

Chapter Q

EXHAUST SYSTEM

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(Single pipe, four box system)
- Q3** Exhaust pipes and silencers (Twin pipe,
six box system)
- Q4** Exhaust manifolds

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EXHAUST SYSTEM

Section Q1

INTRODUCTION

The information contained in this chapter is applicable to the single pipe, four box and twin pipe, six box systems.

Heatshields are fitted to the underbody of all cars above certain parts of the exhaust system. Certain cars built to North American and Japanese emission control regulations are fitted with a catalytic converter in place of the front silencer; grass-fire shields are suspended under the pipework and later under the silencers and catalytic converter.

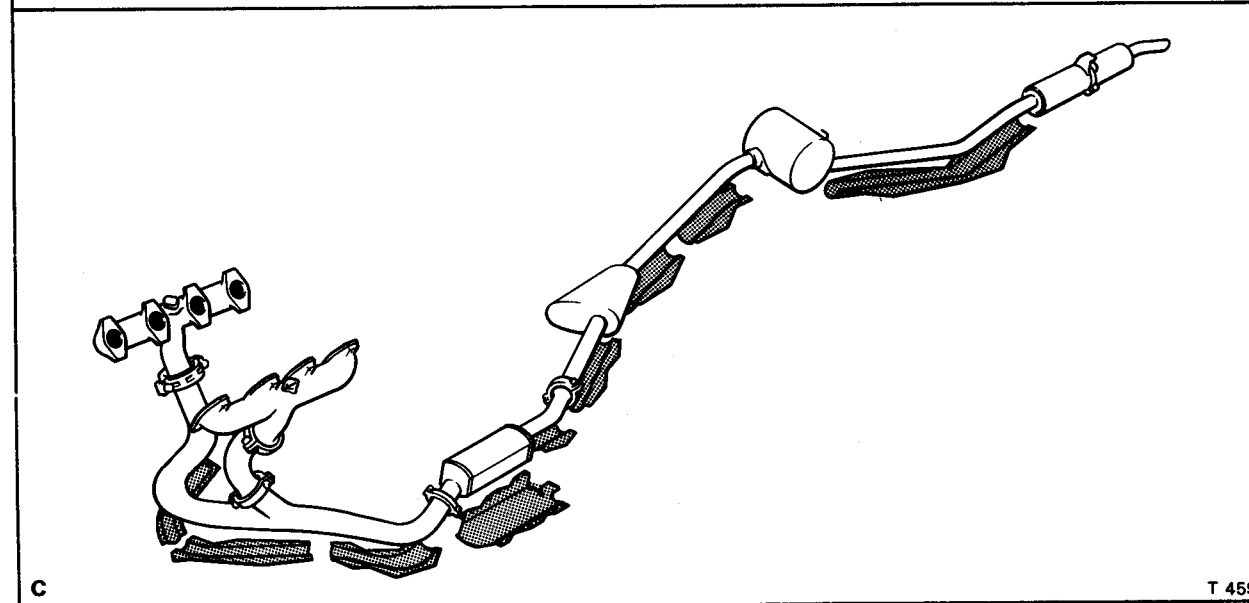
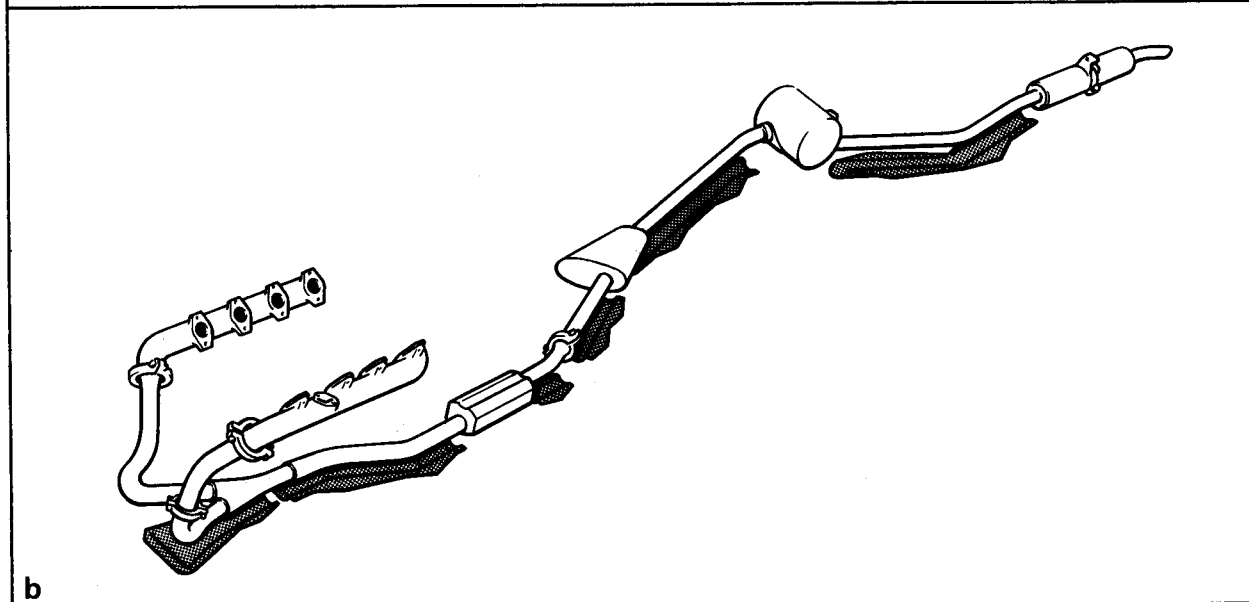
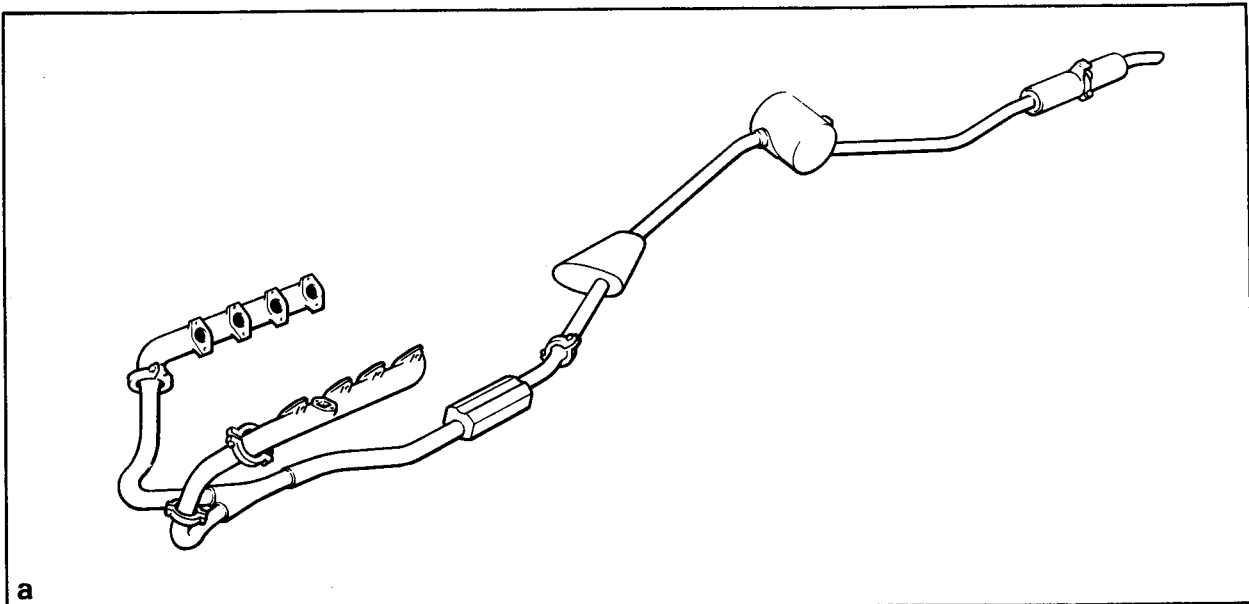
In 1975 a six box, twin pipe system with balance pipe and angled tail pipes was introduced on Corniche cars destined for countries other than Australia, Canada, Japan and the U.S.A. as shown in Figure Q1 - Exhaust configurations.

