

26 - EXHAUST SYSTEM, EMISSION CONTROLS

EXHAUST SYSTEM COMPONENTS, REMOVING AND INSTALLING

Exhaust system components, removing and installing

NOTE:

- Replace gaskets and self-locking nuts.
- After exhaust system repairs, make sure exhaust system is not under stress and is far enough from the body. If necessary, loosen clamping sleeves and align mufflers and exhaust pipes so that there is adequate distance to vehicle body, and weight is evenly distributed among the exhaust hangers.
- Flex joint in front exhaust pipe must not be bent more than 10° , otherwise it may be damaged.
- The following illustration shows the exhaust system for a vehicle with all-wheel drive. The exhaust system for a vehicle with front-wheel drive varies only slightly.

Exhaust system, assembly overview

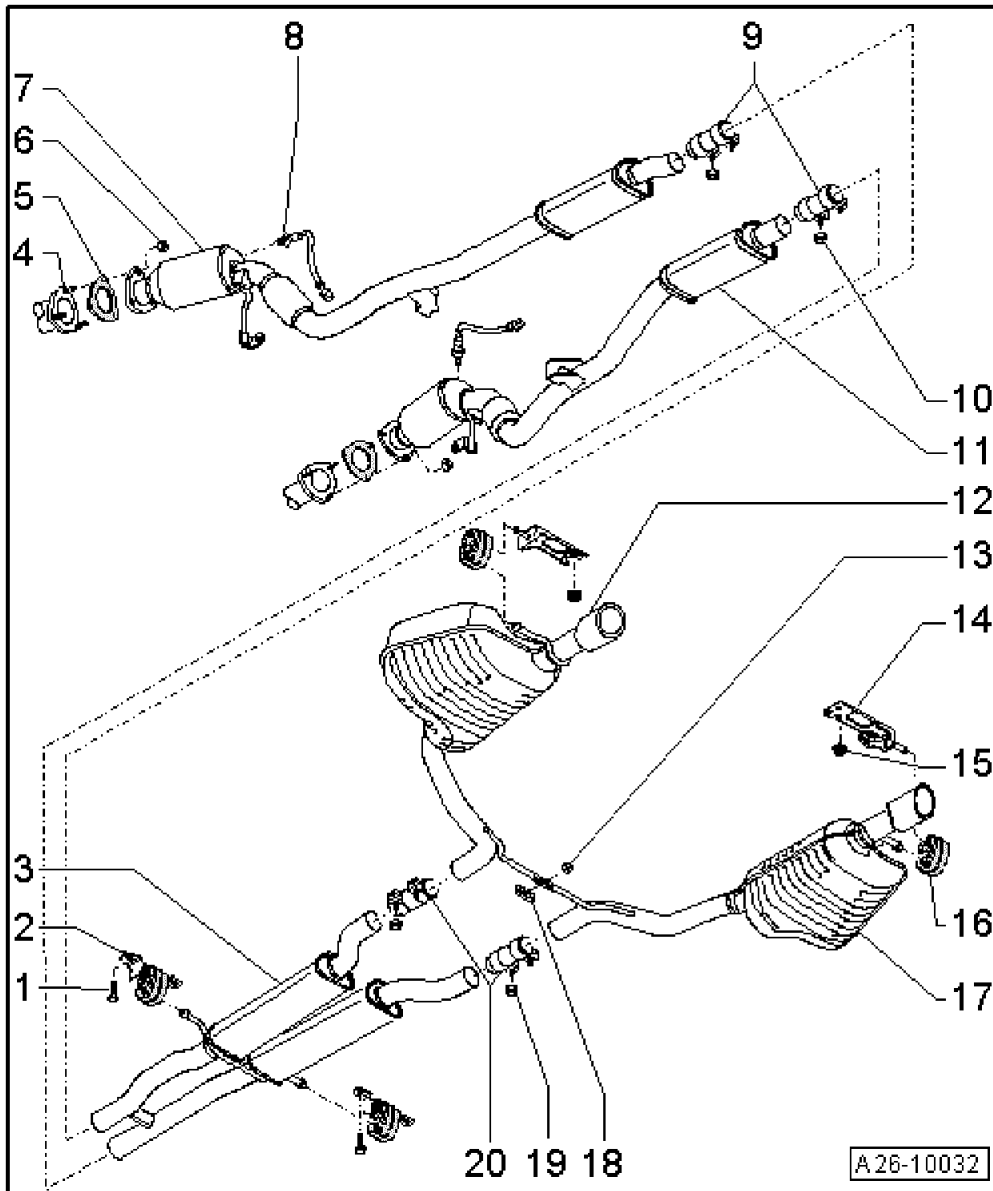


Fig. 505: Exhaust System, Assembly Overview

Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - 23 Nm

2 - Suspended mount

- Replace if damaged

3 - Center muffler

- Original equipment as one unit with rear muffler. For repairs, replace each separately.
- Separating point: Vehicles with front-wheel drive --> **Fig. 512** , Vehicles with all-wheel drive --> **Fig.**

515

- Install exhaust system free of stress --> **Exhaust system, installing free of tension**

4 - Exhaust manifold

- Removing and installing: Left --> **Left exhaust manifold, removing and installing** , right --> **Right exhaust manifold, removing and installing**

5 - Gasket

- Replace

6 - 23 Nm

- Replace

7 - Front exhaust pipe with catalytic converter and front muffler

- For cylinder bank 2 (left)
- With decoupling element; Decoupling element must not be bent more than 10° otherwise it may be damaged
- Protect from shocks and impact stress
- Removing and installing --> **Left front exhaust pipe (with catalytic converter), removing and installing**
- Individual components of suspension **Individual suspension components, left side**
- Install exhaust system free of stress --> **Exhaust system, installing free of tension**

8 - Oxygen Sensor (O2S) Behind Three Way Catalytic Converter (TWC)

- The threads of new oxygen sensors are coated with assembly paste; the paste must not get into slots of oxygen sensor body
- When re-using the old oxygen sensor, grease threads with hot bolt paste; the paste must not get into slots of oxygen sensor body; hot bolt paste
- Removing and installing --> **24 - MULTIPOINT FUEL INJECTION (MPI)**
- Tighten to 55 Nm

9 - Front clamping sleeves

- Installed location **Installed position of front double clamps**
- Before tightening, align exhaust system so that it is tension-free --> **Exhaust system, installing free of tension**
- Tighten threaded connections evenly.

10 - 23 Nm

11 - Front exhaust pipe with catalytic converter and front muffler

- For cylinder bank 1 (right)
- With decoupling element; Decoupling element must not be bent more than 10° otherwise it may be damaged
- Protect from shocks and impact stress
- Removing and installing --> **Right exhaust pipe (with catalytic converter), removing and installing**
- Individual components of suspension **Individual components of suspension, right side**
- Install exhaust system free of stress --> **Exhaust system, installing free of tension**

12 - Rear muffler with tailpipe

- Left side of vehicle
- Original equipment as one unit with center muffler
- In case of repairs, center muffler end muffler and tailpipe should be replaced individually
- Center muffler/rear muffler separating point: Vehicles with front-wheel drive --> **Fig. 512**, Vehicles with all-wheel drive --> **Fig. 515**
- Rear muffler/tailpipe separating point --> **End pipe, replacing**
- Install exhaust system free of stress --> **Exhaust system, installing free of tension**

13 - 23 Nm

- Replace

14 - Suspended mount

15 - 23 Nm

16 - Suspended mount

- Replace if damaged

17 - Rear muffler with tailpipe

- Right side of vehicle
- Original equipment as one unit with center muffler
- In case of repairs, center muffler end muffler and tailpipe should be replaced individually
- Center muffler/rear muffler separating point: Vehicles with front-wheel drive --> **Fig. 512**, Vehicles with all-wheel drive --> **Fig. 515**

- Rear muffler/tailpipe separating point --> **End pipe, replacing**
- Install exhaust system free of stress --> **Exhaust system, installing free of tension**

18 - Bracket

19 - 23 Nm

20 - Rear clamping sleeves

- For individual replacement of center and rear mufflers
- Position clamping sleeve centrally to separation point
- Installed location **Installed position of rear double clamps**
- Before tightening, align exhaust system so that it is tension-free --> **Exhaust system, installing free of tension**
- Tighten threaded connections evenly.

Installed position of front double clamps

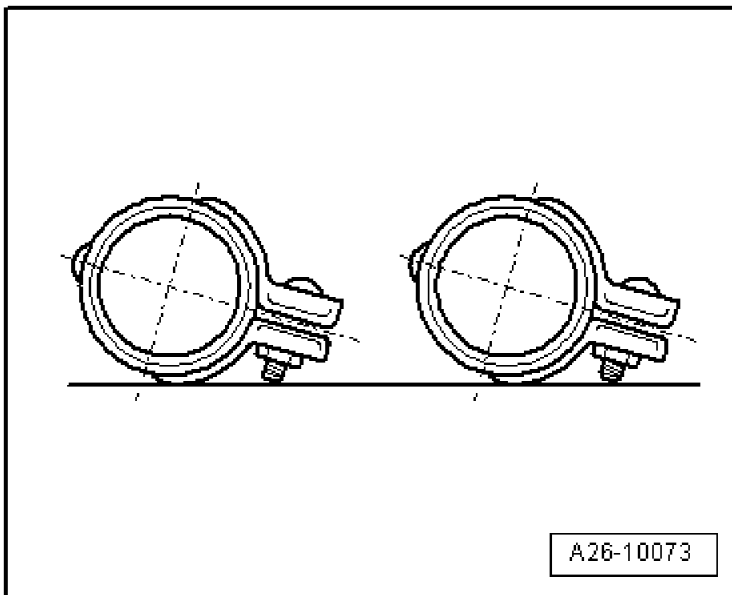


Fig. 506: Installed Position Of Front Double Clamps
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install double clamps so that bolt ends do not project over lower edge of double clamp.
- Threaded connections point toward right.

Installed position of rear double clamps

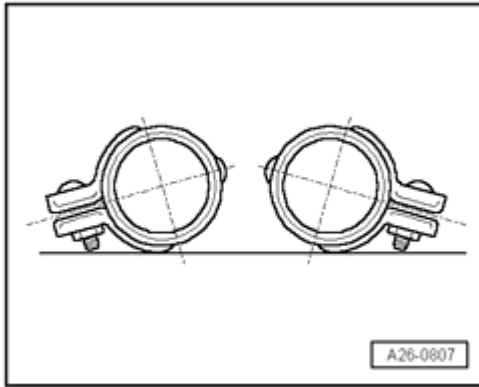


Fig. 507: Installing Double Clamps So That Bolt Ends Do Not Project Over Lower Edge Of Double Clamp

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install double clamps so that the bolt ends do not project over lower edge of double clamp.
- Threaded connections point toward outside.

Individual suspension components, left side

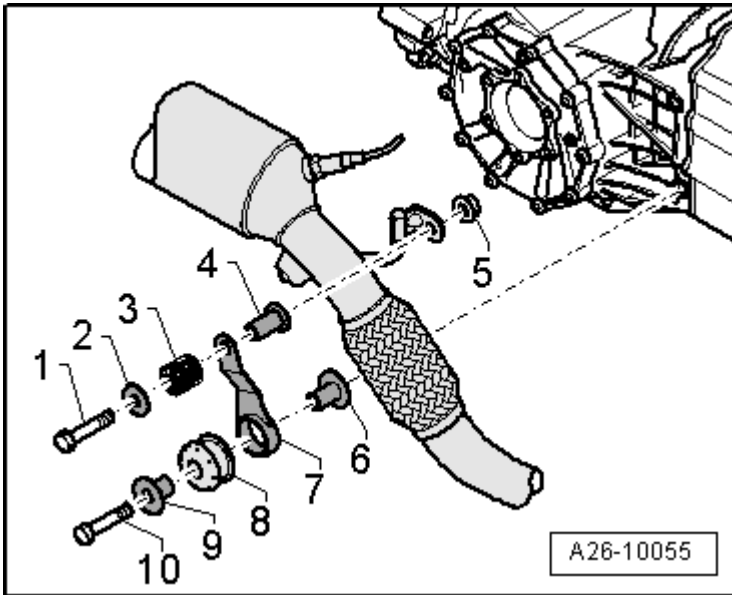


Fig. 508: Individual Suspension Components, Left Side

Courtesy of VOLKSWAGEN UNITED STATES, INC.

1. Bolt
2. Washer
3. Spring
4. Spacing sleeve

6. Spacing sleeve
7. Tab
8. Buffer
9. Spacing sleeve
10. Bolt - 23 Nm

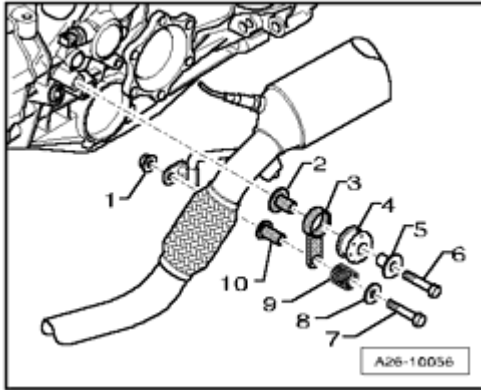
Individual components of suspension, right side

Fig. 509: Individual Components Of Suspension, Right Side
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1. Nut - 23 Nm
2. Spacing sleeve
3. Tab
4. Buffer
5. Spacing sleeve
6. Bolt - 23 Nm
7. Bolt
8. Washer
9. Spring
10. Spacing sleeve

Individual components of center bracket mounting for front exhaust pipe

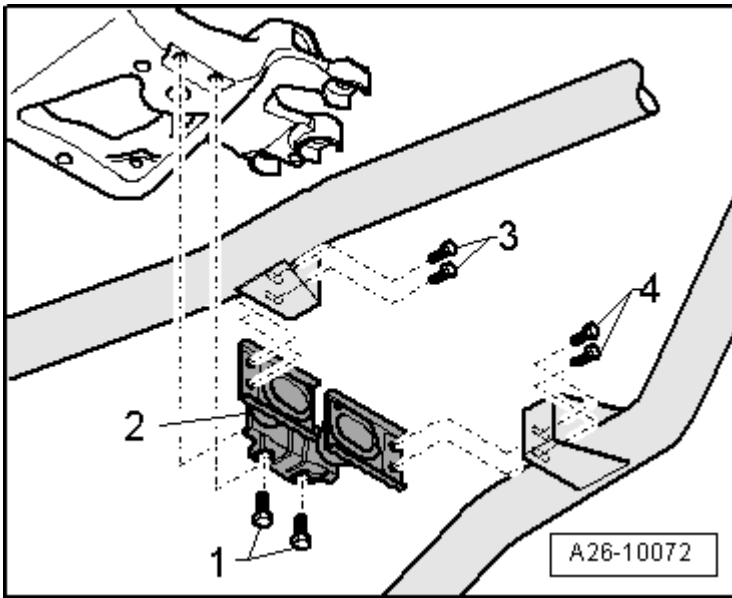


Fig. 510: Individual Components Of Center Bracket Mounting For Front Exhaust Pipe
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

1. 23 Nm
2. Bracket
3. 23 Nm
4. 23 Nm

Center muffler and rear muffler, separating

A separating point has been provided in the connecting pipe for individual replacement of the center or rear muffler.

