

180 Exhaust System

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GENERAL

The exhaust system is designed to be maintenance free, although regular inspection is warranted due to the harsh operating conditions. Under normal conditions, the catalytic converter does not require replacement unless it is damaged.

On 1996 and later cars, a pre- and post-catalytic converter oxygen sensor is used at each catalytic converter. Be sure to take care when removing the system not to damage the sensors.

See **130 Fuel Injection** for information on testing oxygen sensors.

NOTE —

On M52 engines, two resonator pipes (short and long) are incorporated into the rear muffler assembly. See Fig. 1. An exhaust flap is integrated into the outlet side of the short pipe. The flap is operated by a vacuum actuator via the Siemens MS 41.1 engine control module). The flap is closed at engine speeds below 2,500 rpm. This allows exhaust gasses to flow through the long resonator pipe and reduce noise. Above 2,500 rpm, the exhaust flap is open (no vacuum applied to the actuator) and allows exhaust gasses to flow through the short pipe for maximum performance.

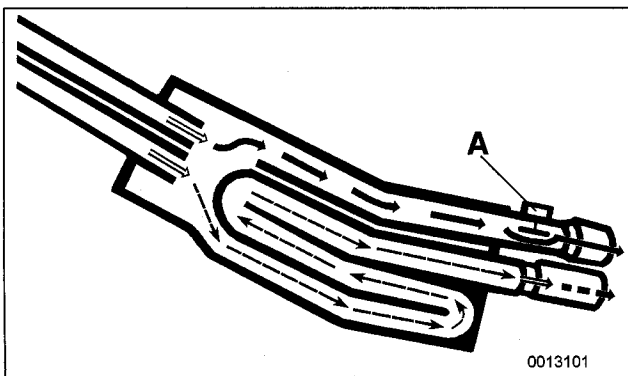


Fig. 1. Rear muffler (active silencer used on M52 engines). Vacuum operated flap (A) changes between short and long pipes, depending on engine speed.

WARNING —

Exhaust gases are colorless, odorless, and very toxic. Run the engine only in a well-ventilated area. Immediately repair any leaks in the exhaust system or structural damage to the car body that might allow exhaust gases to enter the passenger compartment.

EXHAUST SYSTEM REPLACEMENT

Exhaust system components are detailed in Fig. 2 through Fig. 4.

New fasteners, clamps, rubber mounts, and gaskets should be used when replacing exhaust components. A liberal application of penetrating oil to the exhaust system nuts and bolts in advance may make removal easier.

WARNING —

- The exhaust system and catalytic converter operate at high temperatures. Allow components to cool before servicing. Wear protective clothing to prevent burns. Do not use flammable chemicals near a hot catalytic converter.
- Old, corroded exhaust system components crumble easily and often have exposed sharp edges. To avoid injury, wear eye protection and heavy gloves when working with old exhaust parts.