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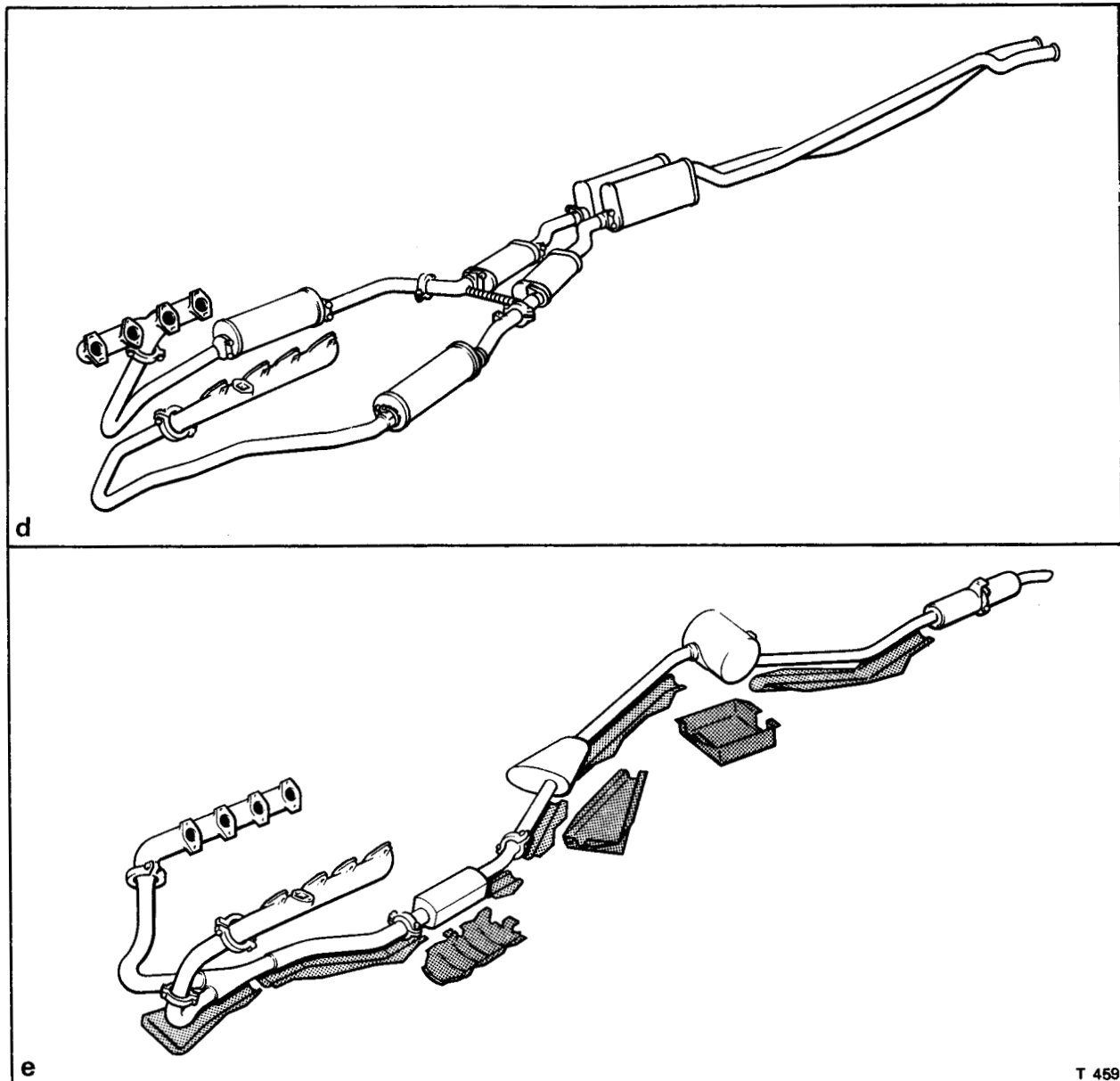


Fig. Q1 EXHAUST SYSTEM CONFIGURATIONS

- a** Early cars. Single four box system with front off-take.
- b** March 1970 (Canada, Japan and U.S.A.). Single four box system with front off-take. Grass-fire shields fitted.
- c** December 1974 (Canada and U.S.A.). Single four box system with centre off-takes and grass-fire shields. Catalytic converter replacing front silencer.
- d** April 1975 Corniche (Other than Australia, Canada, Japan and U.S.A.). Twin six box system with balance pipe. Centre off-take 'A' bank. Front off-take 'B' bank.
- e** March 1976 (Japan). Single four box system with front off-takes. Grass-fire shields fitted. Catalytic converter replacing front silencer. Thermal probe connection to catalytic converter.

Note

Dates quoted are approximate. When renewing an exhaust system reference must be made to the Parts List for details.

