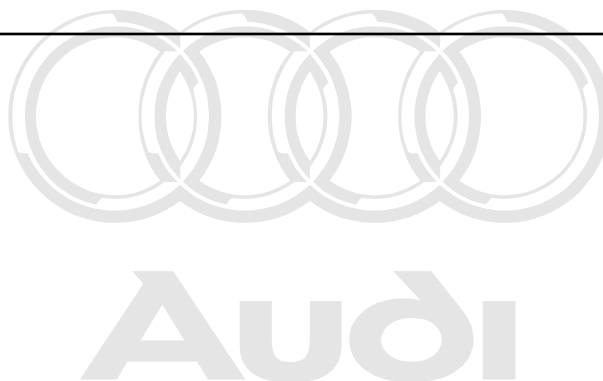




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Workshop Manual

Audi A6 2005 ➤

Simos direct injection and ignition system (6-cyl. 3.0 ltr. TFSI 4-valve)

Engine ID	CAJA	CCA A							
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Edition 02.2015

List of Workshop Manual Repair GroupsList of Workshop Manual Repair GroupsList of Workshop Manual Repair Groups

Repair Group

24 - Mixture preparation - injection

28 - Ignition system



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Technical information should always be available to the foremen and mechanics, because their careful and constant adherence to the instructions is essential to ensure vehicle road-worthiness and safety. In addition, the normal basic safety precautions for working on motor vehicles must, as a matter of course, be observed.

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24 – Mixture preparation - injection

1 Safety precautions and rules for cleanliness

(ARL004175; Edition 02.2015)

1.1 General notes on self-diagnosis

- ◆ The engine control unit has a self-diagnosis capability. Before carrying out repairs and fault finding, the event memory must be interrogated. The vacuum hoses and connections must also be checked (unmetered air).
- ◆ Fuel hoses in engine compartment must only be secured with spring-type clips. O-type clips or screw-type clips must not be used.
- ◆ A voltage of at least 11.5 V is required for proper operation of the electrical components.
- ◆ Do not use sealants containing silicone. Particles of silicone drawn into the engine will not be burnt in the engine and will damage the Lambda probe.
- ◆ The vehicles are fitted with a crash/fuel shut-off system. This system is designed to reduce the risk of a vehicle fire after a crash by deactivating the fuel pump via the fuel pump relay.

1.2 Safety precautions

Note the following if testers and measuring instruments have to be used during a road test:



WARNING

Accidents can be caused if the driver is distracted by test equipment while road-testing, or if test equipment is not properly secured.

Persons sitting in the front passenger's seat could be injured if the airbag is triggered in an accident.

- *The use of test equipment while driving causes distraction.*
- *There is an increased risk of injury if test equipment is not secured.*
- ◆ *Test equipment must always be secured on the rear seat with a strap and operated from the rear seat by a second person.*

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Caution

- ◆ *Observe notes on procedure for disconnecting the battery
⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .*

When working on the fuel system note the following warnings:



WARNING

The fuel system operates at extremely high pressure. This can cause injury.

- ◆ ***The fuel pressure in the high-pressure section of the injection system must be dissipated prior to opening the system.***
- ◆ ***Wrap a clean cloth around the connection and carefully loosen the connection to allow the residual pressure to dissipate.***

- Procedure before opening high-pressure section of injection system ⇒ [page 3](#) .

Observe the following to prevent injuries to persons and damage to the injection and ignition system:

- ◆ Persons wearing a cardiac pacemaker must at all times maintain a safe distance from high-voltage components such as the ignition system and gas-discharge headlights.
- ◆ Always switch off the ignition before connecting or disconnecting electrical wiring for the injection or ignition system or tester cables.
- ◆ Do not open any fuel line connections while the engine is running.
- ◆ Always switch off ignition before washing engine.
- ◆ Certain tests may lead to faults being stored in the engine control unit. The event memory must be interrogated after completing all tests and repair work. If faults are stored:

1.3 Rules for cleanliness and instructions for working on fuel system

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Even small amounts of dirt can cause malfunctions. When working on the fuel supply system and injection system, pay careful attention to the following basic rules:

- ◆ Carefully clean connection points and the surrounding area with engine cleaner or brake cleaner and dry thoroughly before opening.
- ◆ Plug open lines and connections with suitable protective caps immediately.
- ◆ Place parts that have been removed on a clean surface and cover them over. Do not use fluffy cloths.
- ◆ Carefully cover or seal open components if repairs cannot be carried out immediately.
- ◆ Only install clean components; replacement parts should only be unpacked immediately prior to installation. Do not use parts that have been previously unpacked and stored away loose (e.g. in toolboxes, etc.).
- ◆ When the system is open: Do not work with compressed air. Do not move the vehicle unless absolutely necessary.
- ◆ Protect unplugged electrical connectors against dirt and moisture and make sure connections are dry when attaching.

1.4 Procedure before opening high-pressure section of injection system

When working on the fuel system note the following warnings:



WARNING

- ◆ *The injection system consists of a high-pressure section (maximum approx. 120 bar) and a low-pressure section (approx. 6 bar).*
- ◆ *The fuel pressure in the high-pressure section must be reduced before this section of the system is opened.*



WARNING

Risk of injury - fuel system operates under pressure.

- ◆ *Wrap a clean cloth around the connection before opening the fuel system. Then release pressure by carefully loosening the connection.*
- ◆ *Wear protective gloves.*
- ◆ *Wear safety goggles.*

The fuel can become extremely hot. This can cause injuries.

- ◆ *In extreme cases the temperature of the fuel lines and the fuel can be up to 100 °C after the engine is switched off. Allow the fuel to cool down before disconnecting the lines - danger of scalding.*
- ◆ *Wear protective gloves.*
- ◆ *Wear safety goggles.*

The fuel rail is still filled with fuel, however it is no longer under high pressure.



WARNING

There is a risk of injury: avoid skin contact with fuel.

- ◆ *The fuel lines are still filled with fuel, however the fuel is no longer under high pressure. Wear safety goggles and protective clothing when opening the fuel system.*
- ◆ *Before opening the high-pressure section, wrap a cloth around the connection.*



WARNING

Escaping fuel can cause a risk.

- ◆ *The power supply for the fuel system pressurisation pump - G6- must be disconnected before opening the fuel system, since -G6- will be activated briefly when the driver's door is opened with the battery still connected.*

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**Caution**

To prevent irreparable damage to the electronic components when disconnecting the battery:

- ◆ *Observe notes on procedure for disconnecting the battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .*

- Disconnect battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .
- Erase any entries in event memory resulting from testing or installation ⇒ Vehicle diagnostic tester, Guided Functions, Interrogate event memory, then Generate readiness code.

1.5 Checking for leaks in the fuel system

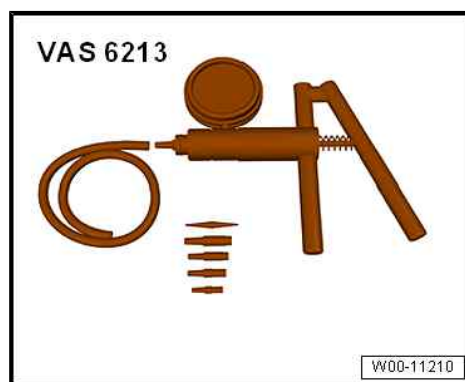
Proceed as follows:

- Allow engine to run for several minutes at moderate rpm.
- Switch off ignition.
- Check complete fuel system for leaks.
- If leaks are found although the connections have been tightened to the correct torque, the relevant component must be renewed.
- Road-test vehicle and accelerate with full throttle at least once.
- Then inspect high-pressure section of fuel system again for leaks.

1.6 Checking vacuum system

Special tools and workshop equipment required

- ◆ Hand vacuum pump - VAS 6213-



Procedure

- Check all vacuum lines in the complete vacuum system for:
 - ◆ Cracks
 - ◆ Traces of animal bites
 - ◆ Kinked or crushed lines
 - ◆ Lines porous or leaking
- Check vacuum line to solenoid valve and from solenoid valve to corresponding component.

- If an entry is stored in the event memory, check the vacuum lines leading to the corresponding component and also check the other vacuum lines leading to other components.
- If it is not possible to build up pressure with the hand vacuum pump - VAS 6213- or if the pressure drops again immediately, check the hand vacuum pump and connecting hoses for leaks.

1.7 Contact corrosion!

Contact corrosion can occur if unsuitable fasteners are used (e.g. bolts, nuts, washers, etc.).

For this reason, only fasteners with a special surface coating are used.

Additionally, all rubber and plastic parts and all adhesives are made of non-conductive materials.

Always install new parts if you are not sure whether used parts can be re-fitted → Electronic parts catalogue .

Note the following:

- ◆ We recommend using only genuine replacement parts; these have been tested and are compatible with aluminium.
- ◆ We recommend the use of Audi accessories.
- ◆ Damage caused by contact corrosion is not covered under warranty.

1.8 Routing and attachment of pipes, hoses and wiring

Mark hydraulic lines, vacuum lines and electrical wiring before removal so they can be re-installed in the original positions and correctly connected. Make sketches or take photographs if necessary.

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2 Injection system

2.1 Test data

3.0 ltr. TFSI engine	
Idling speed	Cannot be adjusted; regulated by idling speed stabilisation
Fuel pressure before high-pressure pump	3.0 ... 6.0 bar
Fuel pressure after high-pressure pump	30 ... 120 bar

2.2 Overview of fitting locations

Engine compartment (right-side)

1 - Secondary air pump motor - V101-

- ☐ Fitting location
⇒ [page 16](#)

2 - Charge pressure sender - G31- / intake manifold temperature sender - G72-

- ☐ Fitting location
⇒ [page 16](#)

3 - Ignition coils for cylinder bank 1

- ☐ Ignition coil 1 with output stage - N70-
- ☐ Ignition coil 2 with output stage - N127-
- ☐ Ignition coil 3 with output stage - N291-
- ☐ Removing and installing
⇒ [page 64](#)

4 - Right electrohydraulic engine mounting solenoid valve - N145-

- ☐ Fitting location
⇒ [page 14](#)

5 - Lambda probe - G39- with Lambda probe heater - Z19-

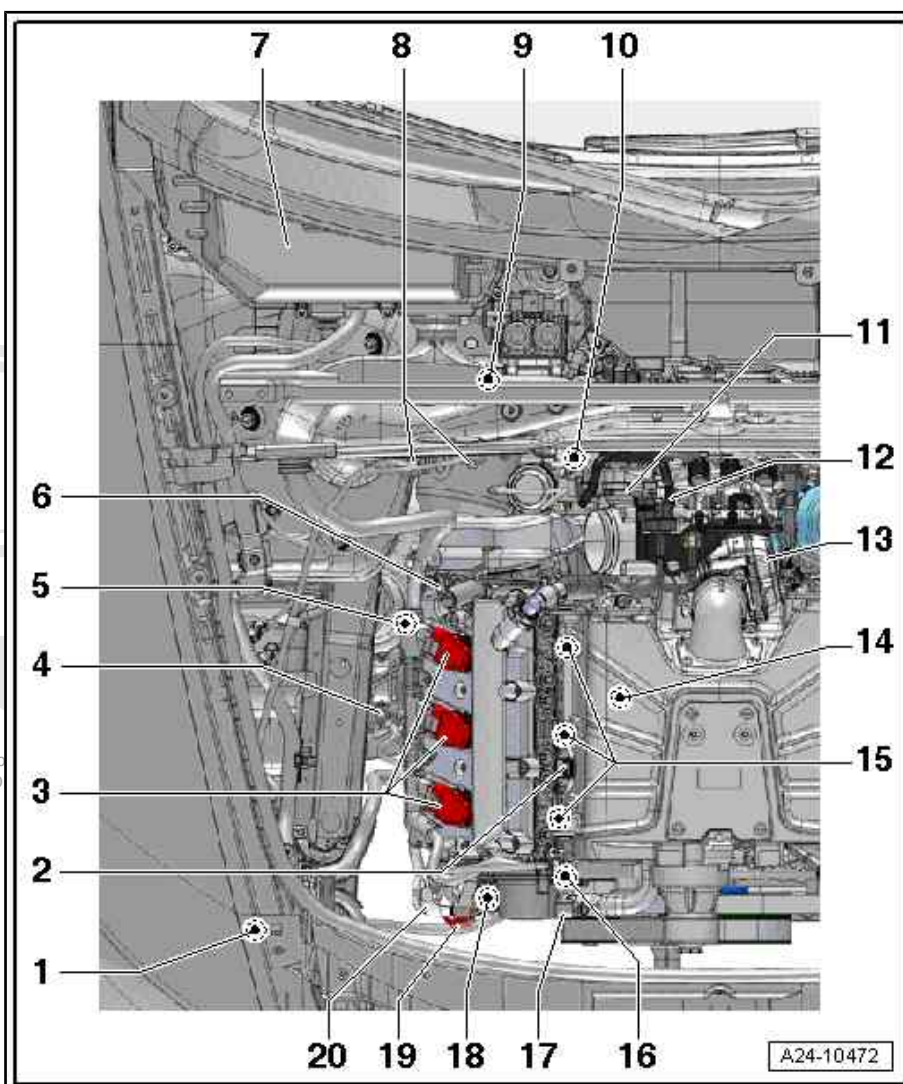
- ☐ Fitting location
⇒ [page 11](#)
- ☐ Fitting location of connector
⇒ [page 11](#)
- ☐ Removing and installing
⇒ [page 45](#)
- ☐ 55 Nm

6 - Camshaft control valve 1 - N205-

- ☐ Fitting location
⇒ [page 12](#)

7 - Engine control unit - J623-

- ☐ Fitting location
⇒ [page 10](#)
- ☐ Removing and installing
⇒ [page 56](#)



8 - Bracket (right-side) for connectors

- ☐ Fitting locations of connectors ➔ [page 11](#)

9 - Lambda probe after catalytic converter - G130- with Lambda probe 1 heater after catalytic converter - Z29-

- ☐ Fitting location ➔ [page 11](#)
- ☐ Fitting location of connector ➔ [page 11](#)
- ☐ Removing and installing ➔ [page 47](#)
- ☐ 55 Nm

10 - Sender 1 for secondary air pressure - G609-

- ☐ Only on USA models
- ☐ Fitting location ➔ Rep. gr. 26

11 - Throttle valve module - J338-

- ☐ Fitting location ➔ [page 15](#)
- ☐ Removing and installing ➔ [page 26](#)
- ☐ After renewing, perform "Adaption" in "Guided Functions". Use vehicle diagnostic tester to do so.

12 - Activated charcoal filter solenoid valve 1 - N80-

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13 - Regulating flap control unit - J808-

- ☐ Fitting location ➔ [page 15](#)
- ☐ Removing and installing ➔ [page 28](#)
- ☐ After renewing, perform "Adaption" in "Guided Functions". Use vehicle diagnostic tester to do so.

14 - Knock sensor 1 - G61-

- ☐ Fitting location ➔ [page 14](#)
- ☐ Fitting location of connector ➔ [page 12](#)

15 - Injectors, cylinder bank 1

- ☐ Injector, cylinder 1 - N30-
- ☐ Injector, cylinder 2 - N31-
- ☐ Injector, cylinder 3 - N32-
- ☐ Removing and installing ➔ [page 29](#)
- ☐ Different types depending on version; refer to ➔ Electronic parts catalogue

16 - Intake manifold flap potentiometer - G336-

- ☐ Fitting location ➔ [page 12](#)

17 - Hall sender - G40-

- ☐ Fitting location ➔ [page 12](#)

18 - Fuel metering valve - N290-

- ☐ Fitting location ➔ [page 14](#)

19 - Fuel pressure sender for low pressure - G410-

- ☐ Fitting location ➔ [page 14](#)

20 - High-pressure fuel pump

- ☐ Fitting location ➔ [page 14](#)
- ☐ Removing and installing ➔ [page 41](#)

Engine compartment (left-side)

1 - Fuel pressure sender - G247-

- ☐ Fitting location
⇒ [page 15](#)

2 - Knock sensor 2 - G66-

- ☐ Fitting location
⇒ [page 15](#)
- ☐ Fitting location of connector ⇒ [page 12](#)

3 - Injectors, cylinder bank 2

- ☐ Injector, cylinder 4 - N33-
- ☐ Injector, cylinder 5 - N83-
- ☐ Injector, cylinder 6 - N84-
- ☐ Removing and installing
⇒ [page 29](#)
- ☐ Different types depending on version; refer to
⇒ Electronic parts catalogue

4 - Intake air temperature sender - G42- / intake manifold pressure sender - G71-

- ☐ Fitting location
⇒ [page 14](#)

5 - Secondary air inlet valve - N112-

- ☐ Fitting location
⇒ [page 13](#)

6 - Intake manifold flap valve - N316-

- ☐ Fitting location ⇒ [page 13](#)

7 - Secondary air inlet valve 2 - N320-

- ☐ Fitting location ⇒ [page 13](#)

8 - Engine speed sender - G28-

- ☐ Fitting location ⇒ [page 15](#)

9 - Lambda probe 2 after catalytic converter - G131- with Lambda probe 2 heater after catalytic converter - Z30-

- ☐ Fitting location ⇒ [page 11](#)
- ☐ Allocation and fitting location for connector ⇒ [page 11](#)
- ☐ Removing and installing ⇒ [page 51](#)
- ☐ 55 Nm

10 - Engine fault warning lamp

- ☐ In instrument cluster

11 - Accelerator position sender - G79- and accelerator position sender 2 - G185-

- ☐ In accelerator pedal module; fitting location ⇒ [page 10](#)

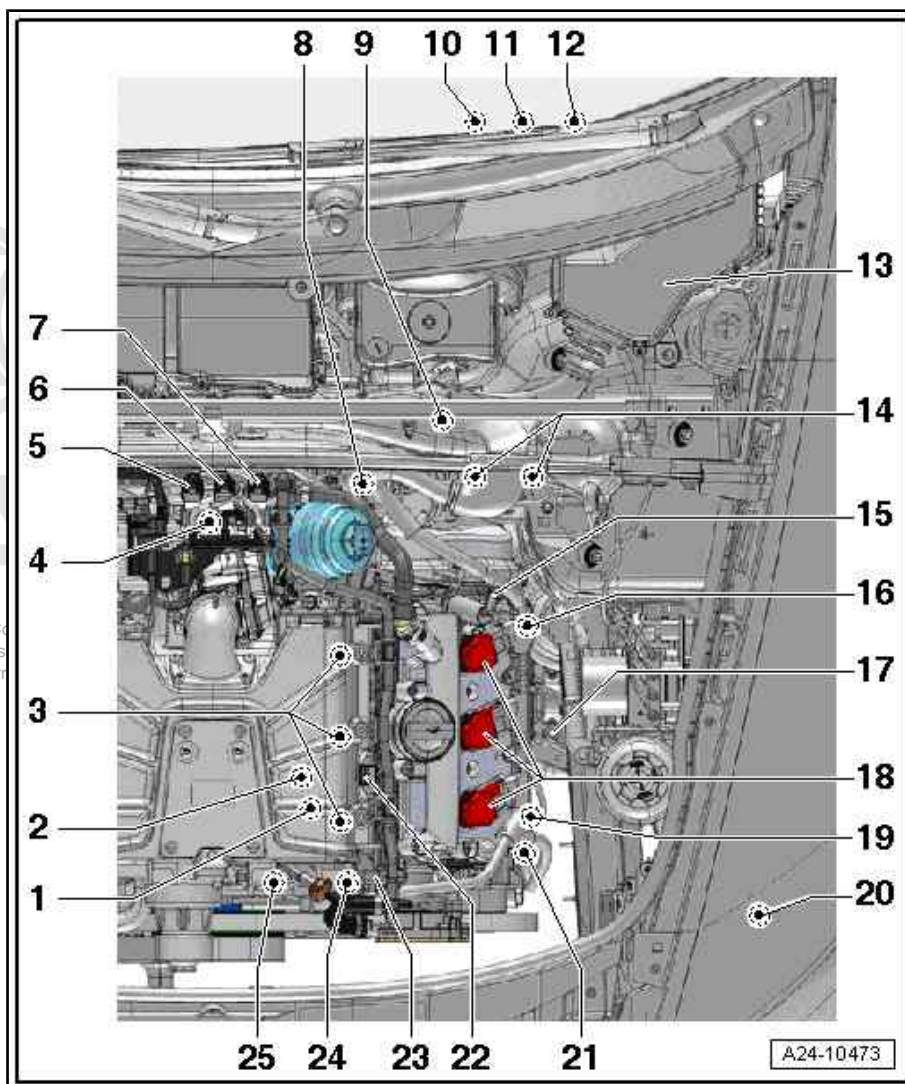
12 - Brake light switch - F- / brake pedal switch - F47-

- ☐ Fitting location ⇒ [page 10](#)

13 - Relay box

14 - Bracket (left-side) for connectors

- ☐ Fitting locations of connectors ⇒ [page 11](#)



15 - Camshaft control valve 2 - N208-

Fitting location ⇒ [page 13](#)

16 - Lambda probe 2 - G108- with Lambda probe heater 2 - Z28-

- ☐ Fitting location ⇒ [page 11](#)
- ☐ Fitting location of connector ⇒ [page 11](#)
- ☐ Removing and installing ⇒ [page 49](#)
- ☐ 55 Nm

17 - Left electrohydraulic engine mounting solenoid valve - N144-

- ☐ Fitting location ⇒ [page 14](#)

18 - Ignition coils for cylinder bank 2

- ☐ Ignition coil 4 with output stage - N292-
- ☐ Ignition coil 5 with output stage - N323-
- ☐ Ignition coil 6 with output stage - N324-
- ☐ Removing and installing ⇒ [page 64](#)

19 - Valve for oil pressure control - N428-

- ☐ Fitting location ⇒ [page 13](#)

20 - Charge air cooling pump - V188-

- ☐ Fitting location ⇒ [page 16](#)

21 - Continued coolant circulation pump - V51-

- ☐ Country-specific version
- ☐ Fitting location ⇒ [page 16](#)

22 - Intake manifold temperature sender 2 - G430- / charge pressure sender 2 - G447-

- ☐ Fitting location ⇒ [page 16](#)

23 - Hall sender 2 - G163-

- ☐ Fitting location ⇒ [page 13](#)

24 - Intake manifold flap potentiometer 2 - G512-

- ☐ Fitting location ⇒ [page 12](#)
- ☐ After renewing, perform "Adaption" in "Guided Functions". Use vehicle diagnostic tester to do so.