180-2 EXHAUST SYSTEM

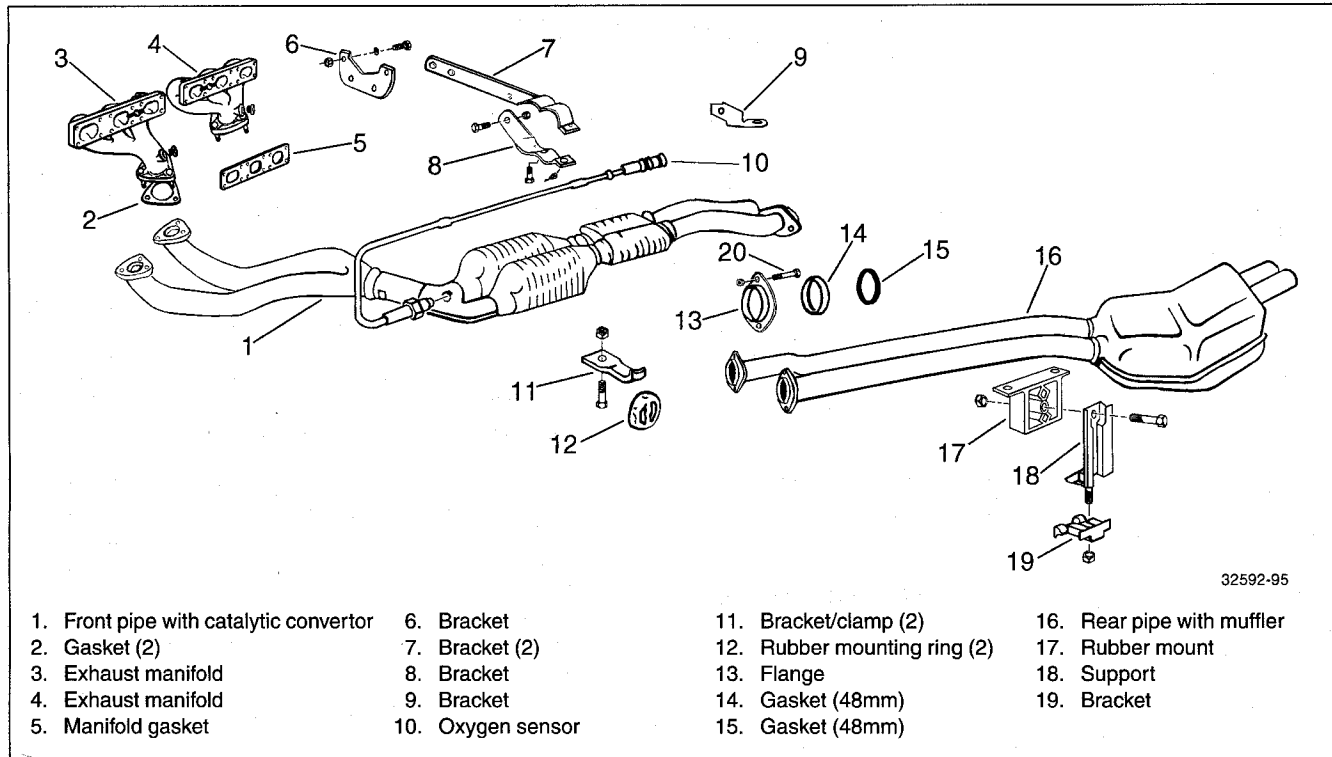


Fig. 2. Exhaust system on 1992-1995 6-cylinder engines. 325i (M50) exhaust system shown.