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EXHAUST PIPES, SILENCERS and GRASS-FIRE SHIELDS

(Single pipe, four box system)

Grass-fire shields - To remove and fit

1. Detach the rear shield and the shield covering the intermediate silencers, if fitted.
2. Remove the remaining shields.
3. Check that the shields are in good condition and no breaks or cracks have occurred in the metal mesh.

If damage to a shield has occurred it must be discarded and a new shield fitted.

4. Replace the shields by reversing the procedure for removal noting the following.
5. On cars built to the Japanese specification, ensure 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

1. Place the car on a ramp; remove the gear range selector thermal cut-out from the fuseboard and chock the rear wheels. Raise to a convenient working height.
2. Remove the rear section of the exhaust by detaching at the spherical joint between the front silencer and the expansion box (*see Fig. Q3*). Also disconnect the pipework at the resilient metal mounts attached to the body underframe.
3. To remove the front section of the exhaust, support the system at the 'Y' joint and release the spherical joints at the manifolds.
4. Detach the short downtake pipe at the lower spherical joint on the 'B' bank side of the engine.

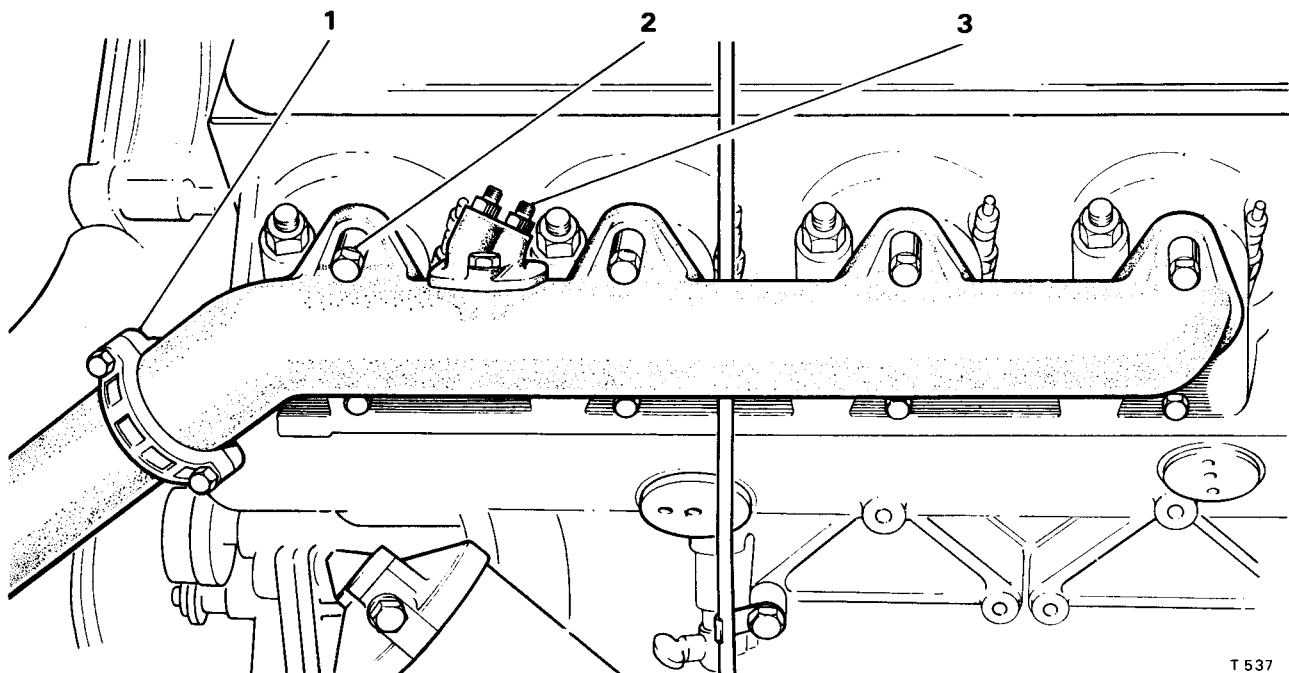
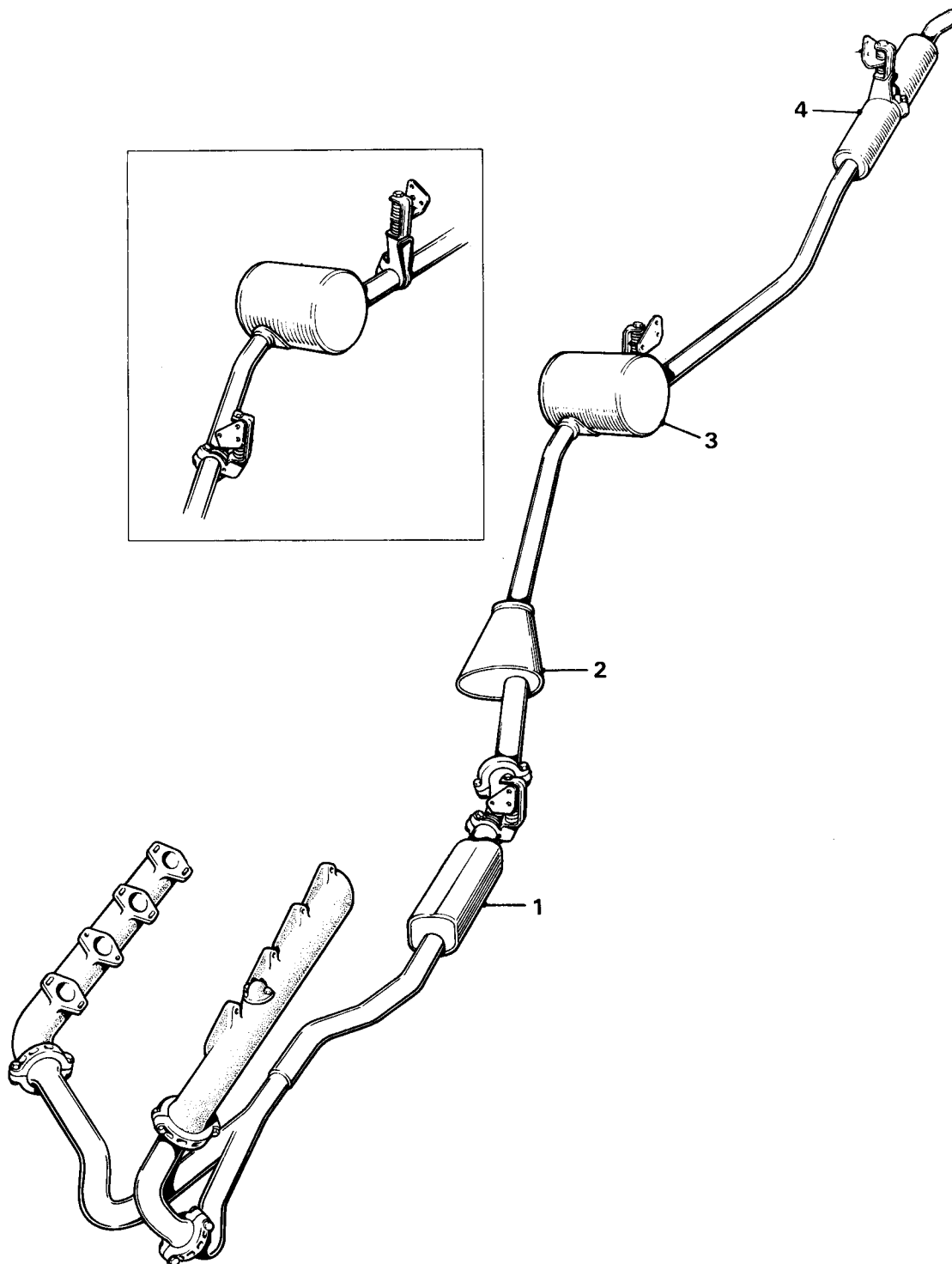


