

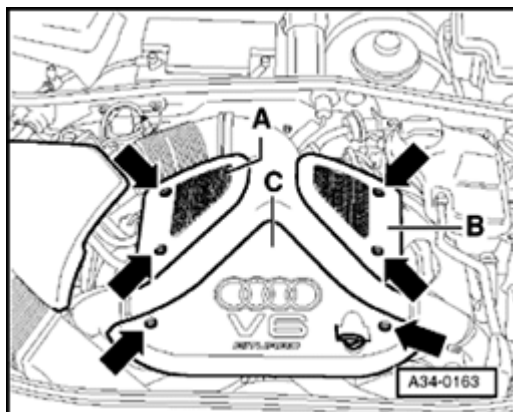
Exhaust system components, removing and installing

Note:

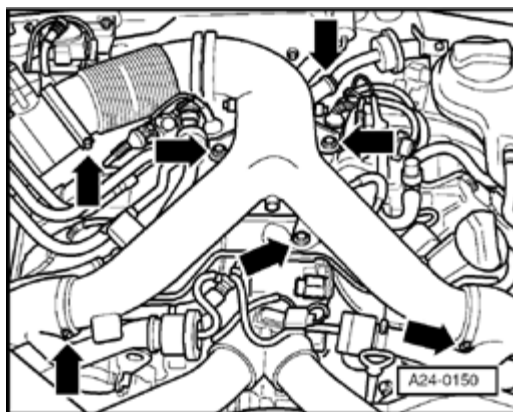
- ◆ *Removing and installing exhaust manifold ⇒ [Page 26-8](#) .*
- ◆ *After working on the exhaust system make sure that the system is not under stress, and that it has sufficient clearance from the bodywork. If necessary, loosen double and single clamps and align muffler and exhaust pipe so that sufficient clearance is maintained to the bodywork and the support rings are evenly loaded.*
- ◆ *Stress-free alignment of exhaust system ⇒ [Page 26-16](#) .*
- ◆ *Replace self-locking nuts.*

Catalytic converter, removing and installing

Removing



- A** - Remove bolts -arrows- and take off engine cover panels -A ... C-.



- A** - Remove air distributor component -arrows-.

Right-hand catalytic converter:

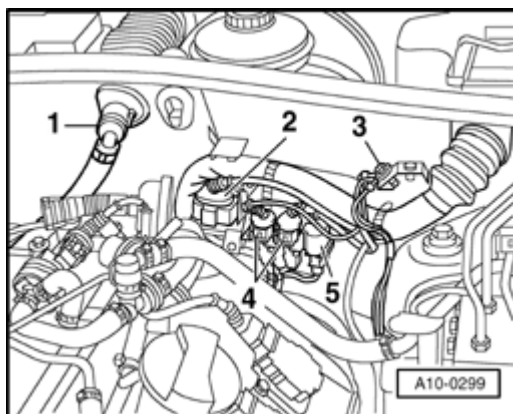
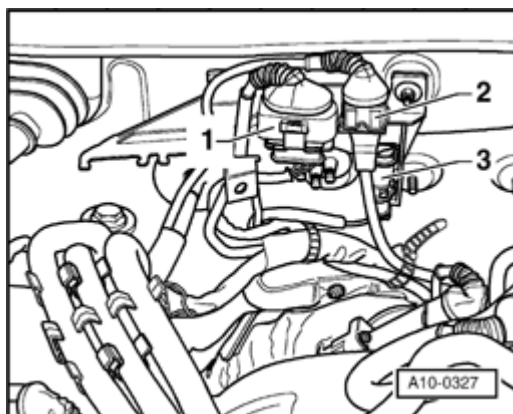


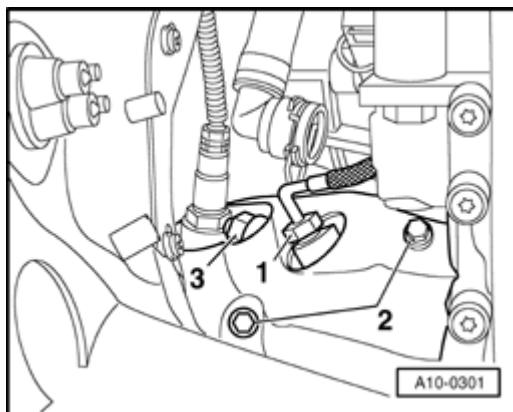
- Disconnect connector -1- for oxygen sensor at bulkhead.

Left-hand catalytic converter:

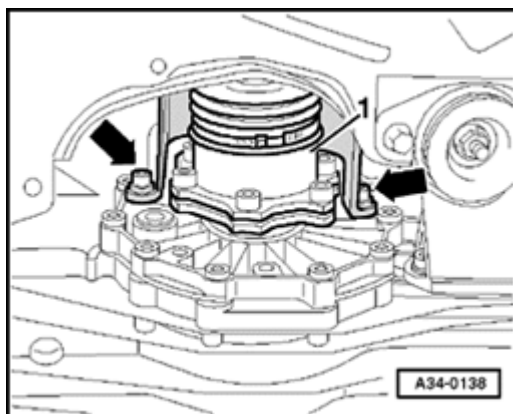


- Disconnect connector -2- for oxygen sensor at bulkhead.

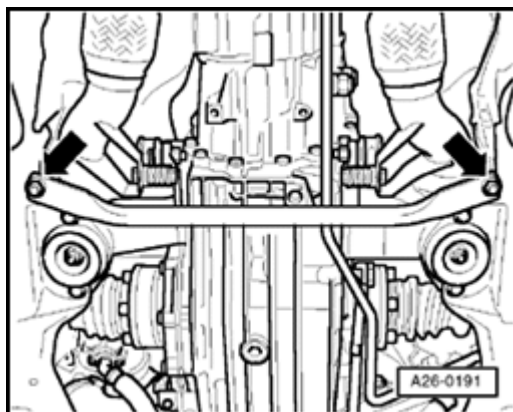




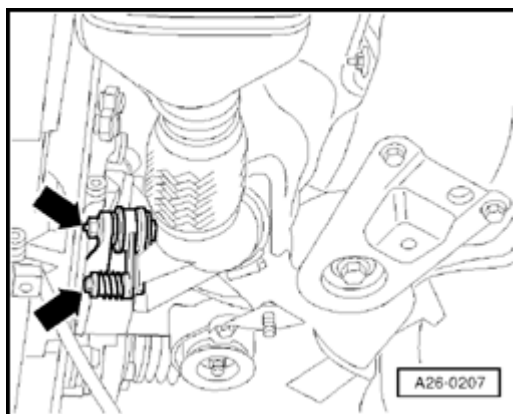
- A**
- Unbolt heat shield -2- on turbocharger.
 - Remove upper bolt -3- securing front exhaust pipe to turbocharger.