25 - Coolant temperature sender - G62-

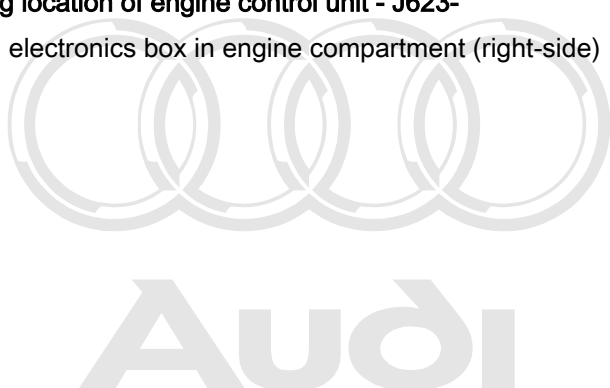
- ☐ Fitting location ⇒ [page 13](#)



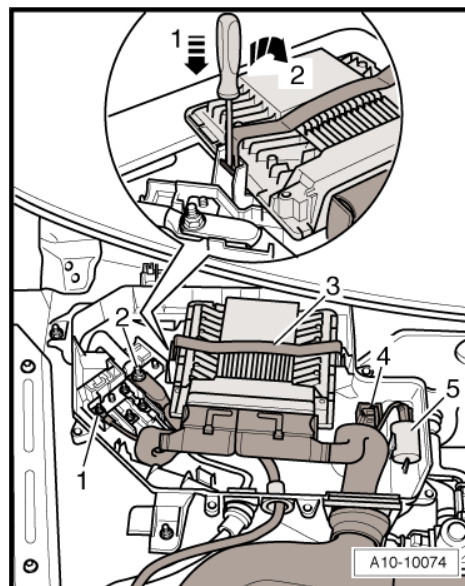
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Fitting location of engine control unit - J623-

- ◆ In electronics box in engine compartment (right-side)



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Fitting location of accelerator position sender - G79- / accelerator position sender 2 - G185-

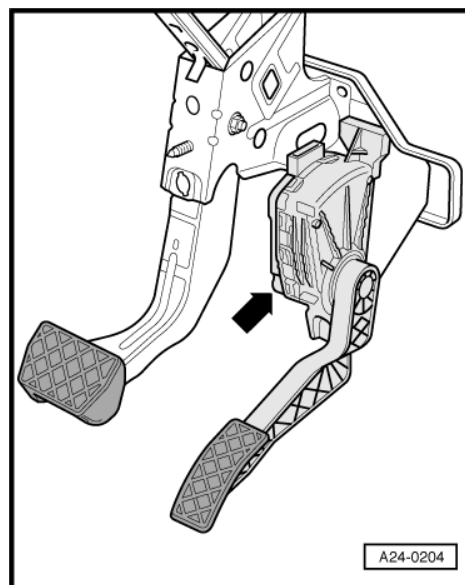
- ◆ In accelerator pedal module -arrow-



Note

The accelerator position sender - G79- and accelerator position sender 2 - G185- are integrated in the accelerator pedal module and cannot be renewed individually.

Removing and installing ⇒ Rep. gr. 20



Fitting location of brake light switch - F- / brake pedal switch - F47-

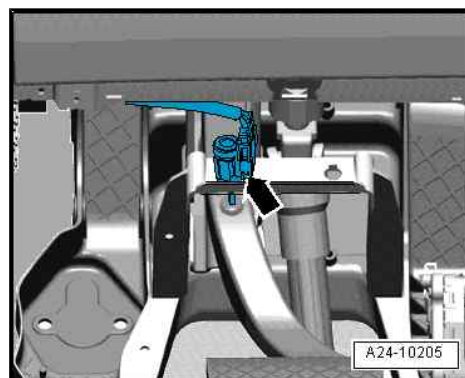
- ◆ On pedal bracket -arrow-



Note

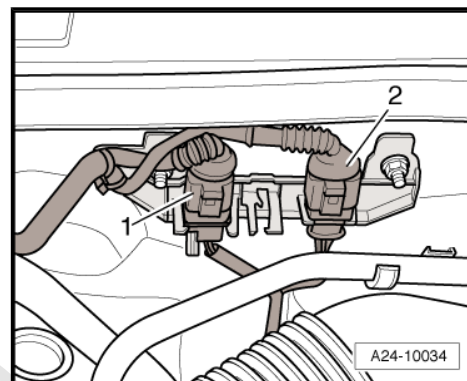
Switches must not be installed more than once, otherwise they may not fit securely.

Removing and installing ⇒ Rep. gr. 46



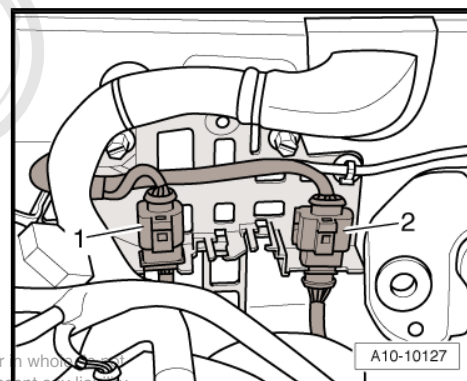
Connectors on plenum chamber partition panel (bracket on right side)

- 1 - For Lambda probe - G39- with Lambda probe heater - Z19-
- 2 - For Lambda probe after catalytic converter - G130- with Lambda probe 1 heater after catalytic converter - Z29-



Connectors on plenum chamber partition panel (bracket on left side)

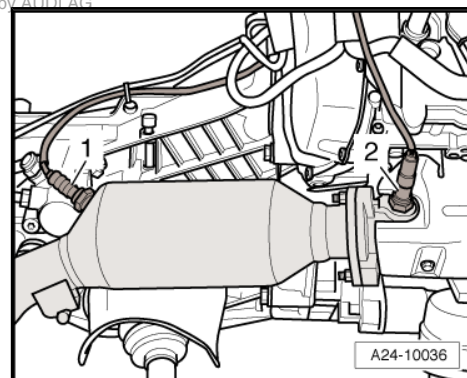
- 1 - For Lambda probe 2 - G108- with Lambda probe heater 2 - Z28-
- 2 - For Lambda probe 2 after catalytic converter - G131- with Lambda probe 2 heater after catalytic converter - Z30-



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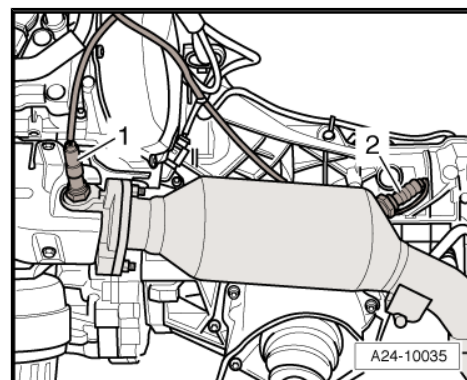
Fitting location of Lambda probes on cylinder bank 1 (right-side)

- 1 - Lambda probe after catalytic converter - G130- with Lambda probe 1 heater after catalytic converter - Z29-
- 2 - Lambda probe - G39- with Lambda probe heater - Z19-



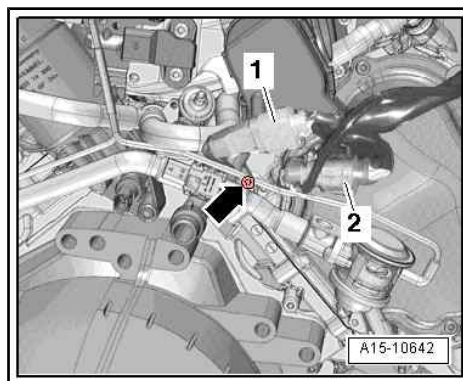
Fitting location of Lambda probes on cylinder bank 2 (left-side)

- 1 - Lambda probe 2 - G108- with Lambda probe heater 2 - Z28-
- 2 - Lambda probe 2 after catalytic converter - G131- with Lambda probe 2 heater after catalytic converter - Z30-



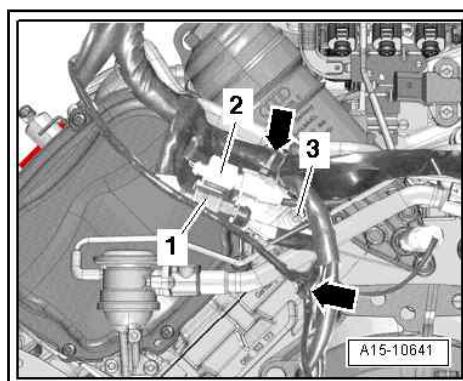
Electrical connectors at rear right of engine

- 1 - To knock sensor 1 - G61-
- 2 - To injectors on cylinder bank 1



Electrical connectors at rear left of engine

- 1 - To injectors on cylinder bank 2 and to fuel pressure sender - G247-
- 2 - To knock sensor 2 - G66-



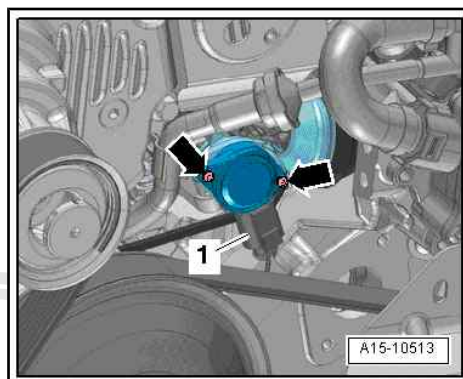
Fitting location of intake manifold flap potentiometer 2 - G512-

- ◆ At front of intake manifold (bottom section, left-side)



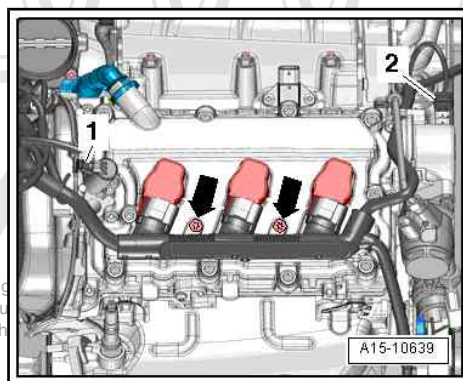
Note

The intake manifold flap potentiometer - G336- is located symmetrically reversed.



Hall sender and camshaft control valve on cylinder bank 1 (right-side)

- 1 - Camshaft control valve 1 - N205-
- 2 - Hall sender - G40-



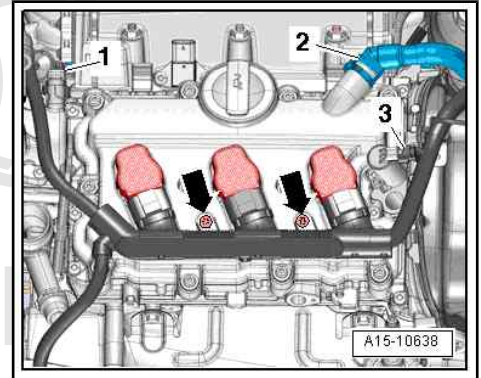
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Hall sender and camshaft control valve on cylinder bank 2 (left-side)

1 - Hall sender 2 - G163-

3 - Camshaft control valve 2 - N208-

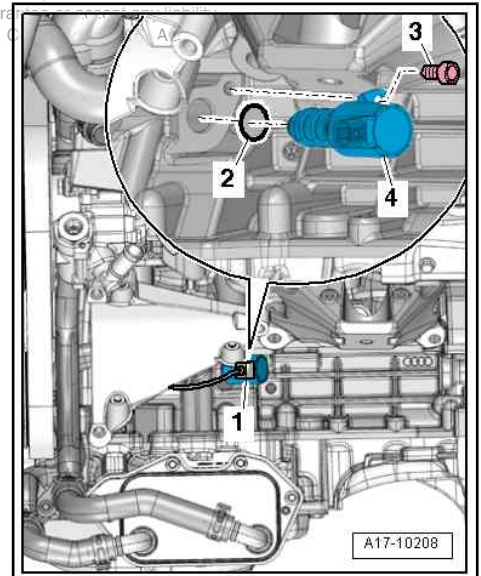


Fitting location of valve for oil pressure control - N428-

4 - Valve for oil pressure control - N428-

◆ On engine (bottom left)

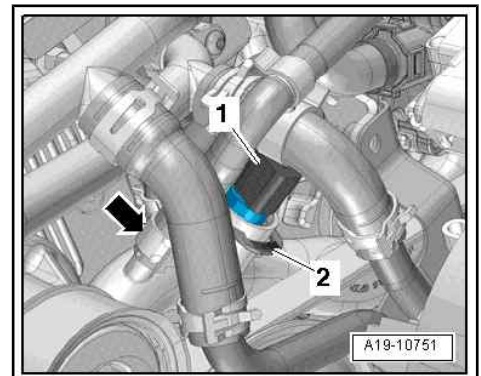
Removing and installing ⇒ Rep. gr. 17



Fitting location of coolant temperature sender - G62-

1 - Coolant temperature sender - G62-

◆ At front of engine



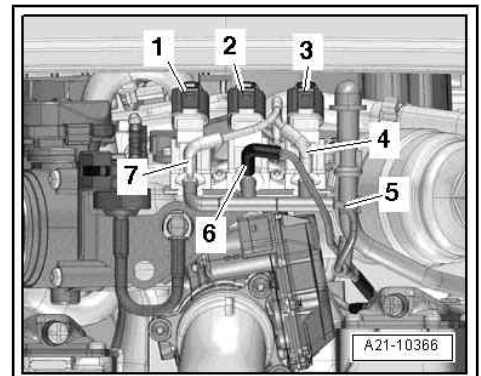
Fitting location of secondary air inlet valve - N112- / intake manifold flap valve - N316- / secondary air inlet valve 2 - N320-

1 - Secondary air inlet valve - N112-

2 - Intake manifold flap valve - N316-

3 - Secondary air inlet valve 2 - N320-

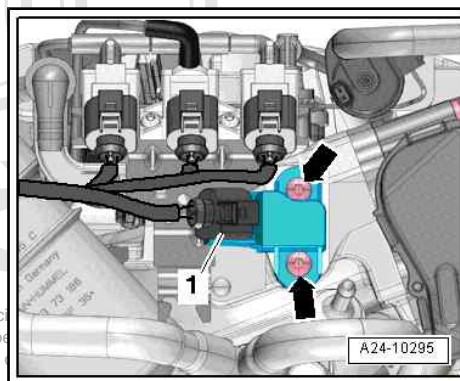
◆ At rear of supercharger with charge air cooler



Fitting location of intake air temperature sender - G42- / intake manifold pressure sender - G71-

- 1 - Intake air temperature sender - G42- / intake manifold pressure sender - G71-

◆ At rear of supercharger with charge air cooler



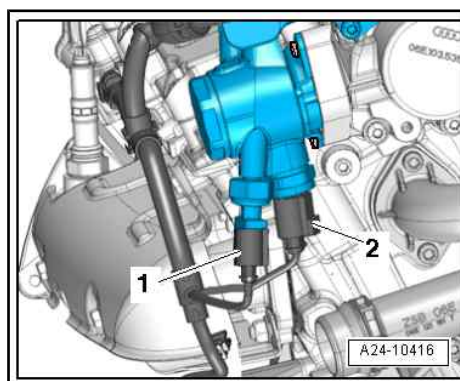
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Fitting locations at high-pressure pump

- 1 - Fuel pressure sender for low pressure - G410-

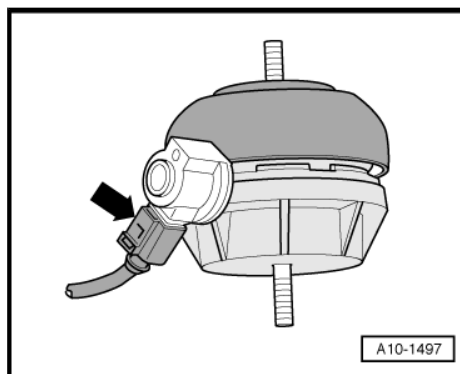
- 2 - Fuel metering valve - N290-

◆ On right side of cylinder head



Fitting location of left electrohydraulic engine mounting solenoid valve - N144- and right electrohydraulic engine mounting solenoid valve - N145-

◆ At engine mountings (left and right) -arrow-.



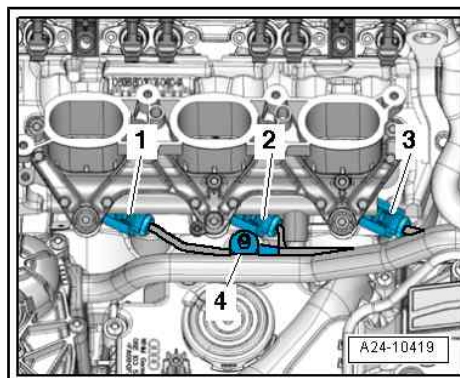
Fitting locations below intake manifold on cylinder bank 1 (right-side)

- 1 - Injector, cylinder 1 - N30-

- 2 - Injector, cylinder 2 - N31-

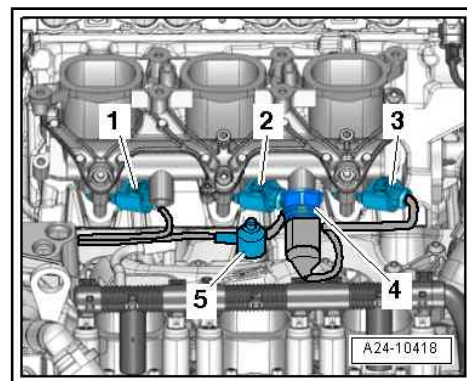
- 3 - Injector, cylinder 3 - N32-

- 4 - Knock sensor 1 - G61-



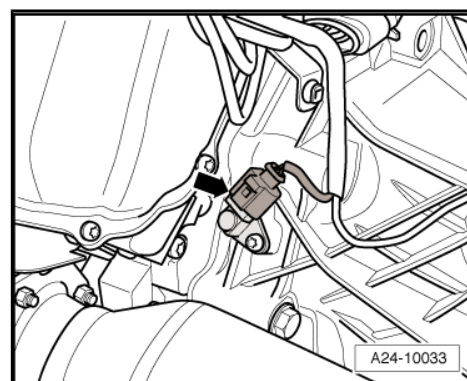
Fitting locations below intake manifold on cylinder bank 2 (left-side)

- 1 - Injector, cylinder 6 - N84-
- 2 - Injector, cylinder 5 - N83-
- 3 - Injector, cylinder 4 - N33-
- 4 - Fuel pressure sender - G247-
- 5 - Knock sensor 2 - G66-



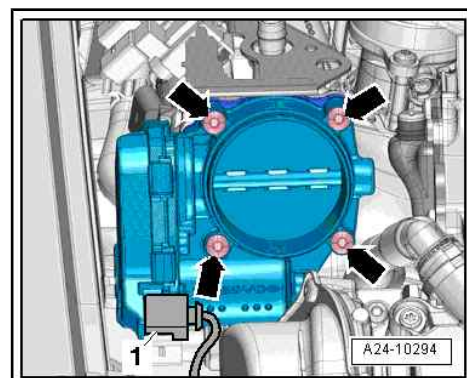
Fitting location of engine speed sender - G28-

- ◆ At front left of gearbox housing -arrow-



Fitting location of throttle valve module - J338-

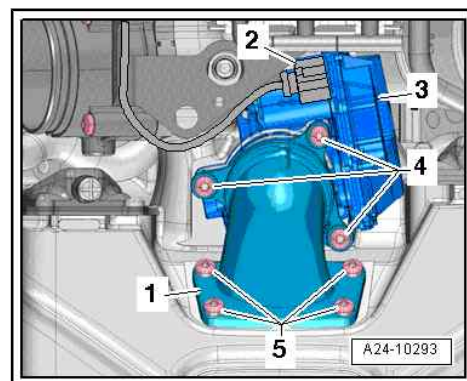
- ◆ At rear of supercharger



Fitting location of regulating flap control unit - J808-

- 4 - Regulating flap control unit - J808-

- ◆ At rear of supercharger



Fitting location of charge pressure sender - G31- / intake manifold temperature sender - G72-

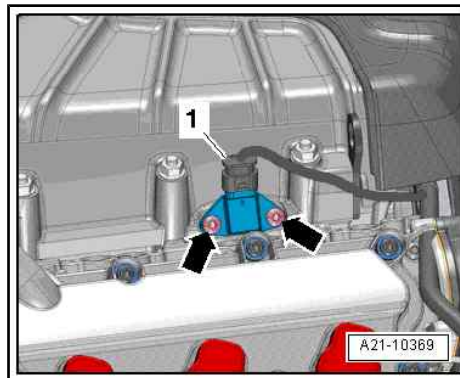
- ◆ At right side of supercharger with charge air cooler



Note

Intake manifold temperature sender 2 - G430- / charge pressure sender 2 - G447- are located symmetrically reversed.

