



Workshop Manual

Audi A1 2011 ➤

Audi A1 Sportback 2018 ➤

3-cylinder direct injection engine (1.0 ltr. 4-valve TFSI EA211)

Engine ID	CHZ E	CHZ B	DDH A	DKL D	DKR A	DKR F	DKLA	DKJA	CHZL
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Edition 06.2019



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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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00 – Technical data

1 Identification

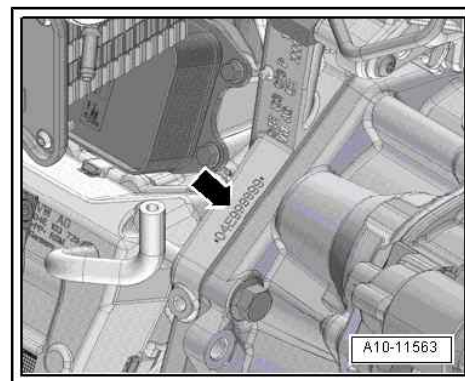
(ARL006443; Edition 06.2019)

⇒ **"1.1 Engine number/engine data", page 1**

1.1 Engine number/engine data

Engine number

- ◆ The engine number ("engine code" and "serial number") is located on the left side at the joint between engine and gearbox -arrow-.
- ◆ Additionally there is a sticker on the toothed belt cover (top) with engine code and serial number.
- ◆ Engine codes starting with the letter "C" have four letters (previously three letters).
- ◆ The first 3 characters of the engine code stand for the engine capacity and the mechanical construction and design. They are stamped onto the cylinder block together with the serial number.
- ◆ The 4th character indicates the power output and torque of the engine and is determined by the engine control unit.
- ◆ The four-letter engine code is found on the type plate (certain countries only), vehicle data sticker and engine control unit.
- ◆ Fitting locations of the type plate (certain countries only) and the vehicle data sticker ⇒ Maintenance : Booklet 819.



For engine data refer to ⇒ Maintenance ; Booklet 819 or ⇒ Technical data for engines; Rep. gr. 00 ; Overview of engines .



2 Safety precautions

⇒ [“2.1 Safety precautions when working on the fuel supply system”, page 2](#)

⇒ [“2.2 Safety precautions when working on vehicles with start/stop system”, page 2](#)

⇒ [“2.3 Safety precautions when using testers and measuring instruments during a road test”, page 3](#)

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⇒ [“2.5 Safety precautions when working on the ignition system”, page 3](#)

⇒ [“2.6 Safety precautions when working on the exhaust system”, page 3](#)

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2.1 Safety precautions when working on the fuel supply system

Risk of injury - fuel system operates under high pressure

The fuel system is pressurised. There is a risk of injury as fuel may spray out.

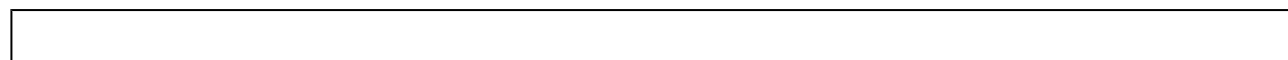
Before opening the fuel system:

- Put on safety goggles.
- Put on protective gloves.
- Release pressure (wrap a clean cloth around connection and open connection carefully).

Risk of fire due to escaping fuel

If the battery is connected, the door contact switch activates the fuel pump when the driver's door is opened. Escaping fuel may ignite, causing a fire.

- Before opening the fuel system, disconnect power supply to fuel pump.



2.2 Safety precautions when working on vehicles with start/stop system

Risk of injury - engine may start unexpectedly

The engine can start unexpectedly if the vehicle's start/stop system is activated. A message in the instrument cluster indicates whether the start/stop system is activated.

- To deactivate the start/stop system, switch off the ignition.



2.3 Safety precautions when using testers and measuring instruments during a road test

Risk of injury if test equipment is not secured

If an accident occurs and the front passenger's airbag is triggered, test equipment which is not secured adequately may be catapulted through the vehicle with potentially serious consequences.

- Secure test equipment on the rear seat with a strap.

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- Have a second mechanic operate test equipment on the rear seat.

2.4 Safety precautions when working on the cooling system

Risk of scalding as hot coolant can escape

The cooling system is under pressure when the power unit is hot. Risk of scalding due to hot steam and hot coolant.

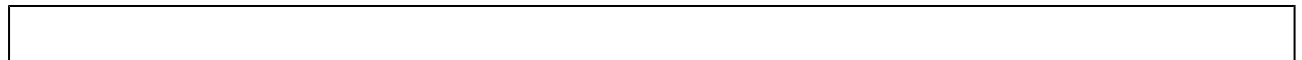
- Put on protective gloves.
- Put on safety goggles.
- Cover filler cap on expansion tank with a cloth and open carefully to release pressure.

2.5 Safety precautions when working on the ignition system

Risk of injury due to electric shock

When the engine is running, there are high voltage levels in the ignition system. There is a risk of electric shock when touching the ignition system!

- Never touch or disconnect ignition wiring when the engine is running or being turned at cranking speed.



Risk of damage to components

Washing the engine or connecting/disconnecting electrical wiring may result in components being damaged if the engine is running.

- Switch off ignition before connecting/disconnecting electrical wiring.
- Switch off ignition before cleaning engine.

2.6 Safety precautions when working on the exhaust system

Risk of damage to flexible joint

The flexible joint can be damaged or develop leaks if it is handled incorrectly.



- Do not bend flexible joint more than 10°.
- Install flexible joint so that it is not under tension.

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Risk of injury caused by components of the exhaust system

Danger of injury to hands and other parts of the body due to hot or sharp parts of the exhaust system.

- Allow exhaust system to cool down.
- Put on protective gloves.



3 Repair instructions

⇒ [“3.1 Rules for cleanliness”, page 5](#)

⇒ [“3.2 General notes”, page 5](#)

⇒ [“3.3 General repair instructions”, page 6](#)

⇒ [“3.4 Foreign particles in engine”, page 6](#)

⇒ [“3.5 Contact corrosion”, page 6](#)

⇒ [“3.6 Routing and attachment of pipes, hoses and wiring”, page](#)

[6](#)

⇒ [“3.7 Nuts, bolts”, page 7](#)

⇒ [“3.8 Identification plates”, page 7](#)

⇒ [“3.9 Use of impact wrenches”, page 7](#)

⇒ [“3.10 Installing radiators and condensers”, page 8](#)

⇒ [“3.11 Checking vacuum system”, page 8](#)

3.1 Rules for cleanliness

Even small quantities of dirt can lead to defects. For this reason, please observe the following rules when working on the fuel supply system, injection system and turbocharger:

- ◆ Clean connections and surrounding area thoroughly with engine cleaner or brake cleaner and dry cleaned area before loosening.
- ◆ Seal off open pipes and connections immediately with clean plugs, e.g. from engine bung set - VAS 6122- .
- ◆ After removal, place parts on a clean surface and cover them. Only use lint-free 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.).
- ◆ Do not work with compressed air when the system is open. If possible, do not move vehicle.
- ◆ Make sure that no fuel runs onto the fuel hoses. Should this occur, the fuel hoses must be cleaned again immediately.
- ◆ Protect unplugged electrical connectors against dirt and moisture and make sure connections are dry when attaching.

3.2 General notes

- ◆ 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).
- ◆ 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.



- ◆ At the same time, this system also improves the engine's starting performance. When the driver's door is opened, the fuel pump is activated for 2 seconds in order to build up pressure in the fuel system

⇒ ["2.1 Safety precautions when working on the fuel supply system", page 2](#) .

3.3 General repair instructions

- ◆ Clean tools and workbench etc. before working on the injection system.
- ◆ If the high-pressure fuel lines are to be re-used, you must mark them before removal. High-pressure pipes must always be re-installed on the same cylinder.
- ◆ Position high-pressure pipes so they are free of stress. Tighten all unions lightly to start with before tightening to final torque.
- ◆ Never attempt to bend high-pressure fuel lines to shape.
- ◆ When working on any parts of the high-pressure fuel system, tools may only be used for loosening and tightening pipe unions. All other components must always be removed and installed by hand without using tools or other equipment.
- ◆ All cable ties which are released or cut open when removing must be refitted in the same position when installing.
- ◆ Fuel hoses in engine compartment must only be secured with spring-type clips. O-type clips or screw-type clips must not be used.

3.4 Foreign particles in engine

- ◆ When performing assembly work on the engine, all open passages in the intake and exhaust systems must be sealed with suitable plugs (e.g. from engine bung set - VAS 6122-) to prevent foreign particles from entering the engine.

If the turbocharger has suffered mechanical damage

⇒ ["1.2 Removing and installing turbocharger", page 238](#)

3.5 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 fitted.

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 .

Please note:

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

3.6 Routing and attachment of pipes, hoses and wiring

- ◆ Mark fuel lines, hydraulic lines, vacuum lines, lines for activated charcoal filter and electrical wiring etc. before removal so



they can be re-installed in the original positions and correctly connected. Make sketches or take photographs if necessary.

- ◆ To avoid damaging pipes, hoses and wiring, ensure sufficient clearance from all moving or hot components in engine compartment (limited space in engine compartment).

3.7 Nuts, bolts

- ◆ Loosen bolts in reverse sequence to specified tightening sequence.
- ◆ Bolts and nuts used to secure covers and housings must be tightened in steps according to the specified tightening sequence and method.
- ◆ Bolts and nuts which secure covers and housings should be loosened and tightened in diagonal sequence and in stages if no tightening sequence is specified.
- ◆ Always renew self-locking bolts and nuts.
- ◆ Unless otherwise specified, use a wire brush to clean the threads of bolts which are secured with locking fluid. Then install bolts with locking fluid; for locking fluid refer to ⇒ Electronic parts catalogue .
- ◆ Threaded holes which take self-locking bolts or bolts coated with locking fluid must be cleaned using a thread tap or similar. Otherwise there is a danger of the bolts shearing off the next time they are removed.

◆ The tightening torques stated apply to non-oiled nuts and bolts.

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3.8 Identification plates

When renewing vehicle components, the identification plates on the old parts that have a replacement part number (see ⇒ Electronic parts catalogue) must be attached to the new parts due to approval regulations.

3.9 Use of impact wrenches

In general, it is permitted to use an impact wrench to unscrew bolts and nuts. An exception to this is when work is performed inside an open high-voltage battery. For this work, it is not permitted to use an impact wrench.

An impact wrench may be used to screw in bolts and nuts when performing repair work if the following requirements are observed. In general, electric and compressed-air impact wrenches should be used.

Requirements:

- Only screw in bolts with locking fluid or self-locking nuts at low speed.
- Use a suitable impact wrench with variable speed and adjustable torque range.
- Use suitable bits when working in the vicinity of sensitive surfaces, e.g. plastic-coated bits for aluminium rims.
- When working in the vicinity of natural gas systems, observe the information in the Workshop Manual "Natural gas engines - General information".



Use:

- Fit bolts/nuts by hand.
- Only use an impact wrench to screw in bolts/nuts until the head of the bolt/nut makes contact and then continue tightening with a torque wrench.
- Clean threaded pins before unscrewing the bolt/nut.

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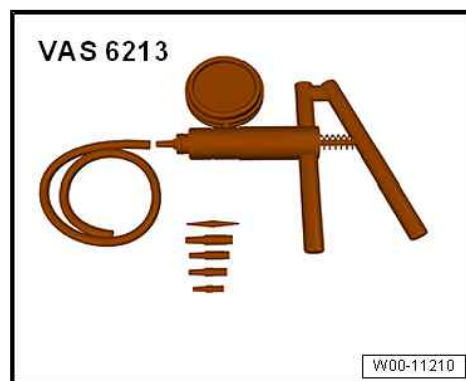
3.10 Installing radiators and condensers

Even when the radiator and condenser are correctly installed, slight impressions may be visible on the fins of these components. This does not mean that the components are damaged. If the fins are only very slightly distorted, this does not justify renewal of the radiator or the condenser.

3.11 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
 - ◆ Porous or leaking lines
- Check vacuum line to solenoid valve and from solenoid valve to corresponding component.
- If an entry is stored in the event memory, check all vacuum lines leading to the corresponding component and also check the remaining 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.



10 – Removing and installing engine

1 Removing and installing engine

⇒ [“1.1 Removing engine”, page 9](#)

⇒ [“1.2 Separating engine and gearbox”, page 29](#)

⇒ [“1.3 Securing engine to engine and gearbox support”, page 32](#)

⇒ [“1.4 Installing engine”, page 34](#)

1.1 Removing engine

⇒ [“1.1.1 Removing engine - Audi A1 2011►”, page 9](#)

⇒ [“1.1.2 Removing engine - Audi A1 2018►”, page 19](#)

1.1.1 Removing engine - Audi A1 2011►

Special tools and workshop equipment required

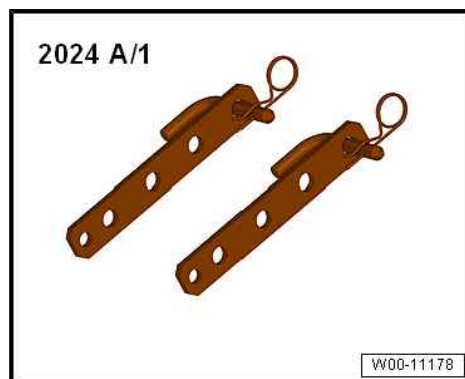


◆ Removal lever - 80-200-

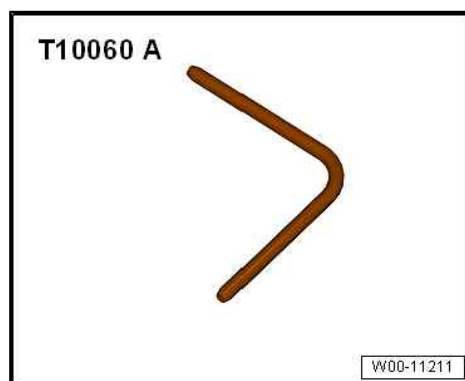
◆ Stepladder (commercially available) or -VAS 5085-



- ◆ Engine bung set - VAS 6122-
- ◆ Coolant collecting system - VAS 5014- or drip tray for work-shop hoist - VAS 6208-
- ◆ Hose clip pliers - VAS 6362-
- ◆ Engine and gearbox jack - VAS 6931-
- ◆ Extension -2024A/1- for lifting tackle - 2024A-



- ◆ Locking pin - T10060A-



- ◆ Engine bracket - T10483-



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- ◆ Safety goggles
- ◆ Protective gloves

Procedure

- The engine is removed from underneath together with the gearbox.
- Re-install all cable ties in original positions.

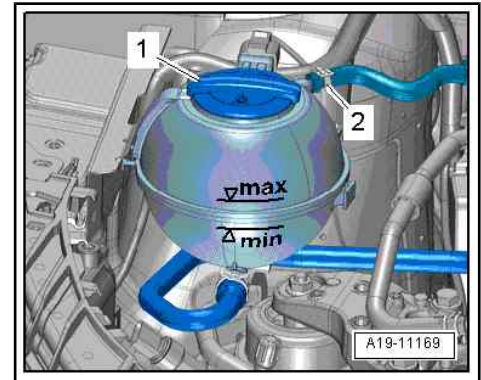


⚠ CAUTION

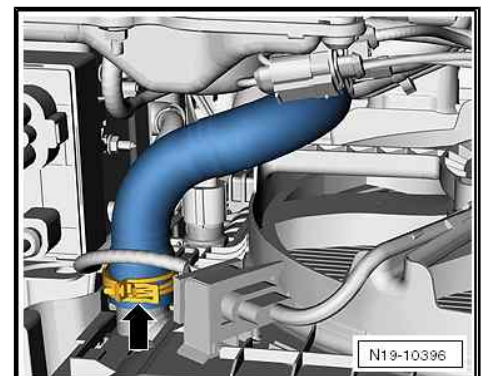
The cooling system is under pressure when the power unit is hot. Risk of scalding due to hot steam and hot coolant.

Danger of scalding skin and other parts of the body.

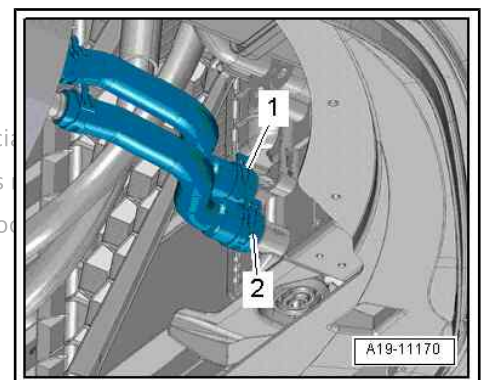
- Put on protective gloves.
- Put on safety goggles.
- Cover filler cap on expansion tank with a cloth and open carefully to release pressure.



- Open filler cap -1- on coolant expansion tank.
- Release hose clip -2- and detach coolant hose.
- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Remove wheel housing liners (front left and front right) ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Exploded view - wheel housing liner (front) .
- Remove front wheels ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .
- Remove battery tray ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray .
- Place collector tank from coolant collecting system -VAS 5014- or drip tray for workshop hoist - VAS 6208- underneath.
- Release hose clip -arrow-, disconnect coolant hose (bottom left) from radiator and drain off coolant.



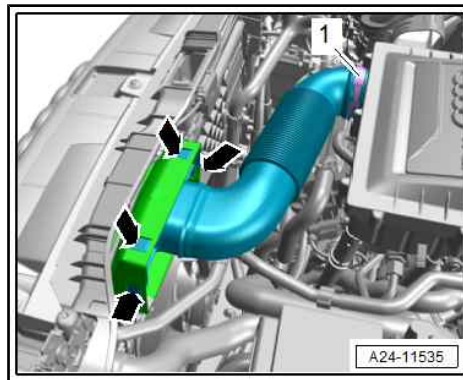
- Release hose clips -1 and 2-, disconnect coolant hoses (bottom right) from water radiator for charge air cooling circuit and drain off remaining coolant.



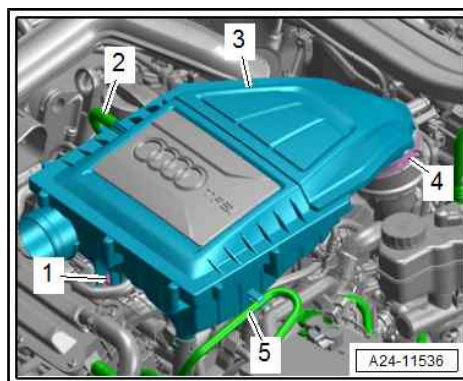
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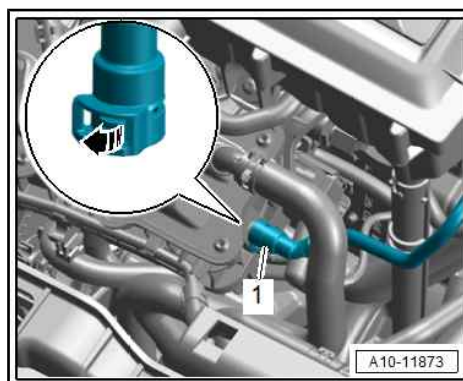
- Release fasteners -arrows- and detach air duct from lock carrier.



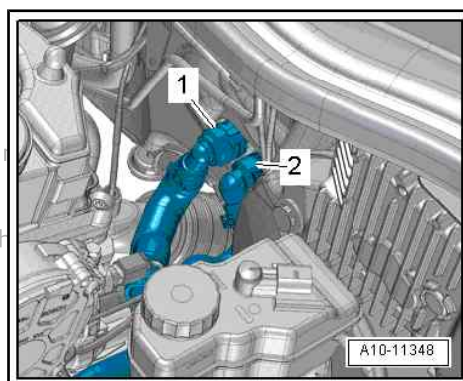
- Disconnect crankcase breather hose -2-.
- Move vacuum line -5- clear.
- Remove bolt -1-.
- Release hose clip -4-.
- Lift air cleaner housing -3- off ball studs and detach.



- Release catch -arrow- and disconnect vacuum hose -1-.



- Place collector tank from coolant collecting system -VAS 5014- or drip tray for workshop hoist -VAS 6208- underneath.
- Lift retaining clips -1 and 2- and disconnect coolant hoses from heat exchanger for heater.
- Guide coolant hoses downwards and drain off coolant.



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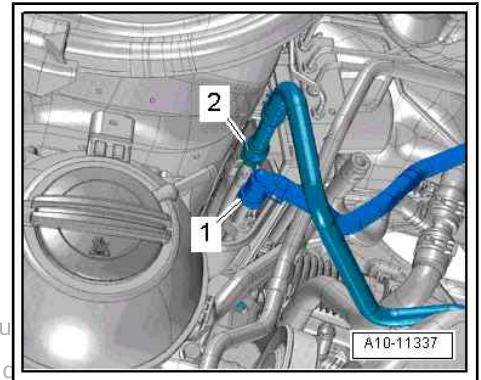


- Press release tabs and disconnect vacuum hose -2- from activated charcoal filter system.

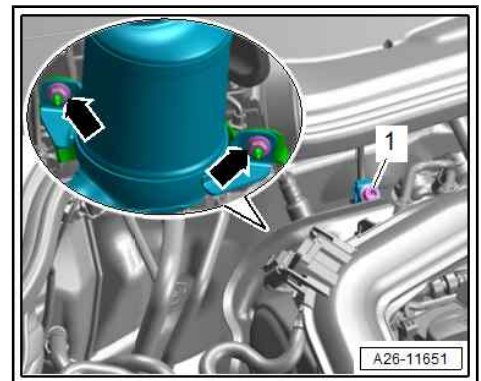
⚠ CAUTION

The fuel system is pressurised.
Risk of injury as fuel may spray out.

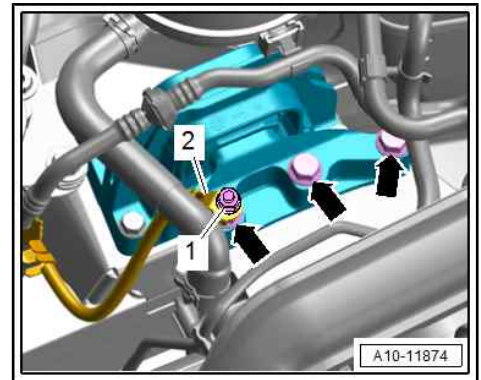
- Put on safety goggles.
- Put on protective gloves.
- Release pressure (wrap a clean cloth around connection and open connection carefully).



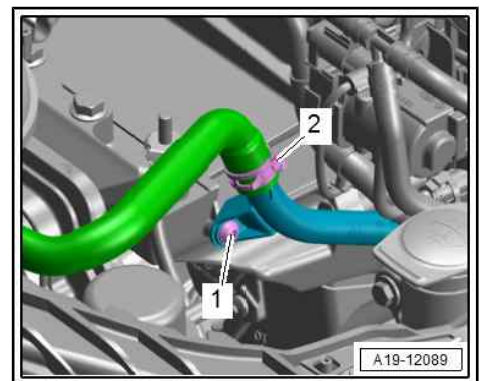
- Disconnect fuel supply line -1- ➔ Fuel supply system; Rep. gr. 20 ; Plug-in connectors; Disconnecting plug-in connectors.
- Seal off open pipes/lines and connections with clean plugs from engine bung set - VAS 6122- .
- Open screw-type clip -1- and place it on intake funnel of catalytic converter.
- Unscrew nuts -arrows- and tie up catalytic converter to rear.



- Remove nut -1- and move earth wire -2- clear.
- Loosen bolts -arrows- for support arm of engine mounting approx. 2 turns.

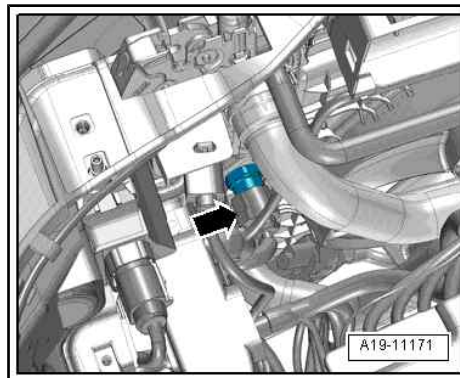


- Release hose clip -2- and disconnect coolant hose.

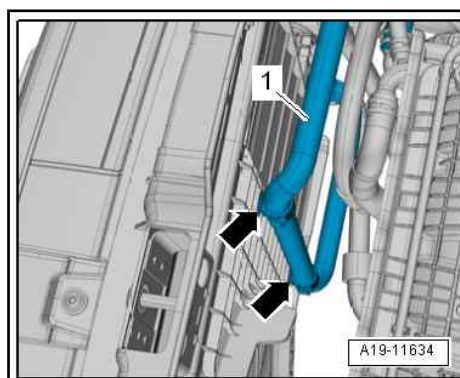




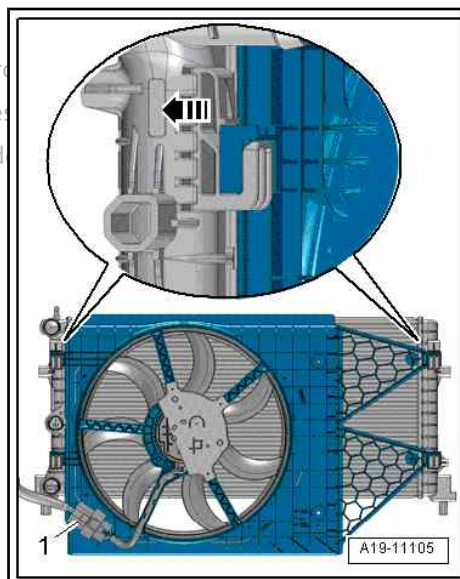
- Unplug electrical connector -arrow- for radiator outlet coolant temperature sender - G83- .



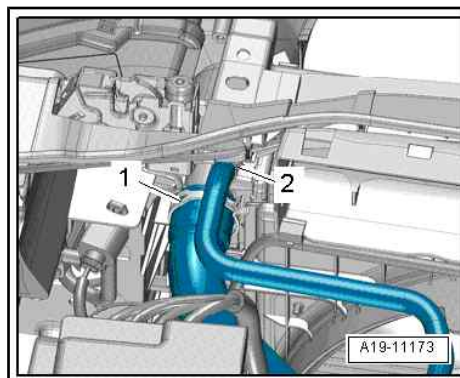
- Move coolant hose -1- clear at radiator cowl -arrows-.



- Unplug electrical connector -1- for radiator fan.
- Press locking tabs (left and right) for radiator cowl -arrow- simultaneously.
- Lift radiator cowl off radiator and detach it downwards.



- Release hose clips -1 and 2- and detach coolant hoses (top left) from radiator.





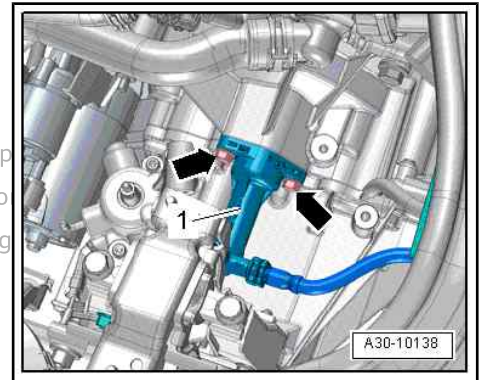
Vehicles with manual gearbox:

- Remove bolts -arrows-, detach clutch slave cylinder -1- and place to one side; do not open pipes.

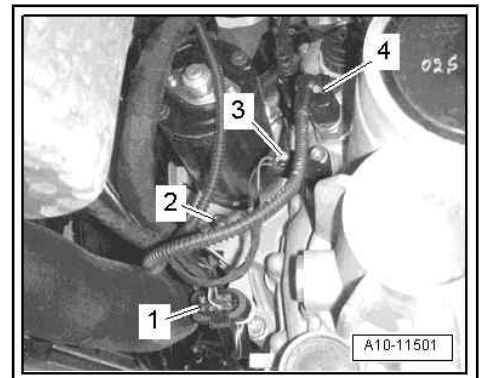
! NOTICE

Risk of damage to removed clutch slave cylinder if clutch pedal is applied.

- Do not apply clutch pedal.



- Unplug electrical connectors on gearbox (front):
 - 2 - For starter
 - 3 - For gearbox neutral position sender - G701-
 - 4 - For reversing light switch - F4-
- Detach electrical connector -1- from bracket and unplug.
- Detach gear selector cable and gate selector cable from gearbox, remove cable support bracket and place to one side with selector cables attached ⇒ Rep. gr. 34 ; Selector mechanism; Removing and installing selector mechanism .



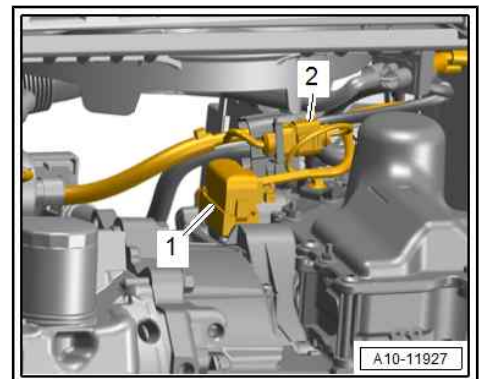
Vehicles with dual clutch gearbox:

- Detach selector lever cable from selector lever ⇒ Rep. gr. 34 ; Selector mechanism; Removing and installing selector mechanism .
- Detach electrical connector -2- from bracket and unplug.

! NOTICE

Risk of irreparable damage due to electrostatic discharge.

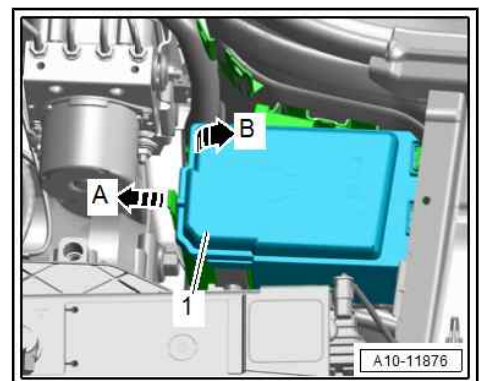
- Do not touch connector contacts with your hands.
- Touch the lifting platform or other earthed object to discharge static electricity.



- Touch vehicle earth with bare hands to eliminate any static charge.
- Unplug electrical connector -1- for mechatronic unit for dual clutch gearbox - J743- .

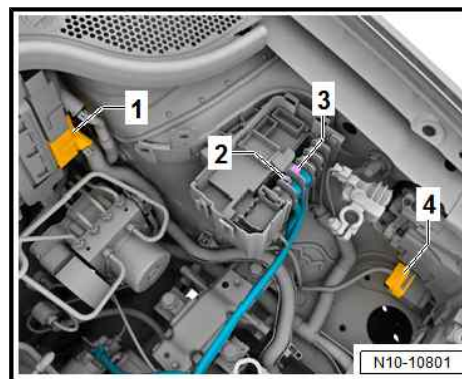
All vehicles (continued):

- Release fastener -arrow A-.
- Open and remove cover -1- for electronics box -arrow B-.

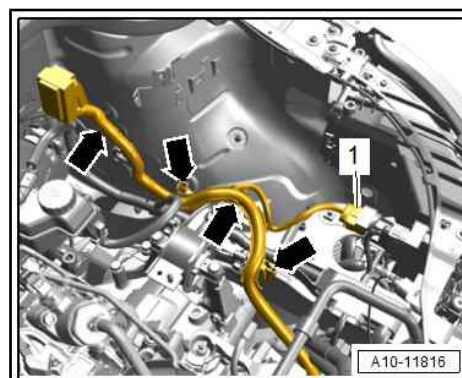




- Release and unplug electrical connector (bottom) -1- at engine control unit - J623- ➔ [page 302](#) .
- Unplug electrical connector -4-.
- Remove bolts -2, 3-, detach electrical wiring and move clear.



- Move engine wiring harness clear using removal lever - 80-200- -arrows- and lay down on top of engine.



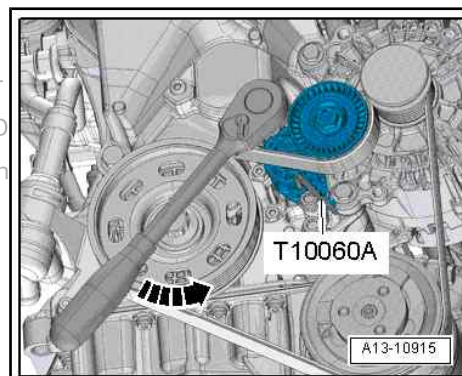
Vehicles with air conditioner compressor:



NOTICE

Risk of irreparable damage due to running a used belt in the opposite direction when it is refitted.

- Mark running direction before removing.
- Pay attention to running direction when reinstalling.
- To slacken poly V-belt, swivel tensioner in anti-clockwise direction -arrow- and detach poly V-belt from pulley for air conditioner compressor.
- Lock tensioner with locking pin - T10060A- .
- Take off poly V-belt.



CAUTION

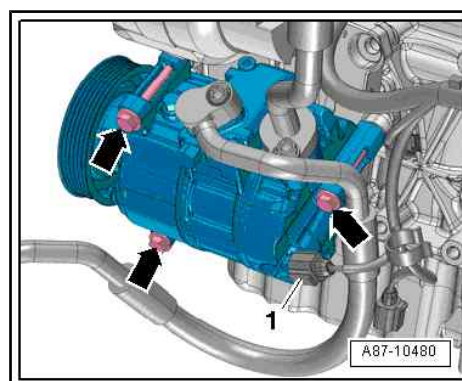
Risk of frostbite caused by refrigerant.

- Do not open refrigerant circuit of air conditioner.

- Unplug electrical connector -1- on air conditioner compressor regulating valve - N280- .
- Remove bolts -arrows- for air conditioner compressor.
- Detach air conditioner compressor with refrigerant lines still connected and tie up to right side.

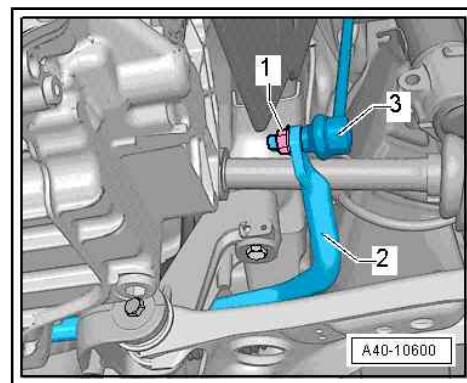
All vehicles (continued):

- Detach drive shaft (left and right) from gearbox ➔ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Removing and installing drive shaft .
- Take care not to damage surface coating of drive shaft.

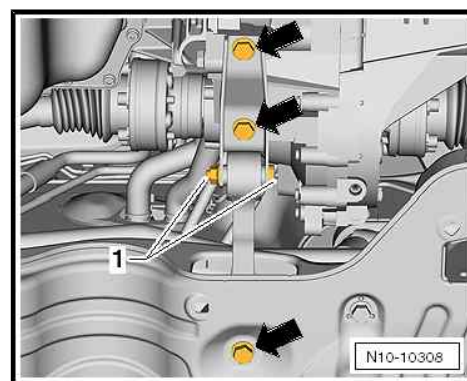




- Remove nut -1- for coupling rod -3- (right-side) on anti-roll bar -2-.
- Counterhold stud with a Torx socket to loosen and tighten nuts.
- Apply counterhold tool so that it is straight (not tilted).



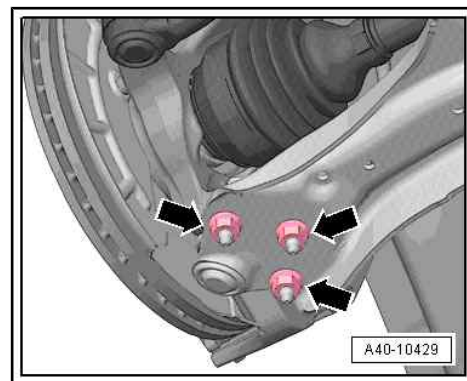
- Remove bolts -arrows- and detach pendulum support.
- Do NOT loosen bolted connection -1-.



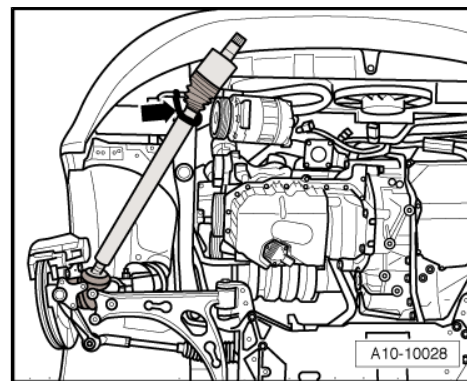
- Remove nuts -arrows- for swivel joint on both sides.
- If fitted, loosen nut on bracket for front left vehicle level sender -G78- .
- Detach swivel joints from wishbones.

Note

When removing and installing, take care not to damage the rubber boot of the swivel joint. The boot should be protected against damage if necessary.



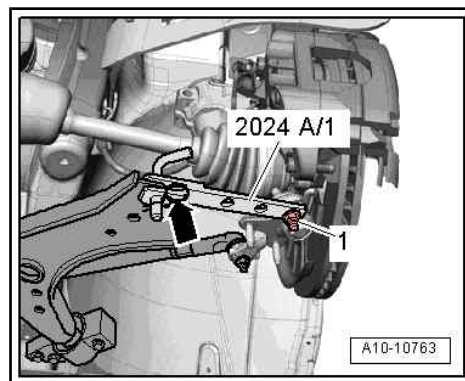
- Pivot drive shaft (right-side) forwards; to do so, push engine/ gearbox assembly slightly forwards.
- Tie up drive shaft to longitudinal member -arrow-.
- Take care not to damage surface coating of drive shaft.



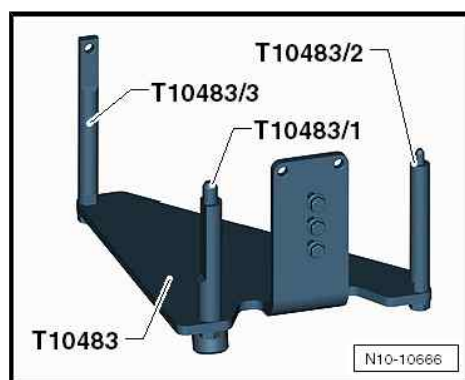
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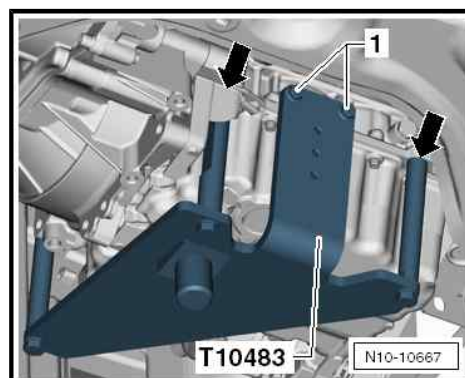
- Swivel suspension strut (left-side) outwards and support with support bracket -2024A/1- , as shown in illustration.
- Secure retaining pin and swivel joint with locking pin -arrow- and nut -1-.



- Engine bracket - /3- and adapters -/2- , -/1- and -T10483- are needed to lower engine/gearbox assembly.



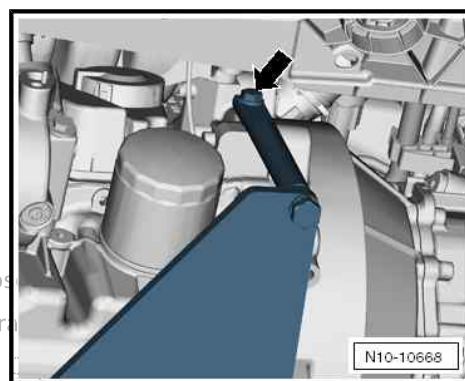
- Press engine bracket - T10483- into holes -arrows- in cylinder block as far as stop.
- Hand-tighten bolts -1- initially.



- Hand-tighten bolt -arrow- initially.



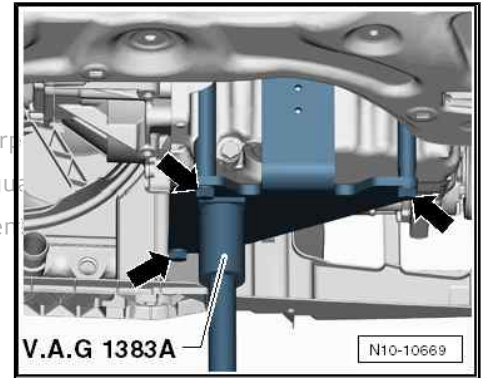
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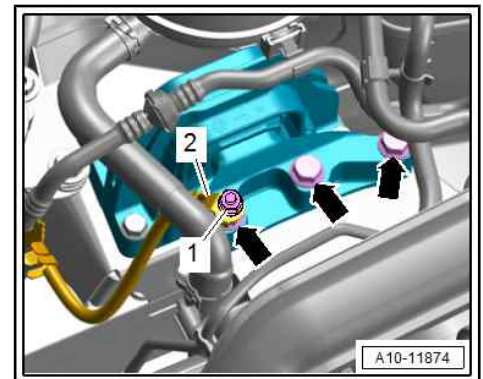


- Tighten bolts -arrows- to 20 Nm.
- Tighten all remaining bolts to 20 Nm as well.
- Attach engine and gearbox jack to engine bracket - T10483- and raise engine/gearbox assembly slightly.

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- Remove bolts -arrows- for support arm of engine mounting.

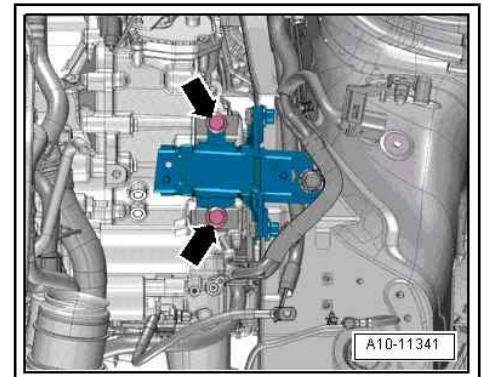


- Remove bolts -arrows- securing gearbox mounting.

! NOTICE

Risk of damage to lines/pipes, hoses and engine compartment when lowering engine/gearbox assembly.

- Check that all connections between engine, gearbox, sub-frame and body have been detached.
- Carefully guide out engine/gearbox assembly with subframe from engine compartment when lowering.
- Pull engine/gearbox assembly as far forward as possible, and lower gradually.



1.1.2 Removing engine - Audi A1 2018➤



Special tools and workshop equipment required



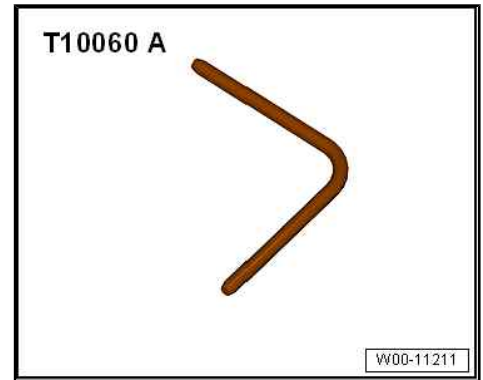
- ◆ Removal lever - 80-200-
- ◆ Stepladder (commercially available) or -VAS 5085-
- ◆ Engine bung set - VAS 6122-
- ◆ Coolant collecting system - VAS 5014- or drip tray for workshop hoist - VAS 6208-
- ◆ Hose clip pliers - VAS 6362-
- ◆ Engine and gearbox jack - VAS 6931-
- ◆ Extension -2024A/1- for lifting tackle - 2024A-

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- ◆ Locking pin - T10060A-



- ◆ Engine bracket - T10483-



- ◆ Safety goggles
- ◆ Protective gloves

Procedure

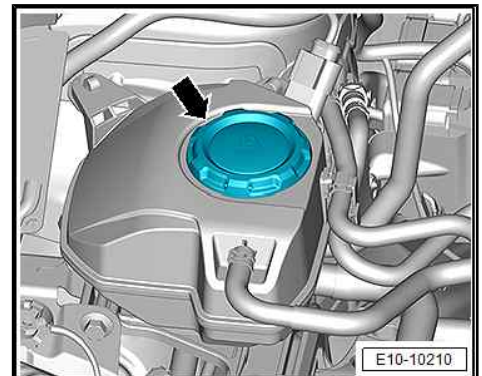
- The engine is removed from underneath together with the gearbox.
- Re-install all cable ties in original positions.

CAUTION

The cooling system is under pressure when the power unit is hot. Risk of scalding due to hot steam and hot coolant.

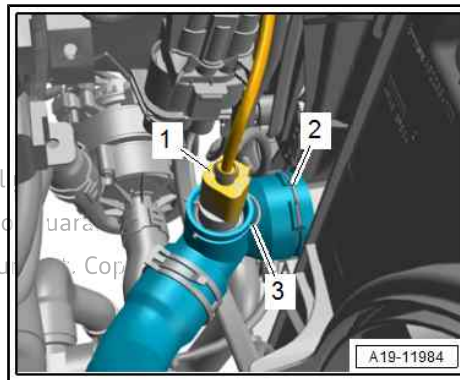
Danger of scalding skin and other parts of the body.

- Put on protective gloves.
 - Put on safety goggles.
 - Cover filler cap on expansion tank with a cloth and open carefully to release pressure.
-
- Carefully open filler cap -arrow- on coolant expansion tank.
 - Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
 - Remove wheel housing liner (front left) ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Exploded view - wheel housing liner (front) .
 - Remove front wheels ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .

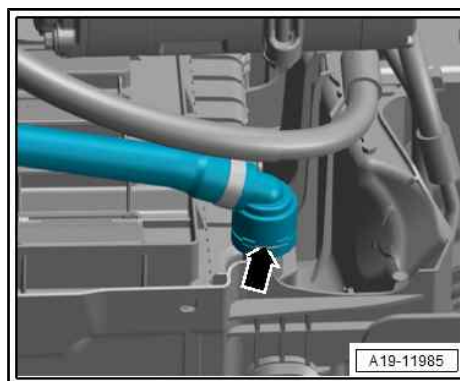




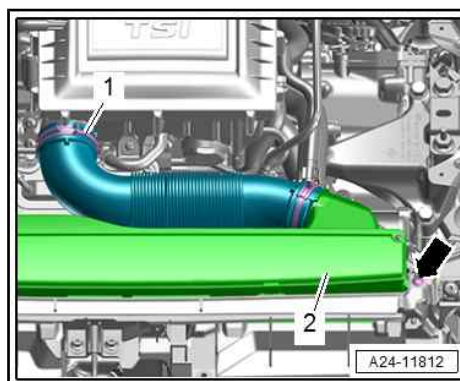
- Unplug electrical connector -1- at radiator outlet coolant temperature sender - G83-.
- Place collector tank from coolant collecting system -VAS 5014- or drip tray for workshop hoist - VAS 6208- underneath.
- Lift retaining clip -2-, disconnect coolant hose from radiator (bottom left) and drain off coolant.



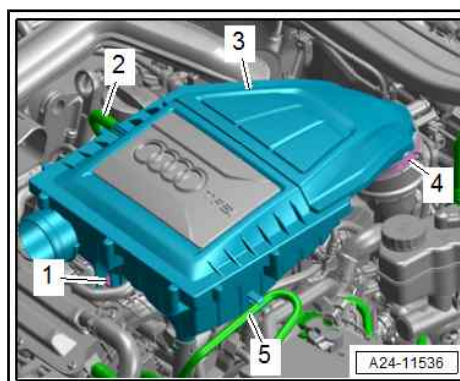
- Lift retaining clip -arrow-, disconnect coolant hose (bottom right) from water radiator for charge air cooling circuit and drain off remaining coolant.



- Release hose clip -1- and detach air hose.
- Remove bolt -arrow- on both sides.
- Unclip air duct -2- at lock carrier and detach.

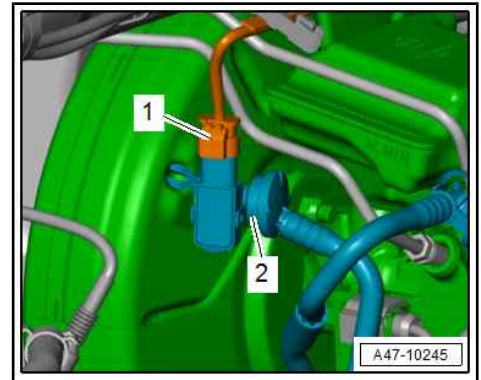


- Disconnect crankcase breather hose -2-.
- Move vacuum line -5- clear.
- Remove bolt -1-.
- Release hose clip -4-.
- Lift air cleaner housing -3- off ball studs and detach.
- Remove battery tray ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray .

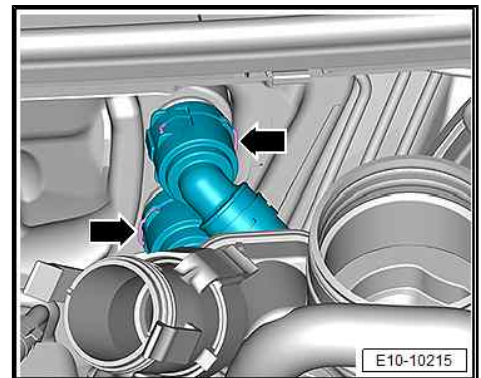




- Unplug electrical connector -1- from vacuum sender - G608- .
- Carefully disconnect vacuum hose from brake servo.
- If damaged, vacuum hose must be renewed.



- Place collector tank from coolant collecting system -VAS 5014- or drip tray for workshop hoist - VAS 6208- underneath.
- Lift retaining clips -arrows- and disconnect coolant hoses from heat exchanger for heater.

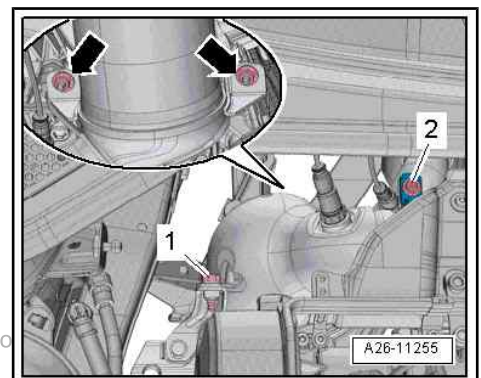
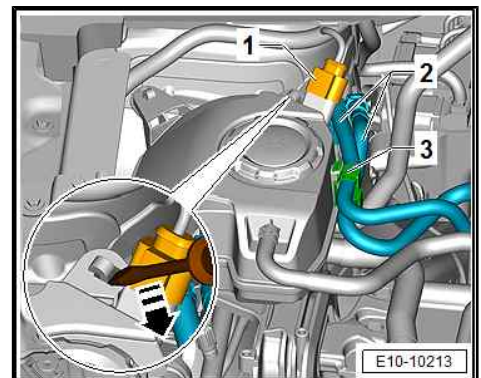


⚠ CAUTION

The fuel system is pressurised.
Risk of injury as fuel may spray out.

- Put on safety goggles.
- Put on protective gloves.
- Release pressure (wrap a clean cloth around connection and open connection carefully).

- Release retainer -3- and move lines -2- for fuel supply and activated charcoal filter clear.
- Disconnect lines -2- ⇒ Fuel supply system; Rep. gr. 20 ; Plug-in connectors; Disconnecting plug-in connectors .
- Seal off open pipes/lines and connections with clean plugs from engine bung set - VAS 6122- .
- Unplug electrical connector -1-.
- Seal off open pipes/lines and connections with clean plugs from engine bung set - VAS 6122- .
- Release fasteners in direction of -arrow- using a screwdriver and place coolant expansion tank on engine.
- Unscrew bolt -2- and remove screw-type clip.
- Remove bolt -1- and nuts -arrows- and tie up catalytic converter towards rear of vehicle.

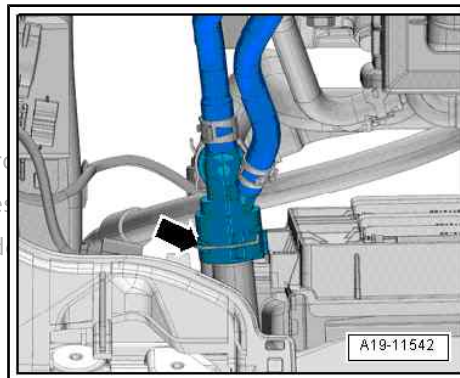


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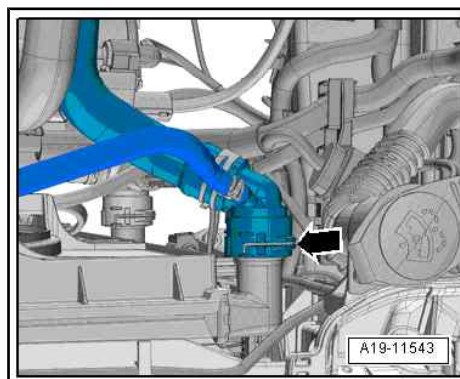


- Lift retaining clip -arrow-, disconnect coolant hose (top right) from water radiator for charge air cooling circuit and drain off coolant.

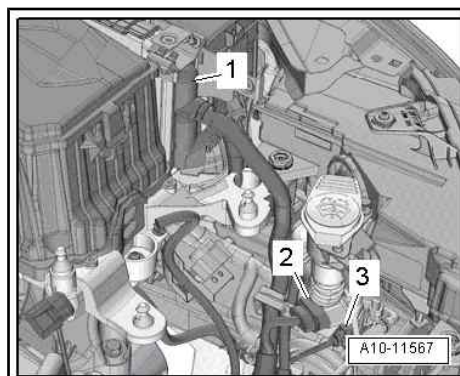
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- Lift retaining clip -arrow- and disconnect coolant hose (top left) from radiator.

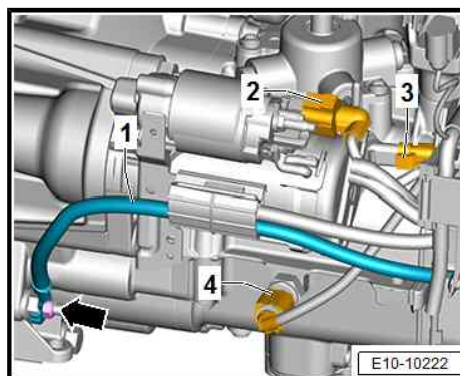


- Unplug electrical connector -1- at engine control unit - J623-
⇒ ["8.2 Removing and installing engine control unit J623", page 302](#) .
- Detach electrical connectors -2 and 3- from bracket and unplug.
- Move electrical wiring clear.



Vehicles with manual gearbox:

- Unplug electrical connectors -2-, -3- and -4-.
- Remove nut -arrow- for earth wire -1-.



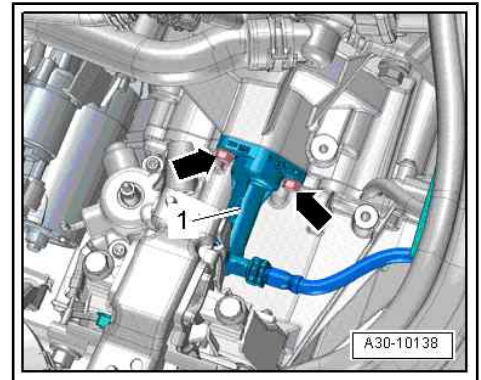


- Push back cover -1- for positive battery terminal and unscrew positive wire from starter solenoid switch.
- Detach selector mechanism from gearbox ⇒ Rep. gr. 34 ; Selector mechanism; Removing and installing selector mechanism .
- Remove bolts -arrows-.
- Remove clutch slave cylinder -1- and place to one side.



Note

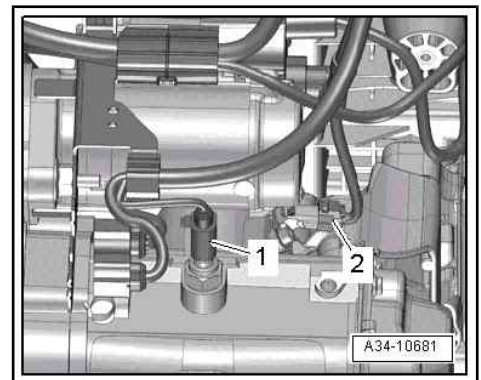
Do not operate clutch pedal with slave cylinder removed.



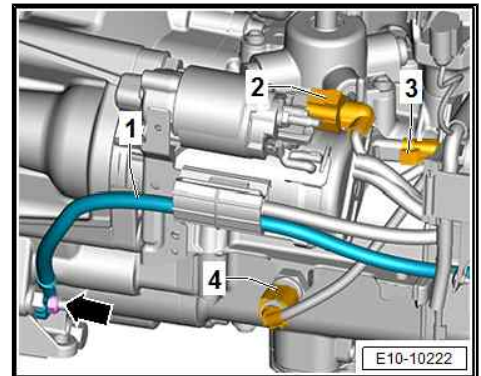
- Unplug electrical connectors -1- and -2-.

Vehicles with dual clutch gearbox:

- Detach selector mechanism from gearbox ⇒ Rep. gr. 34 ; Selector mechanism; Removing and installing selector mechanism .

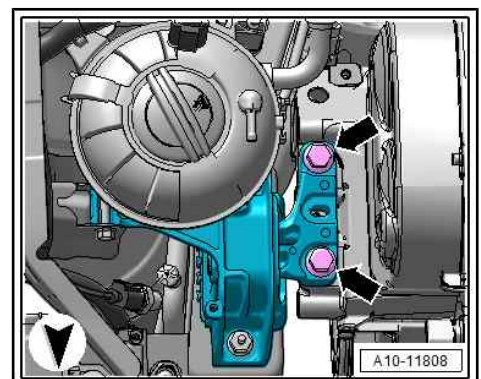


- Unplug electrical connectors -2- and -3-.
- Release and unplug electrical connector for mechatronic unit for dual clutch gearbox - J743- ⇒ Rep. gr. 34 ; Mechatronic unit .
- Attach electrical wiring to longitudinal member (left-side) using cable tie.



Continued for all vehicles:

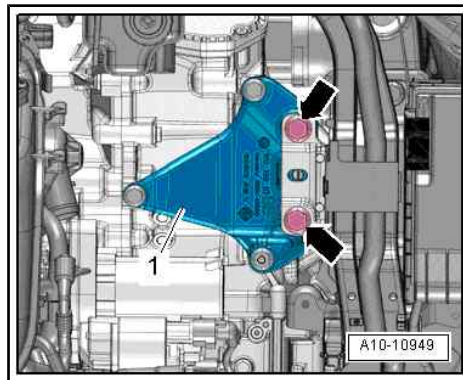
- Loosen bolts -arrows- for support arm of engine mounting approx. 2 turns.



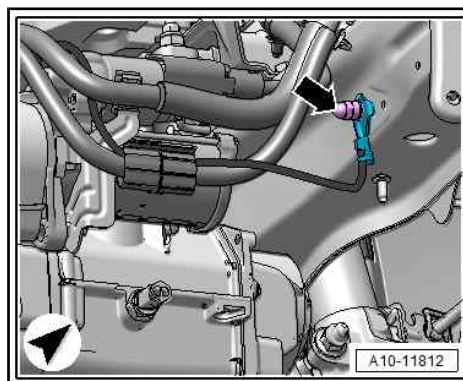
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- Loosen bolts -arrows- for gearbox mounting approx. 2 turns.



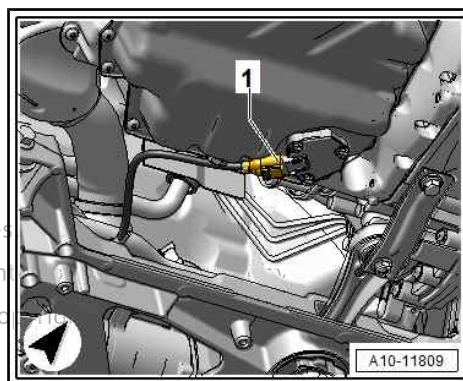
- Remove nut -arrow- and detach earth wire.