The separating point is marked by depressions around circumference of the exhaust pipe.

Special tools, testers and auxiliary items required

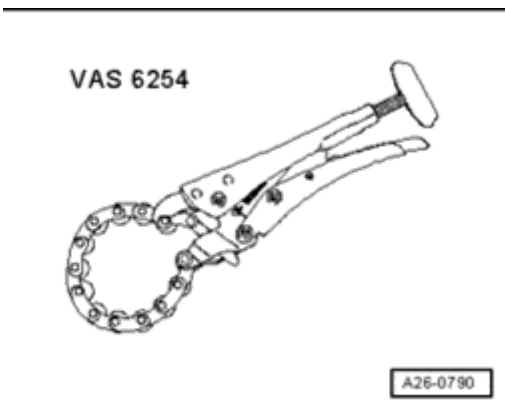


Fig. 511: Chain Pine Cutter VAS 6254

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Chain pipe cutter VAS 6254

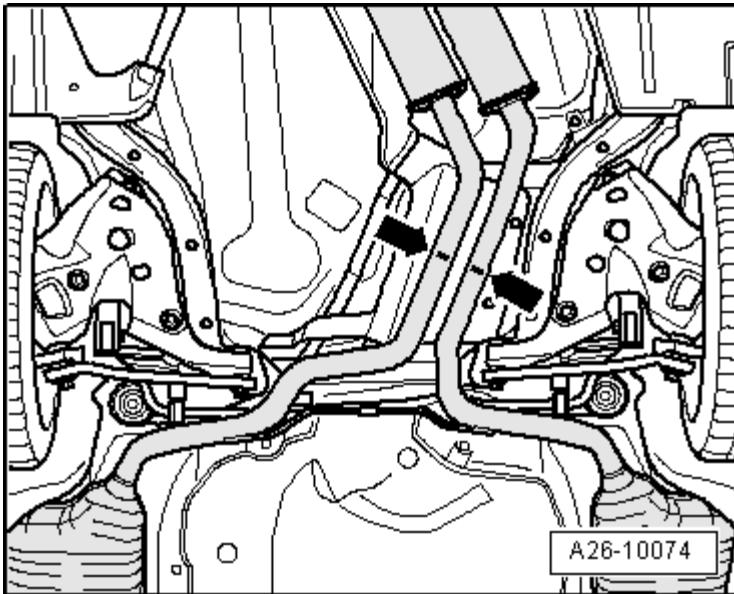


Fig. 512: Separating Exhaust Pipes At A Right Angle At Separating Point Using Chain Pipe Cutter VAS 6254

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Work procedure - Vehicles with front-wheel drive

- Separate exhaust pipes at a right angle at separating point - **arrow** - using chain pipe cutter VAS 6254.

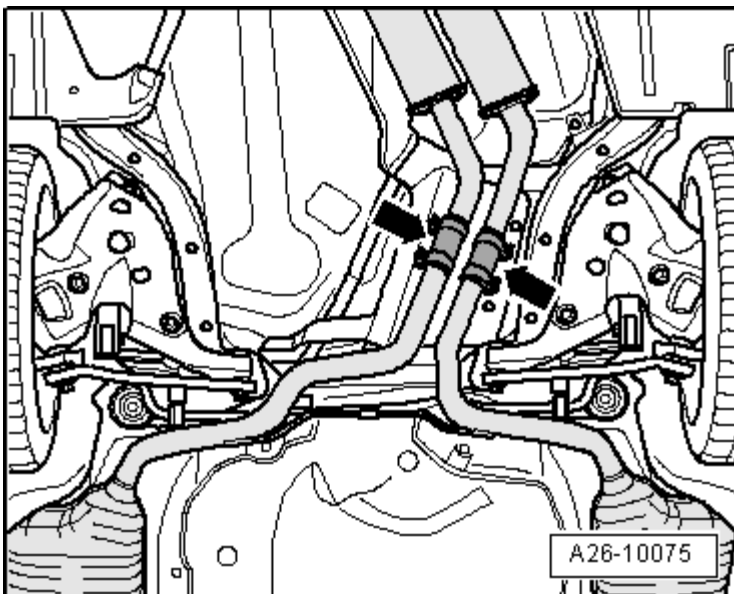


Fig. 513: Positioning Clamping Sleeves Centrally On Separation Point

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- When installing, position clamping sleeves - **arrows** - centrally on separation point.

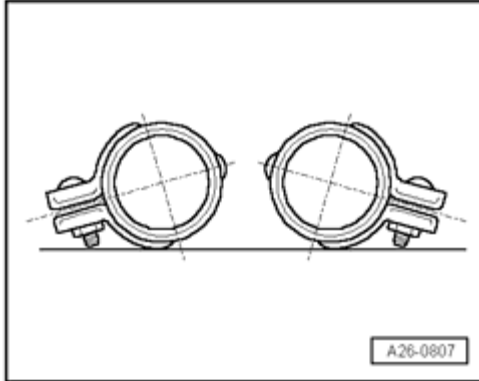


Fig. 514: Installing Double Clamps So That Bolt Ends Do Not Project Over Lower Edge Of Double Clamp

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install double clamps so that the bolt ends do not project over lower edge of double clamp.
- Threaded connections point toward outside.
- Align exhaust system free of tension --> **Exhaust system, installing free of tension.**

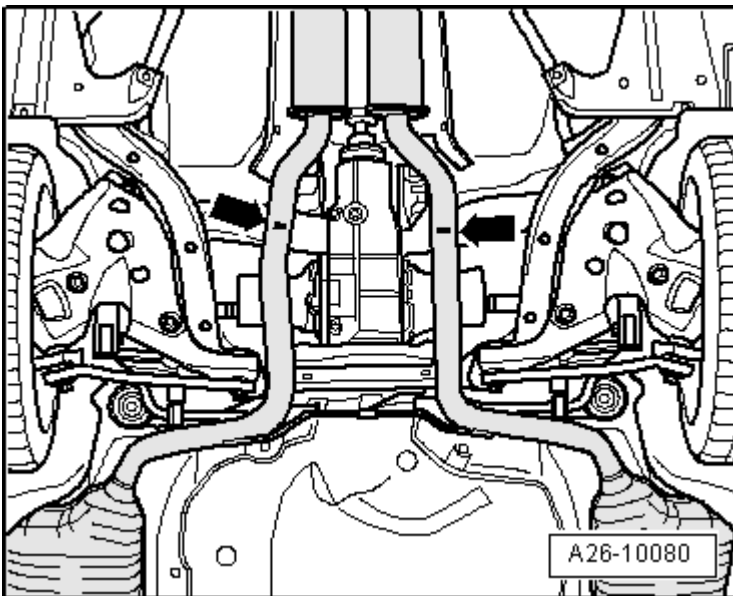


Fig. 515: Separating Exhaust Pipes At Separating Point Using Chain Pipe Cutter VAS 6254 At Right Angle

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Work procedure - Vehicles with all-wheel drive

- Separate exhaust pipes at a right angle at separating point - **arrow** - using chain pipe cutter VAS 6254.

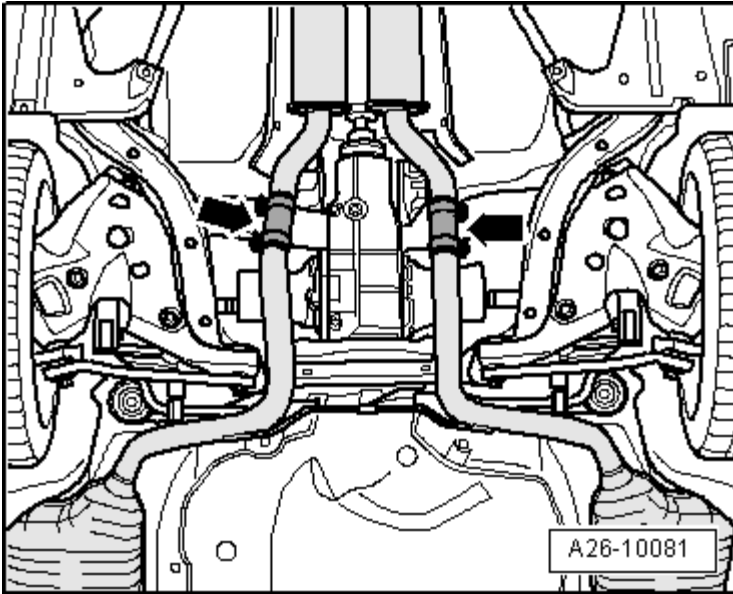


Fig. 516: Positioning Clamping Sleeves At Center Of Separating Cut
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- When installing, position clamping sleeves - **arrows** - centrally on separation point.

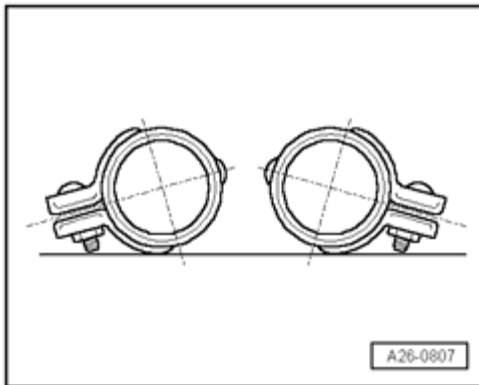


Fig. 517: Installing Double Clamps So That Bolt Ends Do Not Project Over Lower Edge Of Double Clamp
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install double clamps so that the bolt ends do not project over lower edge of double clamp.
- Threaded connections point toward outside.
- Align exhaust system free of tension --> **Exhaust system, installing free of tension.**

End pipe, replacing

Special tools, testers and auxiliary items required

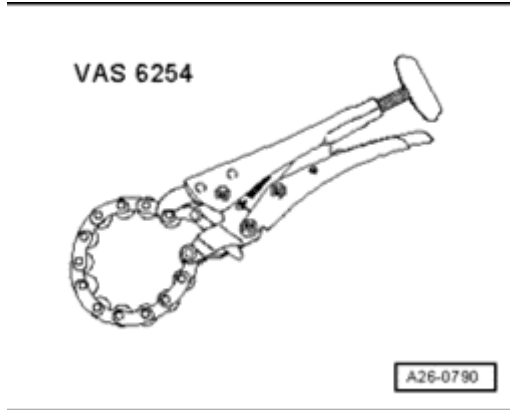


Fig. 518: Chain Pipe Cutter VAS 6254

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Chain pipe cutter VAS 6254

Work procedure

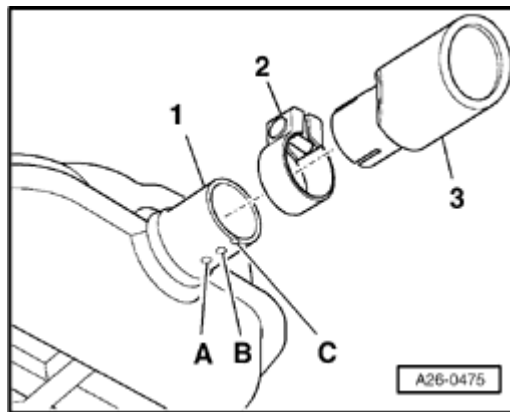


Fig. 519: Identifying End Pipes, Separating Point, Markings & Clamps

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Separate end pipe - 1 - using chain pipe cutter VAS 6254 at right angle at separating point - C -.
- Push end pipe - 3 - on up to marking - A - while aligning slit in end pipe with marking - B - on cover.
- Install clamp - 2 -.

Torque specifications

Component	Nm
Clamp	25

2006 Audi A6 Quattro

ENGINE 4.2 Liter V8 4V Engine Mechanical, Engine Code(s): BAT, BNK

Left front exhaust pipe (with catalytic converter), removing and installing

Special tools, testers and auxiliary items required

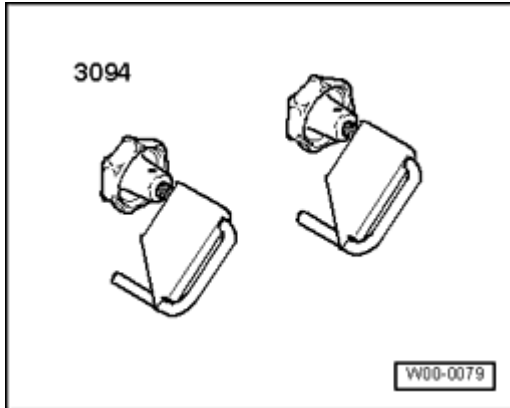


Fig. 520: Identifying Hose Clamps 3094

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Hose Clamps Up to 25 mm dia. 3094

Removing

NOTE:

- All cable ties which are opened or cut open when removing, must be replaced in the same position when installing.

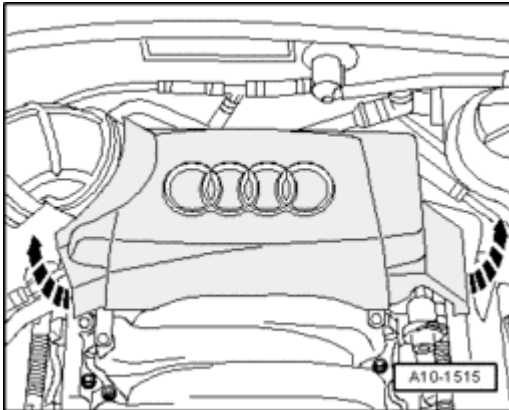


Fig. 521: Removing/Installing Rear Engine Cover

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove rear engine cover - **arrows** -.