FIG. Q2 EXHAUST MANIFOLD AND DOWNTAKE PIPE (FRONT OFF-TAKE)

- | | |
|--|----------------------------|
| 1 Downtake pipe joint and clamp | 3 Choke stove pipe adapter |
| 2 Securing setscrew and distance piece | |

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FIG. Q3 SINGLE EXHAUST SYSTEM

- 1 Front silencer
- 2 Expansion box
- 3 Rear silencer

- 4 High frequency damper
- Inset. Alternative mounting

5. With the front system disconnected, carefully remove the assembly from under the car.

Exhaust pipes and silencers - To fit

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

1. All sealing rings and flared pipes must be thoroughly clean and free from scale. If necessary, lightly dress with fine emery cloth.

2. To ensure free movement of the joints for correct alignment of the components when being assembled, the angular faces of the sealing rings and grooves in the spherical clamps should be smeared with a graphite lubricant.

3. Clamp bolt threads should be oiled to prevent binding.

4. Do not fully tighten the joints until the system has been fitted and manoeuvred to obtain the best run (free from possible fouls) with good joint alignment.

5. The resilient metal exhaust mounts must be set approximately 6,35 mm. (0.250 in.) forward before tightening the clamp on the high-frequency damper. This offset is to allow the thermal expansion of the system (see Fig. Q5).

Exhaust mount - To renew

The 'Vibrashock' exhaust mounts may be readily removed and renewed as a complete assembly if necessary.

If it is necessary to remove and dismantle an exhaust mount, care must be taken on assembly to ensure that the mount cushions are in the correct position.

The two cushions in the mount vary in rate and they are colour coded, red and blue, for identification. On all the mounts, the blue coloured cushion, which is the harder of the two, must always be fitted uppermost.

The mounts have location tabs incorporated on the stirrups to locate the 'handcuff' clamps. Care should be taken when changing mounts to ensure that the tab is located correctly.

It is important when fitting the mounts that the one with the white colour code is fitted to the high frequency damper; the other mounts are coloured coded yellow. The mount colour coded white has a load carrying capacity of 6,8 kg. (15 lb.); the yellow coded mount a capacity of 9,07 kg. (20 lb.).

Refer to Chapter P for torque tightening figures.

Note

When the exhaust system is fitted, a check should be made to see that the correct clearances have been obtained.

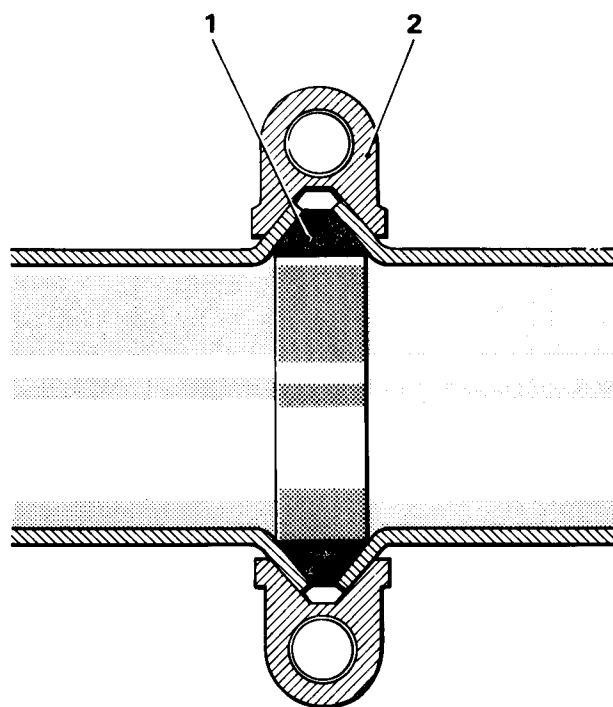
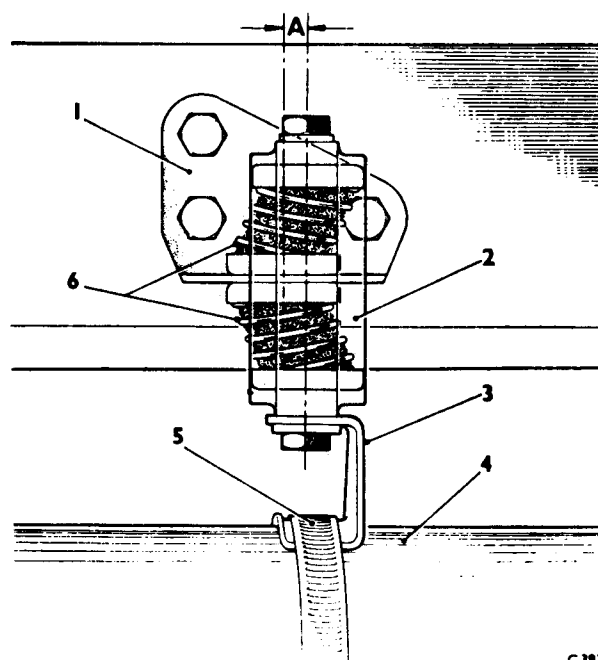