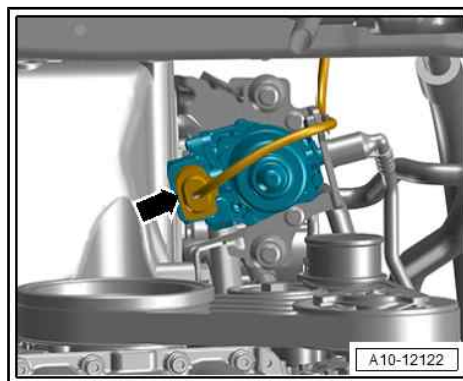
- Unplug electrical connector -1- at oil level and oil temperature sender - G266-



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- Unplug electrical connector -arrow- from vacuum pump for brakes - V192- and move it clear.



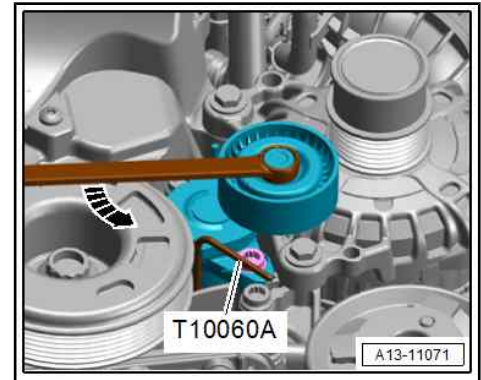


Vehicles with air conditioner compressor:

! NOTICE

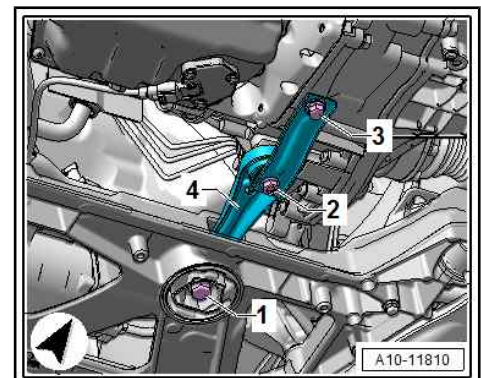
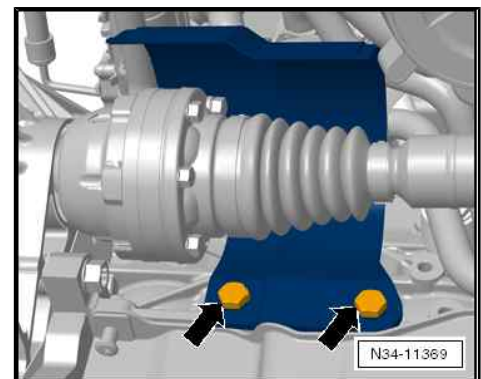
Risk of irreparable damage due to running a used belt in the opposite direction when it is refitted.

- Mark running direction before removing.
- Pay attention to running direction when reinstalling.
- Swivel tensioner in anti-clockwise direction -arrow- and detach poly V-belt from pulley for air conditioner compressor.
- Lock tensioner with locking pin - T10060A- .
- Take off poly V-belt.
- Detach and remove air conditioner compressor from bracket with refrigerant lines still attached and tie up to right side ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Detaching and attaching air conditioner compressor at bracket .

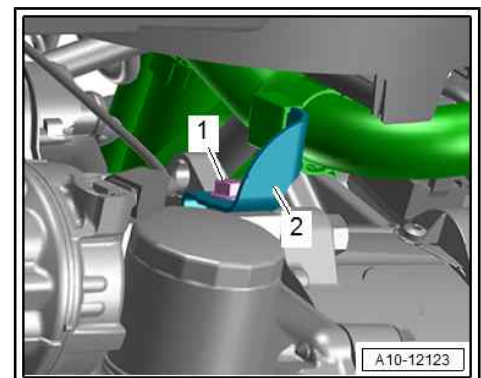


All vehicles (continued):

- Remove bolts -arrows- and detach heat shield for drive shaft (right-side).
- Detach drive shaft (left and right) from gearbox and tie up to rear ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Removing and installing drive shaft .
- Take care not to damage surface coating of drive shaft.
- Remove bolts -1, 2, 3- and remove pendulum support -4-.

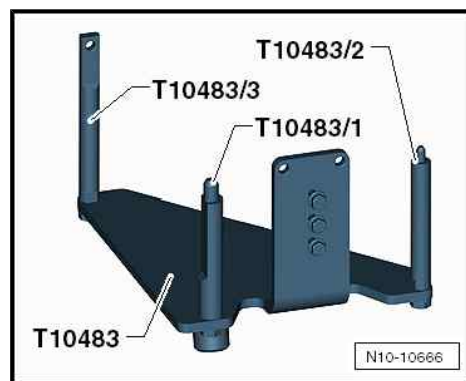


- Remove bolt -1- and push bracket -2- to one side.

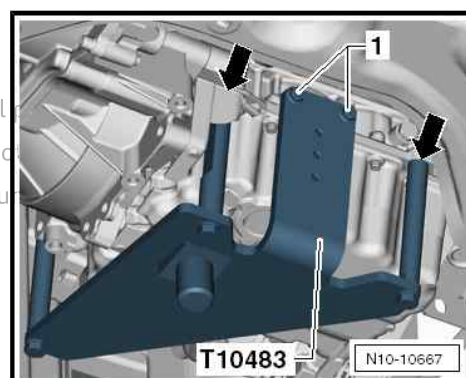




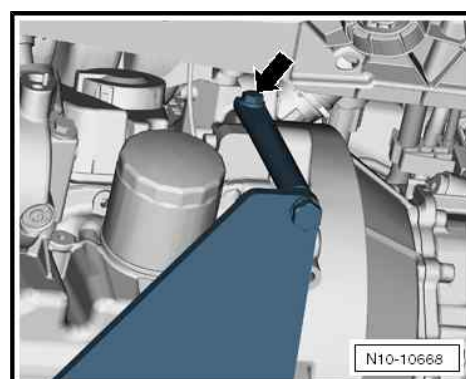
- Fit adapters -T10483-, -/1- and -/2- on engine bracket - /3- .



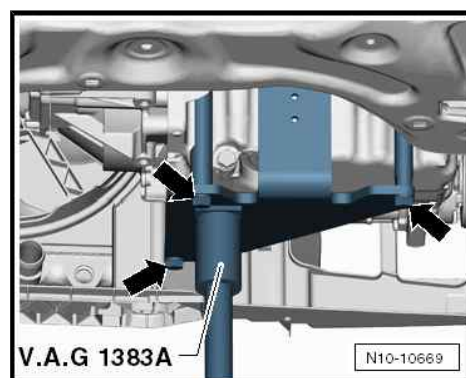
- Press engine bracket - T10483- into holes -arrows- in cylinder block as far as stop.
 - Hand-tighten bolts -1- initially.
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- Hand-tighten bolt -arrow- initially.



- Tighten bolts -arrows- to 20 Nm.
- Tighten all remaining bolts to 20 Nm as well.
- Attach engine and gearbox jack to engine bracket - T10483- and raise engine/gearbox assembly slightly.

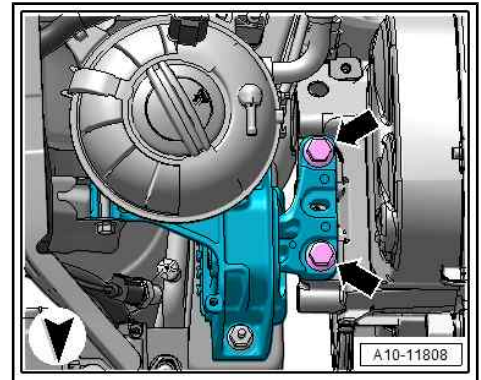




Note

Use a stepladder when unscrewing bolts.

- Remove bolts -arrows- for support arm of engine mounting.

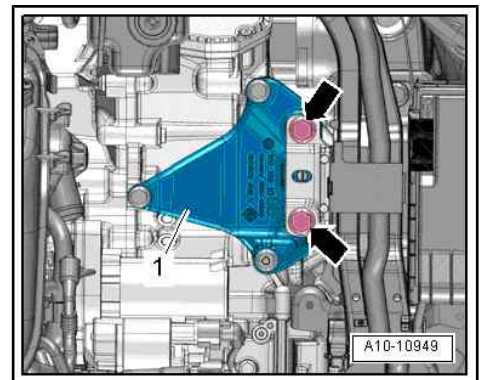


- Remove bolts -arrows- securing gearbox mounting.

! NOTICE

Risk of damage to lines/pipes, hoses and engine compartment when lowering engine/gearbox assembly.

- Check that all connections between engine, gearbox, sub-frame and body have been detached.
- Carefully guide out engine/gearbox assembly with subframe from engine compartment when lowering.
- Pull engine/gearbox assembly as far forward as possible, and lower gradually.



1.2 Separating engine and gearbox

⇒ [“1.2.1 Separating engine and gearbox - vehicles with manual gearbox”, page 29](#)

⇒ [“1.2.2 Separating engine and gearbox - vehicles with dual clutch gearbox”, page 30](#)

1.2.1 Separating engine and gearbox - vehicles with manual gearbox

Special tools and workshop equipment required

- ◆ Shackle - 10-222A/12-



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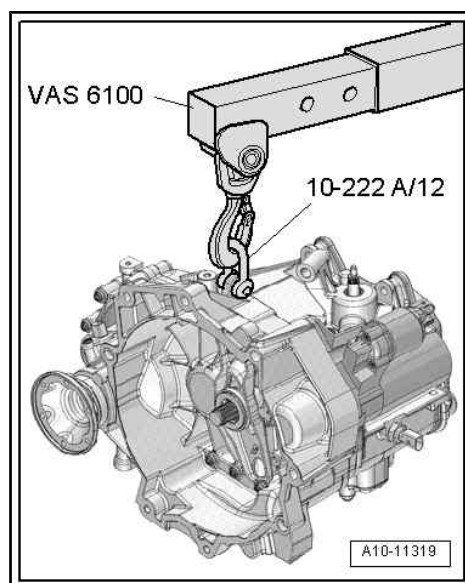


◆ Workshop hoist - VAS 6100-

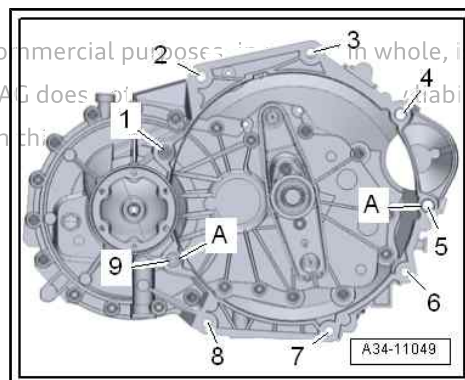


Procedure

- Engine/gearbox assembly removed and attached to engine bracket - T10483- .
- Remove starter ⇒ Electrical system; Rep. gr. 27 ; Starter; Removing and installing starter .
- Fit shackle - 10-222A/12- on gearbox, as shown in illustration.
- Hook workshop hoist - VAS 6100- into shackle.



- Remove bolts -1, 2, 3- and -6 ... 9- securing gearbox to engine.
- Detach gearbox from engine.



1.2.2 Separating engine and gearbox - vehicles with dual clutch gearbox

Special tools and workshop equipment required



◆ Shackle - 10-222A/12-



◆ Workshop hoist - VAS 6100-

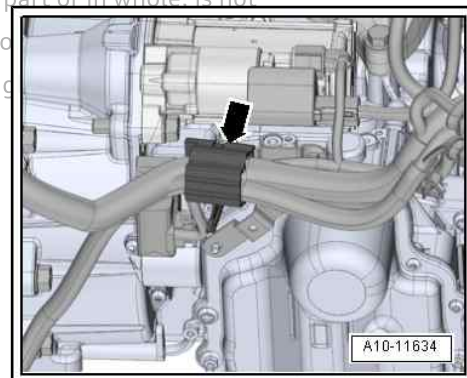


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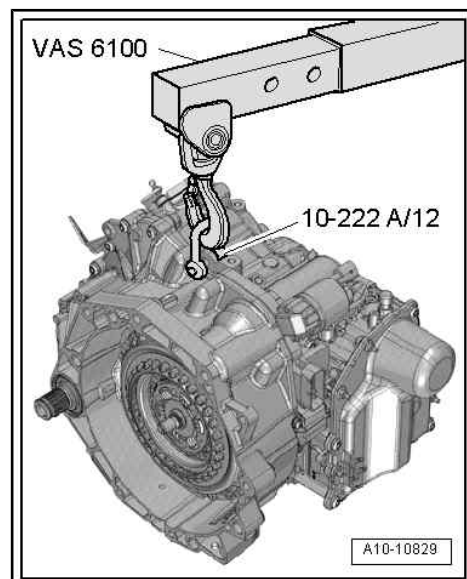
Procedure

- Engine/gearbox assembly removed and attached to engine bracket - T10483- .

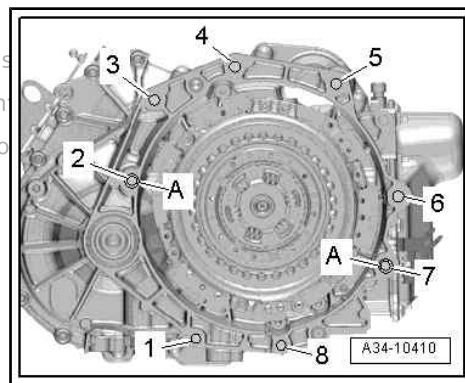
- Move electrical wiring harness clear -arrow-.
- Remove starter ⇒ Electrical system; Rep. gr. 27 ; Starter; Removing and installing starter .



- Secure gearbox to workshop hoist - 10 - 222 A /12- using shackle - VAS 6100- .



- Remove bolts -1 ... 8- securing gearbox to engine.
 - Detach gearbox from engine.
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1.3 Securing engine to engine and gearbox support

Special tools and workshop equipment required

- ◆ Lifting tackle - 2024A-



- ◆ Engine and gearbox support - VAS 6095-

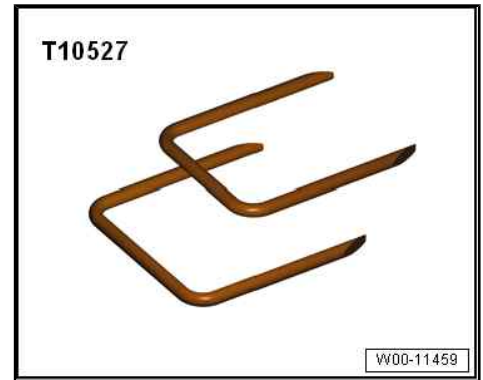


- ◆ Workshop hoist - VAS 6100-



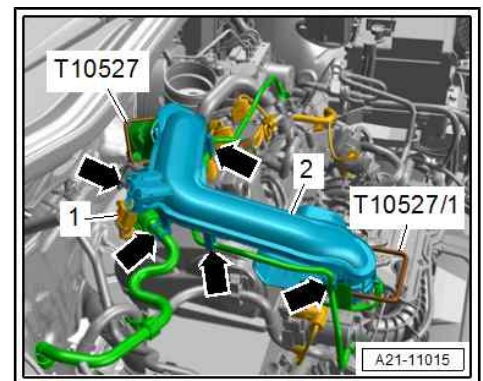


◆ Release tool - T10527-



Procedure

- Gearbox detached from engine
⇒ "1.2 Separating engine and gearbox", page 29 .
- Unplug electrical connector -1- for charge pressure sender - G31- / intake air temperature sender 2 - G299- and move electrical wiring clear.
- Move hoses -arrows- clear at air pipe -2-.
- Release fasteners using release tool - T10527- and detach air pipe.



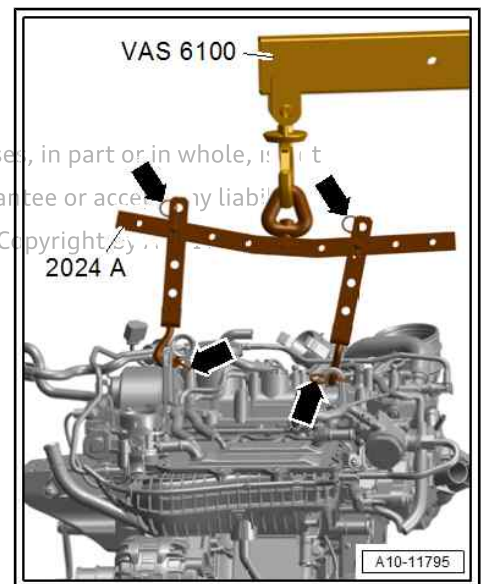
- Attach lifting tackle - 2024A- to engine and workshop hoist - VAS 6100- as shown in illustration.
- To adjust to the centre of gravity of the assembly, the perforated rails must be positioned as shown.

CAUTION

Risk of injury if power unit drops when it is lifted.
Danger of trapping or crushing parts of the body.

- The support hooks and retaining pins on the lifting tackle must be secured with locking pins.

- Lift engine off engine bracket - T10483- using workshop hoist - VAS 6100- .

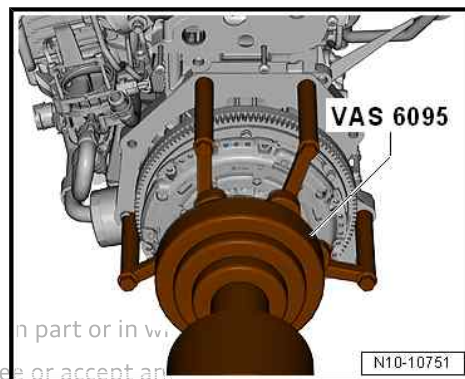




- Secure engine to engine and gearbox support - VAS 6095A- using universal support - VAS 6095/1- .
- Fit spacers so that mounting pin (bottom right in illustration) of -VAS 6095A- makes contact with crankcase free of tension.
- Thickness of spacers: approx. 10 mm

Tightening torque

Component		Nm
Bolts/nuts	M6	10
	M8	20
	M10	45
	M12	65



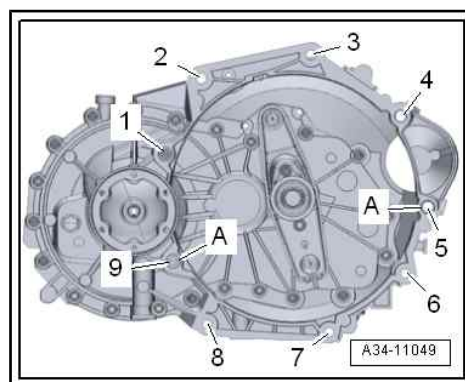
1.4 Installing engine

Procedure

- Vehicles with dual clutch gearbox: The needle bearing in the crankshaft must always be renewed if the engine has been separated from the gearbox
⇒ ["3.2 Renewing needle bearing in crankshaft", page 74](#) .
- Renew bolts tightened with specified tightening angle.
- Renew self-locking nuts and bolts as well as seals, gaskets and O-rings.
- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .
- Re-install all cable ties in original positions.
- Do not reuse coolant.
- Install intermediate plate
⇒ [Fig. "Installing intermediate plate", page 65](#) .

Vehicles with manual gearbox:

- If not already fitted, install dowel sleeves -A- for centring engine and gearbox in cylinder block.
- Remove needle bearing in crankshaft if fitted
⇒ ["3.2 Renewing needle bearing in crankshaft", page 74](#) .



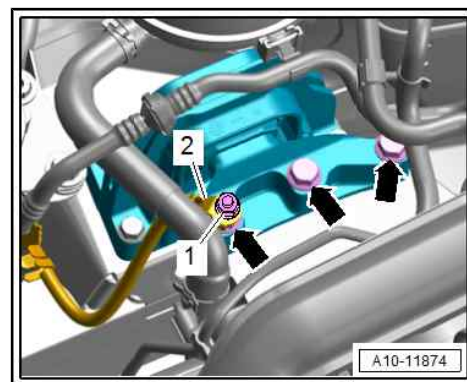
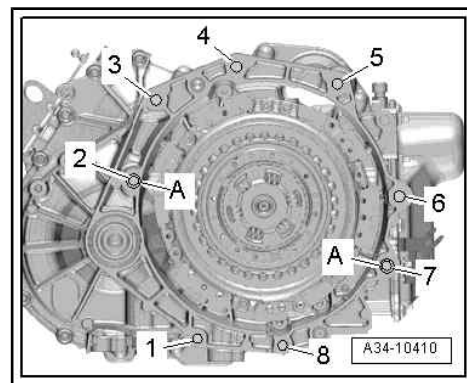


Vehicles with dual clutch gearbox:

- If not already fitted, install dowel sleeves -A- for centring engine and gearbox in cylinder block.
- Install needle bearing if not fitted in crankshaft
⇒ ["3.2 Renewing needle bearing in crankshaft", page 74](#) .

All vehicles (continued):

- Secure gearbox to engine.
- Install gearbox support.
- Take up engine/gearbox assembly with engine bracket - T10483- .
- Guide engine/gearbox assembly into body.
- Initially hand-tighten bolts -arrows- for support arm of engine mounting until they make contact.



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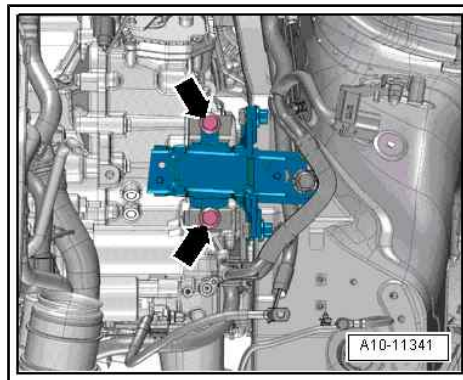
- Initially screw in bolts -arrows- for gearbox mounting by hand until they make contact.
- Remove engine bracket - T10483- from engine.
- Install starter ⇒ Electrical system; Rep. gr. 27 ; Starter; Exploded view - starter .

Vehicles with manual gearbox:

- Install clutch slave cylinder ⇒ Rep. gr. 30 ; Clutch mechanism; Removing and installing clutch slave cylinder .

All vehicles (continued):

- Install cables with cable support bracket or selector lever cable ⇒ Rep. gr. 34 ; Selector mechanism; Exploded view - selector cables .
- Install catalytic converter
⇒ [“2.2 Removing and installing catalytic converter”, page 320](#) .
- Install drive shafts ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Removing and installing drive shaft .
- Install pendulum support
⇒ [“2.5 Removing and installing pendulum support”, page 48](#) .
- Install wishbone, swivel joint and coupling rod ⇒ Running gear, axles, steering; Rep. gr. 40 ; Lower wishbone, swivel joint; Exploded view - lower wishbone, swivel joint .
- Install air conditioner compressor ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Exploded view - air conditioner compressor drive unit .
- Install poly V-belt
⇒ [“1.2 Removing and installing poly V-belt”, page 54](#) .
- Install radiator cowl
⇒ [“4.4 Removing and installing radiator cowl”, page 230](#) .
- Connect fuel hoses ⇒ Fuel supply system; Rep. gr. 20 ; Plug-in connectors; Disconnecting plug-in connectors .
- Electrical connections and routing ⇒ Electrical system; Rep. gr. 97 ; Relay carriers, fuse carriers, electronics boxes; Overview of fitting locations - relay carriers, fuse carriers, electronics boxes and ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Install battery tray ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray .
- Fit front wheels ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .
- Install engine control unit - J623- ⇒ [page 302](#) .
- Install wheel housing liners ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Exploded view - wheel housing liner (front) .
- Install air cleaner housing
⇒ [“2.2 Removing and installing air cleaner housing”, page 265](#) .



NOTICE

Risk of irreparable damage to control units because of excessive voltage.

- Do not use a battery charger to boost starting.



- Connect coolant hoses with plug-in connector
⇒ Fig. [““Connecting coolant hose with plug-in connector””](#),
[page 221](#) .
- Fill up with coolant ⇒ [page 195](#) .
- Check oil level ⇒ Maintenance ; Booklet 819 .

Tightening torques

- ◆ Tightening torques apply only to lightly greased, oiled, phosphated or black-finished nuts and bolts.
- ◆ Additional lubricants such as engine or gear oil may be used, but do not use lubricants containing graphite.
- ◆ Do not use degreased parts.
- ◆ Tolerance for tightening torques: $\pm 15\%$

Component		Nm
Bolts/nuts	M6	9
	M7	15
	M8	20
	M10	40
	M12	65

- ◆ Assembly mountings
⇒ [“2.1 Exploded view - assembly mountings”](#), [page 38](#)
- ◆ Securing gearbox to engine ⇒ Rep. gr. 34 ; Removing and installing gearbox; Tightening torques for gearbox
- Connect ⇒ Vehicle diagnostic tester.
- ◆ Erase entries in event memory, [Guided Functions](#), [Interrogate event memory](#).
- After renewing engine:
- ◆ Reset misfire adaption by selecting [01 - Reset adaptations misfires](#) in [Guided Functions](#).
- ◆ Delete adaption values for injectors using ⇒ Vehicle diagnostic tester: select [Delete adaption values for injectors](#) in [Guided Functions](#).

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2 Assembly mountings

⇒ [“2.1 Exploded view - assembly mountings”, page 38](#)

⇒ [“2.2 Supporting engine in installation position”, page 41](#)

⇒ [“2.3 Removing and installing engine mounting”, page 44](#)

⇒ [“2.4 Removing and installing gearbox mounting”, page 46](#)

⇒ [“2.5 Removing and installing pendulum support”, page 48](#)

⇒ [“2.6 Checking adjustment of assembly mountings - Audi A1 2018►”, page 49](#)

⇒ [“2.7 Adjusting assembly mountings - Audi A1 2018►”, page 49](#)

2.1 Exploded view - assembly mountings

⇒ [“2.1.1 Exploded view - assembly mountings, Audi A1 2011►”, page 38](#)

⇒ [“2.1.2 Exploded view - assembly mountings, Audi A1 2018►”, page 40](#)

2.1.1 Exploded view - assembly mountings, Audi A1 2011►

1 - Engine support

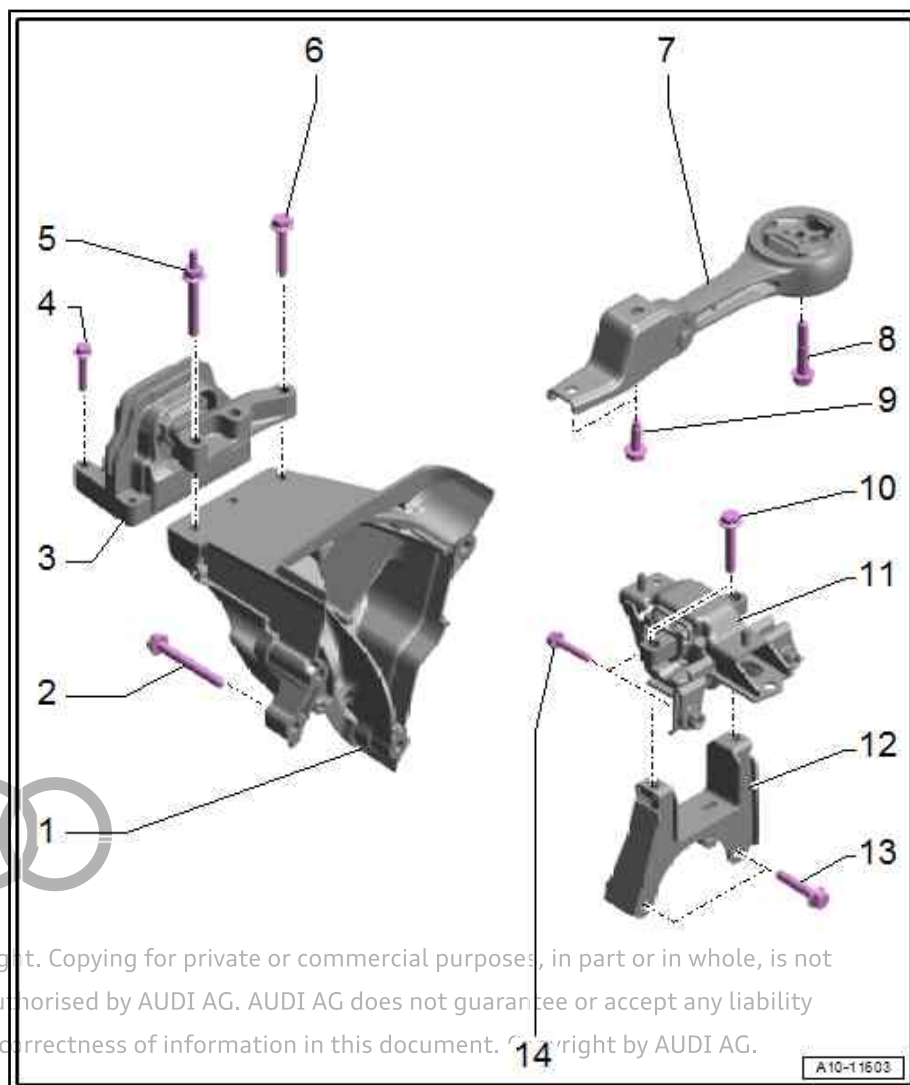
- ☐ Tightening torque and sequence
⇒ [Fig. “Engine support - tightening torque and sequence”, page 39](#)
- ☐ Removing and installing
⇒ [“1.4 Removing and installing engine support”, page 57](#)

2 - Bolt

- ☐ Renew after removing
- ☐ Tightening sequence
⇒ [Fig. “Engine support - tightening torque and sequence”, page 39](#)

3 - Engine mounting

- ☐ With support arm
- ☐ Do not separate engine mounting and support arm
- ☐ Removing and installing
⇒ [“2.3 Removing and installing engine mount-”](#)





[ing", page 44](#)

4 - Bolt

- ☐ Renew after removing
- ☐ 20 Nm +90°

5 - Centre hex stud

- ☐ Renew after removing
- ☐ 30 Nm +90°

6 - Bolt

- ☐ Renew after removing
- ☐ 30 Nm +90°

7 - Pendulum support

- ☐ Removing and installing ⇒ ["2.5 Removing and installing pendulum support", page 48](#)

8 - Bolt

- ☐ Renew after removing
- ☐ 40 Nm +90°

9 - Bolt

- ☐ Renew after removing
- ☐ 30 Nm +90°

10 - Bolt

- ☐ Tightening torque ⇒ Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings

11 - Gearbox mounting

- ☐ With support arm
- ☐ Removing and installing ⇒ ["2.4 Removing and installing gearbox mounting", page 46](#)

12 - Gearbox support

- ☐ Removing and installing ⇒ ["2.4 Removing and installing gearbox mounting", page 46](#)

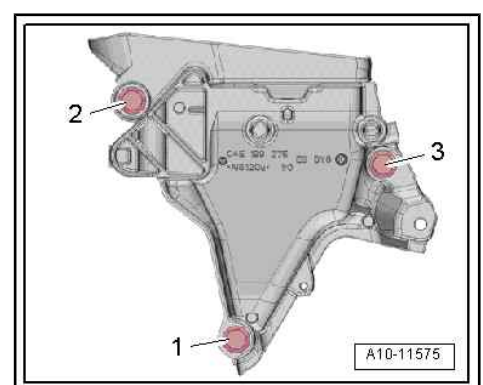
13, 14 - Bolt

- ☐ Tightening torque ⇒ Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings

Engine support - tightening torque and sequence

- After removing, renew bolts tightened with specified tightening angle.
- Tighten bolts in stages in the sequence shown:

Stage	Bolts	Tightening torque/angle specification
1.	-1 ... 3-	7 Nm
2.	-1 ... 3-	40 Nm
3.	-1 ... 3-	Turn 90° further





2.1.2 Exploded view - assembly mountings, Audi A1 2018►

1 - Bolt

- ☐ Renew after removing
- ☐ Tightening torques and sequence
⇒ Fig. "Engine support - tightening torques and sequence", page 41

2 - Engine support

- ☐ Version fitted in vehicle may differ from illustration

3 - Engine mounting

- ☐ With support arm
- ☐ Removing and installing
⇒ "2.3 Removing and installing engine mounting", page 44

4 - Bolt

- ☐ Renew after removing
- ☐ 40 Nm +90°

5 - Bolt

- ☐ Renew after removing
- ☐ 20 Nm +90°

6 - Not fitted

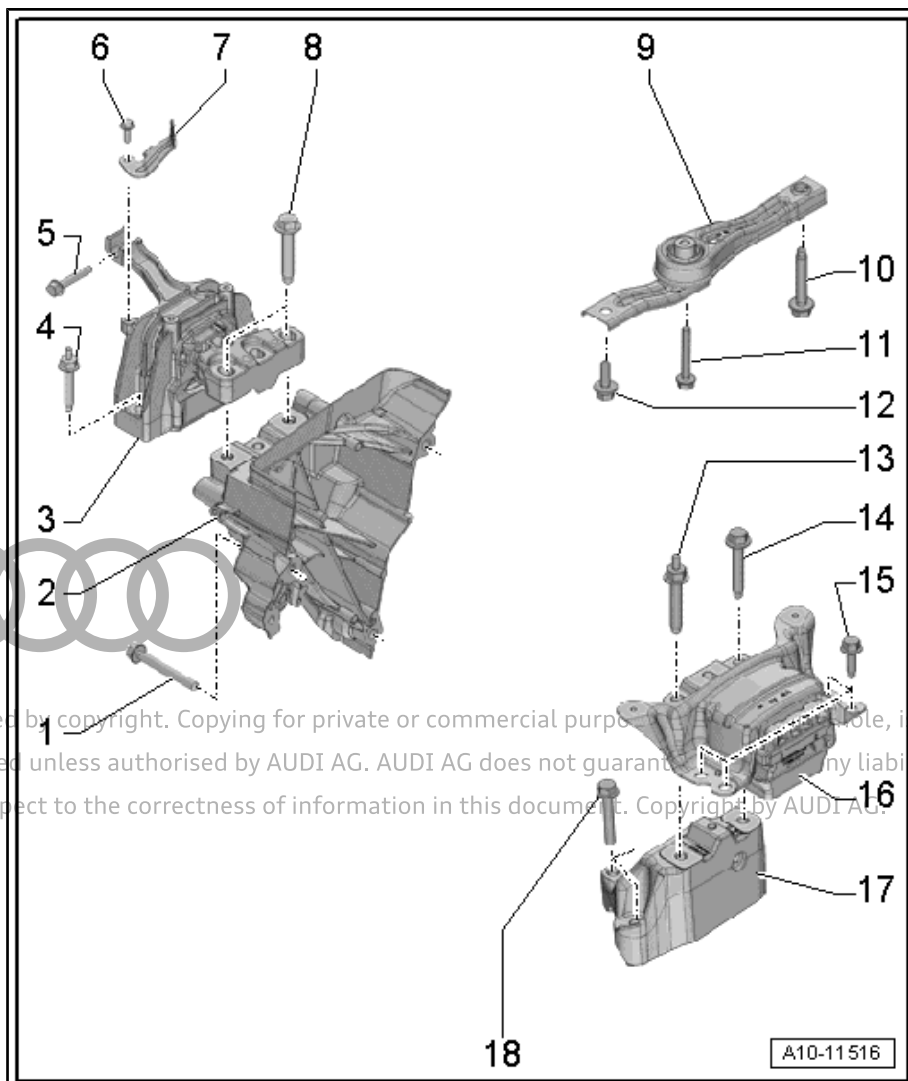
7 - Not fitted

8 - Bolt

- ☐ Renew after removing
- ☐ 60 Nm +90°

9 - Pendulum support

- ☐ Removing and installing





⇒ "2.5 Removing and installing pendulum support", page 48

10, 11, 12 - Bolt

- ☐ Renew after removing
- ☐ Tightening torques and sequence

⇒ Fig. "Pendulum support - tightening torques and sequence", page 41

13 - Bolt

- ☐ Renew after removing
- ☐ 60 Nm +90°

14 - Bolt

- ☐ Renew after removing
- ☐ 60 Nm +90°

15 - Bolts

- ☐ Renew after removing
- ☐ 50 Nm +90°

16 - Gearbox mounting

- ☐ With support arm
- ☐ Removing and installing ⇒ "2.4 Removing and installing gearbox mounting", page 46

17 - Gearbox support

- ☐ Different versions available; for allocation refer to ⇒ Electronic parts catalogue

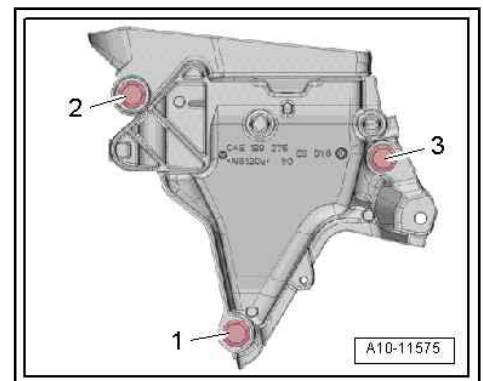
18 - Bolt

- ☐ Tightening torques ⇒ Gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings

Engine support - tightening torques and sequence

- After removing, renew bolts tightened with specified tightening angle.
- Tighten bolts in stages in the sequence shown:

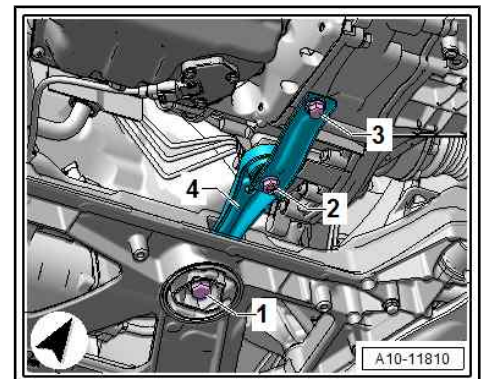
Stage	Bolts	Tightening torque/angle specification
1.	-1 ... 3-	7 Nm
2.	-1 ... 3-	40 Nm
3.	-1 ... 3-	Turn 90° further



Pendulum support - tightening torques and sequence

- Renew bolts tightened with specified tightening angle.
- Tighten bolts in stages in the sequence shown:

Stage	Bolts	Tightening torques/angle specification
1.	-2, 3-	50 Nm
2.	-1-	130 Nm
3.	-1 ... 3-	Turn 90° further

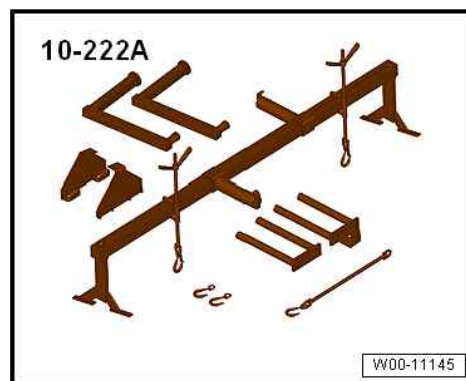


2.2 Supporting engine in installation position

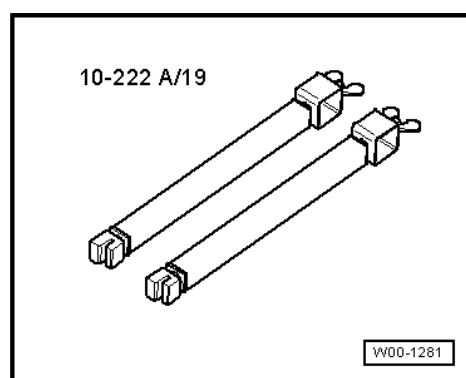
Special tools and workshop equipment required



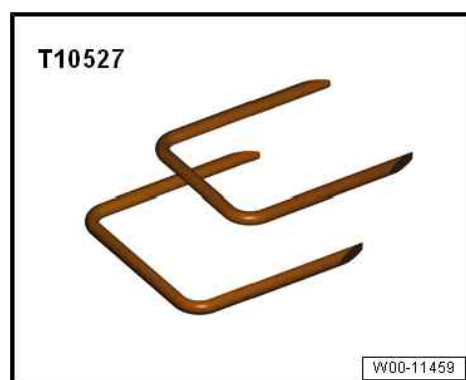
◆ Support bracket - 10-222A-



◆ Adapters - 10-222A/19-



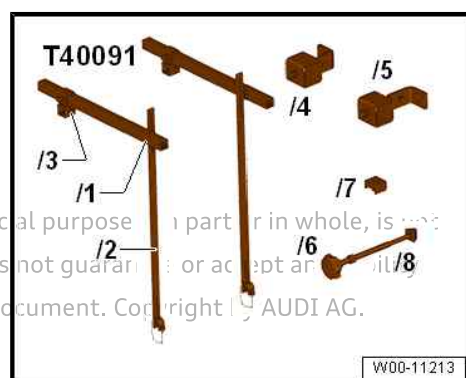
◆ Release tool - T10527-



◆ Engine support (basic set) - T40091-



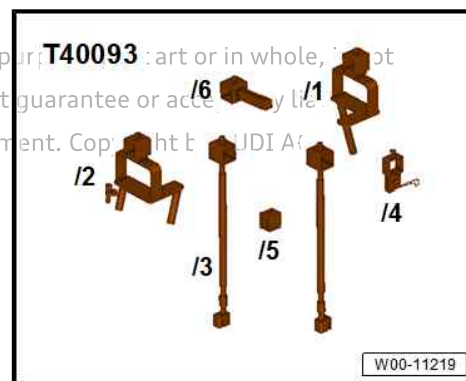
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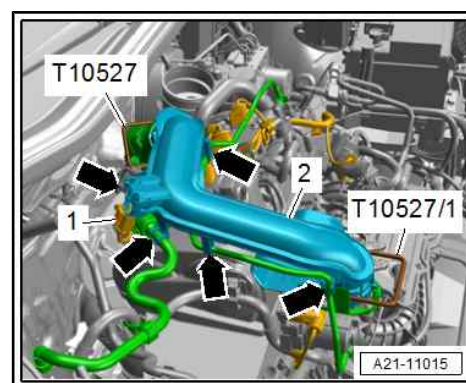
◆ -T40093/6- from engine support supplementary set - T40093-

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Procedure

- Remove air cleaner housing
⇒ ["2.2 Removing and installing air cleaner housing", page 265](#).
- Unplug electrical connector -1- for charge pressure sender - G31- / intake air temperature sender 2 - G299- and move electrical wiring clear.
- Move hoses -arrows- clear at air pipe -2-.
- Release fasteners using release tool - T10527- and detach air pipe.
- Set up support bracket - 10-222A- on top edges of body flanges (left and right) and longitudinal member (right-side), as shown in illustration.
- Engage hooks of spindles -10-222A/11- in engine lifting eyes (left and right).
- Tighten spindles slightly to take up weight of engine/gearbox assembly; do not lift.



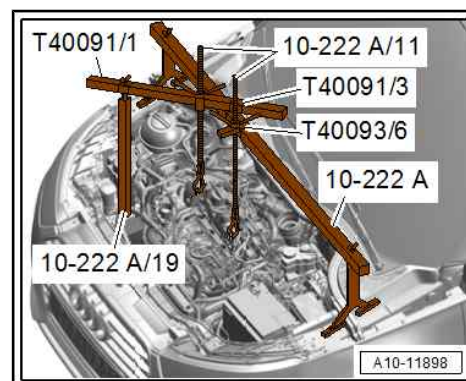
Assembling

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

- Renew O-rings after removing.
- Hose connections and air pipes/hoses must be free of oil and grease prior to fitting.

Tightening torques

- ◆ ⇒ ["2.1 Exploded view - air cleaner housing", page 263](#)





2.3 Removing and installing engine mounting

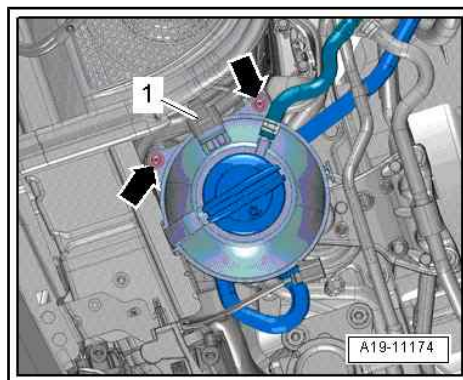
⇒ [“2.3.1 Removing and installing engine mounting - Audi A1 2011►”, page 44](#)

⇒ [“2.3.2 Removing and installing engine mounting - Audi A1 2018►”, page 45](#)

2.3.1 Removing and installing engine mounting - Audi A1 2011►

Removing

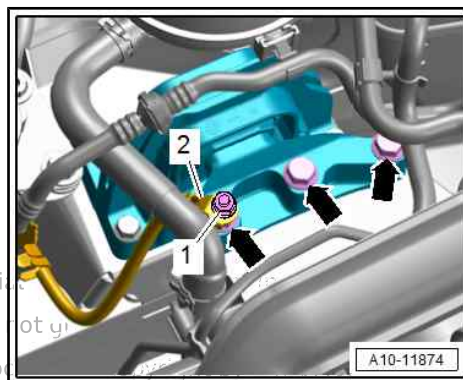
- Remove bolts -arrows-.
- Detach electrical connector -1- for coolant shortage indicator switch - F66- and move coolant expansion tank to side.
- Support engine in installation position
⇒ [“2.2 Supporting engine in installation position”, page 41](#) .



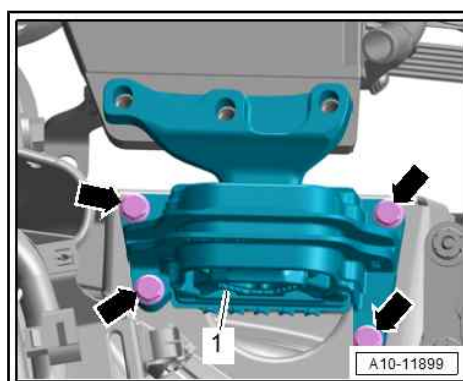
- Remove nut -1- and move earth wire -2- clear.
- Remove bolts -arrows- for support arm of engine mounting.



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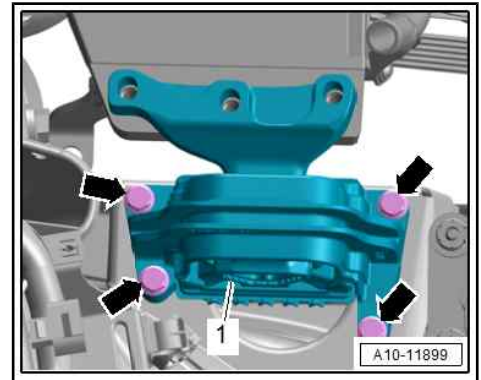
- Remove bolts -arrows- and detach engine mounting -1-.



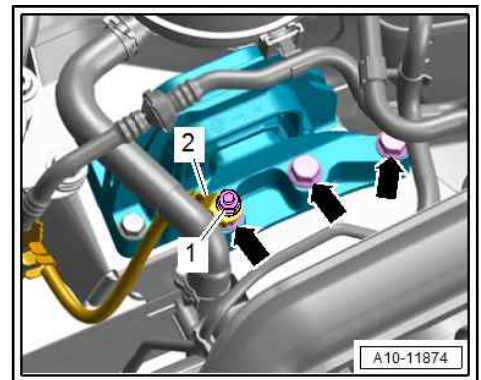


Installing

- After removing, renew bolts tightened with specified tightening angle.
- Fit engine mounting -1- on longitudinal member.
- Initially screw in bolts -arrows- by hand until they make contact.
- Tighten bolts.



- Initially hand-tighten bolts -arrows- for support arm of engine mounting until they make contact.
- The support arm must not turn when you tighten the bolts.
- Tighten bolts.



Remaining installation steps are carried out in reverse sequence; note the following:

- Detach support bracket - 10-222A-
⇒ [“2.2 Supporting engine in installation position”, page 41](#) .

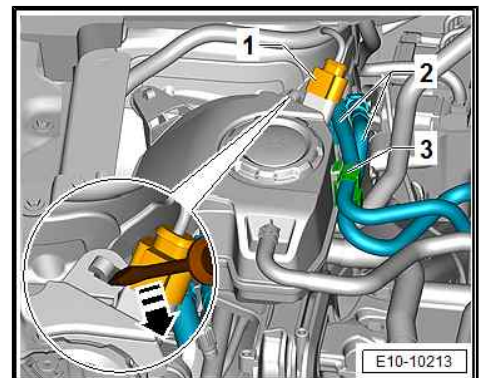
Tightening torques

- ◆ ⇒ [“2.1 Exploded view - assembly mountings”, page 38](#)
- ◆ Nut -1- for earth wire -2- ⇒ Current flow diagrams, Electrical fault finding and Fitting locations

2.3.2 Removing and installing engine mounting - Audi A1 2018➤

Removing

- Release retainer -3- and move lines -2- for fuel supply and activated charcoal filter clear.
- Unplug electrical connector -1-.
- Release fasteners in direction of -arrow- using a screwdriver and place coolant expansion tank to one side.
- Support engine in installation position
⇒ [“2.2 Supporting engine in installation position”, page 41](#) .



- Remove bolts -arrows- and detach engine mounting -1-.

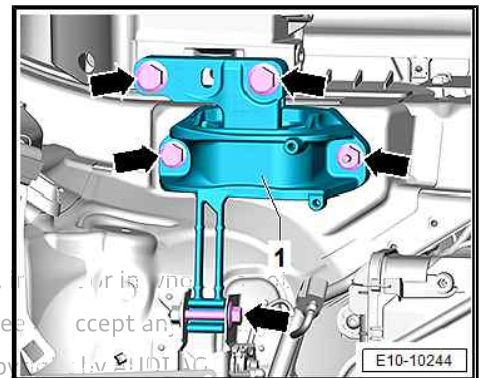
Installing

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



Note

- ◆ *Bolts must be fitted straight to avoid damage to threads.*
- ◆ *After removing, renew bolts tightened with specified tightening angle.*
- ◆ *Only remove support bracket - 10-222A- when bolts on assembly mounting have been tightened to specified torque.*

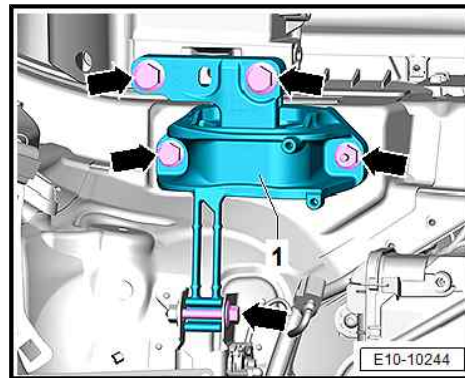




- Initially screw in bolts -arrows- for engine mounting -1- by hand until they make contact.
- Tighten bolts -arrows-.

Tightening torques

- ◆ ⇒ [“2.1 Exploded view - assembly mountings”, page 38](#)



2.4 Removing and installing gearbox mounting

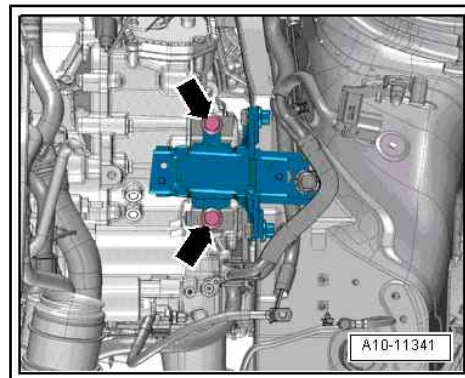
⇒ [“2.4.1 Removing and installing gearbox mounting - Audi A1 2011►”, page 46](#)

⇒ [“2.4.2 Removing and installing gearbox mounting - Audi A1 2018►”, page 47](#)

2.4.1 Removing and installing gearbox mounting - Audi A1 2011►

Removing

- Support engine in installation position
⇒ [“2.2 Supporting engine in installation position”, page 41](#) .
- Remove battery tray ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray .
- Remove bolts -arrows- securing gearbox mounting.



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- Remove bolts -arrows A, B, C- and detach gearbox mounting.

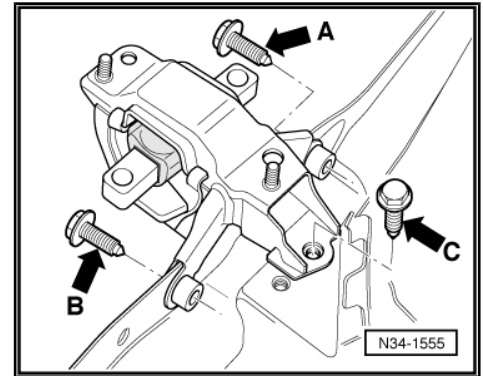
Installing

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

- After removing, renew bolts tightened with specified tightening angle.
- Install battery tray ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray .
- Detach support bracket - 10-222A-
⇒ [“2.2 Supporting engine in installation position”, page 41](#) .

Tightening torques

- ◆ ⇒ Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation



2.4.2 Removing and installing gearbox mounting - Audi A1 2018➤

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- Remove battery tray ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray .



Note

Different types of brackets are fitted depending on version.

- Support engine in installation position
⇒ [“2.2 Supporting engine in installation position”, page 41](#) .
- Tighten spindle slightly to take up weight of engine/gearbox assembly; do not lift.
- Release cable guide -1- from its mounting points -arrows-, push it upwards in direction of -arrow- and secure it to one side.





- Remove bolts -arrows- and detach gearbox mounting -1-.

Installing

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



Note

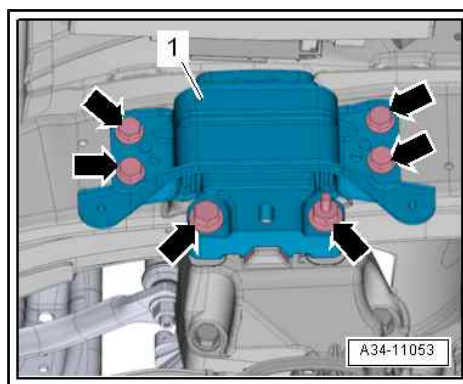
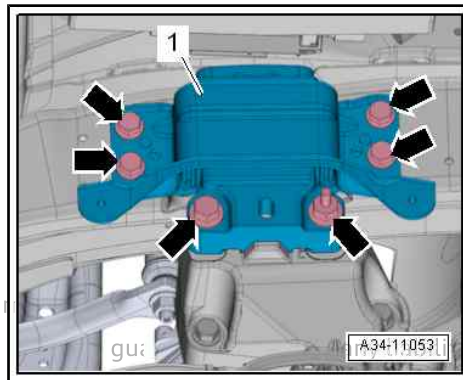


- ◆ Bolts must be fitted straight to avoid damage to threads.
- ◆ After removing, renew bolts tightened with specified tightening angle.
- ◆ Only remove support bracket - 10 - 222 A- when bolts on assembly mounting have been tightened to specified torque.

- Lift gearbox with spindle of support bracket until gearbox support makes contact with support arm of gearbox mounting.
- Initially screw in bolts -arrows- for engine mounting -1- by hand until they make contact.
- Tighten bolts -arrows-.

Tightening torques

- ◆ ⇒ [“2.1 Exploded view - assembly mountings”, page 38](#)
- ◆ ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray



2.5 Removing and installing pendulum support

⇒ [“2.5.1 Removing and installing pendulum support - Audi A1 2011►”, page 48](#)

⇒ [“2.5.2 Removing and installing pendulum support - Audi A1 2018►”, page 49](#)

2.5.1 Removing and installing pendulum support - Audi A1 2011►

Removing

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Do NOT loosen bolted connection -1-.
- Remove bolts -arrows- and detach pendulum support.

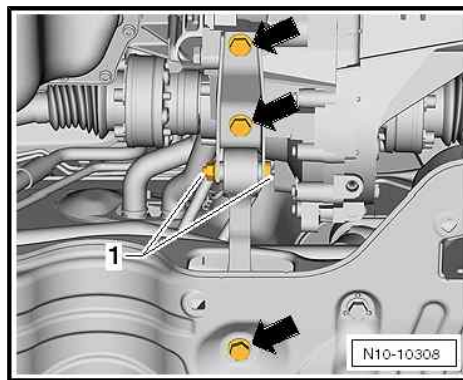
Installing

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

- After removing, renew bolts tightened with specified tightening angle.
- Secure pendulum support first to gearbox and then to sub-frame.

Tightening torques

- ◆ ⇒ [“2.1 Exploded view - assembly mountings”, page 38](#)





2.5.2 Removing and installing pendulum support - Audi A1 2018➤

Removing

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Remove bolts -1, 2, 3- and remove pendulum support -4-.

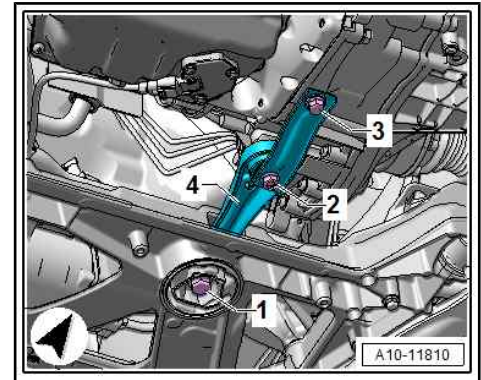
Installing

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

- After removing, renew bolts tightened with specified tightening angle.

Tightening torques

- ◆ ⇒ Fig. [“Pendulum support - tightening torques and sequence”](#), page 41
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation



2.6 Checking adjustment of assembly mountings - Audi A1 2018➤

Procedure

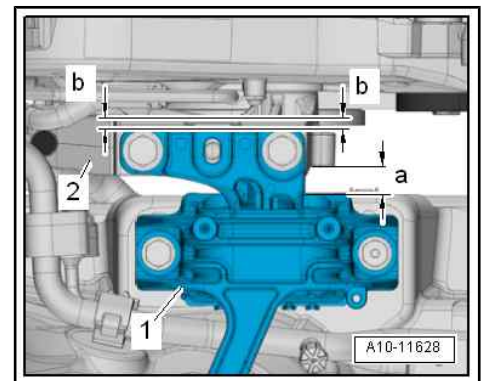
The following specifications must be obtained:

- There must be a distance of -a- = 10 mm between engine support -2- and engine mounting -1-.
- Side surface of engine support casting should be located parallel to support arm of engine mounting -1-.
- Distance -b- = distance -b-.

Note

Distance -a- can be checked using a $\varnothing$ 10 mm drill bit or similar.

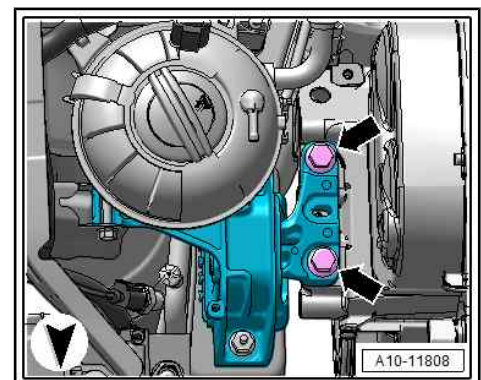
- If the distance measured is too large or small, the assembly mountings must be adjusted
⇒ [“2.7 Adjusting assembly mountings - Audi A1 2018”](#), page 49 .



2.7 Adjusting assembly mountings - Audi A1 2018➤

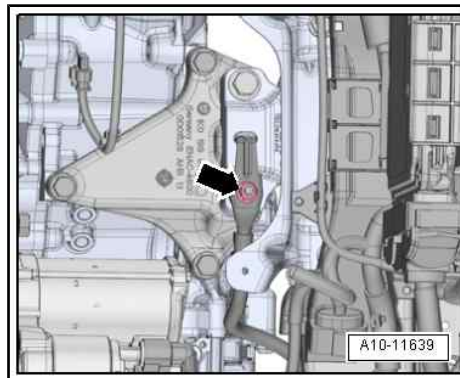
Procedure

- Support engine in installation position
⇒ [“2.2 Supporting engine in installation position”](#), page 41 .
- Remove bolts -arrows- for engine mounting one by one and renew (if they were not renewed when installing engine).
- Initially fit bolts hand-tight.
- Remove battery tray ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray .

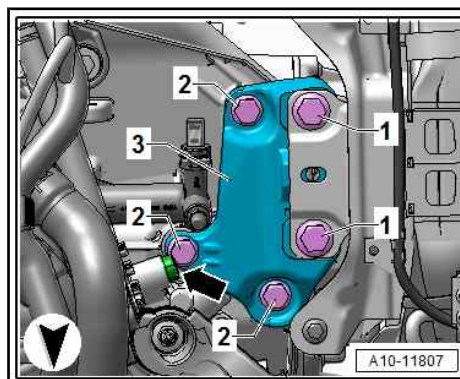




- If fitted, remove nut -arrow- and move earth wire clear.

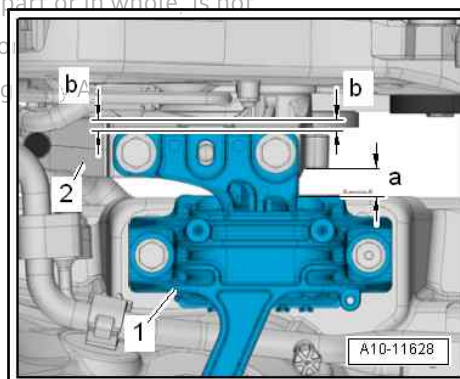


- Remove bolts -1- for gearbox mounting one by one and renew (if they were not renewed when installing engine).
- Initially fit bolts hand-tight.



- Using assembly lever, adjust engine/gearbox assembly so that specifications listed below are attained:

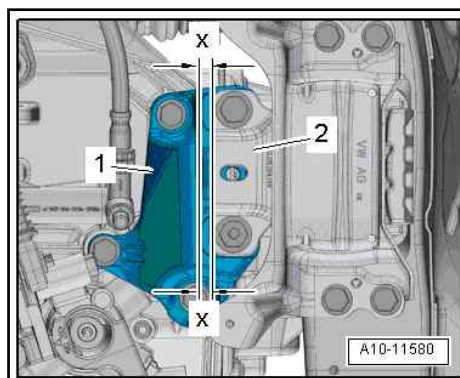
- There must be a distance of -a- = 10 mm between engine support -2- and engine mounting -1-.
- Side surface of engine support casting should be located parallel to support arm of engine mounting -1-.
- Distance -b- = distance -b-.



Note

Distance -a- can be checked using a $\varnothing$ 10 mm drill bit or similar.

- Tighten bolts for engine mounting.
- Ensure that the edges of the support arm -2- (on the gearbox assembly mounting) and gearbox support -1- are parallel.
- Dimension -x- = dimension -x-.
- Tighten bolts for gearbox mounting.
- Detach support bracket - 10-222A-
⇒ ["2.2 Supporting engine in installation position", page 41](#) .



Tightening torques

- ◆ ⇒ ["2.1 Exploded view - assembly mountings", page 38](#)
- ◆ ⇒ Gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings
- ◆ ⇒ Electrical system; Rep. gr. 27 ; Battery; Exploded view - battery
- ◆ Earth wire ⇒ Current flow diagrams, Electrical fault finding and Fitting locations



13 – Crankshaft group

1 Cylinder block (pulley end)

⇒ [“1.1 Exploded view - poly V-belt drive”, page 51](#)

⇒ [“1.2 Removing and installing poly V-belt”, page 54](#)

⇒ [“1.3 Removing and installing tensioner for poly V-belt”, page 57](#)

⇒ [“1.4 Removing and installing engine support”, page 57](#)

⇒ [“1.5 Removing and installing vibration damper”, page 59](#)

⇒ [“1.6 Renewing crankshaft oil seal \(pulley end\)”, page 61](#)

1.1 Exploded view - poly V-belt drive

⇒ [“1.1.1 Exploded view - poly V-belt drive, vehicles without air conditioner compressor”, page 51](#)

⇒ [“1.1.2 Exploded view - poly V-belt drive, vehicles with air conditioner compressor”, page 53](#)

1.1.1 Exploded view - poly V-belt drive, vehicles without air conditioner compressor





1 - Bolt

- ☐ Renew after removing
- ☐ Use counterhold tool - T10475- with adapters - T10475/1- and - T10475/2- to loosen and tighten
- ☐ 150 Nm +180°
- ◆ To avoid disturbing valve timing, do not turn crankshaft when bolt is removed.

2 - Vibration damper

- ☐ Version fitted in vehicle may differ from illustration
- ☐ Removing and installing ⇒ ["1.5 Removing and installing vibration damper", page 59](#)
- ◆ To avoid disturbing valve timing, do not turn crankshaft out of "TDC" position when vibration damper is removed.

3 - Poly V-belt

- ☐ Check for wear
- ☐ Before removing, mark direction of rotation with chalk or felt-tip pen
- ☐ Do not kink
- ☐ Routing of poly V-belt ⇒ [page 55](#)
- ☐ Removing and installing ⇒ ["1.2 Removing and installing poly V-belt", page 54](#)
- ☐ Assigning to decoupler pulley ⇒ [Fig. "Different versions of decoupler pulley", page 53](#)
- ☐ When installing, make sure it is properly seated on pulleys.

4 - Bolt

- ☐ 20 Nm +90°

5 - Tensioner for poly V-belt

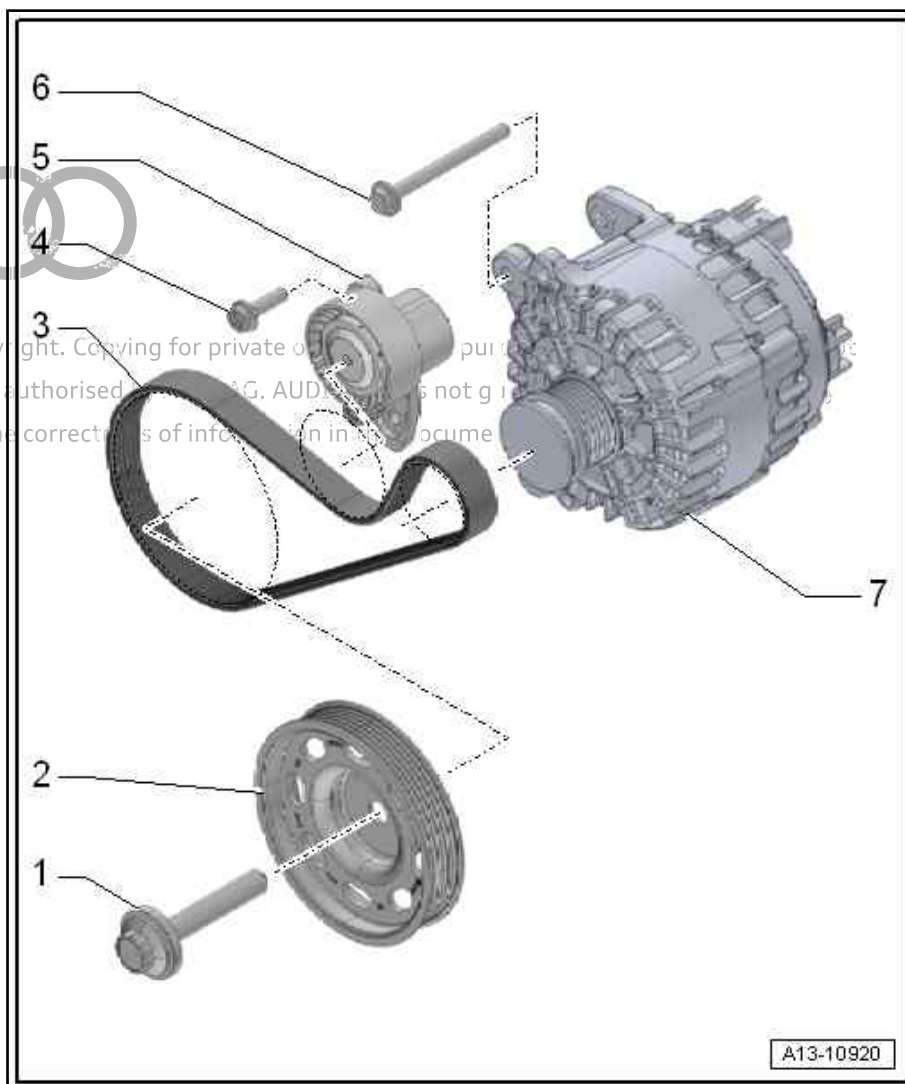
- ☐ Pivot with socket to slacken poly V-belt
- ☐ Lock in position with locking pin - T10060A- .
- ☐ Removing and installing ⇒ ["1.3 Removing and installing tensioner for poly V-belt", page 57](#)

6 - Bolt

- ☐ Tightening torque ⇒ Electrical system; Rep. gr. 27 ; Alternator; Exploded view - alternator

7 - Alternator

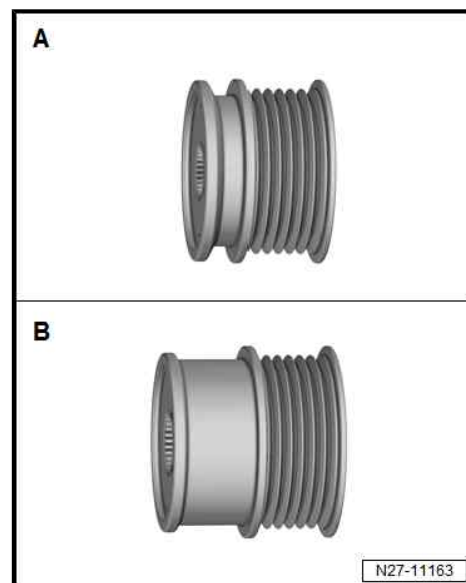
- ☐ Removing and installing ⇒ Electrical system; Rep. gr. 27 ; Alternator; Removing and installing alternator





Different versions of decoupler pulley

- Poly V-belts of different lengths are assigned to decoupler pulleys -A, B-.
- Allocate poly V-belt ⇒ Electronic parts catalogue .



1.1.2 Exploded view - poly V-belt drive, vehicles with air conditioner compressor

1 - Poly V-belt

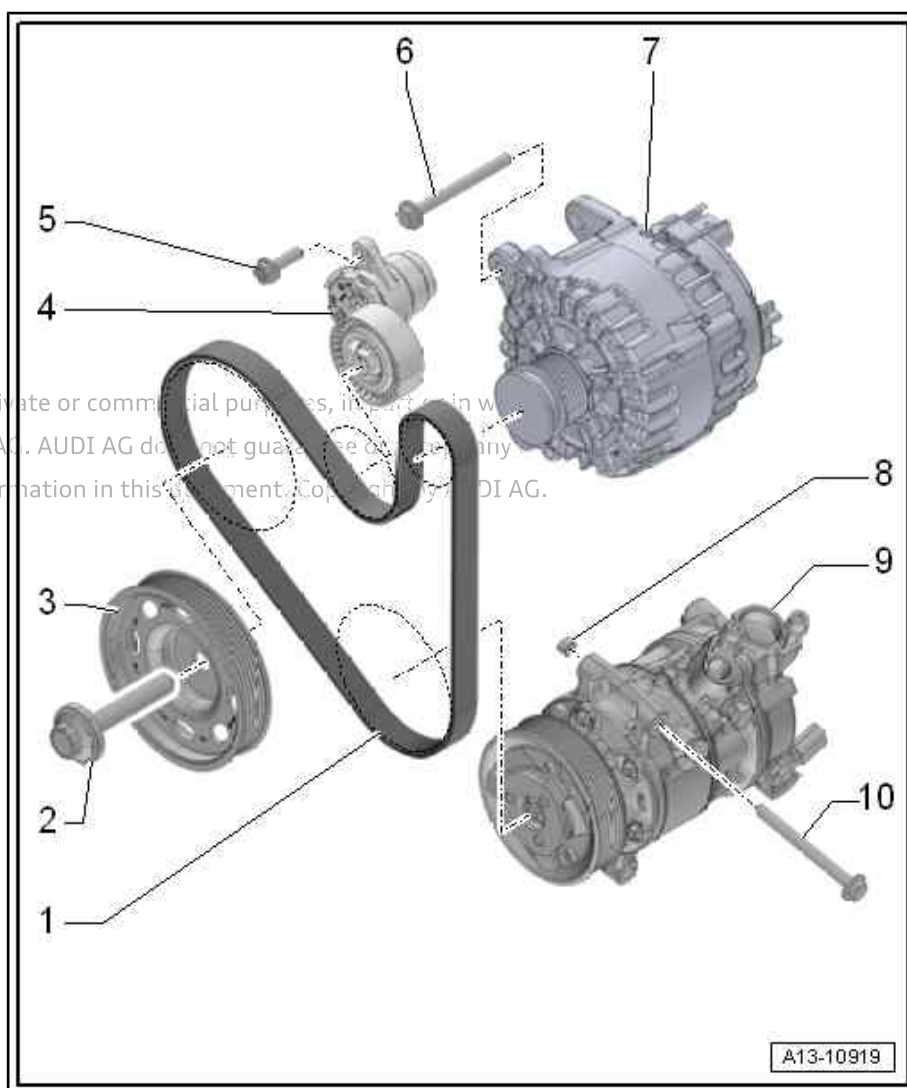
- ☐ Check for wear
- ☐ Before removing, mark direction of rotation with chalk or felt-tip pen
- ☐ Do not kink
- ☐ Routing of poly V-belt
⇒ [page 56](#)
- ☐ Removing and installing
⇒ ["1.2.1 Removing and installing poly V-belt - vehicles without air conditioner compressor"](#)
[page 54](#)
- ☐ Assigning to decoupler pulley
⇒ [Fig. "Different versions of decoupler pulley"](#), [page 53](#)
- ☐ When installing, make sure it is properly seated on pulleys.

2 - Bolt

- ☐ Tightening torque
⇒ [Item 1 \(page 52\)](#)
- ◆ To avoid disturbing valve timing, do not turn crankshaft when bolt is removed.

3 - Vibration damper

- ☐ Version fitted in vehicle may differ from illustration
- ☐ Removing and installing
⇒ ["1.5 Removing and installing vibration damper"](#), [page 59](#)





- ◆ To avoid disturbing valve timing, do not turn crankshaft out of "TDC" position when vibration damper is removed.

4 - Tensioner for poly V-belt

- ❑ Pivot with socket to slacken poly V-belt
- ❑ Lock in position with locking pin - T10060A- .
- ❑ Removing and installing ⇒ ["1.3 Removing and installing tensioner for poly V-belt", page 57](#)

5 - Bolt

- ❑ 20 Nm +90°

6 - Bolt

- ❑ Tightening torque ⇒ Electrical system; Rep. gr. 27 ; Alternator; Exploded view - alternator

7 - Alternator

- ❑ Removing and installing ⇒ Electrical system; Rep. gr. 27 ; Alternator; Removing and installing alternator

8 - Dowel sleeve

- ❑ For air conditioner compressor

9 - Air conditioner compressor

- ❑ Do not unscrew or disconnect refrigerant hoses or pipes
- ❑ Removing and installing ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Detaching and attaching air conditioner compressor at bracket

10 - Bolt

- ❑ Tightening torque ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Exploded view - air conditioner compressor drive unit

1.2 Removing and installing poly V-belt

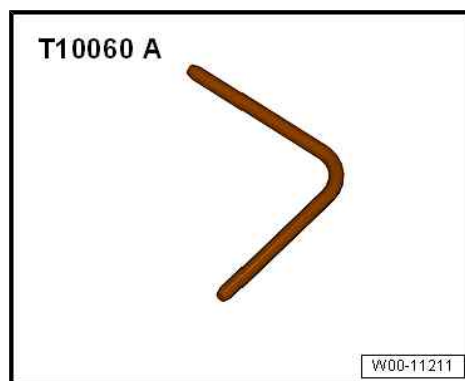
⇒ ["1.2.1 Removing and installing poly V-belt - vehicles without air conditioner compressor", page 54](#)

⇒ ["1.2.2 Removing and installing poly V-belt - vehicles with air conditioner compressor", page 55](#)

1.2.1 Removing and installing poly V-belt - vehicles without air conditioner compressor

Special tools and workshop equipment required

- ◆ Locking pin - T10060A-



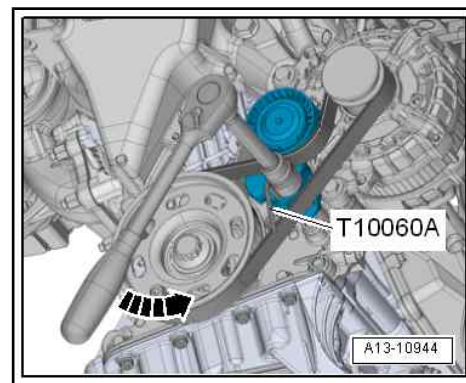


Removing

! NOTICE

Risk of irreparable damage due to running a used belt in the opposite direction when it is refitted.

- Mark running direction before removing.
- Pay attention to running direction when reinstalling.
- Remove vacuum pump for brakes - V192- with bracket and place to one side ⇒ Brake system; Rep. gr. 47 ; Vacuum system; Removing and installing electric vacuum pump .
- If poly V-belt is to be re-installed, mark direction of rotation of poly V-belt with chalk or felt tip pen for re-installation.
- To slacken poly V-belt, turn tensioner in anti-clockwise direction -arrow-.
- Lock tensioner with locking pin - T10060A- .
- Take off poly V-belt.

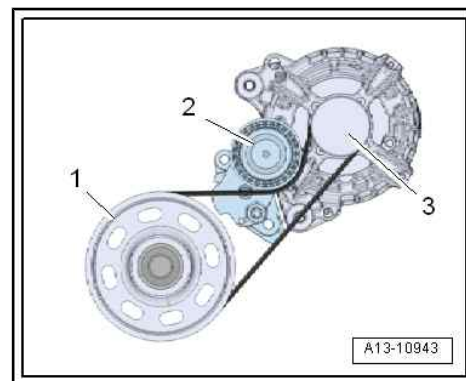


Installing

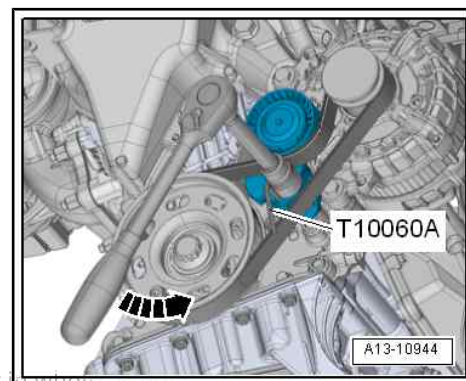
Installation is carried out in reverse order; note the following:

- Fit poly V-belt as shown in illustration.

- 1 - Vibration damper
- 2 - Tensioner for poly V-belt
- 3 - Alternator



- Turn tensioner in direction of -arrow- and remove locking pin - T10060A- .
- Release tensioner.
- Check that poly V-belt is properly seated.
- Start engine and check that poly V-belt runs properly.



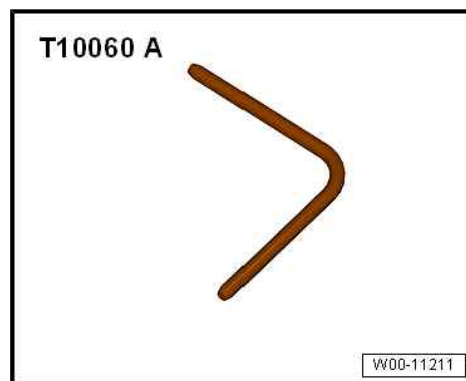
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1.2.2 Removing and installing poly V-belt - vehicles with air conditioner compressor

Special tools and workshop equipment required



◆ Locking pin - T10060A-



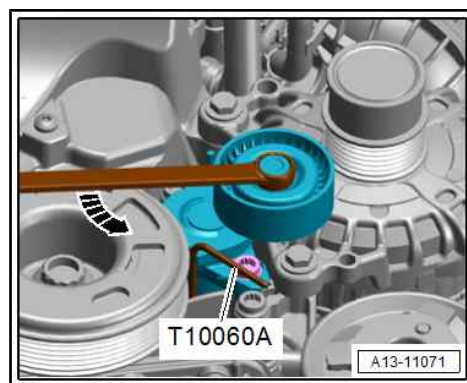
Removing



NOTICE

Risk of irreparable damage due to running a used belt in the opposite direction when it is refitted.

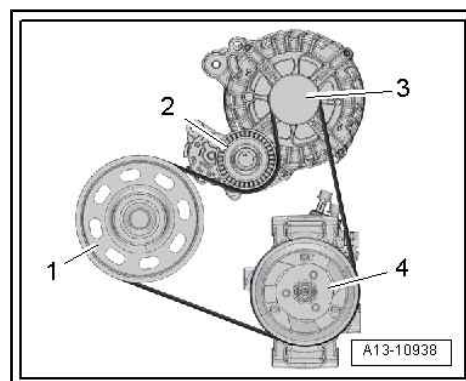
- Mark running direction before removing.
- Pay attention to running direction when reinstalling.
- Remove vacuum pump for brakes - V192- with bracket and place to one side ⇒ Brake system; Rep. gr. 47 ; Vacuum system; Removing and installing electric vacuum pump .
- If poly V-belt is to be re-installed, mark direction of rotation of poly V-belt with chalk or felt tip pen for re-installation.
- To slacken poly V-belt, turn tensioner in anti-clockwise direction -arrow-.
- Lock tensioner with locking pin - T10060A- .
- Take off poly V-belt.



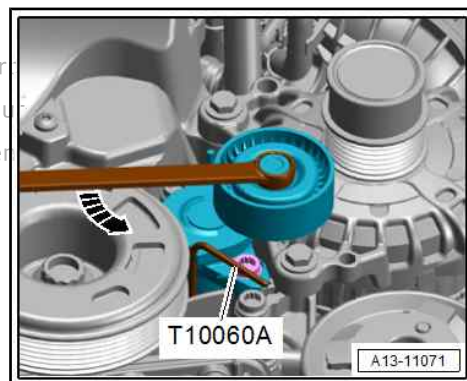
Installing

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

- Fit poly V-belt as shown in illustration:
- 1 - Vibration damper
- 2 - Tensioner for poly V-belt
- 3 - Alternator
- 4 - Air conditioner compressor



- Turn tensioner anti-clockwise -arrow- and remove locking pin - T10060A- .
- Release tensioner.
- Check that poly V-belt is properly seated.
- Start engine and check that poly V-belt runs properly.





1.3 Removing and installing tensioner for poly V-belt

⇒ [“1.3.1 Removing and installing tensioner for poly V-belt - vehicles without air conditioner compressor”, page 57](#)

⇒ [“1.3.2 Removing and installing tensioner for poly V-belt - vehicles with air conditioner compressor”, page 57](#)

1.3.1 Removing and installing tensioner for poly V-belt - vehicles without air conditioner compressor

Removing

- Detach poly V-belt from tensioner
⇒ [“1.2.1 Removing and installing poly V-belt - vehicles without air conditioner compressor”, page 54](#) .
- Remove bolts -arrows- and detach poly V-belt tensioner -1-.

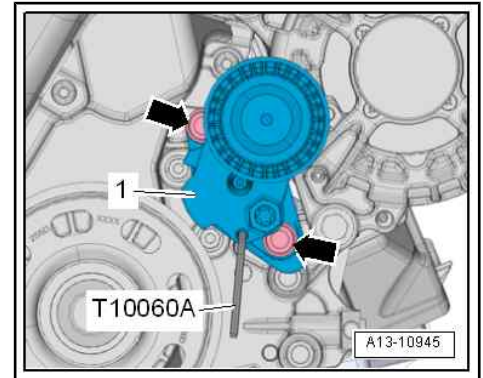
Installing

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

- Install poly V-belt
⇒ [“1.2.1 Removing and installing poly V-belt - vehicles without air conditioner compressor”, page 54](#) .

Tightening torques

- ◆ ⇒ [“1.1.1 Exploded view - poly V-belt drive, vehicles without air conditioner compressor”, page 51](#)



1.3.2 Removing and installing tensioner for poly V-belt - vehicles with air conditioner compressor

Removing

- Detach poly V-belt from tensioner
⇒ [“1.2.2 Removing and installing poly V-belt - vehicles with air conditioner compressor”, page 55](#)
- Remove bolts -arrows- and detach poly V-belt tensioner -1-.

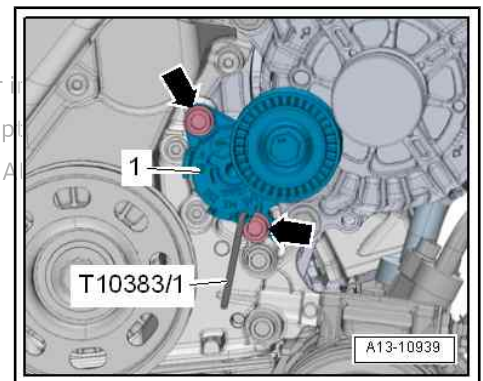
Installing

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

- Install poly V-belt
⇒ [“1.2.2 Removing and installing poly V-belt - vehicles with air conditioner compressor”, page 55](#) .

Tightening torques

- ◆ ⇒ [“1.1.2 Exploded view - poly V-belt drive, vehicles with air conditioner compressor”, page 53](#)



1.4 Removing and installing engine support

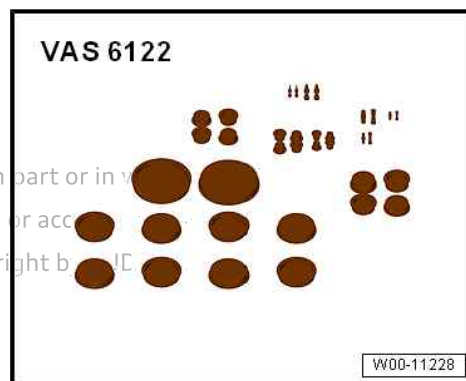
Special tools and workshop equipment required



♦ Engine bung set - VAS 6122-

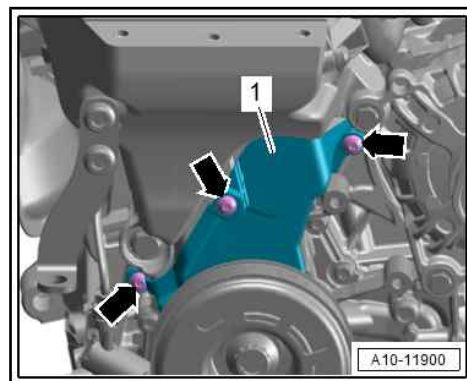


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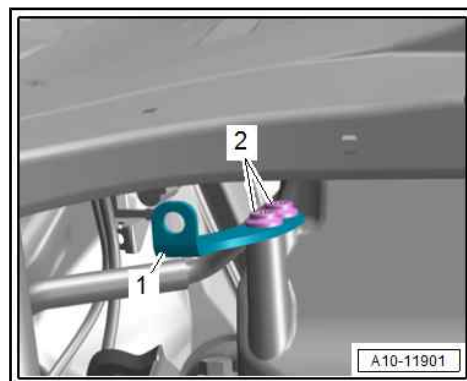


Removing

- Remove engine mounting
⇒ ["2.3 Removing and installing engine mounting", page 44](#) .
- Remove tensioner for poly V-belt
⇒ ["1.3 Removing and installing tensioner for poly V-belt", page 57](#) .
- Remove noise insulation ⇒ General body repairs, exterior;
Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Remove bolts -arrows- for toothed belt cover (bottom) -1-.

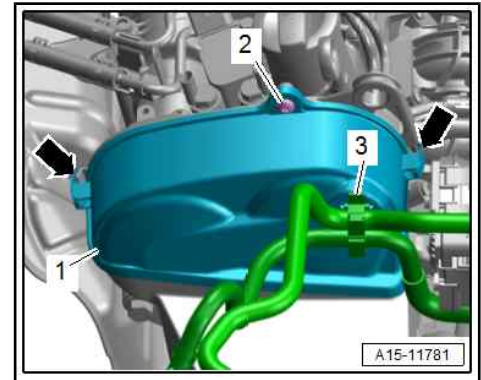


- Unscrew bolts -2- and remove bracket -1-.
- Remove air pipe
⇒ ["2.3 Removing and installing air pipe", page 249](#) .

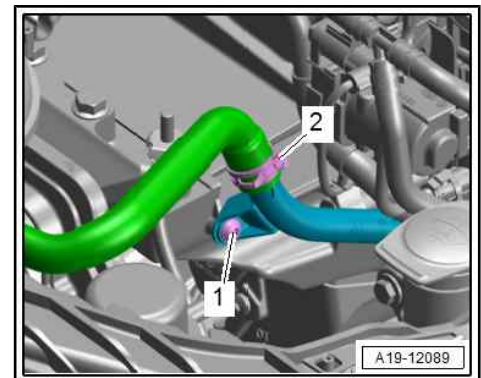




- Move hoses and bracket -3- clear.
- Remove bolt -2-.
- Release clips -arrows- and detach toothed belt cover (top) -1-.
- For illustration purposes, the installation position is shown without the air pipe.



- Remove bolt -1-.
- Disregard -item 2-.
- Remove alternator from bracket and tie up to front ⇒ Electrical system; Rep. gr. 27 ; Alternator; Removing and installing alternator .

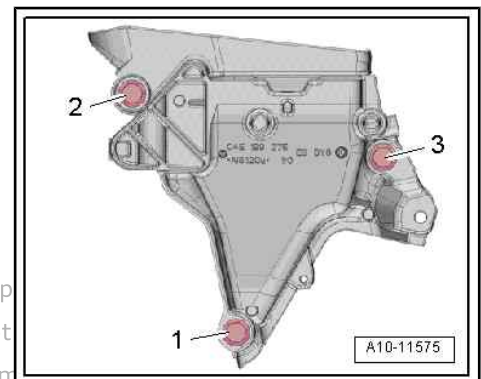


- Unscrew bolts -1, 2 and 3- and detach engine support upwards.

Installing

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

- Connect fuel hoses ⇒ Fuel supply system; Rep. gr. 20 ; Plug-in connectors; Disconnecting plug-in connectors .
- Install poly V-belt tensioner
⇒ [“1.3 Removing and installing tensioner for poly V-belt”, page 57](#) .
- Install engine mountings
⇒ [“2.3 Removing and installing engine mounting”, page 44](#) .



Tightening torques

- ◆ ⇒ [Fig. ““Engine support - tightening torque and sequence””, page 39](#)
- ◆ ⇒ [“1.1 Exploded view - poly V-belt drive”, page 51](#)
- ◆ ⇒ [“2.1 Exploded view - toothed belt cover”, page 98](#)
- ◆ ⇒ [“3.1 Exploded view - coolant pipes”, page 218](#)
- ◆ ⇒ [“2.1 Exploded view - charge air system”, page 247](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation
- ◆ ⇒ Electrical system; Rep. gr. 27 ; Alternator; Exploded view - alternator

1.5 Removing and installing vibration damper

Special tools and workshop equipment required

- ◆ Counterhold tool - T10475- with adapters -T10475/1- and -T10475/2-

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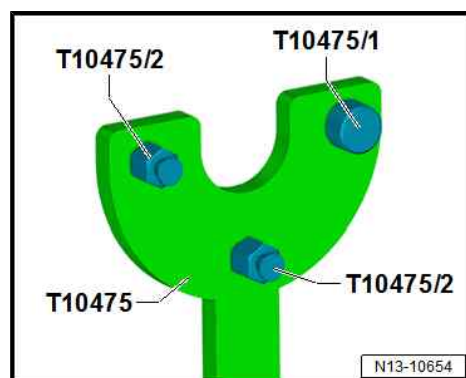


Preparing adapter - T10475- :

- Fit adapters -T10475- and -T10475/1- onto counterhold tool -T10475/2- , as shown in illustration.

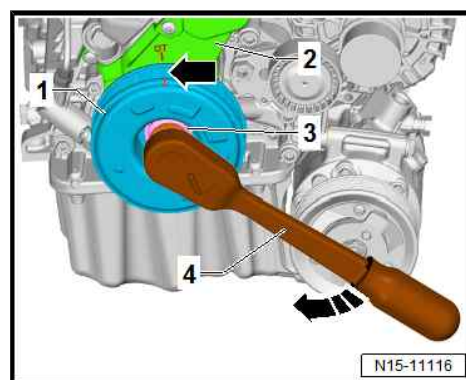
Removing

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Remove poly V-belt
⇒ ["1.2 Removing and installing poly V-belt", page 54](#) .



Moving crankshaft and camshafts into »TDC« position

- Turn crankshaft to "TDC" position in normal direction of engine rotation -arrow- by applying a ratchet -4- to central bolt -3-.
- Crankshaft has reached "TDC" position when marking -arrow- on vibration damper -1- aligns with "TDC" marking on toothed belt cover (bottom) -2-.



- Slacken bolt -arrow- for vibration damper using counterhold tool - T10475- with adapters -T10475/1- and -T10475/2- .
- Remove bolt and take off vibration damper.

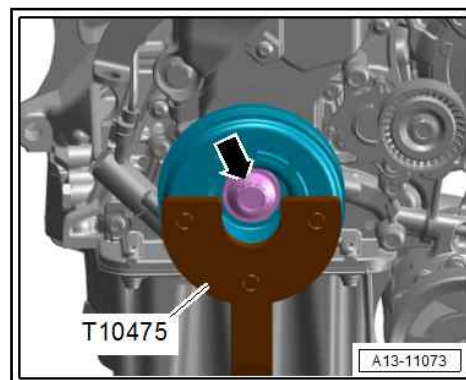
NOTICE

Risk of irreparable damage to engine if valve timing is incorrect

- **Do not rotate crankshaft out of TDC position.**

Installing

- After removing, renew bolts tightened with specified tightening angle.
- All contact surfaces between bolt, vibration damper and crankshaft sprocket must be free of oil and grease.

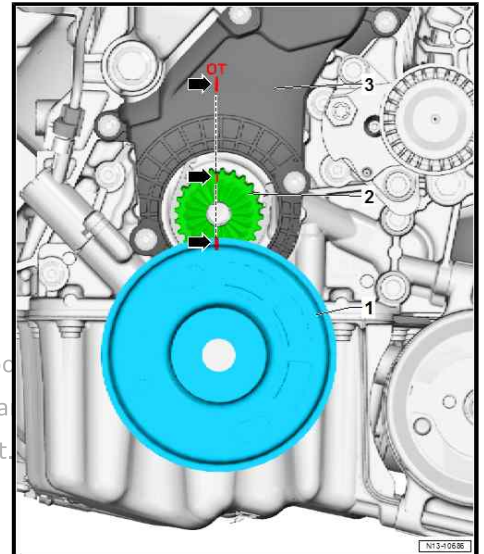




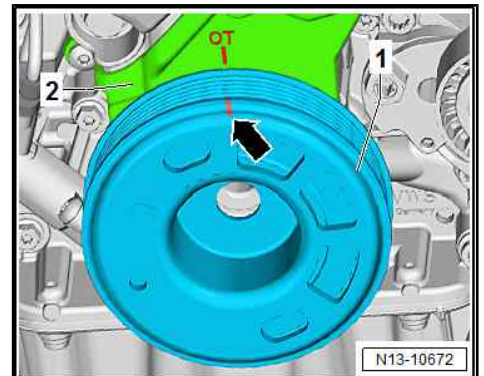
- Check position of crankshaft before fitting vibration damper -1-.
- Marking on crankshaft sprocket -2- must align with »TDC« marking on bottom cover for toothed belt -3-.



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- Position vibration damper -1- so that marking -arrow- on vibration damper -1- aligns with "OT" (TDC) marking on toothed belt cover (bottom) -2-.



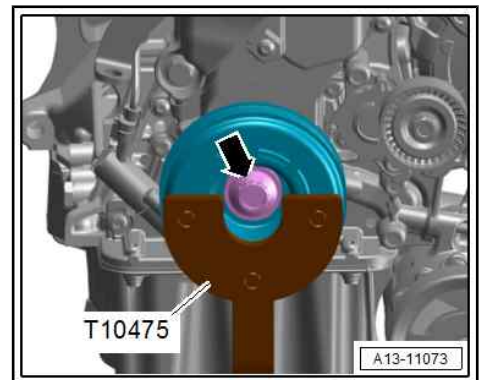
- Screw in bolt -arrow- for vibration damper by hand until it makes contact (lubricate thread of bolt).
- Tighten bolt using counterhold tool - T10475- with adapters - T10475/1- and -T10475/2- .

Remaining installation steps are carried out in reverse sequence; note the following:

- Install poly V-belt
⇒ ["1.2 Removing and installing poly V-belt", page 54](#) .

Tightening torques

- ◆ ⇒ ["1.1 Exploded view - poly V-belt drive", page 51](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation

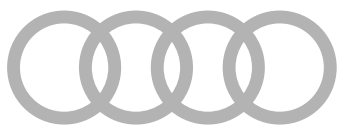


1.6 Renewing crankshaft oil seal (pulley end)

Special tools and workshop equipment required



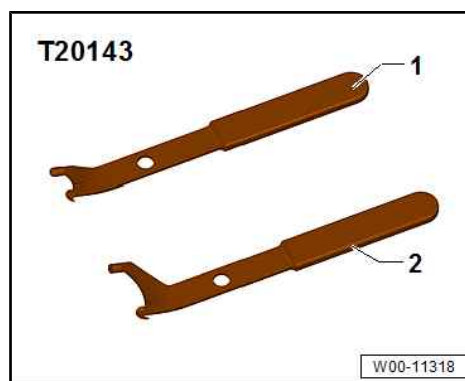
◆ Assembly tool - T10485-



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◆ Extractor tool - T20143-



Procedure

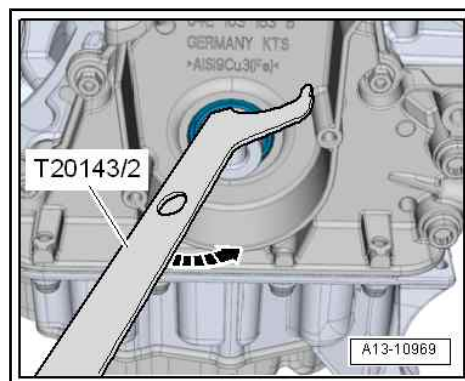
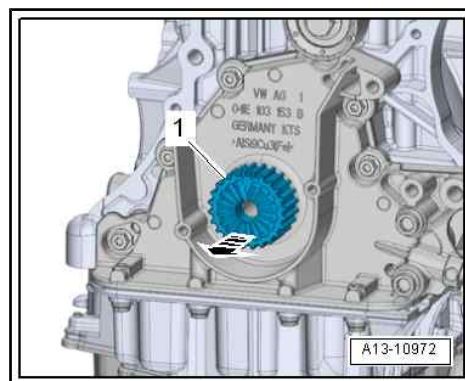
- Remove toothed belt
⇒ [“2.3 Removing and installing toothed belt”, page 101](#) .
- Detach crankshaft sprocket -1- -arrow-.



NOTICE

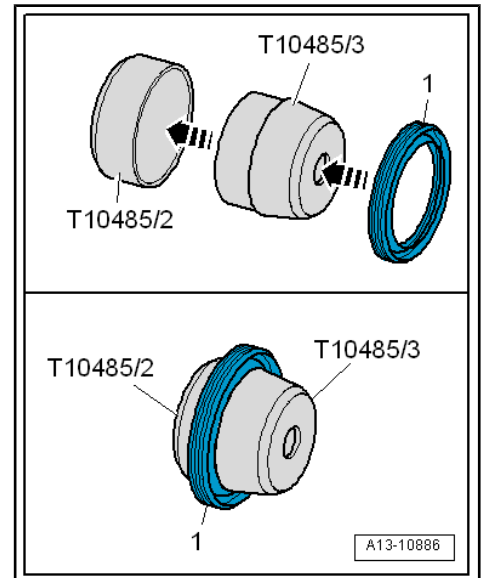
Risk of irreparable damage to engine if valve timing is incorrect

- Do not rotate crankshaft out of TDC position.
- Pry out oil seal using extractor tool -T20143/2- -arrow-.
- Clean contact surface and sealing surface.





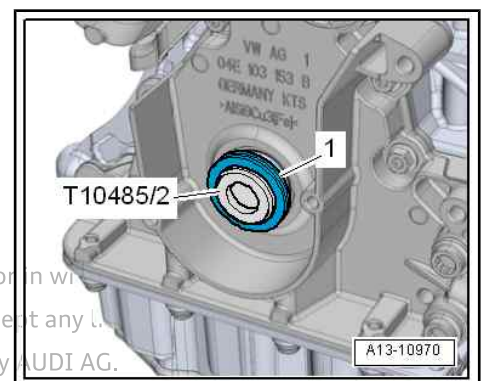
- Do not lubricate new oil seal.
- Slide oil seal -1- over fitting sleeve -T10485/3- onto guide sleeve -T10485/2- .
- Fitting position: closed side of oil seal faces guide sleeve.
- Detach fitting sleeve from guide sleeve.



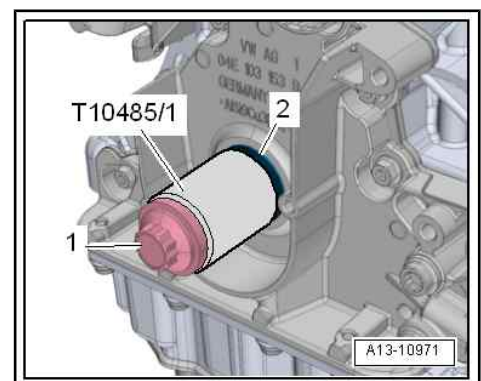
- Fit guide sleeve -T10485/2- with oil seal -1- onto crankshaft.



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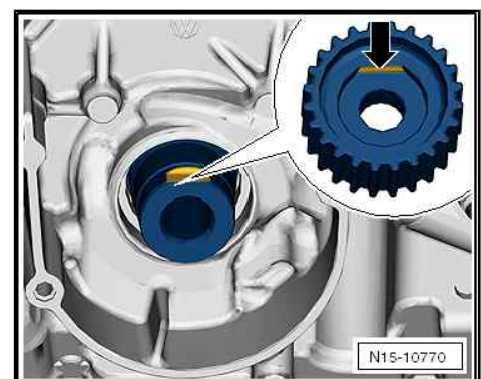


- Use thrust piece -T10485/1- and bolt -1- for vibration damper to pull in oil seal -2- onto stop.



- Fit crankshaft sprocket onto crankshaft.
- Contact surface between poly V-belt pulley and crankshaft sprocket must be free of oil and grease.
- Machined surface -arrow- of crankshaft sprocket must be positioned over machined surface of crankshaft journal.
- Install toothed belt
⇒ ["2.3 Removing and installing toothed belt", page 101](#) .

Further assembly is basically carried out in reverse order of dismantling.





2 Cylinder block (gearbox end)

⇒ [“2.1 Exploded view - cylinder block \(gearbox end\)”, page 64](#)

⇒ [“2.2 Removing and installing flywheel”, page 65](#)

⇒ [“2.3 Removing and installing sealing flange \(gearbox end\)”, page 66](#)

2.1 Exploded view - cylinder block (gearbox end)

- When performing assembly work, secure engine to engine and gearbox support
⇒ [“1.3 Securing engine to engine and gearbox support”, page 32](#).

1 - Bolt

- ☐ Renew after removing
- ☐ 60 Nm +90°

2 - Flywheel

- ☐ Removing and installing
⇒ [“2.2 Removing and installing flywheel”, page 65](#)
- ☐ Can only be installed in one position

3 - Sender wheel

- ☐ For engine speed sender - G28-
- ☐ Only renew together with sealing flange
- ☐ Do not rotate out of position or remove from sealing flange
- ☐ Removing and installing
⇒ [“2.3 Removing and installing sealing flange \(gearbox end\)”, page 66](#)

4 - Engine speed sender - G28-

- ☐ Removing and installing
⇒ [“1.5 Removing and installing engine speed sender G28”, page 332](#)
- ☐ Note installation position ⇒ [page 327](#)

5 - Bolt

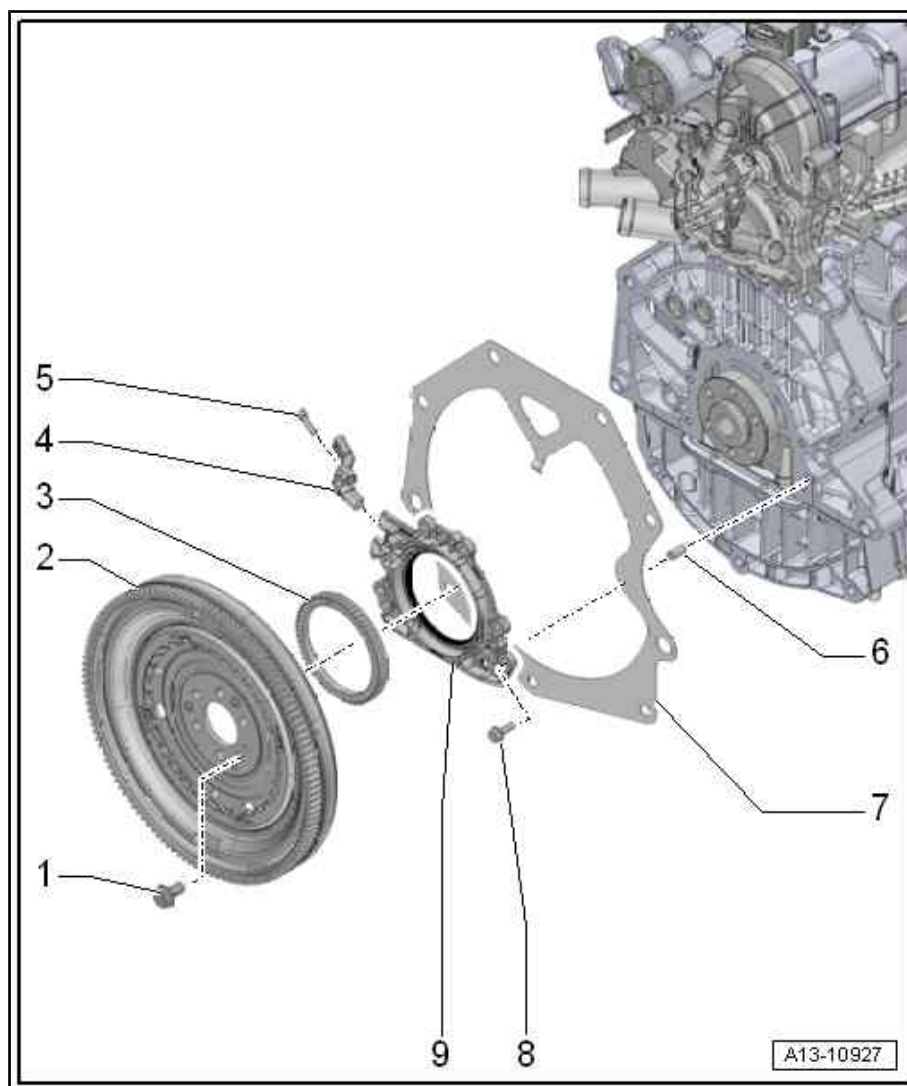
- ☐ Tightening torque
⇒ [Item 15 \(page 327\)](#)

6 - Dowel pin

- ☐ 2x

7 - Intermediate plate

- ☐ Do not damage or bend when assembling
- ☐ Installing ⇒ [Fig. “Installing intermediate plate”, page 65](#)





8 - Bolt

- ❑ Tightening torque and sequence
⇒ Fig. ""Sealing flange (gearbox end) - tightening torque and sequence"" , page 65

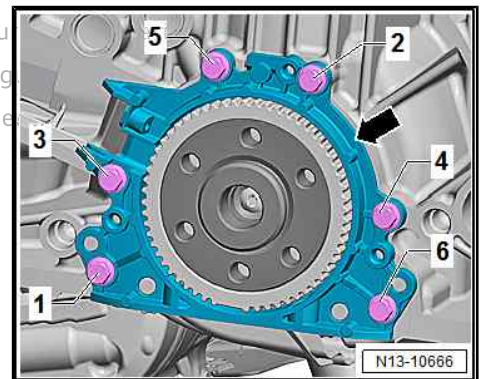
9 - Sealing flange (gearbox end)

- ❑ With oil seal and sender wheel
- ❑ Do not take sender wheel out of sealing flange or rotate it out of position
- ❑ Renewing ⇒ "2.3 Removing and installing sealing flange (gearbox end)", page 66

Sealing flange (gearbox end) - tightening torque and sequence

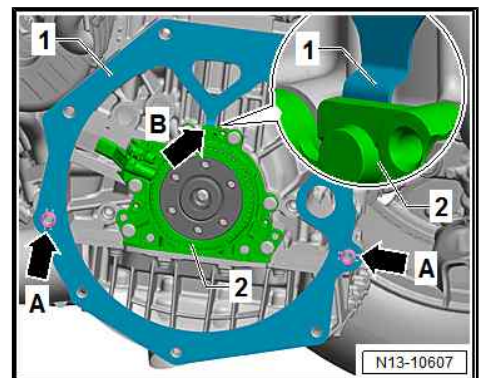
- Tighten bolts in stages as follows:

Stage	Bolts	Tightening torque
1.	-1 ... 6-	Screw in by hand until contact is made
2.	-1 ... 6-	Tighten in stages and in diagonal sequence; final torque 10 Nm.



Installing intermediate plate

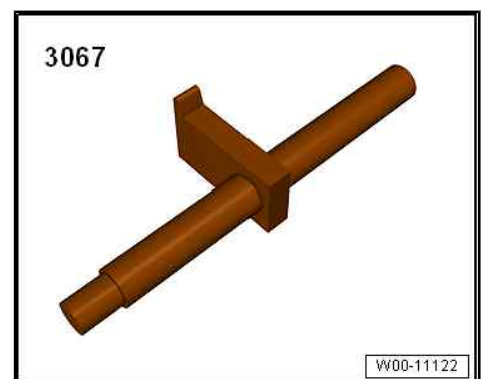
- Engage intermediate plate -1- on sealing flange -2- -arrow B- and push onto dowel sleeves -arrows A-.



2.2 Removing and installing flywheel

Special tools and workshop equipment required

- ◆ Counterhold tool - 3067-





Removing

- Gearbox removed



NOTICE

Risk of damage to thread if an impact driver (or similar) is used.

- When screwing in bolts, fit them manually and perform the first few turns by hand.
- Do not use an impact driver to loosen or tighten bolts.
- Position flywheel -A- so that bolt heads -B- align centrally with holes -arrows-.
- Insert counterhold tool - 3067- in hole on cylinder block -item B-.
- Loosen and remove flywheel bolts.
- Detach flywheel.

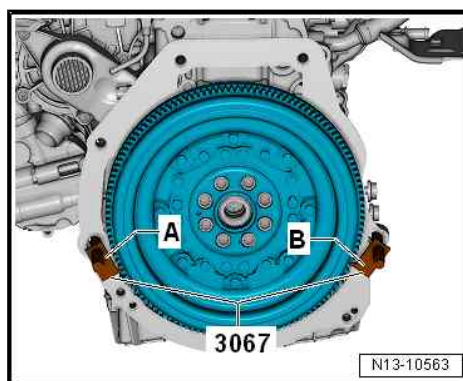
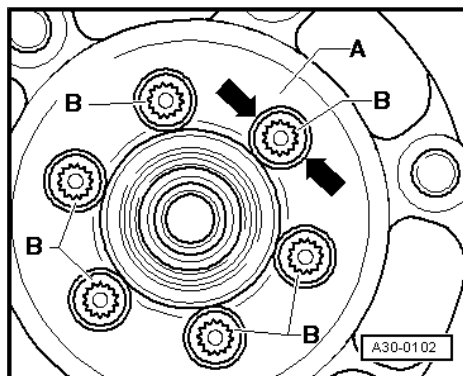
Installing

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

- Renew bolts tightened with specified tightening angle.
- Flywheel with sender wheel can only be fitted in one position.
- Insert counterhold - 3067- in hole on cylinder block -item A-.

Tightening torques

- ♦ ⇒ [“2.1 Exploded view - cylinder block \(gearbox end\)”, page 64](#)



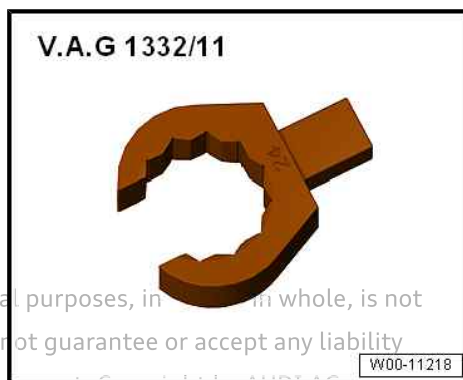
2.3 Removing and installing sealing flange (gearbox end)

Special tools and workshop equipment required

- ♦ Open ring spanner - V.A.G 1332/11-

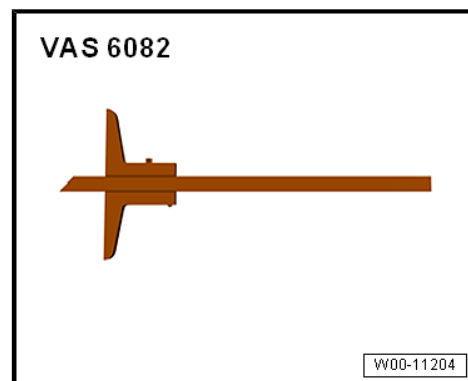


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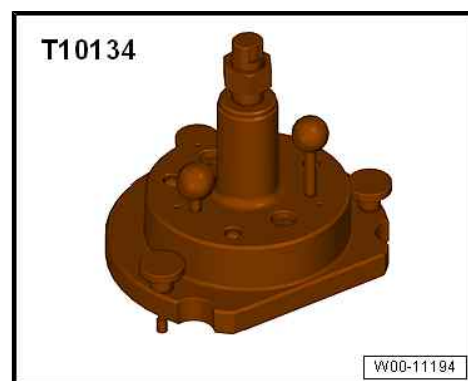




- ◆ Depth gauge - VAS 6082-



- ◆ Assembly tool - T10134-



- ◆ Locking pin - T10340-



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- ◆ Bolt, M6x35 (3x)
- ◆ Hexagon key

Procedure

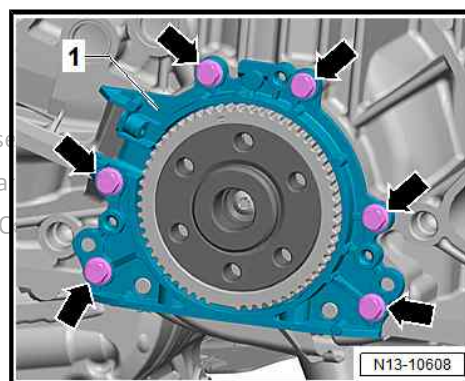
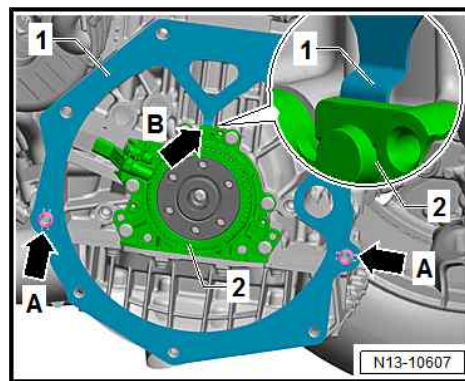
- Gearbox removed ⇒ Rep. gr. 34 ; Removing and installing gearbox .
- For illustration purposes, the procedure is shown with the engine removed.
- Remove flywheel
⇒ ["2.2 Removing and installing flywheel", page 65](#) .



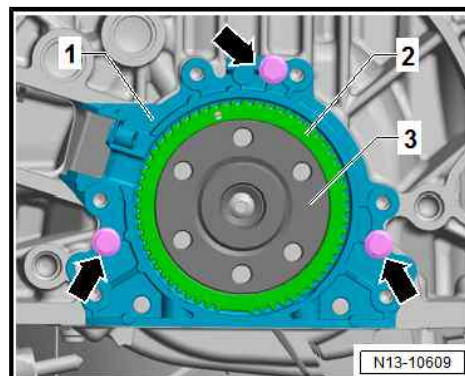
- Detach intermediate plate -1- from dowel sleeves -arrows A-.
- Move intermediate plate upwards.
- At the same time, pull retaining tab -arrow B- for intermediate plate out of opening behind sealing flange -2-.
- Set engine to "TDC for cylinder 1"
⇒ ["4.7 Setting pistons to TDC position", page 82](#) .
- Remove sump
⇒ ["1.3 Removing and installing sump", page 173](#) .
- Remove engine speed sender - G28-
⇒ ["1.5 Removing and installing engine speed sender G28", page 332](#) .
- Remove bolts -arrows-.



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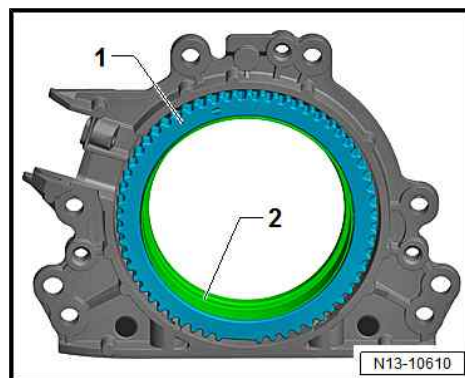


- The sealing flange -1- is pressed off the crankshaft -3- together with the sender wheel -2-.
- To press off, screw 3 bolts M6x35 -arrows- alternately into sealing flange not more than 1/2 turn at a time.
- Detach sealing flange -1- together with sender wheel -2-.



Pressing in sealing flange with sender wheel

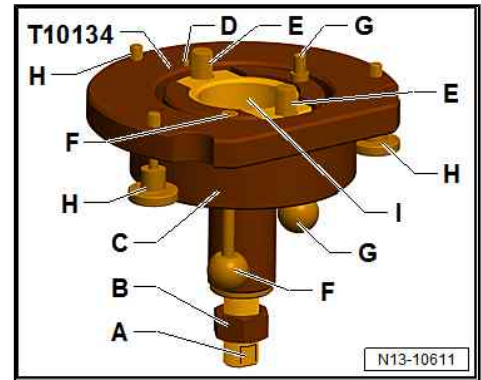
- The sealing flange with PTFE oil seal is fitted with a sealing lip support ring -2-. This support ring acts as an assembly sleeve and must not be removed before installation.
- The sender wheel is held in its installation position by a locating pin on the assembly tool - T10134- .
- Sealing flange and sender wheel -1- must not be separated or rotated out of position after removal from packaging.
- The sealing flange and oil seal are one unit and can only be replaced together with the sender wheel.
- The assembly tool - T10134- is held in the correct position relative to the crankshaft by a guide pin which is inserted into a hole in the crankshaft.