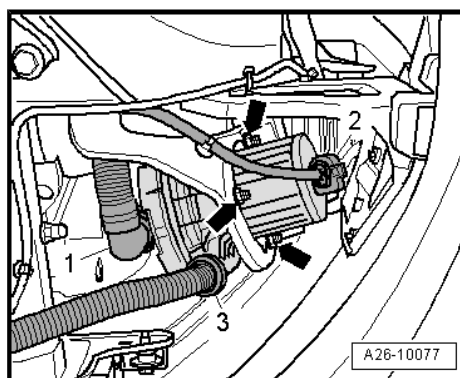
Removing and installing ⇒ Rep. gr. 21



Fitting location of secondary air pump motor - V101-

- ◆ Beneath headlight (right-side)

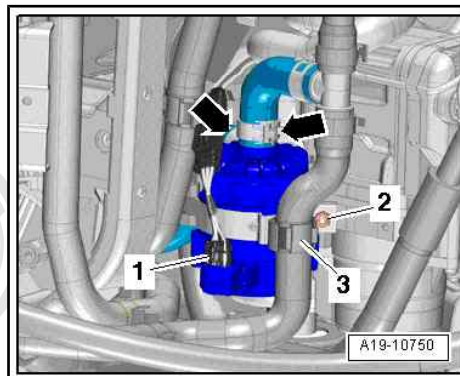
Removing and installing ⇒ Rep. gr. 26



Fitting location of charge air cooling pump - V188-

- ◆ Beneath headlight (left-side)

Removing and installing ⇒ Rep. gr. 19

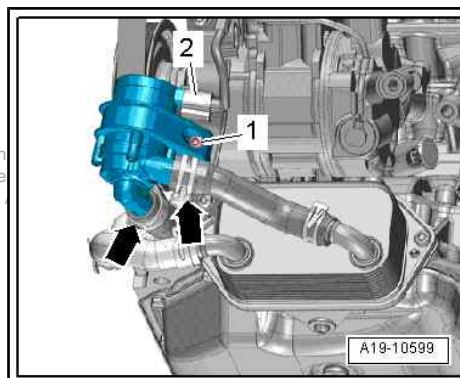


Fitting location of continued coolant circulation pump - V51-

- ◆ At front left of engine

Removing and installing ⇒ Rep. gr. 19

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2.3 Exploded view - air cleaner

- 1.5 Nm



18 - Air duct

- ☐ Clipped into air cleaner (top section)
- ☐ Clean out dirt, leaves and salt deposits

19 - Air filter element

- ☐ Use genuine air filter element ⇒ Electronic parts catalogue
- ☐ Maintenance intervals ⇒ Maintenance tables ⇒ Maintenance ; Booklet 405
- ☐ Removing and installing ⇒ [page 18](#)
- ☐ Clean snow screen (if fitted)

20 - O-ring

- ☐ Renew

21 - Grommet

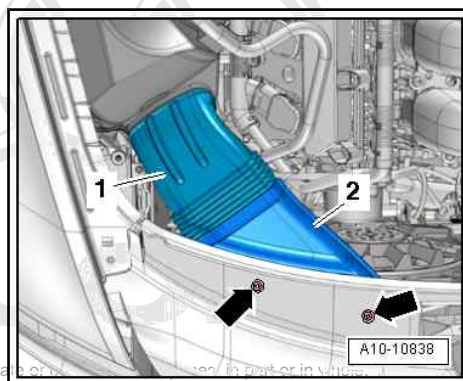
22 - Water drain

- ☐ Check for dirt and clean as necessary

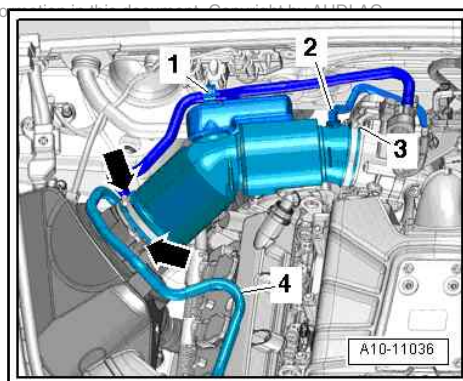
2.4 Removing and installing air filter element

Removing air cleaner (top section)

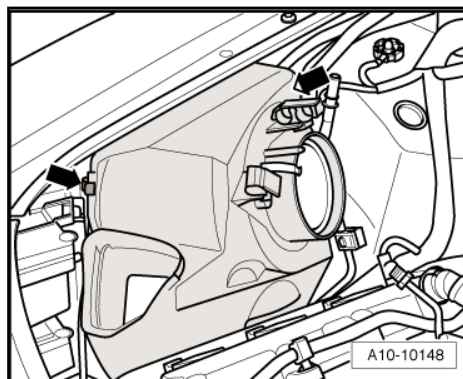
- Remove bolts -arrows-, detach air ducts -1- and -2-.



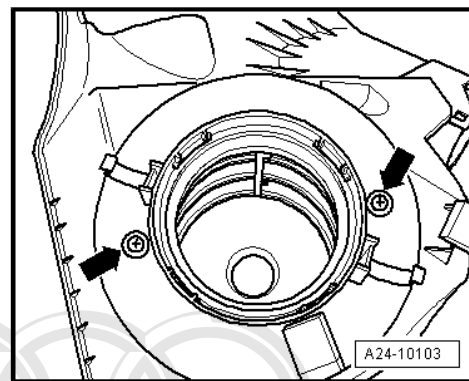
- Move fuel line -4- and line -1- leading to activated charcoal filter clear on air cleaner housing and air pipe.
- Detach vacuum hose -2- from connection on air hose.
- Remove air pipe. To do so, release hose clip -3- and clamps -arrows-.



- Release clamps -arrows- and detach air cleaner (top section).



- Remove bolts -arrows- and take out air filter element.



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Removing air cleaner (bottom section)

- Pull pin out of fastener -2-.
- Detach air cleaner housing (bottom section) and disconnect hose -1- which leads to secondary air pump by pressing release tab.

Installing

- Tightening torque ⇒ [page 16](#)

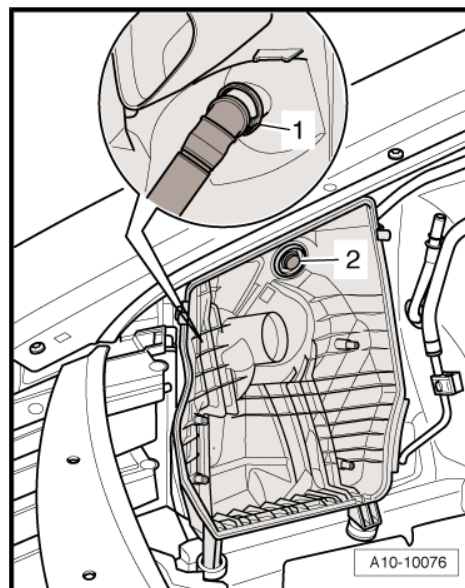


Note

- ◆ Always use genuine part for air filter element.
- ◆ Hose connections and hoses in intake system must be free of oil and grease before assembly. Do not use any lubricants containing silicone when assembling.
- ◆ The air cleaner housing MUST be clean.
- ◆ Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ *Electronic parts catalogue*.
- ◆ To ensure that the air hoses can be properly secured at their connections, spray rust remover onto the worm thread of used hose clips before installing.
- ◆ To prevent malfunctions, cover all critical parts of the engine air intake tract (intake pipes, etc.) with a clean cloth when blowing out the air cleaner housing with compressed air.
- ◆ Observe environmental requirements for disposal.

- Blow out water drain (small hole in bottom section of air cleaner housing) with compressed air.
- Clean salt residue, dirt and leaves out of air cleaner housing (top and bottom sections) using a vacuum cleaner.
- Check for salt residue, dirt and leaves in air hose (engine intake side).
- Check for dirt and leaves in air duct going from lock carrier to air cleaner housing.
- When installing the air filter element, check that it is properly centred in the retainer in the bottom section of the air cleaner housing.
- Carefully fit top section of air cleaner onto bottom section, without using any force. Make sure that air cleaner (top section) is fitted straight on air filter element (note position of sealing lip on air filter element).

The remaining installation steps are carried out in the reverse sequence.



2.5

Intake manifold (bottom section) - exploded view

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1 - Bolts

- ☐ 2.5 Nm

2 - Intake manifold flap potentiometer

- ☐ Left side: intake manifold flap potentiometer 2 - G512-, right side: intake manifold flap potentiometer - G336-

3 - Seal

- ☐ Renew if damaged
- ☐ When renewing lever out with screwdriver
- ☐ Press in by hand

4 - Sleeve

5 - Fuel pressure sender - G247-

- ☐ 22 Nm
- ☐ Lubricate thread

6 - Bracket

7 - Bolt

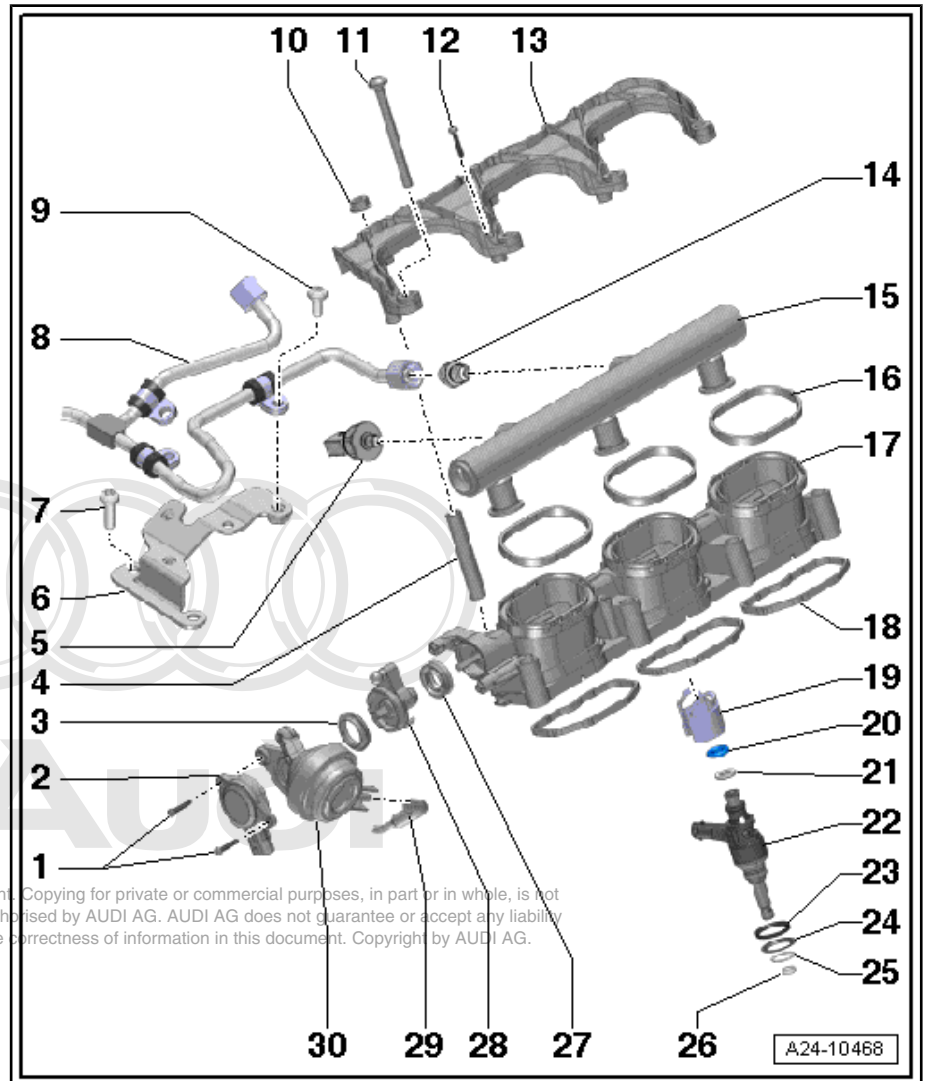
- ☐ 9 Nm

8 - High-pressure pipes



WARNING

The fuel system operates at extremely high pressure. This can cause injury. The pressure in the high-pressure section of the injection system must be reduced to a residual pressure prior to opening the system.



- ☐ Reducing fuel pressure in high-pressure section of injection system ⇒ [page 3](#)
- ☐ Connections must not be damaged
- ☐ Do not alter shape
- ☐ Removing and installing ⇒ [page 39](#)
- ☐ To loosen and tighten fuel pipe, counterhold at fuel pipe connection
- ☐ Re-tighten connection for fuel pipe before installing fuel pipe
- ☐ 27 Nm

9 - Bolt

- ☐ 9 Nm

10 - Nut

- ☐ 9 Nm

11 - Bolt

- ☐ 9 Nm

12 - Bolt

- ☐ 2.5 Nm



13 - Retainer for fuel rail

14 - Threaded connection

- ☐ 40 Nm
- ☐ Always renew after removing

15 - Fuel rail

16 - Seal

- ☐ Renew

17 - Intake manifold (bottom section)

- ☐ Removing and installing ⇒ [page 23](#)

18 - Seal

- ☐ Renew

19 - Support ring

- ☐ Always renew after removing
- ☐ Make sure it is correctly seated
- ☐ Via this support ring, the fuel rail exerts the force which holds the injector in the cylinder head.

20 - O-ring

- ☐ Renew
- ☐ Lubricate lightly with clean engine oil

21 - Spacer ring

- ☐ Renew if damaged

22 - Injector

Removing and installing ⇒ [page 29](#)

- ☐ Different types depending on version; refer to ⇒ Electronic parts catalogue

23 - Sealing element (top)

- ☐ Different types depending on version

24 - Sealing element (bottom)

- ☐ Different types depending on version

25 - Circlip

- ☐ Different types depending on version

26 - Combustion chamber ring seal

- ☐ Renewing ⇒ [“2.10 Removing and installing injectors”, page 29](#)

27 - Seal

- ☐ Renew if damaged
- ☐ When renewing lever out with screwdriver
- ☐ Press in by hand

28 - Operating lever

- ☐ For vacuum unit

29 - Vacuum hose

- ☐ To intake manifold flap valve - N316-

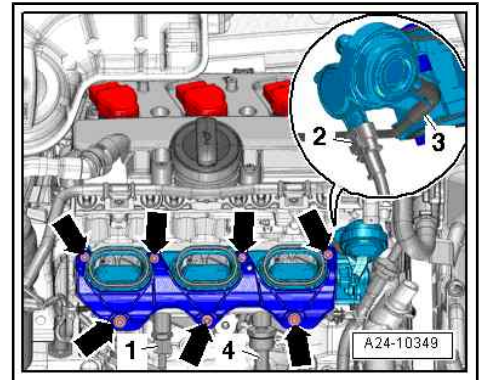
30 - Vacuum unit for actuating intake manifold flaps



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Intake manifold (bottom section) - tightening torque and sequence

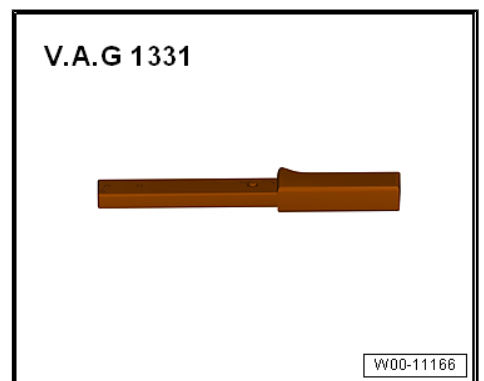
- Tighten bolts and nuts -arrows- for intake manifold (bottom section) in diagonal sequence and in stages.
- 10 Nm



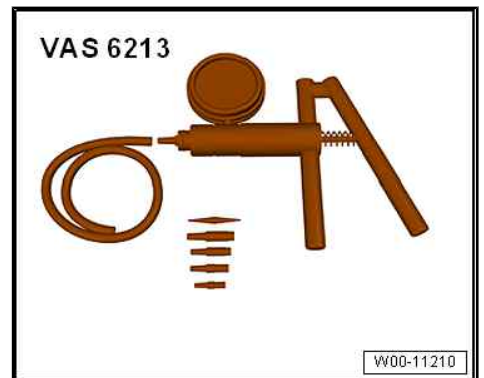
2.6 Removing and installing intake manifold (bottom section) with fuel rail

Special tools and workshop equipment required

◆ Torque wrench - V.A.G 1331-
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- ◆ Tool insert (open-end ring spanner, 17 mm) -V.A.G 1331/2-
- ◆ Hand vacuum pump - VAS 6213-



Removing



Note

The following description shows the removal and installation of the left-side intake manifold (bottom section). The procedure for the other side is more or less identical.



WARNING

The fuel system operates at extremely high pressure. This can cause injury.

- ◆ *The fuel pressure in the high-pressure section of the injection system must be reduced to a residual pressure prior to opening the system ⇒ [page 3](#).*

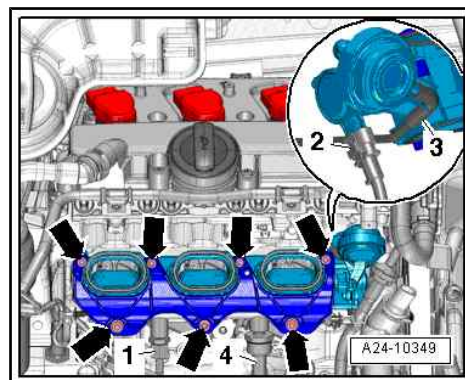
- Reduce fuel pressure in high-pressure section of injection system ⇒ [page 3](#).
- Remove supercharger ⇒ Rep. gr. 21.
- Push vacuum hoses to one side.
- Unplug electrical connector -item 4- at fuel pressure sender - G247-.
- Unscrew union nut -1- (counterhold threaded connection).
- Remove bolts and nuts -arrows- and detach intake manifold (bottom section) with fuel rail.
- Unplug electrical connector -2- at intake manifold flap potentiometer and pull off vacuum hose -3-.



Caution

Risk of irreparable damage to engine.

- ◆ *Block off the intake ports with clean cloths to prevent small objects from dropping into the engine through the intake ports in the cylinder heads.*



Installing

Installation is carried out in the reverse order; note the following:

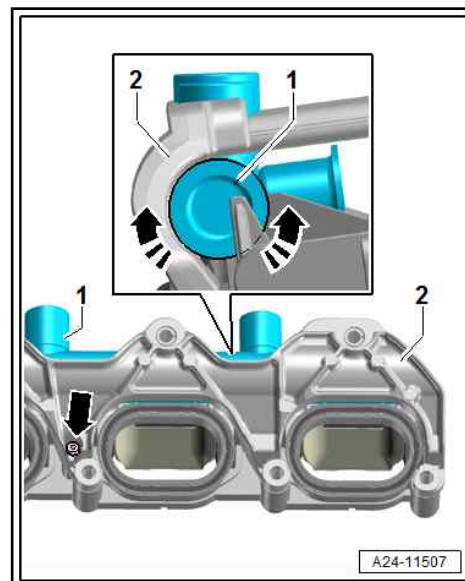


Note

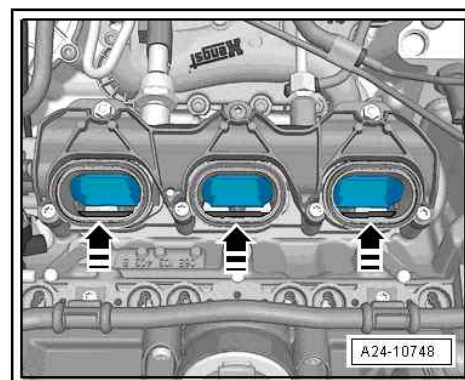
- ◆ *If an injector has been pulled out of the cylinder head, the teflon ring seal must be renewed.*
- ◆ *If threaded connection ⇒ [Item 14 \(page 22\)](#) has been unfastened or removed, it must be renewed.*
- ◆ *Renew gaskets and O-rings.*
- ◆ *Lubricate O-rings of injectors lightly with clean engine oil.*

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- Before installing intake manifold (bottom section), loosen bolt -arrow- and move fuel rail -1- back and forth in direction of -arrows-.
- If fuel rail -1- cannot be moved, remove and clean retainer for fuel rail -2-.
- Re-assemble retainer for fuel rail -2- and fuel rail -1-, only tightening bolt -arrow- hand-tight.



When installing intake manifold (bottom section) move intake manifold flaps in direction of -arrow-.

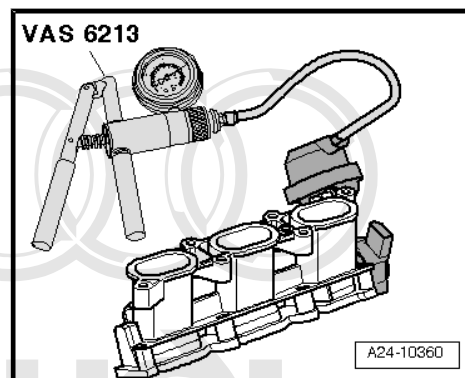


- Connect hand vacuum pump - VAS 6213- to vacuum unit for actuating intake manifold flaps as shown in illustration.
- Use hand vacuum pump to generate vacuum.
- This will cause the intake manifold flaps to open.



Note

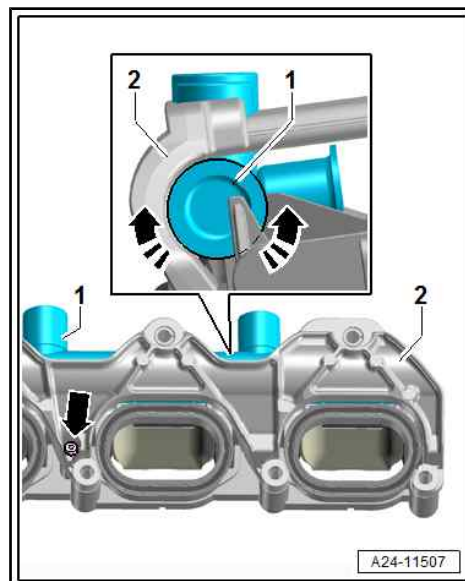
If the intake manifold flaps are not opened, they can catch on the guide plates in the cylinder head when the intake manifold (bottom section) is installed.



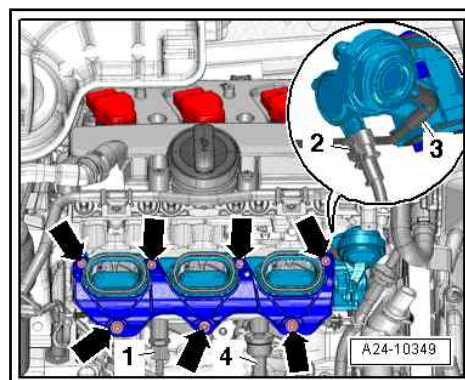
- Then press intake manifold (bottom section) evenly onto injectors.
- Tighten bolts and nuts for intake manifold (bottom section) in diagonal sequence to specified torque.
- Tightening torque of intake manifold (bottom section), see exploded view → [page 23](#)
- Disconnect hand vacuum pump from vacuum unit for actuating intake manifold flaps.

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- Tighten bolt -arrow- to 1 Nm.



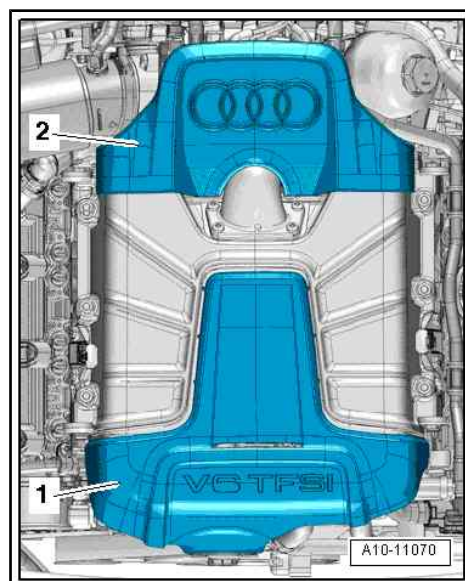
- Plug in electrical connector -4- at fuel pressure sender - G247- .
- Tighten union nut -1- (counterhold threaded connection).
- Ensure that high-pressure pipe is not under tension.
- Install supercharger ⇒ Rep. gr. 21 .



2.7 Removing and installing throttle valve module - J338-

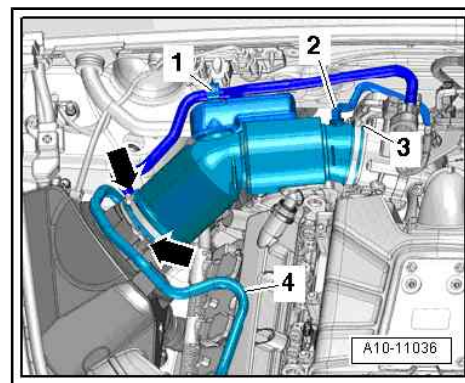
Removing

- Lift off engine cover panel (rear) -2-.