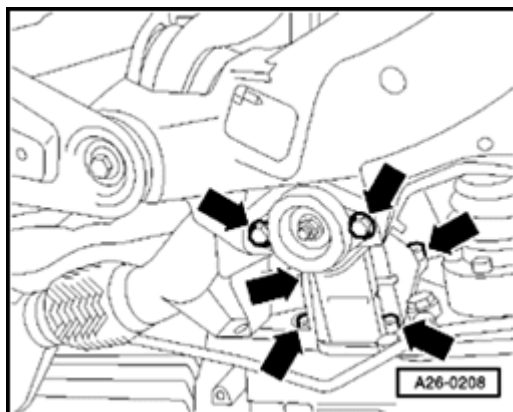
- A**
- Unbolt guard plate -arrows- above drive shaft from transmission.
 - Unbolt drive shaft -1- at transmission and tie up.



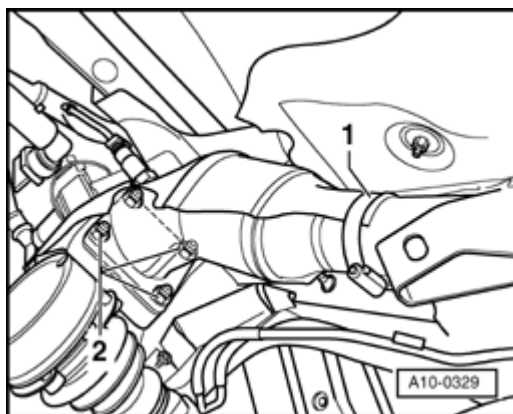
A - Remove cross strut -arrows-.



A - Remove retainers -arrows-.



- A**
- Remove transmission support -arrows-.
 - Loosen exhaust system clamp and push clamp towards muffler.



- A**
- Loosen hose clamp -1- on turbocharger heat shield.
 - Unbolt exhaust pipe -2- from turbocharger.

Note:

Avoid excessive bending of the flexible pipe connection (de-coupling element) on the front exhaust pipe. The angle between the catalytic converter and the front exhaust pipe must not exceed 10°, otherwise the flexible connection will be damaged.

Installing

- Install in reverse order.

Note:

The double clamp must be replaced after removing the bolted connection.

- Adjust exhaust system ⇒ [Page 26-16](#) .

Exhaust manifold, removing and installing

Removing

- Remove engine ⇒ [Page 10-2](#) .
- Remove turbocharger ⇒ [Page 21-1](#)
- Unbolt exhaust manifold.

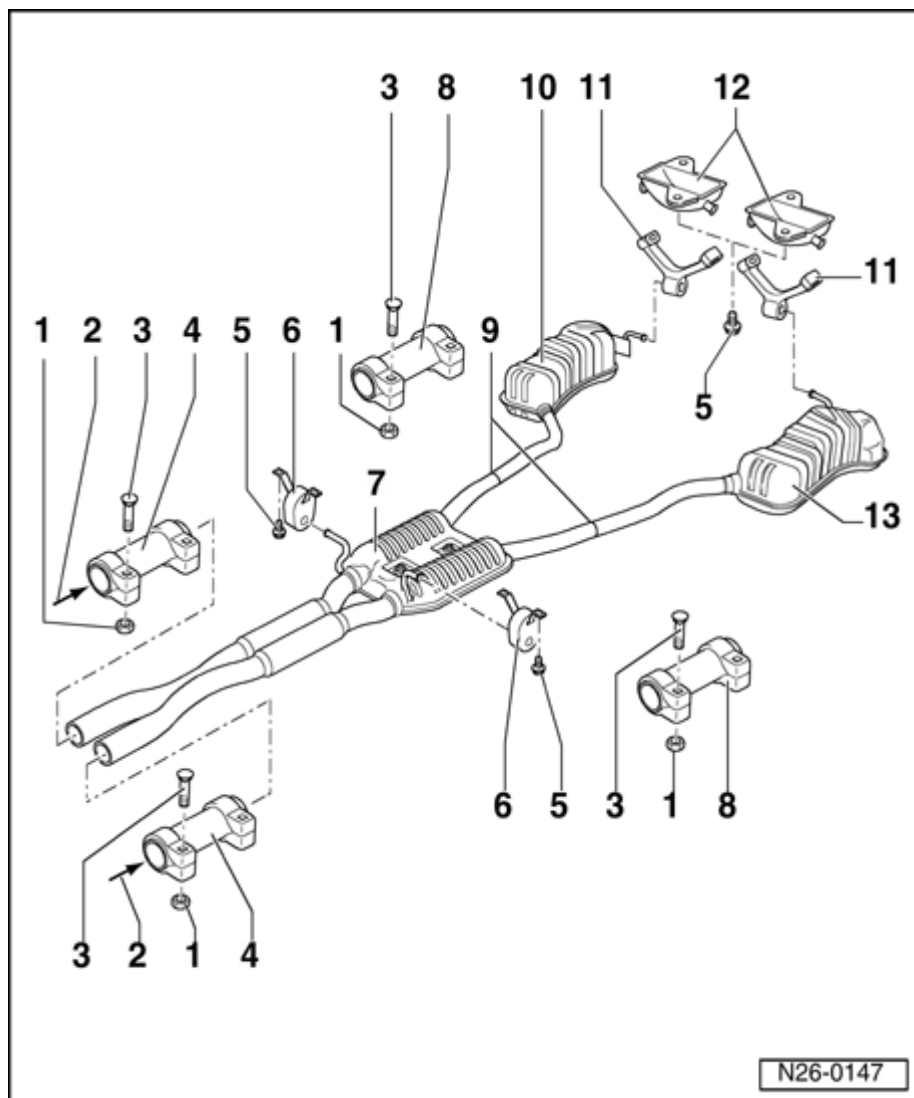
Installing

Note:

- ◆ *Replace self-locking nuts.*
- ◆ *Replace gaskets.*
- Install in reverse sequence.