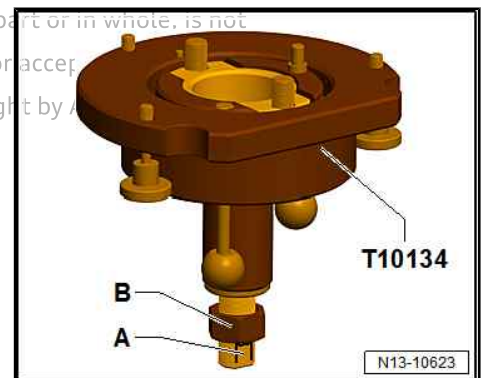
Construction of assembly tool - T10134- :

- A - Tensioning flats
- B - Nut
- C - Assembly housing
- D - Locating pin
- E - Hexagon socket head bolts (2x)
- F - Guide pin for diesel engines (black handle)
- G - Guide pin for petrol engines (red handle)
- H - Knurled screws (3x)
- I - Inner section

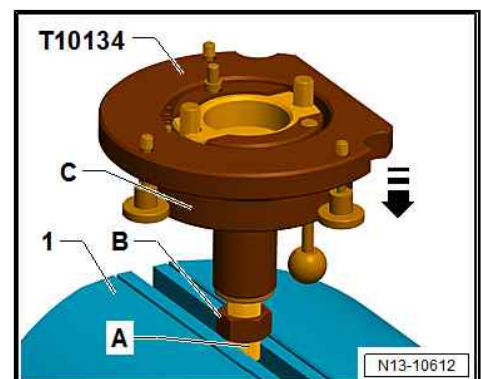


Fitting sealing flange with sender wheel onto assembly tool - T10134- :

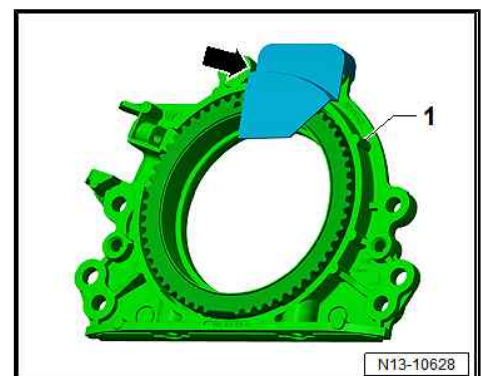
- Unscrew nut -B- until it is just in front of tightening flats -A- on threaded spindle.



- Clamp assembly tool - T10134- in a vice on tightening flats -A- of threaded spindle.
- Press assembly housing -C- downwards so that it lies on nut -B- -arrow-.
- Inner part of assembly device and assembly housing must align (be level) with each other.

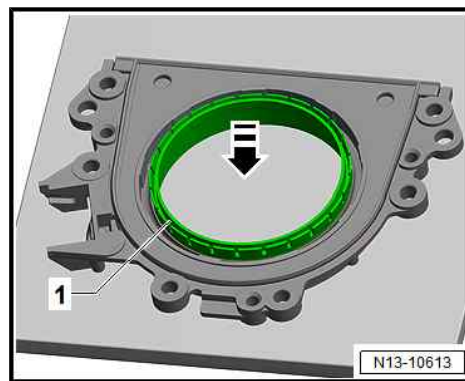


- If fitted, remove securing clip -arrow- from new sealing flange -1-.
- Do not take the sender wheel out of the sealing flange or rotate it out of position.

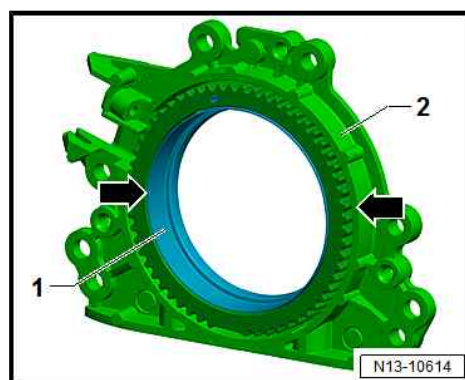




- Place sealing flange (with front side downwards) on a clean flat surface.
- Press sealing lip support ring -1- downwards in direction of -arrow- until it touches flat surface.

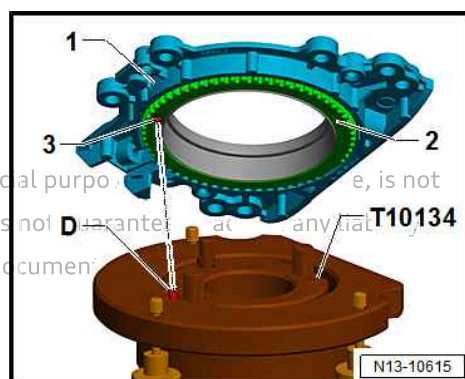


- Upper edge of sealing lip support ring -1- must be flush -arrows- with front edge of sealing flange -2-.

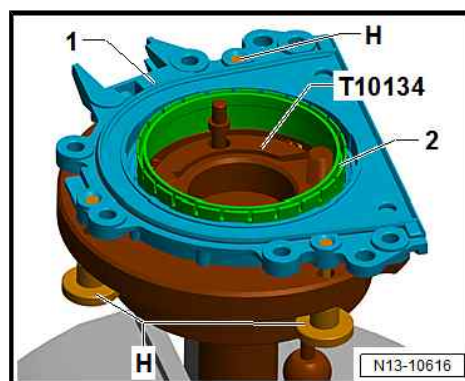


- Place front side of sealing flange -1- on assembly tool - T10134- so that locating pin -D- is seated in hole -3- in sender wheel -2-.
- Ensure that sealing flange lies flat on assembly tool.

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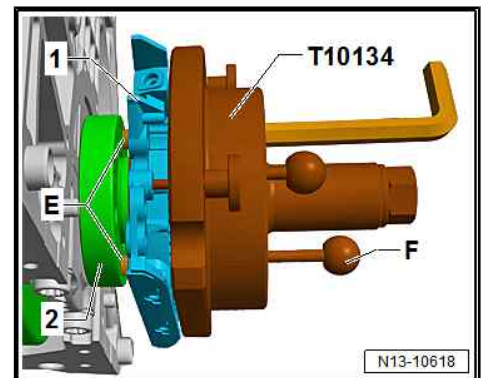
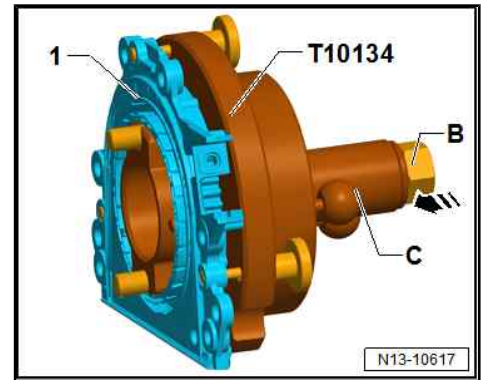
- Screw knurled screws -H- onto sealing flange -1-.
- When securing, press sealing flange -1- and sealing lip support ring -2- against surface of assembly tool - T10134- .
- This prevents locating pin from sliding out of hole in sender wheel.
- Ensure that sender wheel remains fixed on assembly tool when installing sealing flange.





Securing assembly tool - T10134- with sealing flange -1- on crankshaft flange:

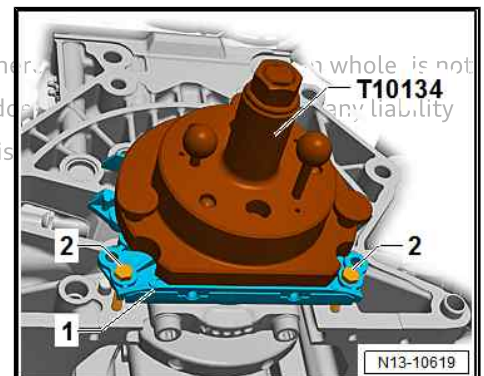
- Crankshaft flange must be free of oil and grease.
- Engine is at "TDC" position
⇒ ["4.7 Setting pistons to TDC position", page 82](#) .
- Screw nut -B- to end of threaded spindle.
- Press threaded spindle of assembly tool - T10134- in direction of -arrow- until nut -B- makes contact with assembly housing -C-.
- Position flat edge of assembly housing towards sealing surface for sump on cylinder block.
- Secure assembly tool - T10134- with sealing flange -1- to crankshaft flange -2-.
- To do so, screw hexagon socket head bolts -E- approx. 5 turns into crankshaft flange with hexagon key.
- Insert guide pin for petrol engines (red handle) -F- into crankshaft flange.



- Screw 2 bolts M6x35 -item 2- into cylinder block to guide sealing flange -1-.

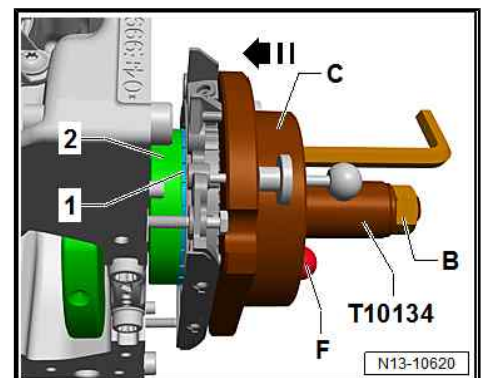


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Securing assembly tool - T10134- on crankshaft flange:

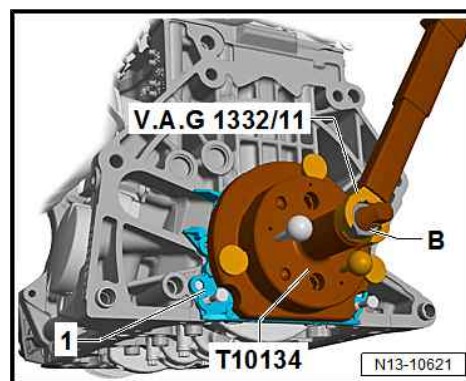
- Press assembly housing -C- by hand in direction of -arrow- until sealing lip support ring -1- touches surface of crankshaft flange -2-.
- Check that guide pin for petrol engines (red handle) -F- is fitted correctly in hole in crankshaft. This ensures that sender wheel reaches its final installation position.
- The guide pin for diesel engines (black handle) must not be inserted into threaded hole in crankshaft.
- Tighten the two hexagon socket head bolts on assembly tool hand-tight.
- Screw nut -B- onto threaded spindle by hand until it touches assembly housing -C-.





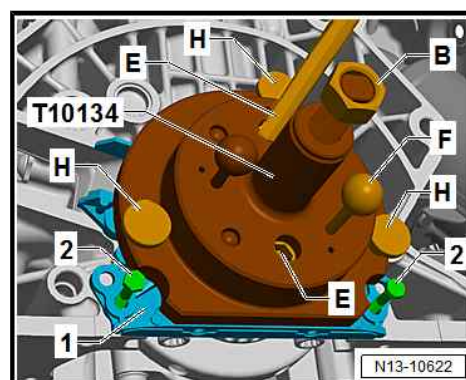
D - Pressing sender wheel onto crankshaft flange with assembly tool - T10134- :

- Tighten nut -B- on assembly tool - T10134- to 35 Nm.
- There must be a small gap between cylinder block and sealing flange -1- after nut has been tightened to 35 Nm.

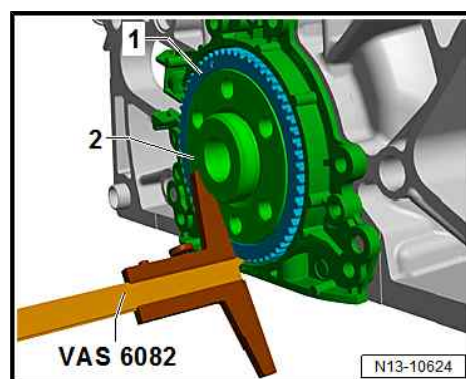


Checking installation position of sender wheel on crankshaft:

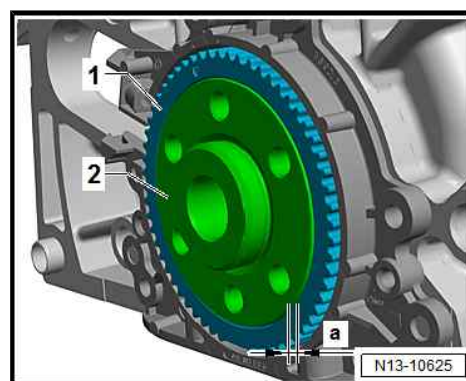
- Screw nut -B- to end of threaded spindle.
- Remove both bolts -2- from cylinder block.
- Unscrew knurled screws -H- from sealing flange -1-.
- Unbolt assembly tool - T10134- from crankshaft flange (remove hexagon socket head bolts -E- from crankshaft flange).
- Detach sealing lip support ring.



- Apply depth gauge - VAS 6082- to crankshaft flange -2-.



- Measure distance -a- between crankshaft flange -2- and sender wheel -1-.
- Specification: Distance -a- = 0.5 mm.
- Press sender wheel in further if measurement is too small
⇒ [page 73](#) .
- If reading matches specification, continue with assembly
⇒ [page 73](#) .

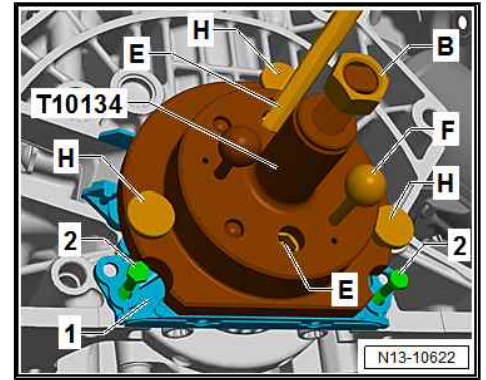


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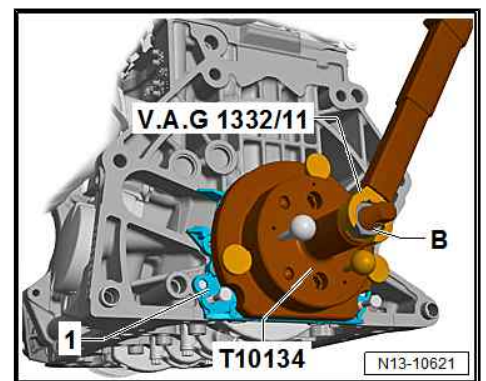
Pressing sender wheel in further:

- Secure assembly tool - T10134- to crankshaft flange.
- Ensure that locating pin of assembly tool - T10134- is fitted in hole in sender wheel.
- Hand-tighten hexagon socket head bolts -E-.
- Slide assembly tool - T10134- onto sealing flange -1- by hand.
- Screw nut -B- onto threaded spindle by hand until it touches assembly tool - T10134- .
- Insert guide pin for petrol engines (red handle) -F- into crankshaft flange.
- Screw 2 bolts M6x35 -item 2- into cylinder block to guide sealing flange -1-.
- Tighten nut -B- on assembly tool - T10134- to 40 Nm.
- Check installation position of sender wheel on crankshaft again ➔ [page 72](#) .
- Tighten nut on assembly tool - T10134- to 45 Nm if measurement is too small.
- Check installation position of sender wheel on crankshaft again ➔ [page 72](#) .



Assembling:

- Tighten bolts for sealing flange in diagonal sequence.
- Install sump
➔ [“1.3 Removing and installing sump”, page 173](#) .
- Install intermediate plate
➔ [Fig. ““Installing intermediate plate””, page 65](#) .
- Install flywheel
➔ [“2.2 Removing and installing flywheel”, page 65](#) .
- Install gearbox ➔ Rep. gr. 34 ; Removing and installing gearbox .
- After renewing sealing flange with sender wheel, misfire adaptations must be reset. To do so, select **01 - Reset adaptations misfires** in **Guided Functions** mode of ➔ Vehicle diagnostic tester.



Tightening torques

- ◆ ➔ [Fig. ““Sealing flange \(gearbox end\) - tightening torque and sequence””, page 65](#)
- ◆ ➔ [“2.1 Exploded view - cylinder block \(gearbox end\)”, page 64](#)
- ◆ **Engine speed sender - G28-**
➔ [“1.1 Exploded view - ignition system”, page 326](#)
- ◆ ➔ [Fig. ““Plug for TDC drilling in cylinder block - tightening torque””, page 100](#)

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3 Crankshaft

⇒ [“3.1 Crankshaft dimensions”, page 74](#)

⇒ [“3.2 Renewing needle bearing in crankshaft”, page 74](#)

3.1 Crankshaft dimensions



NOTICE

Risk of damage to bearing pedestals if crankshaft is removed.
Loosening the bolts for the crankshaft bearing cap results in deformation of the cylinder block bearing pedestals and in damage to the bearings.

- Never remove the crankshaft.

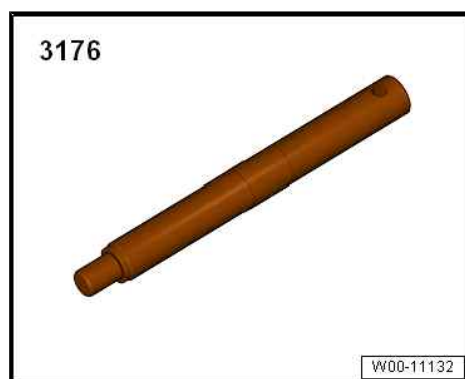
Honing dimension	Conrod journal Ø mm
Basic dimension	47.80 -0.022 -0.037

3.2 Renewing needle bearing in crankshaft

Only fitted on vehicles with dual clutch gearbox

Special tools and workshop equipment required

◆ Centring mandrel - 3176-



◆ Internal puller Kukko 21/2



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◆ Counter-support Kukko 22/1



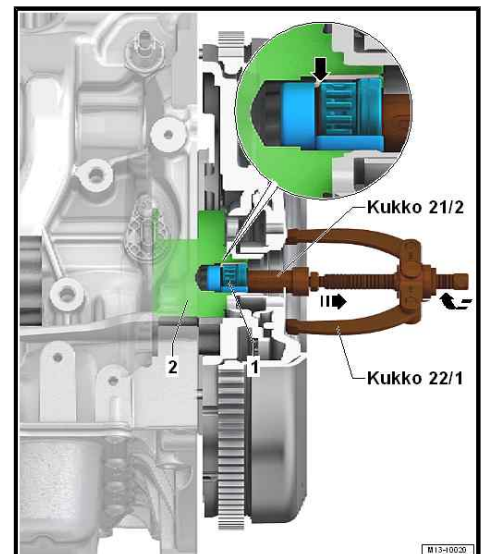
Air conditioner/heater setting

- Gearbox removed ⇒ Rep. gr. 34 ; Removing and installing gearbox; Removing gearbox
- The needle bearing -arrow- must always be renewed if the engine is separated from the gearbox.
- The front edges of the internal puller must not be chipped.



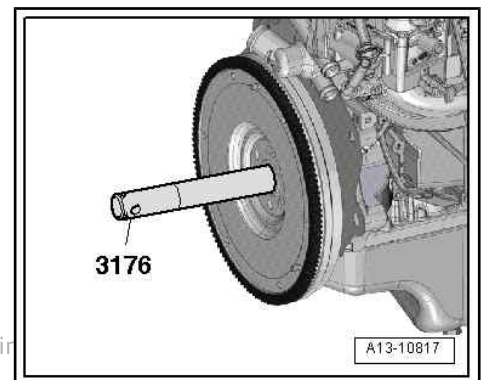
Removing

- Pull needle bearing -1- out of crankshaft -2- using commercially available internal puller (e.g. Kukko - 21/2-) and counter-support (e.g. Kukko - 22/1-).
- Internal puller must be positioned behind needle roller -arrow-.



Installing

- Clean bearing seat in crankshaft and grease lightly.
- Drive in needle bearing until flush using centring mandrel - 3176- .



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4 Pistons and conrods

⇒ [“4.1 Exploded view - pistons and conrods”, page 76](#)

⇒ [“4.2 Removing and installing pistons”, page 78](#)

⇒ [“4.3 Checking pistons and cylinder bores”, page 80](#)

⇒ [“4.4 Separating parts of new conrod”, page 81](#)

⇒ [“4.5 Checking radial clearance of conrod bearings”, page 81](#)

⇒ [“4.6 Removing and installing oil spray jets”, page 81](#)

⇒ [“4.7 Setting pistons to TDC position”, page 82](#)

4.1 Exploded view - pistons and conrods

- All bearing points and running surfaces must be oiled before assembling.

1 - Circlip

- ☐ Renew after removing

2 - Piston pin

- ☐ Removing and installing
⇒ [“4.2 Removing and installing pistons”, page 78](#)

3 - Piston

- ☐ Mark installation position and cylinder number
⇒ [Fig. “Installation position of pistons and location of piston/cylinder”, page 77](#)

- ☐ Removing and installing
⇒ [“4.2 Removing and installing pistons”, page 78](#)

- ☐ Checking pistons and cylinder bores
⇒ [“4.3 Checking pistons and cylinder bores”, page 80](#)

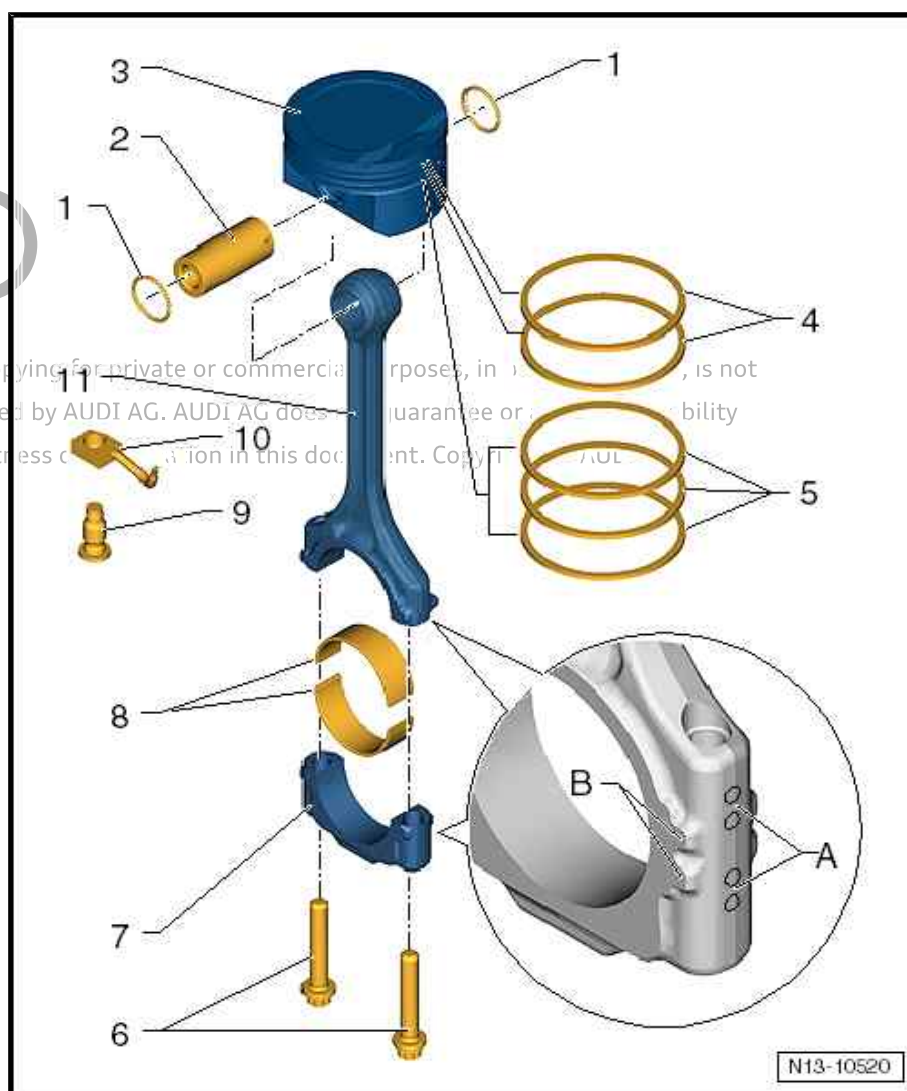
4 - Compression rings

- ☐ Offset gaps by 120°
- ☐ Use piston ring pliers to remove and install compression rings
- ☐ Inscription “TOP” faces towards piston crown
- ☐ Measuring ring gap
⇒ [Fig. “Measuring piston ring gap”, page 80](#)

- ☐ Measuring ring-to-groove clearance ⇒ [Fig. “Measuring ring-to-groove clearance”, page 80](#)

5 - Oil scraper rings

- ☐ Remove and install 3-part oil scraper rings carefully by hand
- ☐ Measuring ring gap ⇒ [Fig. “Measuring piston ring gap”, page 80](#)





- ☐ Ring-to-groove clearance cannot be checked

6 - Bolts

- ☐ Renew after removing
- ☐ Use old bolts when measuring radial clearance
- ☐ Lubricate threads and contact surface
- ☐ 30 Nm +90°

7 - Conrod bearing cap

- ☐ Note installation position
- ☐ Due to the cracking method used to separate the bearing cap from the conrod in manufacture, the caps only fit in one position and only on the appropriate conrod
- ☐ Mark cylinder and conrod allocation in colour -A-
- ☐ Installation position: Marking -A- on conrod bearing cap faces towards pulley end Mark before removing (if no marking is present)

8 - Bearing shell

- ☐ Installation position ⇒ [Fig. "Installation position of bearing shell", page 78](#)
- ☐ Renew used bearing shells

9 - Pressure relief valve

- ☐ Opening pressure: 1.8 ... 2.2 bar
- ☐ 27 Nm

10 - Oil spray jet

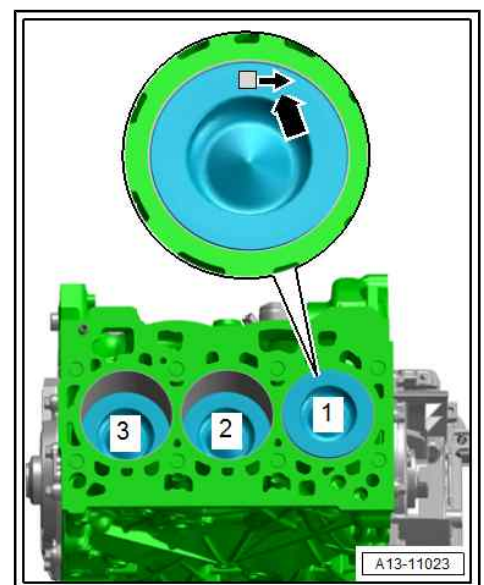
- ☐ For piston cooling
- ☐ Removing and installing ⇒ ["4.6 Removing and installing oil spray jets", page 81](#)

11 - Conrod

- ☐ Only renew as a complete set
- ☐ Mark cylinder and conrod bearing cap allocation in colour -A-
- ☐ Installation position: Marking -A- on conrod bearing cap faces towards pulley end Mark before removing (if no marking is present)
- ☐ Separating parts of new conrod ⇒ ["4.4 Separating parts of new conrod", page 81](#)

Installation position of pistons and allocation of piston/cylinder

- If you intend to re-install used pistons, mark the cylinder number on the piston crown using paint.
- Arrow on piston crown points to pulley end -arrow-.

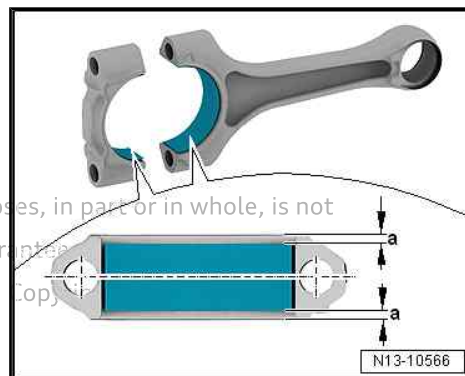




Installation position of bearing shell

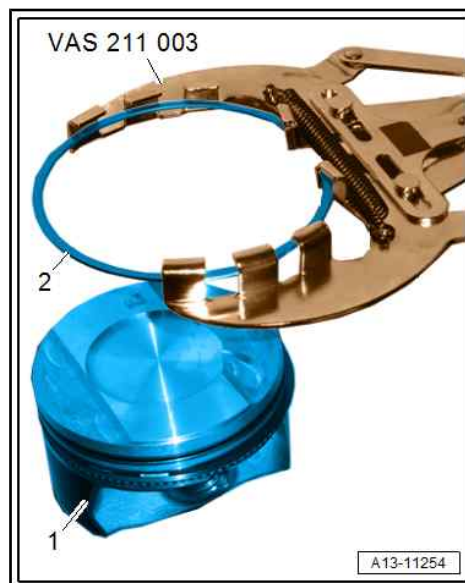
- Insert bearing shells centrally in conrod and conrod bearing cap.
- Dimension -a- = 2.5 mm

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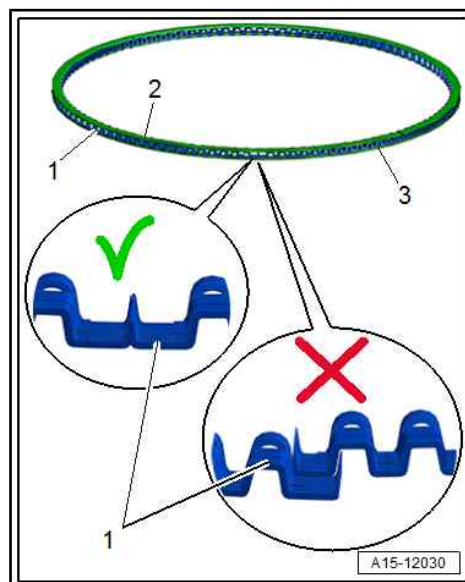
Installing compression rings

- Open up compression ring -2- using piston ring pliers -VAS 211 003- just far enough to be able to slide it over piston -1-.



Installing oil scraper ring

- Note installation position of spring:
- Ends of fins -2, 3- and spring -1- must be offset from one another by at least 90°.



4.2 Removing and installing pistons

Special tools and workshop equipment required



◆ Pin - VW 222 A-



◆ Piston ring clamp, commercially available

Removing

- Remove cylinder head
⇒ ["1.3 Removing and installing cylinder head", page 88](#) .
- Remove sump
⇒ ["1.3 Removing and installing sump", page 173](#) .
- Mark installation position and cylinder number of piston.
- Mark installation position and matching of cylinder and conrod bearing cap to conrod ⇒ [Item 11 \(page 77\)](#) .
- Remove conrod bearing cap and pull out piston and conrod upwards.

Note:

If piston pin is difficult to remove, heat piston to approx. 60 °C.

- Take circlip out of piston pin boss.
- Use drift - 10-14- to drive out piston pin.

Installing

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

- Renew bolts tightened with specified tightening angle.
- Oil running surfaces of bearing shells.
- Install piston using commercially available piston ring clamp; note installation position
⇒ [Fig. "Installation position of pistons and allocation of piston/cylinder", page 77](#) .
- Install conrod bearing cap; note installation position
⇒ [Item 7 \(page 77\)](#) .
- Install sump
⇒ ["1.3 Removing and installing sump", page 173](#) .
- Install cylinder head
⇒ ["1.3 Removing and installing cylinder head", page 88](#) .

Tightening torques

- ◆ ⇒ ["4.1 Exploded view - pistons and conrods", page 76](#)

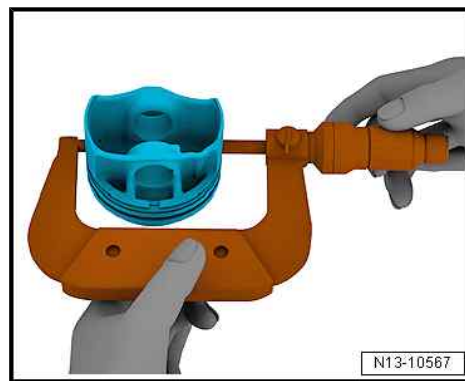


4.3 Checking pistons and cylinder bores

Checking piston

- Using a micrometer, measure approx. 10 mm from the lower edge, perpendicular to the piston pin axis.
- Maximum deviation from nominal dimension: 0.04 mm.

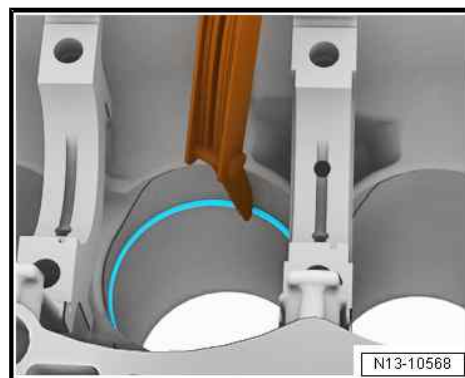
Piston Ø mm	
Nominal dimension	74.461 ... 74.499 ¹⁾
¹⁾ Dimensions including coating (thickness 0.015 ± 0.005 mm on each side)	



Measuring piston ring gap

- Insert ring at right angle to cylinder wall from above and push down into lower cylinder opening approx. 15 mm from bottom of cylinder.
- To do so, use a piston without rings.

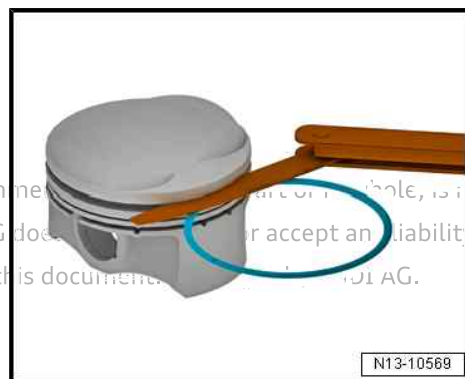
Piston ring	new mm	Wear limit mm
Compression ring	$0.20 + 0.15$	1.0
Oil scraper ring	$0.20 + 0.20$	3.0



Measuring ring-to-groove clearance

- Clean groove in piston before checking clearance.

Piston ring	new mm	Wear limit mm
1. Compression ring	$0.05 \dots 0.09$	0.15
2. Compression ring	$0.03 \dots 0.07$	0.15
Oil scraper rings	Cannot be measured	

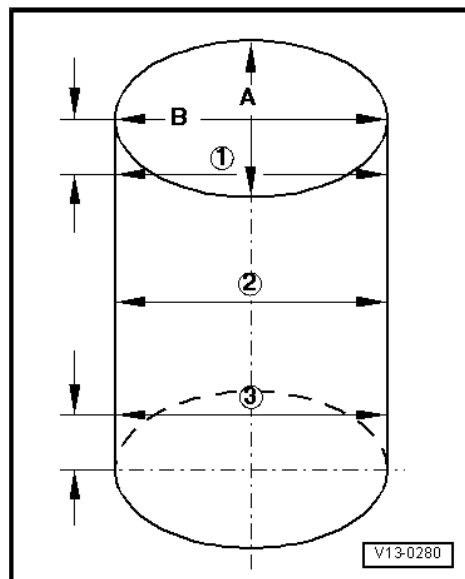


Measuring cylinder bore

- Use a cylinder gauge - VAS 6078- to take measurements at 3 points in transverse direction -A- and in longitudinal direction -B-.

Cylinder bore Ø mm	
Nominal dimension	74.5
Maximum dimension	74.515
Minimum dimension	74.505

- Do not measure the cylinder bore when the cylinder block is mounted to the engine and gearbox support - VAS 6095A- , as this may result in incorrect measurements.

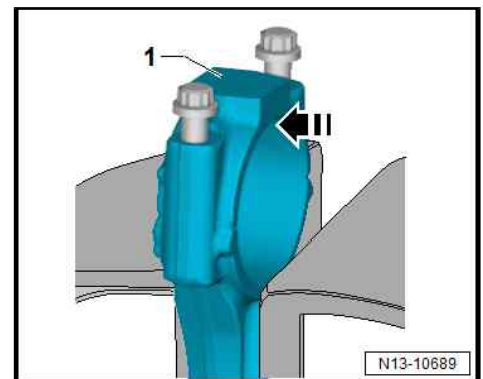
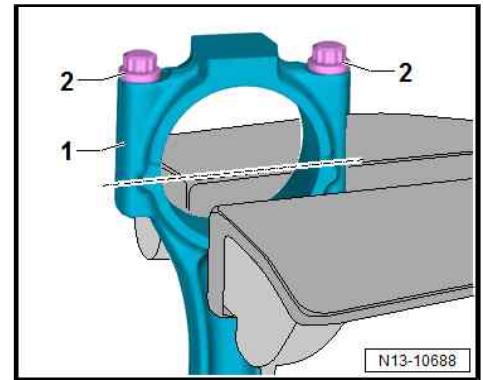




4.4 Separating parts of new conrod

It is possible that the two parts of a new conrod are not completely separated as intended. If it is not possible to detach conrod bearing cap by hand, proceed as follows:

- Clamp conrod -1- lightly in a vice using aluminium jaw covers as shown in illustration.
- To avoid any risk of damage, the conrod should only be clamped lightly.
- The conrod is clamped in a position below the dotted line.
- Loosen the two bolts -2- approx. 5 turns.
- Using a plastic hammer, carefully knock conrod bearing cap -1- loose in direction of -arrow-.



4.5 Checking radial clearance of conrod bearings, in part or in whole, is not permitted unless expressly permitted by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Special tools and workshop equipment required

- ◆ Plastigauge

Procedure

- Remove conrod bearing cap.
- Clean bearing cap and bearing journal.
- Place a length of Plastigauge corresponding to the width of the bearing on the bearing journal or in the bearing shell.
- Fit conrod bearing cap and secure with old bolts
⇒ [Item 6 \(page 77\)](#) without rotating crankshaft.
- Remove conrod bearing cap again.
- Compare width of Plastigauge with measurement scale.

Radial clearance

- New: 0.02 ... 0.06 mm
- Wear limit: 0.07 mm
- Renew conrod bolts.

4.6 Removing and installing oil spray jets

Special tools and workshop equipment required

- ◆ Socket - T10545-

Removing

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation .



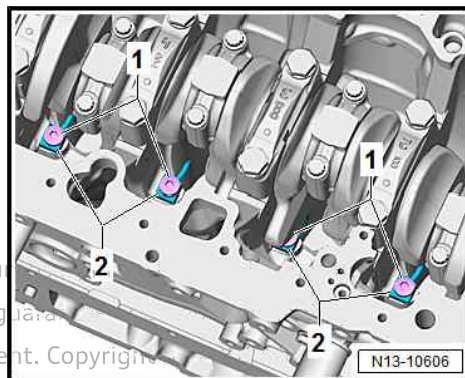
- Remove sump
⇒ ["1.3 Removing and installing sump", page 173](#) .
- Remove baffle plate ⇒ [Item 13 \(page 172\)](#) .
- Remove oil intake pipe ⇒ [Item 5 \(page 172\)](#) .
- Rotate crankshaft in direction of engine rotation by turning bolt for vibration damper until corresponding bolt is accessible.

Note:

- ♦ The crank web of the cylinder must be positioned so that socket - T10545- can be inserted vertically into the pressure relief valve.
- ♦ The teeth on the socket - T10545- and the pressure relief valve must mesh firmly.
- Unscrew pressure relief valve -1- using socket - T10545- .
- Remove oil spray jets -2-.



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Installing

- 1 - Bolt with pressure relief valve, 27 Nm
- 2 - Oil spray jet (for cooling of pistons)

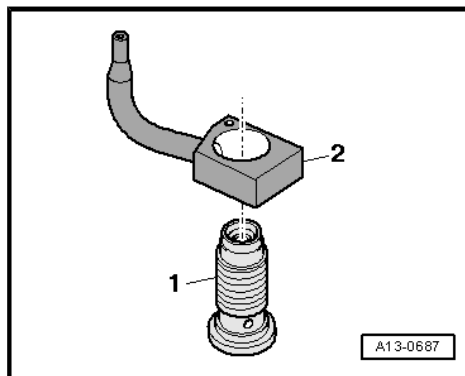
Installation is carried out in reverse order; note the following:



NOTICE

Risk of damage to oil spray jets due to deformation.

- **Never bend oil spray jets.**
- Installation position: align locating edge of oil spray jet with machined surface of cylinder block.
- Check that oil spray jets have adequate clearance after re-installing pistons.
- Always renew bent oil spray jets.
- Install oil intake pipe ⇒ [Item 5 \(page 172\)](#) .
- Install baffle plate ⇒ [Item 13 \(page 172\)](#) .
- Install sump
⇒ ["1.3 Removing and installing sump", page 173](#) .
- Install noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation .

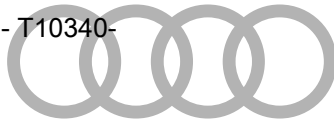


4.7 Setting pistons to TDC position

Special tools and workshop equipment required



◆ Locking pin - T10340-



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T10340



W00-11223

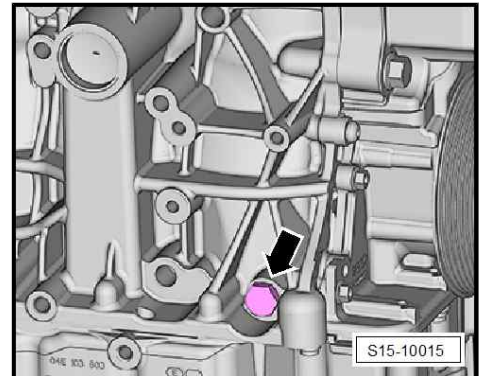
Procedure

Setting cylinder 1 piston to TDC position ⇒ [page 83](#)

Setting cylinder 1 piston to TDC position for repair work on toothed belt drive and for setting valve timing ⇒ [page 84](#)

Setting cylinder 1 piston to TDC position

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation .
- Place a cloth underneath to catch escaping engine oil.
- Unscrew plug -arrow- from cylinder block (rear).



S15-10015

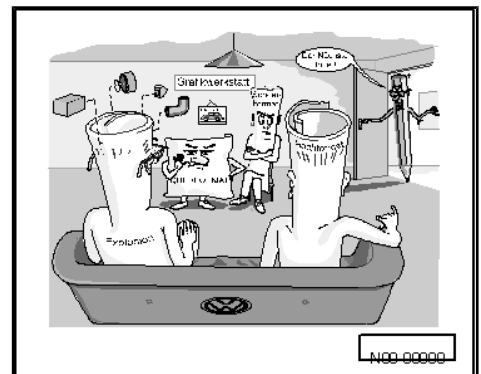
- Screw locking pin - T10340- -A- into cylinder block as far as stop and tighten to 30 Nm.
- Bolt head of locking pin - T10340- -A- must make contact with cylinder block.



Note

If the locking pin - T10340- -A- cannot be screwed in as far as the stop, the crankshaft is not in the correct position.

- Remove locking pin - T10340- -A-.
- Turn crankshaft by 90° in direction of engine rotation.
- Screw locking pin - T10340- -A- into cylinder block as far as stop and tighten to 30 Nm.
- Rotate crankshaft in normal direction of rotation as far as stop. The locking pin - T10340- -A- is now in contact with the crank web.



N00-00000



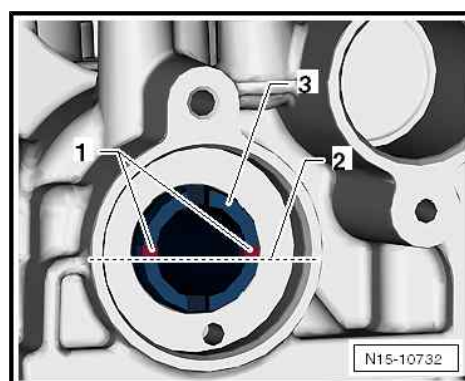
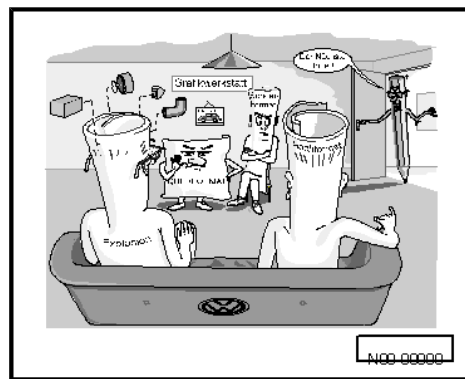
Note

The locking pin - T10340- -A- locks the crankshaft only in the direction of engine rotation.



Setting cylinder 1 piston to TDC position for repair work on toothed belt drive and for setting valve timing

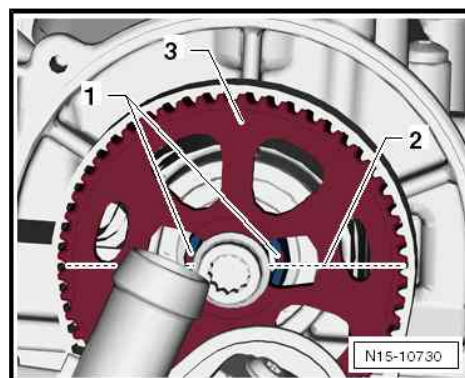
- Set cylinder 1 piston to TDC position ⇒ [page 83](#) .
- Remove air cleaner housing
⇒ ["2.2 Removing and installing air cleaner housing", page 265](#) .
- Unclip electrical wiring harness -3- and place to side.
- Remove bolts -1-.
- Place a cloth underneath to catch escaping oil.
- Remove plug -5-.
- Detach pipe -2-.
- Remove toothed belt cover -4-.



- The grooves -1- on the inlet camshaft -3- must be positioned above the centre -2- of the camshaft.
- The grooves -1- on the exhaust camshaft must be positioned above the centre -2- of the camshaft.
- In the area of the grooves, the cut-outs in the gear wheel -arrow- must be positioned slightly more towards the top.

Tightening torques

- ◆ ⇒ ["1.2 Exploded view - camshaft housing", page 87](#)
- ◆ ⇒ ["2.1 Exploded view - coolant pump/thermostat", page 200](#)
- ◆ ⇒ ["2.1 Exploded view - air cleaner housing", page 263](#)



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1. Cylinder head 85



⇒ [“1.4 Removing and installing camshaft housing”, page 92](#)

6 - Bolt

- ❑ Tightening torque and sequence

⇒ [Fig. “Camshaft housing - tightening torque and sequence”, page 88](#)

7 - Dowel pins

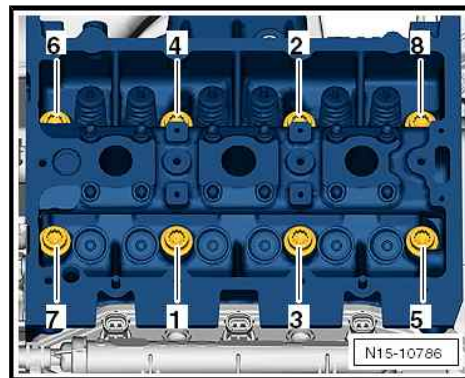
8 - Dowel sleeve

- ❑ 2x

Cylinder head - tightening torque and sequence

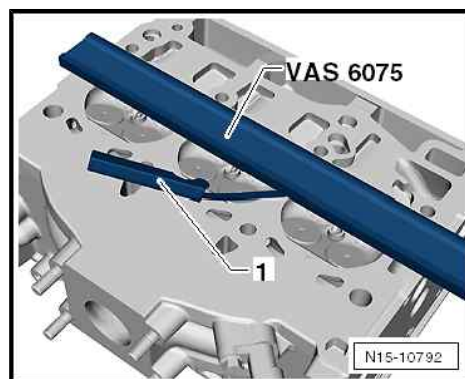
- After removing, renew bolts tightened with specified tightening angle.
- Tighten bolts in stages in the sequence shown:

Stage	Bolts	Tightening torque/ angle specification
1.	-1 ... 8-	40 Nm
2.	-1 ... 8-	Turn 90° further
3.	-1 ... 8-	Turn 90° further
4.	-1 ... 8-	Turn 90° further

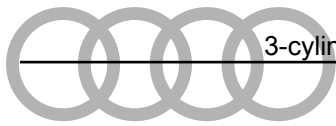


Checking cylinder head for distortion

- Use straight edge 500 mm - VAS 6075- and feeler gauge -1- to measure cylinder head for distortion at several points.
- Max. permissible distortion: 0.05 mm.



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1.2 Exploded view - camshaft housing

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1 - Gasket

- ☐ Renew after removing

2 - Oil seal

- ☐ For inlet camshaft
- ☐ Renewing
⇒ [“3.3.1 Removing and installing inlet camshaft oil seal”, page 147](#)

3 - Oil seal

- ☐ For exhaust camshaft (pulley end)
- ☐ Renewing
⇒ [“3.3.2 Removing and installing exhaust camshaft oil seal \(pulley end\)”, page 149](#)

4 - Camshaft housing

- ☐ Removing and installing
⇒ [“1.4 Removing and installing camshaft housing”, page 92](#)

5 - Bolt

- ☐ Tightening torque and sequence
⇒ [Fig. “Camshaft housing - tightening torque and sequence”](#),
[page 88](#)

6 - O-ring

- ☐ Check O-ring for damage
- ☐ If O-ring is not available individually, renew together with camshaft control valve 1 - N205- if damaged ⇒ [Electronic parts catalogue](#)

7 - Camshaft control valve

- ☐ Inlet side: camshaft control valve 1 - N205-
- ☐ Exhaust side: exhaust camshaft control valve 1 - N318-
- ☐ Removing and installing
⇒ [“3.5 Removing and installing camshaft control valve N205 / N318 ”, page 161](#)

8 - Bolt

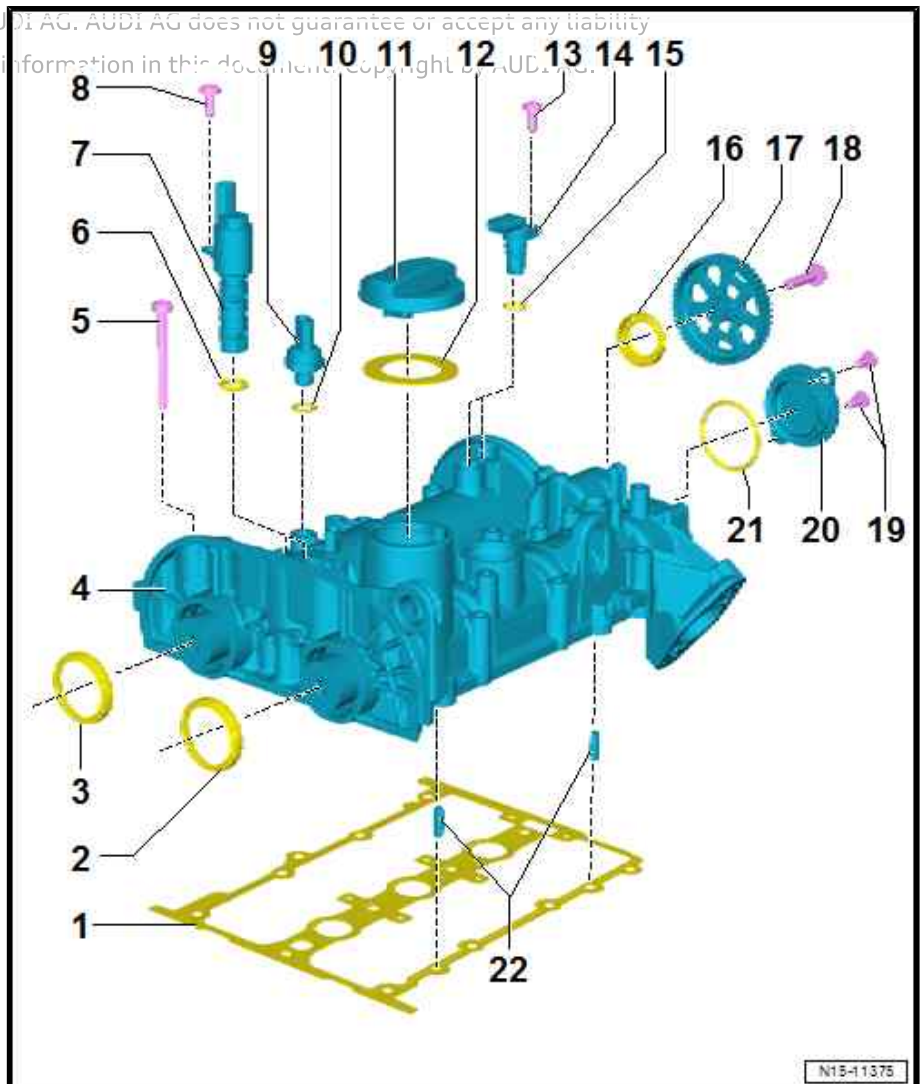
- ☐ 8 Nm

9 - Exhaust gas pressure sensor 1 - G450-

- ☐ Only fitted on vehicles with particulate filter
- ☐ Removing and installing
⇒ [“5.4 Removing and installing exhaust gas pressure sensor 1 G450 ”, page 287](#)
- ☐ Renew after removal
- ☐ 25 Nm

10 - Seal

- ☐ Only fitted on vehicles with particulate filter
- ☐ Only available with exhaust gas pressure sensor 1 - G450-





11 - Sealing cap

12 - Seal

- ☐ For sealing cap

13 - Bolt

- ☐ Tightening torque ⇒ ["1.1 Exploded view - ignition system", page 326](#)

14 - Hall sender

- ☐ Inlet side: Hall sender - G40-
- ☐ Exhaust side: Hall sender 2 - G163-
- ☐ Exploded view ⇒ ["1.1 Exploded view - ignition system", page 326](#)

15 - O-ring

- ☐ Renew after removing

16 - Oil seal

- ☐ For exhaust camshaft (gearbox end)
- ☐ Renewing ⇒ ["3.3.3 Removing and installing exhaust camshaft oil seal \(gearbox end\)", page 150](#)

17 - Toothed belt sprocket

- ☐ For coolant pump
- ☐ Removing and installing
⇒ ["2.7 Removing and installing toothed belt sprocket for coolant pump", page 213](#)

18 - Bolt

- ☐ Tightening torque ⇒ [Item 8 \(page 201\)](#)

19 - Bolt

- ☐ 8 Nm

20 - Sealing cap

21 - O-ring

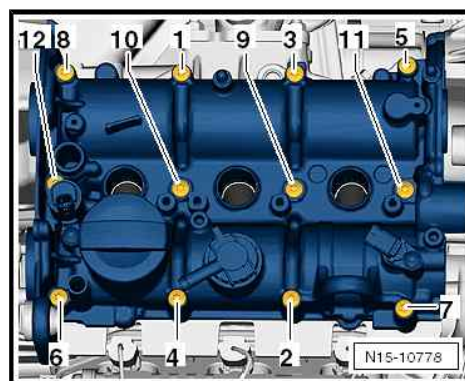
- ☐ Renew after removing

22 - Dowel pins

Camshaft housing - tightening torque and sequence

- After removing, renew bolts tightened with specified tightening angle.
- Tighten bolts in stages in the sequence shown:

Stage	Bolts	Tightening torque/angle specification
1.	-1 ... 12-	10 Nm
2.	-1 ... 12-	Turn 180° further



1.3 Removing and installing cylinder head

Special tools and workshop equipment required

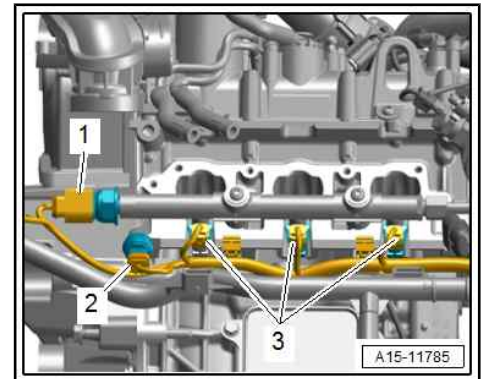
- ◆ Scraper; blade width at least 40 mm (commercially available)

Removing

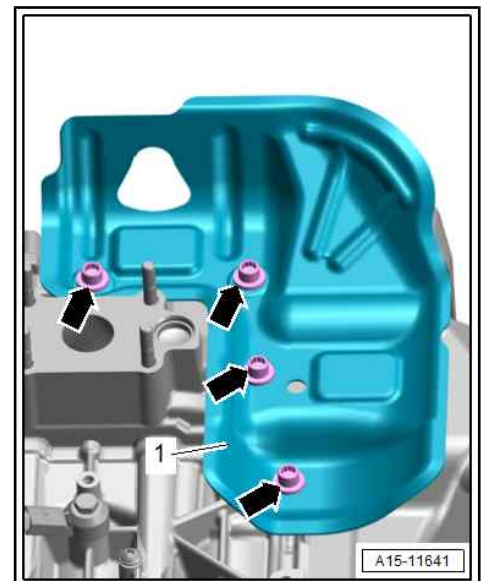
- All open inlet and exhaust ports must be sealed with suitable plugs from engine bung set - VAS 6122- .
- Cover openings on gearbox with a cloth so that no coolant or other liquids can get into the clutch housing.



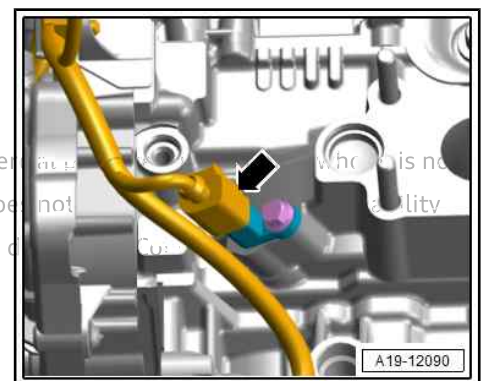
- Secure cable ties in the same locations when installing.
- Reinstall heat insulation sleeves in the same locations when installing.
- Remove camshaft housing
⇒ [“1.4 Removing and installing camshaft housing”, page 92](#) .
- Remove intake manifold
⇒ [“3.2 Removing and installing intake manifold”, page 269](#) .
- Remove turbocharger
⇒ [“1.2 Removing and installing turbocharger”, page 238](#) .
- Unplug electrical connectors:
 - 1 - For fuel pressure sender - G247-
 - 2 - For oil pressure sender - G10-
 - 3 - For injectors -N30- to -N32-



- Remove bolts -arrows- and detach heat shield -1-.



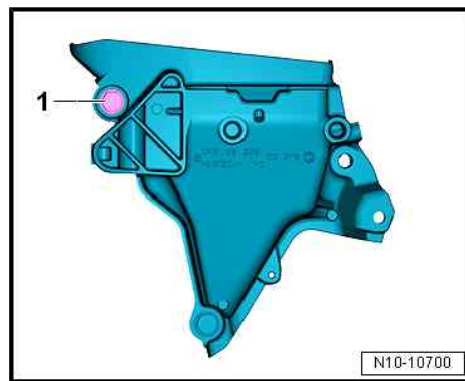
- Detach heat insulation sleeve.
- Unplug electrical connector -arrow- for coolant temperature sender - G62- .



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- Remove bolt -1- on engine support.



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- Loosen and remove cylinder head bolts in sequence -1 ... 8-.
- Take off cylinder head and set it down on a soft surface (foam plastic).

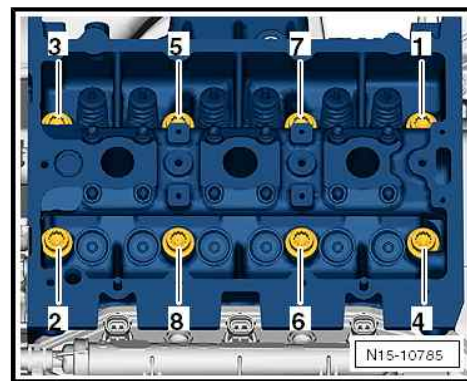
Installing

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

CAUTION

Risk of eye injury due to sealant residue.

- Put on safety goggles.

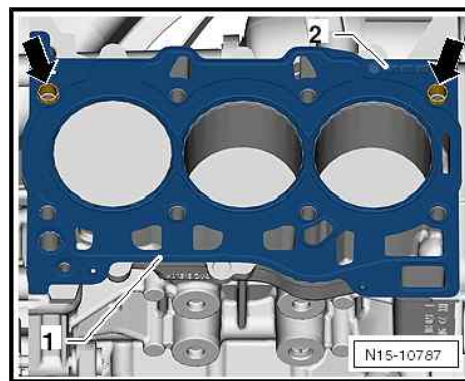


Note

- ◆ Risk of damage to sealing surfaces if handled incorrectly.
- ◆ Carefully remove sealant residue from cylinder head and cylinder block.
- ◆ Do NOT use abrasive materials (sandpaper, sanding discs, sanding pads, abrasive web, wire wool, etc.).
- ◆ When removing sealant residue, make sure none of the residue enters the open channels of the engine.
- ◆ Ensure that nearby workspaces are kept clean and that the abrasive materials listed above are not being used there.
- ◆ Use of impermissible abrasive materials can lead to subsequent damage to the turbocharger, conrod bearings, etc.
- Sealant residue may only be removed from the cylinder head and cylinder block using a commercially available scraper (blade width at least 4 cm).
- Remove loose residue with a lint-free cloth.
- Sealing surfaces must NOT be damaged.
- No oil or coolant must be allowed to remain in the blind holes for the cylinder head bolts in the cylinder block.
- Renew bolts tightened with specified tightening angle.
- Renew self-locking nuts and bolts as well as seals, gaskets and O-rings.
- When installing an exchange cylinder head, oil the contact surfaces between the roller rocker fingers and the running surfaces of the cams.
- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .
- After fitting a new cylinder head or cylinder head gasket, change the engine oil and the coolant in the entire cooling system.
- Do not remove new cylinder head gasket from packaging until it is ready to be fitted.
- Handle the cylinder head gasket very carefully to prevent damage to the silicone coating or the indented area of the gasket.
- Carefully remove sealant residue from cylinder head and cylinder block.
- Clean blind holes for cylinder head bolts in cylinder block so that they are free of oil and coolant residue.