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- Move fuel line -4- and line -1- leading to activated charcoal filter clear on air cleaner housing and air pipe.
- Detach vacuum hose -2- from connection on air hose.
- Remove air pipe. To do so, release hose clip -3- and clamps -arrows-.



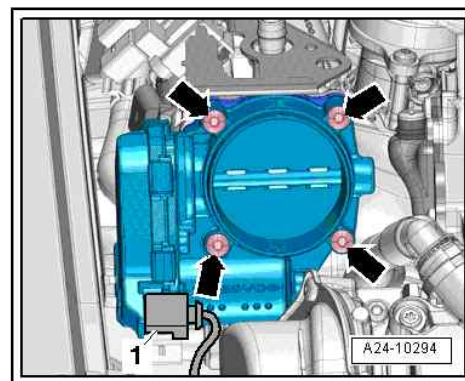
- Unplug electrical connector -1-.
- Remove bolts -arrows- and detach throttle valve module - J338- with intermediate flange.



Caution

Risk of irreparable damage to engine.

- ◆ *Block off the intake port with a clean cloth to prevent small items from dropping into the supercharger.*



Installing

Installation is carried out in the reverse order; note the following:



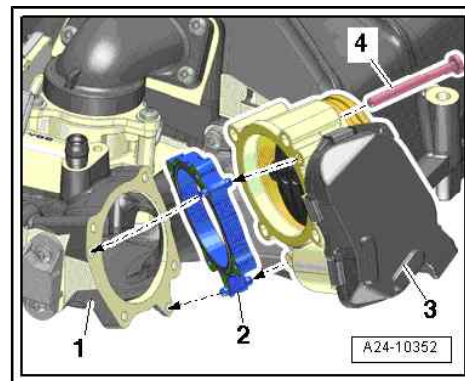
Note

Fit new O-rings.

- Insert intermediate flange -2- with new O-rings into supercharger -1- -left arrows-.
- Fit throttle valve module - J338- -item 3- on intermediate flange -right arrows-.
- Tightening torque: 10 Nm

If throttle valve module - J338- has been cleaned or renewed, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability

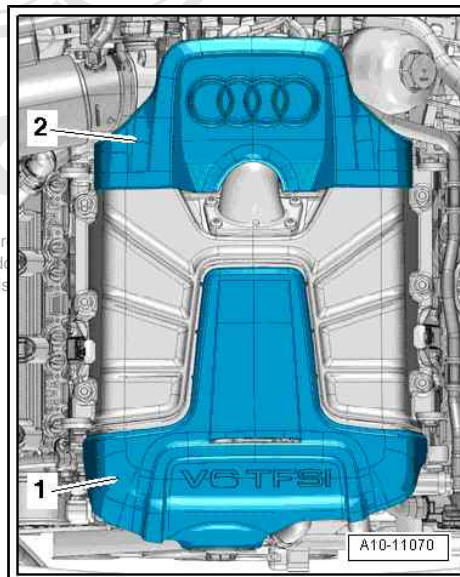
- Erase learnt values and adapt engine control unit - J623- to throttle valve module - J338- ⇒ Vehicle diagnostic tester.



2.8 Removing and installing regulating flap control unit - J808-

Removing

- Lift off engine cover panel (rear) -2-.



- Unplug electrical connector -3- at regulating flap control unit - J808- .
- Remove bolts -5- and -6-.
- Take out bypass elbow -1- with adapter (intermediate flange) -2- and regulating flap control unit - J808- -4-.

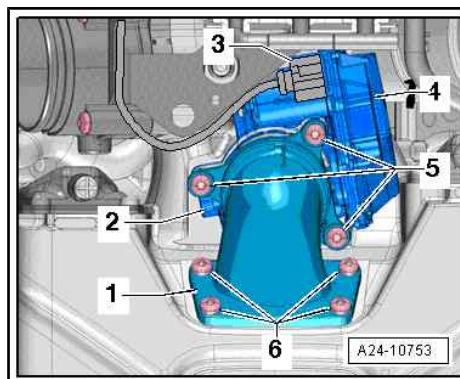
Installing

Installation is carried out in the reverse order; note the following:

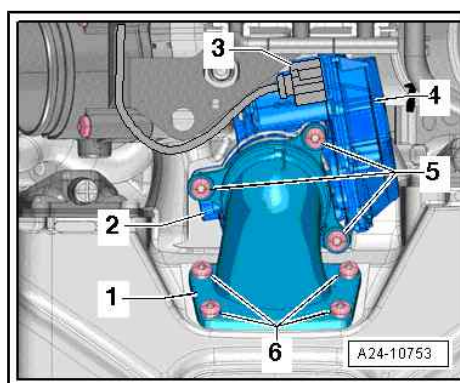


Note

Fit new O-rings.



- Install bypass elbow -1- with adapter (intermediate flange) -2- and regulating flap control unit - J808- -4- using new O-rings.
- Screw in bolts -5- and -6- hand-tight.
- Then first tighten bolts -6- to specified torque.
 - Tightening torque: 10 Nm
- Then tighten bolts -5- to the same specified torque.
- Re-attach electrical connector -3-.
- After renewing regulating flap control unit - J808- , perform Adaption in Guided Functions ⇒ vehicle diagnostic tester .



2.9 Cleaning throttle valve module



Note

Take care not to scratch the throttle valve housing when cleaning it.

Special tools and workshop equipment required

- ◆ Acetone (commercially available)

- ◆ Brush

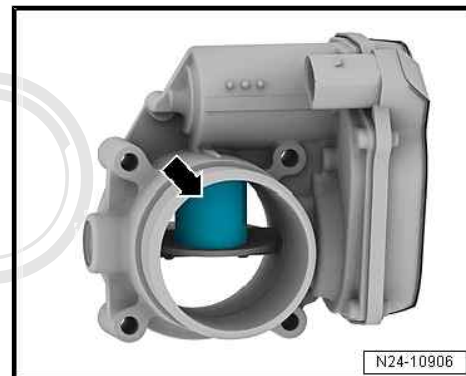
Procedure

- Remove throttle valve module - J338- → [page 26](#) .
- Open throttle valve by hand and block it in the open position with a suitable object (e.g. plastic or wooden wedge) -arrow-.

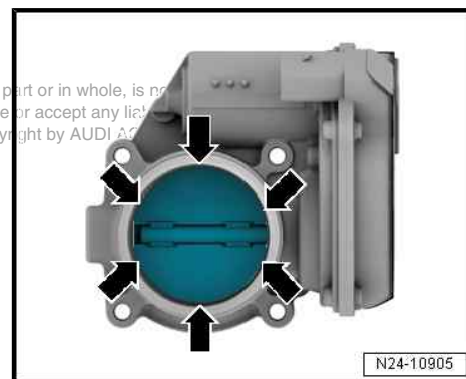


WARNING

Acetone is highly flammable. Please observe all accident prevention regulations and safety precautions when handling flammable liquids. Do not use compressed air when cleaning the throttle valve. Wear safety goggles and protective clothing to avoid possible injury and skin contact.



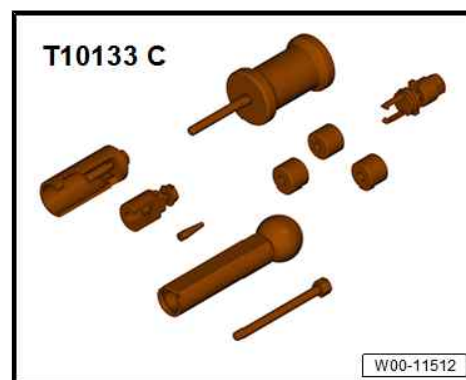
- Clean throttle valve housing thoroughly, especially around the points -arrows- where the throttle valve closes, using commercially available acetone and a small brush.
- Wipe out throttle valve housing with a lint-free cloth.
- Allow acetone to evaporate completely and re-install throttle valve module after cleaning.
- Install throttle valve module - J338- → [page 26](#) .
- Erase learnt values and adapt engine control unit - J623- to throttle valve module. Use → Vehicle diagnostic tester.



2.10 Removing and installing injectors

Special tools and workshop equipment required

- ◆ Tool set for FSI engines - T10133 C-



Removing



WARNING

The fuel system operates at extremely high pressure. This can cause injury.

- ◆ **The fuel pressure in the high-pressure section of the injection system must be reduced to a residual pressure prior to opening the system.**

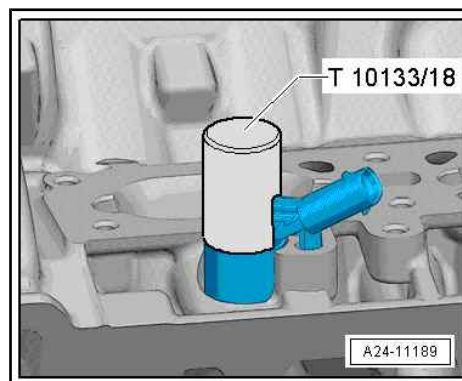
- Reduce fuel pressure in high-pressure section of injection system ⇒ [page 3](#) .
- Remove supercharger ⇒ Rep. gr. 21 .
- Remove corresponding intake manifold (bottom section) ⇒ [page 23](#) .

Removing any injectors lodged in fuel rail

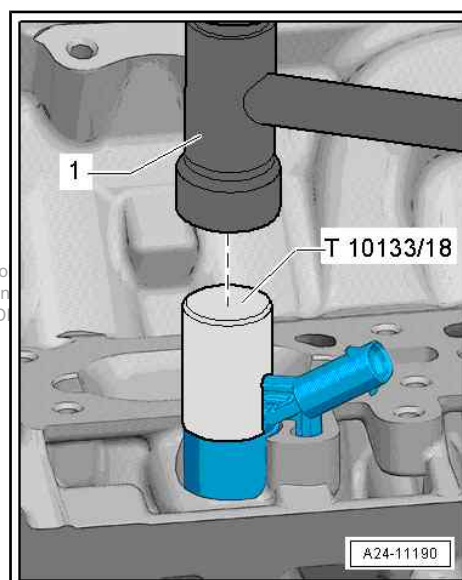
- Carefully pull injectors out of fuel rail.

Removing any injectors lodged in cylinder head

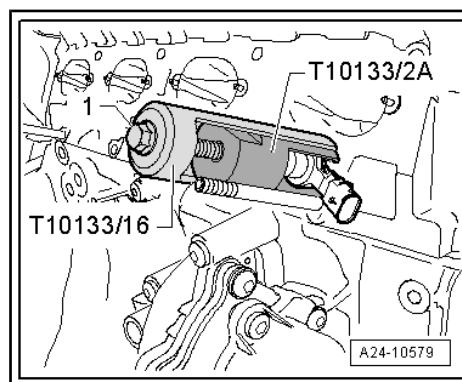
- Cover open inlet ports with a clean cloth.
- Unplug electrical connector at injector that is to be removed.
- Slide stop sleeve -T10133/18- over injector.



- Carefully knock against stop sleeve several times to loosen injector.

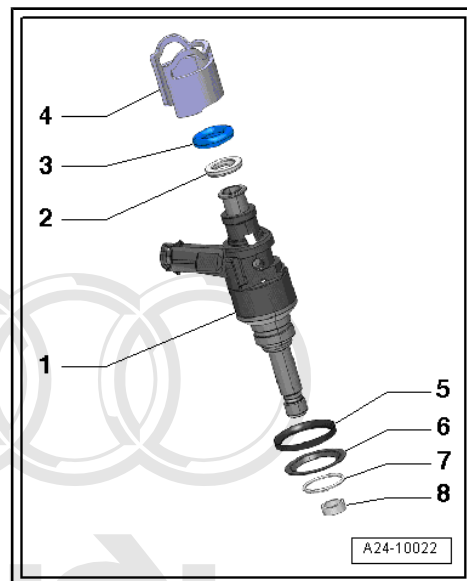


- Guide puller -T10133/2A- into groove on injector.
- Attach removal tool -T10133/16- to puller and pull out injector by turning bolt -1-.



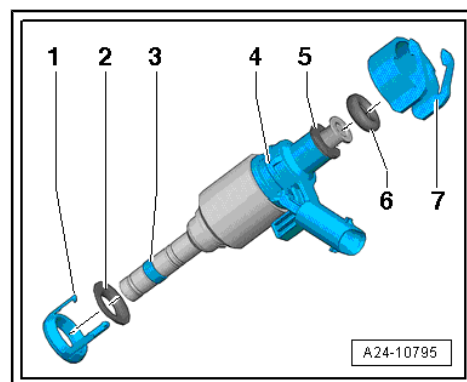
Injector (old version)

- 1 - Injector
- 2 - Spacer ring - renew
- 3 - O-ring - renew (apply thin coating of clean engine oil prior to installation)
- 4 - Support ring - renew (via this support ring, fuel rail exerts force which secures injector in cylinder head)
- 5 - Intermediate ring/retaining ring (top) - note installation position; renew if visibly damaged or worn (no longer available; replaced with an intermediate ring - see next illustration ➔ [page 31](#))
- 6 - Intermediate ring/retaining ring (bottom) - note installation position; renew if visibly damaged or worn (no longer available; replaced with an intermediate ring - see next illustration ➔ [page 31](#))
- 7 - Circlip - do not stretch (no longer available; replaced with a retaining ring - see next illustration ➔ [page 31](#))
- 8 - Combustion chamber ring seal (teflon ring seal) - renew; when fitting, do not grease ring or use any other lubricant. Carefully remove old combustion chamber ring seal. To do so, cut open combustion chamber ring seal using knife or prise open with small screwdriver and then pull off forwards. **Take care not to damage groove on injector. The injector must be renewed if the groove is damaged.**



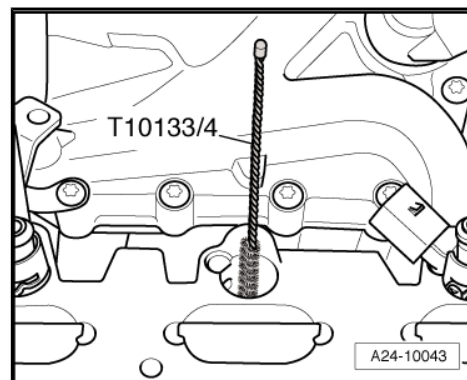
Injector (new version)

- 1 - Retaining ring - renew (combined as a unit with intermediate ring -2-)
- 2 - Intermediate ring - renew (combined as a unit with retaining ring -1-)
- 3 - Combustion chamber ring seal (teflon ring seal) - renew; when fitting, do not grease ring or use any other lubricant
- 4 - Injector
- 5 - Spacer ring - renew
- 6 - O-ring - renew (apply thin coating of clean engine oil prior to installation)
- 7 - Support ring - renew (via this support ring, fuel rail exerts force which secures injector in cylinder head)

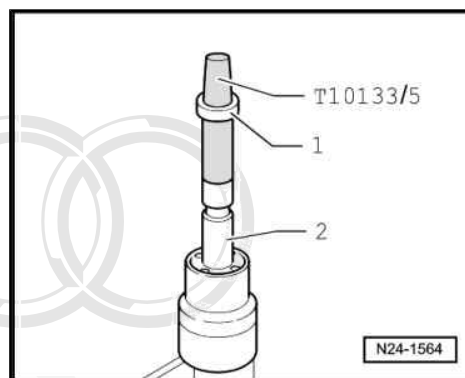


Installing

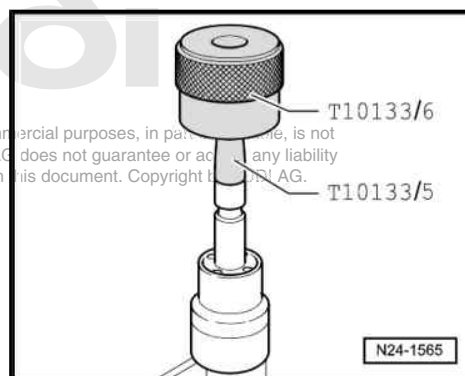
- Clean bore in cylinder head with nylon cylinder brush - T10133/4- .



- Fit assembly cone -T10133/5- with new combustion chamber ring seal -1- from repair set onto injector -2-.

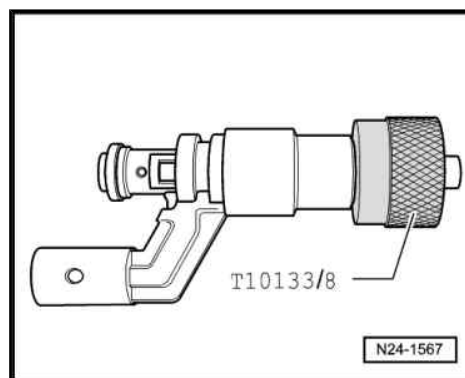
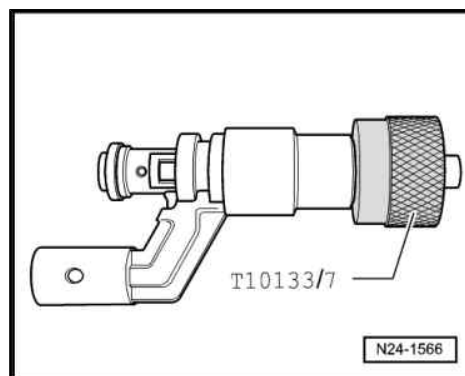


- Push combustion chamber ring seal onto assembly cone - T10133/6- as far as it will go using assembly sleeve - T10133/5- .
- Turn assembly sleeve -T10133/6- upside down and push combustion chamber ring seal into sealing ring groove.


Note

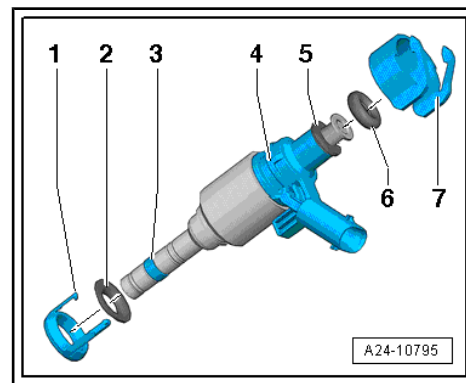
The combustion chamber ring seal is widened when it is pushed onto the injector. After pushing it on, it therefore has to be compressed again. This is done in two stages, as described below.

- Push calibration sleeve -T10133/7- onto injector as far as it will go and simultaneously turn it slightly (approx. 180°).
- Pull calibration sleeve -T10133/7- off again by turning it in the opposite direction.
- Push calibration sleeve -T10133/8- onto injector as far as it will go and simultaneously turn it slightly (approx. 180°).
- Pull calibration sleeve -T10133/8- off again by turning it in the opposite direction.



Fully assembling/installing injector

- 1 - Retaining ring - renew (combined as a unit with intermediate ring -2-)
- 2 - Intermediate ring - renew (combined as a unit with retaining ring -1-)
- 3 - Combustion chamber ring seal (teflon ring seal) - renew; when fitting, do not grease ring or use any other lubricant
- 4 - Injector
- 5 - Spacer ring - renew
- 6 - O-ring - renew (apply thin coating of clean engine oil prior to installation)
- 7 - Support ring - renew (via this support ring, fuel rail exerts force which secures injector in cylinder head)



Note

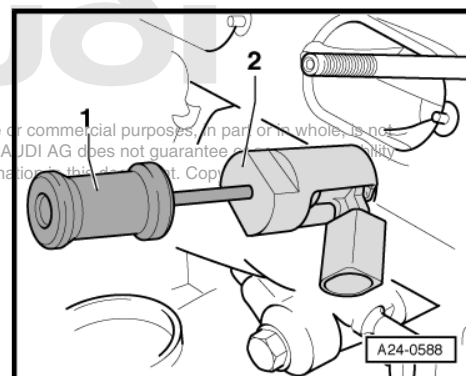
The combustion chamber ring seal must always be renewed prior to re-installing the injector.

- Push injector by hand as far as it will go into aperture in cylinder head (do not use oil or grease). Ensure that the injector is properly seated in the cylinder head.



Note

- ◆ *It should be possible to insert injector easily. If necessary wait until the combustion chamber ring seal has contracted sufficiently.*
- ◆ *Note correct installation position and ensure that injectors are properly seated in cylinder head.*
- ◆ *If the injector cannot be pushed in by hand, use puller - T10133/2A- -2- with striker - T10133/3- to insert the injector.*
- Electrical connector of injector must engage in recess in cylinder head.



Perform further installation in reverse order, paying attention to the following:

- Install intake manifold (bottom section) ⇒ [page 23](#) .
- Install supercharger ⇒ Rep. gr. 21 .

2.11 Cleaning injectors

Special tools and workshop equipment required

- ◆ Ultrasonic cleaning unit - VAS 6418-
- ◆ Mounting plate for injection modules - VAS 6418/1-
- ◆ Cleaning fluid - VAS 6418/2-

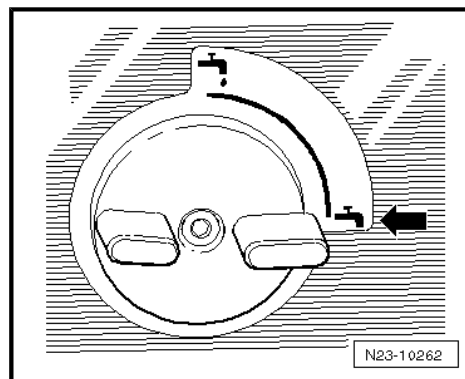
Cleaning

- Remove injectors ⇒ [page 29](#) .

- Close drain tap -arrow- on ultrasonic cleaning unit - VAS 6418- (located on right side of housing).
- Fill ultrasonic unit with 2,120 ml of water which has been allowed to settle for a few minutes and cleaning fluid - VAS 6418/2- .

Mixture ratio for cleaning fluid

- 2,100 ml of tap water which has been allowed to settle for a few minutes and 20 ml of cleaning fluid - VAS 6418/2-



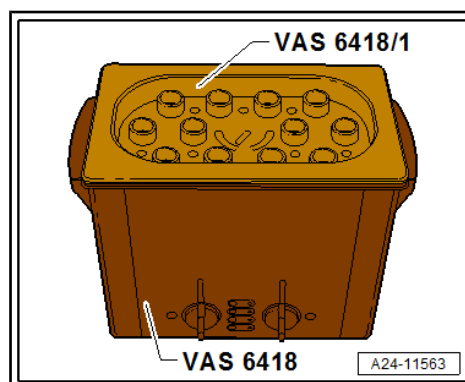
- Place mounting plate for injection modules - VAS 6418/1- on top of cleaning unit.



WARNING

It is important to read the safety notes in the operating instructions before switching on the ultrasonic cleaning unit - VAS 6418- .

The ideal fluid level is approx. 1-4 mm above the base of the mounting plate. The ultrasonic cleaning unit - VAS 6418- can be damaged if the fluid level is too low.