Tightening torques

Bolted mountings	Tightening torques
Exhaust pipe between exhaust manifold and turbocharger	25 Nm
Exhaust pipe with catalytic converter to turbocharger	25 Nm
Exhaust manifold to cylinder head	25 Nm
Exhaust pipe to transmission	25 Nm
Catalytic converter to front muffler	25 Nm
Heat shield to turbocharger	10 Nm



Mufflers with mountings

1 - 40 Nm

2 - From catalytic converter

3 - Flat-head bolt

4 - Double clamp

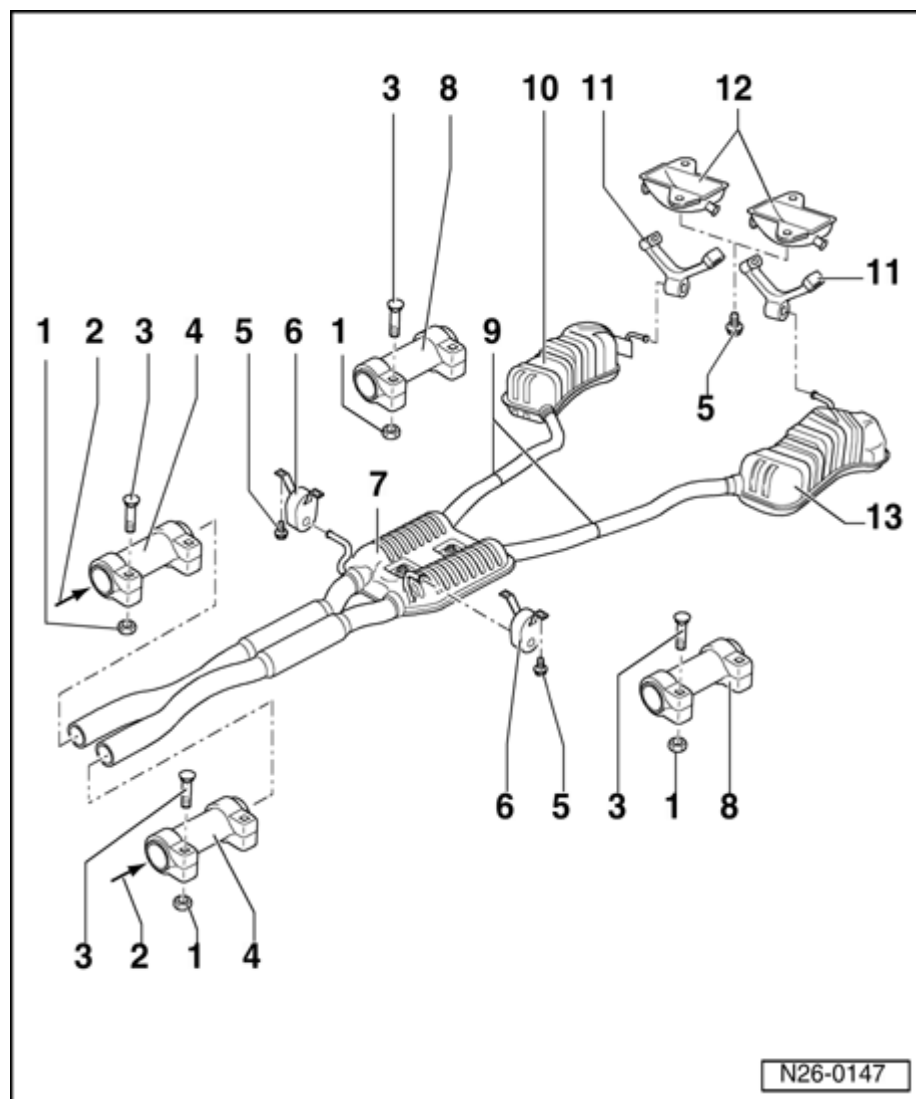
5 - 25 Nm

6 - Mounting

◆ With retaining ring

7 - Front muffler

8 - Double clamp (for repairs)



9 - Separating point

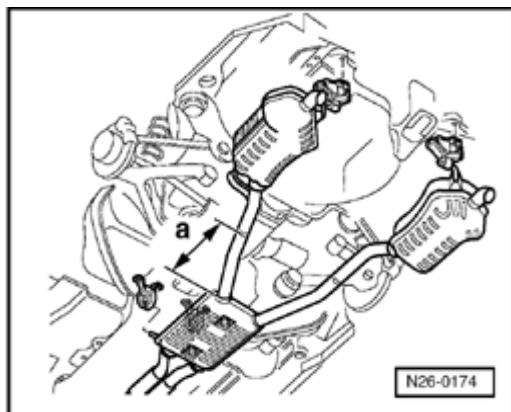
- ◆ The front and rear mufflers are installed as one component when the vehicle is built. For repairs, the front muffler and rear muffler can be replaced separately and connected with a double clamp.
- ◆ Cutting through connecting pipe ⇒ [Fig. 1](#)

10 - Rear muffler (right)

11 - Mounting

12 - Bracket

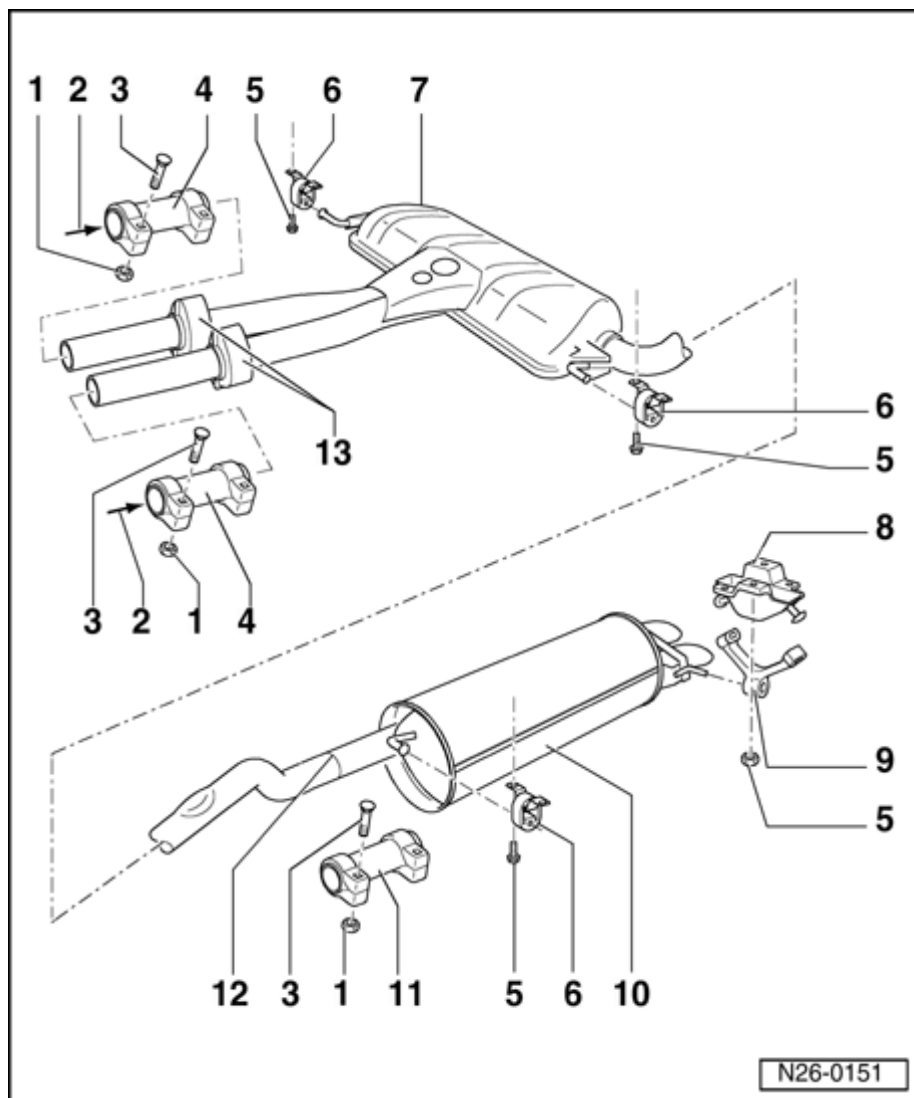
13 - Rear muffler (left)