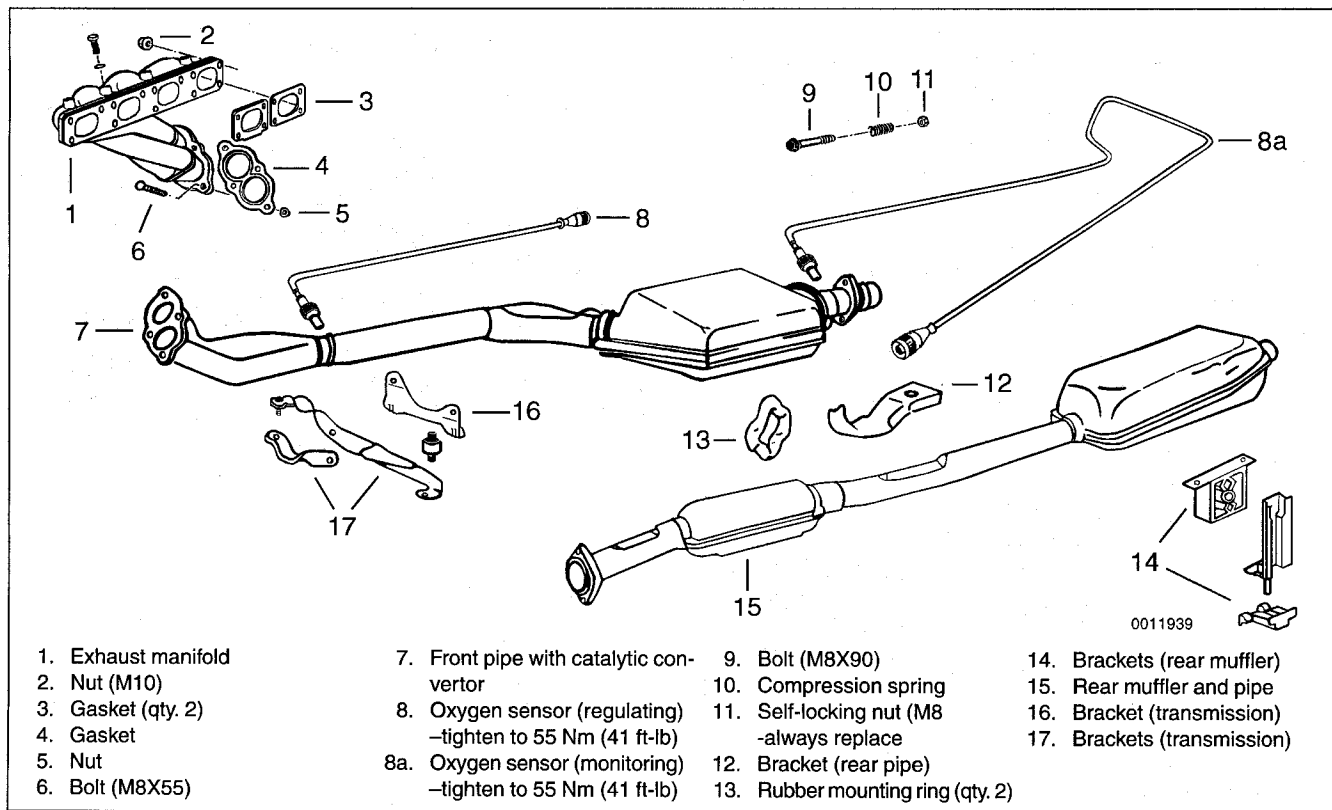
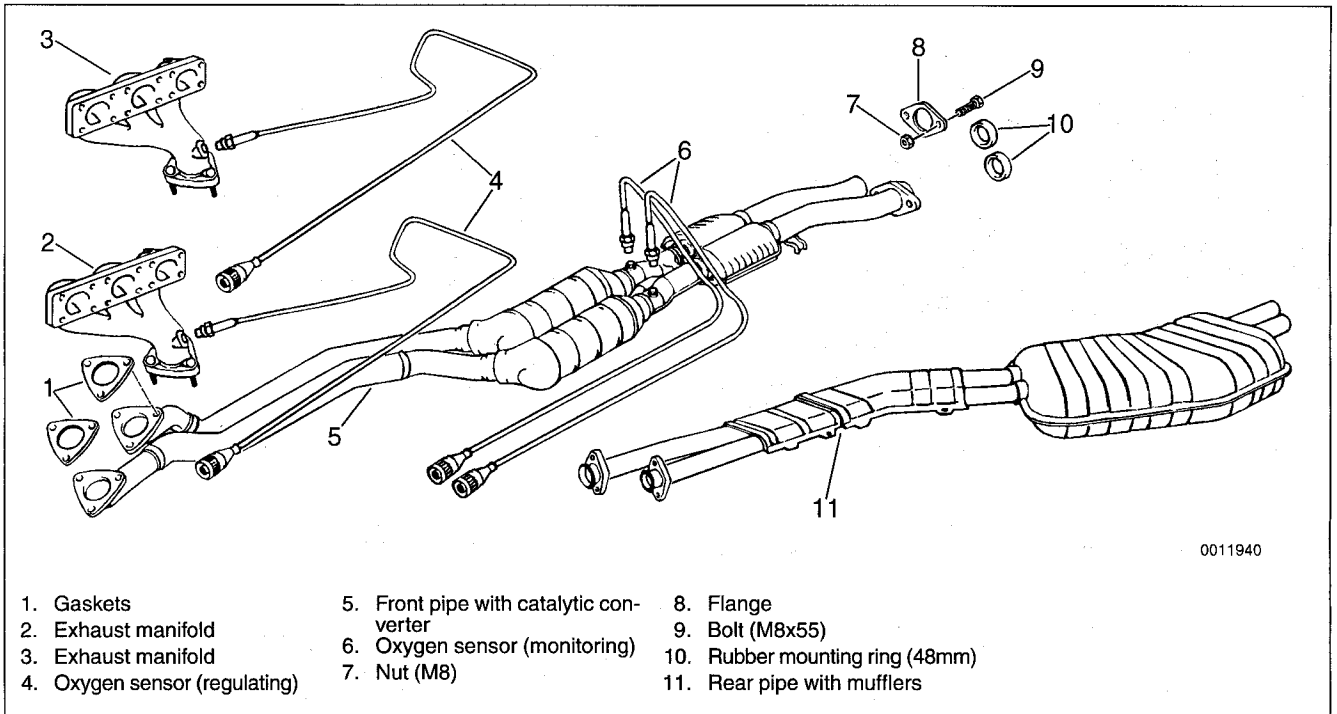


Fig. 3. Exhaust system on 1996-1998 4-cylinder (M44) engine. 1992-1995 4-cylinder engine exhaust system is similar.

EXHAUST SYSTEM REPLACEMENT



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Fig. 4. Exhaust system on 1996-1998 6-cylinder engines. M3 (S50US) exhaust system shown.

Exhaust system, removing and installing

This section covers removing the exhaust system as a complete unit. Once the system is removed from the car, individual pipes and mufflers can be more easily replaced.