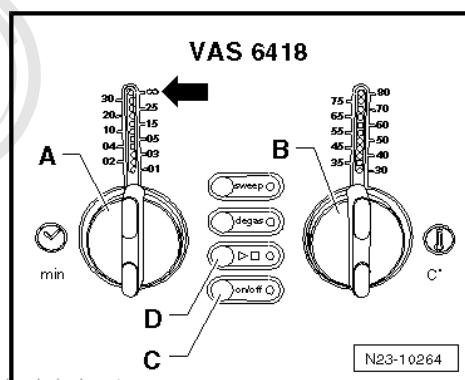


- Insert FSI injectors all the way into guides of mounting plate for injection modules - VAS 6418/1- .
- Switch on cleaning unit by pressing **[on/off]** button -C-.
- Select a cleaning time of 30 minutes with rotary control -A-.
- Set rotary control -B- to a temperature of 50°C.
- Press **[]** button -D- to start cleaning procedure.



Note

- ◆ *The temperature-controlled cleaning process is now started. While the fluid is being heated, the ultrasound is activated at intervals in order to circulate the cleaning solution. The ultrasound is activated continuously when the preselected temperature is reached.*
- ◆ *The actual cleaning process commences when the temperature reaches at least 50 °C and must last for at least 30 minutes.*

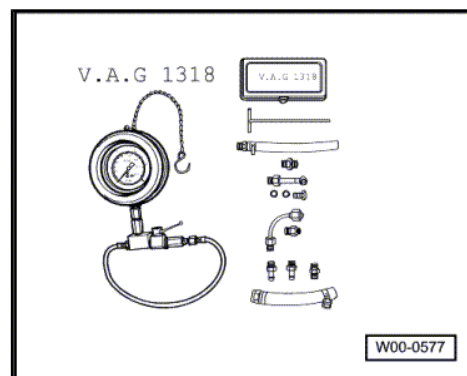


- After cleaning, renew combustion chamber ring seal for each injector ➔ [page 29](#) .

2.12 Checking fuel pressure and residual pressure (up to high-pressure pump)

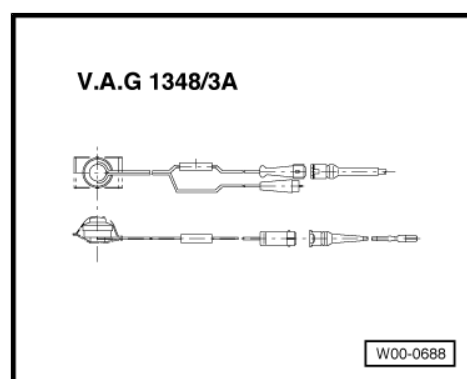
Special tools and workshop equipment required

◆ K-Jetronic pressure tester - V.A.G 1318-



◆ Adapter set - V.A.G 1318/10-12-

◆ Remote control - V.A.G 1348/3A- for V.A.G 1348 with adapter cable -V.A.G 1348/3-3-



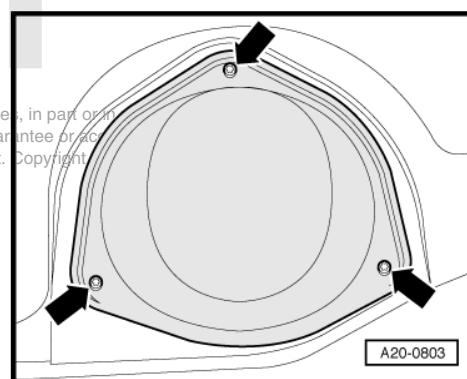
◆ Fuel-resistant measuring container

Test conditions

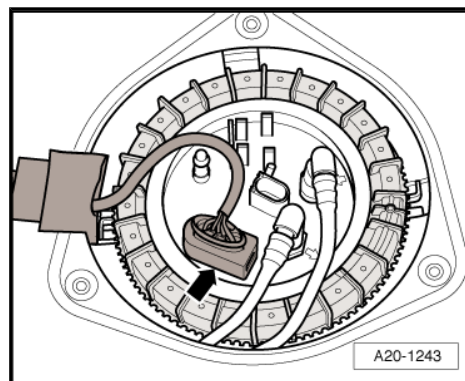
- Battery voltage at least 12.5 V
- Fuel filter OK.
- Fuel tank at least $\frac{1}{4}$ full.
- Fuel pump control unit - J538- OK; checking ⇒ Rep. gr. 20 .
- Ignition off.

Checking fuel pressure

- Remove rear seat bench ⇒ Rep. gr. 72 .
- Unscrew bolts -arrows- and remove cover for flange (right side).



- Carefully release electrical connector from flange -arrow- and unplug.

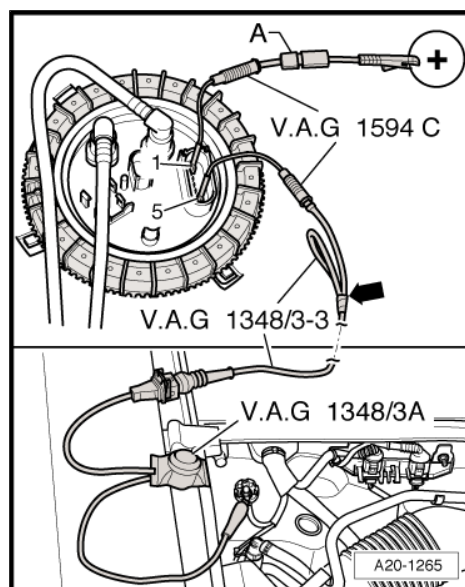


- Connect remote control - V.A.G 1348/3A- for V.A.G 1348 to contact -5- using adapter cable -V.A.G 1348/3-3- and test lead from auxiliary measuring set - V.A.G 1594C- .
- Tape off 2nd connector contact of adapter cable - V.A.G 1348/3-3- with insulating tape -arrow- to prevent short circuits.
- Move switch of remote control - V.A.G 1348/3A- for V.A.G 1348 to front of engine compartment.
- Connect crocodile clip to earth point in engine compartment.
- Connect contact -1- to battery “+” via an improvised test lead.



Note

For safety reasons an in-line fuse -A- must be connected into the lead.



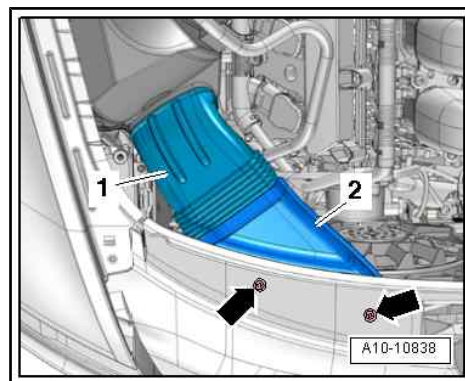
- Remove bolts -arrows-, detach air ducts -1- and -2-.



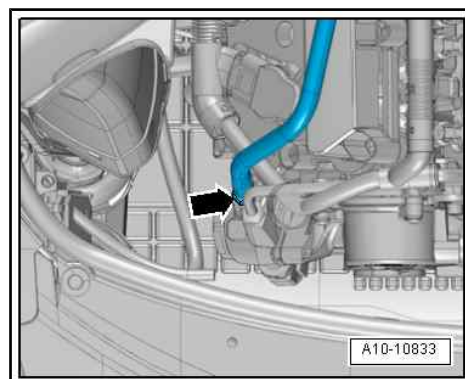
WARNING

The fuel system operates at extremely high pressure. This can cause injury.

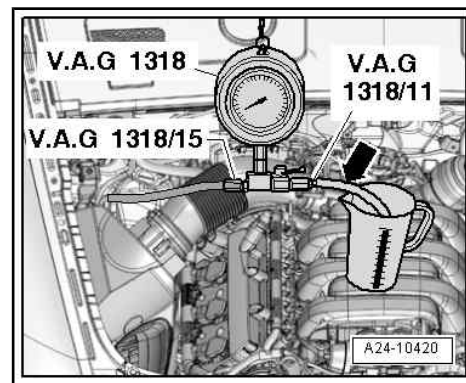
- ♦ **The fuel pressure in the high-pressure section of the injection system must be reduced to a residual pressure prior to opening the system.**



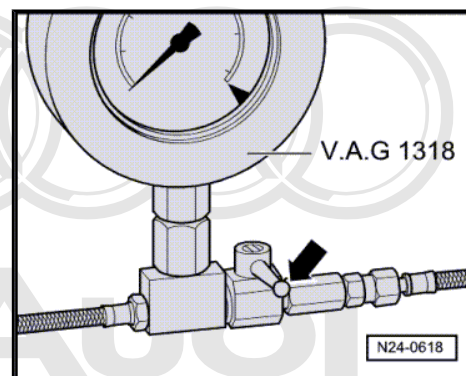
- Reduce fuel pressure in high-pressure section of injection system ⇒ [page 3](#) .
- Detach fuel supply hose from high-pressure pump -arrow- and move clear.



- Connect K-Jetronic pressure tester - V.A.G 1318- with adapters -V.A.G 1318/11- and -V.A.G 1318/15- to fuel line.
- Connect extension hose -arrow- to pressure tester and hold end of hose in measuring container.
- Open cut-off valve on pressure tester.
- Lever points in direction of flow.
- Bleed fuel system by pressing remote control briefly.



- Close cut-off valve on pressure tester.
- Lever is at right angle to direction of flow -arrow-.
- Press switch on remote control until pressure tester shows no further increase in pressure.
- Specification: approx. 6 bar
- If specification is not attained, check delivery rate of fuel pump
⇒ Rep. gr. 20 .



Checking residual pressure

- Check for leaks and check residual pressure by watching pressure drop on pressure tester.

- After 10 minutes pressure should still be at least 3 bar.

If the residual pressure drops below 3 bar:

- ◆ Check union between pressure tester and fuel line for leaks.
- ◆ Check pressure tester for leaks.
- ◆ Check fuel lines and their connections for leaks.
- ◆ Renew fuel filter with integrated fuel pressure regulator ⇒ Rep. gr. 20 .
- ◆ Renew fuel pump ⇒ Rep. gr. 20 .

Assembling

Installation is carried out in the reverse order; note the following:



WARNING

The fuel system operates at extremely high pressure. This can cause injury.

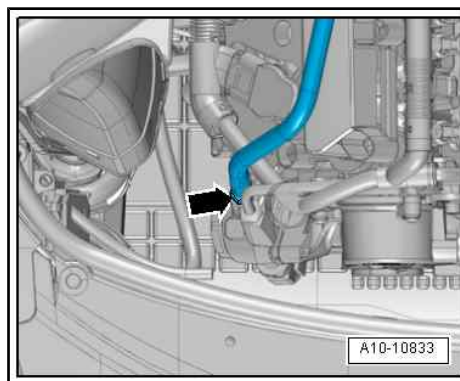
- ◆ *Before removing the pressure tester, release the fuel pressure by opening the cut-off valve. Hold a container under the connection.*

- Re-attach fuel supply hose -arrow- to high-pressure pump (make sure that all parts are clean).
- Tightening torques: exploded view - high-pressure pump
⇒ [page 38](#)
- Install rear seat bench ⇒ Rep. gr. 72 .



Note

Check fuel system for leaks.



2.13 Exploded view - high-pressure pump

1 - Fuel pressure sender for low pressure - G410-

- 15 Nm

2 - Seal

- Renew

3 - Bolt

- Hand-tighten in diagonal sequence, then tighten to 5 Nm
- Final torque: 20 Nm
- Do not tilt high-pressure pump

4 - High-pressure pump

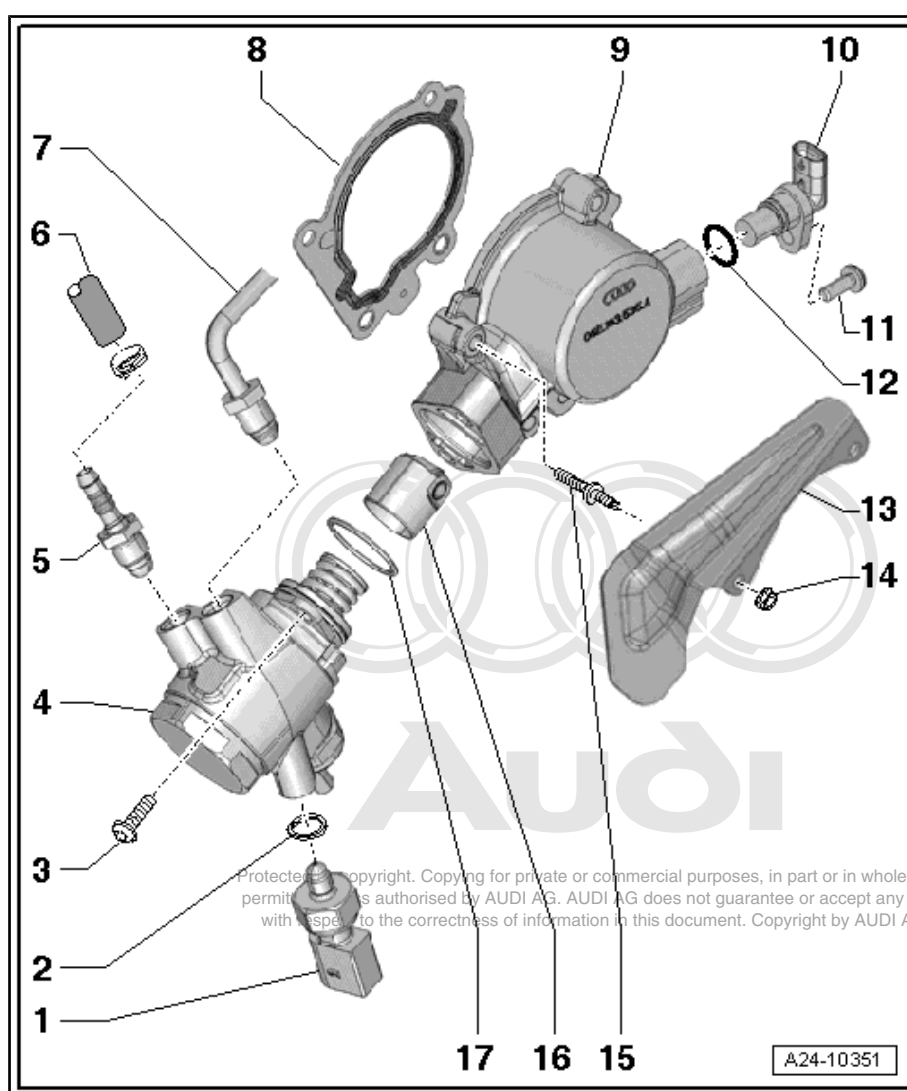
- With fuel metering valve - N290-
- Removing and installing
⇒ [page 41](#)
- Do not dismantle

5 - Threaded connection

- Connections must not be damaged
- Use open-end spanner insert AF 14 -V.A.G 1331/9- to tighten
- 27 Nm
- Always renew after removing

6 - Fuel supply hose

- Low-pressure section



7 - High-pressure fuel pipe



WARNING

There is a risk of injury: avoid skin contact with fuel.

The fuel pressure in the high-pressure section of the injection system must be reduced to a residual pressure prior to opening the system.

- ☐ Reducing fuel pressure in high-pressure section of injection system ⇒ [page 3](#)
- ☐ Removing and installing ⇒ [page 39](#)
- ☐ 27 Nm

8 - Gasket

- ☐ Renew

9 - Housing

10 - Hall sender - G40-

- ☐ Removing and installing ⇒ [page 67](#)

11 - Bolt

- ☐ Tightening torque ⇒ [Item 1 \(page 63\)](#)

12 - O-ring

- ☐ Renew
- ☐ Lubricate lightly with clean engine oil before installing

13 - Protective plate

- ☐ For high-pressure pipe
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14 - Nut

- ☐ 9 Nm

15 - Centre hex stud

- ☐ 9 Nm

16 - Roller tappet

- ☐ Can only be installed in one position
- ☐ Lubricate lightly with clean engine oil before installing

17 - O-ring

- ☐ Renew
- ☐ Lubricate lightly with clean engine oil before installing

2.14 Removing and installing high-pressure pipe

Special tools and workshop equipment required



◆ Torque wrench - V.A.G 1331-

V.A.G 1331

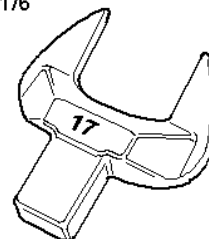


W00-0427

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◆ Open end spanner insert, AF 17 - V.A.G 1331/6-

V.A.G 1331/6



W00-1126

Removing

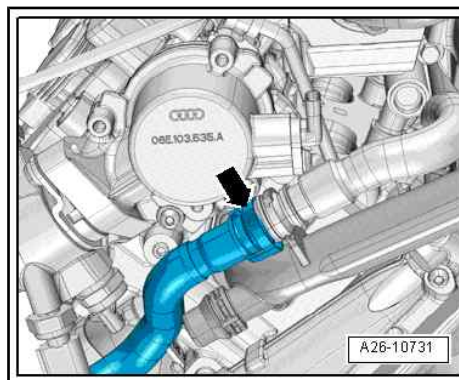


WARNING

The fuel system operates at extremely high pressure. This can cause injury.

- ◆ *The fuel pressure in the high-pressure section of the injection system must be reduced to a residual pressure prior to opening the system.*

- Reduce fuel pressure in high-pressure section of injection system ⇒ [page 3](#) .
- Remove supercharger ⇒ Rep. gr. 21 .
- Press release tabs and detach secondary air hose -arrow- to front from bracket.

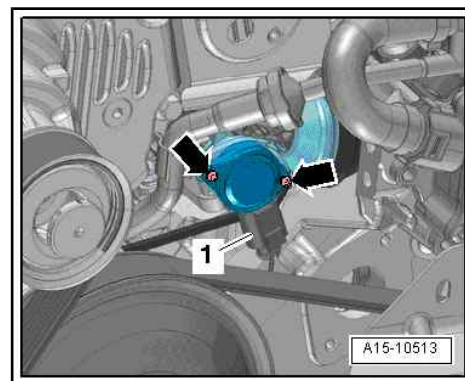


A26-10731

- Remove bolts -arrows- and move intake manifold flap potentiometer - G336- with vacuum unit for intake manifold flap clear to one side.

Note

- ◆ Disregard -item 1-.
- ◆ The procedure is illustrated for the left-side cylinder bank 2.



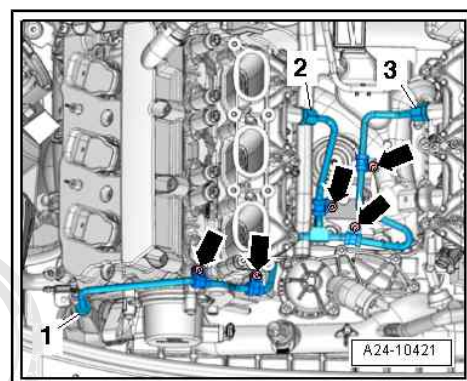
- Unscrew bolts -arrows- and bolt connection -1-.
- Unscrew union nuts -2- and -3- (counterhold threaded connection).

Note

Do not attempt to bend high-pressure pipe to a different shape.

Installing

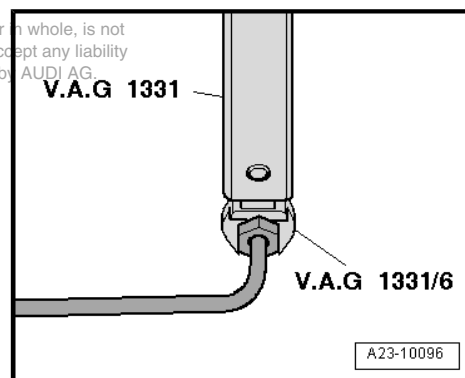
- Tightening torques ⇒ [page 20](#) , ⇒ [page 38](#) .



Note

- ◆ The connections of the high-pressure pipe must not be damaged.
- ◆ Do not attempt to bend high-pressure pipe to a different shape.

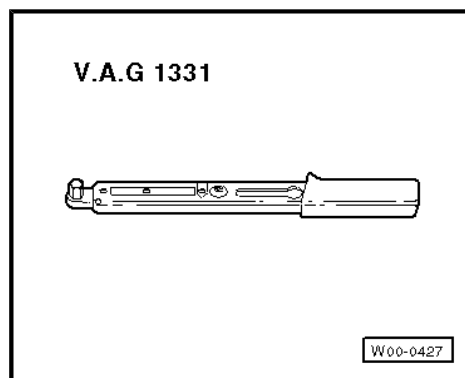
- First tighten union nut by hand until it makes contact, making sure that high-pressure pipe is not under tension.
- Tighten union nut with torque wrench - V.A.G 1331- and tool insert, AF 17 - V.A.G 1331/6- ; to do so, counterhold at hexagon flats of threaded connection on fuel rail with an open-end spanner.
- Do not tighten bolt for retainer until high-pressure pipe has been tightened.
- Install supercharger ⇒ Rep. gr. 21 .



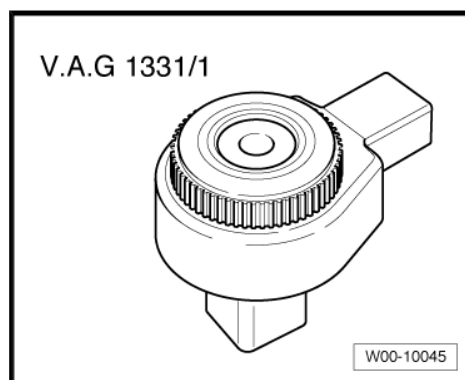
2.15 Removing and installing high-pressure pump

Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1331-



- ◆ Ratchet - V.A.G 1331/1-



- ◆ Open-end spanner insert AF 14 -V.A.G 1331/9-

Removing

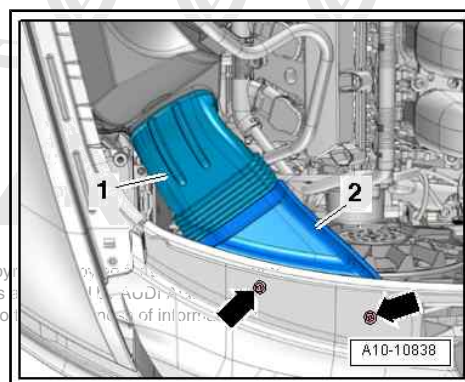


WARNING

The fuel system operates at extremely high pressure. This can cause injury.