- Fit cylinder head gasket -1-.
- ◆ Note position of dowel sleeves in cylinder block -arrows-.
- ◆ Note installation position of cylinder head gasket. Part number -2- should be legible from inlet side.
- If crankshaft has been rotated: Set piston of cylinder 1 to top dead centre and then turn crankshaft back slightly.
- Fit cylinder head.
- Insert and hand-tighten cylinder head bolts.
- Tighten cylinder head bolts
⇒ [Fig. "Cylinder head - tightening torque and sequence"](#), [page 86](#) .



Note:

Cylinder head bolts do not have to be torqued down again later after repair work.

Remaining installation steps are carried out in reverse sequence; note the following:

- Install turbocharger
⇒ ["1.2 Removing and installing turbocharger"](#), [page 238](#) .
- Install camshaft housing
⇒ ["1.4 Removing and installing camshaft housing"](#), [page 92](#) .
- Electrical connections and routing ⇒ Electrical system; Rep. gr. 97 ; Relay carriers, fuse carriers, electronics boxes; Overview of fitting locations - relay carriers, fuse carriers, electronics boxes and ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Change engine oil ⇒ Maintenance ; Booklet 819 .
- Fill cooling system with fresh coolant
⇒ ["1.3 Draining and filling cooling system"](#), [page 192](#) .

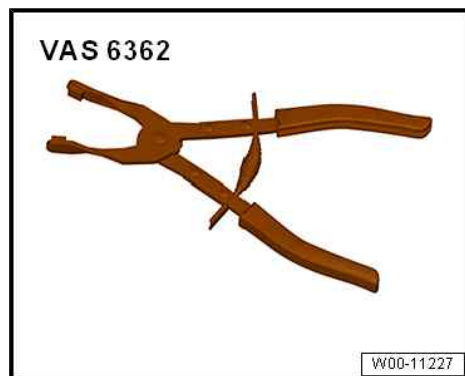
Tightening torques

- ◆ ⇒ ["1.1 Exploded view - cylinder head"](#), [page 85](#)
- ◆ ⇒ [Fig. "Engine support - tightening torque and sequence"](#), [page 39](#)
- ◆ ⇒ ["1.1 Exploded view - turbocharger"](#), [page 235](#)
- ◆ ⇒ ["3.1 Exploded view - intake manifold"](#), [page 268](#)

1.4 Removing and installing camshaft housing

Special tools and workshop equipment required

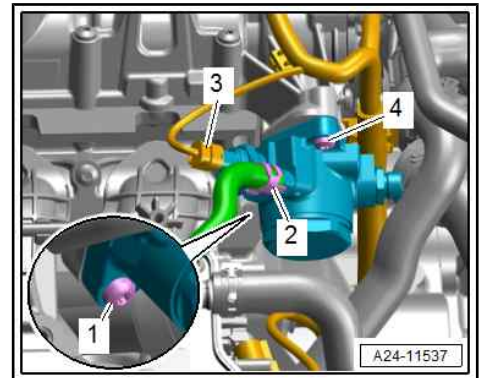
- ◆ Hose clip pliers - VAS 6362-



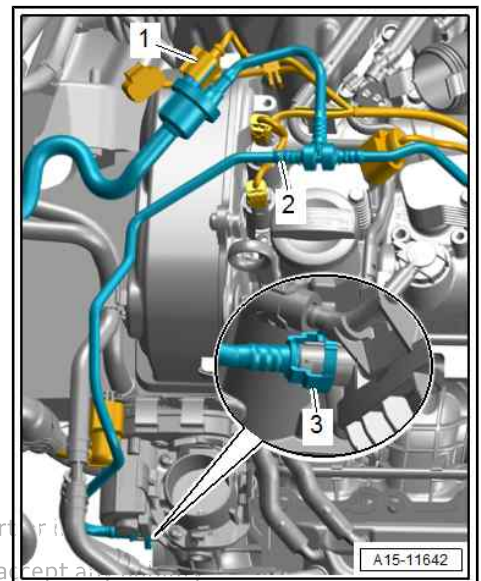


Removing

- Remove coolant pump
⇒ [“2.5 Removing and installing coolant pump”, page 207](#) .
- Remove ignition coils
⇒ [“1.2 Removing and installing ignition coils with output stages”, page 327](#) .
- Detach toothed belt from camshafts
⇒ [“2.7 Detaching toothed belt from camshaft”, page 133](#) .
- Remove high-pressure pipe
⇒ [“6.3 Removing and installing high-pressure pipe”, page 291](#) .
- Unplug electrical connector -3-.
- Release hose clip -2- and disconnect hose.

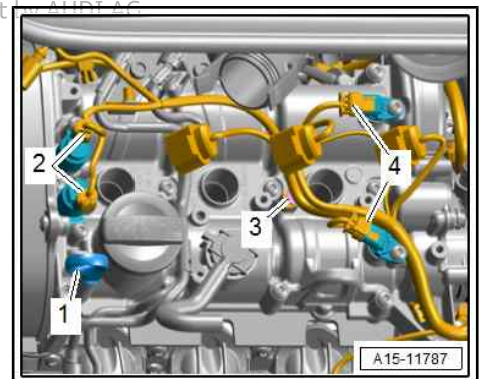


- Unplug electrical connector -1- at activated charcoal filter solenoid valve 1 - N80- .
- Press release tabs -3- on both sides and disconnect line -2- for activated charcoal filter system.
- Push line for activated charcoal filter slightly to right.



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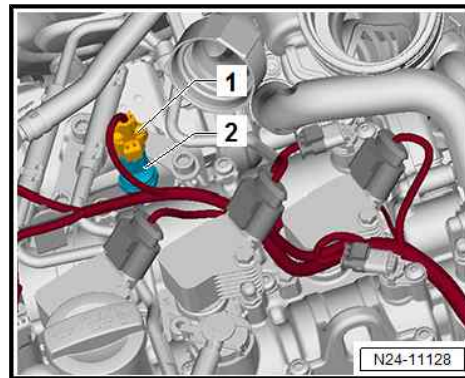
- Unplug electrical connectors:
 - 2 - For camshaft control valve 1 - N205- / exhaust camshaft control valve 1 - N318-
 - 4 - For Hall sender - G40- / Hall sender 2 - G163-
- Remove bolt -3-, move wiring harness clear and place to left side.
- Pull out oil dipstick -1-.





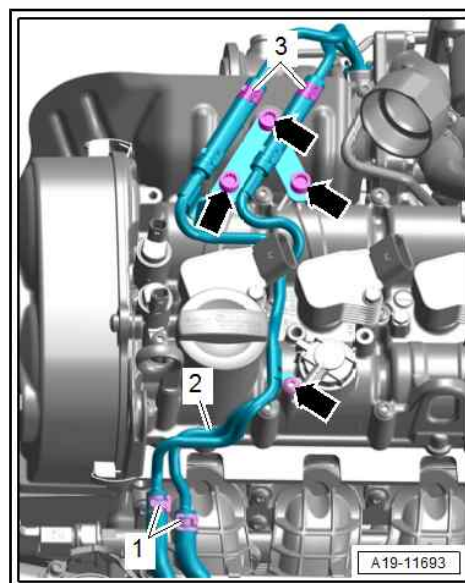
Vehicles with particulate filter:

- Unplug electrical connector -1- on exhaust gas pressure sensor 1 - G450- -2-.

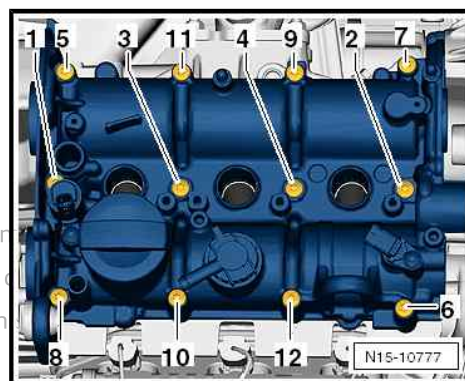


All vehicles (continued):

- Remove bolts -arrows-.
- Release hose clips -3- and disconnect coolant hoses.
- Move coolant lines -2- towards front.



- Loosen and remove bolts for camshaft housing in the sequence -1 ... 12-.
- Lift camshaft housing straight upwards off cylinder head.
- Detach gasket.
- If not already marked, mark original positions of roller rocker fingers and compensation elements for reinstallation.
- Remove roller rocker fingers together with compensation elements and put down on a clean surface.

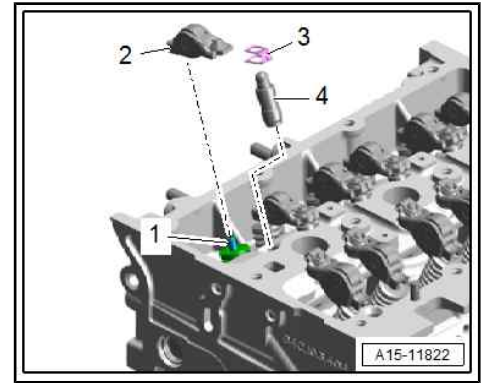


Installing

- After removing, renew bolts tightened with specified tightening angle.
- Renew gasket and O-ring after removal.



- Make sure that all roller rocker fingers -2- make contact with the valve ends -1- correctly and are clipped into their respective support elements -4- with retaining clip -3-.
- Clean sealing surfaces; they must be free of oil and grease.

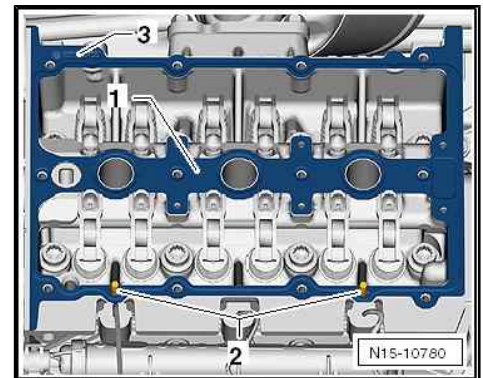


- Fit new gasket -1- onto dowel pins -2-.
- The part number -3- of the gasket is legible from above.
- Check “TDC” position of camshafts and crankshaft
⇒ [“4.7 Setting pistons to TDC position”, page 82](#) .

NOTICE

Risk of damage to valve gear if handled incorrectly. Roller rocker fingers can slip off the ends of the valve stems and compensation elements.

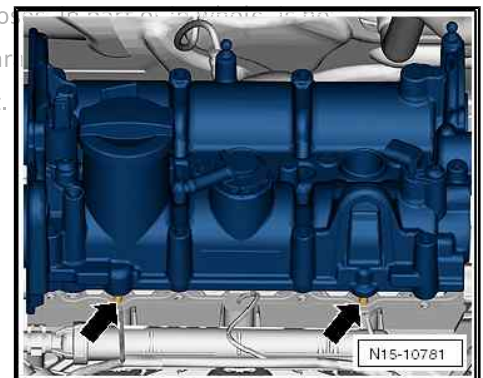
- Carefully fit camshaft housing onto cylinder head from top slowly and vertically.



- Fit camshaft housing onto dowel pins -arrows-.
- Note different bolt lengths.
- Tighten camshaft housing bolts
⇒ [“Camshaft housing - tightening torque and sequence”](#),
[page 88](#) .

Remaining installation steps are carried out in reverse sequence; note the following:

- Install high-pressure pipe
⇒ [“6.3 Removing and installing high-pressure pipe”, page 291](#) .
- Fit toothed belt onto camshaft sprockets ⇒ [page 141](#) .
- Install ignition coils
⇒ [“1.2 Removing and installing ignition coils with output stages”, page 327](#) .
- Install coolant pump
⇒ [“2.5 Removing and installing coolant pump”, page 207](#) .
- Electrical connections and routing ⇒ Electrical system; Rep. gr. 97 ; Relay carriers, fuse carriers, electronics boxes; Overview of fitting locations - relay carriers, fuse carriers, electronics boxes and ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.



Tightening torques

- ◆ ⇒ [“3.1 Exploded view - valve gear”, page 145](#)
- ◆ ⇒ [“3.1 Exploded view - coolant pipes”, page 218](#)
- ◆ ⇒ [“1.1 Exploded view - turbocharger”, page 235](#)

1.5 Checking compression

Special tools and workshop equipment required



- ◆ Spark plug spanner - 3122 B-



- ◆ Compression tester - V.A.G 1763-



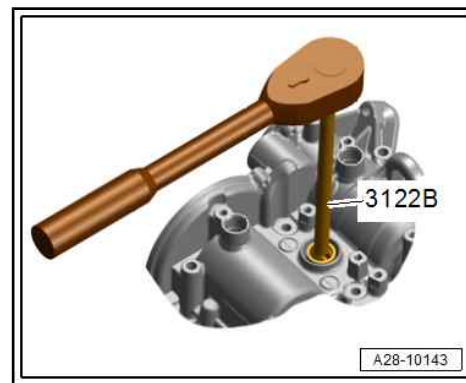
Procedure

- Engine oil temperature at least 30 °C
- Battery voltage at least 12.5 V
- Remove ignition coils
⇒ [“1.2 Removing and installing ignition coils with output stages”, page 327](#) .





- Remove spark plugs with spark plug spanner - 3122 B- .
- Unplug electrical connector for engine speed sender - G28-
⇒ [“1.5 Removing and installing engine speed sender G28”](#),
[page 332](#) .
- Check compression pressure with compression tester -
V.A.G 1763- (see ⇒ operating instructions for details of how
to use tester).
- Have a 2nd mechanic press down the accelerator pedal com-
pletely and at the same time operate the starter until the
pressure on the tester display no longer increases.
- Repeat procedure on each cylinder.



Compression pressure	bar
When new	10.0 ... 15.0
Wear limit	7.0
Maximum difference between cylinders	3.0

Assembling

Assembly is performed in reverse sequence; note the following:

- Install spark plugs ⇒ Maintenance ; Booklet 819 .
- Install ignition coils
⇒ [“1.2 Removing and installing ignition coils with output
stages”](#), [page 327](#) .
- Erase any entries in event memory resulting from testing ⇒ Ve-
hicle diagnostic tester.



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2 Toothed belt drive

⇒ [“2.1 Exploded view - toothed belt cover”, page 98](#)

⇒ [“2.2 Exploded view - toothed belt”, page 99](#)

⇒ [“2.3 Removing and installing toothed belt”, page 101](#)

⇒ [“2.4 Pre-assembling and fitting test tool VAS 611 007”, page 115](#)

⇒ [“2.5 Checking valve timing”, page 122](#)

⇒ [“2.6 Adjusting valve timing”, page 124](#)

⇒ [“2.7 Detaching toothed belt from camshaft”, page 133](#)

2.1 Exploded view - toothed belt cover

1 - Toothed belt cover (bottom)

2 - Bolt

□ 8 Nm

3 - Bracket

4 - Bolt

□ 20 Nm

5 - Engine support

□ Removing and installing
⇒ [“1.4 Removing and installing engine support”, page 57](#)

6 - Bolt

□ Tightening torque and sequence
⇒ [Fig. “Engine support - tightening torque and sequence”, page 39](#)

7 - Toothed belt cover (top)

8 - Bolt

□ 8 Nm

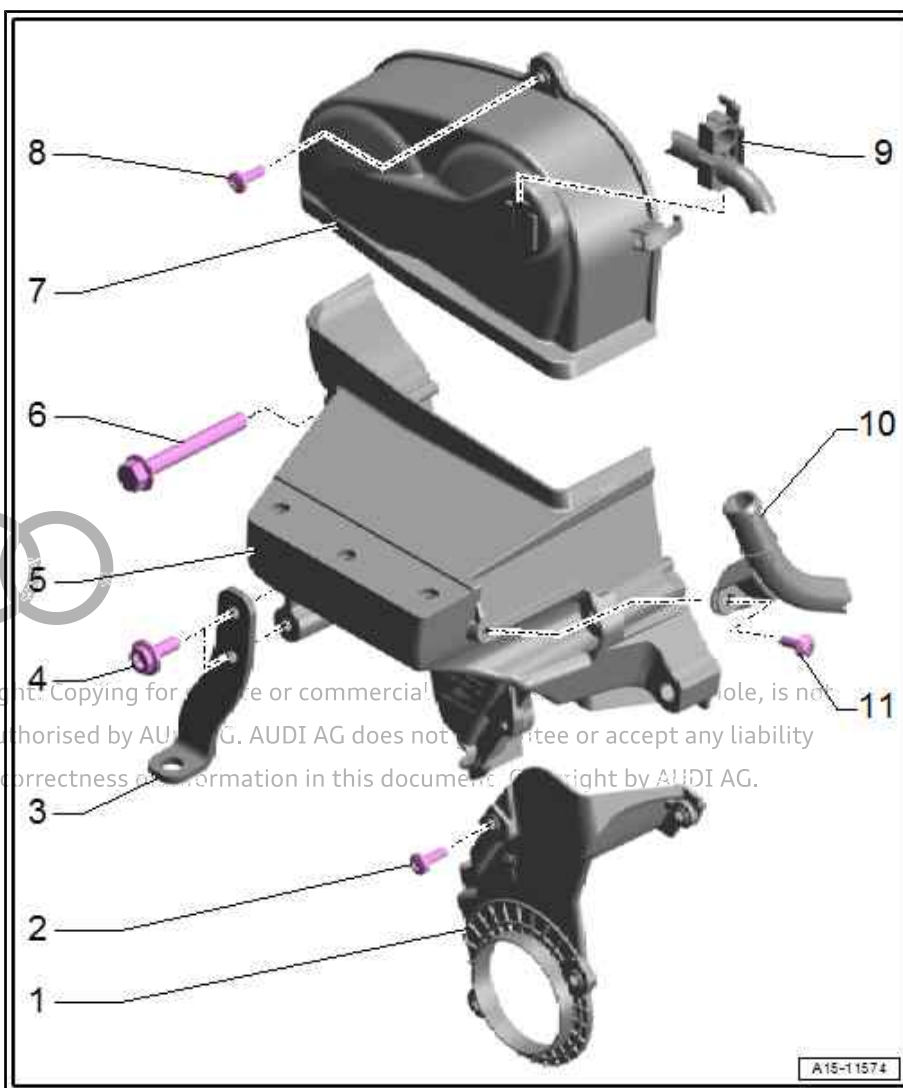
9 - Bracket

□ For fuel hose and coolant hose

10 - Coolant pipe

11 - Bolt

□ Tightening torque
⇒ [Item 3 \(page 218\)](#)





2.2 Exploded view - toothed belt

1 - Toothed belt

- ☐ Before removing, mark direction of rotation with chalk or felt-tip pen
- ☐ Check for wear
- ☐ Make sure it is not kinked / make sure minimum radius of toothed belt is observed
⇒ [Fig. "Bending radius of toothed belt", page 101](#)
- ☐ ⇒ ["2.7 Detaching toothed belt from camshaft", page 133](#)
- ☐ Removing and installing
⇒ ["2.3 Removing and installing toothed belt", page 101](#)
- ☐ Adjusting valve timing
⇒ ["2.6 Adjusting valve timing", page 124](#)

2 - Bolt

- ☐ 25 Nm
- ☐ When setting the tightening torque on the torque wrench - VAS 6583- , the reading on the insert tool - T10500- must be entered in the torque wrench.

3 - Tensioning roller

- ☐ Removal and installation involve taking out engine support
⇒ ["1.4 Removing and installing engine support", page 57](#)

4 - Bolt

- ☐ Renew after removing
- ☐ 8 Nm +45°

5 - Sealing cap

6 - O-ring

- ☐ Renew after removing

7 - Bolt

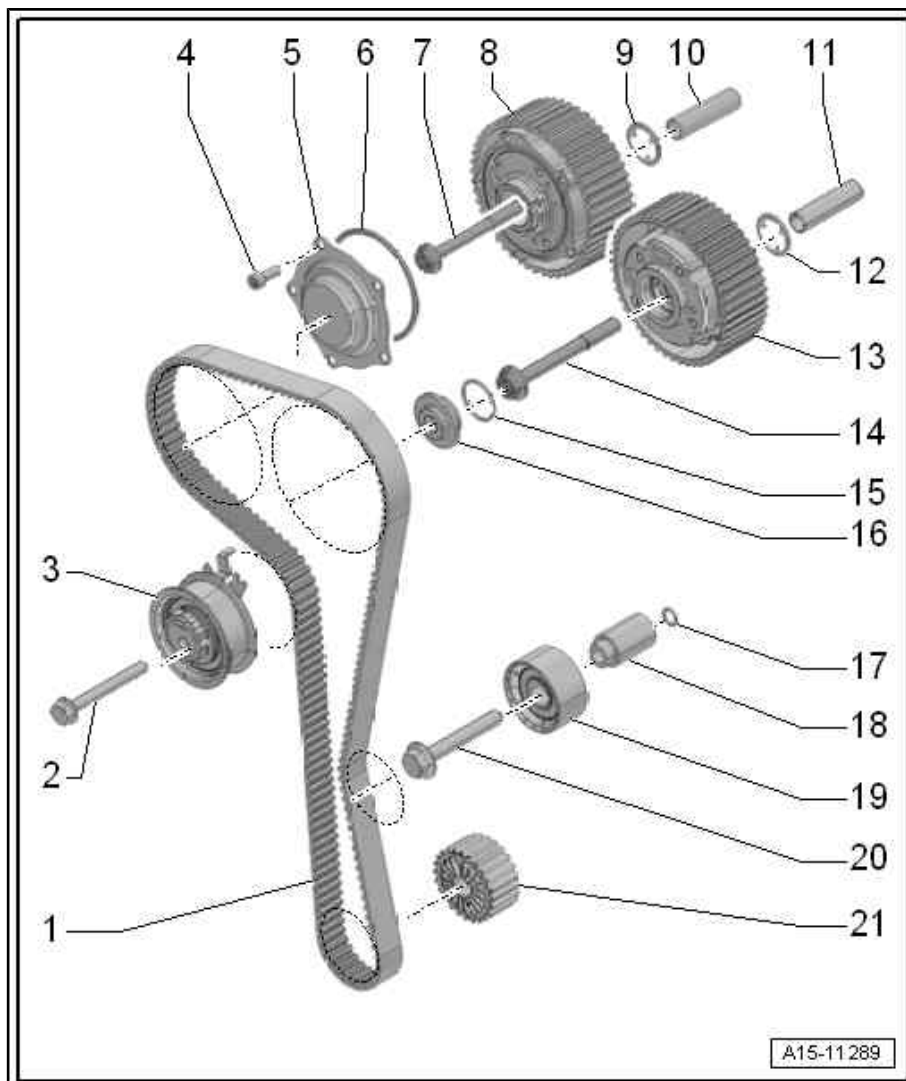
- ☐ Renew after removing
- ☐ 50 Nm +135°

8 - Camshaft sprocket, exhaust side

- ☐ With camshaft adjuster
- ☐ Removing and installing ⇒ ["2.7 Detaching toothed belt from camshaft", page 133](#)

9 - Diamond-coated washer

- ☐ Not fitted on all versions; for allocation refer to ⇒ Electronic parts catalogue
- ☐ Renew after removing





10 - Guide sleeve

11 - Guide sleeve

12 - Diamond-coated washer

- ☐ Not fitted on all versions; for allocation refer to ⇒ Electronic parts catalogue
- ☐ Renew after removing

13 - Camshaft sprocket, inlet side

- ☐ With camshaft adjuster
- ☐ Removing and installing ⇒ [“2.7 Detaching toothed belt from camshaft”, page 133](#)

14 - Bolt

- ☐ Renew after removing
- ☐ 50 Nm +135°

15 - O-ring

- ☐ Renew after removing

16 - Plug

- ☐ 20 Nm

17 - O-ring

- ☐ Retaining element, supplied with “item 19”

18 - Spacer sleeve

- ☐ Supplied with “item 19”

19 - Idler roller

20 - Bolt

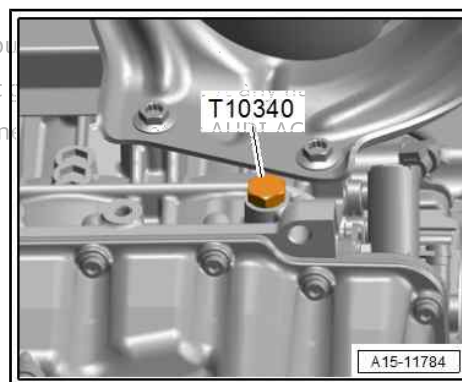
- ☐ 45 Nm

21 - Crankshaft sprocket

- ☐ Contact surface between sprocket and crankshaft must be free of oil
- ☐ Can only be installed in one position

Plug for “TDC” drilling in cylinder block - tightening torque

- Renew O-ring if damaged.
- Tighten bolt -arrow- to 30 Nm.



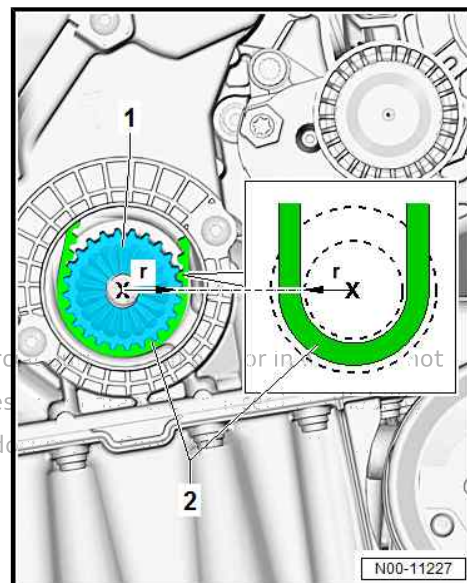


Bending radius of toothed belt

- The bending radius - r - of the toothed belt -2- must be at least 25 mm (approx. half the diameter of the crankshaft sprocket -1-).



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2.3 Removing and installing toothed belt

Special tools and workshop equipment required

- ◆ Torque wrench - VAS 6583-



- ◆ Counterhold tool - T10172 A- with adapters -T10172/1-





- ◆ Release tool - T10527- and -T10527/1-



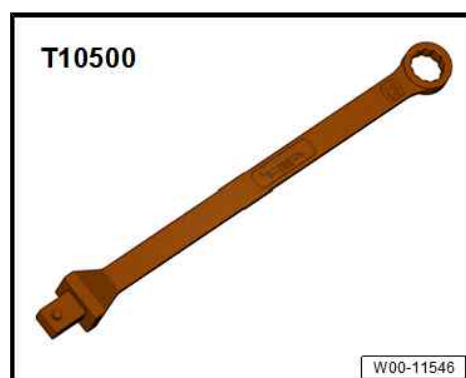
- ◆ Counterhold tool - T10475-



- ◆ Special wrench, 30 mm - T10499 A-



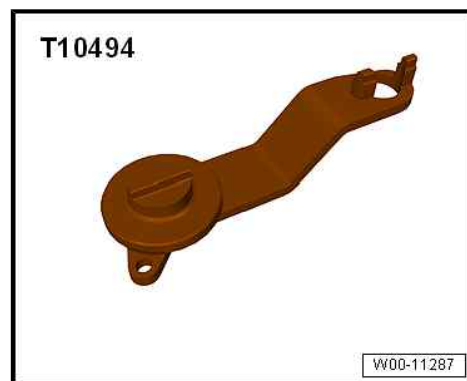
- ◆ Open end spanner insert, AF 13 - T10500-



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◆ Camshaft clamp - T10494-



◆ Socket Torx T30 - T10405-

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◆ Assembly tool - T10487-



◆ Assembly tool - T10476A-



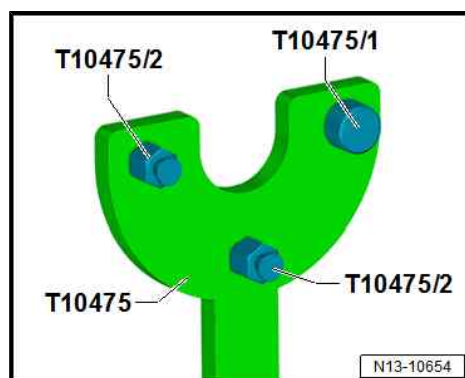


◆ Counterhold tool - T10554-



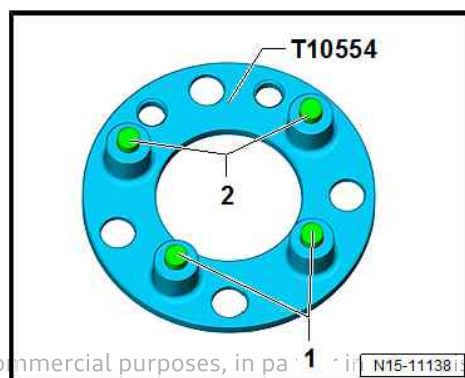
Preparing adapter - T10475- :

- Fit adapters -T10475- and -T10475/1- onto counterhold tool - T10475/2- , as shown in illustration.



Counterhold tool - T10554-

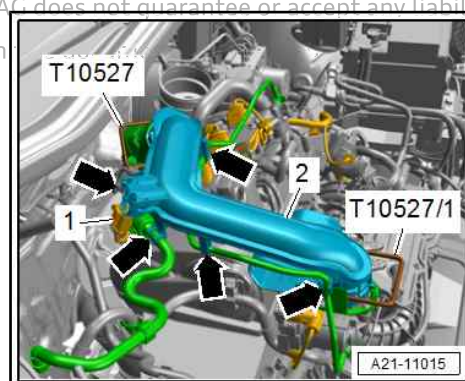
- The lugs -1- and -2- on counterhold tool - T10554- are different distances apart.
- Counterhold tool - T10554- can only be applied in one position.
- Position counterhold tool - T10554- flush against camshaft adjusters.



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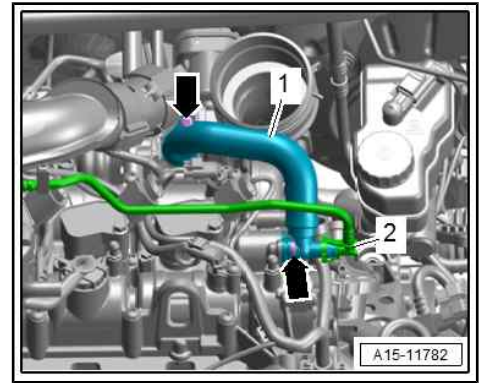
Removing

- Remove air cleaner housing
⇒ [“2.2 Removing and installing air cleaner housing”, page 265](#) .
- Unplug electrical connector -1- for charge pressure sender - G31- / intake air temperature sender 2 - G299- and move electrical wiring clear.
- Move hoses -arrows- clear at air pipe -2-.
- Release fasteners using release tool - T10527- and detach air pipe.

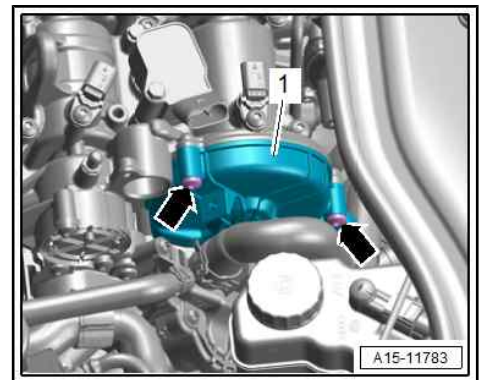




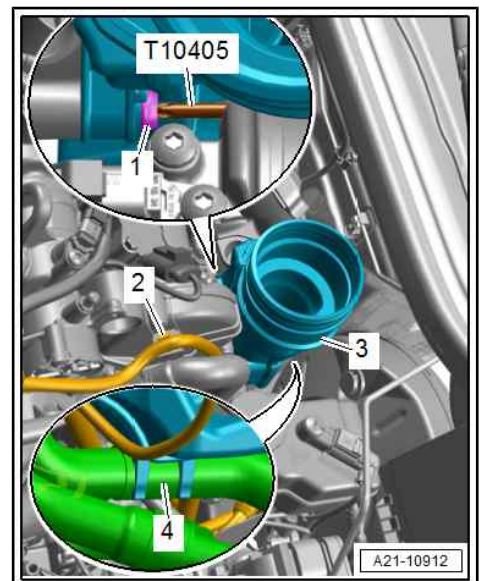
- Remove bolts -arrows- and move crankcase breather hose -1- to one side (with hose -2- going to activated charcoal filter attached).



- Unscrew bolts -arrows- and remove cover -1- for toothed belt for coolant pump.



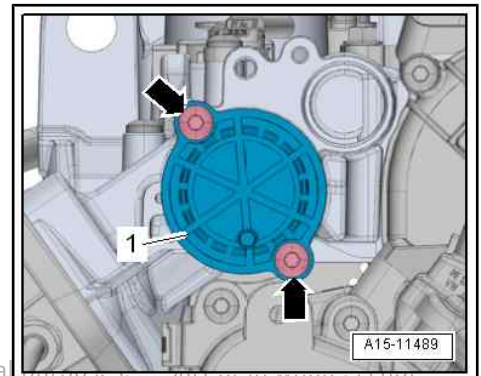
- Move electrical wiring harness -2- and coolant hose -4- clear and push to one side.
- Unscrew bolt -1- using socket Torx T30 - T10405- .
- Detach resonator -3- from turbocharger to left side and press it towards rear.



! NOTICE

Danger of chemical damage to seal for coolant pump if oil enters between coolant pump and cylinder head.

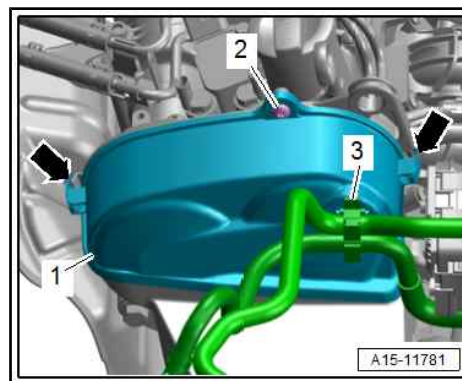
- Cover coolant pump with a cloth.
- Catch escaping engine oil with a cloth.
- Unscrew bolts -arrows- and detach sealing cap -1-.



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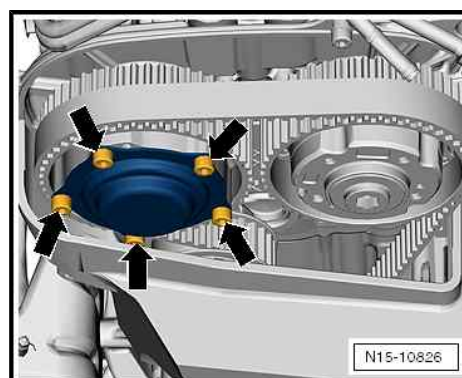
- Move hoses and bracket -3- clear.
- Remove bolt -2-.
- Release clips -arrows- and detach toothed belt cover (top) -1-.



NOTICE

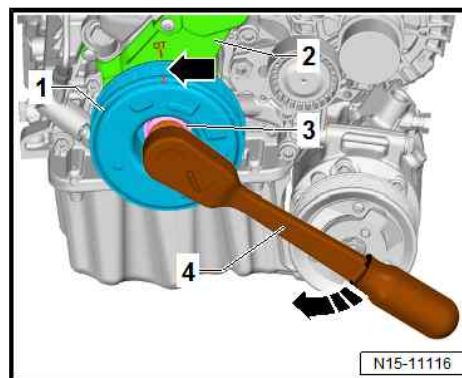
Risk of irreparable damage to engine due to oil on toothed belt.

- Catch escaping engine oil with a cloth.
- Clean any spaces/cavities that have filled with engine oil.
- Remove all accessible bolts -arrows-.
- Rotate crankshaft at vibration damper in normal direction of rotation so you can access the remaining bolts -arrows- and unscrew them.
- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Detach cover from camshaft sprocket of exhaust camshaft.



Rotate crankshaft to "TDC" as follows:

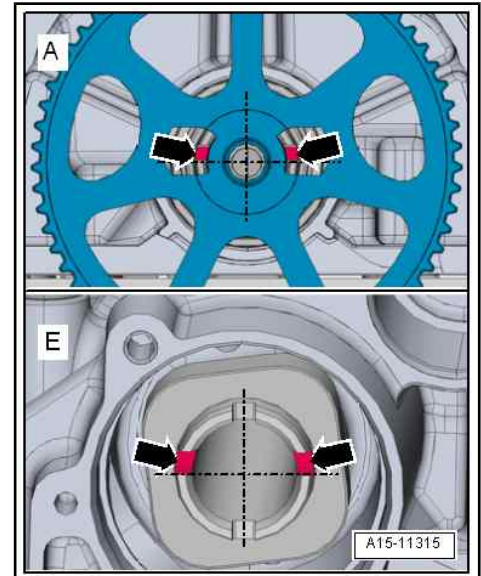
- Turn crankshaft in normal direction of engine rotation -arrow- by applying a ratchet -4- to centre bolt -3-.
- Crankshaft has reached "TDC" position when marking -arrow- on vibration damper -1- aligns with "TDC" marking on toothed belt cover (bottom) -2-.



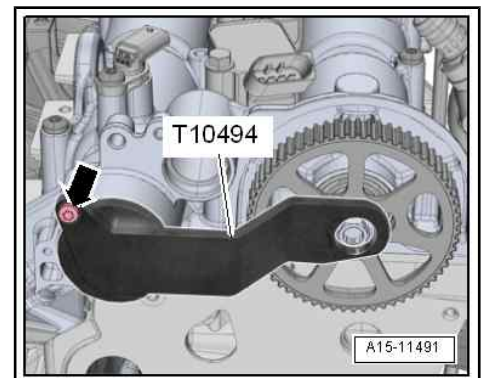
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- On both camshafts, asymmetrically positioned grooves -top and bottom arrows- on gearbox end must now face upwards, as shown in illustrations.
- On exhaust camshaft -A-, grooves -top arrows- are accessible via openings in coolant pump drive sprocket.
- On inlet camshaft -E-, grooves -bottom arrows- are directly accessible.
- The camshafts have two pairs of grooves: one positioned symmetrically and one positioned asymmetrically. In TDC position, the asymmetrically positioned pair of grooves must be above the imaginary horizontal centre line.
- If camshafts are not positioned as described, turn crankshaft one rotation further and return to TDC position.



- It should be possible to insert the camshaft clamp - T10494- easily.
- Do not knock camshaft clamp into place with any kind of tool.
- When camshafts are positioned as described, insert camshaft clamp - T10494- into camshafts as far as stop and hand-tighten bolt -arrow-.



Note:

If it is not possible to insert the camshaft clamp - T10494- easily, press down toothed belt -arrow- using assembly tool - T10487- and then insert camshaft clamp - T10494- into camshafts as far as stop and tighten bolt hand-tight.

NOTICE

Risk of damage to camshaft if handled incorrectly

- Never use camshaft clamp as a counterhold tool.

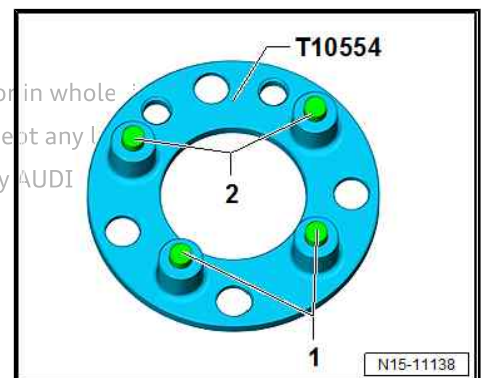
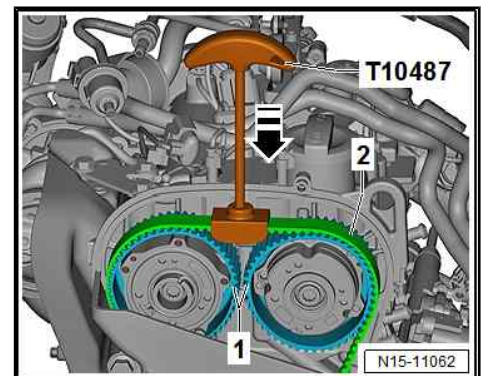


Exhaust camshaft:

- Guide in counterhold tool - T10554- between camshaft adjuster and engine support.

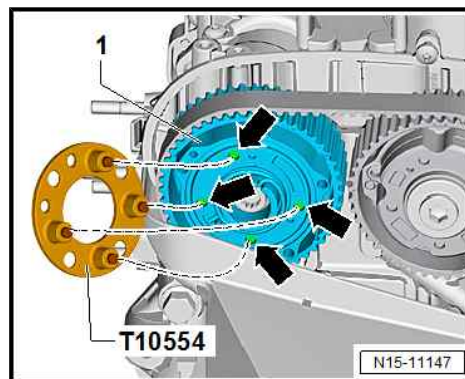
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- To do so, first guide area between lugs -2- on counterhold tool - T10554- past camshaft adjuster.





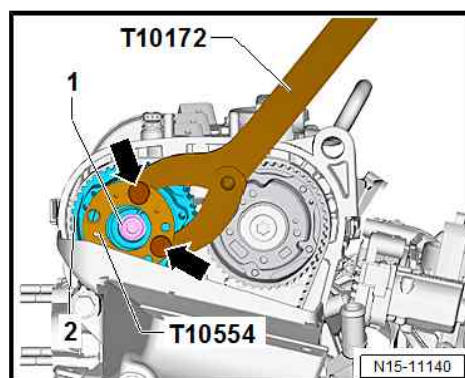
- Turn counterhold tool - T10554- so that it can be inserted in holes -arrows- as shown.
- Position counterhold tool - T10554- flush against camshaft adjuster -1-.



NOTICE

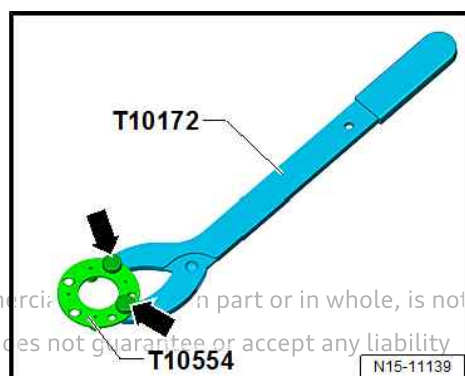
Risk of irreparable damage to engine due to oil on toothed belt.

- Catch escaping engine oil with a cloth.
- Clean any spaces/cavities that have filled with engine oil.
- Loosen bolt -1- one turn. Secure camshaft sprocket in place with counterhold tool - T10554- and counterhold tool - T10172- .



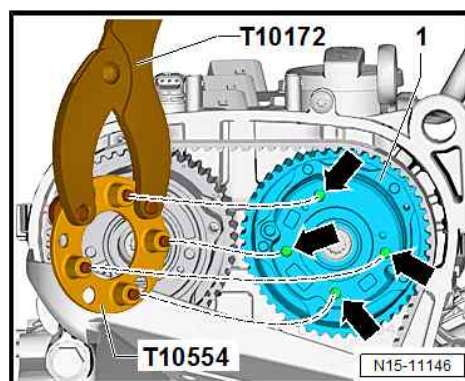
Inlet camshaft

- Assemble tools as shown.
- Attach counterhold tool - T10172- to counterhold tool - T10554- using knurled screws -arrows-.



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- Apply counterhold tool - T10554- with counterhold tool - T10172- to camshaft sprocket -1-, as shown.
- Pins must be inserted correctly into holes -arrows-.
- Position counterhold tool - T10554- flush against camshaft adjuster -1-.
- Secure camshaft with counterhold tool - T10554- and counterhold tool - T10172- so that it cannot turn.





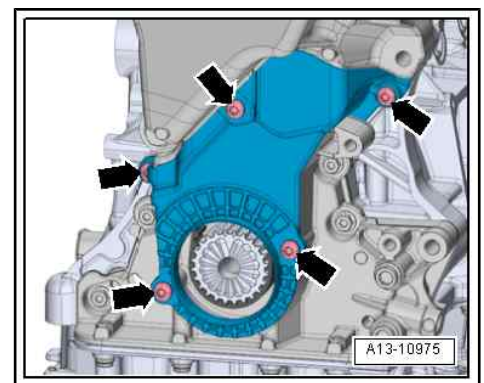
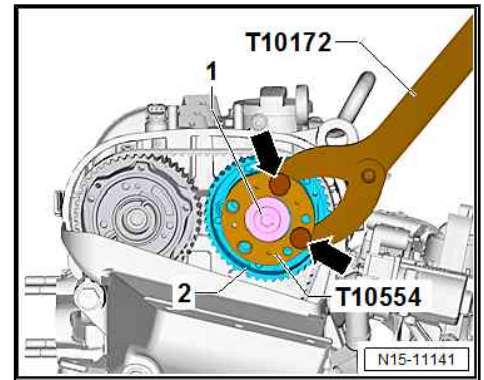
NOTICE

Risk of irreparable damage to engine due to oil on toothed belt.

- Catch escaping engine oil with a cloth.
- Clean any spaces/cavities that have filled with engine oil.
- Unscrew plug -1- on camshaft sprocket (inlet side) using counterhold tool - T10554- with counterhold tool - T10172- .
- Then loosen bolt for camshaft sprocket (inlet side) located behind plug one turn, holding camshaft sprocket in position with counterhold tool - T10554- and counterhold tool - T10172- .

Both sides (continued):

- Remove vibration damper
⇒ ["1.5 Removing and installing vibration damper", page 59](#) .
- Remove bolts -arrows- and detach toothed belt cover (bottom).

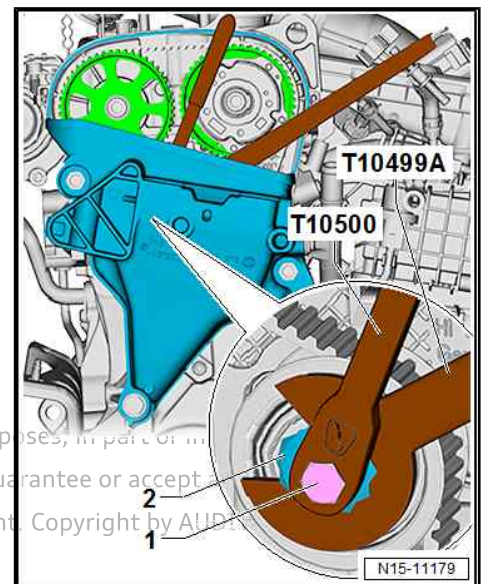


- Fit special wrench, 30 mm - T10499 A- onto eccentric adjuster -2- of tensioning roller.
- Loosen bolt -1- using insert tool, 13 mm - T10500- .
- Release tensioning roller on eccentric adjuster -2- using special wrench, 30 mm - T10499 A- .

NOTICE

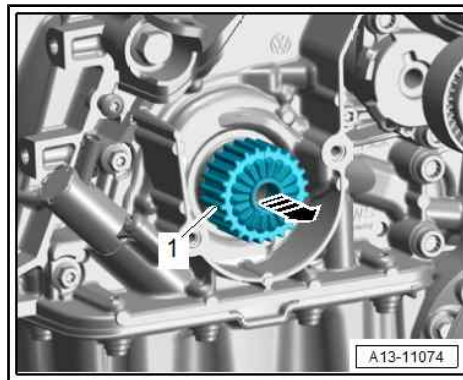
Risk of irreparable damage due to running a used belt in the opposite direction when it is refitted.

- Mark running direction before removing.
- Pay attention to running direction when reinstalling.
- Take off toothed belt.
- The bending radius of the toothed belt must be at least 25 mm (approx. half the diameter of the crankshaft sprocket)
⇒ [Fig. "Bending radius of toothed belt", page 101](#) .





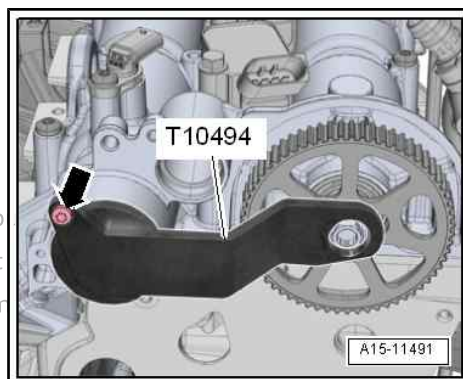
- Detach crankshaft sprocket -1- -arrow-.



Installing

- Renew bolts tightened with specified tightening angle.
- Renew O-rings.
- Check "TDC" position of camshaft and crankshaft:
- Camshaft clamp - T10494- must be fitted to camshaft housing.

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NOTICE

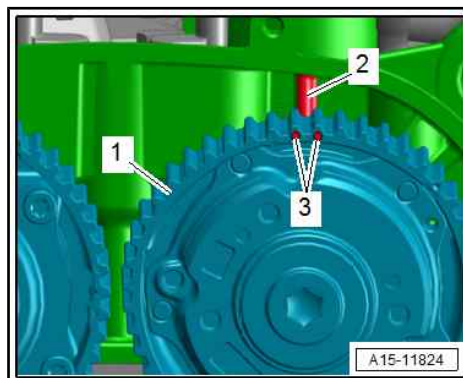
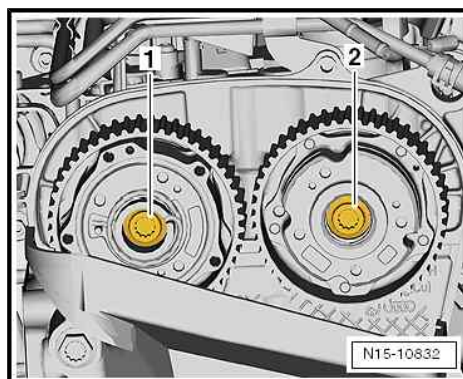
Risk of damage to camshaft if handled incorrectly

- Never use camshaft clamp as a counterhold tool.
- Fit new bolts -1, 2- for camshaft sprockets and screw them in loosely.
- It should just be possible to turn the adjusters on the camshafts without axial movement.

Note:

The camshaft sprockets are tri-oval in shape.

- If you have loosened one or both of the camshaft sprockets, they must be re-aligned with one another using the assembly tool - T10476A- .
- Align markings -3- on camshaft sprocket on inlet side -1- with rib -2- on camshaft housing.





- Align marking -3- on camshaft sprocket on exhaust side -1- with rib -2- on camshaft housing.

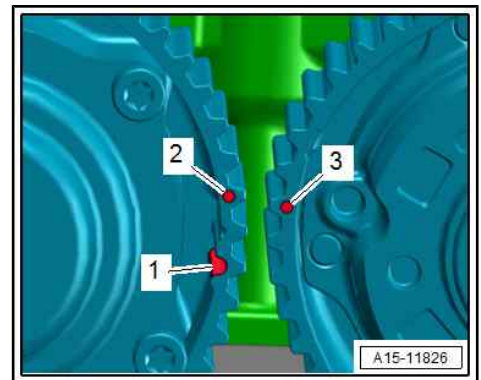
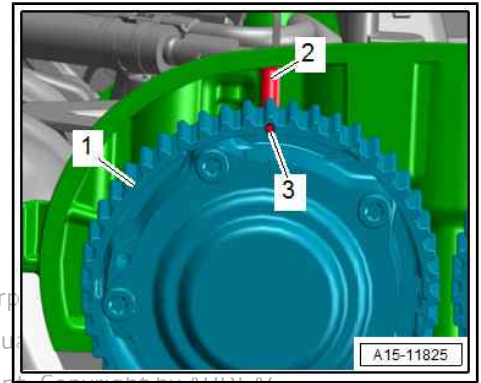


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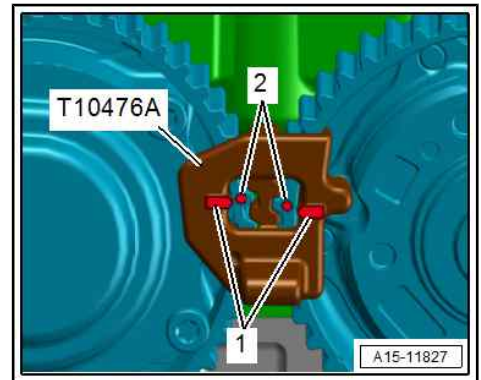
- The dot markings -2- and -3- on the camshaft sprockets are slightly offset.

Note:

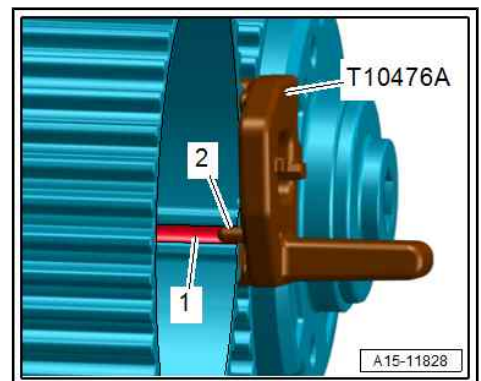
Groove -1- helps to ensure that assembly tool -T10476A- is applied correctly.



- Insert assembly tool - T10476A- between camshaft sprockets.
- Markings -1- on -T10476A- must be aligned with dot markings -2- on camshaft sprockets.

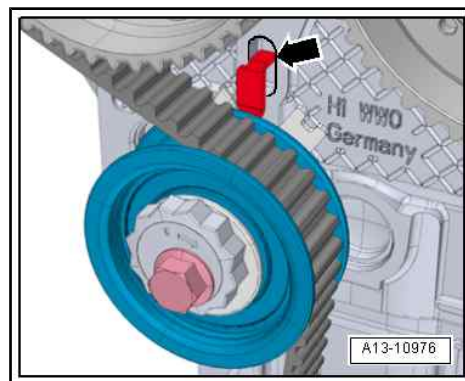


- It should be possible to insert assembly tool - T10476A- easily as far as stop.
- The projection -2- of -T10476A- must engage in groove -1- in camshaft sprocket on exhaust side.

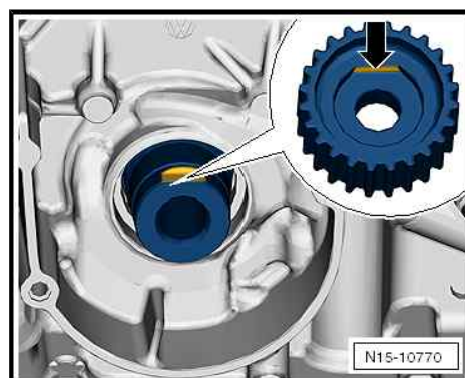




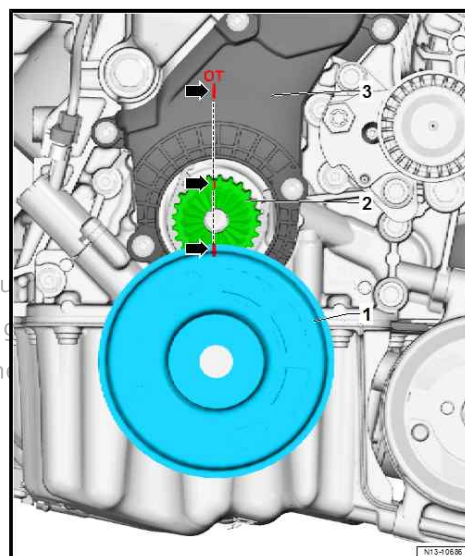
- Metal lug -arrow- of tensioning roller must engage in cast recess on cylinder head.



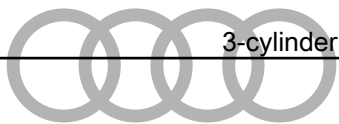
- Fit crankshaft sprocket onto crankshaft.



- Contact surface between vibration damper and crankshaft sprocket must be free of oil and grease.
- Machined surface -arrow- of crankshaft sprocket must be positioned over machined surface of crankshaft journal.
- Check position of crankshaft before fitting vibration damper -1-.
- Marking -arrow- on crankshaft sprocket -2- must align with »TDC« marking on bottom cover -arrow- for toothed belt -3-.



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- Fit toothed belt in the specified sequence.

1 - Crankshaft sprocket

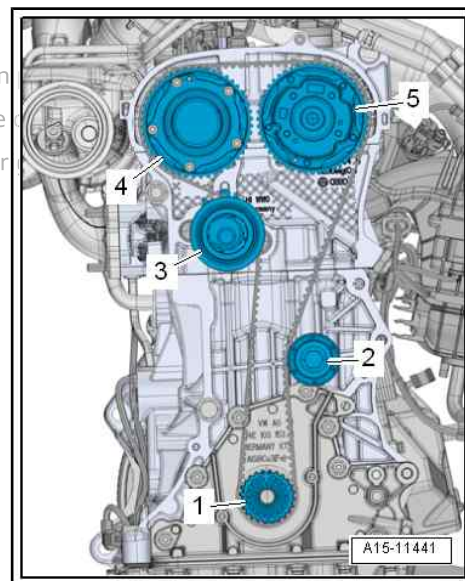
- Reach through engine support and pull toothed belt upwards

2 - Idler roller

3 - Tensioning roller

4 - Camshaft sprocket, exhaust side

5 - Camshaft sprocket, inlet side

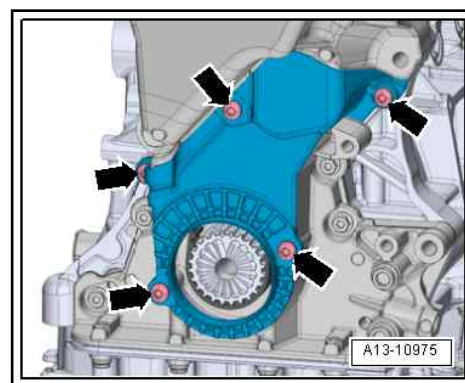


- Install toothed belt cover (bottom section) -arrows-.

- Install vibration damper

⇒ ["1.5 Removing and installing vibration damper", page 59](#) .

- The assembly tool - T10476A- must be removed before tensioning the toothed belt.





- Using special wrench, 30 mm - T10499 A- , turn eccentric adjuster -2- of tensioning roller in direction of -arrow- until adjustment indicator -3- is positioned approx. 10 mm to right of adjustment window.
- Turn eccentric adjuster back until adjustment indicator is positioned exactly in adjustment window.

NOTICE

Risk of damage to engine if tightening torque is incorrect.

- Torque wrench - VAS 6583- must be used to tighten the bolts.
- When setting the tightening torque on the torque wrench - VAS 6583- , the reading on the insert tool, 13 mm - T10500- must be entered in the torque wrench.
- Hold eccentric adjuster in this position and tighten bolt -1- using insert tool, 13 mm - T10500- with torque wrench - VAS 6583- .

Note:

Turning the engine further or running the engine may lead to slight differences in the position of the adjustment indicator -3- in relation to the adjustment window. This does not affect the toothed belt tension.

NOTICE

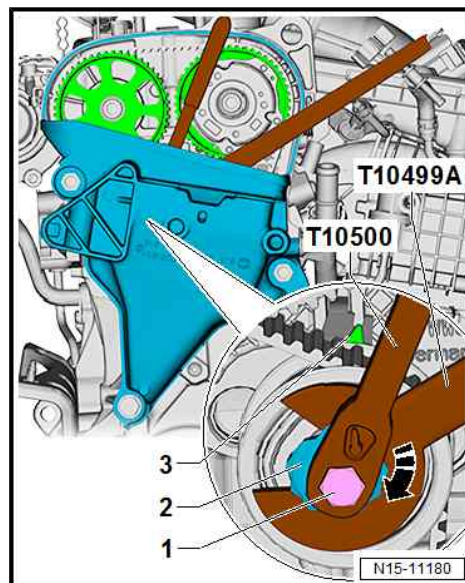
Risk of damage to camshaft if handled incorrectly

- Never use camshaft clamp as a counterhold tool.
- Detach camshaft clamp - T10494- .
- Adjust valve timing ⇒ [“2.6 Adjusting valve timing”, page 124](#) .

