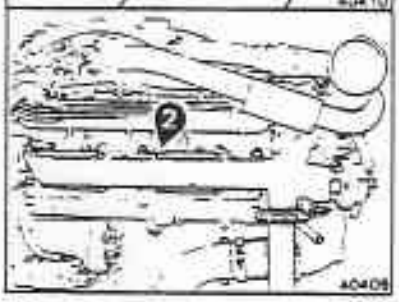
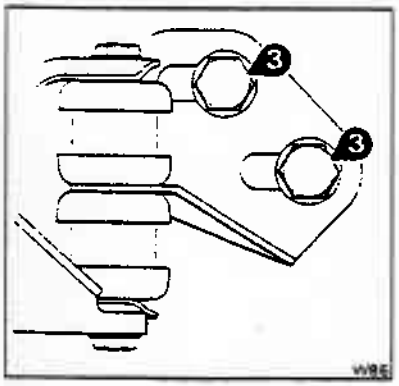
Special torque tightening figures

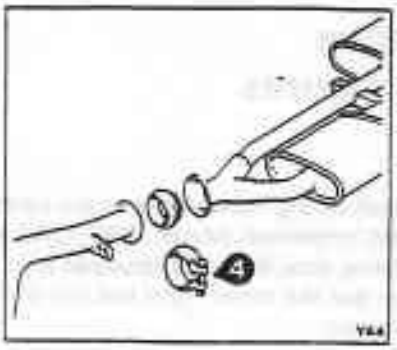
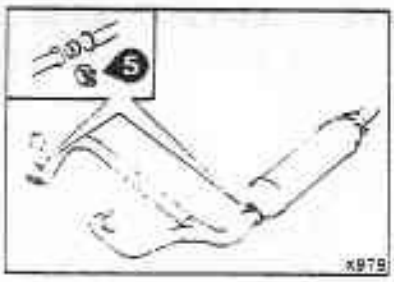
Introduction

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

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 Q2/1	Ref.	Component	Nm	kgf m	lbf ft
	1	Turbocharger assembly to exhaust manifold – stud 4 off	11 – 13	1,1–1,3	8 – 10
	2	Exhaust manifold - setscrew 16 off	20	2.0	15
Section Q3					
	3	Front exhaust mount to body crossmember (RH) - setscrew 2 off	37 – 41	4	27 – 30

Section Q3/1	Ref.	Component	Nm	kgf m	lbf ft
	4	Hymatic clamp - downtake pipe to intermediate silencer assembly - nut 1 off	25 – 27	2,5–2,7	18 – 20
Section Q4					
	5	Hymatic clamp - downtake pipe to catalytic converter - nut (Cars produced from 1984) 2 off	25 – 27	2,5–2,7	18 – 20