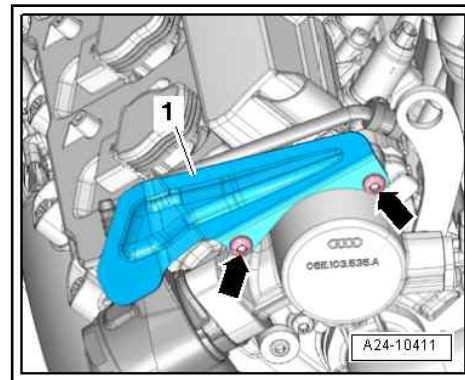
- ◆ *The fuel pressure in the high-pressure section of the injection system must be reduced to a residual pressure prior to opening the system.*

- Reduce fuel pressure in high-pressure section of injection system ⇒ [page 3](#).
- Remove bolts -arrows-.
- Remove air ducts -1- and -2-.



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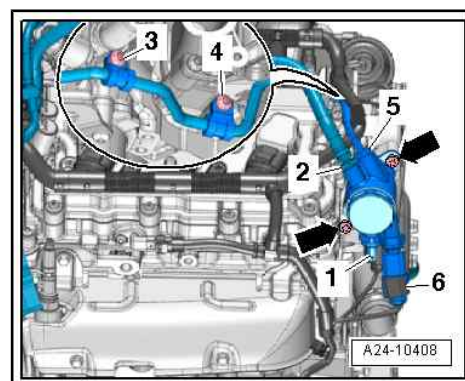
- Unscrew nuts -arrows- and remove guard plate -1-.



- Unplug electrical connectors -1- and -6-.
- Unscrew connections -2- and -5-.
- Remove bolt -3- on retaining clip.
- Remove bolts -arrows- and lift high-pressure pipe carefully.

 Note

- ◆ Do not bend pipes to a different shape.
- ◆ Disregard -item 4-.



- Detach high-pressure pump with roller tappet.

Installing

- Tightening torques ⇒ [page 16](#) , ⇒ [page 38](#) .

Installation is carried out in the reverse order; note the following:

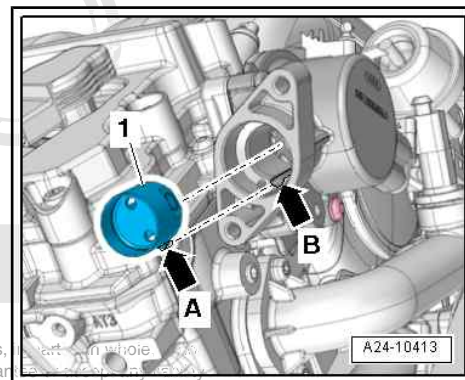
 Note

Renew O-ring.

 Note

- ◆ The connections of the high-pressure pipe must not be damaged.
- ◆ Do not attempt to bend high-pressure pipe to a different shape.

- Check roller tappet -1- for damage and renew if necessary.
- Lightly lubricate roller tappet with oil and insert it so that lug -arrow A- slides into guide notch -arrow B-.
- Rotate crankshaft in direction of engine rotation by turning bolt for vibration damper, and at the same time press roller tappet into cylinder head until it reaches its lowest point.
- Only lift high-pressure pipe slightly to fit high-pressure pump.
- Hand-tighten bolts for high-pressure pump as far as stop.
- Now tighten bolts in diagonal sequence to specified torque.



- Tightening torques: exploded view: high-pressure pump ⇒ [page 38](#)

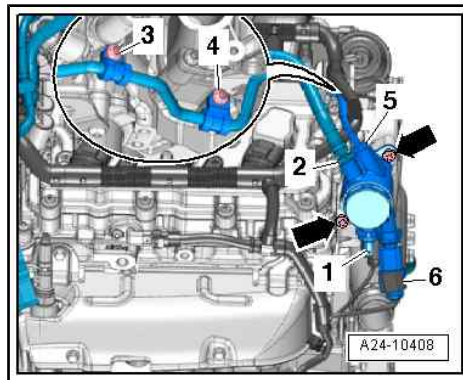
- Install high-pressure pipes -2- and -5- ⇒ [page 39](#) .

- Re-attach electrical connectors -1- and -6-.
- Tighten bolt -3- on retaining clip.



Note

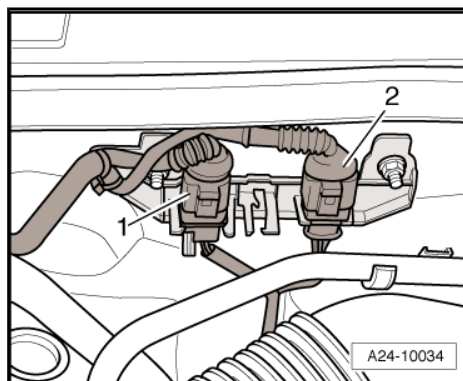
Check fuel system for leaks.



2.16 Overview - Lambda probes

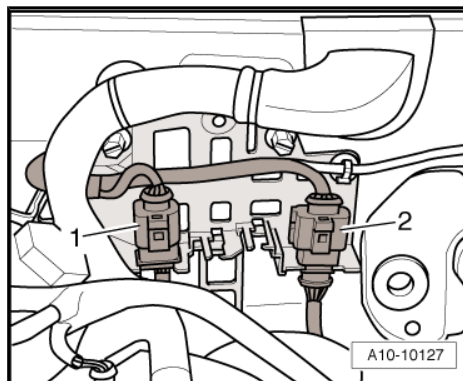
Connectors of Lambda probes (cylinder bank 1)

- 1 - For Lambda probe - G39- with Lambda probe heater - Z19-
- 2 - For Lambda probe after catalytic converter - G130- with Lambda probe 1 heater after catalytic converter - Z29-



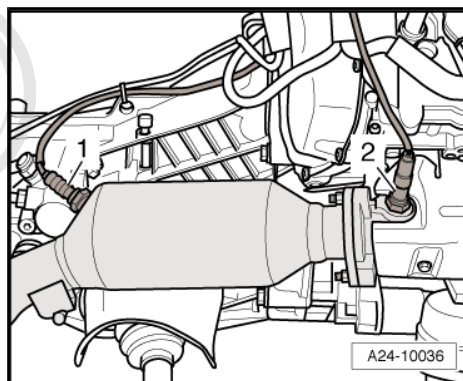
Connectors of Lambda probes (cylinder bank 2)

- 1 - For Lambda probe 2 - G108- with Lambda probe heater 2 - Z28-
- 2 - For Lambda probe 2 after catalytic converter - G131- with Lambda probe 2 heater after catalytic converter - Z30-



Fitting location of Lambda probes (cylinder bank 1)

- 1 - Lambda probe after catalytic converter - G130- with Lambda probe 1 heater after catalytic converter - Z29-
 - 2 - Lambda probe - G39- with Lambda probe heater - Z19-
- Tightening torque: 55 Nm



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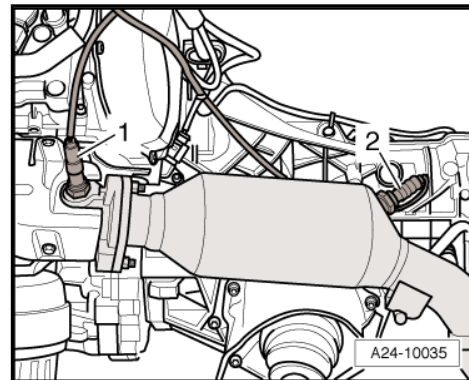
Fitting location of Lambda probes (cylinder bank 2)

- 1 - Lambda probe 2 - G108- with Lambda probe heater 2 - Z28-
 - 2 - Lambda probe 2 after catalytic converter - G131- with Lambda probe 2 heater after catalytic converter - Z30-
- Tightening torque: 55 Nm



Note

- ◆ *Threads of new Lambda probes are already coated with assembly paste; the paste must not get into the slots on the probe body.*
- ◆ *In the case of a used Lambda probe grease only the thread with high-temperature paste. The paste must not get into the slots on the Lambda probe body. High-temperature paste → Parts catalogue*
- ◆ *When installing, it is important to re-attach the Lambda probe wiring at the same locations to prevent it from coming into contact with the exhaust pipe.*



Removing and installing Lambda probe - G39- and Lambda probe heater - Z19- ⇒ [page 45](#) .

Removing and installing Lambda probe after catalytic converter - G130- and Lambda probe 1 heater after catalytic converter - Z29- ⇒ [page 47](#)

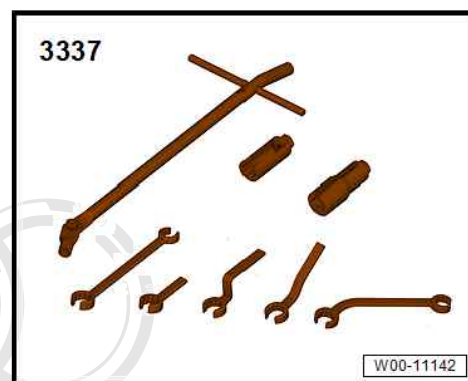
Lambda probe 2 - G108- with Lambda probe heater 2 - Z28- ⇒ [page 49](#)

Lambda probe 2 after catalytic converter - G131- with Lambda probe 2 heater after catalytic converter - Z30- ⇒ [page 51](#)

2.17 Removing and installing Lambda probe - G39-

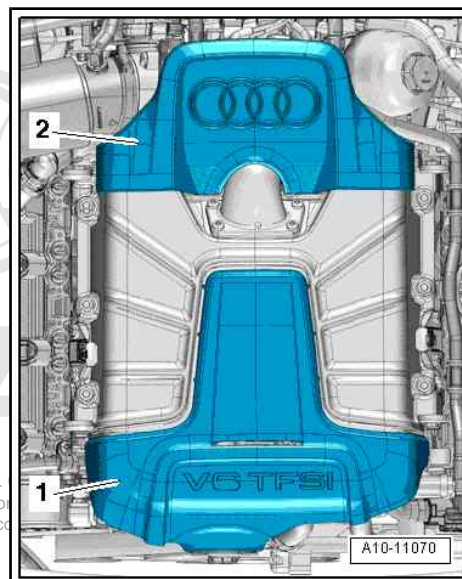
Special tools and workshop equipment required

- ◆ Lambda probe open ring spanner set - 3337-

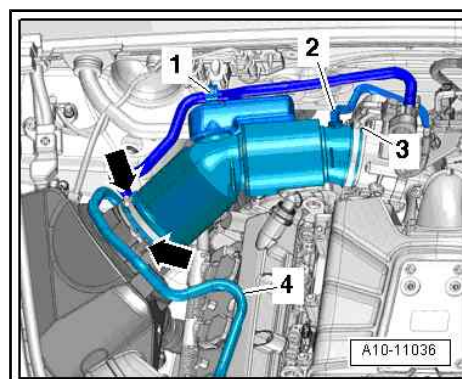


Removing

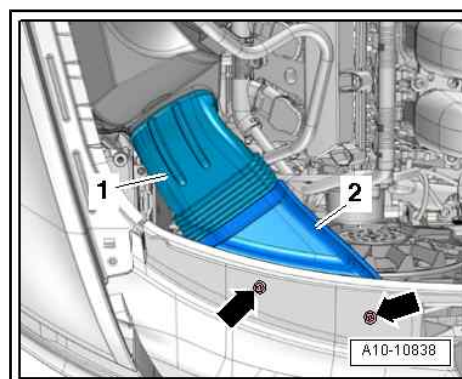
- Lift off engine cover panel (rear) -2-.



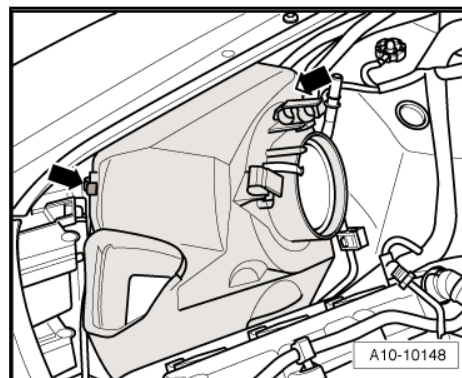
- Move fuel line -4- and line -1- leading to activated charcoal filter clear on air cleaner housing and air pipe.
- Detach vacuum hose -2- from connection on air hose.
- Remove air pipe. To do so, release hose clip -3- and clamps -arrows-.



- Remove bolts -arrows-, detach air ducts -1- and -2-.



- Release clamps -arrows- and detach air cleaner (top section).

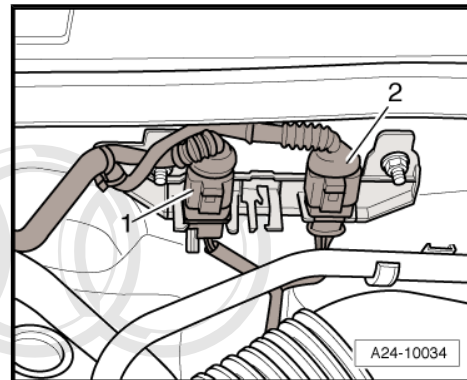


- Unplug electrical connector -1- for Lambda probe - G39- and move wiring clear.



Note

Disregard -item 2-.

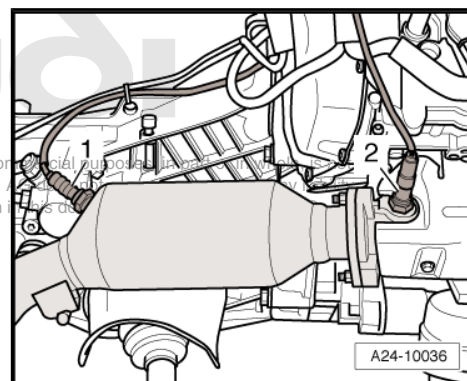


- Unscrew Lambda probe -2- using ring spanner -3337/- .



Note

For illustration purposes, the installation position is shown from the rear and with the engine removed.



Installing

Installation is carried out in the reverse order; note the following:



Note

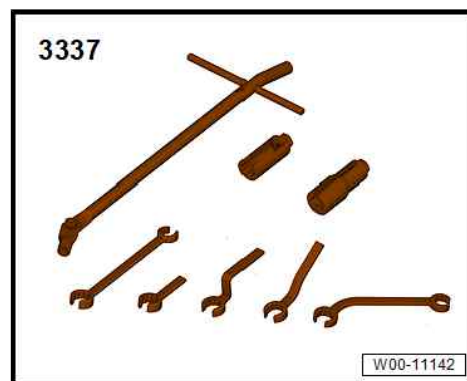
- ◆ Threads of new Lambda probes are already coated with assembly paste; the paste must not get into the slots on the probe body.
- ◆ In the case of a used Lambda probe grease only the thread with high-temperature paste. The paste must not get into the slots on the Lambda probe body. High-temperature paste → Parts catalogue
- ◆ When installing, it is important to re-attach the Lambda probe wiring at the same locations to prevent it from coming into contact with the exhaust pipe.

- Tightening torques: Lambda probes - overview ⇒ [page 44](#)

2.18 Removing and installing Lambda probe after catalytic converter - G130-

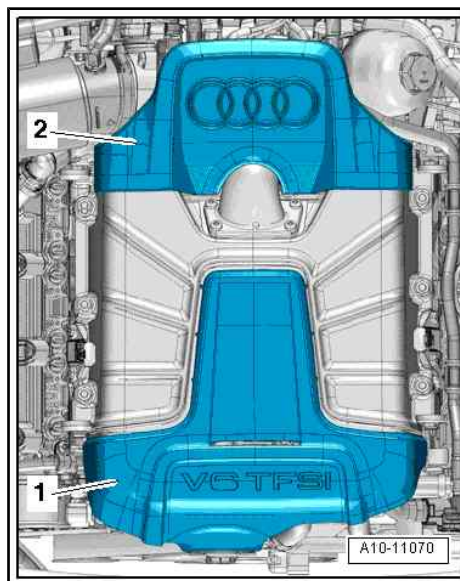
Special tools and workshop equipment required

- ◆ Lambda probe open ring spanner set - 3337-

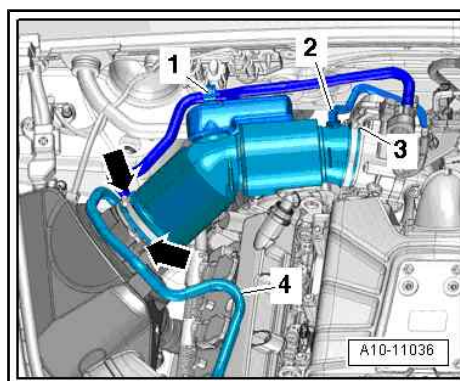


Removing

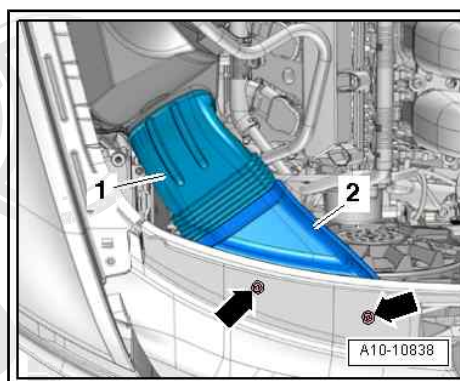
- Lift off engine cover panel (rear) -2-.



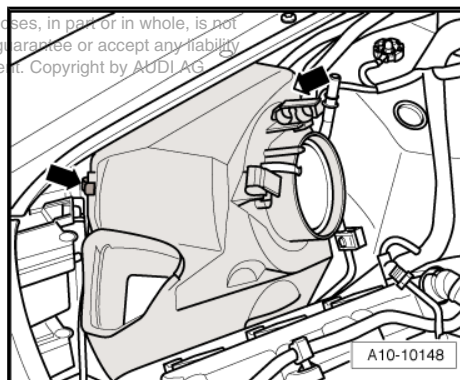
- Move fuel line -4- and line -1- leading to activated charcoal filter clear on air cleaner housing and air pipe.
- Detach vacuum hose -2- from connection on air hose.
- Remove air pipe. To do so, release hose clip -3- and clamps -arrows-.



- Remove bolts -arrows-, detach air ducts -1- and -2-.



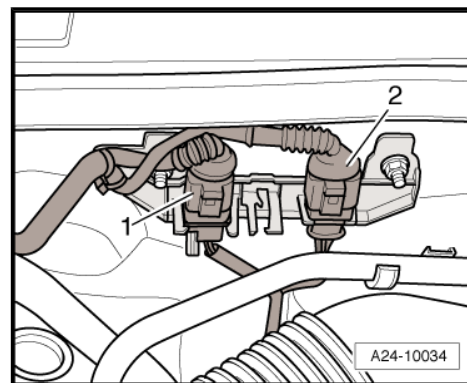
- Release clamps -arrows- and detach air cleaner (top section).



- Unplug electrical connector -2- for Lambda probe after catalytic converter - G130- and move wiring clear.

**Note**

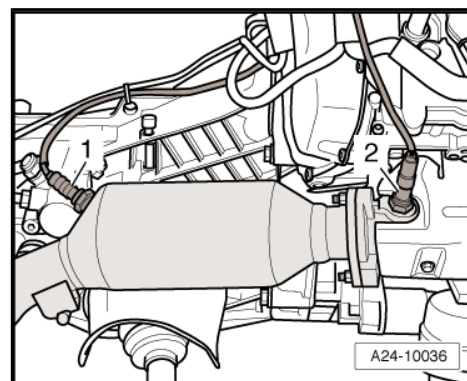
Disregard -item 1-.



- Unscrew Lambda probe -1- using ring spanner -3337/1/2- .

**Note**

For illustration purposes, the installation position is shown from the rear and with the engine removed.

**Installing**

Installation is carried out in the reverse order; note the following:

**Note**

- ◆ Threads of new Lambda probes are already coated with assembly paste; the paste must not get into the slots on the probe body.
- ◆ In the case of a used Lambda probe grease only the thread with high-temperature paste. The paste must not get into the slots on the Lambda probe body. High-temperature paste ⇒ Parts catalogue
- ◆ When installing, it is important to re-attach the Lambda probe wiring at the same locations to prevent it from coming into contact with the exhaust pipe.

- Tightening torques: Lambda probes - overview ⇒ [page 44](#)

2.19 Removing and installing Lambda probe 2 - G108-

Special tools and workshop equipment required

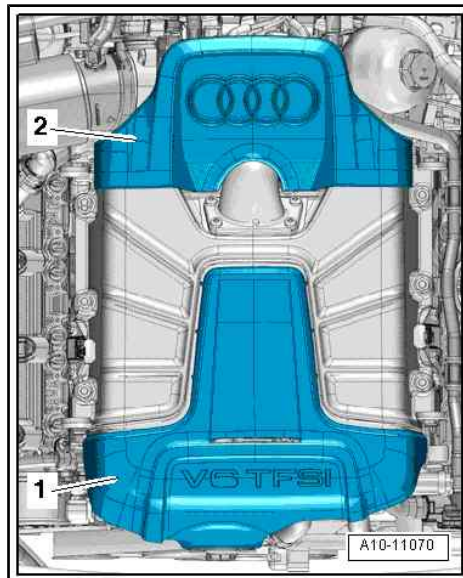
- ◆ Lambda probe open ring spanner set - 3337-



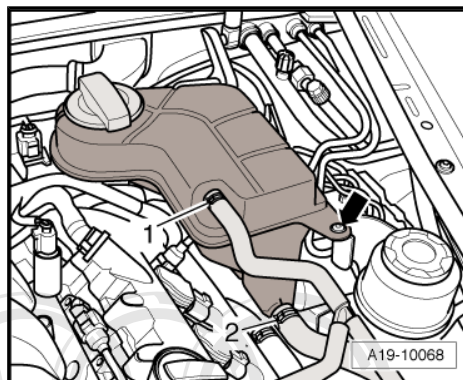
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Removing

- Lift off engine cover panel (rear) -2-.



- Remove bolt -arrow-.
- Unplug electrical connector for coolant shortage indicator switch - F66- at bottom of expansion tank and move expansion tank to one side with coolant hoses -1- and -2- attached.

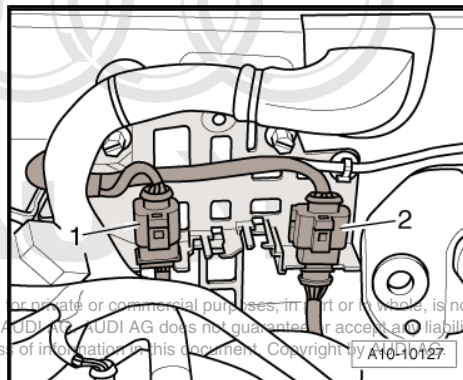


- Unplug electrical connector -1- for Lambda probe 2 - G108- and move wiring clear.



Note

Disregard -item 2-.



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- Unscrew Lambda probe -1- using ring spanner -3337/- .



Note

For illustration purposes, the installation position is shown from the rear and with the engine removed.