A

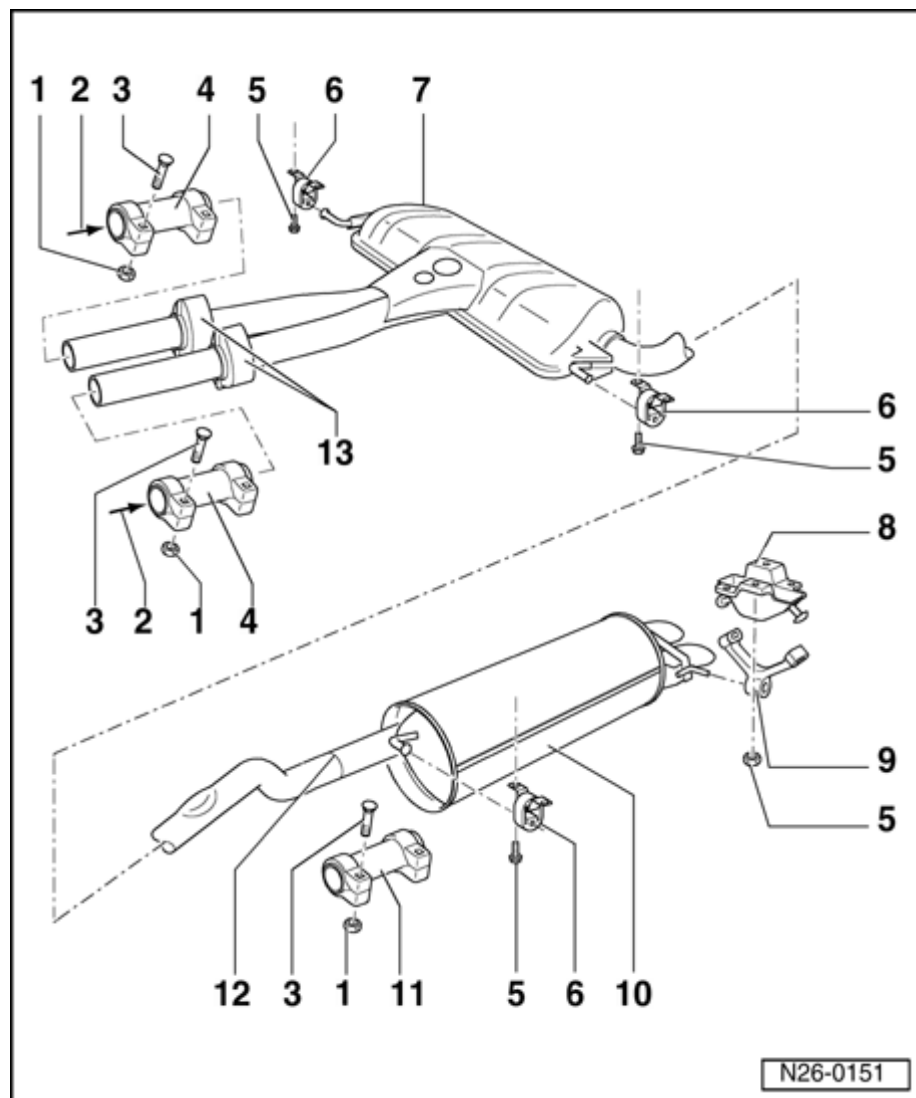
Fig. 1 Separating point in connecting pipe for separate replacement of front and rear mufflers

- ◆ The separating point is marked by an indentation on the outside of the exhaust pipe.
 - Cut through exhaust pipe at right angles with body saw (e.g. VAG 1523) at the position marked.
- Distance -a- = approx. 244 mm



Vehicles with front wheel drive

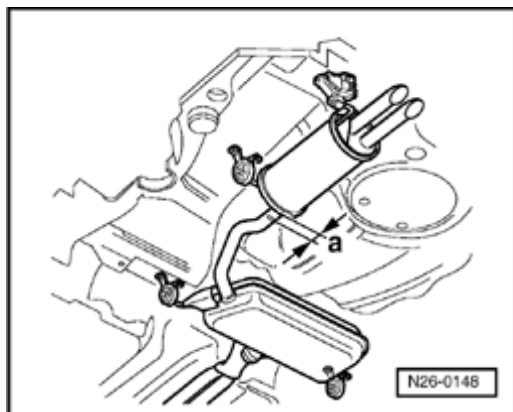
- 1 - 40 Nm
- 2 - From catalytic converter
- 3 - Flat-head bolt
- 4 - Double clamp
- 5 - 25 Nm
- 6 - Mounting
 - ◆ With retaining ring
- 7 - Front muffler
- 8 - Bracket
- 9 - Mounting
- 10 - Rear muffler
- 11 - Double clamp (for repairs)



12 - Separating point

- ◆ Front and rear mufflers are installed as one component when vehicle is built. For repairs, front muffler and rear muffler can be replaced separately and connected with a double clamp.
- ◆ Cutting through connecting pipe ⇒ [Fig. 1](#)

13 - Auxiliary mufflers



A

Fig. 1 Separating point in connecting pipe for separate replacement of front and rear mufflers

- ◆ The separating point is marked by an indentation on the outside of the exhaust pipe.
 - Cut through exhaust pipe at right angles with body saw (e.g. VAG 1523) at the position marked.
- Distance -a- = approx. 182 mm

Exhaust system, aligning free of stress

Align the exhaust system as follows to avoid stresses in the system and prevent the transmission of noise into the body:

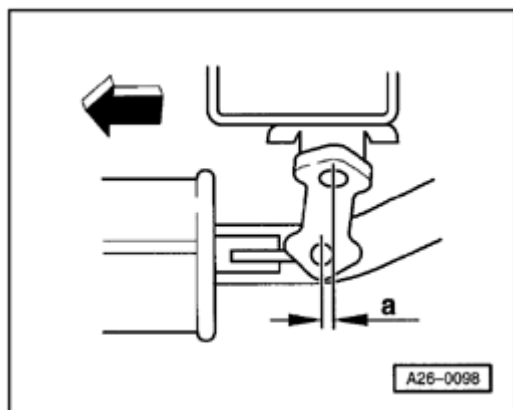
Note:

- ◆ *Before assembling the exhaust system, the front exhaust pipes and the catalytic converters must be aligned accurately and secured.*
- ◆ *Loosen all bolted connections on the exhaust system (except exhaust manifold and flange mountings, catalytic converter/intermediate pipe).*
- ◆ *The exhaust system must be aligned when it is cold.*
- ◆ *Keep to the sequence described below.*
- ◆ *The dimensions in the illustrations are approximate.*

Vehicles with front-wheel drive:

- Vehicles without clamp between front muffler and rear muffler

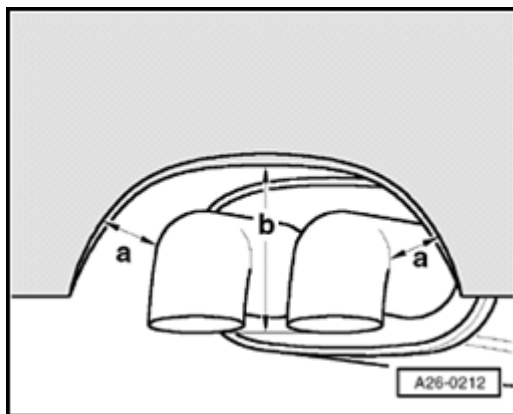
- Loosen bolted connections on front clamps between catalytic converters and front muffler.



A

- Push exhaust system towards front of vehicle -arrow- so that rear mounting of rear muffler is pre-loaded by amount $a = 7 - 9$ mm.
- Tighten bolts on front clamps between catalytic converters and front muffler evenly to 40 Nm; installation position \Rightarrow [Page 26-23](#) .

Aligning tailpipes:



A

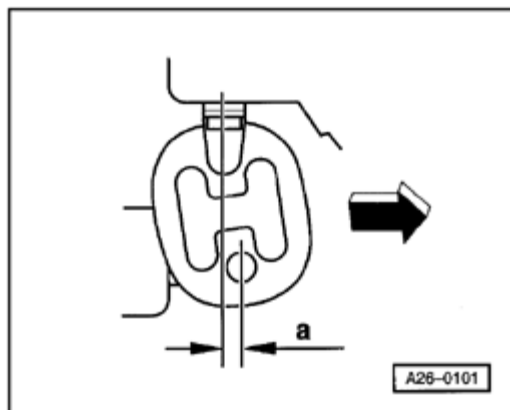
- Align tailpipes so that distance -a- is same on both sides.
- At same time, set distance -b- between bumper cut-out and bottom of tailpipes:
 - ◆ Distance $b = 97 - 103$ mm

- Vehicles with clamp between front muffler and rear muffler

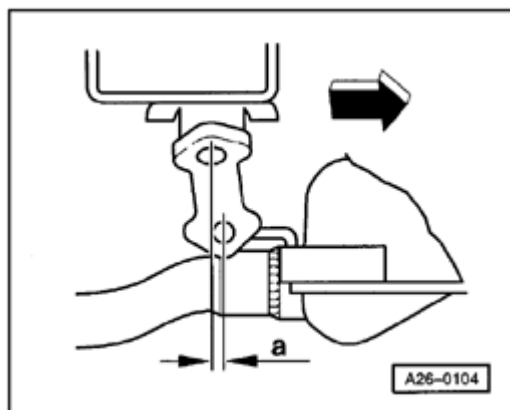
Note:

It is only necessary to additionally align the front muffler on vehicles with clamp installed between front muffler and rear muffler.

- Loosen bolted connections on front clamps between catalytic converters and front muffler.
- Loosen bolted connections on rear clamp between front muffler and rear muffler.
- Push exhaust system towards front of vehicle -arrow- so that rear left mounting on front muffler is preloaded by $a = 7 - 9$ mm.
- Tighten bolts on front clamps between catalytic converters and front muffler evenly to 40 Nm; installation position \Rightarrow [Page 26-23](#) .



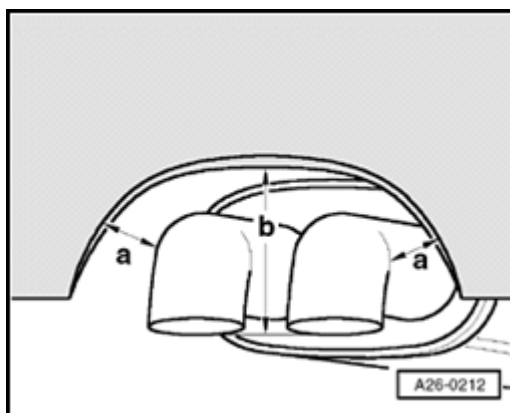
A



A

- Push rear muffler towards front of vehicle -arrow- so that rear right mounting on rear muffler is preloaded by $a = 7 - 9$ mm.
- Tighten bolted connections on rear clamp between front muffler and rear muffler evenly to 40 Nm; installation position \Rightarrow [Page 26-23](#) .

Aligning tailpipes:



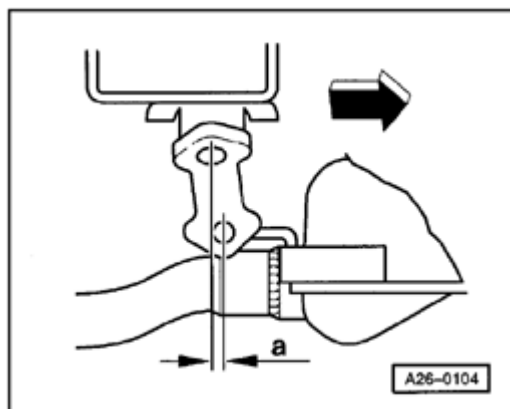
A

- Align tailpipes so that distance -a- is same on both sides.
- At same time, set distance -b- between bumper cut-out and bottom of tailpipes:
 - ◆ Distance $b = 97 - 103$ mm

Vehicles with four-wheel drive:

- Vehicles without clamp between front muffler and rear muffler

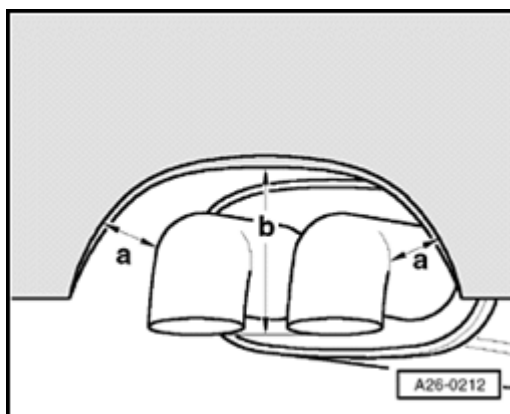
- Loosen bolted connections on front clamps between catalytic converters and front muffler.