FIG. Q4 FLARED EXHAUST PIPE JOINT

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1 Sealing ring 2 Joint clamp

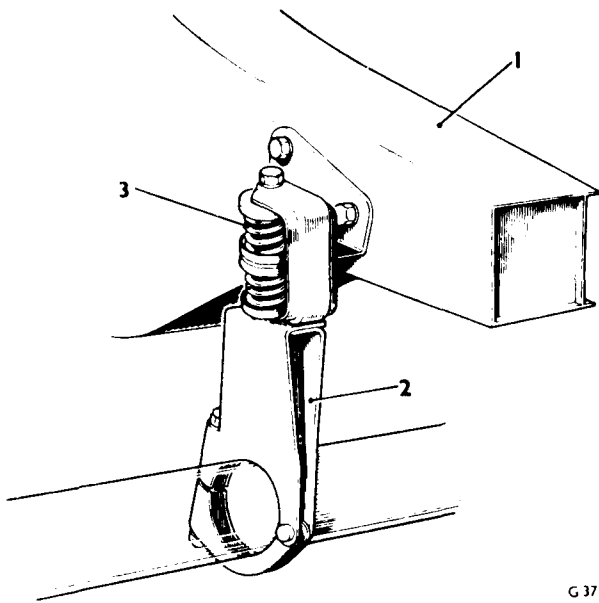


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FIG. Q5 EXHAUST MOUNT SETTING
(Rear illustrated)

A Expansion misalignment
1 Mounting bracket 4 Tail pipe
2 Mount stirrup 5 Clip
3 Pipe bracket 6 Absorber spring and cushion

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**FIG. Q6 EXHAUST MOUNT
WITH 'HANDCUFF' CLAMP**

- 1 Final drive crossmember
- 2 Handcuff clamp
- 3 Absorber spring and cushion

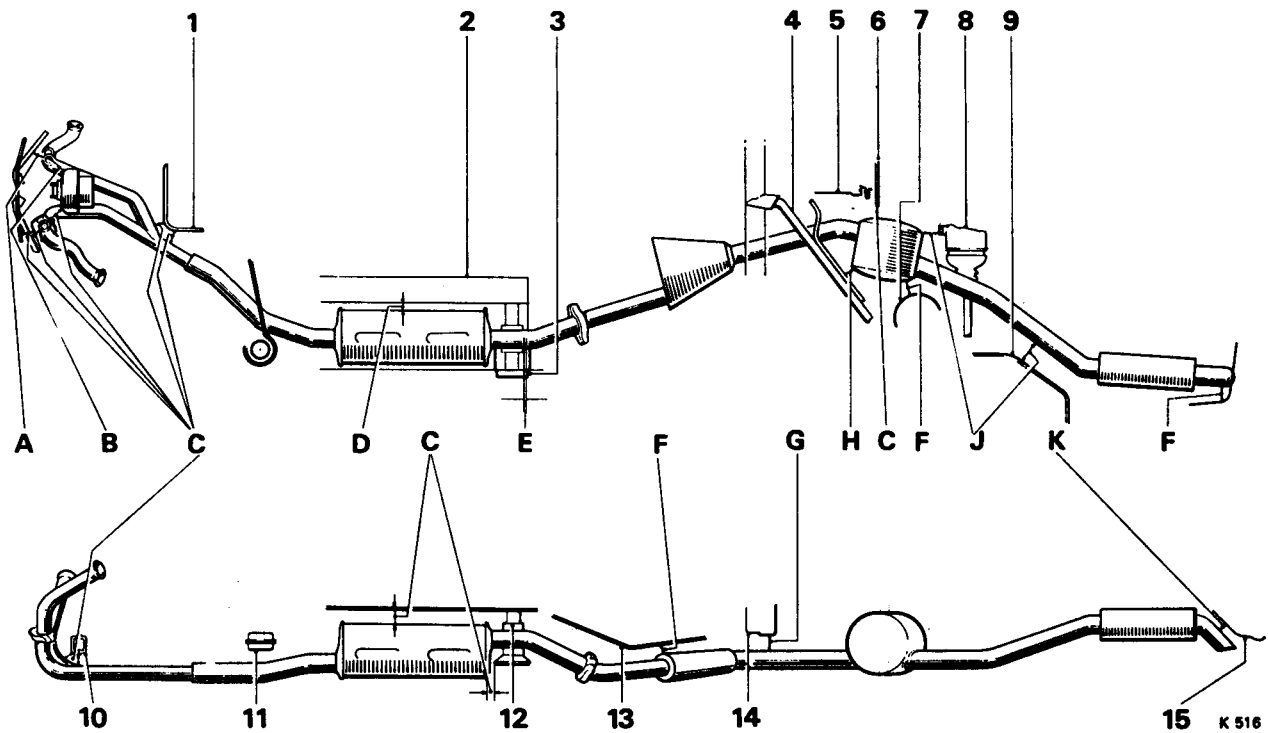
**Exhaust pipes and silencers
- To inspect**

Inspection should include an investigation to ensure that misalignment has not caused the exhaust system to bear on sub-frame, suspension, body, transmission or engine components, with resultant damage to any of these parts.

Individual exhaust components should be inspected at the flared ends of the pipes and for 'crimping' around the stub end pipes of some silencers.

Clamps should be checked to ascertain the freedom of all threads. Inspect each resilient metal mount assembly to ensure the spring mounts are working efficiently with the fixing brackets rigidly attached to the underbody.

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**FIG. Q7 EXHAUST SYSTEM ALIGNMENT**

- | | | |
|---|--------------------------------|---|
| 1 Engine sump | 4 Rear suspension trailing arm | 11 Front sub-frame rear member |
| 2 Body main member | 5 Propeller shaft | 12 Minimum annular clearance
(Dimension C) |
| 3 Exhaust mount offset forward
to allow for exhaust system
movement when hot
(Dimension E) | 6 Transmission damper | 13 Body floor depression |
| | 7 Spring support | 14 Rear suspension crossmember |
| | 8 Final drive half-shaft | 15 Rear of body |
| | 9 Wheel arch | |
| | 10 Engine front crossmember | |
| A 3,112 cm. (1.225 in.) | E 0,475 cm. (0.187 in.) | H 2,413 cm. (0.950 in.) |
| B 3,571 cm. (1.406 in.) | F 1,905 cm. (0.750 in.) | J 2,540 cm. (1.000 in.) |
| C 1,270 cm. (0.500 in.) | G 2,444 cm. (0.962 in.) | K 1,334 cm. (0.525 in.) |
| D 0,793 cm. (0.312 in.) | | |