Further installation is carried out in the reverse order; note the following:

Tightening torques

- ◆ ⇒ [“2.2 Exploded view - toothed belt”, page 99](#)
- ◆ ⇒ [“2.1 Exploded view - toothed belt cover”, page 98](#)
- ◆ ⇒ [“1.2 Exploded view - camshaft housing”, page 87](#)
- ◆ ⇒ [“1.1 Exploded view - poly V-belt drive”, page 51](#)
- ◆ ⇒ [“2.1 Exploded view - coolant pump/thermostat”, page 200](#)
- ◆ ⇒ [“1.1 Exploded view - turbocharger”, page 235](#)
- ◆ ⇒ [“2.1 Exploded view - air cleaner housing”, page 263](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation





2.4 Pre-assembling and fitting test tool - VAS 611 007-

⇒ [“2.4.1 Pre-assembling test tool VAS 611 007”, page 115](#)

⇒ [“2.4.2 Fitting test tool VAS 611 007”, page 118](#)

⇒ [“2.4.3 Adapting test tool VAS 611 007 electronically and performing basic setting”, page 120](#)

2.4.1 Pre-assembling test tool - VAS 611 007-

Special tools and workshop equipment required

◆ Testing tools - VAS 611 007-



Procedure

Test tool - VAS 611 007-



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A - Angle sensor - VAS 611 007/1-

- ❑ Tightening torque for brake: 11 Nm

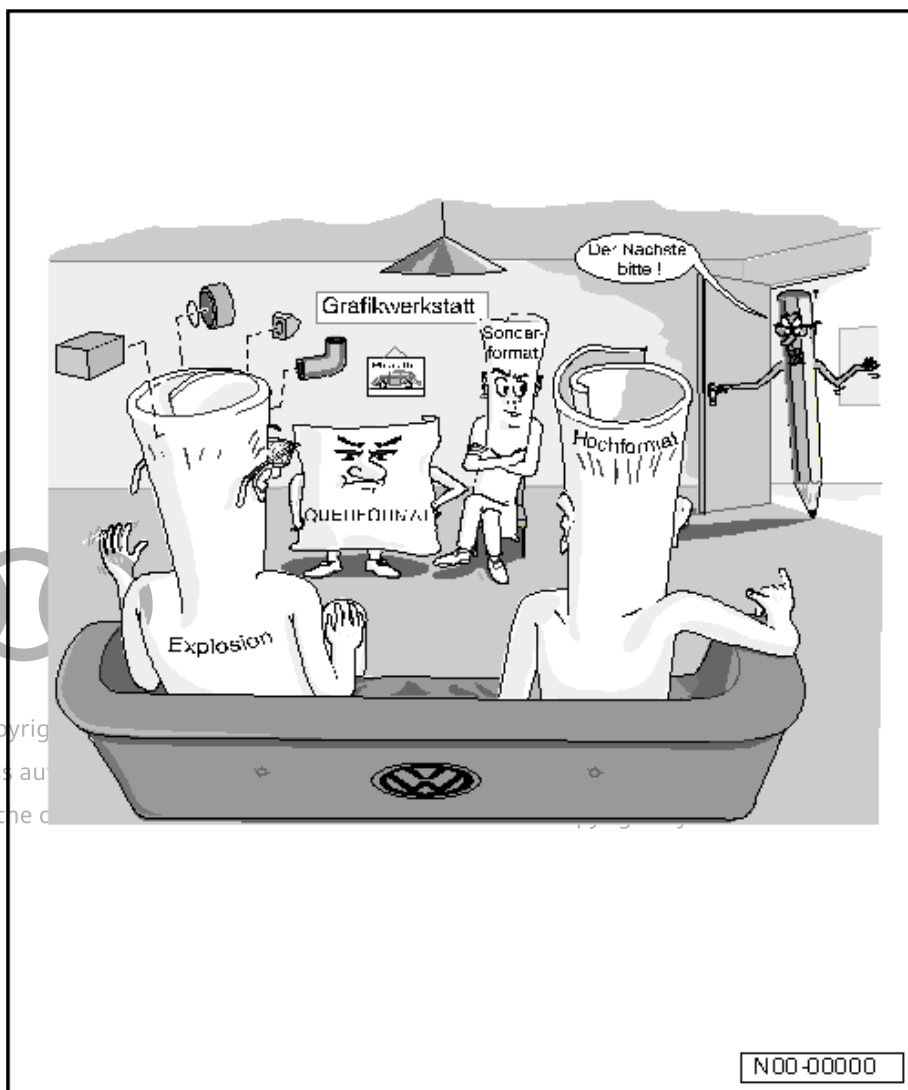
B - Securing ring - VAS 611 007/2-

C - Clamping ring - VAS 611 007/3-

D - Adapter for camshaft housing - VAS 611 007/8-

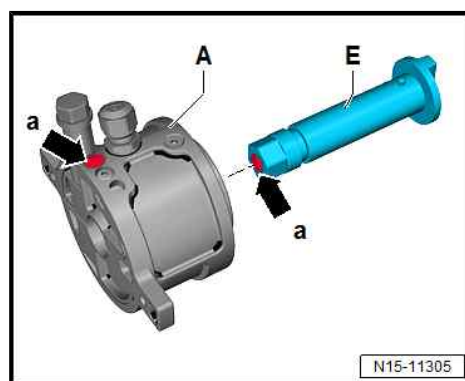
E - Adapter for angle sensor - VAS 611 007/9- and adapter for angle sensor - VAS 611 007/10-

- ❑ Adapter for angle sensor - VAS 611 007/9- (blue)
- ❑ Adapter for angle sensor - VAS 611 007/10- (red)



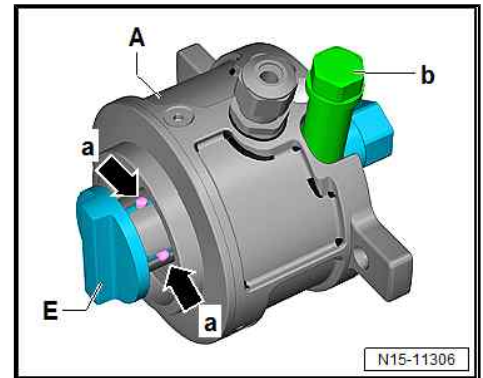
Pre-assembling test tool - VAS 611 007-

- Before inserting adapter for angle sensor - VAS 611 007/9- and adapter for angle sensor - VAS 611 007/10- -E- in angle sensor - VAS 611 007/1- -A-, verify collect allocation in accordance with colour coding -a-.
- Insert adapter for angle sensor - VAS 611 007/9- and adapter for angle sensor - VAS 611 007/10- -E- in angle sensor - VAS 611 007/1- -A-.

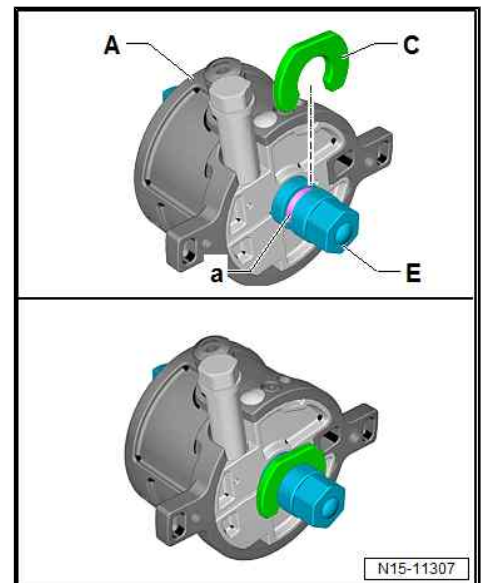




- Note position of dowel pins -a- when installing.
- Adapter for angle sensor - VAS 611 007/9- and adapter for angle sensor - VAS 611 007/10- -E- only fit in one position.
- Make sure that brake -b- is released. Do not use force.
- Insert adapter for angle sensor - VAS 611 007/9- and adapter for angle sensor - VAS 611 007/10- -E- in angle sensor - VAS 611 007/1- -A- as far as stop.

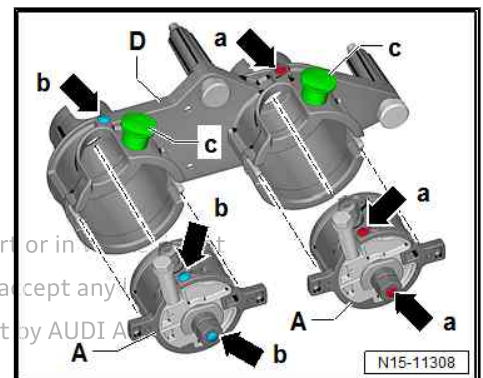


- Fit clamping ring - VAS 611 007/3- -C- in groove -a- in adapter for angle sensor - VAS 611 007/9- and adapter for angle sensor - VAS 611 007/10- -E-.

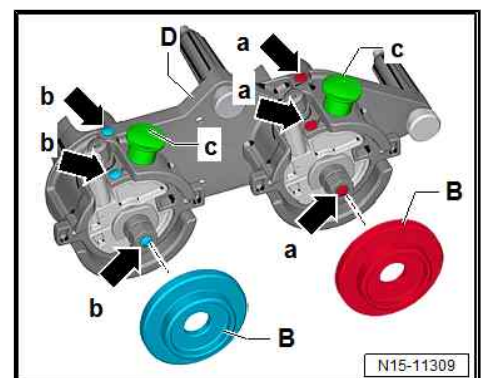


- Insert angle sensor - VAS 611 007/1- -A- with red colour coding on the side marked in red -arrows a- of adapter for camshaft housing - VAS 611 007/8- -D-. To do this, release locking pins -c- by pulling them upwards.
- Slide angle sensor - VAS 611 007/1- -A- in until locking pin engages audibly.
- Repeat procedure with angle sensor - VAS 611 007/1- -A- with blue colour coding -arrows b-

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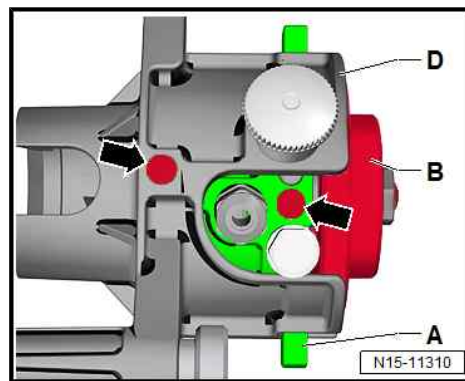


- Screw in red and blue securing rings - VAS 611 007/2- -B- by approx. two turns. When doing so, note colour coding -arrows a- and -arrows b-.





- Screw in securing ring - VAS 611 007/2- -B- by hand by a maximum of two turns.
- Make sure that the shaft can move freely.
- It should be possible to turn adapter for angle sensor - VAS 611 007/9- and adapter for angle sensor - VAS 611 007/10- slightly.



2.4.2 Fitting test tool - VAS 611 007-

Special tools and workshop equipment required

- ♦ Testing tools - VAS 611 007-

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Procedure

- Pre-assemble test tool - VAS 611 007-
⇒ [“2.4.1 Pre-assembling test tool VAS 611 007 ”, page 115](#) .
- Adapt test tool - VAS 611 007- electronically and perform basic setting
⇒ [“2.4.3 Adapting test tool VAS 611 007 electronically and performing basic setting”, page 120](#) .
- Turn adapter for angle sensor - VAS 611 007/9- and adapter for angle sensor - VAS 611 007/10- so that display shows approx. 0°.
- Perform preliminary work for checking valve timing
⇒ [“2.5 Checking valve timing”, page 122](#) .
- Make sure that piston in cylinder 1 is at TDC position
⇒ [“4.7 Setting pistons to TDC position”, page 82](#) .
- Make sure that brakes are released on angle sensor - VAS 611 007/1- on both sides ⇒ [page 117](#) .

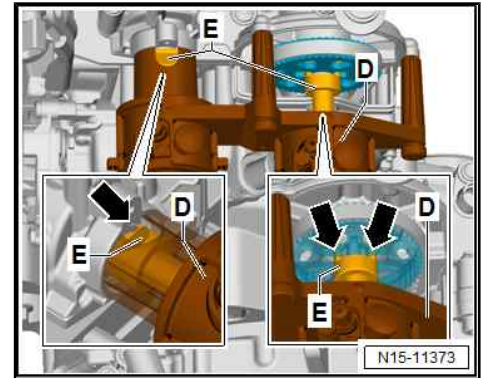


Note

Before attaching the test tool - VAS 611 007- to the camshaft housing, the grooves on the camshafts must be checked for damage.



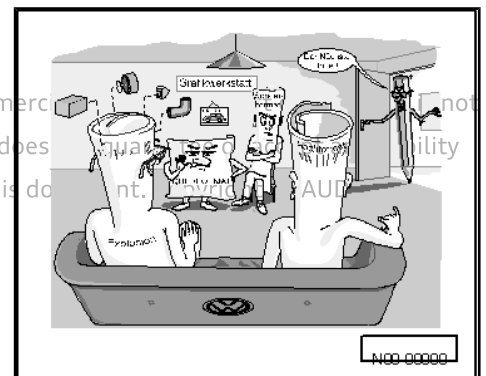
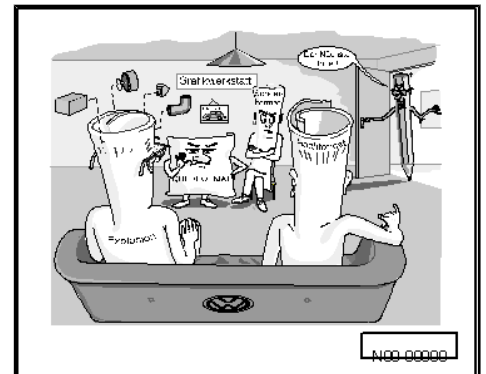
- Align adapters for angle sensor -E- by hand with grooves on camshafts -arrows-.
- Look through recess to check proper alignment and adjust position by turning.



- Fit adapter for camshaft housing - VAS 611 007/8- -D- at camshaft housing and slide it on.
- Tighten knurled screws -arrows a- alternately by hand.
- Make sure that adapter for camshaft housing - VAS 611 007/8- -D- is seated correctly.

i Note

- ◆ *If the adapter for camshaft housing - VAS 611 007/8- -D- comes into contact with the coolant pump housing, the basic setting of the coolant pump is incorrect.*
- ◆ *In this case, it is not possible to correct the setting or check the valve timing.*
- ◆ *The coolant pump must be removed and reset
⇒ [“2.5 Removing and installing coolant pump”, page 207](#).*
- Test tool - VAS 611 007- must rest flush against camshaft housing.
- Make sure that brakes are released on angle sensor - VAS 611 007/1- on both sides ⇒ [page 117](#).
- Tighten securing ring - VAS 611 007/2- -B- evenly on both sides by hand. When doing so, ensure that adapter for camshaft housing - VAS 611 007/8- -D- always rests flat against camshaft housing.





- Adapter for camshaft housing - VAS 611 007/8- -D- must not lift off camshaft housing -1-.

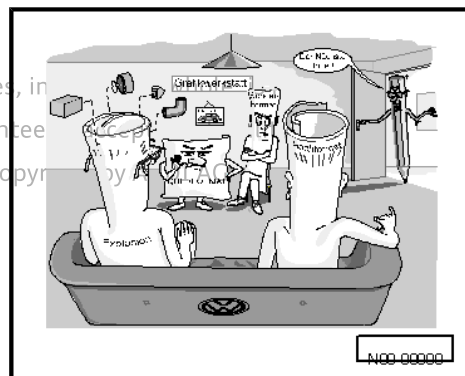


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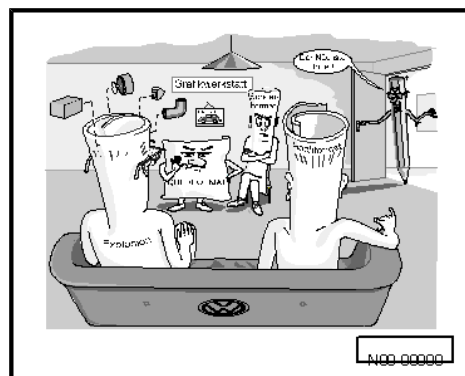
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The correct preload has been achieved when the adapter for camshaft housing - VAS 611 007/8- rests flat -a- against the camshaft housing.



- Ensure that brakes -a- are released on both sides.



2.4.3 Adapting test tool - VAS 611 007- electronically and performing basic setting

Special tools and workshop equipment required

- ♦ Testing tools - VAS 611 007-

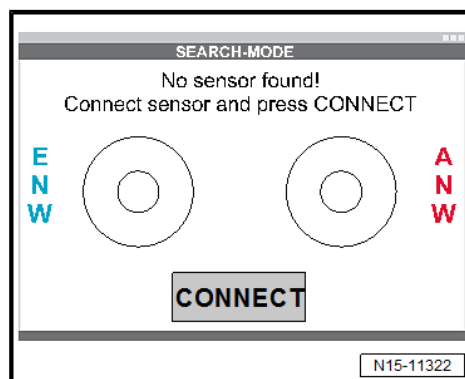


Procedure

- Connect electronic measuring equipment of test tool - VAS 611 007- ⇒ Operating instructions .
- Perform software installation of test tool - VAS 611 007- ⇒ Operating instructions .
- Start test program ⇒ Operating instructions .

If the angle sensors are not connected, the message shown in the illustration is displayed.

- Connect test tool - VAS 611 007- and press **CONNECT**.





If the test tool - VAS 611 007- is connected, the display is as shown in the illustration.

ANW - Exhaust camshaft, red

ENW - Inlet camshaft, blue

- Turn adapter for angle sensor - VAS 611 007/10- (red) -E- for exhaust camshaft.

If OK is displayed, exhaust camshaft has been adapted.

- Turn adapter for angle sensor - VAS 611 007/9- (blue) -E- for inlet camshaft.

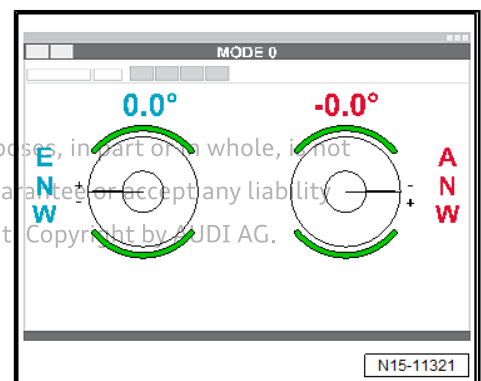
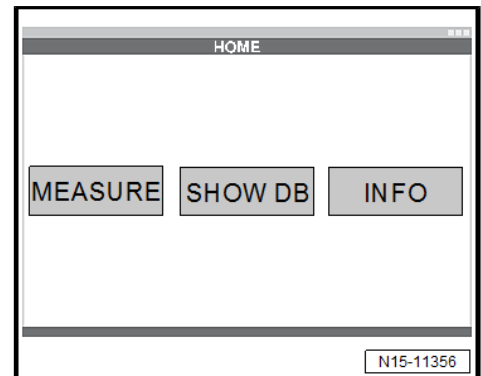
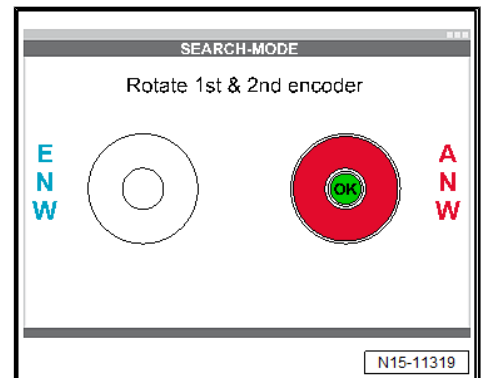
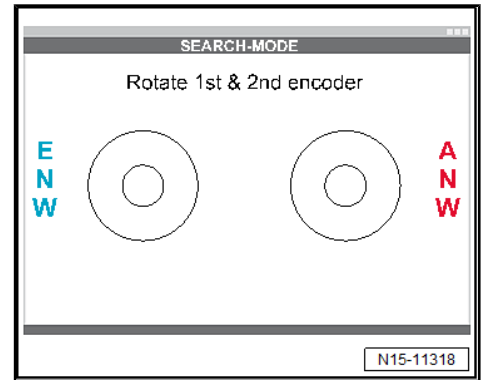
If the display is as shown in the illustration, exhaust camshaft has been adapted.

- Select **MEASURE** function.

If the display is as shown in the illustration:

- Check valve timing
⇒ [“2.5 Checking valve timing”, page 122](#) .

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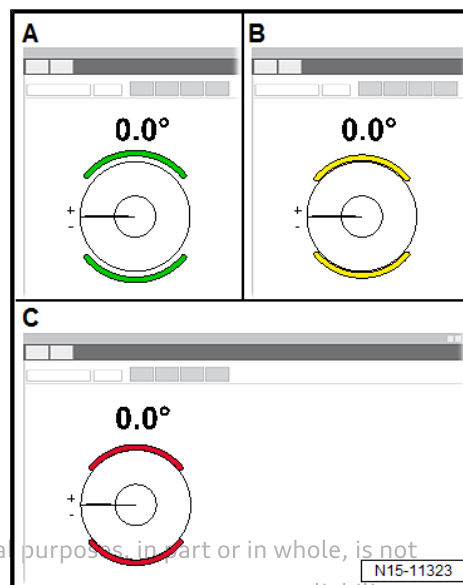


- Make sure that the brake indicator on the display is green.
- The indicator must not be yellow or red.

A - Green: brake is released

B - Yellow: brake is applied

C - Red: brake has been tightened to specified torque



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2.5 Checking valve timing

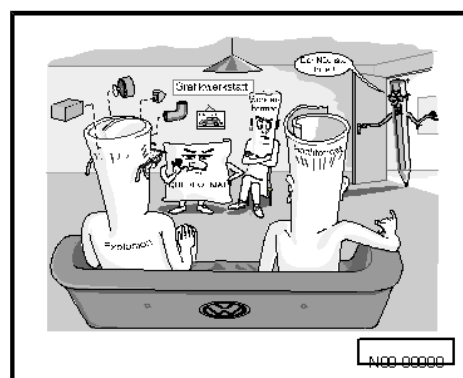
Special tools and workshop equipment required

- ♦ Testing tools - VAS 611 007-



Procedure

- Toothed belt fitted.
- Remove air cleaner housing
⇒ [“2.2 Removing and installing air cleaner housing”, page 265](#).
- Drain coolant
⇒ [“1.3 Draining and filling cooling system”, page 192](#).
- Remove bolts -2-.
- Detach cover for thermostat housing -1-.





- Unclip electrical wiring harness -3- and place to side.
- Remove bolts -1-.
- Place a cloth underneath to catch escaping oil.
- Detach filler cap -5-.
- Detach pipe -2-.
- Remove toothed belt cover -4-.

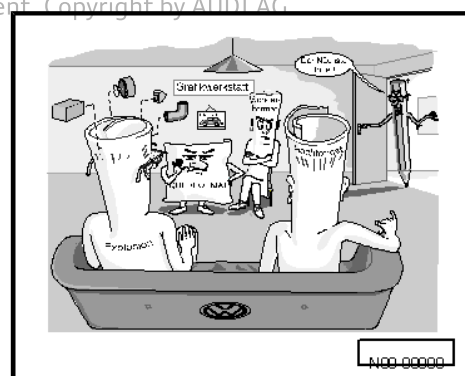
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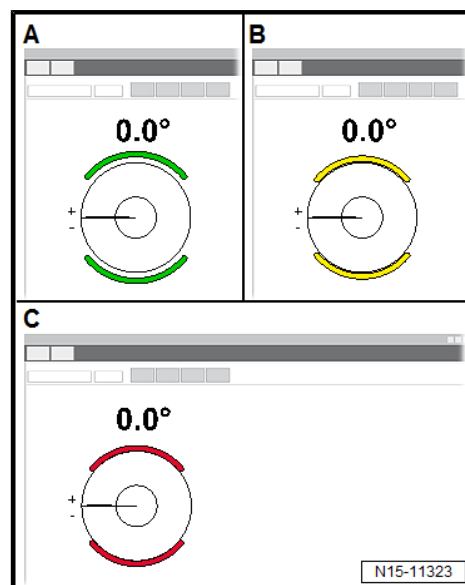
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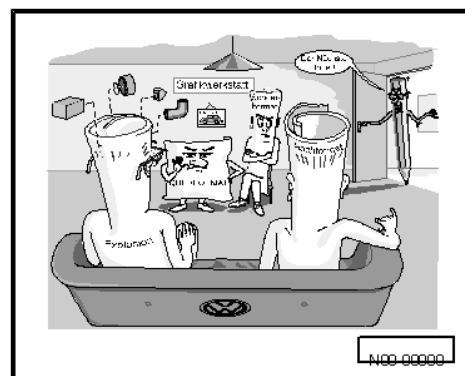
- Set cylinder 1 piston to TDC position
⇒ ["4.7 Setting pistons to TDC position", page 82](#) .
- Pre-assemble test tool - VAS 611 007-
⇒ ["2.4.1 Pre-assembling test tool VAS 611 007", page 115](#) .
- Fit test tool - VAS 611 007-
⇒ ["2.4.2 Fitting test tool VAS 611 007", page 118](#) .
- Ensure that brakes -a- are released on both sides.



- Make sure that the brake indicator on the display is green -A-.
- The indicator must not be yellow or red.

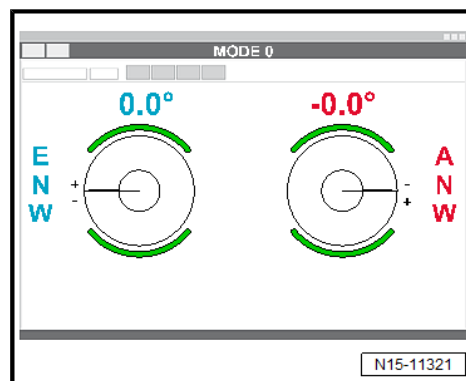


- Remove locking pin - T10340- -A-.
- Turn crankshaft 2 rotations in normal direction of engine rotation.
- Screw in locking pin - T10340- -A-.
- Set cylinder 1 piston to TDC position
⇒ ["4.7 Setting pistons to TDC position", page 82](#) .





- Read valve timing angles off display and compare with specified values.



Specifications

Inlet camshaft	Exhaust camshaft
$+1.1^{\circ} \pm 1.5^{\circ}$	$+0.8^{\circ} \pm 1.5^{\circ}$



NOTICE

Adjust valve timing as precisely as possible. The settings must be as close to the specifications as possible.

The valve timing must not be outside the tolerance limits.

- Adjust valve timing if necessary
⇒ [“2.6 Adjusting valve timing”, page 124](#) .

Assembly is performed in reverse sequence; note the following:

- Fill up with coolant
⇒ [“1.3 Draining and filling cooling system”, page 192](#) .

Tightening torques

- ♦ ⇒ [“2.1 Exploded view - coolant pump/thermostat”, page 200](#)
- ♦ ⇒ [“2.1 Exploded view - air cleaner housing”, page 263](#)

Component	Tightening torque
Bolt for TDC drilling in cylinder block	30 Nm

2.6 Adjusting valve timing

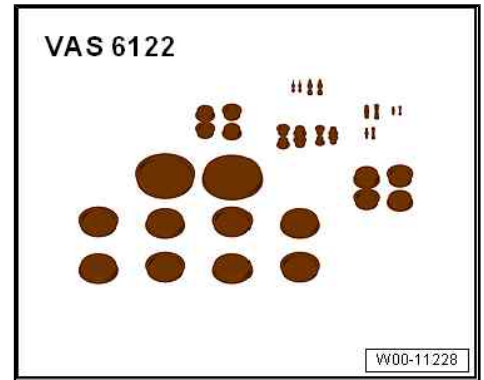
Special tools and workshop equipment required

- ♦ Locking pin - T10340-





◆ Engine bung set - VAS 6122-



Procedure

- Toothed belt fitted.
- Do not release tension from toothed belt and do not remove toothed belt from camshafts when adjusting valve timing. Only loosen camshaft adjuster.

If toothed belt has been removed and re-installed due to a different repair:

- Securing bolts for camshaft adjusters are not pre-tightened.
- Tighten securing bolts for camshaft adjusters to initial tightening torque ⇒ [page 155](#) , ⇒ [page 159](#) .



Note

If the securing bolts for the camshaft adjusters have already been renewed, the instructions to renew the bolts in the following description can be ignored.

Checking valve timing (without toothed belt having been removed)

- Check valve timing ⇒ [“2.5 Checking valve timing”, page 122](#) .
- Loosen camshaft adjuster on inlet side
⇒ [“3.4.1 Removing and installing camshaft adjuster for inlet camshaft”, page 152](#) .
- Loosen camshaft adjuster on exhaust side
⇒ [“3.4.2 Removing and installing camshaft adjuster for exhaust camshaft”, page 156](#) .



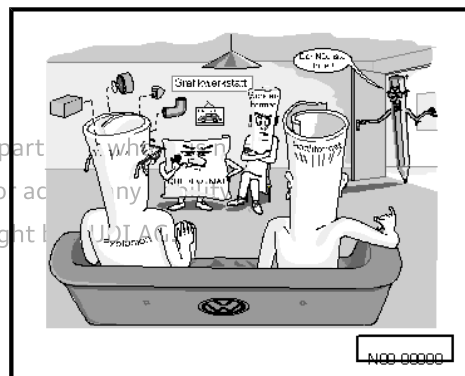
Note

*Risk of irreparable damage to engine if valve timing is incorrect
Do not rotate crankshaft out of TDC position.*

- Place a cloth under the camshaft adjusters and over tensioning roller to catch escaping engine oil.
- Points which contact toothed belt (such as camshaft sprockets, tensioning roller and idler roller) must be kept free of oil.
- Catch or remove escaping engine oil immediately.
- After engine has been turned, remove any engine oil on the camshaft adjusters.

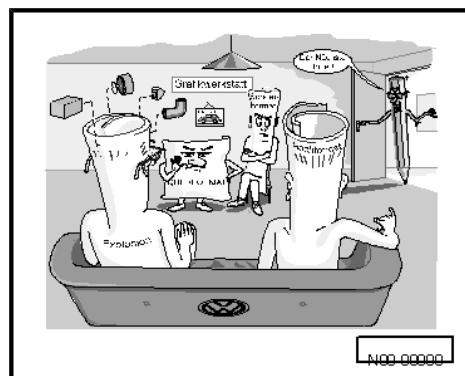


- Make sure that piston in cylinder 1 is at TDC position
⇒ [“4.7 Setting pistons to TDC position”, page 82](#) .
- Renew bolts -3- and -4- and loosely screw them in
⇒ [“3.4 Removing and installing camshaft adjuster”, page 152](#)
- Renewing bolts -3- and -4- is only necessary if they have not yet been renewed as part of a previous repair measure.
- It should just be possible to turn camshaft adjusters -1- and -2- on the camshafts.

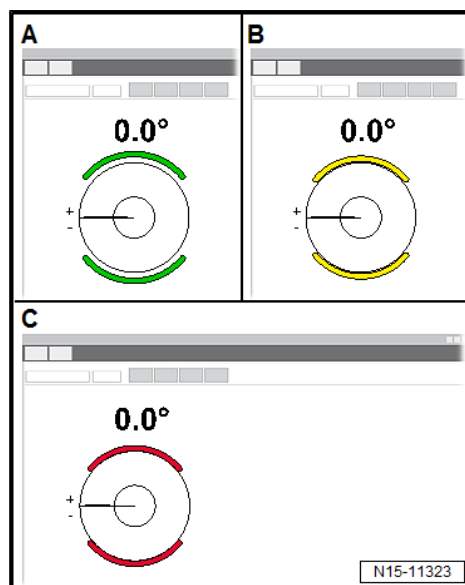


Setting camshafts to 0°

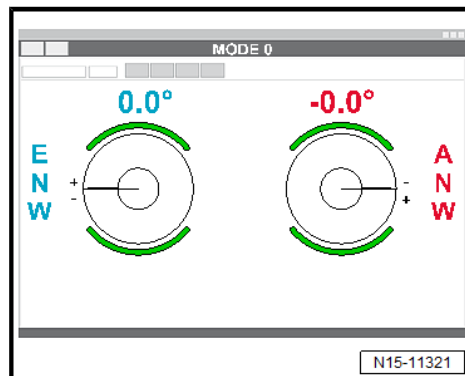
- Ensure that bolts -a- for brakes are loosened on both sides.



- Make sure that the brake indicator on the display is green -A-.
- The indicator must not be yellow or red.



- Set both camshafts to 0.0°.





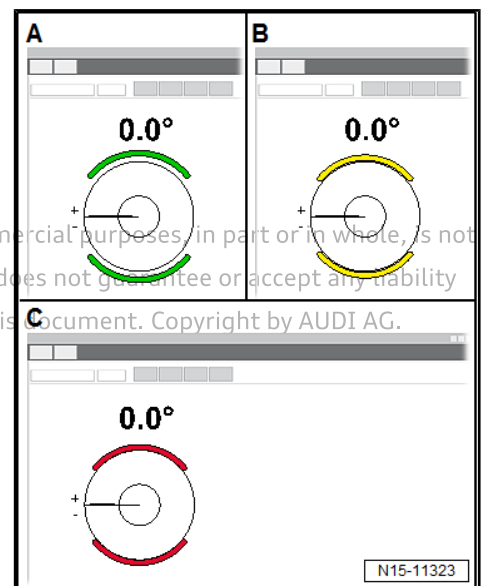
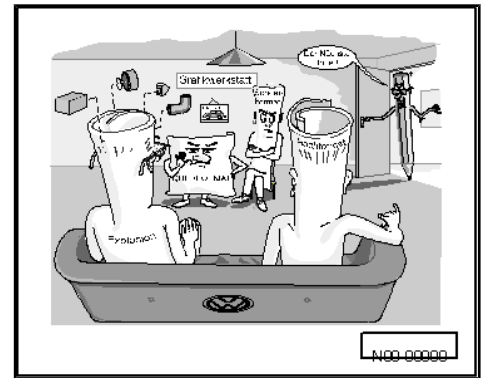
- To do so, turn camshafts with adapter for angle sensor - VAS 611 007/5- -E-.
- Hold camshafts in 0.0° position via adapter for angle sensor - VAS 611 007/9- and adapter for angle sensor - VAS 611 007/10- -E- using a hexagon key.

i Note

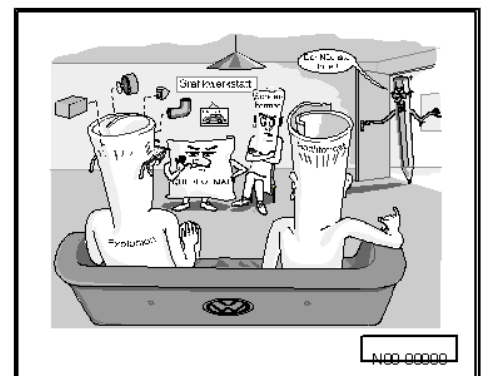
- ◆ *The camshafts tend to turn.*
- ◆ *Use a hexagon key to hold the camshafts in 0.0° position.*
- ◆ *Always remove the hexagon key after tightening.*
- Tighten brakes after adjustment has been completed.
- Tighten bolts -a- for brakes to 11 Nm on both sides.
- Make sure that the brake indicator on the display is red -C-.
- The indicator must not be yellow or green.



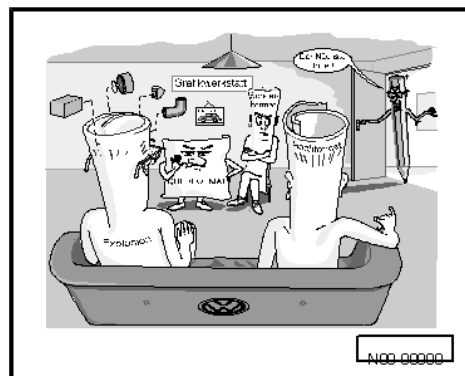
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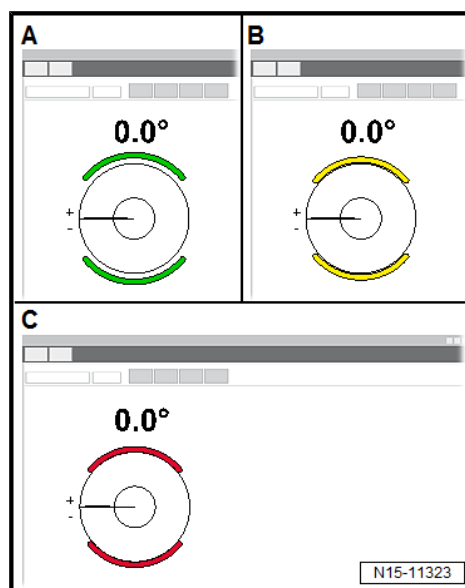
- Remove locking pin - T10340- -A-.
- Tighten camshaft adjuster for inlet camshaft to specified initial torque
⇒ ["3.4.1 Removing and installing camshaft adjuster for inlet camshaft", page 152](#) .
- Tighten camshaft adjuster for exhaust camshaft to specified initial torque
⇒ ["3.4.2 Removing and installing camshaft adjuster for exhaust camshaft", page 156](#) .



- Ensure that bolts -a- for brakes are loosened on both sides.



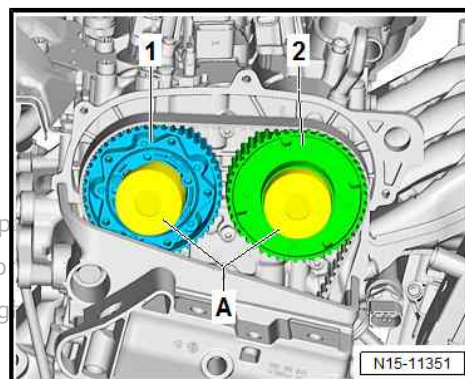
- Make sure that the brake indicator on the display is green -A-.
- The indicator must not be yellow or red.



- Seal camshaft adjusters -1- and -2- using suitable plugs -A- from engine bung set - VAS 6122- .
- Put some paper into the plugs -A- to absorb engine oil.
- Plug for camshaft adjuster -1- on exhaust side must be squashed slightly to fit.
- Turn crankshaft 2 rotations in normal direction of engine rotation.

Determining correction angle

- Screw in locking pin - T10340- .
- Set cylinder 1 piston to TDC position
 ⇒ "4.7 Setting pistons to TDC position", page 82 .
- Read valve timing off on display and note down values.



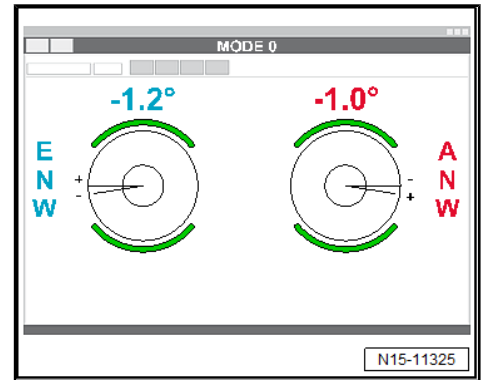


1. Measurement example using read-off value



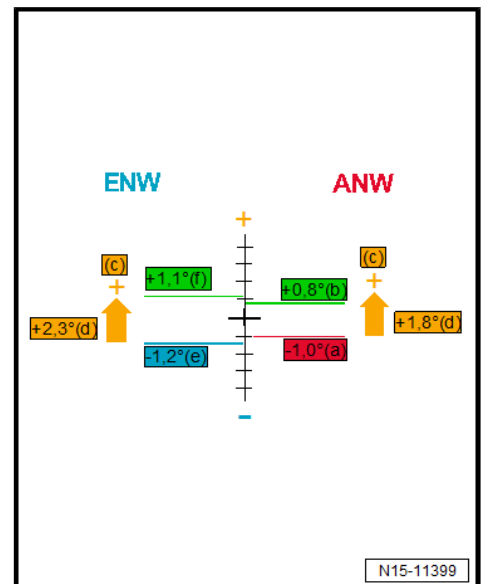
Note

- ◆ The correction angle must be determined for each vehicle individually.
- ◆ The value read after the engine has been turned is used for determining the correction angle.
- ◆ Note whether the values are + or -.
- ◆ The correction angle results from the difference between the specification and the value which has been read after the crankshaft has been turned twice.
- ◆ The correction angle is used to adjust the valve timing.
- ◆ The difference between the actual value (value read off after engine has been turned twice) and the specification (refer to table) is calculated.
- ◆ This results in the correction angle (with the corresponding +/- sign/direction of rotation) which should be set.



Example:

Index	Explanation
e	Inlet camshaft - actual value (after engine has been turned twice)
f	Inlet camshaft - specification (+/- tolerance)
c	Direction of correction (+/-)
d	Correction value - correction angle
a	Exhaust camshaft - actual value (after engine has been turned twice)
b	Exhaust camshaft - specification (+/- tolerance)



Angle in °	Inlet camshaft	Exhaust camshaft
Specified	+1.1°±1.5°	+0.8°±1.5°

- Set determined correction angle for camshafts.

Setting valve timing with correction angle

- Place a cloth underneath camshaft adjuster to catch escaping engine oil.
- Take plugs from engine bung set - VAS 6122- out of camshaft adjusters.
- Remove paper from plugs and camshaft adjusters.
- Clean camshaft adjuster with a cloth and remove as much engine oil as possible.

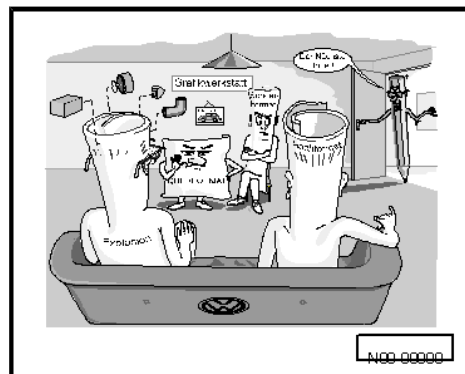


- Loosen camshaft adjuster on inlet side
⇒ [“3.4.1 Removing and installing camshaft adjuster for inlet camshaft”, page 152](#) .
- Loosen camshaft adjuster on exhaust side
⇒ [“3.4.2 Removing and installing camshaft adjuster for exhaust camshaft”, page 156](#) .

NOTICE

Risk of irreparable damage to engine if valve timing is incorrect

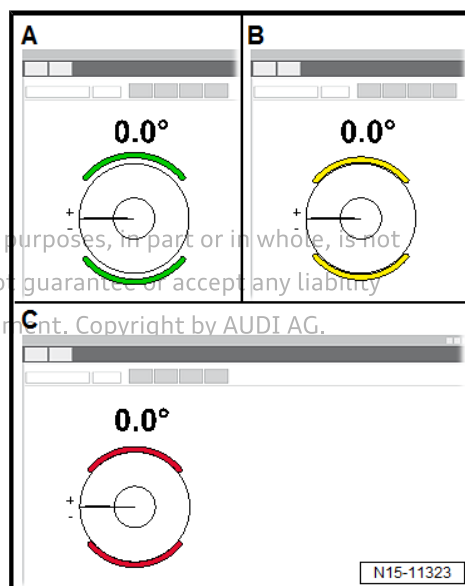
- Do not rotate crankshaft out of TDC position.
- Make sure that piston in cylinder 1 is at TDC position
⇒ [“4.7 Setting pistons to TDC position”, page 82](#) .
- Ensure that bolts -a- for brakes are loosened on both sides.



- Make sure that the brake indicator on the display is green -A-.
- The indicator must not be yellow or red.



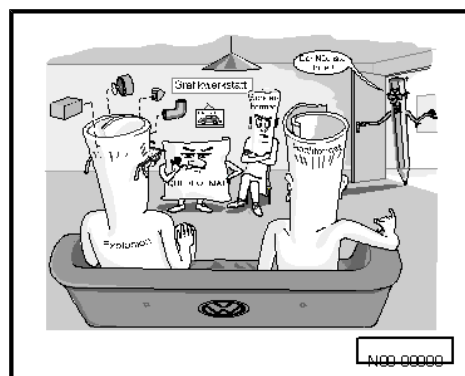
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- Set both camshafts to the determined correction angle
⇒ [page 128](#) .
- To do so, turn camshafts using adapter for angle sensor - VAS 611 007/9- and adapter for angle sensor - VAS 611 007/10-E-.

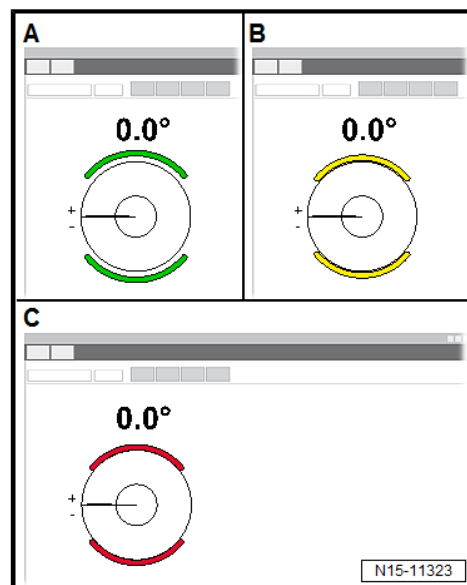
If the valve timing has been set:

- Tighten bolts -a- for brakes to 11 Nm on both sides.



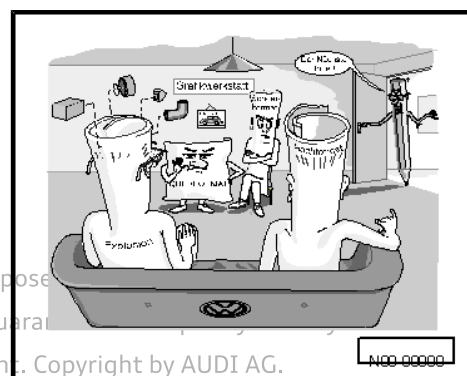


- Make sure that the brake indicator on the display is red -C-.
- The indicator must not be yellow or green.

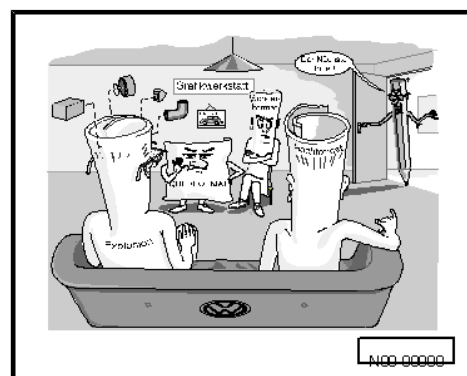


- Remove locking pin - T10340- -A-.
- Tighten camshaft adjuster for inlet camshaft to specified initial torque
⇒ [“3.4.1 Removing and installing camshaft adjuster for inlet camshaft”, page 152](#).
- Tighten camshaft adjuster for exhaust camshaft to specified initial torque
⇒ [“3.4.2 Removing and installing camshaft adjuster for exhaust camshaft”, page 156](#).

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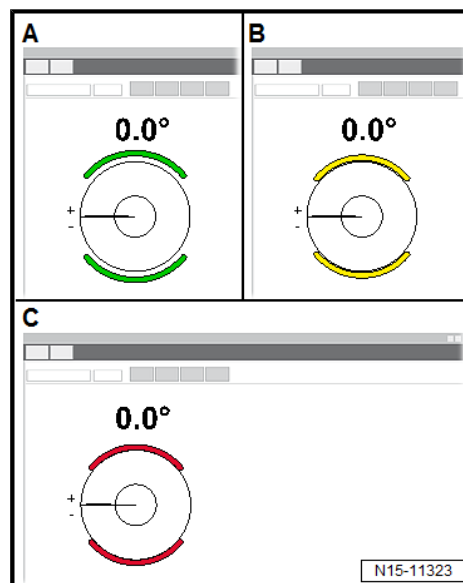


- Release brakes -a- on both sides.

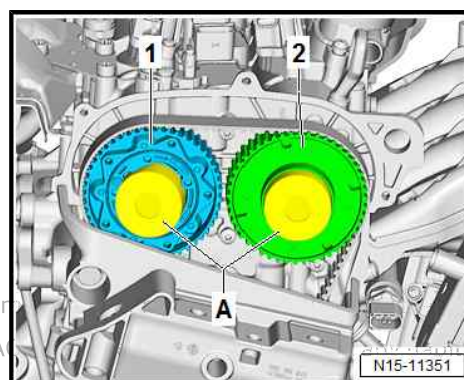




- Make sure that the brake indicator on the display is green -A-.
- The indicator must not be yellow or red.



- Seal camshaft adjusters -1- and -2- using suitable plugs -A- from engine bung set - VAS 6122- .
- Put new paper into plugs -A- to absorb engine oil.
- Plug for camshaft adjuster -1- on exhaust side must be squashed slightly to fit.
- Turn crankshaft 2 rotations in normal direction of engine rotation.
- Screw in locking pin - T10340- .
- Set cylinder 1 piston to TDC position
⇒ [“4.7 Setting pistons to TDC position”, page 82](#) .
- Check valve timing ⇒ [“2.5 Checking valve timing”, page 122](#) .

**NOTICE**

Adjust valve timing as precisely as possible. The settings must be as close to the specifications as possible.

The valve timing must not be outside the tolerance limits.

- Read off valve timing and compare it with specifications.

Specified angle in °

Inlet camshaft	Exhaust camshaft
+1.1° ±1.5°	+0.8° ±1.5°

- Re-adjust valve timing if necessary
⇒ [“2.6 Adjusting valve timing”, page 124](#) .

Assembly is performed in reverse sequence; note the following:

- Remove locking pin - T10340- .
- Ensure that brakes are released on both sides.
- Tighten camshaft adjuster for inlet camshaft to specified final torque
⇒ [“3.4.1 Removing and installing camshaft adjuster for inlet camshaft”, page 152](#) .
- Tighten camshaft adjuster for exhaust camshaft to specified final torque



⇒ ["3.4.2 Removing and installing camshaft adjuster for exhaust camshaft", page 156](#) .

Tightening torques

- ◆ ⇒ ["2.2 Exploded view - toothed belt", page 99](#)
- ◆ ⇒ ["3.1 Exploded view - valve gear", page 145](#)
- ◆ ⇒ ["2.1 Exploded view - coolant pump/thermostat", page 200](#)
- ◆ ⇒ ["2.1 Exploded view - air cleaner housing", page 263](#)

2.7 Detaching toothed belt from camshaft

Special tools and workshop equipment required

- ◆ Torque wrench - VAS 6583-



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- ◆ Counterhold tool - T10172 A- with adapters -T10172/1-



- ◆ Release tool - T10527- and -T10527/1-





- ◆ Counterhold tool - T10475-



- ◆ Special wrench, 30 mm - T10499 A-



- ◆ Open end spanner insert, AF 13 - T10500-



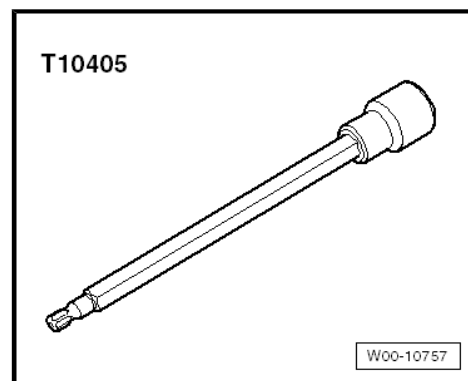
- ◆ Camshaft clamp - T10494-



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◆ Socket Torx T30 - T10405-



◆ Assembly tool - T10487-



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◆ Assembly tool - T10476A-



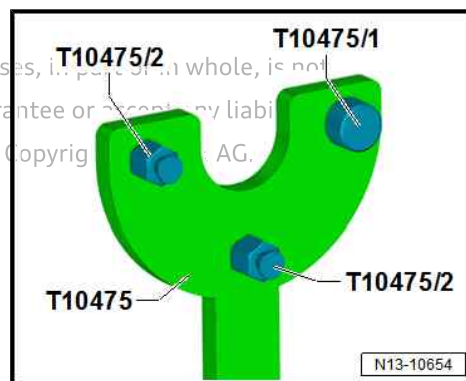
◆ Counterhold tool - T10554-





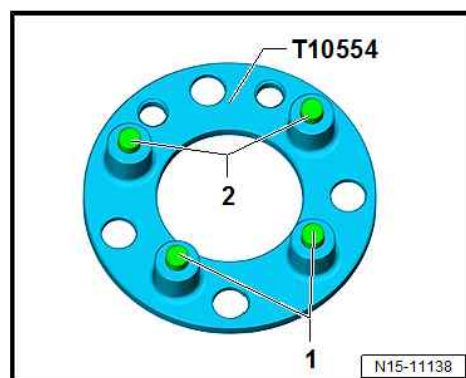
Preparing adapter - T10475- :

- Fit adapters **T10475** and **T10475/1** onto counterhold tool **T10475/2**, as shown in illustration.



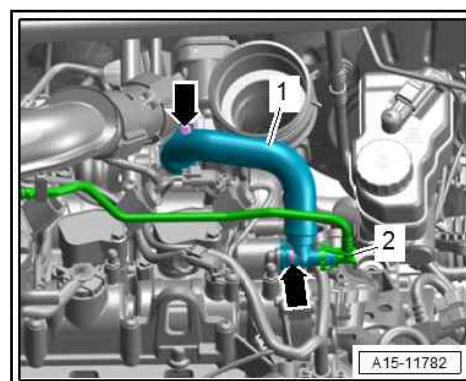
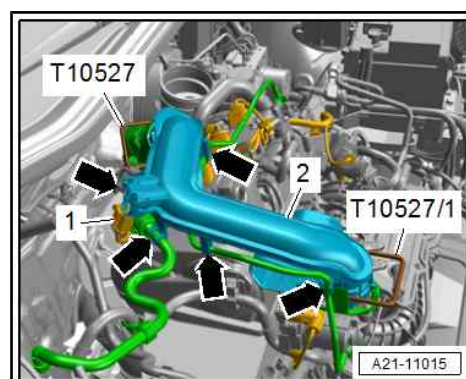
Counterhold tool - T10554-

- The lugs -1- and -2- on counterhold tool - T10554- are different distances apart.
- Counterhold tool - T10554- can only be applied in one position.
- Position counterhold tool - T10554- flush against camshaft adjusters.



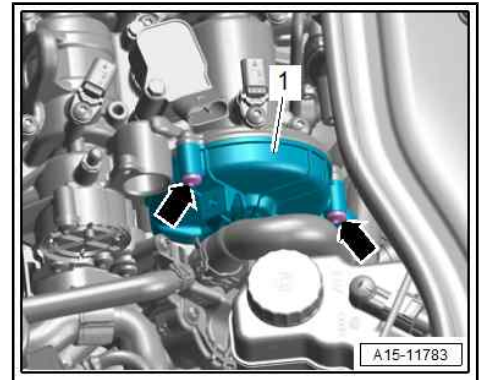
Procedure

- Remove air cleaner housing
⇒ ["2.2 Removing and installing air cleaner housing", page 265](#).
- Unplug electrical connector -1- for charge pressure sender - G31- and move wiring clear.
- Move hoses -arrows- clear at air pipe -2-.
- Release fasteners using release tool - T10527- and detach air pipe.
- Remove bolts -arrows- and move crankcase breather hose -1- to one side (with hose -2- going to activated charcoal filter attached).

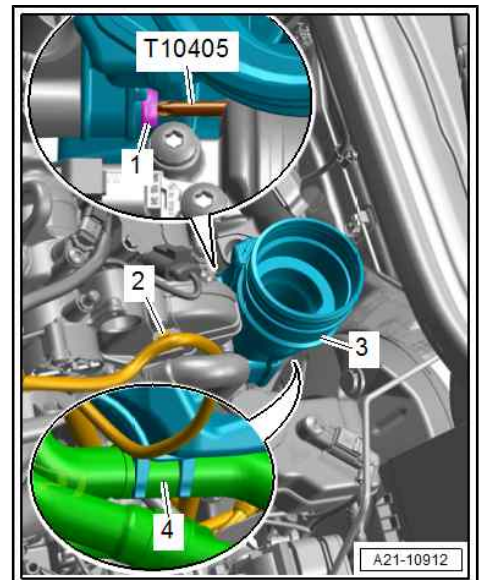




- Unscrew bolts -arrows- and remove cover -1- for toothed belt for coolant pump.



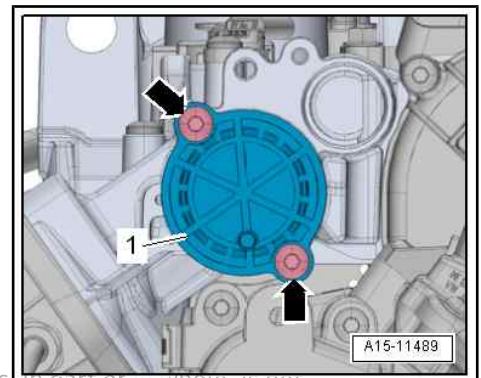
- Move electrical wiring harness -2- and coolant hose -4- clear and push to one side.
- Unscrew bolt -1- using socket Torx T30 - T10405- .
- Detach resonator -3- from turbocharger to left side and press it inwards.



! NOTICE

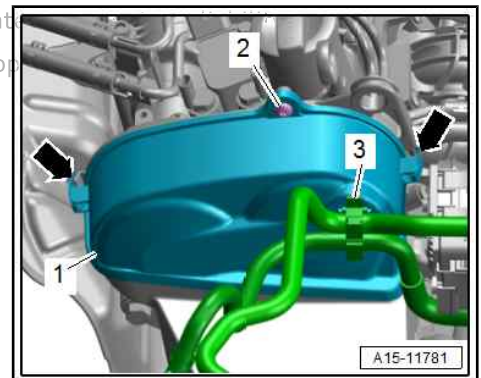
Danger of chemical damage to seal for coolant pump if oil enters between coolant pump and cylinder head.

- Cover coolant pump with a cloth.
- Catch escaping engine oil with a cloth.
- Unscrew bolts -arrows- and detach sealing cap -1-.



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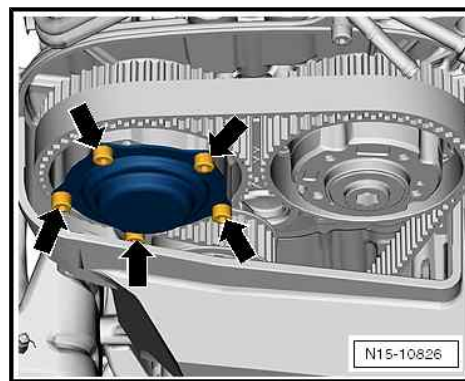
- Move hoses and bracket -3- clear.
- Remove bolt -2-.
- Release clips -arrows- and detach toothed belt cover (top) -1-.



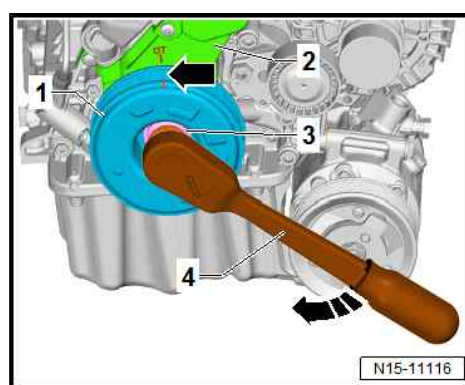
**NOTICE**

Risk of irreparable damage to engine due to oil on toothed belt.