A

- Push exhaust system towards front of vehicle -arrow- so that right rear mounting on rear muffler is preloaded by $a = 9 - 11$ mm.
- Tighten bolts on front clamps between catalytic converters and front muffler evenly to 40 Nm; installation position \Rightarrow [Page 26-23](#) .

Aligning tailpipes:



A

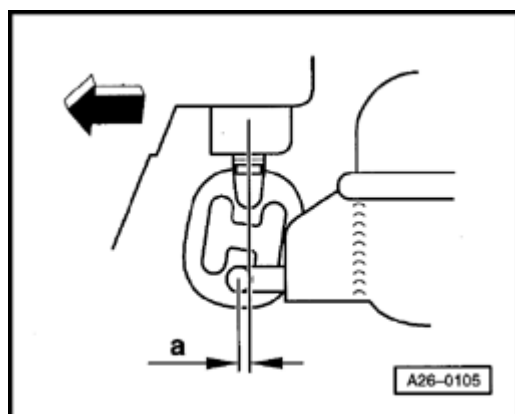
- Align tailpipes so that distance -a- is same on both sides.
- At same time, set distance -b- between bumper cut-out and bottom of tailpipes:
 - ◆ Distance $b = 97 - 103$ mm

- Vehicles with clamp between front muffler and rear muffler

Note:

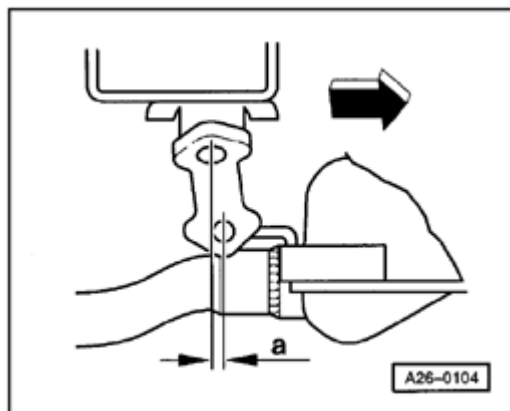
It is only necessary to additionally align the front muffler on vehicles with clamp installed between front muffler and rear muffler.

- Loosen bolted connections on front clamps between catalytic converters and front muffler.



A

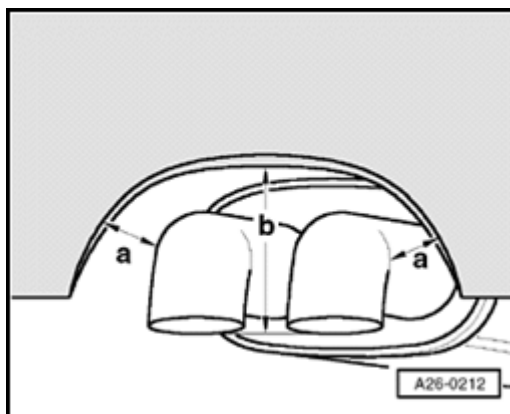
- Push exhaust system towards front of vehicle -arrow- so that rear left mounting on front muffler is preloaded by $a = 7 - 9$ mm.
- Tighten bolts on front clamps between catalytic converters and front muffler evenly to 40 Nm; installation position \Rightarrow [Page 26-23](#) .



A

- Push rear muffler towards front of vehicle -arrow- so that right rear mounting on rear muffler is preloaded by $a = 9 - 11$ mm.
- Tighten bolted connections on rear clamp between front muffler and rear muffler evenly to 40 Nm; installation position \Rightarrow [Page 26-23](#) .

Aligning tailpipes



A

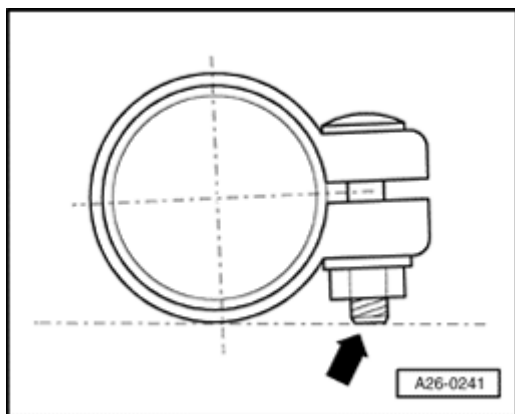
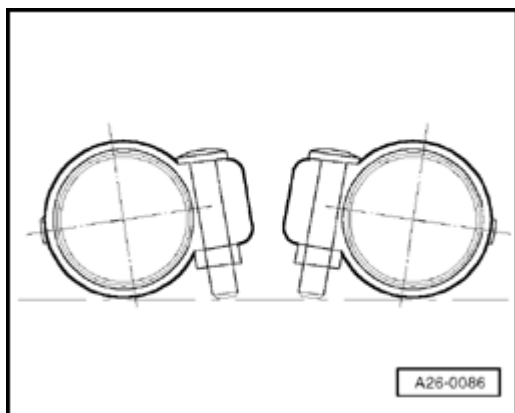
- Align tailpipes so that distance -a- is the same on both sides.
- At the same time, set distance -b- between bumper cut-out and bottom of tailpipes:
 - ◆ Distance $b = 97 - 103$ mm

Installation position of double clamp at front

- ⚠ The ends of the bolts must not project below the bottom of the clamp.

Installation position of double clamp at rear

- ⚠ The ends of the bolts must not project below the bottom of the clamp.

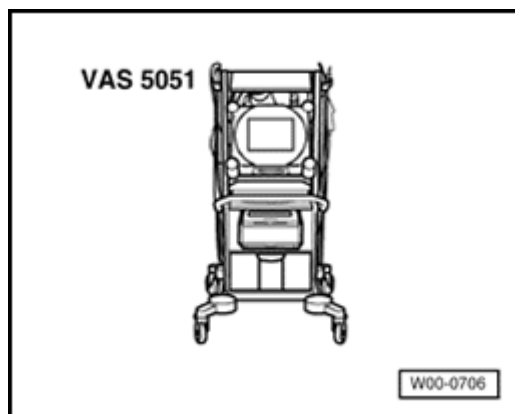


Exhaust system, checking for leaks

- Start engine and run at idling speed.
- Plug tailpipe (e. g. with rag or stopper) and leave plugged until check is complete.
- Listen for noise at connection points (cylinder head/manifold, manifold/turbocharger, turbocharger/catalytic converter, etc.) to locate any leaks.
- Correct any leaks that are found.