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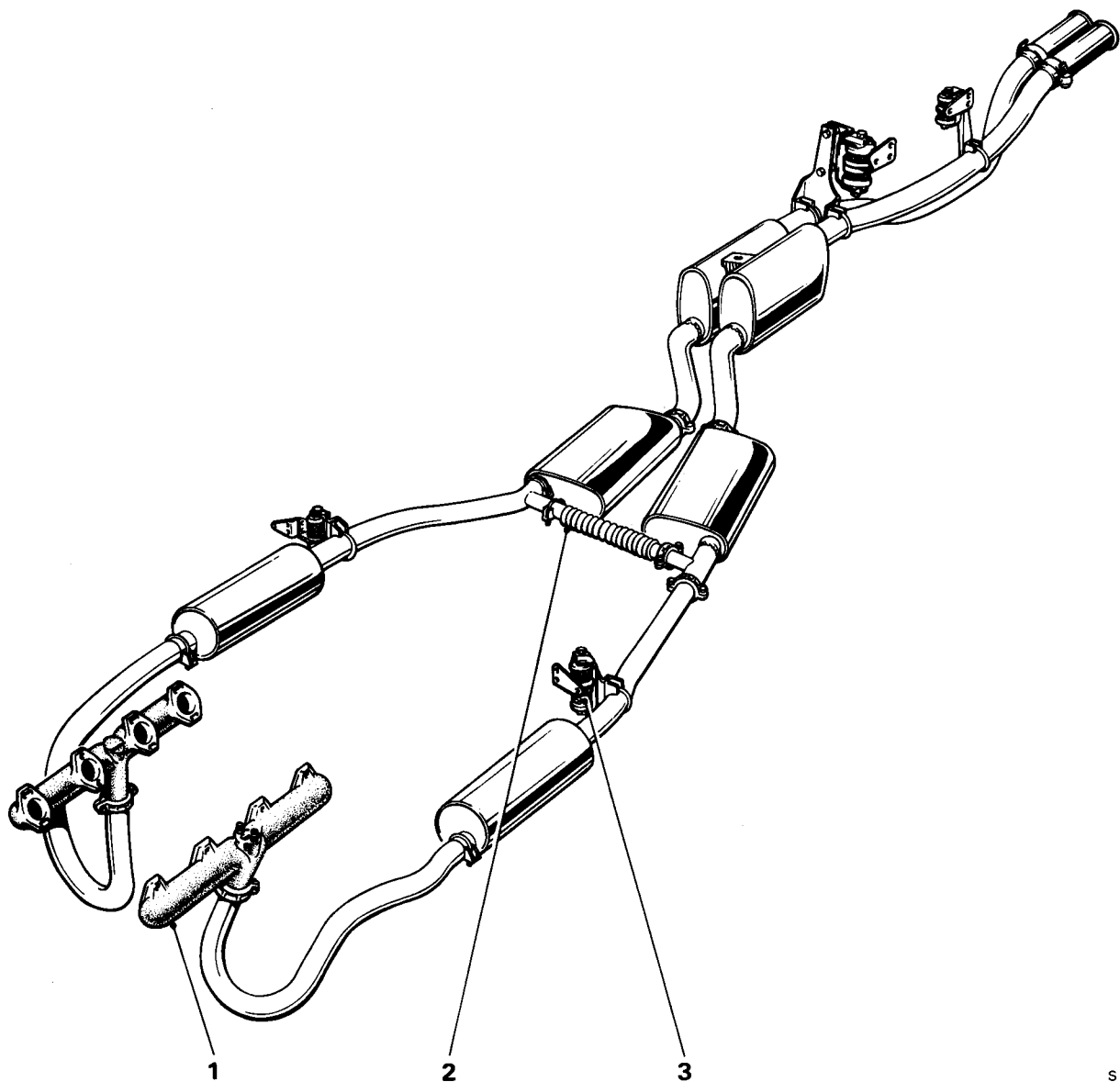
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Section Q3 EXHAUST PIPES and SILENCERS (Twin pipe, six box system)

Introduction

The pipes and silencers of this system are fitted to Corniche cars only, destined for countries other

than Australia, Canada, Japan and the U.S.A., from car serial numbers 22583 to 30000 (including 21729 and 21998).



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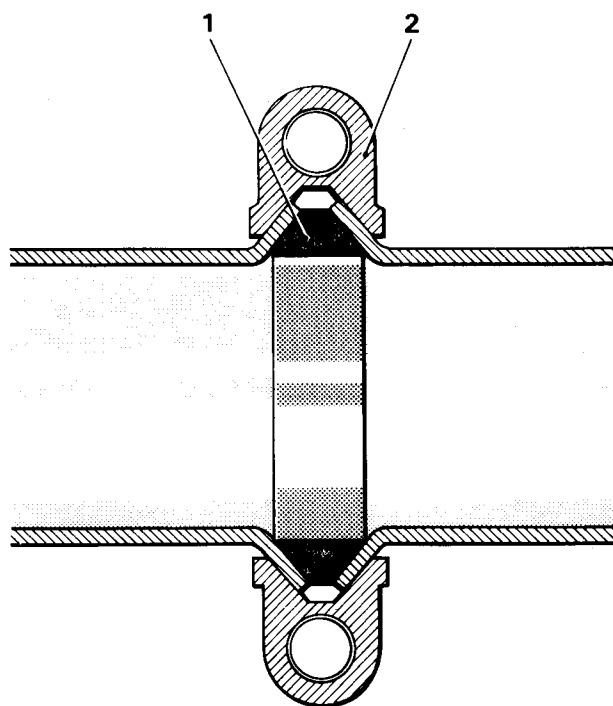
FIG. Q8 TWIN EXHAUST SYSTEM

1 Exhaust manifold

2 Intermediate balance pipe

3 Vibrashock mount

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FIG. Q9 FLARED EXHAUST PIPE - SPHERICAL JOINT

- 1 Seal ring
- 2 Joint clamp

Exhaust pipes and silencers - To remove (see Fig. Q8)

1. Drive the car onto a ramp; remove the gear range selector thermal cut-out from the fuseboard and chock the rear wheels. Raise to a convenient working height.
2. Detach the rear silencers and pipework at the spherical joints situated behind the intermediate silencers and also at the resilient metal mounts attached to the body underframe (see Fig. Q8). Remove the sealing rings.
3. Withdraw the rear section of the exhaust system.
4. Remove the 'U' clamp and spherical joint to detach the intermediate balance pipe (see Fig. Q9). Check all threads for damage and discard any 'U' clamps which are splayed.
5. Release the 'U' clamp to the 'A' bank intermediate silencer. Twist at the joint to break the seal and remove.
6. Detach the pipe attached to the rear of 'A' bank front silencer at the 'U' clamp and at the resilient metal mount situated behind the body cross-beam.