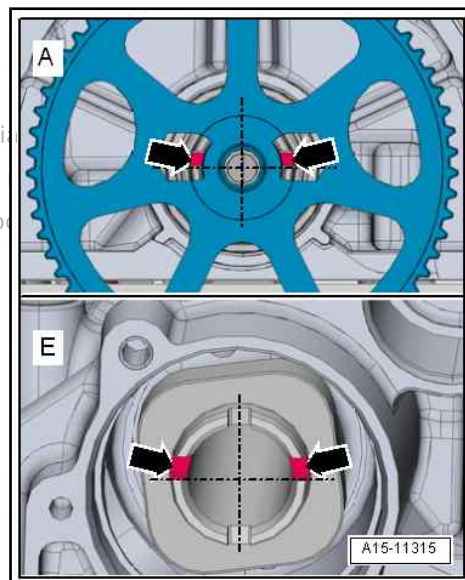
- Catch escaping engine oil with a cloth.
- Clean any spaces/cavities that have filled with engine oil.
- Remove all accessible bolts -arrows-.
- Rotate crankshaft at vibration damper in normal direction of rotation so you can access the remaining bolts -arrows- and unscrew them.
- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Detach cover from camshaft sprocket of exhaust camshaft.

**Rotate crankshaft to "TDC" as follows:**

- Turn crankshaft in normal direction of engine rotation -arrow- by applying a ratchet -4- to centre bolt -3-.
- Crankshaft has reached "TDC" position when marking -arrow- on vibration damper -1- aligns with "TDC" marking on toothed belt cover (bottom) -2-.



- On both camshafts, asymmetrically positioned grooves -top and bottom arrows- on gearbox end must now face upwards, as shown in illustrations.
- On exhaust camshaft -A-, grooves -top arrows- are accessible via openings in coolant pump drive sprocket.
- On inlet camshaft -E-, grooves -bottom arrows- are directly accessible.
- The camshafts have two pairs of grooves: one positioned symmetrically and one positioned asymmetrically. In TDC position, the asymmetrically positioned pair of grooves must be above the imaginary horizontal centre line.
- If camshafts are not positioned as described, turn crankshaft one rotation further and return to TDC position.





- It should be possible to insert the camshaft clamp - T10494- easily.
- Do not knock camshaft clamp into place with any kind of tool.
- When camshafts are positioned as described, insert camshaft clamp - T10494- into camshafts as far as stop and hand-tighten bolt -arrow-.

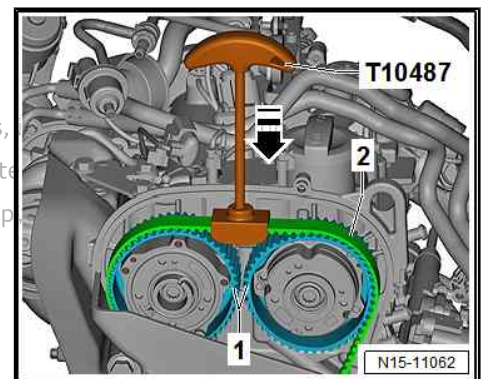
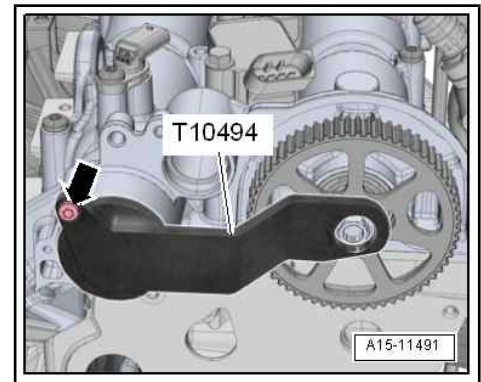
Note:

If it is difficult to insert camshaft clamp - T10494- , press against toothed belt -arrow- with assembly tool - T10487- . At the same time insert camshaft clamp - T10494- into camshafts as far as stop and hand-tighten bolt.



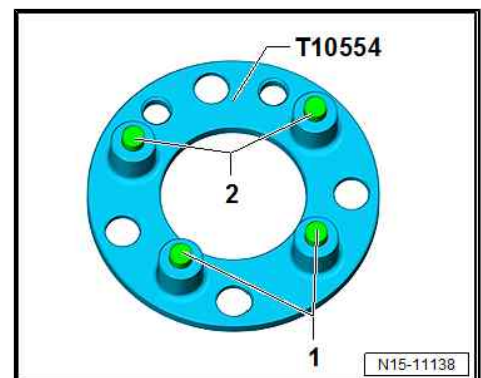
Risk of damage to camshaft if handled incorrectly

- Never use camshaft clamp as a counterhold tool.

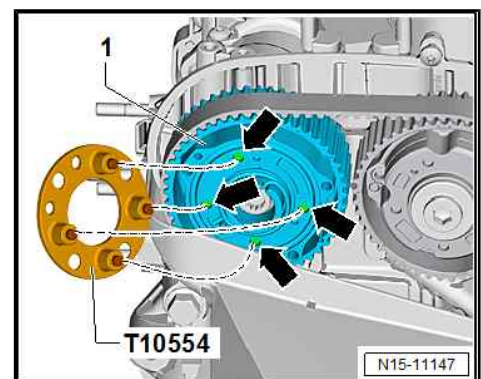


Exhaust camshaft:

- Guide in counterhold tool - T10554- between camshaft adjuster and engine support.
- To do so, first guide area between lugs -2- on counterhold tool - T10554- past camshaft adjuster.



- Turn counterhold tool - T10554- so that it can be inserted in holes -arrows- as shown.
- Position counterhold tool - T10554- flush against camshaft adjuster -1-.





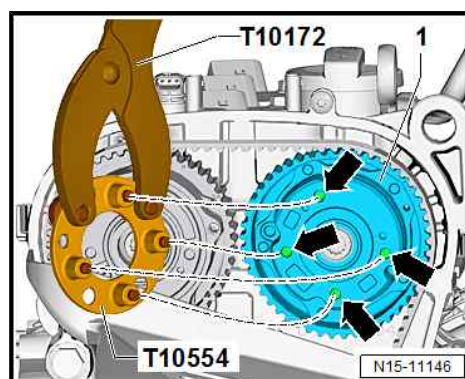
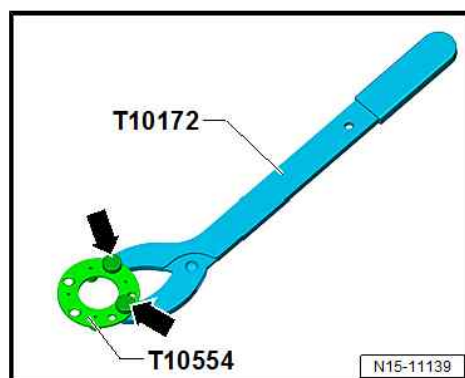
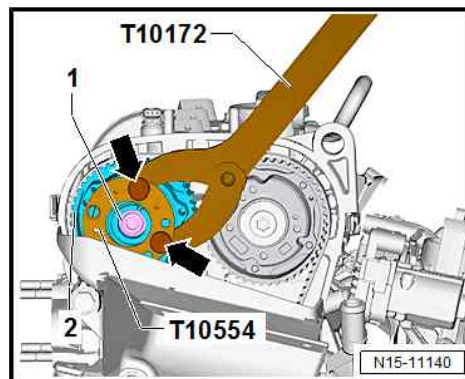
NOTICE

Risk of irreparable damage to engine due to oil on toothed belt.

- Catch escaping engine oil with a cloth.
- Clean any spaces/cavities that have filled with engine oil.
- Loosen bolt -1- one turn. Secure camshaft sprocket in place with counterhold tool - T10554- and counterhold tool - T10172- .

Inlet camshaft

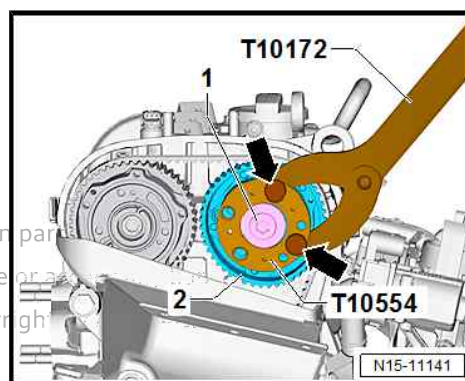
- Assemble tools as shown.
- Attach counterhold tool - T10172- to counterhold tool - T10554- using knurled screws -arrows-.
- Apply counterhold tool - T10554- with counterhold tool - T10172- to camshaft sprocket -1-, as shown.
- Pins must be inserted correctly into holes -arrows-.
- Position counterhold tool - T10554- flush against camshaft adjuster -1-.
- Secure camshaft with counterhold tool - T10554- and counterhold tool - T10172- so that it cannot turn.



NOTICE

Risk of irreparable damage to engine due to oil on toothed belt.

- Catch escaping engine oil with a cloth.
- Clean any spaces/cavities that have filled with engine oil.
- Unscrew plug -1- on camshaft sprocket (inlet side) using counterhold tool - T10554- with counterhold tool - T10172- .
- Then loosen bolt for camshaft sprocket (inlet side) located behind plug one turn, holding camshaft sprocket in position with counterhold tool - T10554- and counterhold tool - T10172- .





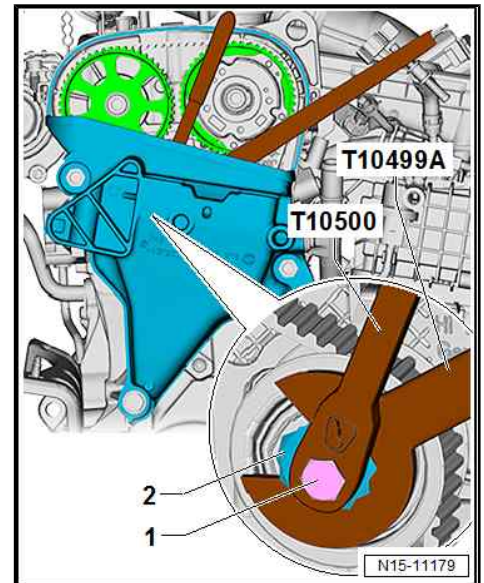
Both sides (continued):

- Fit special wrench, 30 mm - T10499 A- onto eccentric adjuster -2- of tensioning roller.
- Loosen bolt -1- using insert tool, 13 mm - T10500- .
- Release tensioning roller on eccentric adjuster -2- using special wrench, 30 mm - T10499 A- .
- Detach toothed belt from camshaft sprockets.
- The bending radius of the toothed belt must be at least 25 mm (approx. half the diameter of the crankshaft sprocket)
⇒ Fig. [“Bending radius of toothed belt”](#) , page 101 .

! NOTICE

Risk of damage to toothed belt if required radius/diameter is not reached.

- The toothed belt is made of a glass fibre cord fabric.
- The toothed belt must NOT be bent.
- It is important that the bending radius -r- of the toothed belt must be at least 25 mm (approx. half the diameter of the crankshaft sprocket).

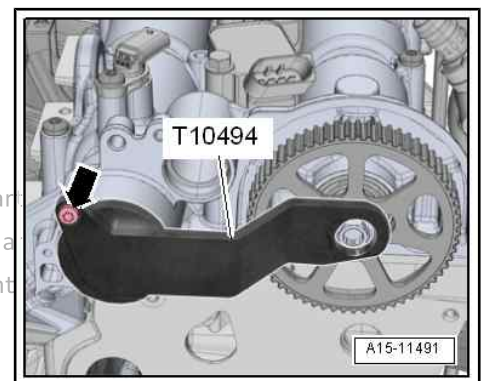


Installing

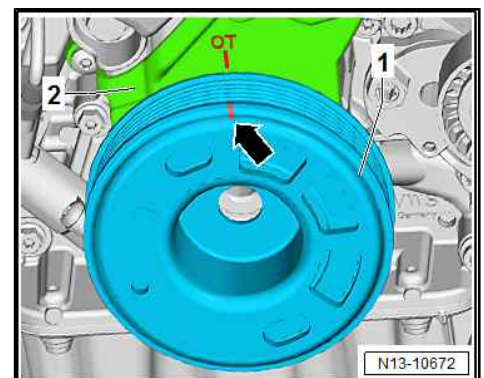
- Renew bolts tightened with specified tightening angle.
- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .
- Renew O-rings.
- Check “TDC” position of camshaft and crankshaft:
- Camshaft clamp - T10494- must be fitted to camshaft housing.



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- Marking -arrow- on vibration damper -1- aligns with “OT” (TDC) marking on toothed belt cover (bottom) -2-.





NOTICE

Risk of damage to camshaft if handled incorrectly

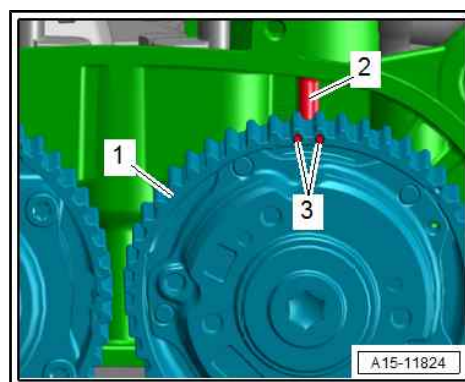
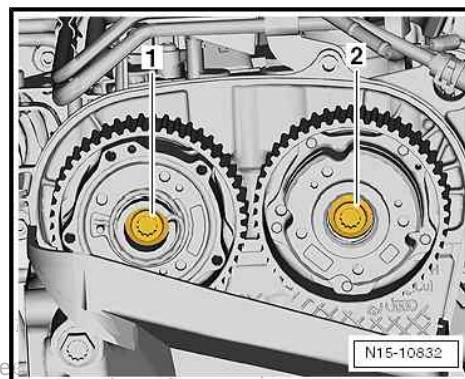
- Never use camshaft clamp as a counterhold tool.

- Fit new bolts -1, 2- for camshaft sprockets and screw them in loosely.
- It should just be possible to turn the adjusters on the camshafts without axial movement.

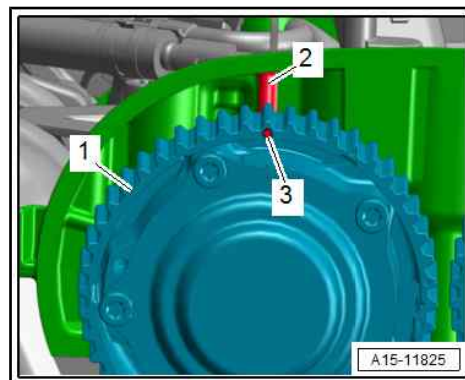
Note:

The camshaft sprockets are tri-oval in shape.

- If you have loosened one or both of the camshaft sprockets, they must be re-aligned with one another using the assembly tool - T10476A- .
- Align markings -3- on camshaft sprocket on inlet side -1- with rib -2- on camshaft housing.



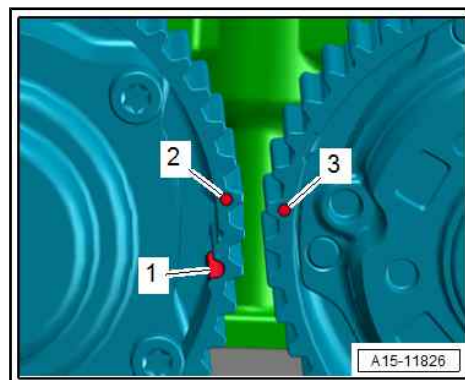
- Align marking -3- on camshaft sprocket on exhaust side -1- with rib -2- on camshaft housing.



- The dot markings -2- and -3- on the camshaft sprockets are slightly offset.

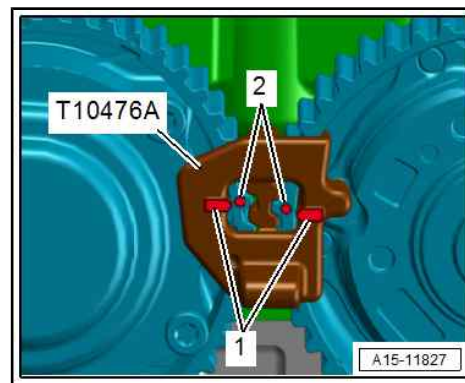
Note:

Groove -1- helps to ensure that assembly tool -T10476A- is applied correctly.

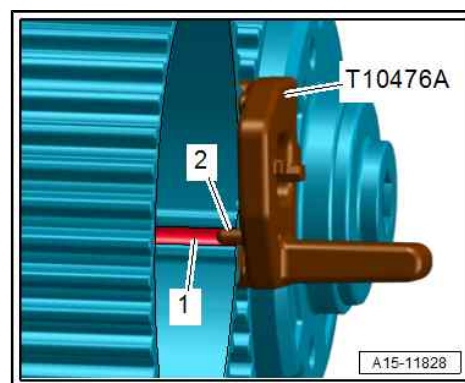




- Insert assembly tool - T10476A- between camshaft sprockets.
- Markings -1- on assembly tool - T10476A- must be aligned with dot markings -2- on camshaft sprockets.



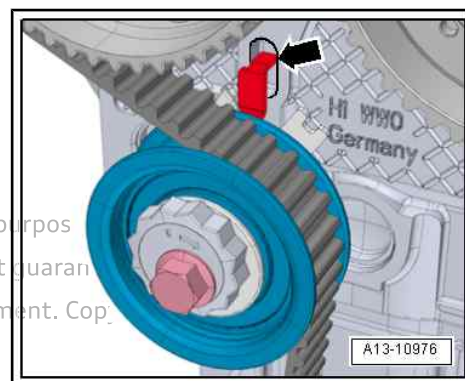
- It should be possible to insert assembly tool - T10476A- easily as far as stop.
- The projection -2- of assembly tool - T10476A- must engage in groove -1- in camshaft sprocket on exhaust side.



- Metal lug -arrow- of tensioning roller must engage in cast recess on cylinder head.

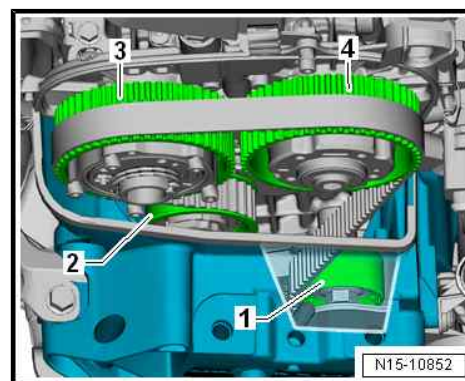


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Note correct sequence for fitting toothed belt:

- Pull toothed belt upwards and fit onto idler roller -1-, tensioning roller -2- and camshaft sprockets -3, 4-.
- The assembly tool - T10476A- must be removed before tensioning the toothed belt.





- Using special wrench, 30 mm - T10499 A- , turn eccentric adjuster -2- of tensioning roller in direction of -arrow- until adjustment indicator -3- is positioned approx. 10 mm to right of adjustment window.
- Turn eccentric adjuster -2- back until adjustment indicator -3- is positioned exactly in adjustment window.

NOTICE

Risk of damage to engine if tightening torque is incorrect.

- Torque wrench - VAS 6583- must be used to tighten the bolts.
- When setting the tightening torque on the torque wrench - VAS 6583- , the reading on the insert tool, 13 mm - T10500- must be entered in the torque wrench.
- Hold eccentric adjuster in this position and tighten bolt -1- using insert tool, 13 mm - T10500- with torque wrench - VAS 6583- .

Note:

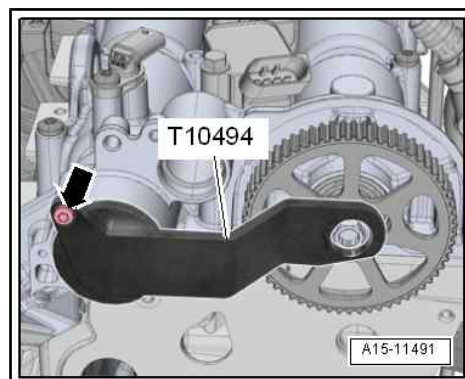
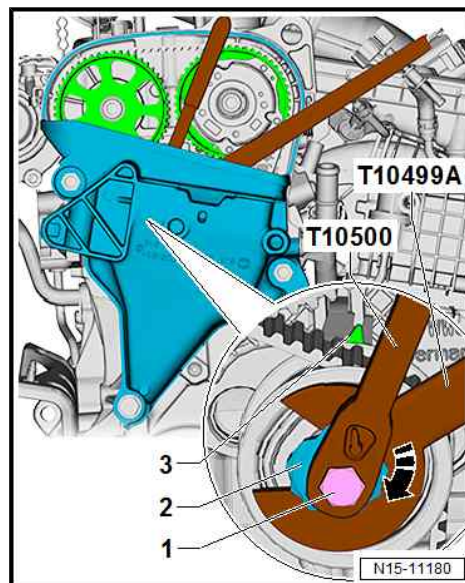
Turning the engine further or running the engine may lead to slight differences in the position of the adjustment indicator -3- in relation to the adjustment window. This does not affect the toothed belt tension.

- Remove bolt -arrow- and detach camshaft clamp - T10494- .
- Adjust valve timing ⇒ [“2.6 Adjusting valve timing”, page 124](#) .

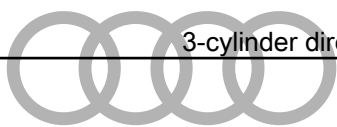
Further installation is carried out in the reverse order; note the following:

Tightening torques

- ♦ ⇒ [“2.1 Exploded view - toothed belt cover”, page 98](#)
- ♦ ⇒ [“1.2 Exploded view - camshaft housing”, page 87](#)
- ♦ ⇒ [“3.1 Exploded view - crankcase breather system”, page 181](#)
- ♦ ⇒ [“2.1 Exploded view - air cleaner housing”, page 263](#)
- ♦ ⇒ [“1.1 Exploded view - turbocharger”, page 235](#)
- ♦ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation



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3 Valve gear

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⇒ [“3.1 Exploded view - valve gear”, page 145](#)

⇒ [“3.2 Measuring axial clearance of camshaft”, page 146](#)

⇒ [“3.3 Removing and installing camshaft oil seal”, page 147](#)

⇒ [“3.4 Removing and installing camshaft adjuster”, page 152](#)

⇒ [“3.5 Removing and installing camshaft control valve N205 / N318”, page 161](#)

⇒ [“3.6 Removing and installing valve stem oil seals”, page 161](#)

3.1 Exploded view - valve gear

1 - Exhaust valve

- ☐ Do not machine, only grinding-in is permitted
- ☐ Valve dimensions
⇒ [“4.3 Valve dimensions”, page 170](#)
- ☐ Checking valve guides
⇒ [“4.1 Checking valve guides”, page 169](#)

2 - Cylinder head

3 - Valve stem oil seal

- ☐ Renewing
⇒ [“3.6 Removing and installing valve stem oil seals”, page 161](#)

4 - Valve spring

- ☐ Installation position
⇒ [Fig. “Position of valve spring”, page 146](#)

5 - Valve spring plate

6 - Valve cotters

7 - Roller rocker finger

- ☐ Removing and installing
⇒ [“1.4 Removing and installing camshaft housing”, page 92](#)
- ☐ Mark installation position for re-installation
- ☐ Check roller bearings for ease of movement
- ☐ Lubricate contact surfaces before installing

8 - Securing clip

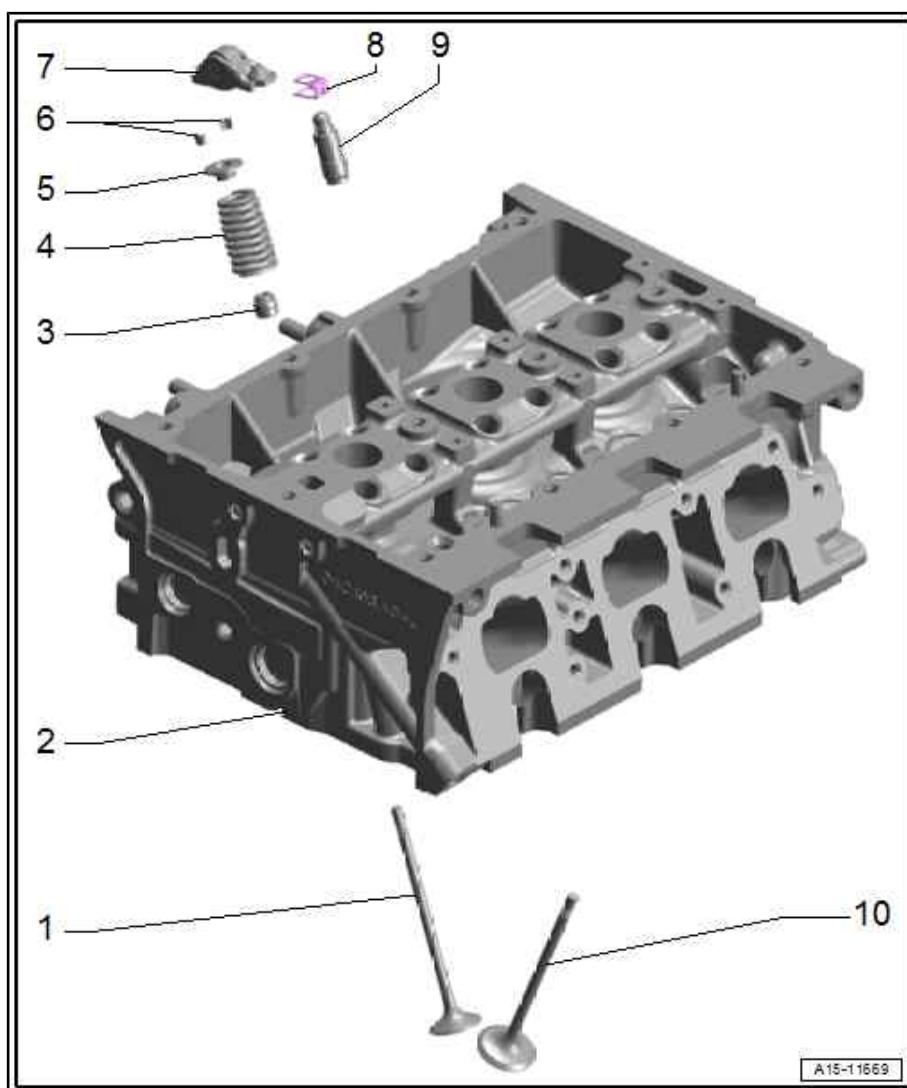
- ☐ For hydraulic compensation element

9 - Hydraulic compensation element

- ☐ Do not interchange
- ☐ Lubricate contact surface

10 - Inlet valve

- ☐ Do not machine, only grinding-in is permitted
- ☐ Valve dimensions ⇒ [“4.3 Valve dimensions”, page 170](#)



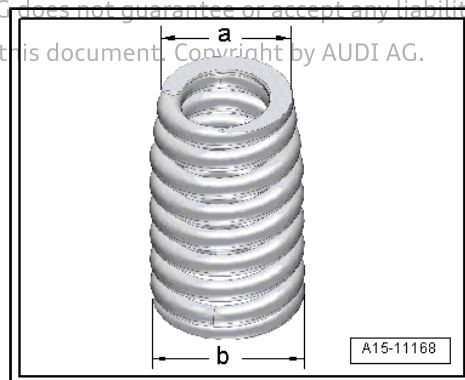


- ❑ Checking valve guides ⇒ [“4.1 Checking valve guides”, page 169](#)

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Position of valve spring

- The smaller $\varnothing$ -a- faces the valve spring plate.
- The larger $\varnothing$ -b- faces the cylinder head.



3.2 Measuring axial clearance of camshaft

Special tools and workshop equipment required

- ◆ Universal dial gauge bracket - VW 387-



- ◆ Dial gauge - VAS 6080-

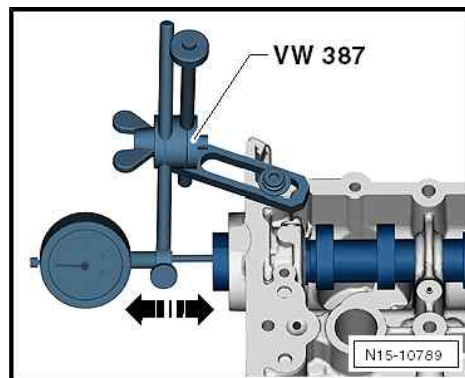


Procedure

- Remove camshaft housing
⇒ [“1.4 Removing and installing camshaft housing”, page 92](#) .
- Secure universal dial gauge bracket - VW 387- with dial gauge - VAS 6080- to camshaft housing, as shown in illustration.
- Press camshaft against dial gauge by hand.
- Set dial gauge to “0”.
- Press camshaft away from dial gauge and read off value:

Axial clearance:

- Wear limit: 0.25 mm.





3.3 Removing and installing camshaft oil seal

⇒ [“3.3.1 Removing and installing inlet camshaft oil seal”, page 147](#)

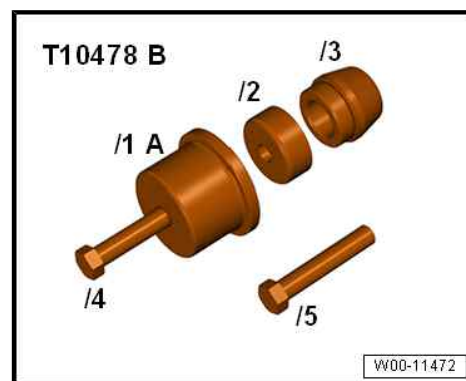
⇒ [“3.3.2 Removing and installing exhaust camshaft oil seal \(pulley end\)”, page 149](#)

⇒ [“3.3.3 Removing and installing exhaust camshaft oil seal \(gear-box end\)”, page 150](#)

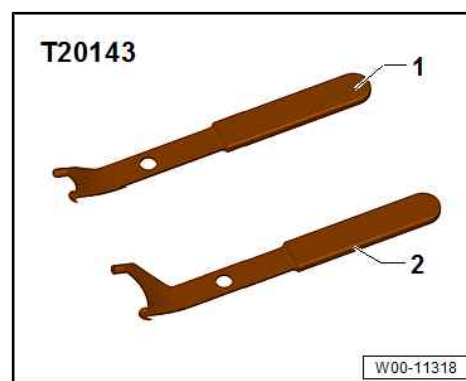
3.3.1 Removing and installing inlet camshaft oil seal

Special tools and workshop equipment required

◆ Assembly tool - T10478 B-

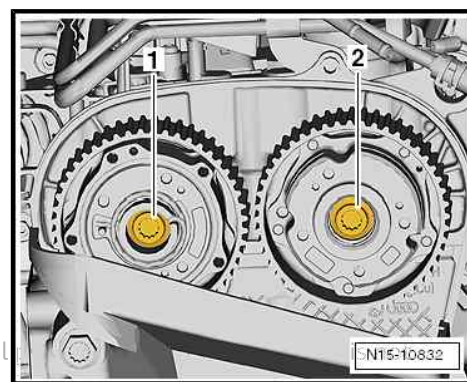
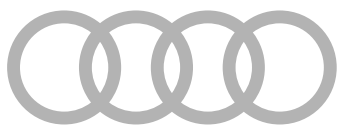


◆ Extractor tool - T20143-



Removing

- Detach toothed belt from camshafts
⇒ [“2.7 Detaching toothed belt from camshaft”, page 133](#) .
- Unscrew bolt -2- and remove camshaft sprocket.



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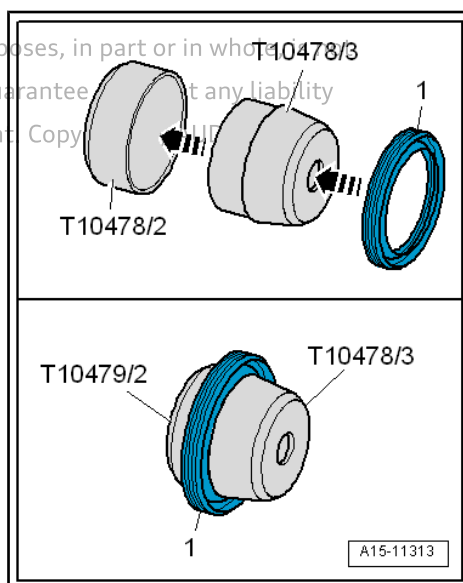
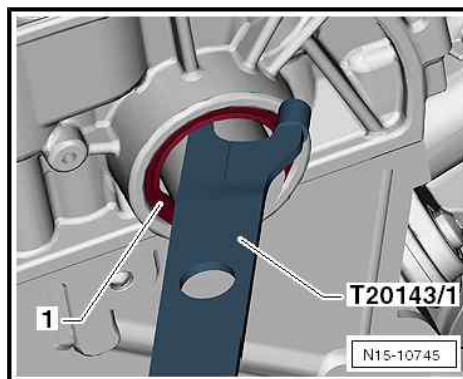


- Pull out oil seal -1- using extractor tool -T20143/1- .

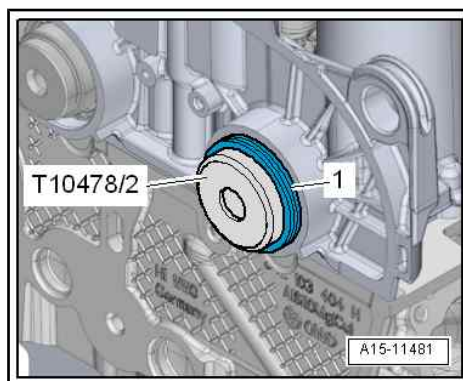


Installing

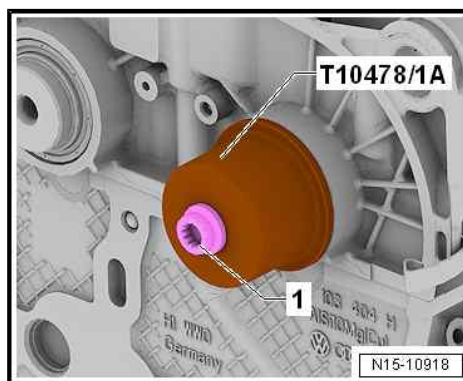
- Do not lubricate new oil seal.
- Slide oil seal -1- over fitting sleeve -T10478/3- onto guide sleeve -T10478/2- .
- Fitting position: closed side of oil seal faces guide sleeve.
- Detach fitting sleeve from guide sleeve.



- Fit guide sleeve -T10478/2- with oil seal -1- onto camshaft.



- Use thrust piece -T10478/1A- and bolt -1- for camshaft sprocket to pull in oil seal onto stop.
- Fit toothed belt onto camshafts ⇒ [page 141](#) .

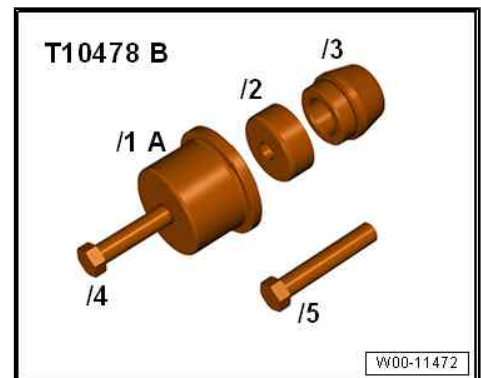




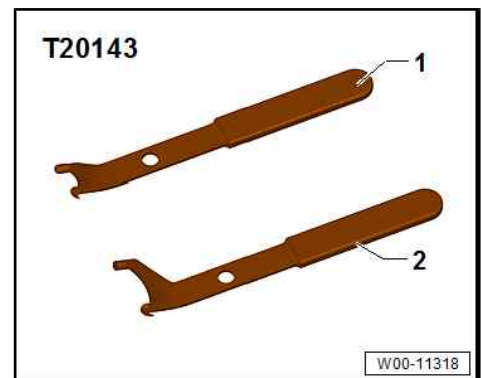
3.3.2 Removing and installing exhaust camshaft oil seal (pulley end)

Special tools and workshop equipment required

- ◆ Assembly tool - T10478 B-



- ◆ Extractor tool - T20143-



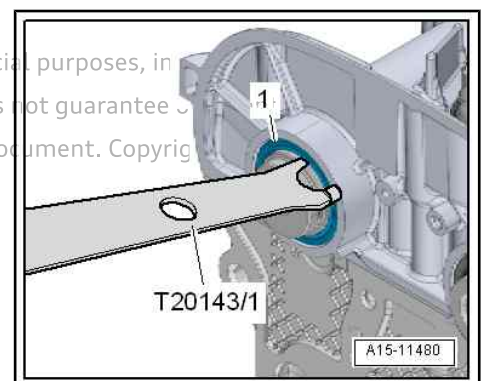
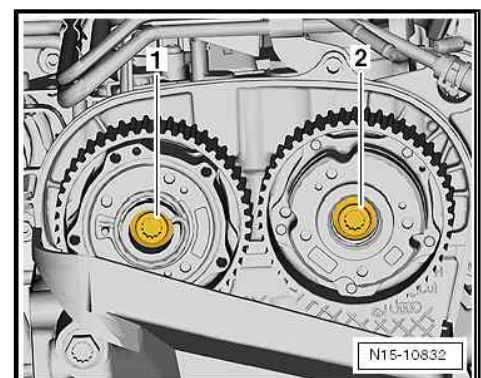
Removing

- Detach toothed belt from camshafts
⇒ ["2.7 Detaching toothed belt from camshaft", page 133](#) .
- Remove engine support
⇒ ["1.4 Removing and installing engine support", page 57](#) .
- Unscrew bolt -1- and detach camshaft adjuster.



- Pull out oil seal -1- using extractor tool -T20143/1- .

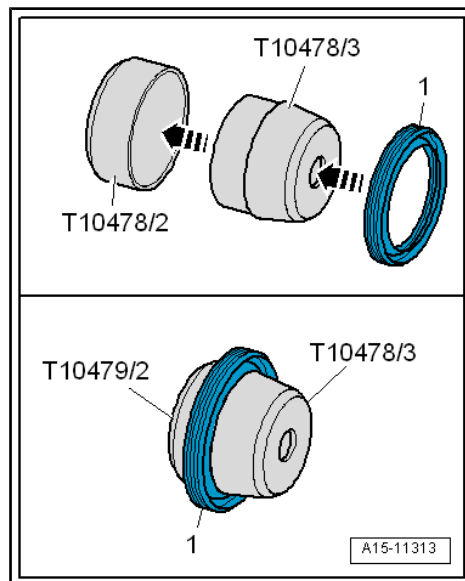
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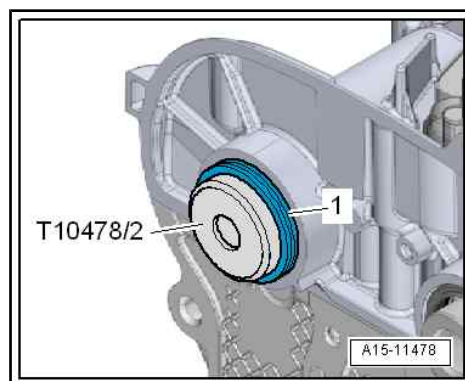


Installing

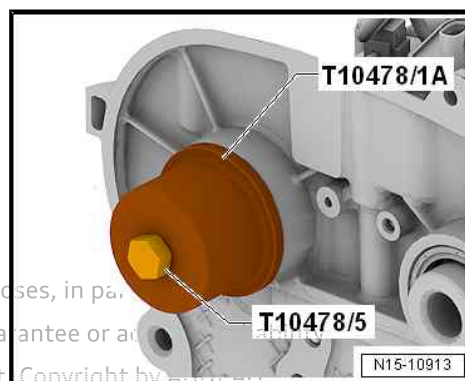
- Do not lubricate new oil seal.
- Slide oil seal -1- over fitting sleeve -T10478/3- onto guide sleeve -T10478/2- .
- Fitting position: closed side of oil seal faces guide sleeve.
- Detach fitting sleeve from guide sleeve.



- Fit guide sleeve -T10478/2- with oil seal -1- onto camshaft.



- Pull in thrust piece -T10478/1A- with bolt -T10478/5- as far as stop.
- Install engine support
⇒ [“1.4 Removing and installing engine support”, page 57](#) .
- Fit toothed belt onto camshafts ⇒ [page 141](#) .



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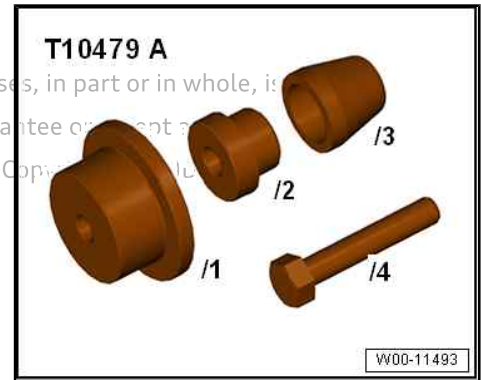
3.3.3 Removing and installing exhaust camshaft oil seal (gearbox end)

Special tools and workshop equipment required

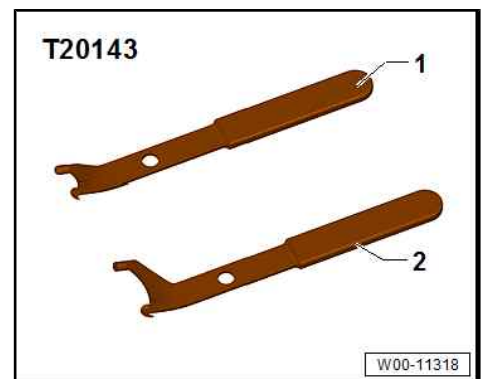


◆ Assembly tool - T10479-

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◆ Extractor tool - T20143-

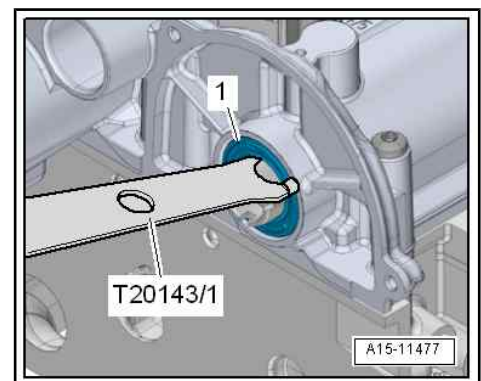


Removing

! NOTICE

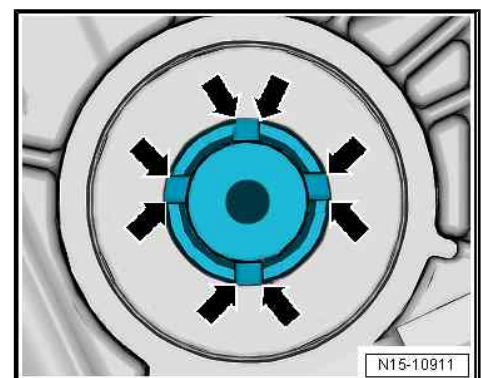
Danger of chemical damage to seal for coolant pump if oil enters between coolant pump and cylinder head.

- Cover coolant pump with a cloth.
- Catch escaping engine oil with a cloth.
- Remove toothed belt sprocket for coolant pump
⇒ ["2.7 Removing and installing toothed belt sprocket for coolant pump", page 213](#) .
- Carefully slide extractor tool -T20143/1- between camshaft and oil seal -1-.
- Pry out oil seal.



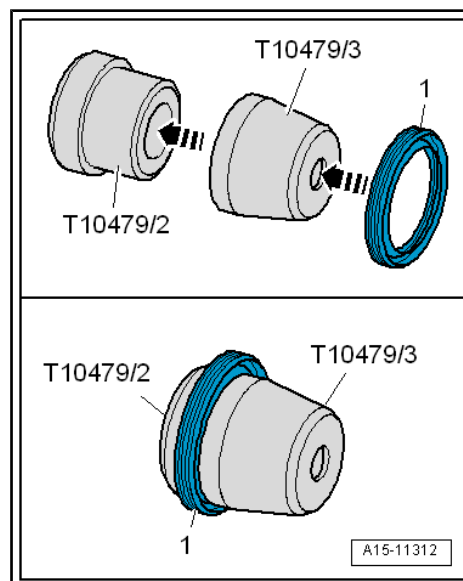
Installing

- If necessary, use fine sandpaper (grit 220 ... 1000) to remove any burrs that have formed on the outside of the outer grooves on the exhaust camshaft -arrows-.
- Do not lubricate new oil seal.

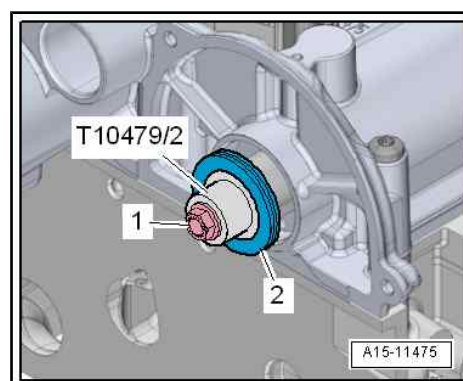




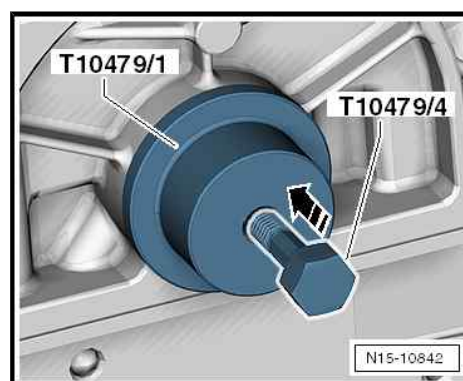
- Slide oil seal -1- over fitting sleeve -T10479/3- onto guide sleeve -T10479/2- .
- Fitting position: closed side of oil seal faces guide sleeve.
- Detach fitting sleeve from guide sleeve.



- Fit guide sleeve -T10479/2- with oil seal -2- onto camshaft so that it is centred.
- Secure guide sleeve onto camshaft using bolt -1- for coolant pump drive sprocket.
- Slide oil seal onto camshaft and unbolt guide sleeve.



- Pull in oil seal onto stop -arrow- using press tool -T10479/1- and bolt -T10479/4- .
- Install toothed belt sprocket for coolant pump
⇒ [“2.7 Removing and installing toothed belt sprocket for coolant pump”, page 213](#) .



3.4 Removing and installing camshaft adjuster

⇒ [“3.4.1 Removing and installing camshaft adjuster for inlet camshaft”, page 152](#)

⇒ [“3.4.2 Removing and installing camshaft adjuster for exhaust camshaft”, page 156](#)

3.4.1 Removing and installing camshaft adjuster for inlet camshaft

Special tools and workshop equipment required

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◆ Assembly tool - T10476A-



◆ Counterhold tool - T10554-



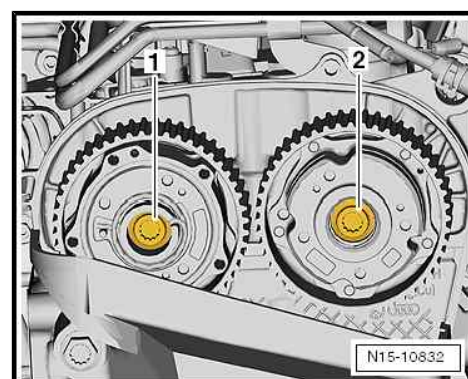
◆ Counterhold tool - T10172A-

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Removing

- Set engine to "TDC for cylinder 1"
⇒ ["4.7 Setting pistons to TDC position", page 82](#) .
- Detach toothed belt from camshafts
⇒ ["2.7 Detaching toothed belt from camshaft", page 133](#) .
- Secure camshaft with counterhold tool - T10554- and counterhold tool - T10172- so that it cannot turn.
- Unscrew bolt -2- for camshaft adjuster for inlet camshaft.
- Remove camshaft adjuster for inlet camshaft.
- Seal camshaft adjuster immediately using suitable plug from engine bung set - VAS 6122- .





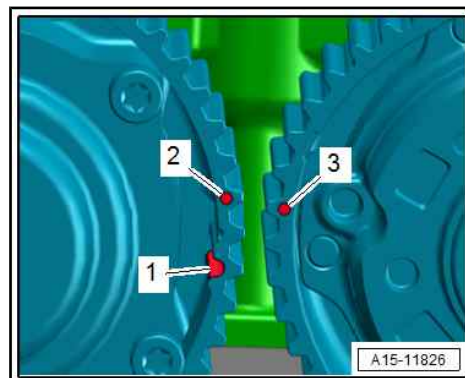
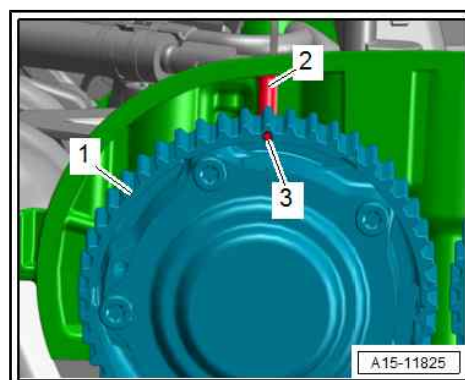
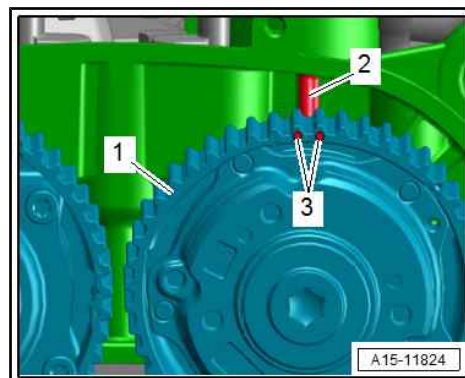
Installing

- Fit camshaft adjuster.
- Renew bolts -3- and -4- for camshaft adjusters and screw in loosely.
- It should just be possible to turn the sprockets -1- and -2- on the camshafts without axial movement.
- Camshafts are locked in "TDC" position.
- Camshaft sprockets are aligned with one another.
- Crankshaft is in "TDC" position.



Note

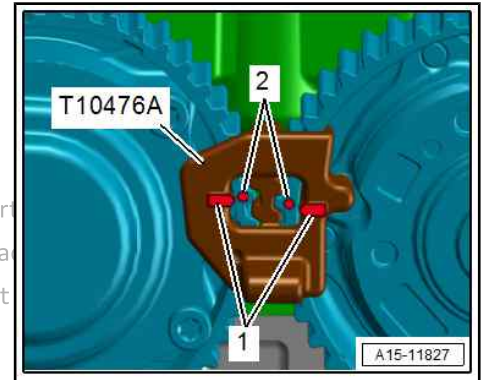
- ◆ Renew bolts tightened with specified tightening angle.
 - ◆ Renew O-ring of plug if damaged.
 - ◆ Make sure that guide sleeve ⇒ [Item 11 \(page 100\)](#) is re-installed.
-
- Align markings -3- on inlet camshaft sprocket -1- centrally with rib -2- on camshaft housing.
-
-
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-
- Align marking -3- on exhaust camshaft sprocket -1- centrally with rib -2- on camshaft housing.
-
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-
- Markings -2- and -3- must be slightly offset.
 - Groove -1- is used to check that assembly tool - T10476A- has been inserted correctly.



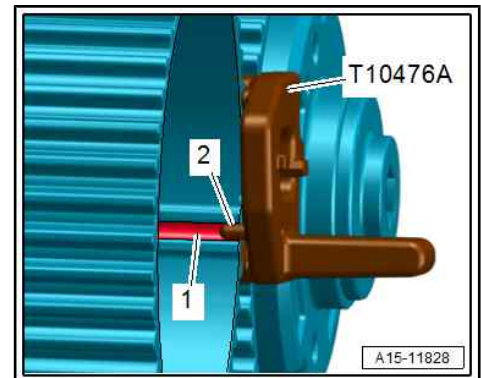


- Insert assembly tool - T10476A- between camshaft sprockets.
- Markings -1- on assembly tool - T10476A- must be aligned with markings -2- on camshaft sprockets.

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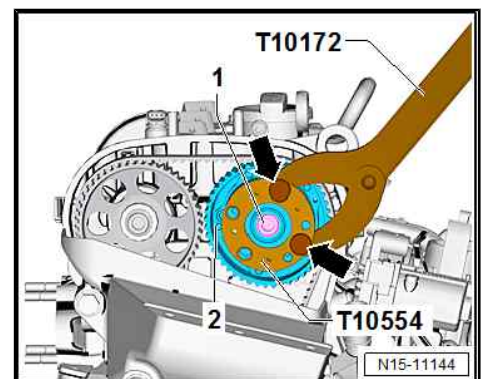
- Insert assembly tool - T10476A- as far as stop.
- Projection -2- of assembly tool - T10476A- must engage in groove -1- in exhaust camshaft sprocket.
- Fit toothed belt onto camshafts
⇒ ["2.7 Detaching toothed belt from camshaft", page 133](#) .



Pre-tightening procedure

- Hold inlet camshaft in position using counterhold tool - T10554- and counterhold tool - T10172- .
- Pre-tighten bolt -1- to initial tightening torque in two stages.

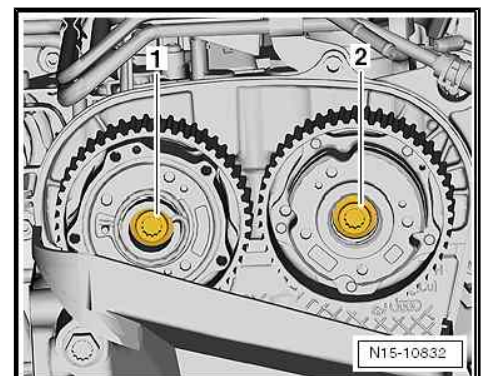
Stage	Securing bolt for camshaft adjuster (inlet side)	Tightening torque
1.	-1-	18 Nm
2.	-1-	50 Nm



- Hold exhaust camshaft in position using counterhold tool - T10554- and counterhold tool - T10172- .

- Pre-tighten bolt -1- to initial tightening torque in two stages.

Stage	Securing bolt for camshaft adjuster (exhaust side)	Tightening torque
1.	-1-	18 Nm
2.	-1-	50 Nm



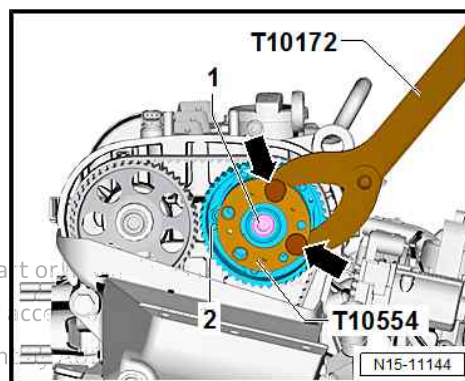


Procedure for tightening to final torque

- Tighten bolt -1- for camshaft adjuster to final torque.

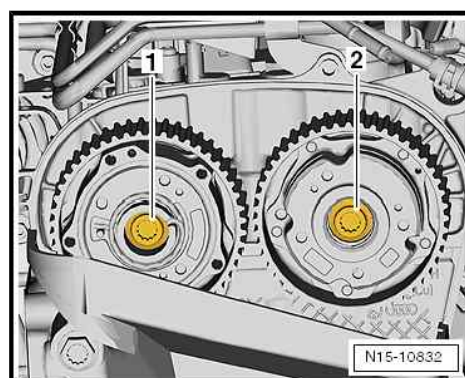
Stage	Securing bolt for camshaft adjuster (inlet side)	Angle to turn bolts
1.	-1-	135°

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- Tighten securing bolt for camshaft adjuster (exhaust side) -1- to final torque.

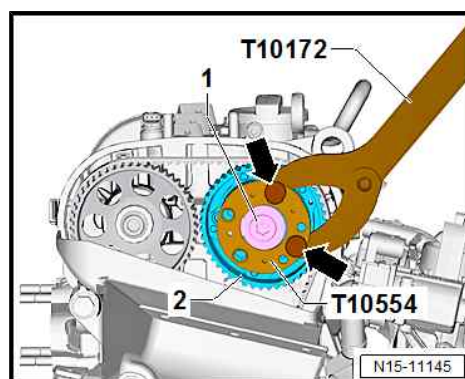
Stage	Securing bolt for camshaft adjuster	Angle to turn bolts
1.	-1-	135°



- Hold inlet camshaft in position using counterhold tool - T10554- and counterhold tool - T10172- .

- Fit plug -1- and tighten to specified torque.

Stage	Plug for camshaft adjuster	Tightening torque
1.	-1-	20 Nm



Assembling

Assembly is performed in reverse sequence; note the following:



Note

Remove camshaft clamp and crankshaft locking pin before turning the engine.

Tightening torques

- ♦ ⇒ [“2.2 Exploded view - toothed belt”, page 99](#)
- ♦ ⇒ [“3.1 Exploded view - valve gear”, page 145](#)

3.4.2 Removing and installing camshaft adjuster for exhaust camshaft

Special tools and workshop equipment required



◆ Assembly tool - T10476A-



◆ Counterhold tool - T10554-

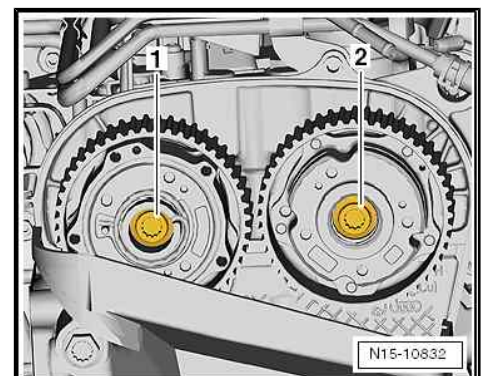


◆ Counterhold tool - T10172A-



Removing

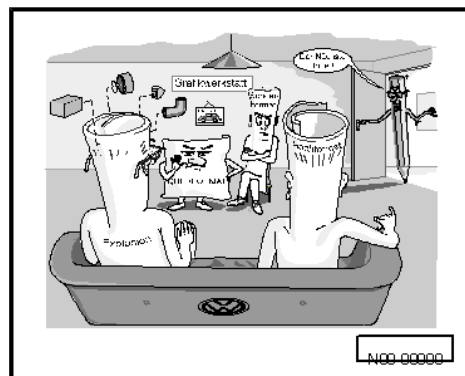
- Set engine to “TDC for cylinder 1”
⇒ [“4.7 Setting pistons to TDC position”, page 82](#).
- Detach toothed belt from camshafts
⇒ [“2.7 Detaching toothed belt from camshaft”, page 133](#).
- Secure camshaft with counterhold tool - T10554- and counterhold tool - T10172- so that it cannot turn.
- Unscrew bolt -1- for camshaft adjuster for exhaust camshaft.
- Remove engine support
⇒ [“1.4 Removing and installing engine support”, page 57](#).
- Remove camshaft adjuster for exhaust camshaft.
- Seal camshaft adjuster immediately using suitable plug from engine bung set - VAS 6122-.





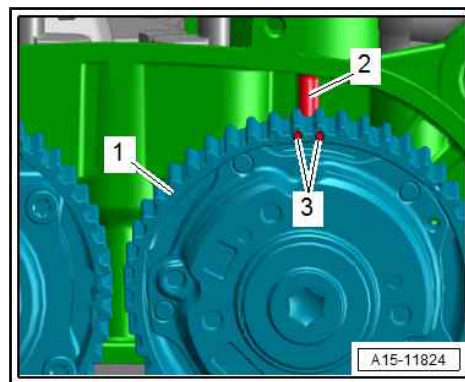
Installing

- Fit camshaft adjuster.
- Renew bolts -3- and -4- for camshaft adjusters and screw in loosely.
- It should just be possible to turn the sprockets -1- and -2- on the camshafts without axial movement.
- Camshafts are locked in “TDC” position.
- Camshaft sprockets are aligned with one another.
- Crankshaft is in “TDC” position.