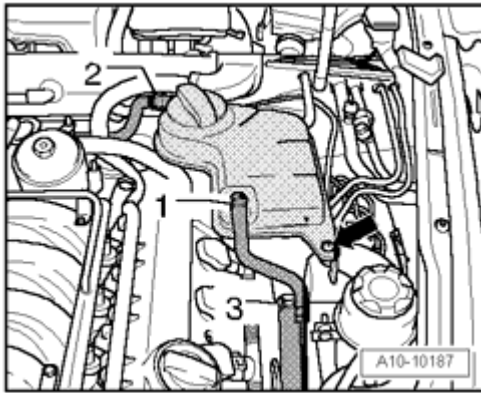


Fig. 522: Removing Coolant Hoses & Coolant Expansion Tank
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Clamp off coolant hose - 2 - using Hose Clamps Up to 25 mm dia. 3094 and disconnect from coolant expansion tank.
- Remove coolant expansion tank - **arrow** -.
- Disconnect electrical wire to Engine Coolant Level (ECL) Warning Switch F66 on bottom of expansion tank and set aside coolant expansion tank with coolant hoses - **1 and 3** - connected.
- If necessary, seal connection using an appropriate plug.

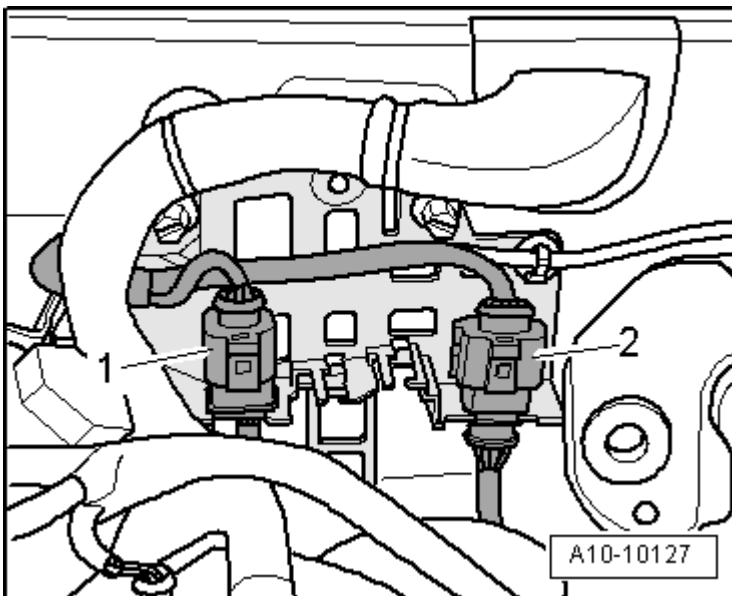


Fig. 523: Disconnecting Electrical Harness Connector For Oxygen Sensor (O2S) 2 Behind Three Way Catalytic Converter (TWC) G131 And Free Up Wiring
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical harness connector - 2 - for Oxygen Sensor (O2S) 2 Behind Three Way Catalytic Converter (TWC) G131 and free up wiring.

NOTE:

- Ignore - 1 -.

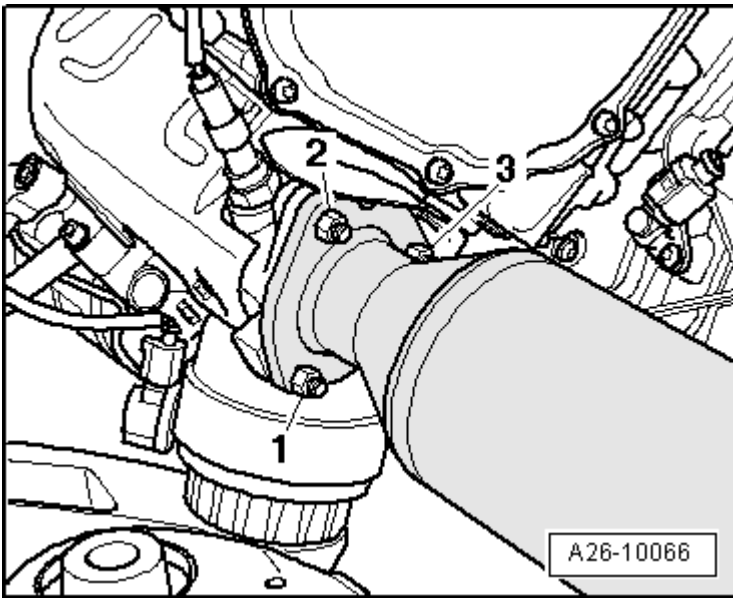


Fig. 524: Removing Nut Which Is Accessible From Top For Front Exhaust Pipe/Exhaust Manifold
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove nut - 2 - which is accessible from top for front exhaust pipe/exhaust manifold.

NOTE:

- To improve clarity, the removed engine is shown from the rear.

- Remove left front wheel.

NOTE:

- Secure brake disc with a wheel bolt.

2006 Audi A6 Quattro

ENGINE 4.2 Liter V8 4V Engine Mechanical, Engine Code(s): BAT, BNK

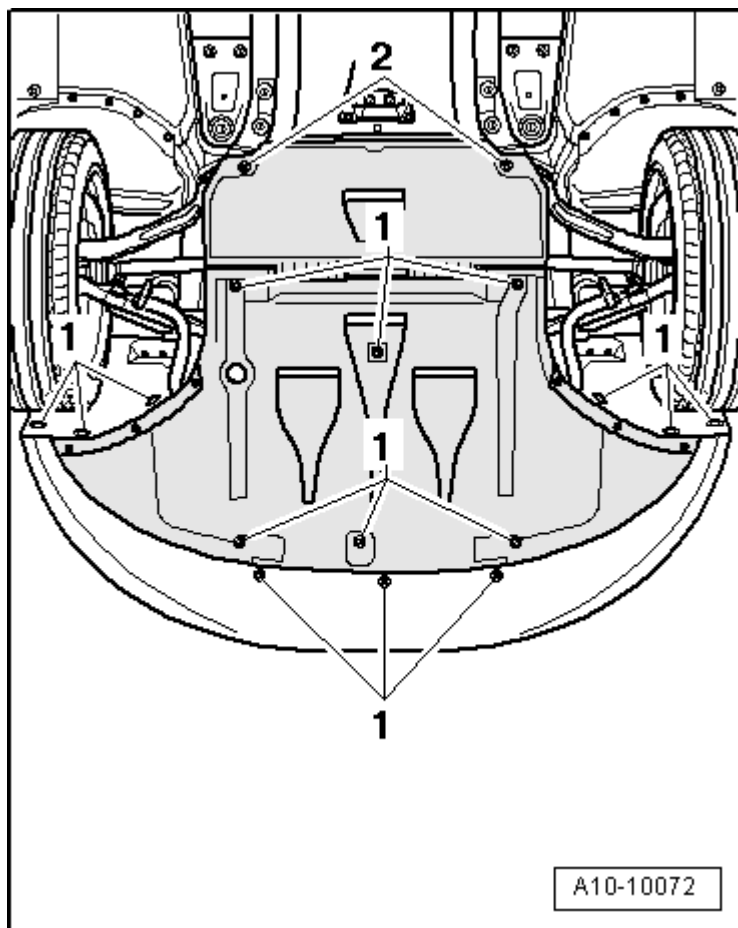


Fig. 525: Identifying Quick-Release Fasteners & Noise Insulation
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen quick-release fasteners - 1 - and - 2 - and remove noise insulation.

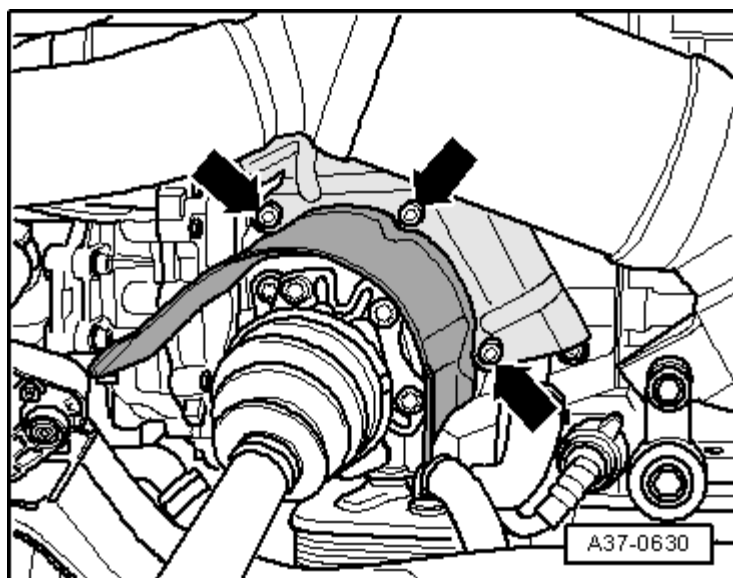


Fig. 526: Removing Heat Shield For Left Drive Axle
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shield - **arrows** - for left drive axle.

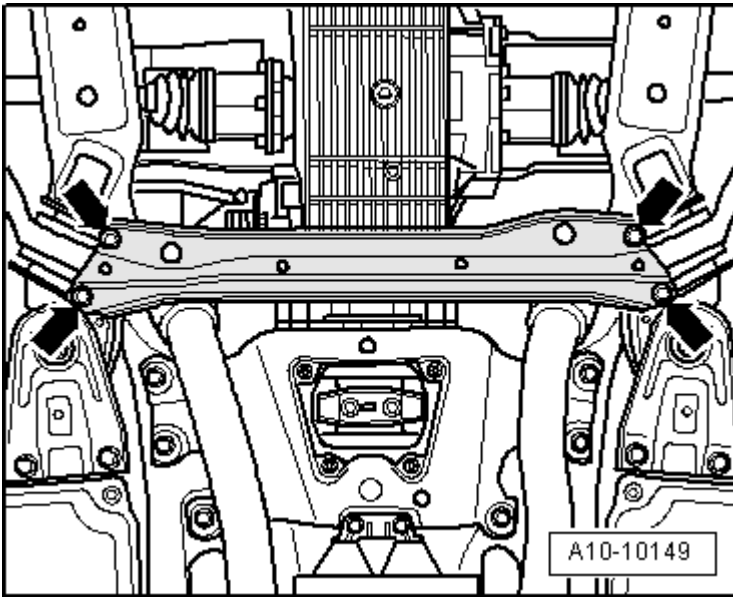


Fig. 527: Removing Subframe Transverse Beam
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove subframe transverse beam - **arrows** -.

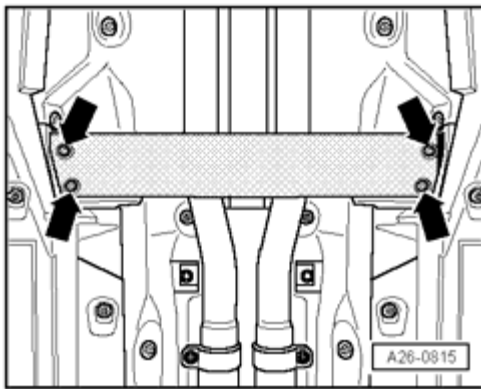


Fig. 528: Removing Front Transverse Beam
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove front transverse beam - **arrows** -.

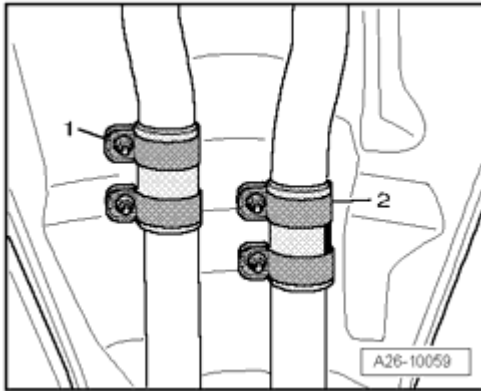


Fig. 529: Separating Exhaust System At Left Clamping Sleeve
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Separate exhaust system at left clamping sleeve - 2 -.

NOTE:

- Ignore - 1 -.

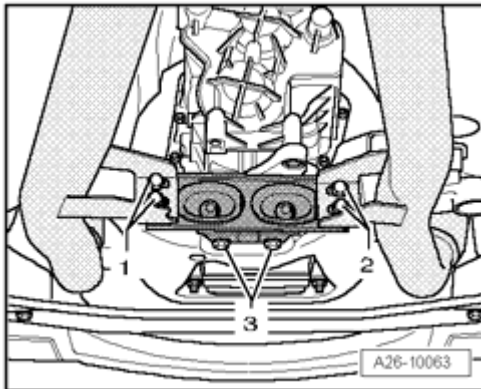


Fig. 530: Removing/Installing Mounting Bolts For Front Exhaust Pipes
Courtesy of VOLKSWAGEN UNITED STATES, INC.

NOTE:

- Flex joint in front exhaust pipe must not be bent more than 10° , otherwise it may be damaged.

- Remove bolts - 1 - at rear bracket for front exhaust pipe.

NOTE:

- Ignore - 2 - and - 3 -.

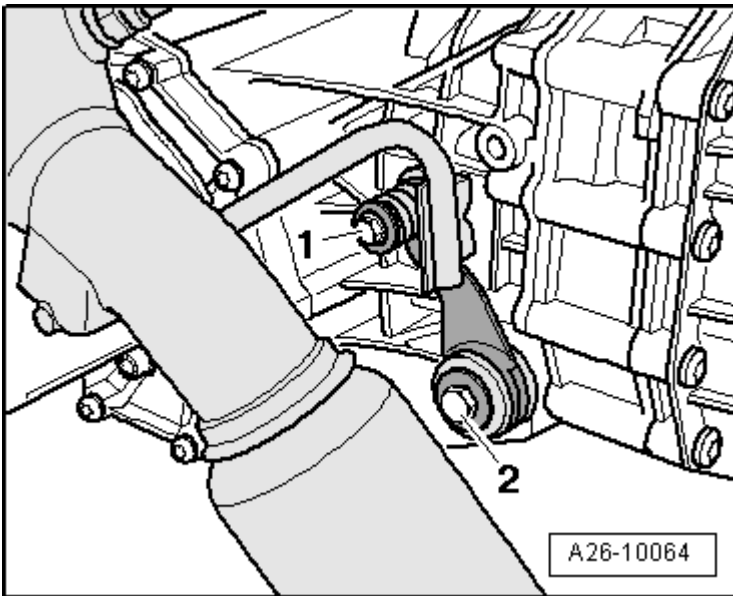


Fig. 531: Removing Bolt At Left Bracket For Front Exhaust Pipe
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolt - 1 - at left bracket for front exhaust pipe.