7. Unfasten the 'U' clamp attaching the 'A' bank front silencer to the downtake pipe. Twist at the joint to break the seal and withdraw.

8. Detach the 'B' bank intermediate silencer at the spherical joint just forward of the silencer body. Collect the sealing ring.

9. Unfasten the 'U' clamps at the pipe joint and at the resilient metal mount to release the length of pipe attached to the rear of 'B' bank front silencer.

10. Remove the 'B' bank front silencer by slackening the forward 'U' clamp (see Fig. Q8) at the sliding joint, twist the silencer to break the seal and withdraw.

11. To remove the downtake pipes, support at the lower end before attempting to release the spherical joint at the exhaust manifold.

Exhaust pipes and silencers - To fit

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

1. Ensure all pipes are a sliding fit into the silencer box stub pipe to allow for adjustment.
2. The arrow stamped on each silencer must point to the rear when the box is assembled into the system.
3. All sealing rings and pipes must be thoroughly clean and free from scale. If necessary, lightly dress with fine emery cloth.

To ensure free movement of the joints for correct alignment of the components when being assembled, the angular faces of the sealing rings and grooves in the spherical clamps should be smeared with a graphite lubricant.

The clamp bolt threads should be oiled to prevent binding.

4. Do not fully tighten the joints until the system has been fitted and manoeuvred to obtain the best run (free from possible fouls) with good joint alignment.
5. When the pipe runs are satisfactory, apply a sealant, such as Holts Firegum, into the ends of any straight tube joint especially covering the slits down the sides of the silencer stub pipes.

Important

Do not overtighten the 'U' clamps across the sliding joints as this could 'crimp' the inner and outer tubes together, causing difficult; when dismantling.

6. The rear silencers and tailpipes are fitted under the car as one unit assembled to the rear of the intermediate silencers by spherical clamps and sealing rings.

If however, in the intermediate or front system, only one component is to be replaced, the transfer is made easier as a bench operation. Ensure the

new component is left loose to facilitate manoeuvring the pipe run when the system is assembled to the car.

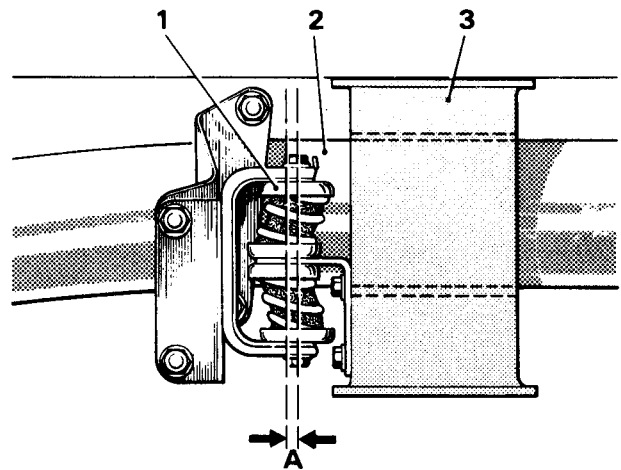
7. The resilient metal exhaust mounts must be set approximately 6,35 mm. (0.250 in.) forward before tightening the 'U' clamp around the exhaust pipe. This offset is to allow for thermal expansion of the system (see Fig. Q10).

Exhaust pipes and silencers - To inspect

Inspection should include an investigation to ensure that misalignment has not caused the exhaust system to bear on sub-frame, suspension, body, transmission or engine components, with resultant damage to any of these parts.

Individual exhaust components should be inspected at the flared ends of the pipes and for 'crimping' around the stub end pipes of some silencers.

Clamps should be checked to ascertain the freedom of all threads. Inspect each resilient metal mount assembly to ensure the spring mounts are working efficiently with the fixing brackets rigidly attached to the underbody.



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FIG. Q10 EXHAUST MOUNT - SHOWING OFFSET

- 1 Spring mount
- 2 Exhaust pipe
- 3 Body crossbeam
- A 6,35 mm. (0.250 in.)

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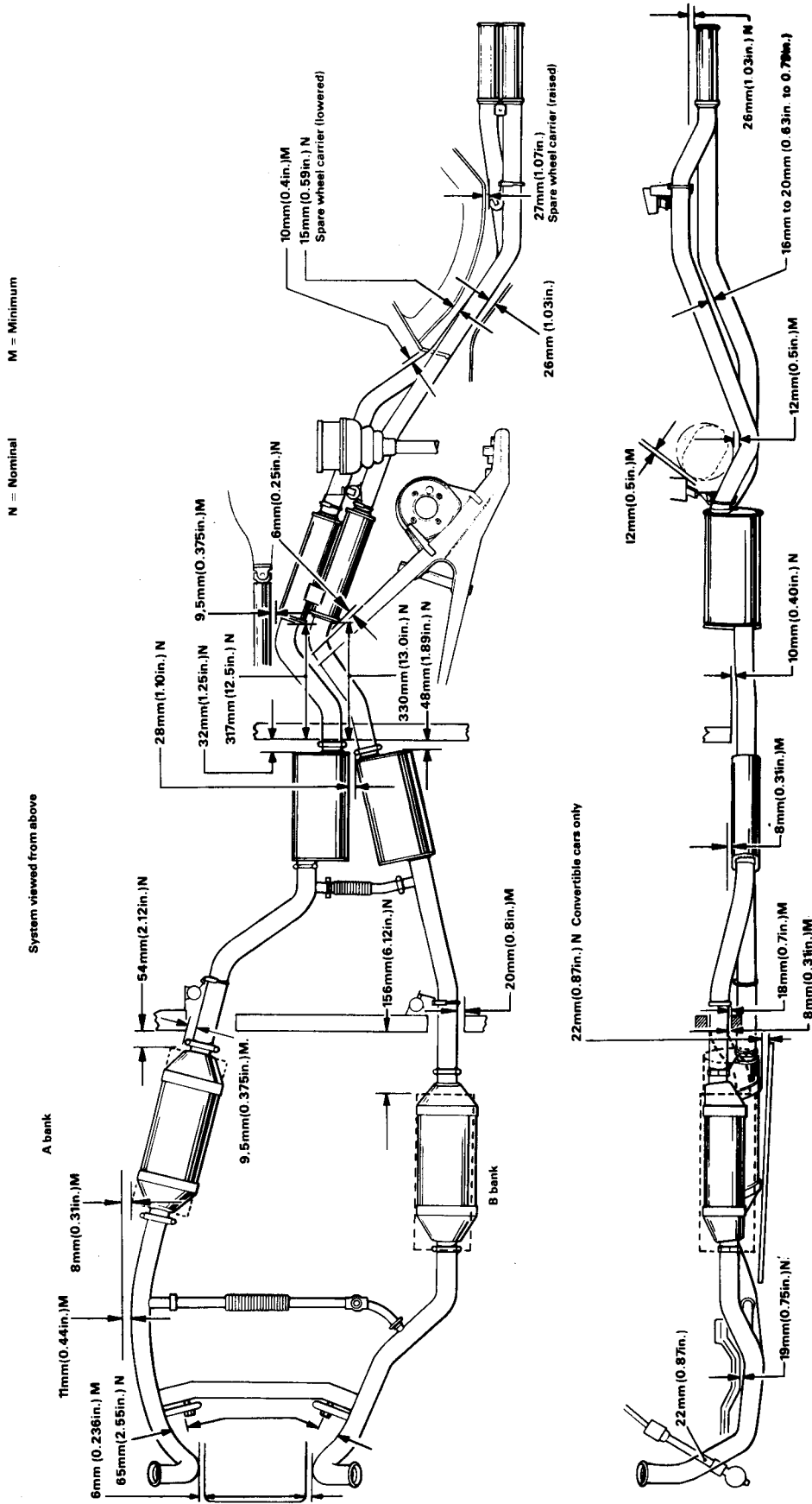