Exhaust gas temperature sensor, checking function

Special tools and equipment



A

- ◆ VAS 5051 with VAG 5051/1
or
- ◆ VAG 1551 with VAG 1551/3A

Test requirement:

- Coolant Temperature at least 80° C.

WARNING!

- ◆ **During a road test in an airbag-equipped vehicle, test equipment must always be fastened to and operated from the rear seat by a second technician.**
- ◆ **When driving or riding in an airbag-equipped vehicle, NEVER hold the scan tool or other test equipment in your hands or lap while in motion. Objects between you and the airbag increase the risk of injury in an accident.**

Test sequence

- Connect VAS 5051 tester or VAG 1551 scan tool and select control module for engine electronics using "address word" 01 Engine must run at idle for this.

⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Fuel Injection & Ignition, Engine Code(s): APB; Repair Group 01*

Rapid data transfer HELP
Select function XX

⚠ When indicated on display

- Press buttons -0- and -8- to select "Read Measuring Value Block" and press -Q- button to confirm input.

Read Measuring Value Block Q
Input display group number XXX

⚠ When indicated on display

- Press buttons -1-, -1- and -2- to select "display group number 112" and press -Q- button to confirm input.

Read Measuring Value Block 112 →
1 2 3 4

⚠ Indicated on display (1 - 4 = display fields)

- Check exhaust gas temperature.

- Road test vehicle to check exhaust gas temperature.

◆ Wide Open Throttle (WOT) at engine speeds between 5000 - 6500 RPM

must be reached.

Note:

Exhaust gas temperature must rise to above 980

° C so that regulation sets in. Values below 945

° C are displayed as 945° C.

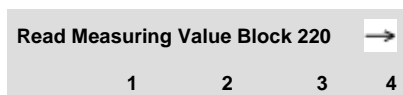
	Display fields			
	1	2	3	4
Display group 112: Exhaust temperature				
Display	° C	%	° C	%
Indicated	Exhaust temperature, Bank 1	Enrichment factor, Sensor, Bank 1	Exhaust temperature, Bank 2	Enrichment factor, Sensor, Bank 2
Specified value	980 ¹⁾	9.0 ± 5 ²⁾	980	9.0 ± 5
Note:	Regulation does not begin until temperatures above 980° C	If the enrichment factor is above 30%, there is a malfunction	Regulation does not begin until temperatures above 945° C	If the enrichment factor is above 30%, there is a malfunction

- 1) During oscillation stage, values around 1025 ° C may be displayed briefly.
- 2) During oscillation stage, values of 25% may be displayed briefly.

If values above 20% are displayed constantly, then

- ◆ Fuel pressure may be too low,
- ◆ Mass air flow sensor signal may be too small.

- Select measuring value block 220.



Indicated on display (1 - 4 = display fields)


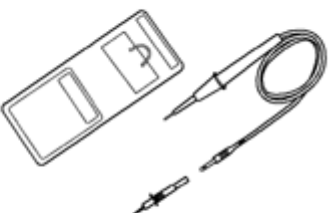
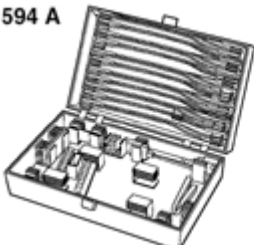

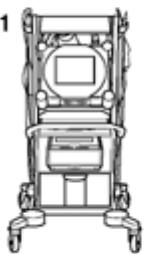
- Check exhaust temperature regulation.

	Display fields			
	1	2	3	4
Display group 220: Exhaust gas temperature regulation				
Display	1 RPM	%	%	Text
Indicated	Engine speed (RPM)	Load	Duty cycle, Sensor, Bank 1	Operating condition, Bank 1
Specified value	> 5000	> 100	42 ± 10	Regulation on
Note:	Increase engine speed and load enough that regulation jumps to "on"			

- Repeat test for bank 2 ⇒ measuring value block 221

If specified values are not obtained and there is a malfunction stored in DTC memory:

- Check exhaust gas temperature sensor.

<p>V.A.G 1526 A</p>  A handheld diagnostic tool with a digital display and several buttons, shown next to its carrying case.	<p>V.A.G 1527 B</p>  A diagnostic tool consisting of a rectangular control unit and a long, flexible probe with a needle tip.
<p>V.A.G 1594 A</p>  A diagnostic tool housed in a large, open carrying case with multiple compartments for various components.	<p>V.A.G 1598/31</p>  A diagnostic tool featuring a central control unit connected to several cables and a probe.
<p>VAS 5051</p>  A diagnostic tool mounted on a four-wheeled metal stand with a central display and control panel.	<p>G24-0023</p>

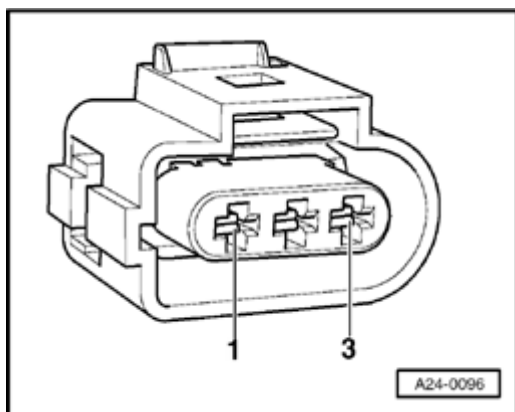
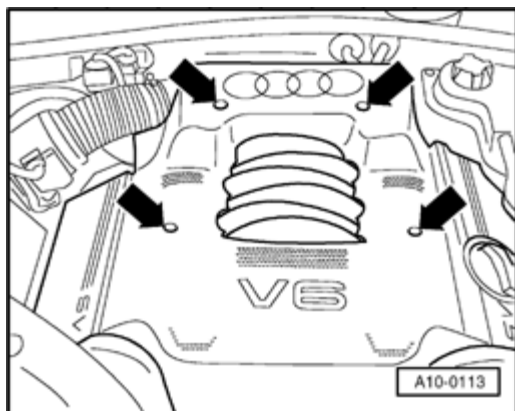
Exhaust gas temperature sensor, checking

Special tools and equipment

- ◆ VAG 1526A
- ◆ VAG 1527B
- ◆ VAG 1594A
- ◆ VAG 1598/31

Checking voltage supply

- Switch ignition off.
- A - Remove engine cover (arrows).
- Disconnect connector at exhaust gas temperature sensor.