1. With exhaust system fully cold, raise and support car for access to exhaust system.

WARNING —

Do not work under a lifted car unless it is solidly supported on jack stands designed for that purpose. Never work under a car that is supported solely by a jack.

2. Disconnect oxygen sensor connector(s).

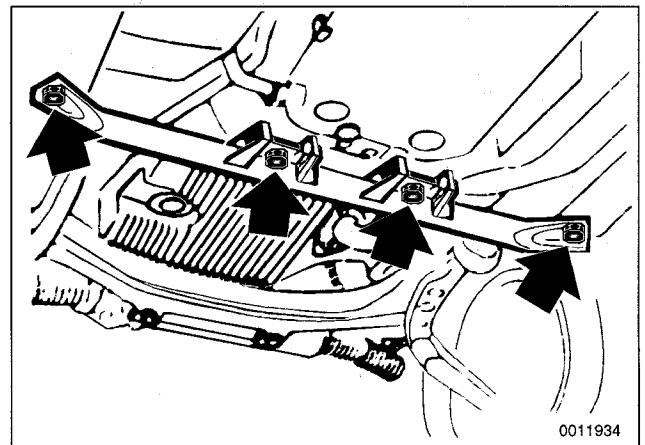
NOTE —

On 1996 and later cars with multiple oxygen sensors, label the oxygen sensor connectors before disconnecting.

3. Loosen and remove bolts holding front exhaust pipes to exhaust manifolds.
4. Where applicable, remove support brace from transmission. See Fig. 5.

NOTE —

The automatic transmission will be supported by the rear crossmember once the brace is removed.



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Fig. 5. Cross brace mounting bolts (arrows).

5. Disconnect exhaust support bracket assembly from transmission. See Fig. 6.
6. Support exhaust system from below and disconnect rubber supports/rubber rings from exhaust system. Remove exhaust system from below. See Fig. 7.

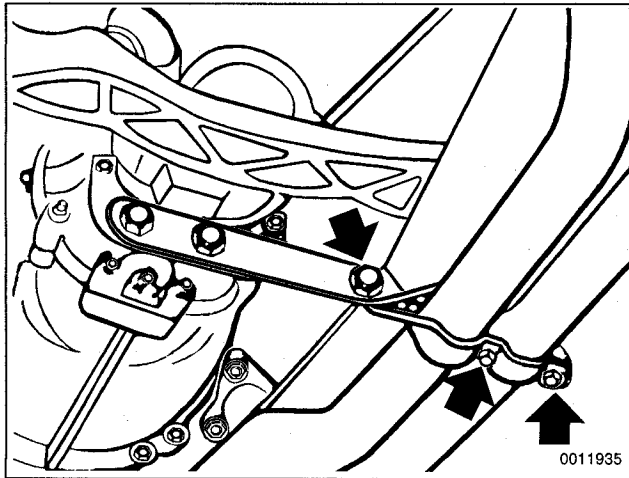


Fig. 6. Exhaust system support bracket on 6-cylinder engine. Remove bolts (**arrows**) to separate from exhaust pipe.

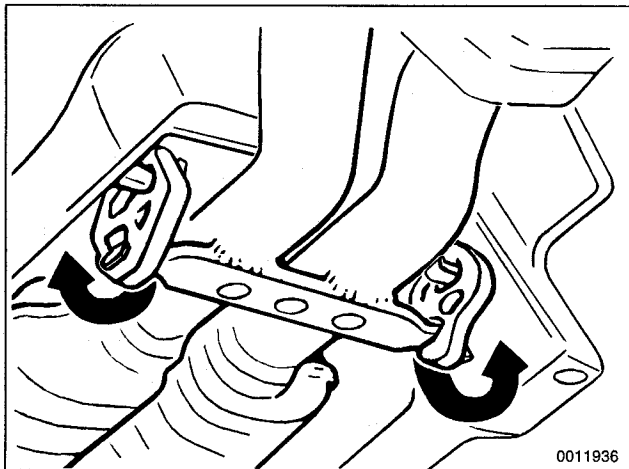


Fig. 7. Rubber exhaust system hangers. Remove hanger by prying off bracket (**arrows**).

7. Installation is reverse of removal.

- Where necessary, transfer parts from old system to replacement system.
- Coat manifold studs with copper paste before installing nuts.
- Where applicable, tighten front pipe with semi-flexible compensator last when installing front pipe to manifolds.
- Make sure there is at least 20 mm ($\frac{3}{4}$ in.) of clearance between exhaust system and car body at every point.
- Loosely install all exhaust system mounting hardware and hangers before tightening fasteners to their final torque.
- On 4-cylinder engines: Tighten center mounting flange nuts evenly until correct dimension is obtained. See Fig. 8.