FIG. Q11 TWIN EXHAUST SYSTEM - CLEARANCE DIMENSIONS

Section Q4

EXHAUST MANIFOLDS

Exhaust manifolds - To remove

1. Support the downtake pipes just forward of the front silencer(s) with wood blocks and jacks.
2. Slacken and remove the bolts to the 'A' and 'B' bank downtake to manifold, spherical joints. Remove the clamps.
3. If fitted remove the two choke stove pipes from the unions located on 'B' bank manifold. Blank off the pipes to prevent ingress of dirt (see Fig. Q2 and Q11).
4. Remove the setscrews and distance pieces securing the manifolds to the cylinder heads, then detach the manifolds, taking care to retain the sealing rings from the downtake joints.
5. Discard the joints fitted between the manifolds and the cylinder heads.
6. Using a flat scraper remove all traces of carbon from the machined faces of the exhaust manifolds and the exhaust port faces on the cylinder heads. Extra care must be taken when scraping the cylinder heads not to damage the faces of the aluminium.
7. Blank off the ports in the cylinder heads to prevent the ingress of dirt and other foreign matter.

Note

The manifolds have 1,3 cm. (0.50 in.) long slotted holes on numbers 1, 2 and 4 flange faces on 'B' bank and numbers 1, 3 and 4 flange faces on 'A' bank. These holes allow for normal expansion and contraction without manifold distortion (see Fig. Q12 inset).

Exhaust manifolds - To inspect

1. The exhaust manifold should be checked for distortion by applying a straight edge across the joint face. Small irregularities should be corrected by dressing the face using abrasive cloth.

Note

Before re-facing, any scale on the joint faces should be carefully removed with a medium-cut file.

The importance of the manifold faces being flat and square cannot be over-emphasised.

Exhaust manifolds - To fit

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

1. Ensure all joint faces are free from scale

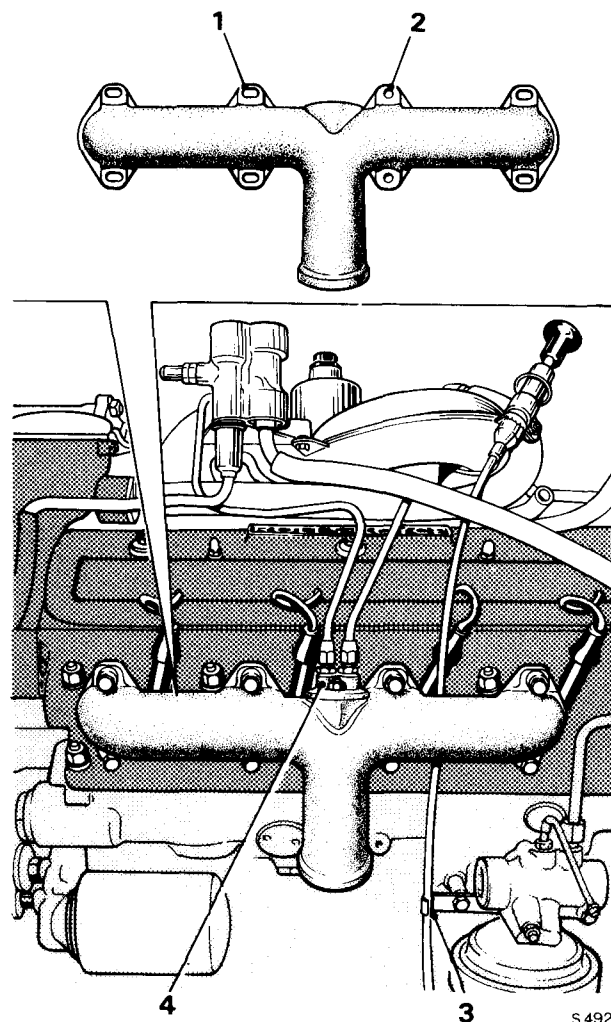


FIG. Q12 'B' BANK EXHAUST MANIFOLD WITH CENTRE OFF-TAKE

- 1 Elongated expansion hole
- 2 Location hole
- 3 Dipstick tube
- 4 Choke stove pipe (If fitted)

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and emery dust before being assembled.

2. The spherical seating faces of the manifold to downtake pipe joints may be lightly dressed with fine emery cloth before assembly.

3. Jointing compound must not be used on any of the manifold joints. The spherical joint clamp nuts of the manifold to downtake pipes should be lubricated with oil to ensure that the threads do not bind.

4. Smear the spherical seating faces of the sealing rings and the grooves in the spherical clamps with a graphite lubricant to assist in correct alignment when assembling.

5. All nuts and bolts should be tightened to the standard specified torque loadings (see Chapter P). Manifold setscrews must be tightened evenly, starting from the centre and working outwards.

6. 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, tightened again to the specified torque loadings (see Chapter P).