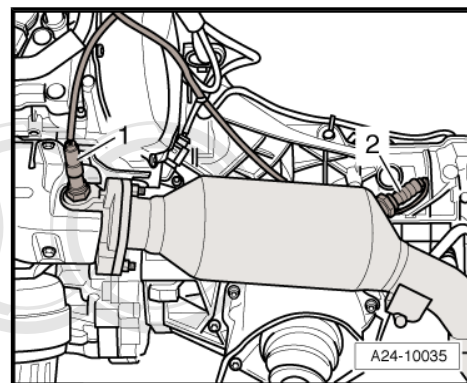
Installing

Installation is carried out in the reverse order; note the following:



Note

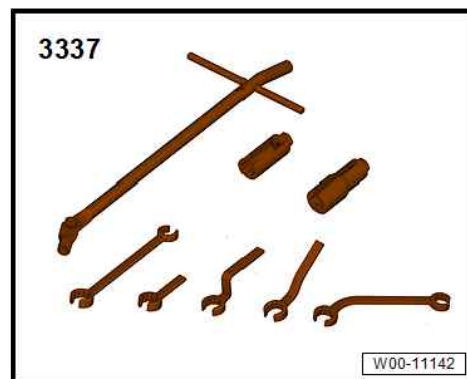
- ◆ *Threads of new Lambda probes are already coated with assembly paste; the paste must not get into the slots on the probe body.*
- ◆ *In the case of a used Lambda probe grease only the thread with high-temperature paste. The paste must not get into the slots on the Lambda probe body. High-temperature paste ⇒ Parts catalogue*
- ◆ *When installing, it is important to re-attach the Lambda probe wiring at the same locations to prevent it from coming into contact with the exhaust pipe.*
- Tightening torques: Lambda probes - overview ⇒ [page 44](#)



2.20 Removing and installing Lambda probe 2 after catalytic converter - G131-

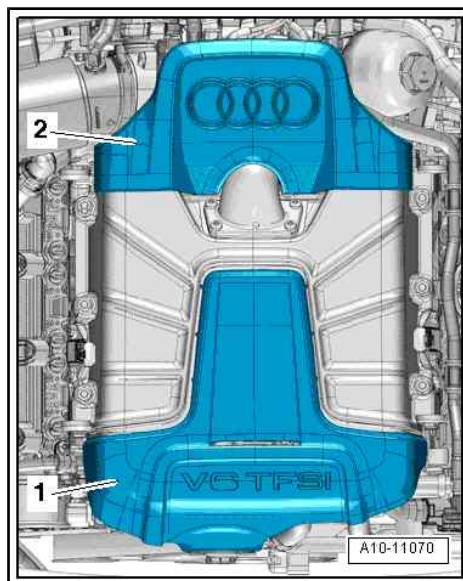
Special tools and workshop equipment required

- ◆ Lambda probe open ring spanner set - 3337-

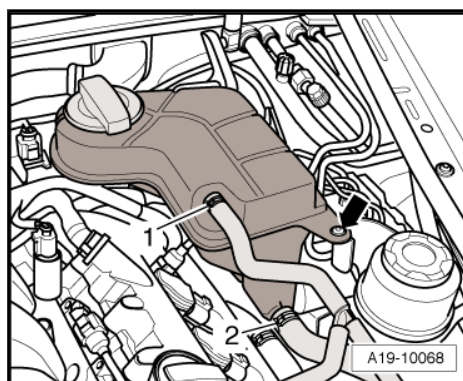


Removing

- Lift off engine cover panel (rear) -2-.



- Remove bolt -arrow-.
- Unplug electrical connector for coolant shortage indicator switch - F66- at bottom of expansion tank and move expansion tank to one side with coolant hoses -1- and -2- attached.

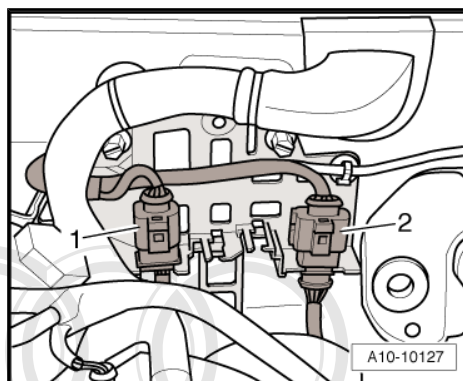


- Unplug electrical connector -2- for Lambda probe 2 after catalytic converter - G131- and move wiring clear.

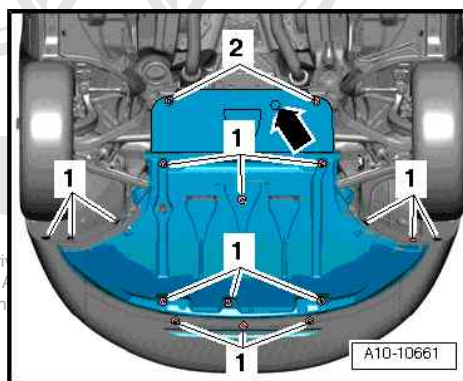


Note

Disregard -item 1-.



- Release fasteners -1, 2, arrow- and remove noise insulation panels.



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- Unscrew Lambda probe -2- using ring spanner -3337/1- .



Note

For illustration purposes, the installation position is shown from the rear and with the engine removed.

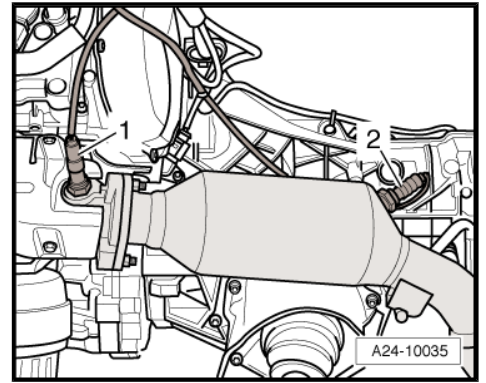
Installing

Installation is carried out in the reverse order; note the following:



Note

- ◆ *Threads of new Lambda probes are already coated with assembly paste; the paste must not get into the slots on the probe body.*
- ◆ *In the case of a used Lambda probe grease only the thread with high-temperature paste. The paste must not get into the slots on the Lambda probe body. High-temperature paste ⇒ Parts catalogue*
- ◆ *When installing, it is important to re-attach the Lambda probe wiring at the same locations to prevent it from coming into contact with the exhaust pipe.*
- Tightening torques: Lambda probes - overview ⇒ [page 44](#)
- Install noise insulation panels ⇒ Rep. gr. 50 .



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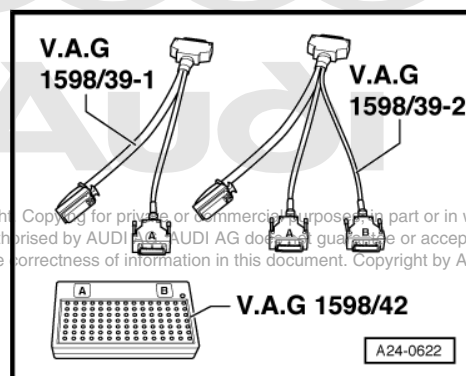
3 Engine control unit

3.1 Wiring and component check with test box - V.A.G 1598/42-

Special tools and workshop equipment required

- ◆ Adapter cable - V.A.G 1598/39-1-
- ◆ Adapter cable - V.A.G 1598/39-2-
- ◆ Test box - V.A.G 1598/42-

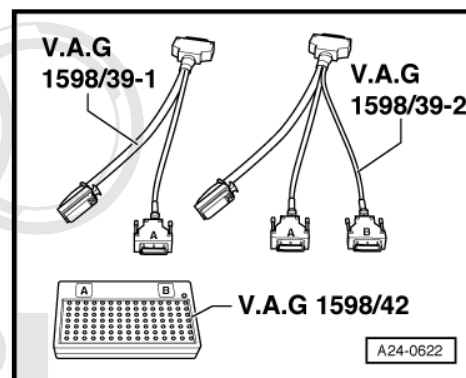
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Note

- ◆ The test box - V.A.G 1598/42- has 105 sockets. It can be connected to one of the engine control units via 2 different adapter leads.
- ◆ To carry out tests on the 60-pin wiring harness connector, the adapter cable - V.A.G 1598/39-1- is connected to connector "A" on the test box. For components connected to 60-pin wiring harness connector ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- ◆ To carry out tests on the 94-pin wiring harness connector, the adapter cable - V.A.G 1598/39-2- must be connected to connectors "A" and "B" on the test box. For components connected to 94-pin wiring harness connector ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- ◆ The test box - V.A.G 1598/42- is designed so it can be connected both to the wiring harness for the engine control unit and to the engine control unit itself at the same time.
- ◆ The advantage of this is that the electronic engine control system remains fully functional when the test box is connected (for example, for measuring signals when the engine is running).
- ◆ The relevant test procedure will state whether it is necessary to also connect the engine control unit to the test box.



Procedure

- Remove engine control unit ⇒ [page 56](#) .



Caution

Electronic components are susceptible to damage.

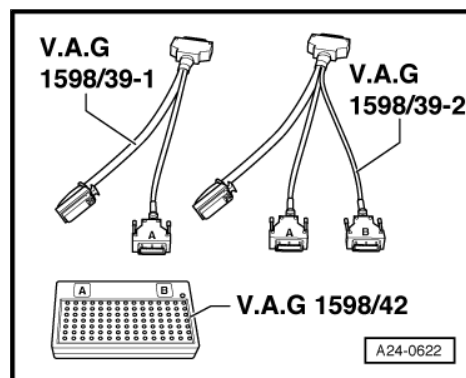
- ◆ Select the appropriate measuring range before connecting the test leads and observe test requirements.

- Connect test box - V.A.G 1598/42- to wiring harness with adapter cable - V.A.G 1598/39-1- or adapter cable - V.A.G 1598/39-2- . Connect earth clip of test box to negative terminal of battery. The instructions for performing the individual tests indicate whether or not the engine control unit itself also needs to be connected to the test box.



Note

The instructions for performing the individual tests indicate whether or not the engine control unit itself also needs to be connected to the test box.



- Carry out test as described in repair procedure.

Installing engine control unit

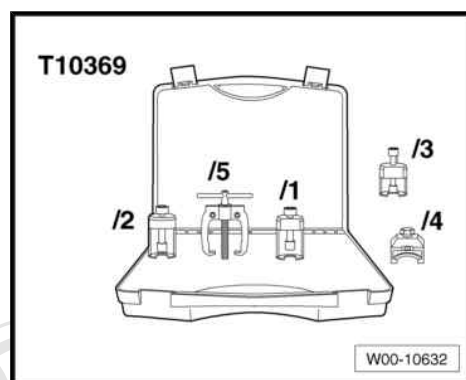
Installation is performed in the reverse sequence.

- After installation, the locking plate must be re-fitted on the control unit.
- Clean threaded holes for shear bolts to remove any residue from locking fluid. This can be done using a thread tap.
- Always use new shear bolts.
- Interrogate event memory and erase if necessary. If you have erased event memory, you must then generate readiness code in engine control unit in “Guided Fault Finding” mode.

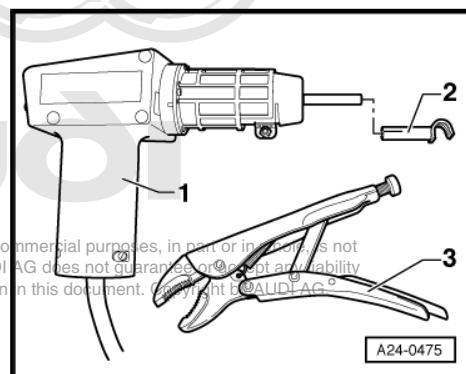
3.2 Removing and installing engine control unit

Special tools and workshop equipment required

- ◆ Puller - T10369-



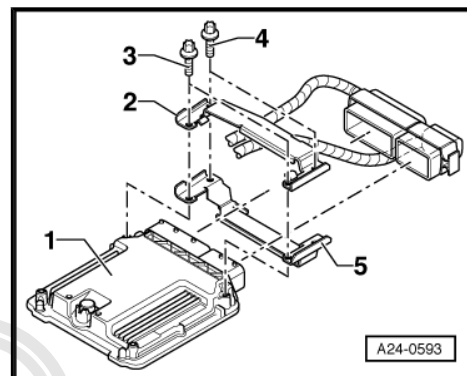
- ◆ Hot air blower - VAS 1978/14A- -item 1- with nozzle attachment -2- from wiring harness repair set - VAS 1978 B-
- ◆ Small, commercially available mole grips -3-



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Note

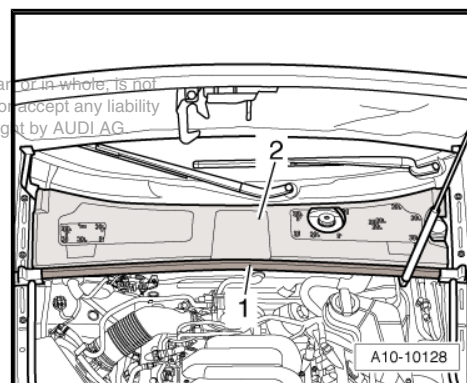
- ◆ *Not every engine control unit is bolted to a protective housing. Whether a protective housing is fitted depends on the engine/gearbox combination.*
- ◆ *The engine control unit -1- is bolted to the protective housing -5-. To make it more difficult to unscrew the shear bolts -4- for locking plate -2-, their threads have been coated with locking fluid.*
- ◆ *The protective housing has to be removed before the connectors can be unplugged from the engine control unit (e.g. to connect the test box or renew the engine control unit).*



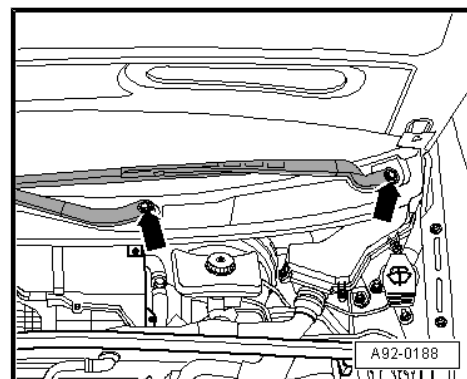
Removing

- When replacing engine control unit, select diagnosis object “Renew engine control unit” in “Guided Fault Finding”. Use vehicle diagnostic tester to do so.
- Switch off ignition and take out ignition key.
- Pull off seal -1- and remove plenum chamber cover -2-.

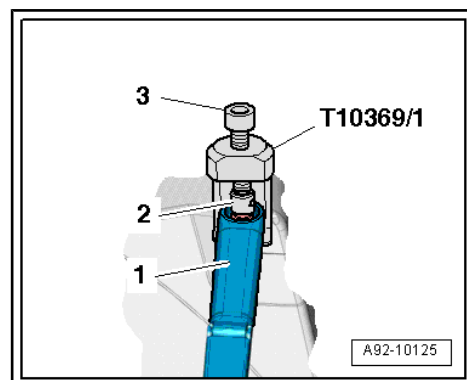
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- Pry off caps on windscreen wiper arms with a screwdriver.
- Loosen nuts -arrows- several turns.



- Apply puller -T10369/1- to wiper arm -1- as shown in illustration.
- Apply thrust piece -2- onto wiper shaft.
- Turn bolt -3- in clockwise direction until wiper arm is pulled off wiper shaft.
- Remove nuts and detach wiper arms.





Caution

Risk of damage to cowl panel trim.

- ◆ To avoid cracking the cowl panel grille -1- during removal, apply a small amount of soap solution to the joint between the windscreen and the cowl panel grille and pull the grille vertically up out of the fastening strip, starting from the edge of the windscreen.

- Unscrew bolts -arrows- and pull cowl panel trim off windscreen.
- Unscrew bolts -arrows- and take off cover for electronics box in engine compartment (right-side).



WARNING

Risk of burns at the pump valve unit for the heating system (left-side in front of electronics box).

- ◆ Wear protective gloves when working near the pump valve unit for the heating system.

- Carefully lever out retaining strap using a screwdriver -arrows 1 and 2- and remove engine control unit from electronics box.



Caution

Wiring, connectors, insulation and control units can be burnt and damaged.

- ◆ Keep exactly to the following procedure. Observe the instructions for operating the hot air blower.

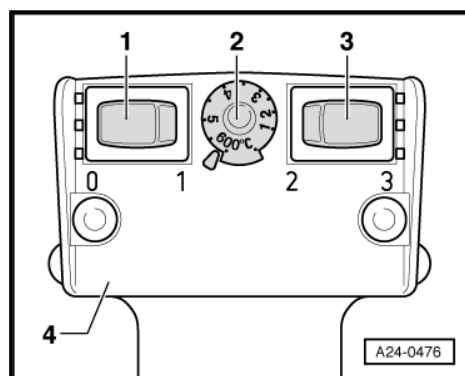
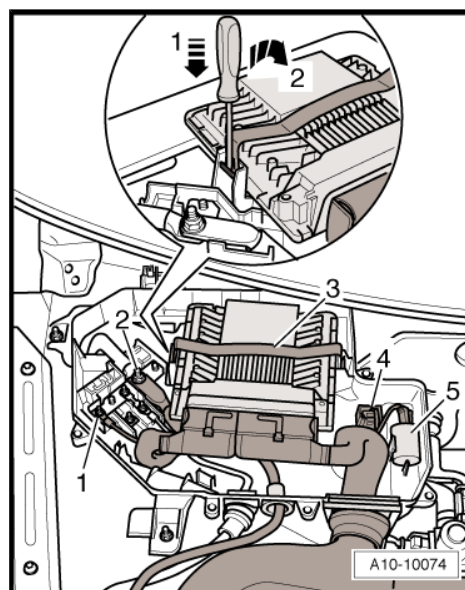
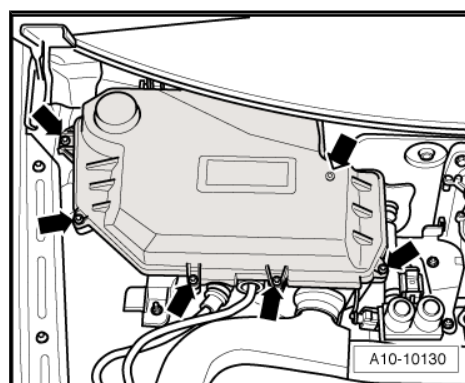
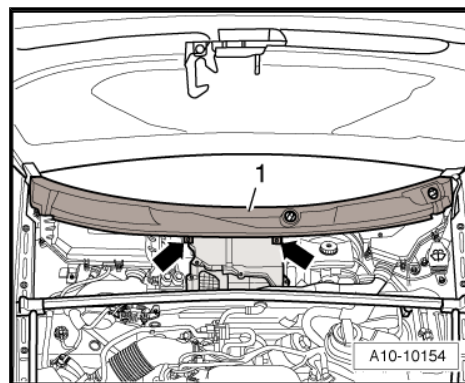
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- Select settings on hot air blower as shown in illustration, i.e. set temperature potentiometer -2- to max. heat output and two-stage air flow switch -3- to position "3".



Note

Then use hot air blower to heat threaded holes in protective housing into which shear bolts have been screwed. This reduces the inhibiting action of the locking fluid on the shear bolt threads and makes it easier to unscrew these bolts.



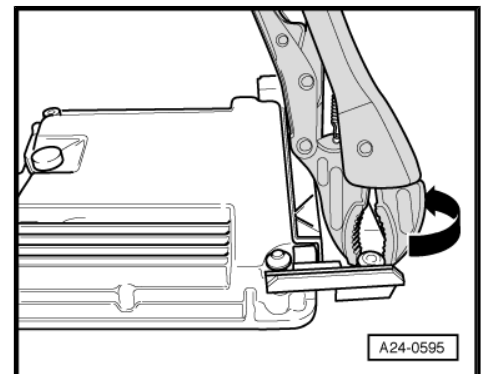
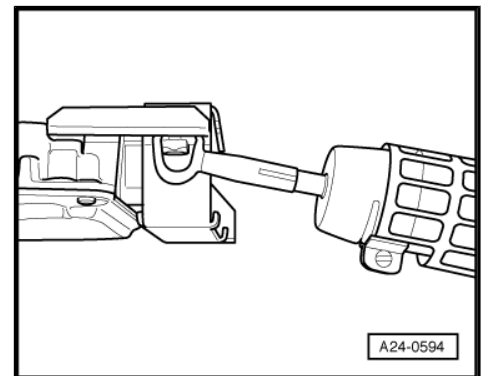
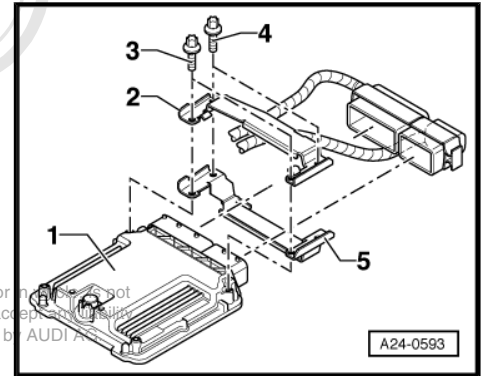


WARNING

Risk of burns.

- ◆ *Parts of the protective housing will become very hot as a result of heating the shear bolts. Try to ensure that only the shear bolt is heated and none of the nearby components. These should be covered if necessary.*

- Carry out the following operations on the two shear bolts -4- in turn.
- Place the nozzle of the hot air blower close to the shear bolt on the protective housing.
- Switch on the hot air blower and heat the bolt for approximately 20 ... 25 seconds.
- Unscrew shear bolts using vice-grip pliers -arrow-.

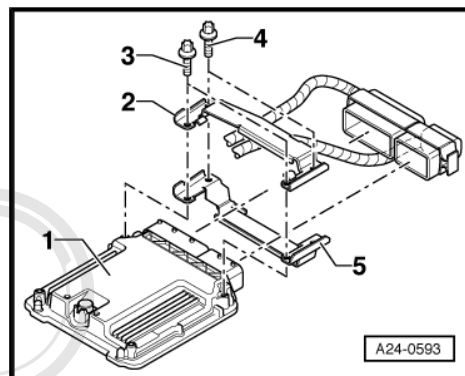




Note

The threads of the two shear bolts -3- which are screwed into the engine control unit are not secured with locking fluid. Do not apply heat to the threads in the control unit housing; this is not necessary and would cause overheating of the control unit.

- Unscrew the two shear bolts -3-.
- Release locking plate -2- for control unit connectors.
- Release retaining tabs and unplug connectors from engine control unit.



Note

When the connectors are unplugged from the engine control unit, the learnt values are erased, but the contents of the event memory remain intact.

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Installing

Installation is carried out in the reverse order; note the following:

- After installation, the locking plate must be re-fitted on the engine control unit - J623- .
- Clean threaded holes for shear bolts to remove any residue from locking fluid. This can be done using a thread tap.
- Use new shear bolts.

After installing a new engine control unit, the following operation must be performed:

- Activate engine control unit via a vehicle diagnostic tester in "Guided Functions" mode, "Replace engine control unit".