NOTE:

- Ignore - 2 -.

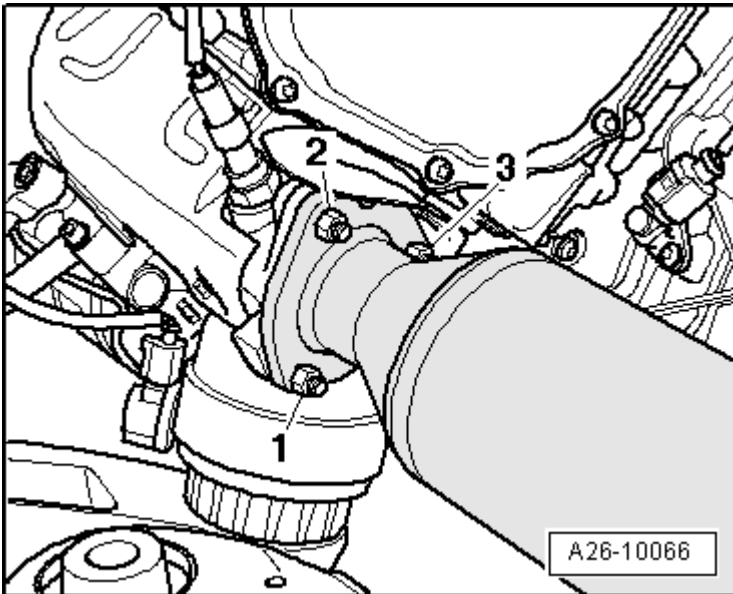


Fig. 532: Removing Nut Which Is Accessible From Top For Front Exhaust Pipe/Exhaust Manifold
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove nuts - 1 - and - 3 - which are accessible from bottom for front exhaust pipe/exhaust manifold.

2006 Audi A6 Quattro

ENGINE 4.2 Liter V8 4V Engine Mechanical, Engine Code(s): BAT, BNK

NOTE:

- To improve clarity, the removed engine is shown.

- Remove front exhaust pipe with catalytic converter.

Installing

Installation is in reverse order of removal, note the following:

NOTE:

- Replace gaskets and self-locking nuts.
- During installation, all cable ties must be re-installed at the same location.
- Electrical wire of oxygen sensor must always be secured in the same position when installing so that contact with the exhaust pipe is avoided.

- Install subframe cross member --> 40 - FRONT SUSPENSION .
- Install front cross member --> 50 - BODY - FRONT .
- Align exhaust system free of tension --> Exhaust system, installing free of tension.

NOTE:

- Individual components of exhaust system mounting Individual suspension components, left side

Torque specifications

Component	Nm
Front exhaust pipe with catalytic converter to exhaust manifold	23 * See note
Mounting strap to front exhaust pipe	23
Front exhaust pipe to bracket	23
Heat shield for drive shaft to transmission	23

*Replace bolts and nuts.

Right exhaust pipe (with catalytic converter), removing and installing

Removing

NOTE:

- All cable ties which are opened or cut open when removing, must be replaced in the same position when installing.

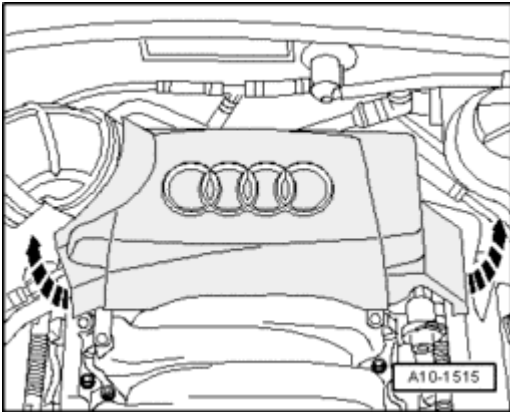


Fig. 533: Removing/Installing Rear Engine Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove rear engine cover - **arrows** -.

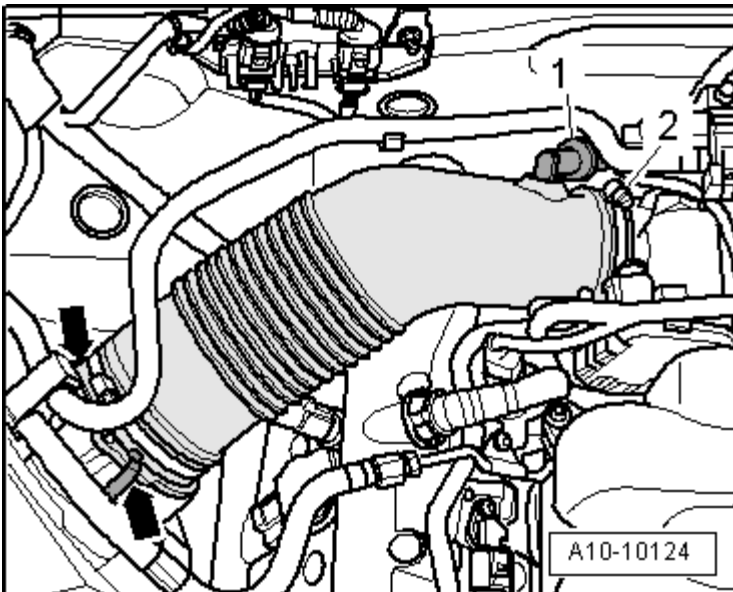


Fig. 534: Disconnecting Check Valve From Connection At Air Duct Hose
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect check valve - **1** - from air duct hose.
- Remove air duct hose, thereby loosening hose clamp - **2** - and opening clips - **arrows** -.

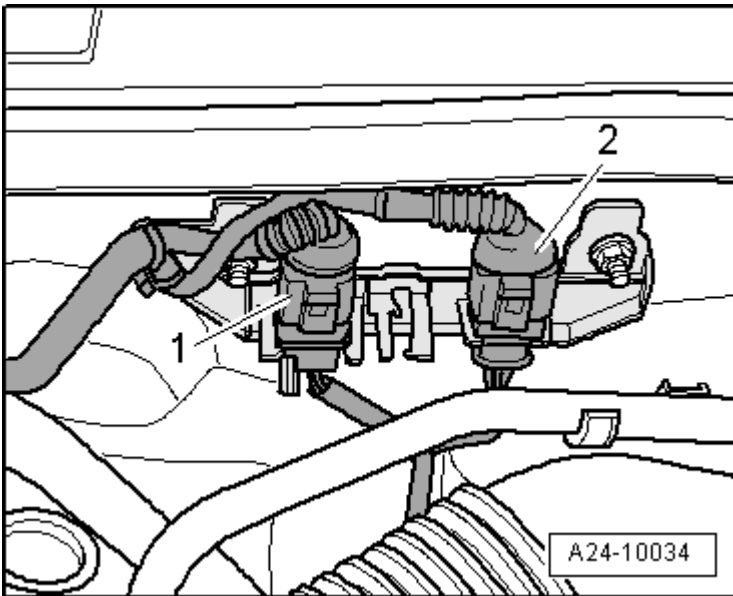


Fig. 535: Disconnecting Electrical Harness Connector For Oxygen Sensor (O2S) Behind Three Way Catalytic Converter (TWC) G130

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical harness connector - 2 - for Oxygen Sensor (O2S) Behind Three Way Catalytic Converter (TWC) G130 and free up wiring.

NOTE:

- Ignore - 1 -.

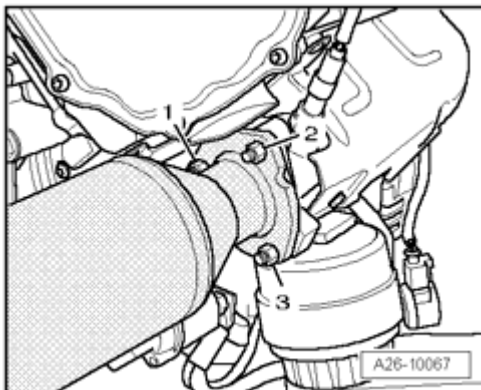


Fig. 536: Removing Nuts & Right Front Exhaust Pipe With Catalytic Converter

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove nut - 2 - which is accessible from top for front exhaust pipe/exhaust manifold.

NOTE:

- To improve clarity, the removed engine is shown from the rear.

- Remove right front wheel.

NOTE:

- Secure brake disc with a wheel bolt.

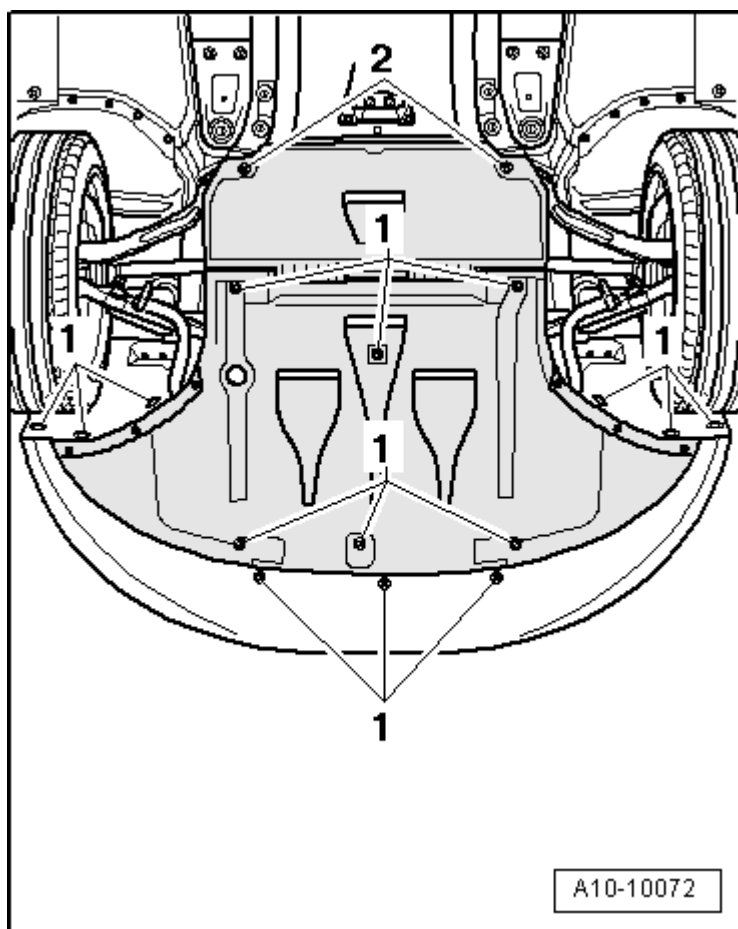


Fig. 537: Identifying Quick-Release Fasteners & Noise Insulation
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen quick-release fasteners - 1 - and - 2 - and remove noise insulation.

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ENGINE 4.2 Liter V8 4V Engine Mechanical, Engine Code(s): BAT, BNK

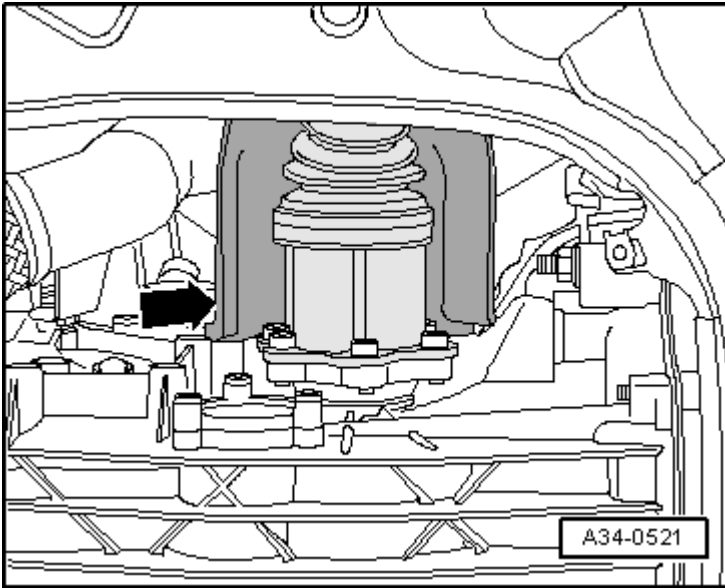


Fig. 538: Removing Heat Shield For Right Drive Axle
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shield - **arrow** - for right drive axle.

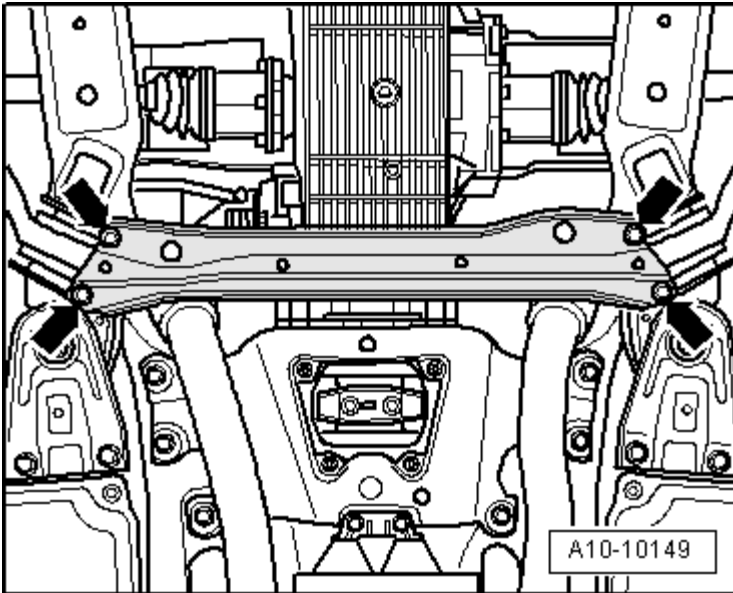


Fig. 539: Removing Subframe Transverse Beam
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove subframe transverse beam - **arrows** -.

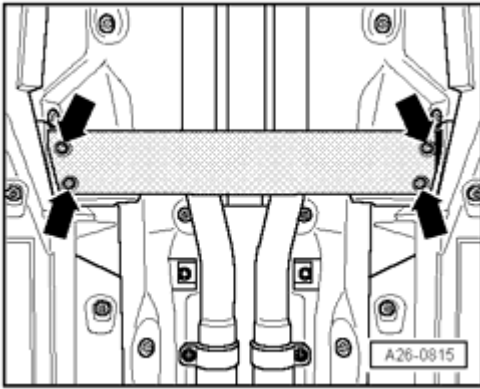


Fig. 540: Removing Front Transverse Beam
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove front transverse beam - **arrows** -.