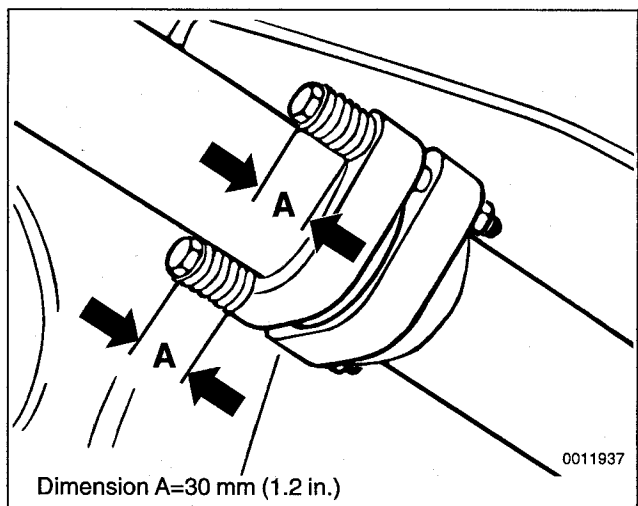


Fig. 8. On 4-cylinder engines, tighten nuts evenly so that springs are preloaded to **Dimension A**.

NOTE —

To prevent exhaust system rattles and vibration, preload the rear clamping brackets in the forward direction. See Fig. 9.

Tightening Torques

- Cross brace to chassis 21 Nm (17 ft-lb)
- Exhaust support bracket to transmission 21 Nm (17 ft-lb)
- Exhaust system mounting clamps . . . 15 Nm (11 ft-lb)
- Front exhaust pipe to exhaust manifold M10 nut 30 Nm (22 ft-lb)
- Front exhaust pipe to rear pipe M8 bolt/nut 22 Nm (16 ft-lb) with compression spring. See Fig. 8
- Oxygen sensor to exhaust pipe 55 Nm (41 ft-lb)

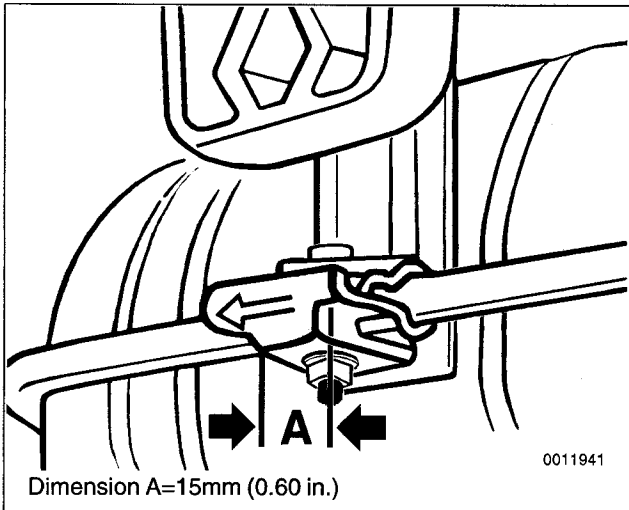


Fig. 9. Preload rear clamping bracket as specified to help prevent system rattling.

Exhaust manifolds, removing and installing

Always use new retaining nuts and gaskets when removing and installing the exhaust manifolds.

1. With exhaust system cold, raise and support car for access to exhaust system.

WARNING —

Do not work under a lifted car unless it is solidly supported on jack stands designed for that purpose. Never work under a car that is supported solely by a jack.

2. On 1996 and later 6-cylinder engines, disconnect the secondary air check valve and pipe from the exhaust manifold.
3. Unbolt front exhaust pipe(s) from exhaust manifold(s).
4. Remove exhaust support bracket from transmission.
5. Loosen and remove nuts from exhaust manifolds and remove manifolds. Discard nuts and gaskets.

NOTE —

On cars with oxygen sensors mounted in the exhaust manifolds, use care when removing manifolds. To be safe, remove the sensors from the manifolds before removing manifolds.

6. Installation is reverse of removal.
 - Coat exhaust manifold mounting studs with copper paste before installing new nuts.
 - Install manifold gaskets with arched side facing manifolds.

Tightening Torques

- Exhaust manifold to cylinder head

| | | |
|----------------------------|-------|------------------|
| 4-cylinder engine (M7 nut) | | 15 Nm (11 ft-lb) |
| 6-cylinder engine (M7 nut) | | 20 Nm (15 ft-lb) |