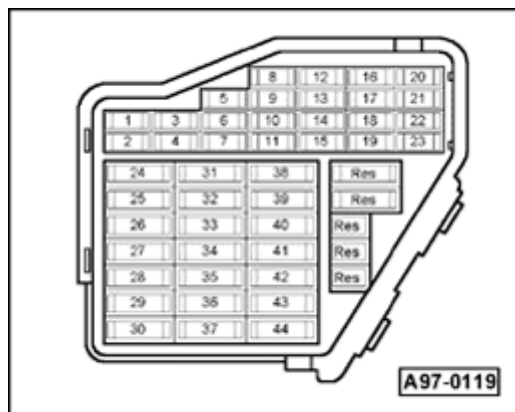
- A - Connect VAG 1527B voltage tester as follows:

Harness connector terminal	Measure to
3	Engine Ground (GND)

- Operate starter briefly.
 - ◆ LED must light.

If LED does not light:

- Perform following tests marked with dots:



A

- Check fuse S234 (in fuse holder, position 34).
- Check wire connection from exhaust gas temperature sensor via fuse S234 (in fuse holder, socket 34) to Fuel Pump (FP) relay for open circuit:

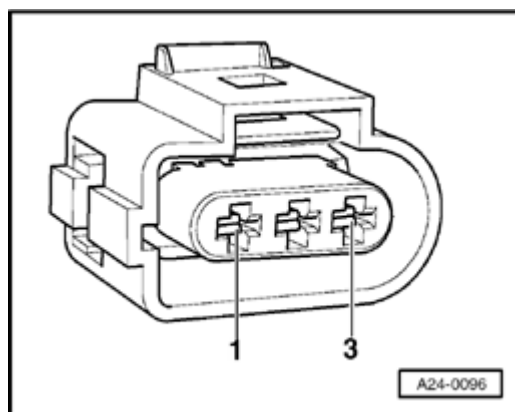
⇒ *Electrical Wiring Diagrams, Troubleshooting & Component Locations*

- Check Fuel Pump (FP) relay.

⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Fuel Injection & Ignition, Engine Code(s): APB; Repair Group 24*

- Connect VAG 1598/31 test box at wiring harness to ECM, do not connect ECM.

⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Fuel Injection & Ignition, Engine Code(s): APB; Repair Group 24*



A

- Check following wire connections for open circuit and short circuit to Ground (GND) and B+:

Harness connector terminal	VAG 1598/31 test box Bushing
1 (Bank 1)	61
1 (Bank 2)	20
2	50

If wire connection is OK:

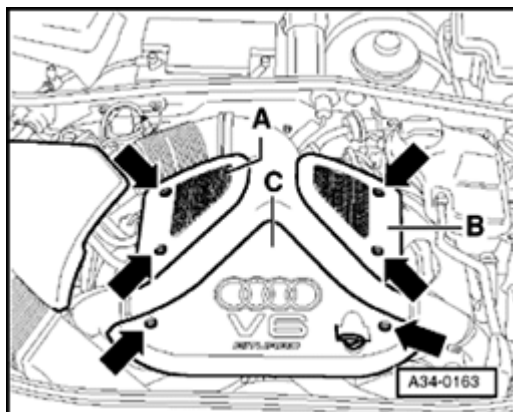
- Replace exhaust gas temperature sensor.

If the same malfunction occurs again after replacing the exhaust gas temperature sensor:

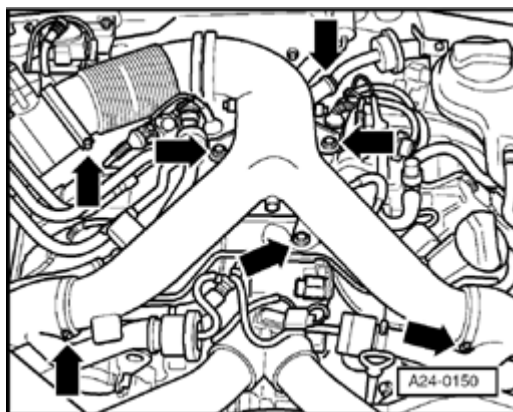
- Replace Engine Control Module (ECM).

⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Fuel Injection & Ignition, Engine Code(s): APB; Repair Group 24*

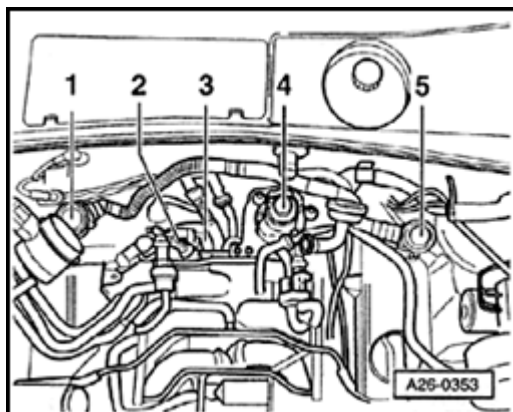
Exhaust gas temperature sensor, removing and installing



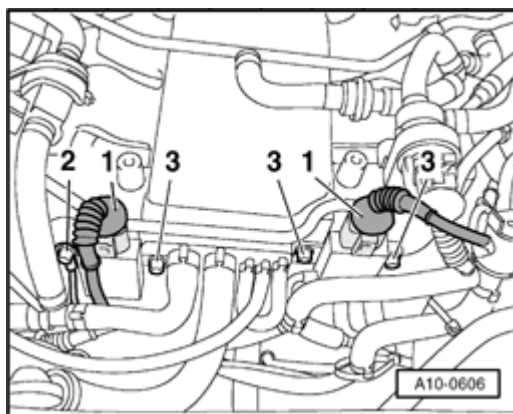
- A**
- Remove bolts (arrows) and remove engine covers -A- and -B-.



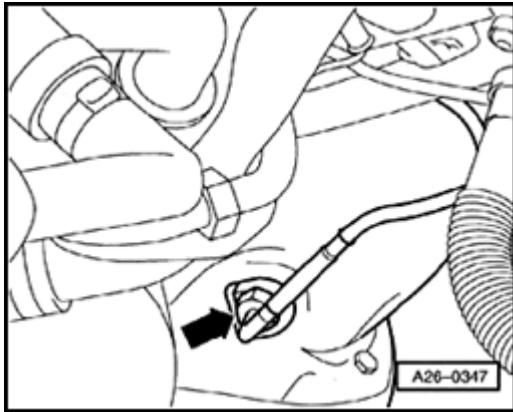
- A**
- Remove air distributor (arrows).



- A**
- Disconnect both connectors -2- from control modules for exhaust gas temperature.
 - Remove control module from intake manifold and set wires aside.



- A**
- For vehicles with manual transmission, control modules for exhaust gas temperature are at rear of intake manifold, on left and right.



- A** - Remove exhaust gas temperature sensor from exhaust manifold.