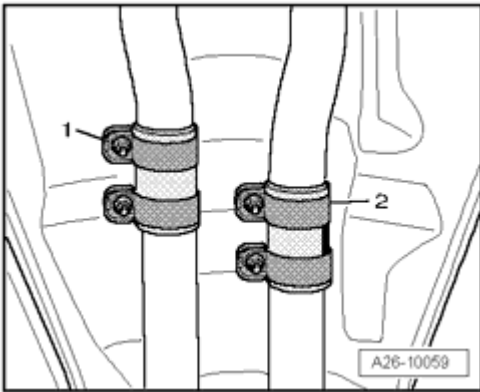


Fig. 541: Loosening Clamping Sleeves
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Separate exhaust system at right clamping sleeve - **1** -.

NOTE:

- Ignore - **2** -.

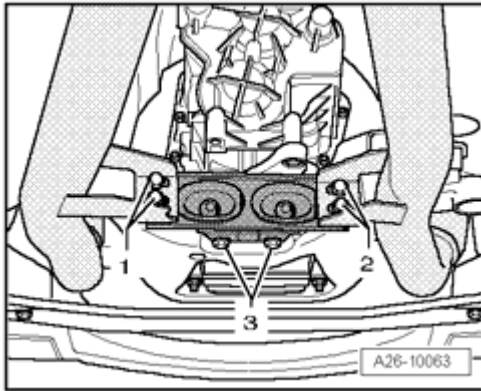


Fig. 542: Removing/Installing Mounting Bolts For Front Exhaust Pipes
Courtesy of VOLKSWAGEN UNITED STATES, INC.

NOTE:

- Flex joint in front exhaust pipe must not be bent more than 10° , otherwise it may be damaged.

- Remove bolts - 2 - at rear bracket for front exhaust pipe.

NOTE:

- Ignore - 1 - and - 3 -.

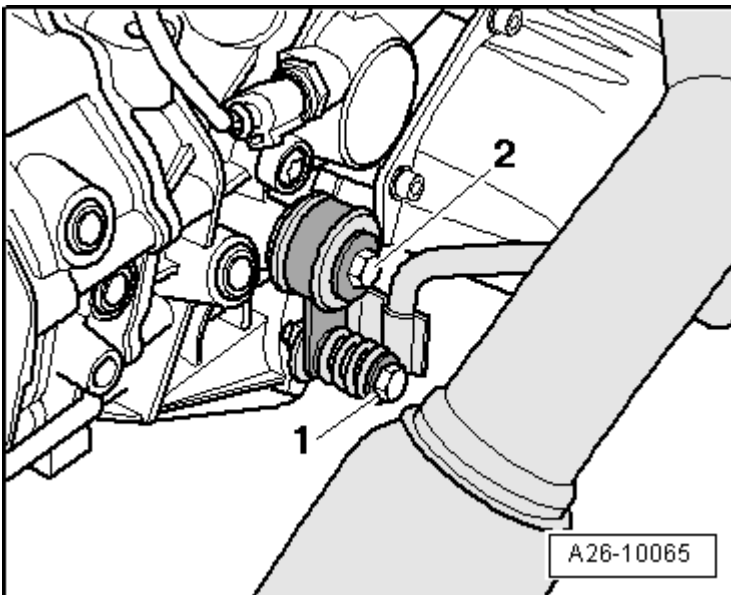


Fig. 543: Removing Bolt At Right Bracket For Front Exhaust Pipe
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolt - 1 - at right bracket for front exhaust pipe.

NOTE:

- Ignore - 2 -.

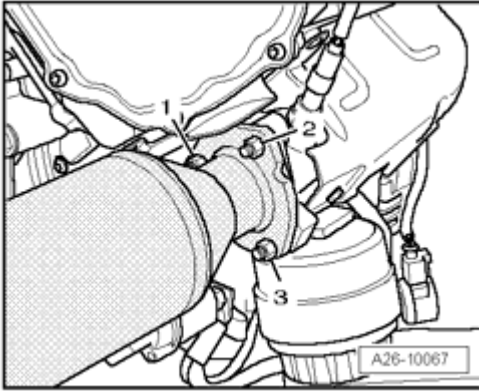


Fig. 544: Removing Nuts & Right Front Exhaust Pipe With Catalytic Converter
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove nuts - 1 - and - 3 - which are accessible from bottom for front exhaust pipe/exhaust manifold.

NOTE:

- To improve clarity, the removed engine is shown.

- Remove front exhaust pipe with catalytic converter.

Installing

Installation is in reverse order of removal, note the following:

NOTE:

- Replace gaskets, O-rings and self-locking nuts.
- Secure all hose connections using hose clamps appropriate for the model type .
- During installation, all cable ties must be re-installed at the same location.
- Electrical wire of oxygen sensor must always be secured in the same position when installing so that contact with the exhaust pipe is avoided.

- Install subframe cross member --> 40 - FRONT SUSPENSION .
- Install front cross member --> 50 - BODY - FRONT .
- Align exhaust system free of tension --> Exhaust system, installing free of tension.

NOTE:

- Individual components of exhaust system mounting Individual components of suspension, right side

Torque specifications

Component	Nm
Front exhaust pipe with catalytic converter to	23 * See note

2006 Audi A6 Quattro

ENGINE 4.2 Liter V8 4V Engine Mechanical, Engine Code(s): BAT, BNK

exhaust manifold	
Mounting strap to front exhaust pipe	23
Front exhaust pipe to bracket	23
Heat shield for drive axle to transmission	23
Hose clamps 9 mm wide	3

*Replace bolts and nuts.

Left exhaust manifold, removing and installing

Removing

- Remove engine --> **Engine, removing and installing.**

NOTE:

- All cable ties which are opened or cut open when removing, must be replaced in the same position when installing.

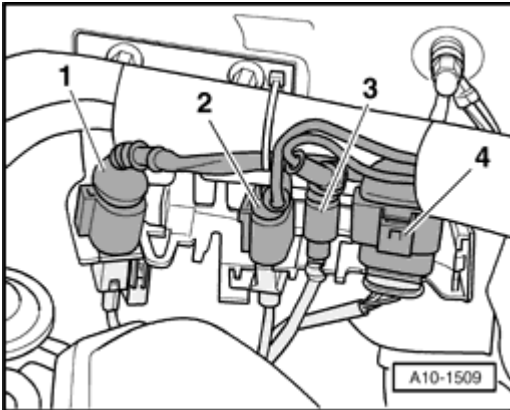


Fig. 545: Disconnecting Scissor Lift Platform VAS 6131 A Electrical Harness Connectors
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical harness connectors - 1 - and - 4 - for oxygen sensors.
- Free up cables.

NOTE:

- Harness connectors are depicted in the installation position in the illustration.

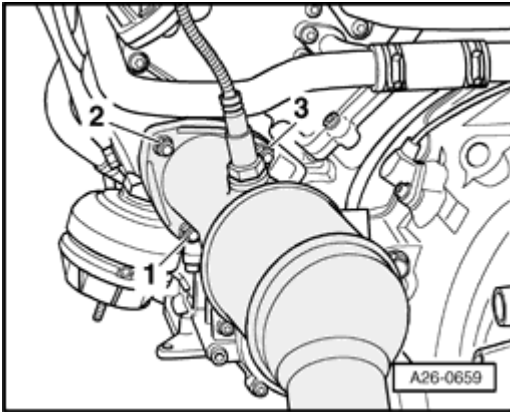


Fig. 546: Removing/Installing Nuts For Left Front Exhaust Pipe/Exhaust Manifold
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove front exhaust pipe from left exhaust manifold nuts - **1 to 3** -.
- Remove left coolant pipe --> **Left coolant pipe, removing and installing.**

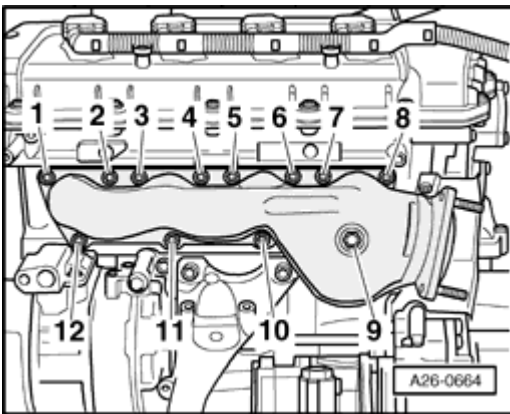


Fig. 547: Removing Nuts And Left Exhaust Manifold
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove nuts - **1 to 12** - and remove left exhaust manifold.

Installing

Installation is in reverse order of removal, note the following:

NOTE:

- **Replace gaskets and self-locking nuts.**
- **During installation, all cable ties must be re-installed at the same location.**

- Install left coolant pipe --> **Left coolant pipe, removing and installing.**
- Install left front exhaust pipe with pre- and main catalytic converters --> **Left front exhaust pipe (with catalytic converter), removing and installing.**
- Install engine --> **Engine, installing.**

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ENGINE 4.2 Liter V8 4V Engine Mechanical, Engine Code(s): BAT, BNK

Torque specifications

Component	Nm
Exhaust manifold to cylinder head	25 * See note

* Replace nuts

Right exhaust manifold, removing and installing

Removing

NOTE:

- All cable ties which are opened or cut open when removing, must be replaced in the same position when installing.

- Remove engine --> Engine, removing and installing.

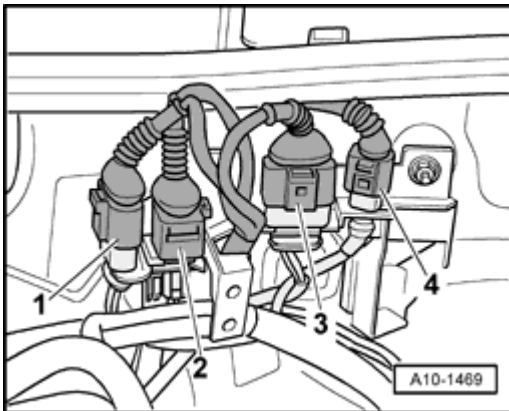


Fig. 548: Disconnecting Electrical Harness Connectors For Oxygen Sensors
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical harness connectors - 1 - and - 2 - for oxygen sensors.
- Free up cables.

NOTE:

- Harness connectors are depicted in the installation position in the illustration.

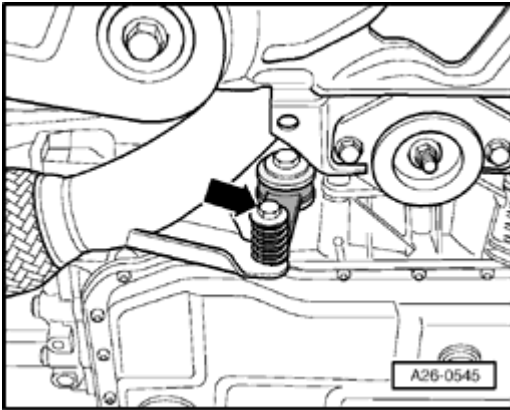


Fig. 549: Removing Bolt At Strap For Right Front Exhaust Pipe
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolt - **arrow** - at strap for right front exhaust pipe.

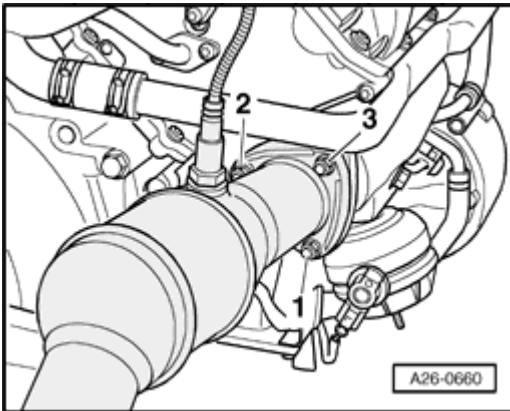


Fig. 550: Removing Front Exhaust Pipe From Right Exhaust Manifold Nuts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove front exhaust pipe from right exhaust manifold nuts - **1 to 3** -.

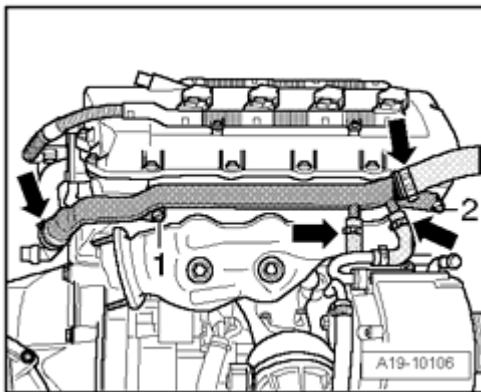


Fig. 551: Removing Bolts & Loosening Hose Clamps And Removing Right Coolant Pipe From Coolant Hoses

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **1** - and - **2** -.
- Loosen hose clamps - **arrows** - and remove right coolant pipe from coolant hoses.

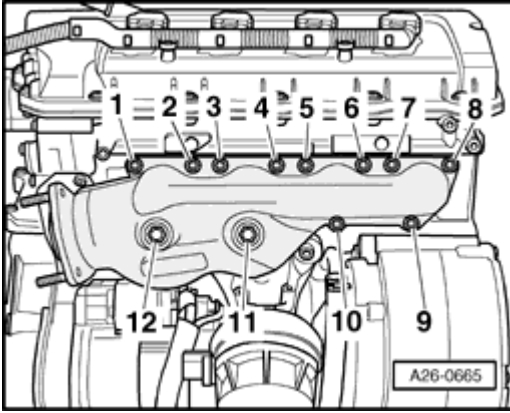


Fig. 552: Removing Nuts And Right Exhaust Manifold

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove nuts - **1 to 12** - and remove right exhaust manifold.

Installing

Installation is in reverse order of removal, note the following:

NOTE:

- **Replace gaskets and self-locking nuts.**
- **During installation, all cable ties must be re-installed at the same location.**
- Install right coolant pipe.
- Install right front exhaust pipe with pre- and main catalytic converters --> **Right exhaust pipe (with catalytic converter), removing and installing.**
- Install engine --> **Engine, installing.**

Torque specifications

Component	Nm
Exhaust manifold to cylinder head	25 * See note

* Replace nuts

Exhaust system, installing free of tension

NOTE:

- **Align exhaust system when cold.**

Vehicles without double clamps between center and rear muffler

- Loosen bolts of clamping sleeves.