28 – Ignition system

1 General notes and safety precautions

1.1 General notes on ignition system

- ◆ The engine control unit has a self-diagnosis capability.
- ◆ A voltage of at least 11.5 V is required for proper operation of the electrical components.
- ◆ Certain tests may lead to faults being stored in the engine control unit. The event memory must be interrogated after completing all tests and repair work.
- ◆ If the engine starts, runs for a short period and then cuts out after completing fault finding, repairs or component tests, this may be due to the immobiliser disabling the engine control unit. The event memory must then be interrogated and, if necessary, the control unit must be adapted.

1.2 Safety precautions

Note the following if testers and measuring instruments have to be used during a road test:



WARNING

Accidents can be caused if the driver is distracted by test equipment while road-testing, or if test equipment is not properly secured.

Persons sitting in the front passenger's seat could be injured if the airbag is triggered in an accident.

- *The use of test equipment while driving causes distraction.*
- *There is an increased risk of injury if test equipment is not secured.*
- ◆ *Test equipment must always be secured on the rear seat with a strap and operated from the rear seat by a second person.*

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Observe the following to prevent injuries to persons and damage to the injection and ignition system:

- ◆ Persons wearing a cardiac pacemaker must at all times maintain a safe distance from high-voltage components such as the ignition system and gas-discharge headlights.
- ◆ Always switch off the ignition before connecting or disconnecting electrical wiring for the injection or ignition system or tester cables.
- ◆ Do not touch or disconnect ignition wiring when the engine is running or being turned at cranking speed.
- ◆ Always switch off ignition before washing engine.
- ◆ If you want to turn the engine at cranking speed without actually starting it (e.g. compression test), first unplug the connectors from the ignition coils and the injectors. After completing the work, interrogate and erase the event memory.



- ◆ Certain tests may lead to faults being stored in the engine control unit. The event memory must be interrogated after completing all tests and repair work. If faults are stored:



Caution

To prevent irreparable damage to the electronic components when disconnecting the battery:

- ◆ ***Observe notes on procedure for disconnecting the battery.***

- Disconnect battery ⇒ Rep. gr. 27 .

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2 Servicing ignition system

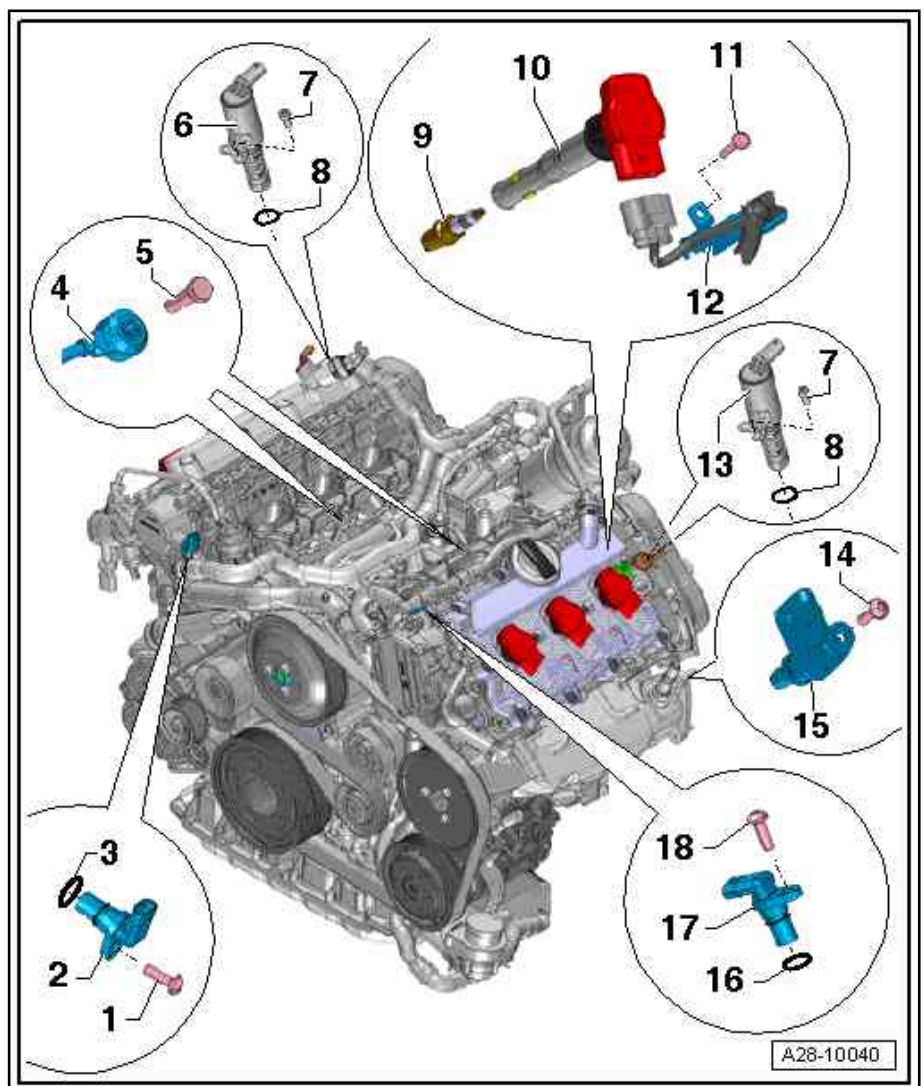
2.1 Test data

3.0 ltr. TFSI engine		
Idling speed	Cannot be adjusted; regulated by idling speed stabilisation	
Ignition timing	Cannot be adjusted; determined by control unit	
Ignition system	Multi-coil system with 6 ignition coils (output stages integrated) connected directly to spark plugs via spark plug connectors	
Spark plugs	Designations	⇒ Data sheets for exhaust emissions test
	Tightening torque	⇒ Maintenance ; Booklet 405
Firing order	1-4-3-6-2-5	

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2.2 Exploded view - ignition system

- 1 - Bolt
 - ☐ 9 Nm
- 2 - Hall sender - G40-
 - ☐ Removing and installing
⇒ [page 67](#)
- 3 - O-ring
 - ☐ Renew
- 4 - Knock sensor
 - ☐ Knock sensor 1 - G61- (right-side), knock sensor 2 - G66- (left-side)
 - ☐ Removing and installing
⇒ [page 66](#)
- 5 - Bolt
 - ☐ 20 Nm
- 6 - Camshaft control valve 1 - N205-
- 7 - Bolt
 - ☐ 5 Nm
- 8 - O-ring
 - ☐ Renew
- 9 - Spark plug
 - ☐ Change interval ⇒ Maintenance tables
 - ☐ Tightening torque
⇒ Maintenance ; Booklet 405
- 10 - Ignition coil
 - ☐ Removing and installing
⇒ [page 64](#)





11 - Bolt

- ☐ 5 Nm

12 - Electrical wiring harness

13 - Camshaft control valve 2 - N208-

14 - Bolt

- ☐ 9 Nm

15 - Engine speed sender - G28-

- ☐ Removing and installing ⇒ [page 68](#)

16 - O-ring

- ☐ Renew

17 - Hall sender 2 - G163-

- ☐ Removing and installing ⇒ [page 67](#)

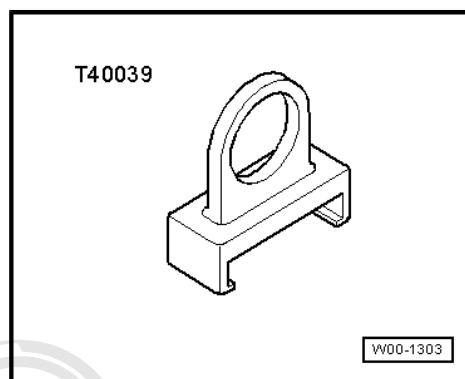
18 - Bolt

- ☐ 9 Nm

2.3 Removing and installing ignition coils

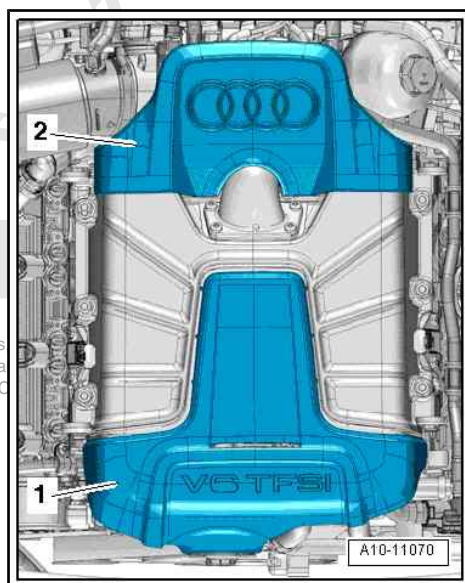
Special tools and workshop equipment required

- ◆ Puller - T40039-



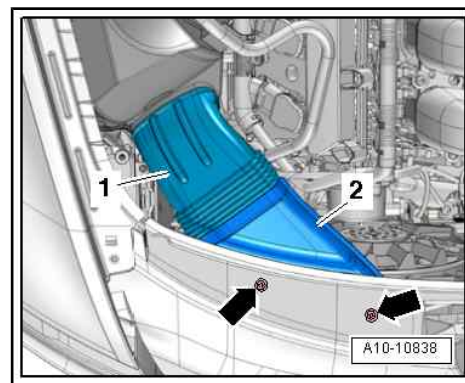
Removing

- Lift off engine cover panels -1- and -2-.

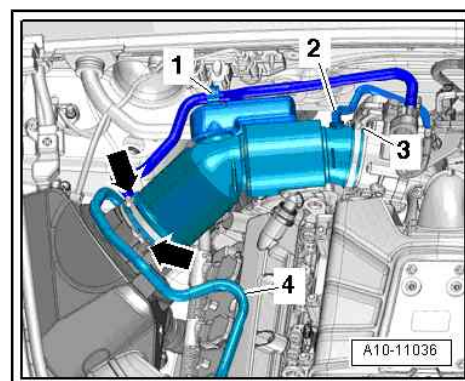


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- Remove bolts -arrows-, detach air ducts -1- and -2-.



- Move fuel line -4- and line -1- leading to activated charcoal filter clear on air cleaner housing and air pipe.
- Detach vacuum hose -2- from connection on air hose.
- Remove air pipe. To do so, release hose clip -3- and clamps -arrows-.



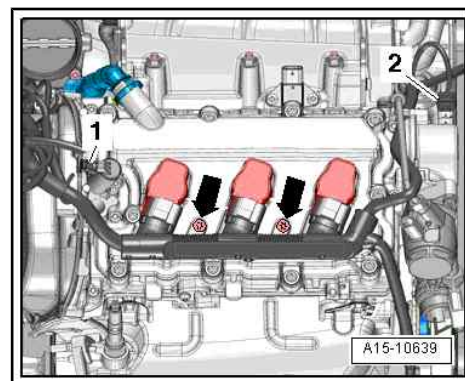
- Remove bolts -arrows- and unplug electrical connectors at ignition coils.
- Move electrical wiring harness down slightly.

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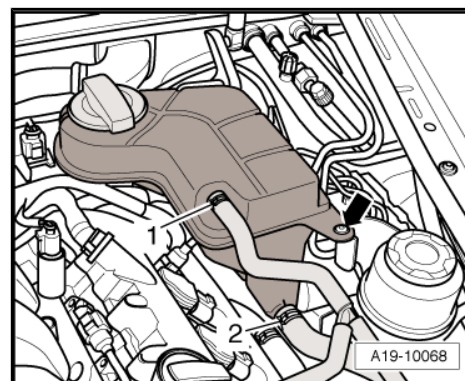
Note

Disregard -items 1, 2-.



Cylinder bank 2 (left-side):

- Remove bolt -arrow-.
- Unplug electrical connector for coolant shortage indicator switch - F66- at bottom of expansion tank and move expansion tank to one side with coolant hoses -1- and -2- attached.

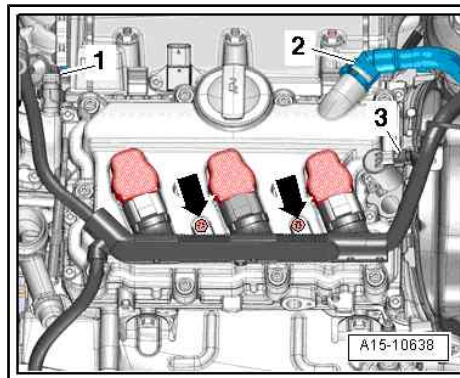


- Remove bolts -arrows- and unplug electrical connectors at ignition coils.
- Move electrical wiring harness down slightly.



Note

Disregard -items 1, 2, 3-.



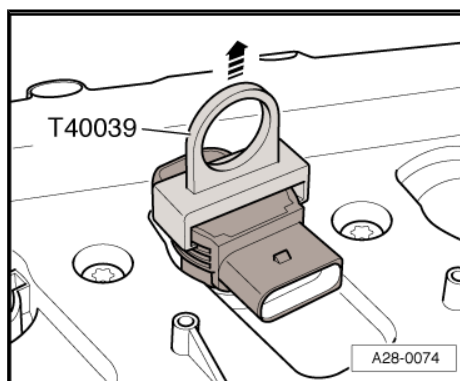
Both sides (continued):

- Remove ignition coils using puller - T40039- .

Installing

- Tightening torques ⇒ [page 16](#) , ⇒ [page 63](#) .

Install in reverse order.



2.4 Removing and installing knock sensors -G61- / -G66-

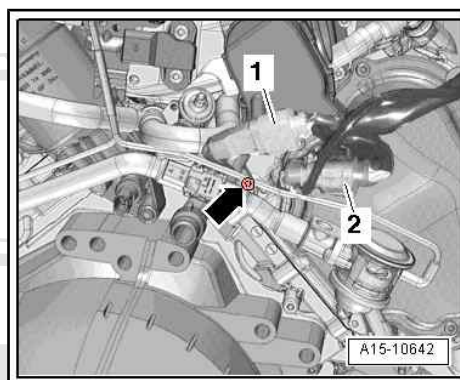
Removing

- Remove supercharger ⇒ Rep. gr. 21 .
- Remove intake manifold bottom sections (left and right) ⇒ [page 23](#) .
- Remove electrical connector -1- for knock sensor 1 - G61- from bracket (right-side) and unplug connector.



Note

Disregard -item 2- and -arrow-.

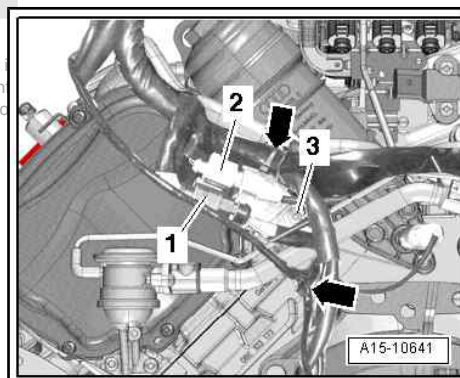


- Remove electrical connector -2- for knock sensor 2 - G66- from bracket (left-side) and unplug connector.



Note

Disregard items marked -1, 3- and -arrows-.



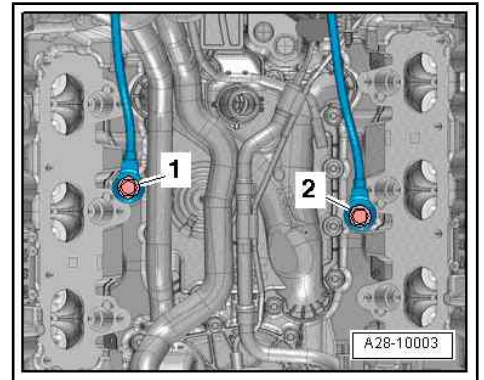
- Remove bolt -1- for knock sensor 1 - G61- and bolt -2- for knock sensor 2 - G66- and detach knock sensors.

Installing

- Tightening torque ⇒ [page 63](#)

Installation is carried out in the reverse order; note the following:

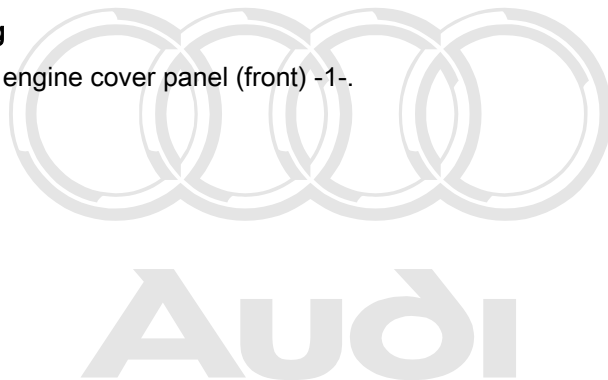
- Install intake manifold bottom sections (left and right) ⇒ [page 23](#) .
- Install supercharger ⇒ Rep. gr. 21 .



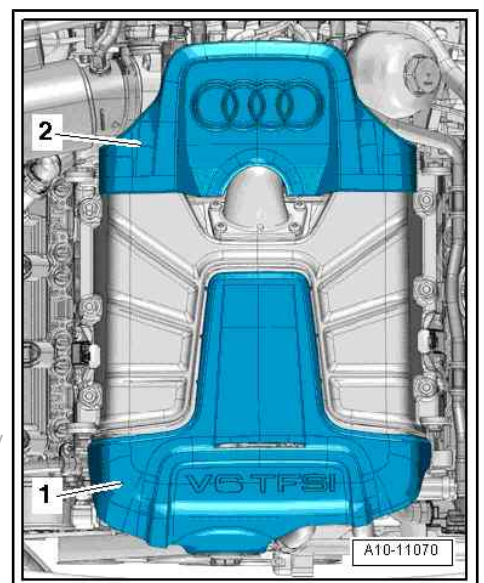
2.5 Removing and installing Hall senders - G40- / -G163-

Removing

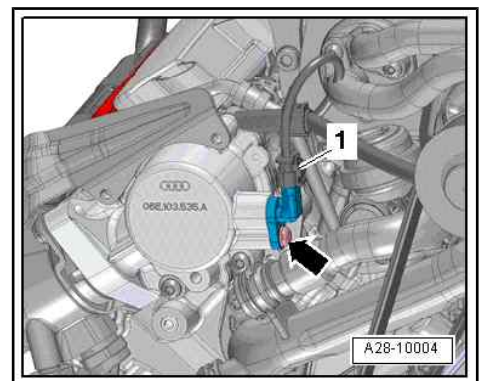
- Lift off engine cover panel (front) -1-.



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- Unplug electrical connector -1-.
- Unscrew bolt -arrow- and remove Hall sender - G40- (right-side).



- Unplug electrical connector -1-.
- Unscrew bolt -arrow- and remove Hall sender 2 - G163- (left-side).

Installing

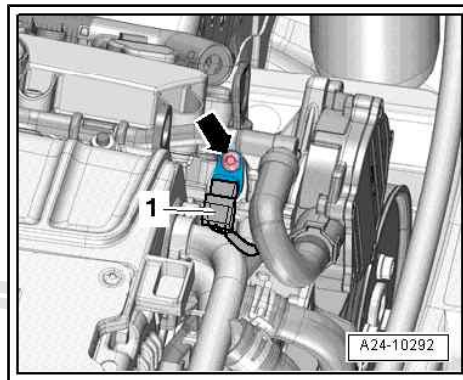
- Tightening torques ⇒ [page 38](#) , ⇒ [page 63](#) .

Installation is carried out in the reverse order; note the following:



Note

Fit new O-rings.

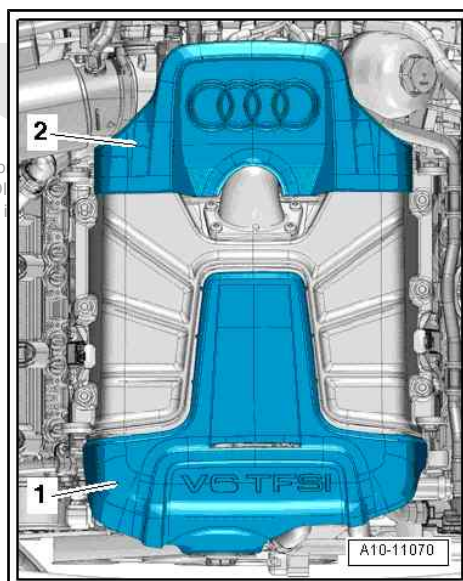


2.6 Removing and installing engine speed sender - G28-

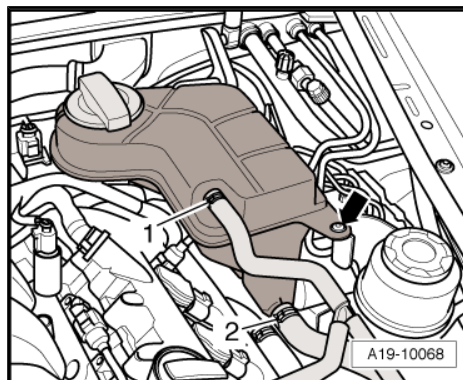
Removing

- Lift off engine cover panel (rear) -2-.

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- Remove bolt -arrow-.
- Unplug electrical connector for coolant shortage indicator switch - F66- at bottom of expansion tank and move expansion tank to one side with coolant hoses -1- and -2- attached.





Note

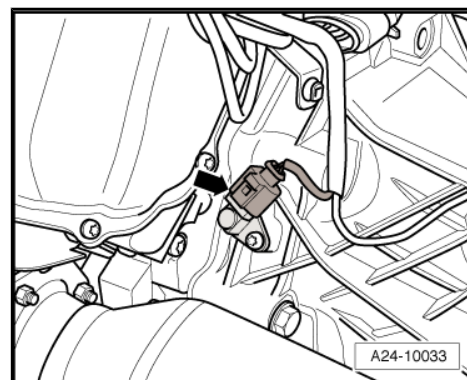
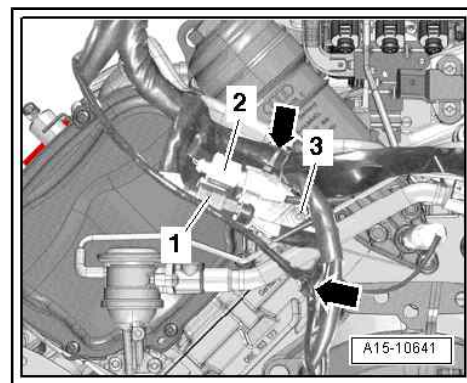
For illustration purposes, the work steps are shown in the following illustrations from the rear with the engine removed.

- Detach electrical connectors -1- and -2- from bracket and unplug connectors.
- Move electrical wiring clear -arrows-.
- Remove nut -3- and move earth wire clear.
- Remove centre hex stud and remove bracket.
- Unplug electrical connector -arrow-.
- Remove bolt and detach engine speed sender - G28- .

Installing

- Tightening torque ➔ [page 63](#)

Install in reverse order.



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