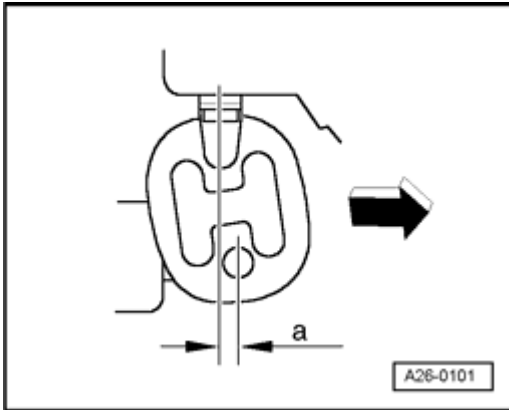


Fig. 553: Pushing Exhaust System Toward Front Of Vehicle
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press exhaust system far enough forward - **arrow** - until pre-load on retaining loops at right on rear mufflers is - **a** - = 5 to 9 mm.
- Tighten clamping sleeve connections evenly to 23 Nm.
- Align end pipes --> **Tail pipes, aligning.**

Vehicles with double clamps between center and rear muffler**NOTE:**

- Only for vehicles with clamping sleeves between center and rear mufflers, the center muffler must also be aligned.**

- Loosen bolts of clamping sleeves and.

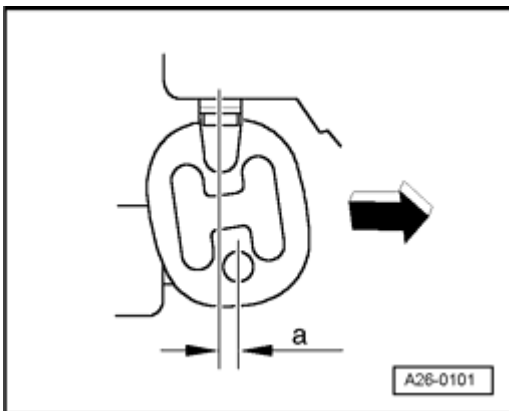


Fig. 554: Pushing Exhaust System Toward Front Of Vehicle
Courtesy of VOLKSWAGEN UNITED STATES, INC.

center muffler - **a** - = 5 to 9 mm.

- Tighten from clamping sleeve connections evenly to 23 Nm.

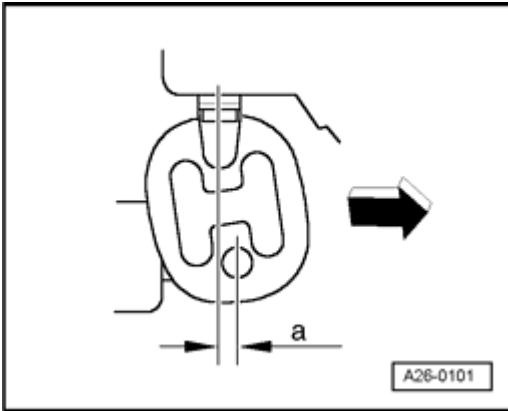


Fig. 555: Pushing Exhaust System Toward Front Of Vehicle
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press rear part of exhaust system far enough forward - **arrow** - so that the pre-tension at rear retaining loops of rear mufflers is - **a** - = 5 to 9 mm.
- Align rear muffler horizontally.
- Tighten bolts for rear clamping sleeve uniformly to 23 Nm.
- Align end pipes --> **Tail pipes, aligning.**

Tail pipes, aligning

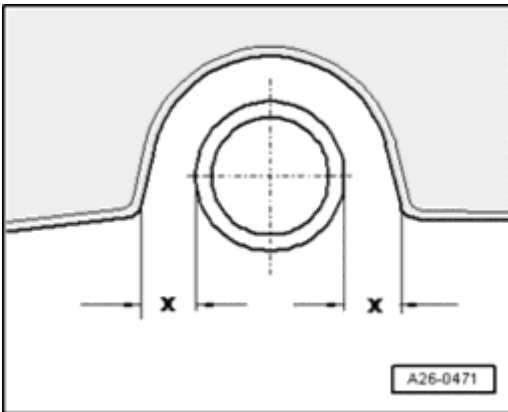


Fig. 556: Checking Distance Of End Pipes At Left/Right To Bumper
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check distance of end pipes at left and right to bumper:
 - Dimension - **x** - left = dimension - **x** - right

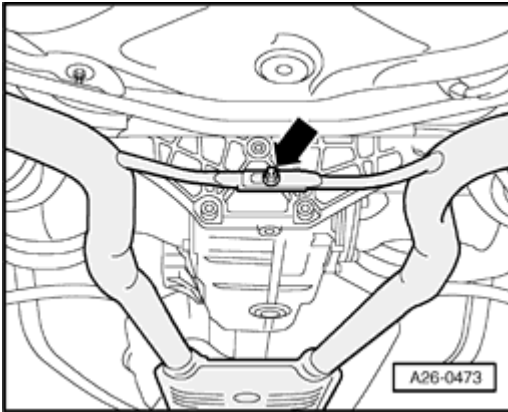


Fig. 557: Loosening Nut Of Brace Between Exhaust Pipes
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

If necessary, correct dimension - **x** - as follows:

- Loosen threaded connections - **arrow** - of brace between exhaust pipes.
- Adjust distance between rear mufflers.
- Tighten threaded fastener to 25 Nm.

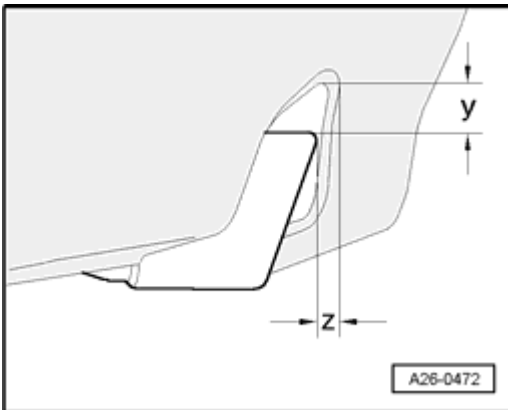


Fig. 558: Checking Distances Of End Pipes To Bumper
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check distances - **y** - and - **z** - of end pipes to bumper:
 - Dimension - **y** - = 17 to 19 mm.
 - Dimension - **z** - = 0 ± 2 mm.
- If necessary, check whether exhaust system is aligned tension-free --> **Exhaust system, installing free of tension.**

Exhaust system, checking for leaks

- Start engine and let run at idle.

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- Seal tailpipes with cloths or plug for duration of leak test.
- Check for leaks by listening at connection areas of cylinder head/exhaust manifold, exhaust manifold/front exhaust pipe etc.
- Repair leaks detected.

SECONDARY AIR INJECTION (AIR), SERVICING

Secondary Air Injection (AIR), servicing

- The Secondary Air Injection (AIR) system heats up engine faster, and thereby the catalytic converter achieves operation readiness earlier after a cold start.
- Due to rich mixture during the cold start phase, the exhaust emissions contain an increased level of unburned hydrocarbons. The Secondary Air Injection (AIR) system improves the secondary oxidation within the catalytic converter, thereby reducing harmful emissions. The heat released by secondary oxidation shortens start-up time of the catalytic converter considerably, as well as significantly improves emissions quality during cold-running phase.

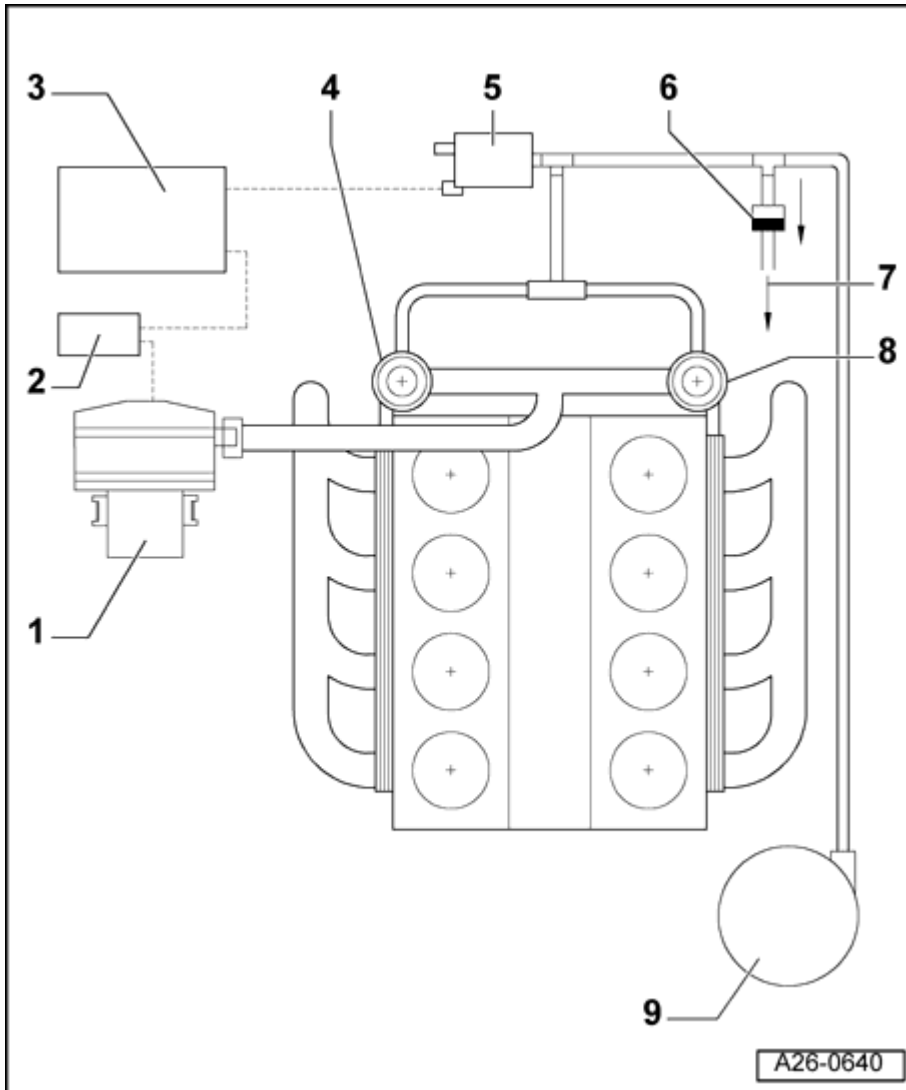


Fig. 559: Secondary Air Injection (AIR), Component Overview
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- In cold start phase, the Motronic Engine Control Module (ECM) J220 - **3** - via Secondary Air Injection (AIR) Pump Relay J299 - **2** - activates the Secondary Air Injection (AIR) Pump Motor V101 - **1** -. Air reaches the combination valves for Secondary Air Injection (AIR) - **4** - and - **8** -.
- The Secondary Air Injection (AIR) Solenoid Valve N112 - **5** - is activated in parallel, which allows the vacuum to reach the combination valves for secondary air injection - **4** - and - **8** -. The appropriate combination valve for Secondary Air Injection (AIR) thereby opens the path for secondary air to the exhaust channels of the cylinder head.

Secondary air injection (AIR) system, overview

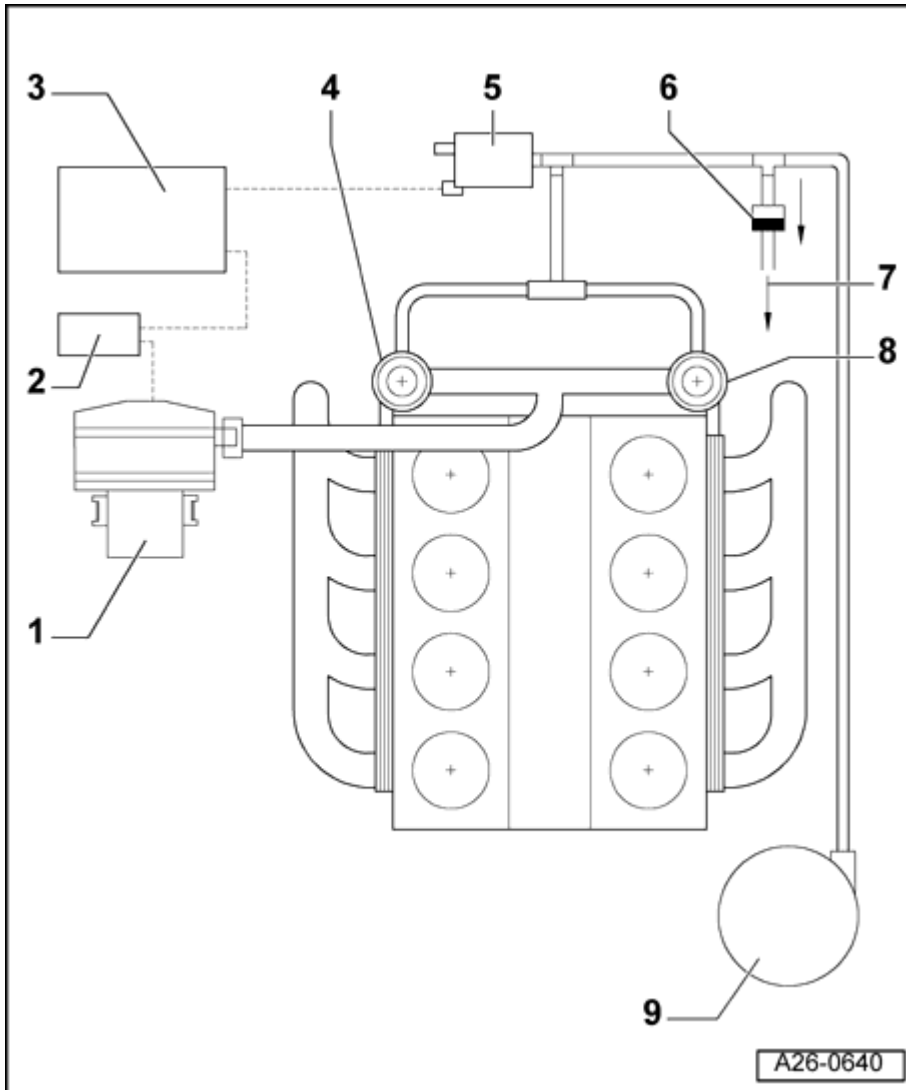


Fig. 560: Secondary Air Injection (AIR), Component Overview
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Secondary Air Injection (AIR) Pump Motor V101

- Component location --> **Component location of Secondary Air Injection (AIR) Pump Motor V101**
- Removing and installing --> **Secondary Air Injection (AIR) Pump Motor V101 , removing and installing**

2 - Secondary Air Injection (AIR) Pump Relay J299

- Component location --> **Component location for Secondary Air Injection (AIR) Pump Relay J299**

3 - Motronic engine control module J220

4 - Right combination valve for Secondary Air Injection (AIR)

- Component location **Combination valve for Secondary Air Injection (AIR)**
- Checking --> **Combination valve for Secondary Air Injection (AIR), checking for function and leaks**
- Removing and installing --> **Right combination valve for Secondary Air Injection (AIR), removing and installing**

5 - Secondary air injection (AIR) solenoid valve N112

- Component location --> **Installation location of Secondary Air Injection (AIR) Solenoid Valve N112**

6 - Non-return valve

- Installed location: Arrow points in direction of flow, as shown in **Fig. 560**.

7 - To Intake manifold

8 - Left combination valve for Secondary Air Injection (AIR)

- Component location **Combination valve for Secondary Air Injection (AIR)**
- Checking --> **Combination valve for Secondary Air Injection (AIR), checking for function and leaks**
- Removing and installing --> **Left combination valve for Secondary Air Injection (AIR), removing and installing**

9 - Vacuum reservoir

- Component location: In left front wheel housing behind wheel housing liner

Installation location of Secondary Air Injection (AIR) Solenoid Valve N112

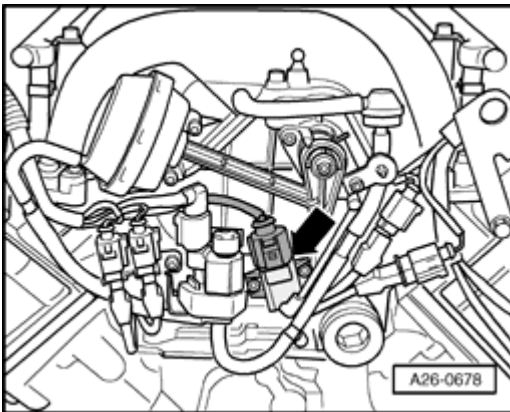


Fig. 561: Installation Location Of Secondary Air Injection (AIR) Solenoid Valve N112
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Front at intake manifold - **arrow** -.

Component location of Secondary Air Injection (AIR) Pump Motor V101

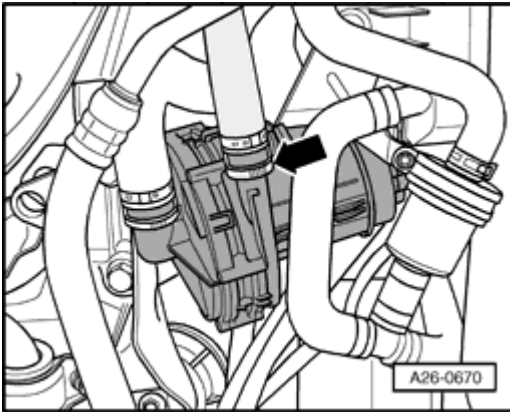


Fig. 562: Secondary Air Injection (AIR) Pump Motor -V101-
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- At right front in engine compartment below long member.

Component location for Secondary Air Injection (AIR) Pump Relay J299

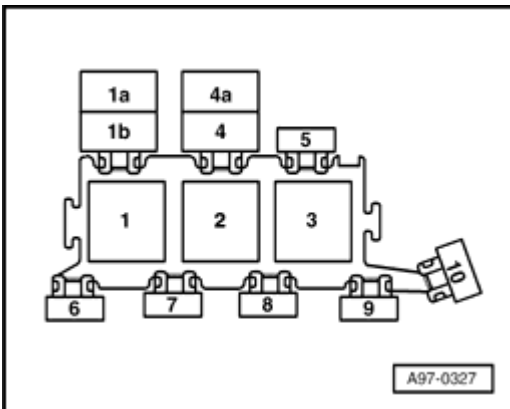


Fig. 563: Component Location For Secondary Air Injection (AIR) Pump Relay J299
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- At position 2 in 3-socket relay carrier in E-box, plenum chamber.

Combination valve for Secondary Air Injection (AIR)

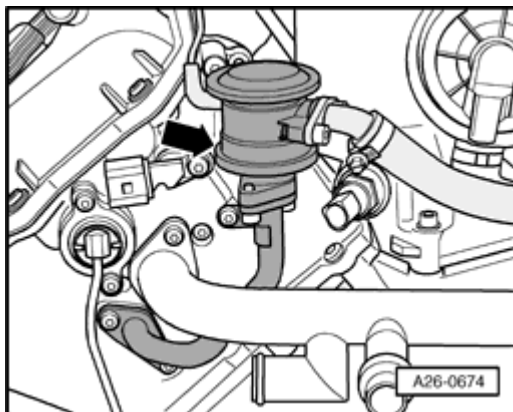


Fig. 564: Combination Valve For Secondary Air Injection (AIR)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- At rear of cylinder heads.

NOTE:

- Left valve is displayed in illustration.

Secondary Air Injection (AIR) Pump Motor V101 , removing and installing

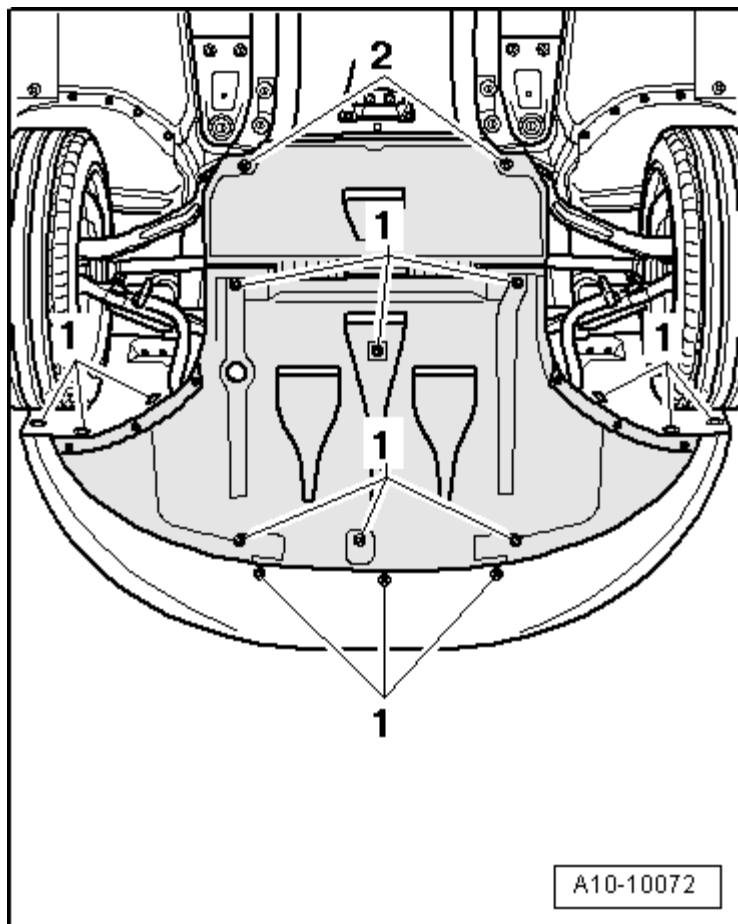
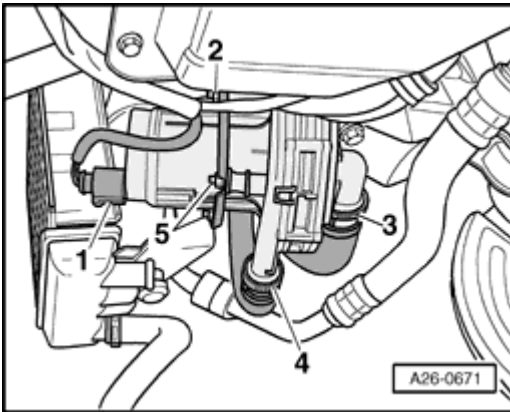


Fig. 565: Identifying Quick-Release Fasteners & Noise Insulation

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Removing

- Loosen quick-release fasteners - **1** - and - **2** - and remove front noise insulation.
- Remove front bumper --> **63 - BUMPERS** .

**Fig. 566: Identifying Hoses, Electrical Connector, Nuts & Secondary Air Injection (AIR) Pump Motor V101**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect hoses - **3** - and - **4** - at Secondary Air Injection (AIR) Pump Motor V101.
- Disconnect electrical connector - **1** -.
- Remove nuts - **2** - and - **5** - and remove Secondary Air Injection (AIR) pump motor V101 from bracket.

Installing

Installation is in reverse order of removal, note the following:

- Install front bumper --> **63 - BUMPERS** .

Torque specifications

Component	Nm
Secondary Air Injection (AIR) pump to bracket	10

Combination valve for Secondary Air Injection (AIR), checking for function and leaks

Special tools, testers and auxiliary items required

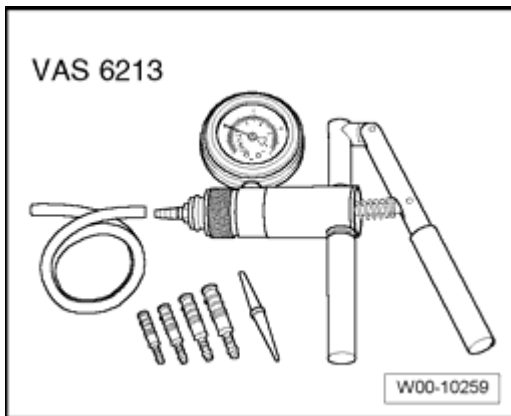


Fig. 567: Identifying Hand Vacuum Pump VAS 6213
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Hand vacuum pump VAS 6213

Test conditions

- Vacuum lines and hose connections free of leaks.
- Vacuum lines not plugged.

Test sequence

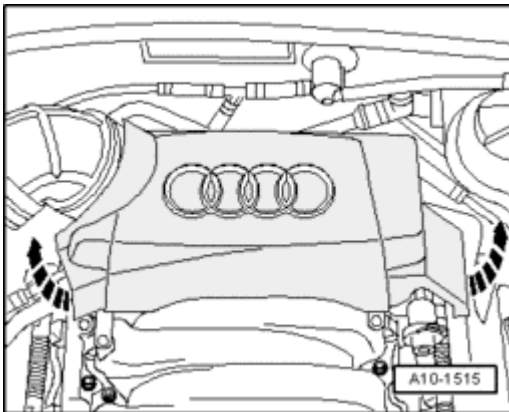


Fig. 568: Removing/Installing Rear Engine Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove rear engine cover - **arrows** -.

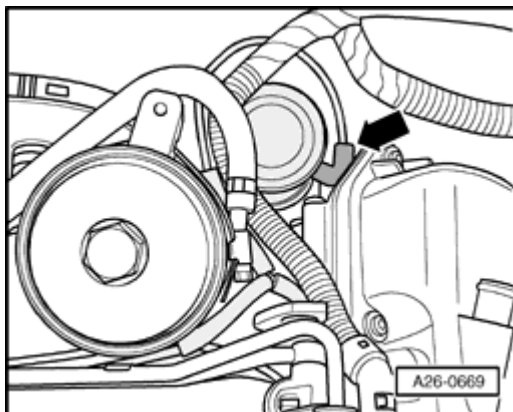


Fig. 569: Disconnecting Vacuum Hose At Combination Valve To Be Tested
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect vacuum hose - **arrow** - at combination valve to be tested.

NOTE:

- **Left combination valve is shown in illustration.**

- Connect hand vacuum pump VAS 6213 to vacuum hose of combination valve to be checked.

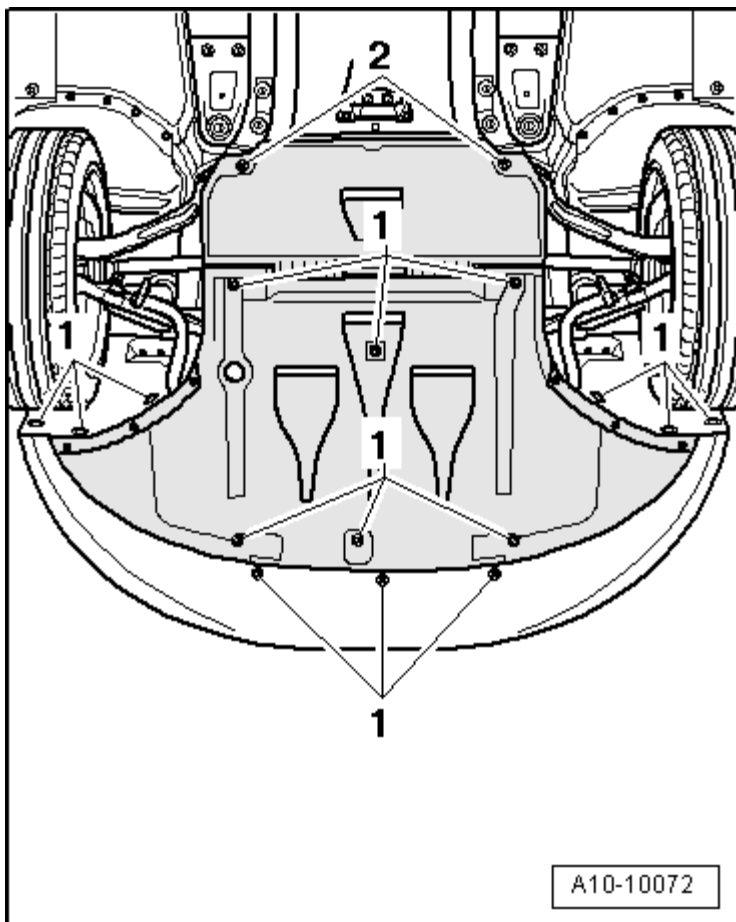


Fig. 570: Identifying Quick-Release Fasteners & Noise Insulation
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen quick-release fasteners - 1 - and - 2 - and remove front noise insulation.

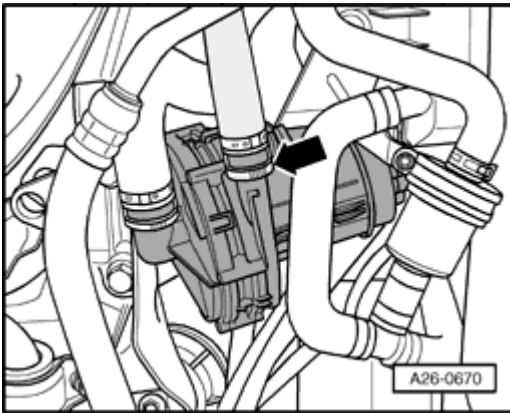


Fig. 571: Secondary Air Injection (AIR) Pump Motor -V101-
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect pressure hose - **arrow** - at Secondary Air Injection (AIR) Pump Motor V101.
- Blow with light pressure into pipe (do not use pressurized air).
- Both combination valves must be closed, it must not be possible to blow through hose.
- Operate hand vacuum pump.
- The relevant combination valve must open, it must not be possible to blow through.

If relevant combination valve does not open:

- Replace combi-valve --> **Left combination valve for Secondary Air Injection (AIR), removing and installing** and --> **Right combination valve for Secondary Air Injection (AIR), removing and installing**.

Left combination valve for Secondary Air Injection (AIR), removing and installing

Special tools, testers and auxiliary items required

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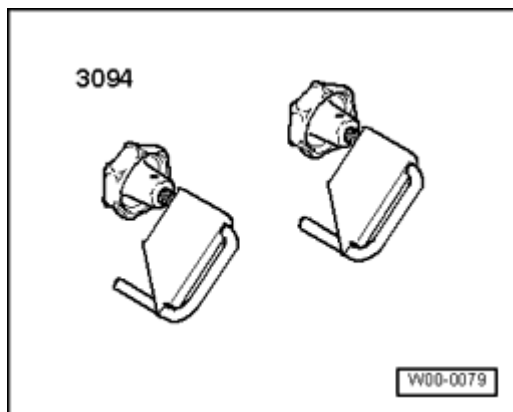


Fig. 572: Identifying Hose Clamps 3094

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Hose Clamps Up to 25 mm dia. 3094

Removing

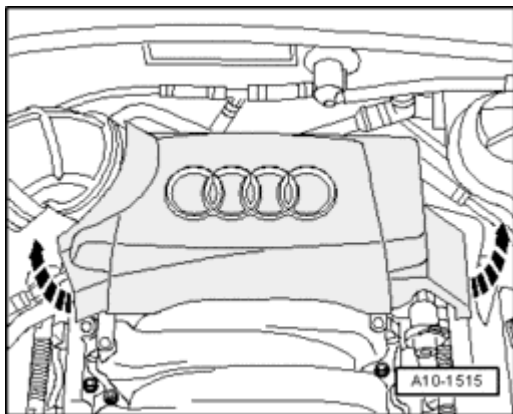


Fig. 573: Removing/Installing Rear Engine Cover

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove rear engine cover - **arrows** -.

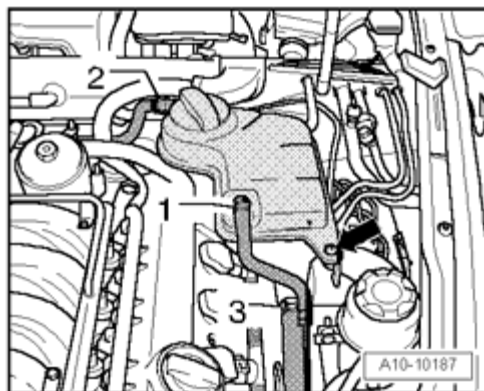


Fig. 574: Removing Coolant Hoses & Coolant Expansion Tank

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Clamp off coolant hose - **2** - using Hose Clamps Up to 25 mm dia. 3094 and disconnect from coolant expansion tank.
- Remove coolant expansion tank - **arrow** -.
- Disconnect electrical wire to Engine Coolant Level (ECL) Warning Switch F66 on bottom of expansion tank and set aside coolant expansion tank with coolant hoses - **1 and 3** - connected.
- If necessary, seal connection using an appropriate plug.

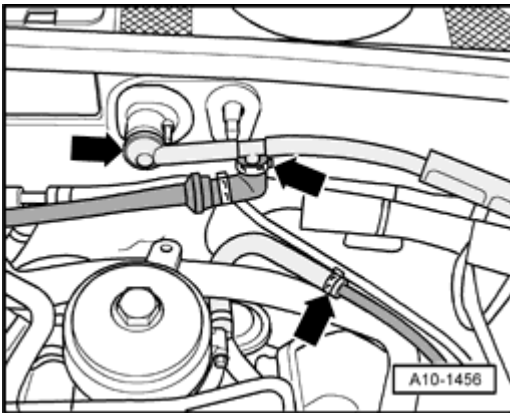


Fig. 575: Disconnecting Vacuum Hoses

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect vacuum hoses at positions indicated by - **arrows** -.
- Disconnect hose for crankcase ventilation at left cylinder head cover.

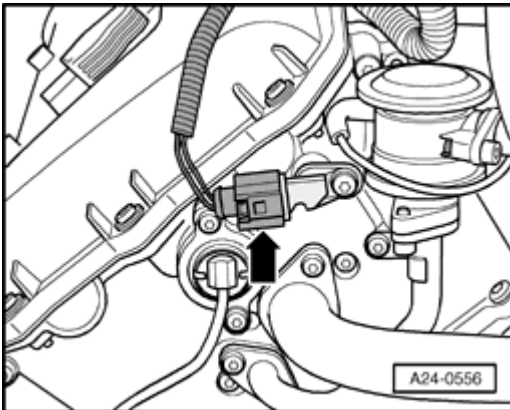


Fig. 576: Disconnecting Electrical Harness Connector For Camshaft Position (CMP) Sensor 2 G163 On Left Cylinder Head

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical harness connector - **arrow** - for Camshaft Position (CMP) Sensor 2 G163 on left cylinder head.

NOTE: • Illustration depicts engine from rear.

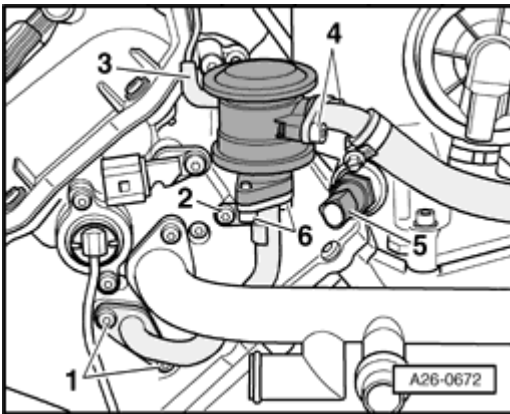


Fig. 577: Disconnect Vacuum Hose, Electrical Harness Connector From Oil Pressure Switch F1, Removing Bolts & Oil Pressure Switch

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect vacuum hose - **3** -.
- Remove bolts - **4** -.
- Disconnect electrical harness connector from oil pressure switch - **5** -.
- Remove oil pressure switch.
- Remove bolts - **1** - and - **2** -.
- Swing combination valve and remove bolts - **6** -.
- Remove combination valve and connecting tube.

NOTE: • Illustration depicts engine from rear.

Installing

Installation is in reverse order of removal, note the following:

- NOTE:**
- Always replace gaskets and seals.
 - Note installation position of seal between cylinder head and connecting tube.
 - Secure all hose connections using hose clamps appropriate for the model type .
- Check coolant level.

Torque specifications

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ENGINE 4.2 Liter V8 4V Engine Mechanical, Engine Code(s): BAT, BNK

Component		Nm
Connecting pipe	Cylinder head	10
to	Combi-valve	10
Oil pressure switch to oil filter housing		25

Right combination valve for Secondary Air Injection (AIR), removing and installing

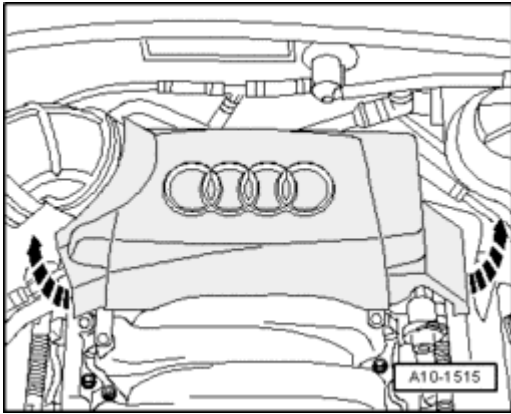


Fig. 578: Removing/Installing Rear Engine Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Removing

- Remove rear engine cover - **arrows** -.

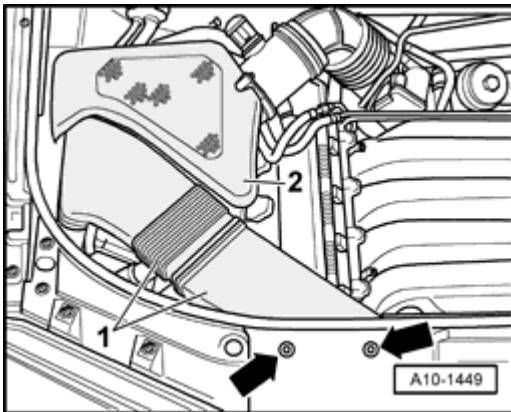


Fig. 579: Identifying Air Filter Cover & Air Duct
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove air filter cover - **2** -.
- Remove air duct - **1** -.

NOTE:

- To pull out clips - **arrows** - , use pry lever 80-200.
- If necessary, use silicon-free spray lubricant to facilitate removal.

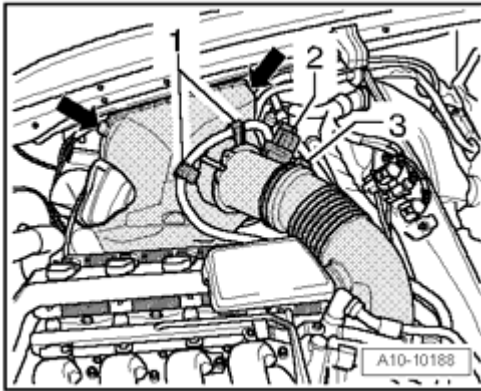


Fig. 580: Disconnecting Mass Air Flow (MAF) Sensor G70 Electrical Harness Connector
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unclip fuel hose - **1** -.
- Disconnect electrical connector - **2** - from mass air flow (MAF) sensor.
- Disconnect mass air flow sensor from intake air duct - **3** -.
- Remove upper part of air filter housing with mass air flow (MAF) sensor - **arrows** -.

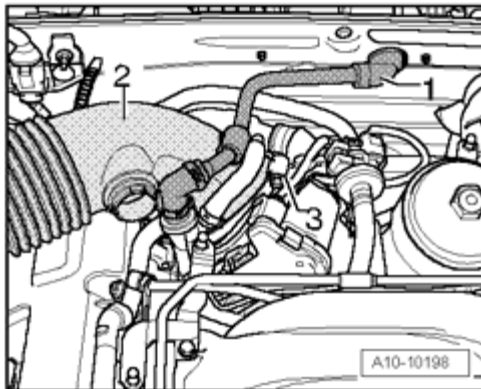


Fig. 581: Identifying Vacuum Hose, Intake Hose & Clamp
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove intake hose - **2** - , thereby loosening clamp - **3** -.

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ENGINE 4.2 Liter V8 4V Engine Mechanical, Engine Code(s): BAT, BNK

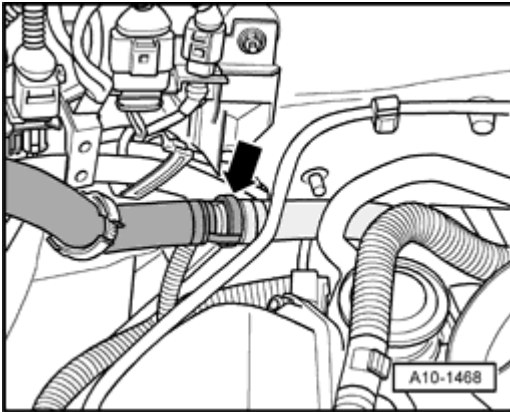


Fig. 582: Disconnecting Air Hose To Combination Valves For Secondary Air Injection (AIR)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect air hose - **arrow** - to combination valves for Secondary Air Injection (AIR).

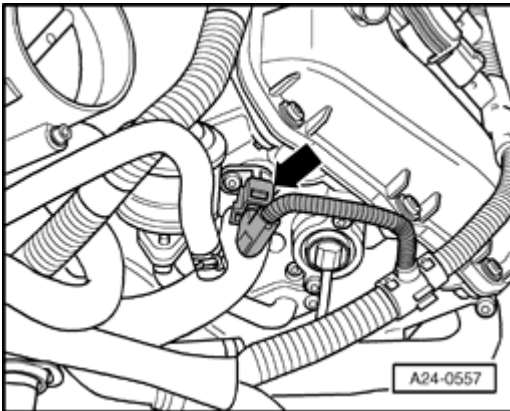


Fig. 583: Disconnecting Electrical Harness Connector For Camshaft Position (CMP) Sensor G40 On Right Cylinder Head
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical harness connector - **arrow** - for Camshaft Position (CMP) Sensor G40 on right cylinder head.

NOTE:

- Illustration depicts engine from rear.

2006 Audi A6 Quattro

ENGINE 4.2 Liter V8 4V Engine Mechanical, Engine Code(s): BAT, BNK

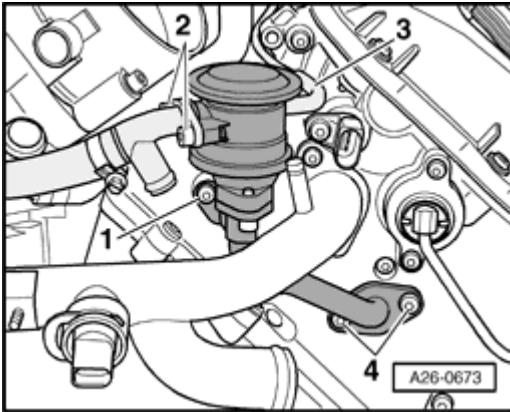


Fig. 584: Disconnecting Vacuum Hose And Remove Bolts & Combination Valve
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect vacuum hose - **3** -.
- Remove bolts - **1** - , - **2** - and - **4** - and remove combination valve.

NOTE: • Illustration depicts engine from rear.

Installing

Installation is in reverse order of removal, note the following:

- NOTE:**
- Replace seals.
 - Secure all hose connections using hose clamps appropriate for the model type .

Torque specifications

Component		Nm
Connecting pipe	Cylinder head	10
to	Combi-valve	10