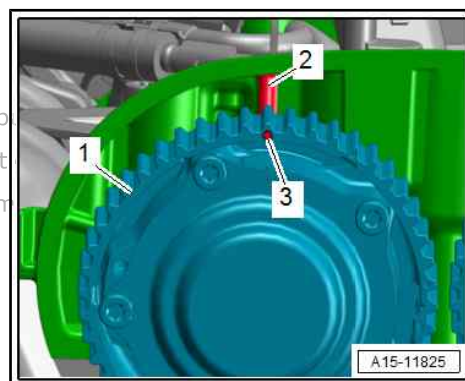


Note

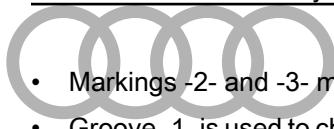
- ◆ *It should just be possible to turn the adjusters on the camshafts without axial movement.*
 - ◆ *Renew bolts tightened with specified tightening angle.*
 - ◆ *Renew O-ring of plug if damaged.*
 - ◆ *Make sure that guide sleeve ⇒ [Item 10 \(page 100\)](#) is re-installed.*
-
- Align markings -3- on inlet camshaft sprocket -1- centrally with rib -2- on camshaft housing.



- Align marking -3- on exhaust camshaft sprocket -1- centrally with rib -2- on camshaft housing.

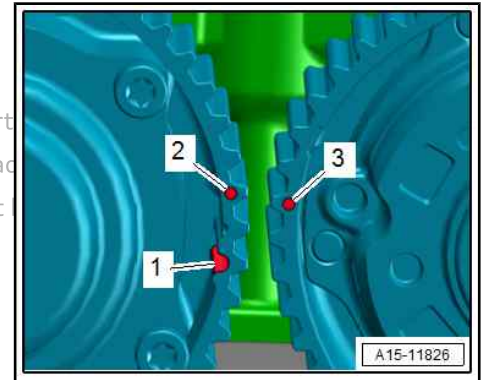


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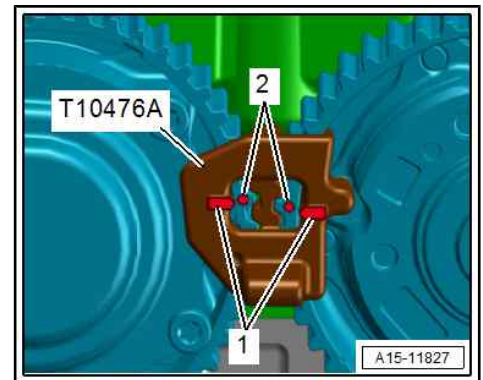


- Markings -2- and -3- must be slightly offset.
- Groove -1- is used to check that assembly tool - T10476A- has been inserted correctly.

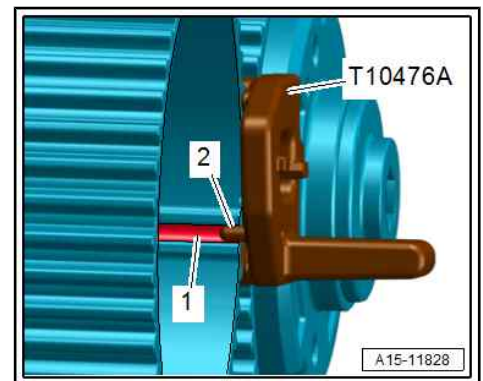
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- Insert assembly tool - T10476A- between camshaft sprockets.
- Markings -1- on assembly tool - T10476A- must be aligned with markings -2- on camshaft sprockets.



- Insert assembly tool - T10476A- as far as stop.
- Projection -2- of assembly tool - T10476A- must engage in groove -1- in exhaust camshaft sprocket.
- Fit toothed belt onto camshafts
⇒ [“2.7 Detaching toothed belt from camshaft”, page 133](#) .

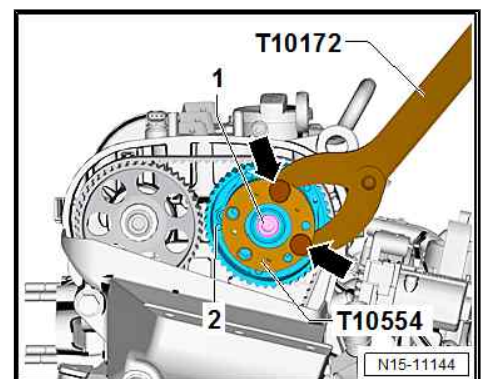


Pre-tightening procedure

- Hold inlet camshaft in position using counterhold tool - T10554- and counterhold tool - T10172- .
- Pre-tighten bolt -1- to initial tightening torque in two stages.

Stage	Securing bolt for camshaft adjuster (inlet side)	Tightening torque
1.	-1-	18 Nm
2.	-1-	50 Nm

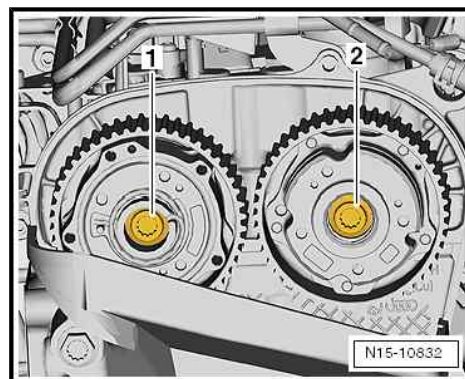
- Hold exhaust camshaft in position using counterhold tool - T10554- and counterhold tool - T10172- .





- Pre-tighten bolt -1- to initial tightening torque in two stages.

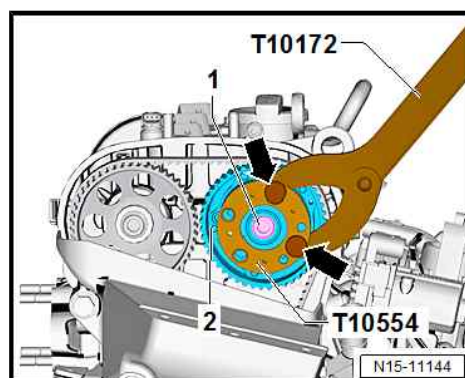
Stage	Securing bolt for camshaft adjuster (exhaust side)	Tightening torque
1.	-1-	18 Nm
2.	-1-	50 Nm



Procedure for tightening to final torque

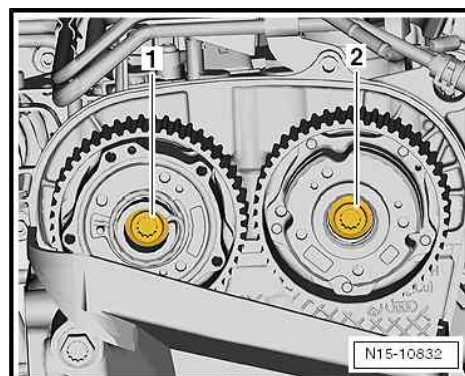
- Tighten bolt -1- for camshaft adjuster to final torque.

Stage	Securing bolt for camshaft adjuster (inlet side)	Angle to turn bolts
1.	-1-	135°



- Tighten securing bolt for camshaft adjuster (exhaust side) -1- to final torque.

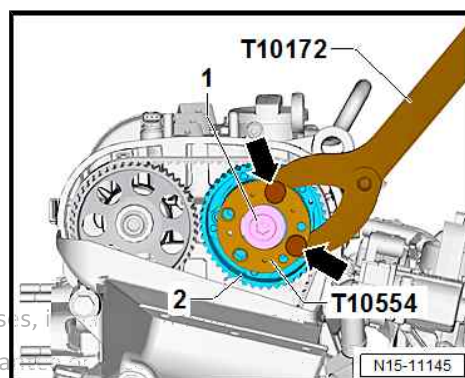
Stage	Securing bolt for camshaft adjuster	Angle to turn bolts
1.	-1-	135°



- Hold inlet camshaft in position using counterhold tool - T10554- and counterhold tool - T10172- .

- Fit plug -1- and tighten to specified torque.

Stage	Plug for camshaft adjuster	Tightening torque
1.	-1-	20 Nm



Assembling

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



Note

Remove camshaft clamp and crankshaft locking pin before turning the engine.

Tightening torques

- ♦ ⇒ [“2.2 Exploded view - toothed belt”, page 99](#)
- ♦ ⇒ [“3.1 Exploded view - valve gear”, page 145](#)



3.5 Removing and installing camshaft control valve -N205- / -N318-

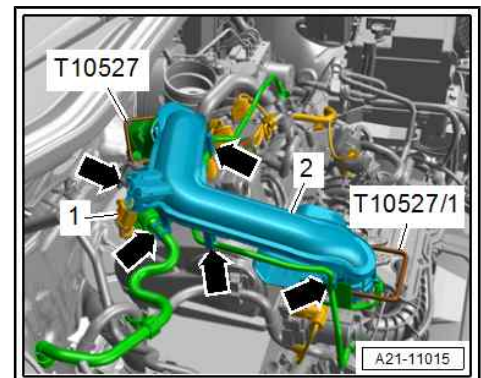
Special tools and workshop equipment required

- ◆ Release tool - T10527-



Removing

- Unplug electrical connector -1- for charge pressure sender - G31- / intake air temperature sender 2 - G299- and move electrical wiring clear.
- Move hoses -arrows- clear at air pipe -2-.
- Release fasteners using release tool - T10527- and detach air pipe.



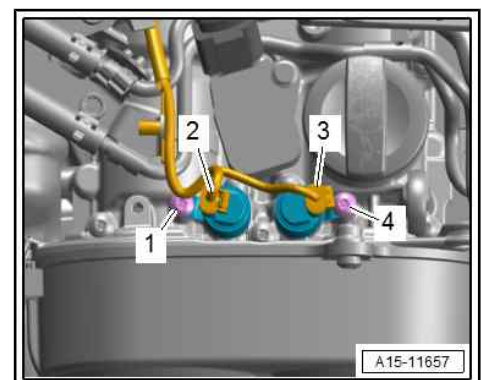
- Unplug relevant electrical connector -2- or -3-.
- Remove bolt -1- and remove exhaust camshaft control valve 1 - N318- .
- Unscrew bolt -4- and remove camshaft control valve 1 - N205- .

Installing

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

- Do not lubricate new oil seal.

Tightening torques



- ◆ ⇒ ["3.1 Exploded view - valve gear", page 145](#)

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3.6 Removing and installing valve stem oil seals

⇒ ["3.6.1 Removing and installing valve stem oil seals \(cylinder head installed\)", page 161](#)

⇒ ["3.6.2 Removing and installing valve stem oil seals \(cylinder head removed\)", page 165](#)

3.6.1 Removing and installing valve stem oil seals (cylinder head installed)

Special tools and workshop equipment required



- ◆ Spark plug spanner - 3122 B-



- ◆ Valve stem seal fitting tool - 3365-



- ◆ Removal and installation device for valve cotters - VAS 5161 A- with set -VAS 5161 A/32-



- ◆ Adapters - T40012-



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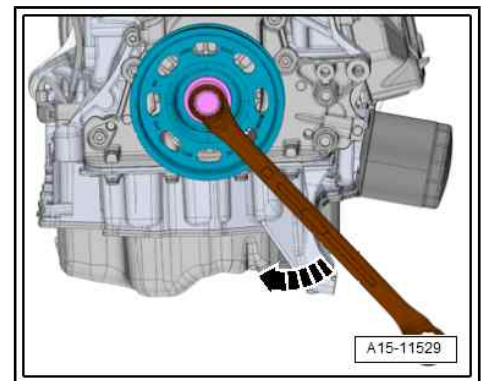
◆ Valve shaft pliers - VAS 6770-

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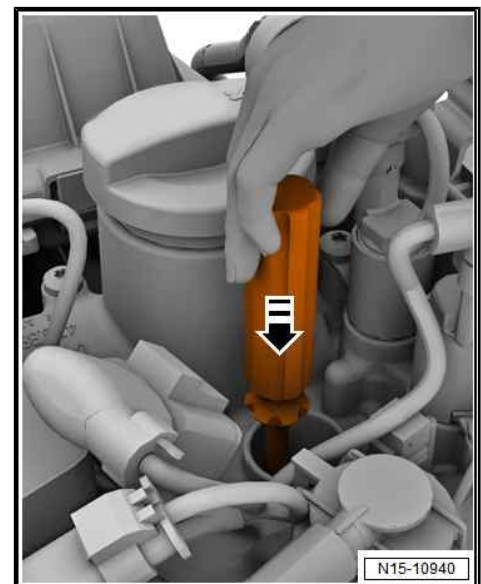
Procedure

- Remove camshaft housing
⇒ ["1.4 Removing and installing camshaft housing", page 92](#) .
- Unscrew spark plugs using spark plug socket - 3122 B- .
- Set piston of appropriate cylinder to "bottom dead centre".
- Insert a screwdriver with a shaft length of at least 250 mm into spark plug hole until it contacts piston crown.
- Rotate crankshaft in normal direction of rotation -arrow- until piston of respective cylinder is at "BDC".



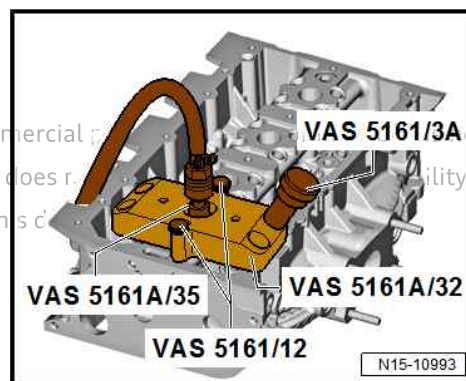
The screwdriver will move in direction of -arrow- in the process.

- "BDC" position is reached just before the screwdriver moves in the opposite direction again.

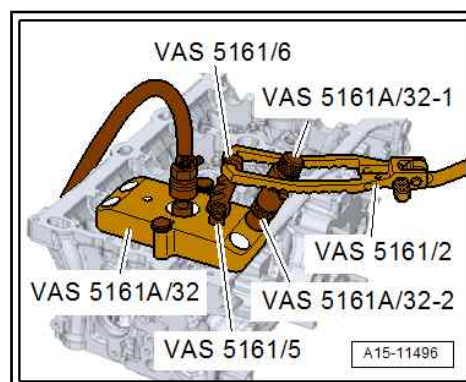




- Fit guide plate -VAS 5161A/32- onto cylinder head and secure with knurled screws -VAS 5161/12- .
- Screw adapter - VAS 5161A/35- with seal hand-tight into the corresponding spark plug thread.
- Connect adapter to compressed air line using a commercially available connection piece and apply constant air pressure.
- Minimum pressure: 6 bar
- Apply drift -VAS 5161/3A- to guide plate and use plastic-headed hammer to release sticking valve cotters.



- Screw snap-in device -VAS 5161/6- with engaging fork -VAS 5161/5- into guide plate.
- Insert assembly cartridge -VAS 5161 A/32-1- (slide on sleeve -VAS 5161 A/32-2-) in guide plate.
- Attach pressure fork -VAS 5161/2- to snap-in device and push assembly cartridge down.
- At the same time, turn knurled screw of assembly cartridge clockwise until tips engage in valve cotters.
- Move knurled screw back and forth slightly; the valve cotters are thus forced apart and taken up by the assembly cartridge.
- Release pressure fork.
- Take out assembly cartridge.
- Detach guide plate and turn to one side.
- The compressed air hose remains connected.
- Detach valve spring with valve spring plate.
- Pull off valve stem oil seal with valve shaft pliers - VAS 6770- .

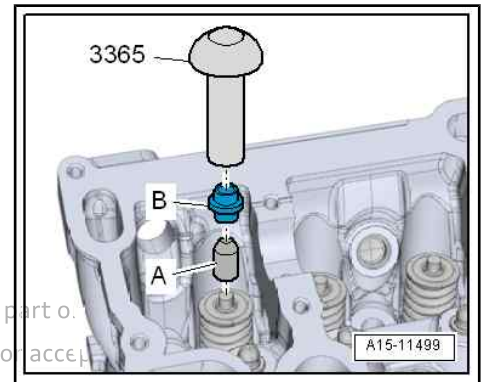




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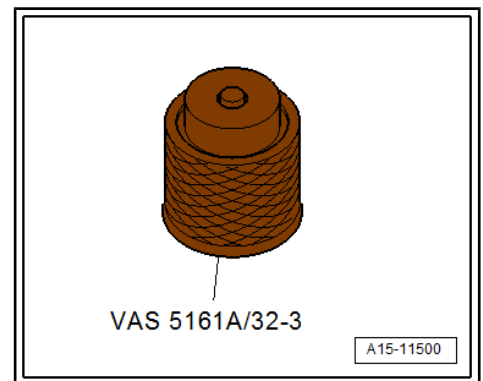
Risk of damage to valve stem oil seals if installed incorrectly.

- **Install new valve stem oil seals using the plastic sleeve supplied.**
- Lightly oil sealing lip of valve stem oil seal.
- Slide valve stem oil seal -B- onto plastic sleeve -A-.
- Carefully press valve stem oil seal onto valve guide using valve stem seal fitting tool - 3365.
- Remove plastic sleeve.

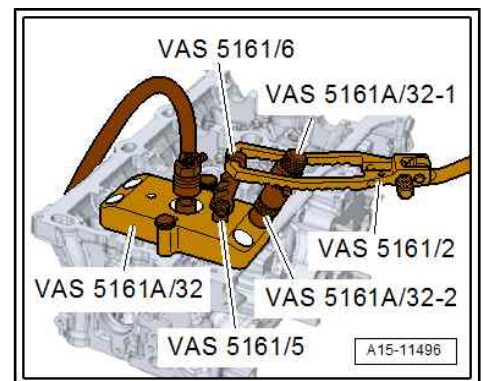


If valve cotters have been removed from assembly cartridge, they must first be inserted in insertion device -VAS 5161 A/32-3- .

- Larger diameter of valve cotters faces upwards.
- Press assembly cartridge onto insertion device from above and pick up valve cotters.
- Insert valve spring and valve spring plate; installation position of valve spring ⇒ [Fig. "Position of valve spring", page 146](#) .



- Secure guide plate -VAS 5161 A/32- back onto cylinder head.
- Insert assembly cartridge -VAS 5161 A/32-1- with sleeve -VAS 5161 A/32-2- into guide plate.
- Press down pressure fork and pull knurled screw upwards while turning screw in both directions - this will insert the valve cotters.
- Release pressure fork with knurled screw still in pulled position.
- Repeat procedure for each valve.



Assembling

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

- Install spark plugs ⇒ Maintenance ; Booklet 819 .
- Install camshaft housing
⇒ ["1.4 Removing and installing camshaft housing", page 92](#) .

3.6.2 Removing and installing valve stem oil seals (cylinder head removed)

Special tools and workshop equipment required



- ◆ Valve stem seal fitting tool - 3365-



- ◆ Removal and installation device for valve cotters - VAS 5161 A- with set -VAS 5161/32-



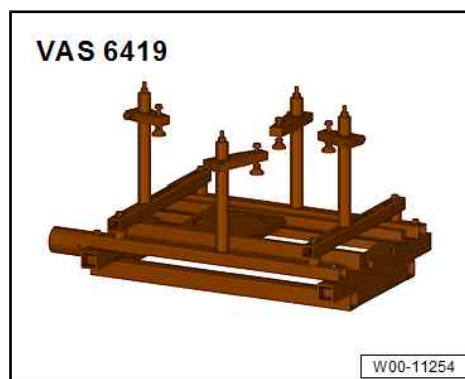
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- ◆ Engine and gearbox support - VAS 6095-

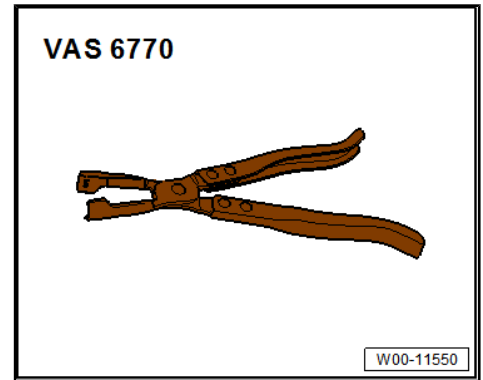


- ◆ Cylinder head tensioning device - VAS 6419-



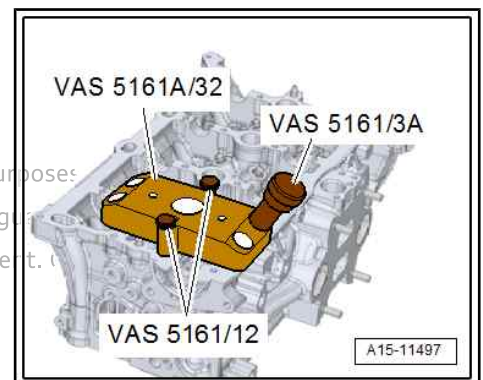
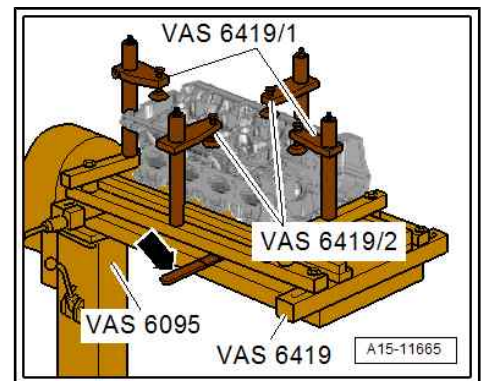


◆ Valve shaft pliers - VAS 6770-

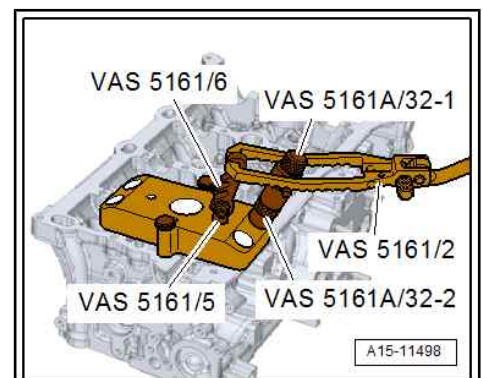


Procedure

- Insert cylinder head tensioning device - VAS 6419- into engine and gearbox support - VAS 6095- .
- Secure cylinder head in cylinder head tensioning device, as shown in illustration.
- Connect cylinder head tensioning device to compressed air supply.
- Using lever -arrow-, slide air pad under combustion chamber where valve stem oil seals are to be removed.
- Apply just enough compressed air to bring air pad into contact with valve heads.
- Fit guide plate -VAS 5161 A/32- onto cylinder head and secure with knurled screws -VAS 5161/12- .
- Apply drift -VAS 5161/3A- to guide plate and use plastic-headed hammer to release sticking valve cotters.



- Screw snap-in device -VAS 5161/6- with engaging fork - VAS 5161/5- into guide plate.
- Insert assembly cartridge -VAS 5161 A/32-1- (slide on sleeve -VAS 5161 A/32-2-) in guide plate.
- Attach pressure fork -VAS 5161/2- to snap-in device and push assembly cartridge down.
- At the same time, turn knurled screw of assembly cartridge clockwise until tips engage in valve cotters.
- Move knurled screw back and forth slightly; the valve cotters are thus forced apart and taken up by the assembly cartridge.
- Release pressure fork.
- Take out assembly cartridge.
- Detach guide plate and turn to one side.
- Detach valve spring with valve spring plate.





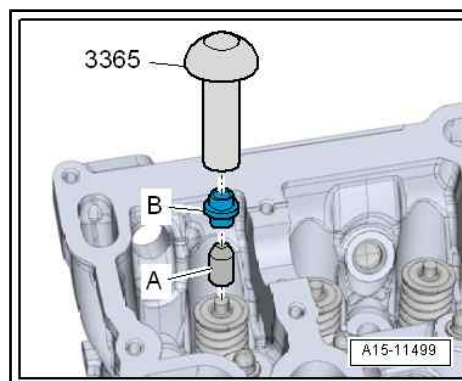
- Pull off valve stem oil seal with valve shaft pliers - VAS 6770- .



NOTICE

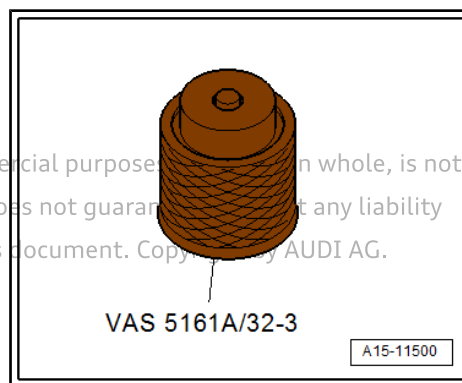
Risk of damage to valve stem oil seals if installed incorrectly.

- Install new valve stem oil seals using the plastic sleeve supplied.
- Lightly oil sealing lip of valve stem oil seal.
- Slide valve stem oil seal -B- onto plastic sleeve -A-.
- Carefully press valve stem oil seal onto valve guide using valve stem seal fitting tool - 3365- .
- Remove plastic sleeve.

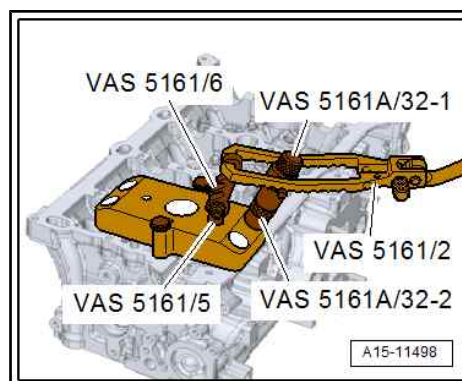


If valve cotters have been removed from assembly cartridge, they must first be inserted in insertion device -VAS 5161 A/32-3- .

- Larger diameter of valve cotters faces upwards.
- Press assembly cartridge onto insertion device from above and pick up valve cotters.
- Insert valve spring and valve spring plate; installation position of valve spring ⇒ Fig. "Position of valve spring" page 146



- Secure guide plate -VAS 5161 A/32- back onto cylinder head.
- Insert assembly cartridge -VAS 5161 A/32-1- with sleeve -VAS 5161 A/32-2- into guide plate.
- Press down pressure fork and pull knurled screw upwards while turning screw in both directions - this will insert the valve cotters.
- Release pressure fork with knurled screw still in pulled position.
- Repeat procedure for each valve.





4 Inlet and exhaust valves

⇒ ["4.1 Checking valve guides", page 169](#)

⇒ ["4.2 Checking valves", page 169](#)

⇒ ["4.3 Valve dimensions", page 170](#)

4.1 Checking valve guides

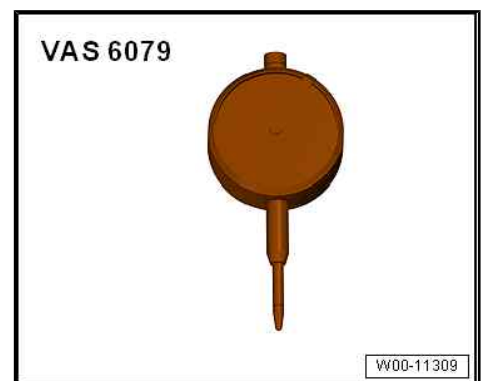
Special tools and workshop equipment required

- ◆ Universal dial gauge bracket - VW 387-

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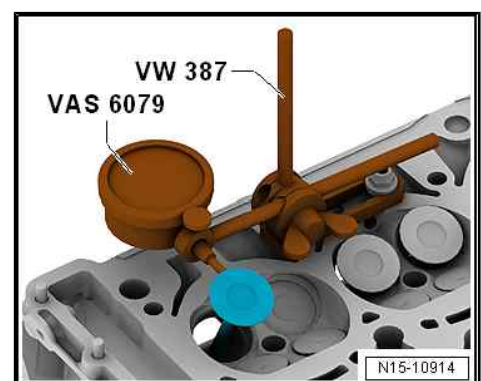


- ◆ Dial gauge - VAS 6079-



Test sequence

- Insert valve into guide. End of valve stem must be flush with guide. Only insert inlet valve into inlet valve guide and exhaust valve into exhaust valve guide, as the stem diameters are different.
- Measure the amount of sideways play.
 - Wear limit: 0.5 mm.
- If the wear limit is exceeded, repeat the measurement with new valves.
- Renew cylinder head if wear limit is still exceeded. Valve guides cannot be renewed.



4.2 Checking valves

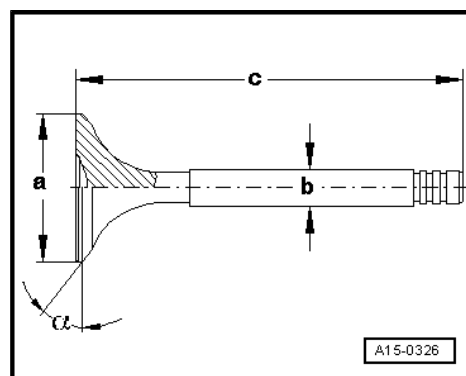
- Visually inspect for scoring on valve stems and valve seat surfaces.
- Renew valve if scoring is clearly visible.



4.3 Valve dimensions

- Inlet and exhaust valves must not be machined. Only grinding-in is permitted.

Dimension		Inlet valve	Exhaust valve
Ø a	mm	28.5	25.0
Ø b	mm	4.973	4.963
c	mm	110.25	110.09
α	°	45	30



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17 – Lubrication

1 Sump/oil pump

⇒ [“1.1 Exploded view - sump/oil pump”, page 171](#)

⇒ [“1.2 Engine oil”, page 173](#)

⇒ [“1.3 Removing and installing sump”, page 173](#)

⇒ [“1.4 Removing and installing oil pump”, page 176](#)

⇒ [“1.5 Removing and installing oil level and oil temperature sender G266”, page 178](#)

1.1 Exploded view - sump/oil pump

- If large quantities of metal shavings or abrasion are found when performing engine repairs, this may be an indication of damage to the crankshaft or conrod bearings. To prevent further damage, the following steps are required after completion of repair work: clean the oil passages carefully and renew the oil spray jets, engine oil cooler and oil filter.
- Oil spray jet and pressure relief valve
⇒ [“4.1 Exploded view - pistons and conrods”, page 76](#)

1 - Sump

- ❑ Removing and installing
⇒ [“1.3 Removing and installing sump”, page 173](#)
- ❑ Securing threaded connection for oil filter if it has come loose
⇒ [Fig. “Securing threaded connection for oil filter”, page 186](#)

2 - Bolt

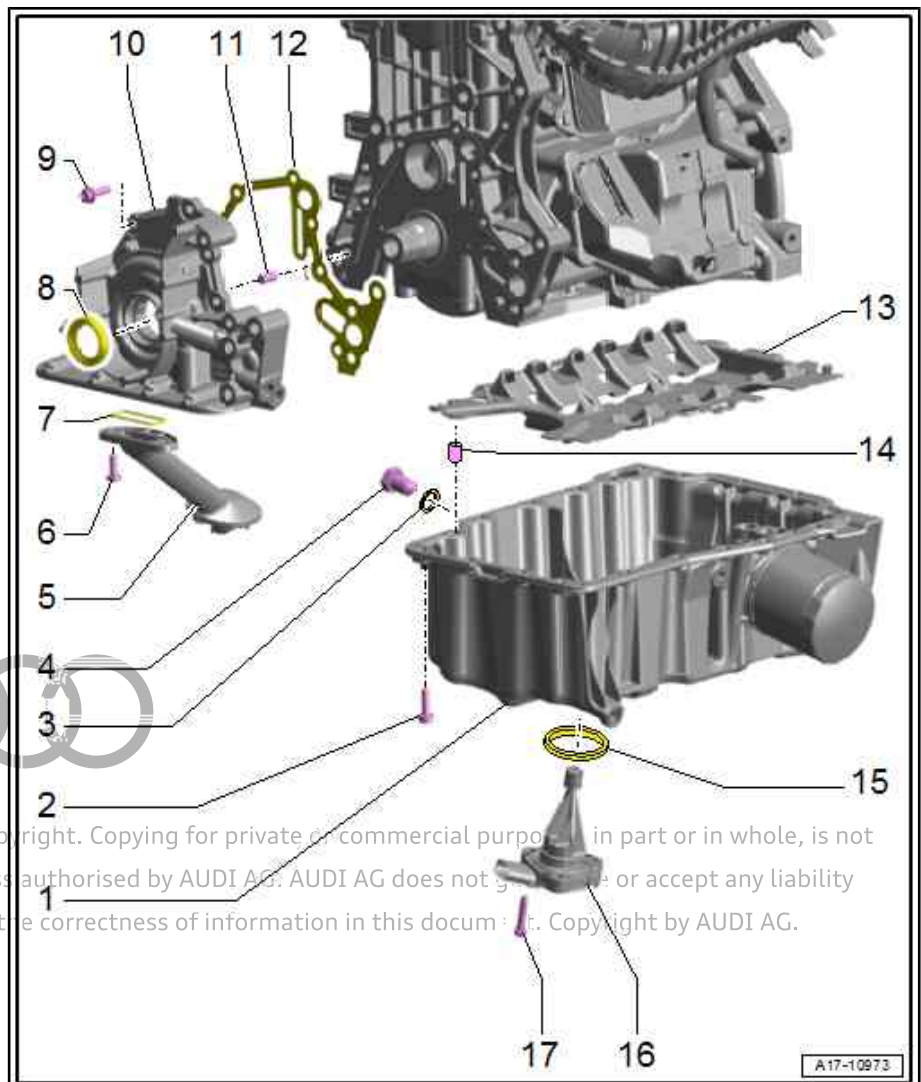
- ❑ Renew after removing
- ❑ Tightening sequence
⇒ [Fig. “Sump - tightening torque and sequence”, page 172](#)

3 - Seal

- ❑ Renew (for oil drain plug with separate seal)

4 - Oil drain plug

- ❑ With attached seal on new vehicles
⇒ [Fig. “Oil drain plug with attached seal \(fitted at factory\)”, page 173](#)
- ❑ Renewed when first oil change is performed
⇒ [Fig. “Oil drain plug with attached seal \(fitted at factory\)”, page 173](#)
- ❑ The oil drain plug with separate seal (fitted when first oil change is performed) can be re-





used

⇒ [Fig. “Oil drain plug with exchangeable seal \(all further oil changes\)”](#), page 173

- ☐ 30 Nm

5 - Oil intake pipe

- ☐ Clean strainer if dirty

6 - Bolt

- ☐ 8 Nm

7 - Gasket

- ☐ Renew after removing

8 - Seal

- ☐ Renewing ⇒ [“1.6 Renewing crankshaft oil seal \(pulley end\)”](#), page 61

9 - Bolt

- ☐ Tightening torque and sequence ⇒ [Fig. “Oil pump - tightening torque and sequence”](#), page 173

10 - Oil pump

- ☐ Removing and installing ⇒ [“1.4 Removing and installing oil pump”](#), page 176

11 - Dowel sleeve

- ☐ 2x

12 - Gasket

- ☐ Renew after removing

13 - Baffle plate

14 - Dowel pin

15 - Seal

- ☐ Renew after removing

16 - Oil level and oil temperature sender - G266-

- ☐ Removing and installing
⇒ [“1.5 Removing and installing oil level and oil temperature sender G266 ”](#), page 178

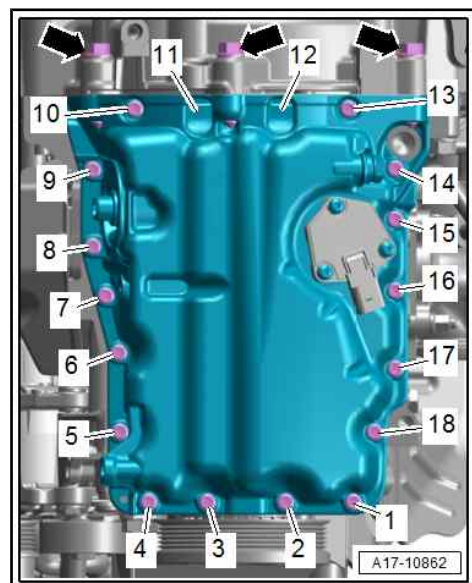
17 - Bolt

- ☐ 9 Nm

Sump - tightening torque and sequence

– Tighten bolts in stages in the sequence shown:

Stage	Bolts	Tightening torque
1.	-1 ... 18-	Screw in by hand until contact is made
2.	-1 ... 18-	12 Nm

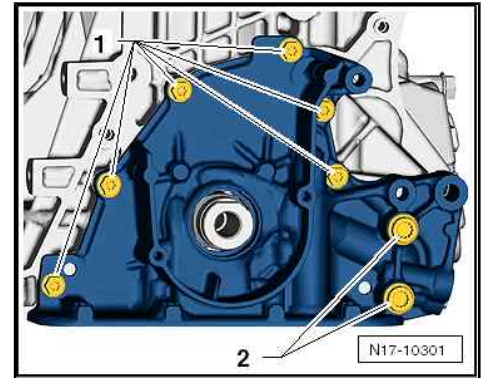




Oil pump - tightening torque and sequence

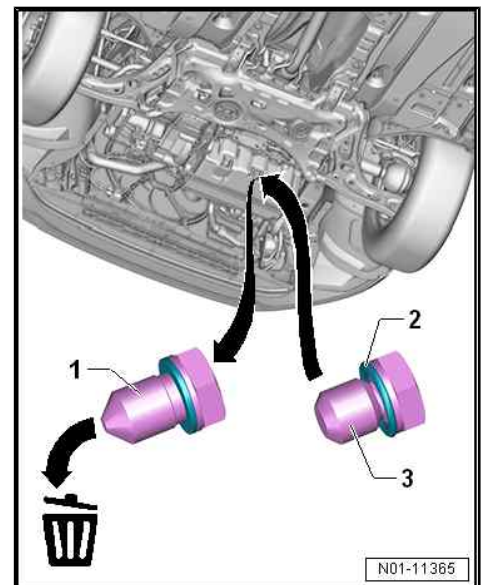
- Renew bolts tightened with specified tightening angle.
- Tighten bolts in stages in the sequence shown:

Stage	Bolts	Tightening torque/angle specification
1.	-1, 2-	8 Nm
2.	-1-	Turn 90° further
3.	-2-	20 Nm



Oil drain plug with attached seal (fitted at factory)

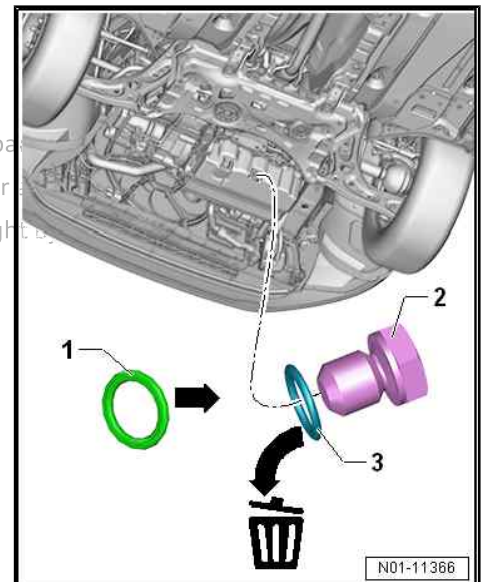
- Discard oil drain plug with captive seal -1- when performing first oil change.
- Fit new oil drain plug -3- with exchangeable seal -2-.



Oil drain plug with exchangeable seal (all further oil changes)

- Unscrew oil drain plug -2- and discard used seal -3-.
- New seal -1- can be renewed separately when performing future oil changes.

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1.2 Engine oil

For engine oil capacity, oil specifications and viscosity grades, refer to ➤ Maintenance tables or ➤ Technical data for engines; Rep. gr. 00 ; Overview of engines .

1.3 Removing and installing sump

Special tools and workshop equipment required



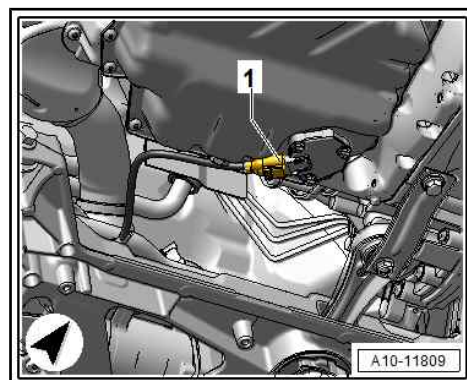
◆ Socket - T10058-



- ◆ Electric drill with plastic brush attachment
- ◆ Safety goggles
- ◆ Sealant ➔ Electronic parts catalogue

Removing

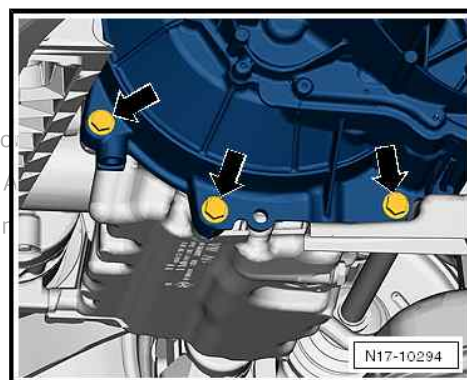
- Engine oil drained, oil filter removed ➔ Maintenance ; Booklet 819
- Detach air conditioner compressor from bracket and tie up ➔ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Detaching and attaching air conditioner compressor at bracket .
- Unplug electrical connector -1- at oil level and oil temperature sender - G266- .



- Remove bolts -arrows- securing gearbox to sump.

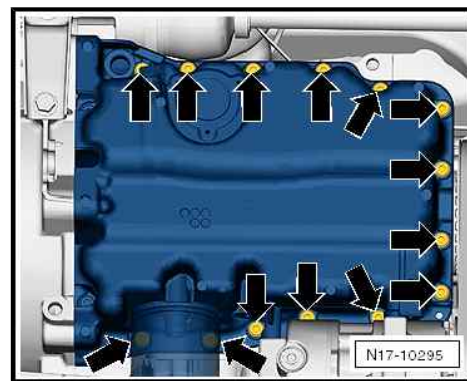


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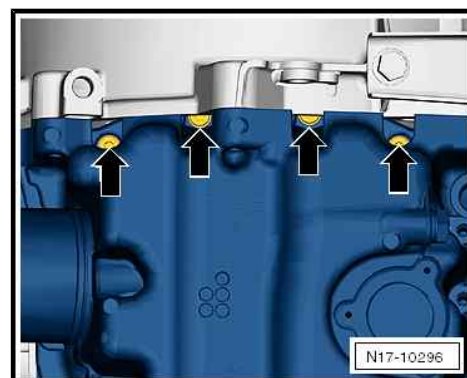




- Loosen bolts -arrows- in diagonal sequence and remove.



- Unscrew bolts -arrows- at gearbox end using Allen key, long reach - T10058- .



- Use assembly lever to prise sump off cylinder block at recesses -arrow- (front and rear).
- Remove sump. To do so, it may be necessary to strike sump lightly with a rubber hammer to loosen it from bonded joint.
- Cover exposed parts of the engine.

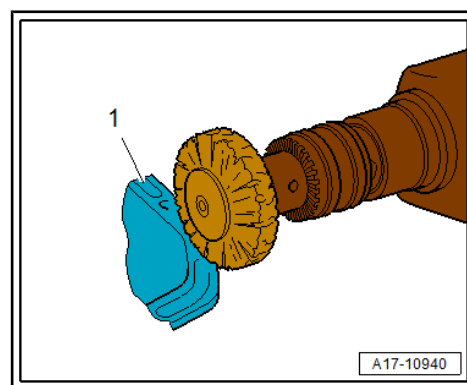


Installing

⚠ CAUTION

Risk of eye injury due to sealant residue.

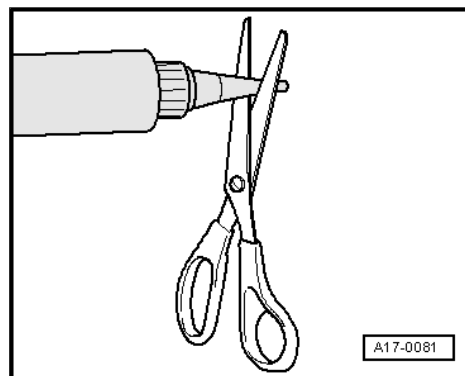
- Put on safety goggles.
- Remove sealant residue from sump -1- and cylinder block using rotating plastic brush or similar.
- Clean sealing surfaces; they must be free of oil and grease.



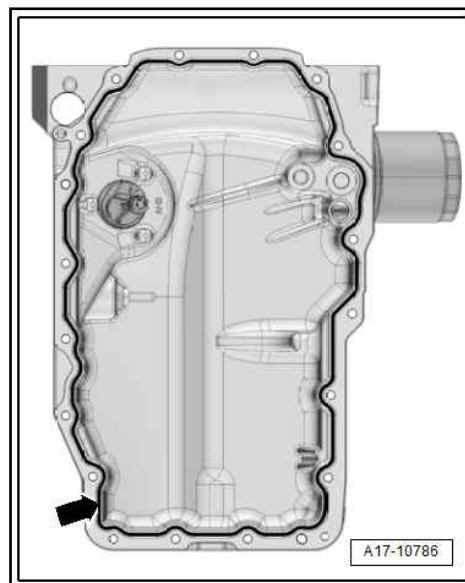
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- Note expiry date of sealant.
- Cut off nozzle of tube at front marking (nozzle $\varnothing$ approx. 2 mm).



- Thickness of sealant bead: 2 ... 3 mm
- Apply sealant bead -arrow- onto clean sealing surface of sump (bottom section) as shown in illustration.
- Take particular care when applying sealant bead in area of sealing flange.
- The sump (bottom section) must be installed within 5 minutes after applying the sealant.
- Fit sump and tighten bolts
⇒ [Fig. “Sump - tightening torque and sequence”](#), [page 172](#) .
- After fitting sump, sealant must dry for approx. 30 minutes. Then (and only then) fill the engine with engine oil.
- Install oil filter, fill up with engine oil and check oil level ⇒ Maintenance ; Booklet 819 .



Tightening torques

- ◆ ⇒ [Fig. “Sump - tightening torque and sequence”](#), [page 172](#)
- ◆ ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Exploded view - air conditioner compressor drive unit
- ◆ ⇒ Rep. gr. 34 ; Removing and installing gearbox; Tightening torques for gearbox

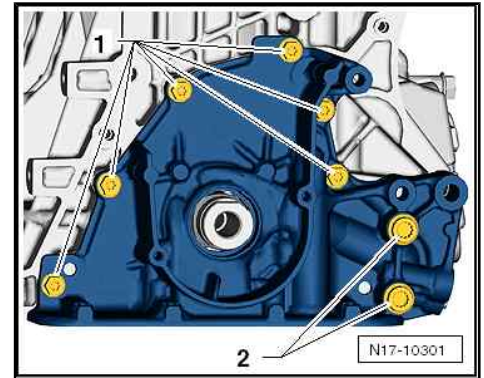
1.4 Removing and installing oil pump

Removing

- Remove toothed belt
⇒ [“2.3 Removing and installing toothed belt”, page 101](#) .
- Remove sump
⇒ [“1.3 Removing and installing sump”, page 173](#) .
- Remove alternator ⇒ Electrical system; Rep. gr. 27 ; Alternator; Removing and installing alternator .
- Remove crankshaft oil seal (pulley end)
⇒ [“1.6 Renewing crankshaft oil seal \(pulley end\)”, page 61](#) .



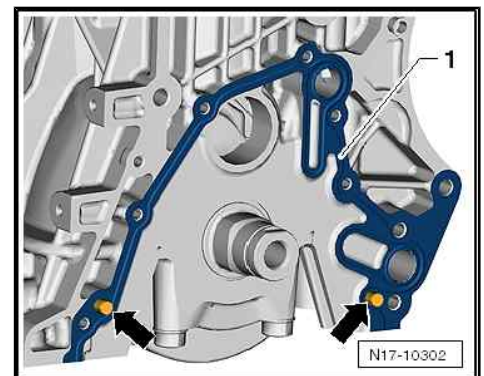
- Remove bolts -1, 2- and detach oil pump horizontally from dowel pins in cylinder block.
- Detach gasket.



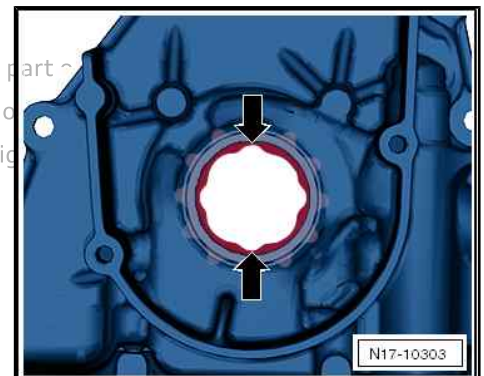
Installing

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

- After removing, renew bolts tightened with specified tightening angle.
- Renew gasket.
- Check whether dowel pins -arrows- for centring oil pump and cylinder block are fitted; insert dowel pins if necessary.
- Fit new gasket -1-.



- Turn bearing -arrows- by hand to check oil pump for ease of movement.
- Renew oil pump if it does not turn easily.
- Turn oil pump gear so that two opposite recesses are vertically aligned -arrows-.



- Fit oil pump and tighten bolts
⇒ [Fig. “Oil pump - tightening torque and sequence”](#), [page 173](#) .
- Install new crankshaft oil seal (pulley end)
⇒ [“1.6 Renewing crankshaft oil seal \(pulley end\)”](#), [page 61](#) .
- Install sump
⇒ [“1.3 Removing and installing sump”](#), [page 173](#) .
- Install toothed belt
⇒ [“2.3 Removing and installing toothed belt”](#), [page 101](#) .
- Install alternator ⇒ Electrical system; Rep. gr. 27 ; Alternator; Removing and installing alternator .

Tightening torques

- ◆ ⇒ [Fig. “Oil pump - tightening torque and sequence”](#), [page 173](#)
- ◆ ⇒ Electrical system; Rep. gr. 27 ; Alternator; Exploded view - alternator



1.5 Removing and installing oil level and oil temperature sender - G266-

Removing

- Engine oil drained ⇒ Maintenance ; Booklet 819
- Unplug electrical connector -2-.
- Remove bolts -1- and detach oil level and oil temperature sender - G266- -item 3-.

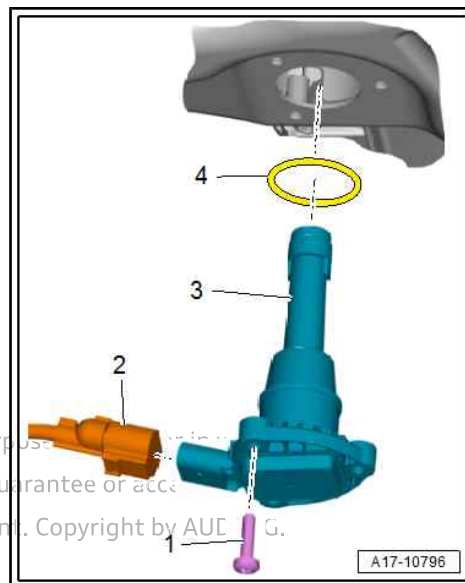
Installing

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

- Renew seal -4- after removing.
- Fill with engine oil and check oil level ⇒ Maintenance ; Booklet 819 .

Tightening torques

- ♦ ⇒ ["1.1 Exploded view sump/oil pump", page 171](#)





2 Engine oil cooler

⇒ [“2.1 Exploded view - engine oil cooler”, page 179](#)

⇒ [“2.2 Removing and installing engine oil cooler”, page 179](#)

2.1 Exploded view - engine oil cooler

1 - Bolt

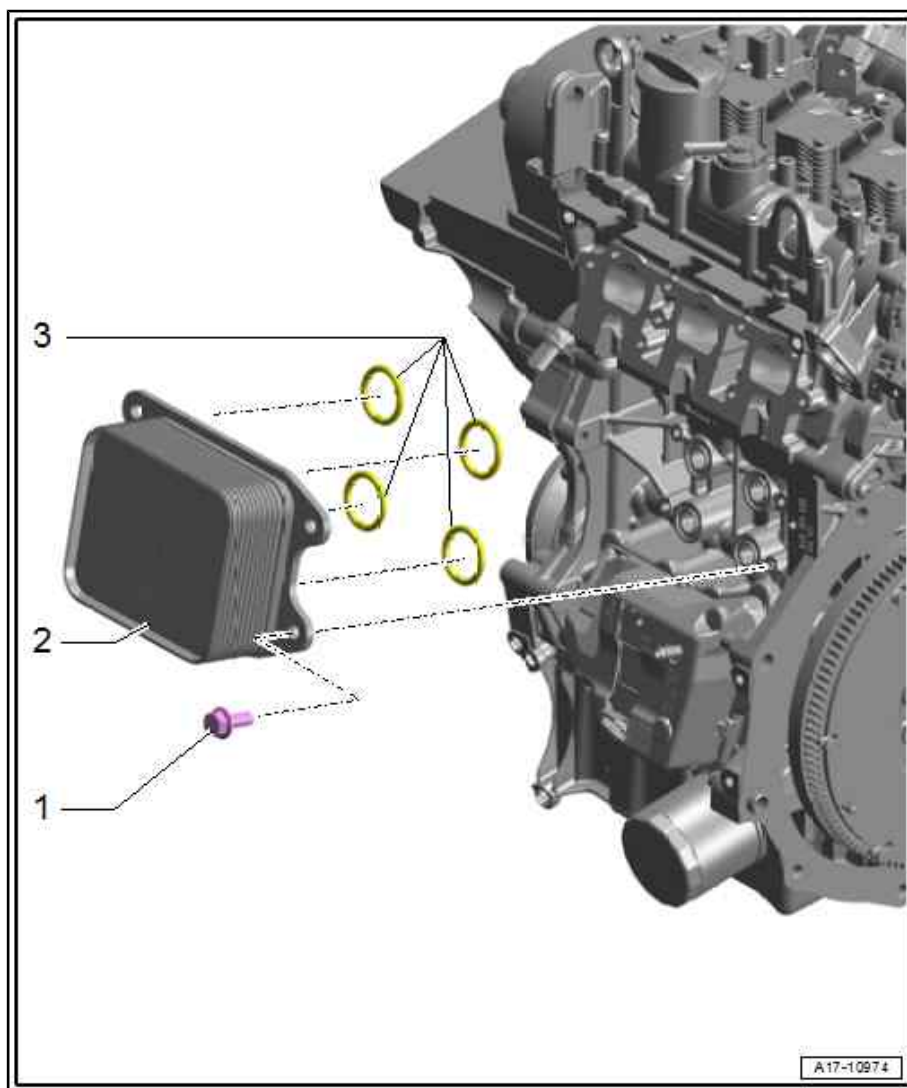
- ☐ Renew after removing
- ☐ 8 Nm +90°

2 - Engine oil cooler

- ☐ See note
⇒ [“1 Sump/oil pump”, page 171](#)
- ☐ Removing and installing
⇒ [“2.2 Removing and installing engine oil cooler”, page 179](#)
- ☐ If renewed, refill system with fresh coolant

3 - Seals

- ☐ Renew after removing



2.2 Removing and installing engine oil cooler

Removing

- Remove intake manifold

⇒ [“3.2 Removing and installing intake manifold”, page 269](#)

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- Unscrew bolts -arrows- and detach engine oil cooler -1-.

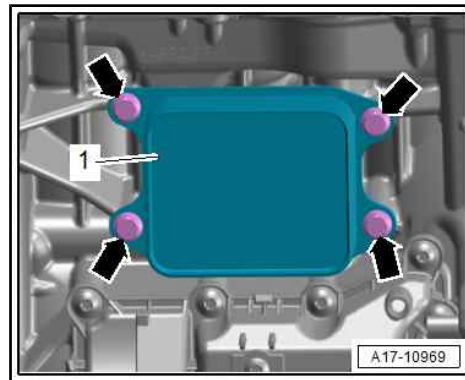
Installing

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

- Renew oil seals after removing.
- Do not reuse coolant.
- Install intake manifold
⇒ [“3.2 Removing and installing intake manifold”, page 269](#) .
- Fill up with coolant ⇒ [page 199](#) .

Tightening torques

- ◆ ⇒ [“2.1 Exploded view - engine oil cooler”, page 179](#)



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3 Crankcase breather

⇒ ["3.1 Exploded view - crankcase breather system", page 181](#)

⇒ ["3.2 Removing and installing oil separator", page 182](#)

3.1 Exploded view - crankcase breather system

1 - Bolt

- ☐ Self-locking
- ☐ Renew after removing
- ☐ 9 Nm

2 - Oil separator

- ☐ Removing and installing
⇒ ["3.2 Removing and installing oil separator", page 182](#)
- ☐ Renew if damaged

3 - Cover

- ☐ For oil separator

4 - Hose

- ☐ For crankcase breather

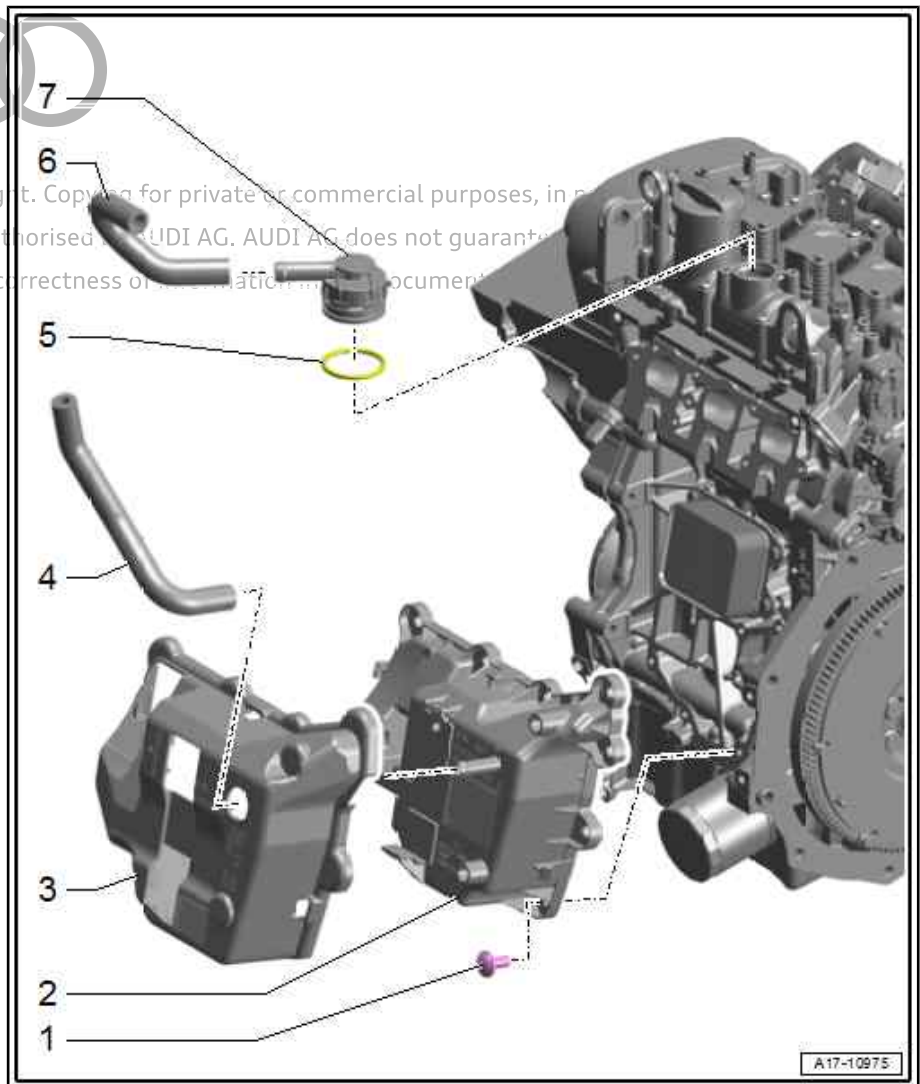
5 - O-ring

- ☐ Lubricate lightly with oil before fitting
- ☐ Check for damage and renew if necessary; supplied together with non-return valve

6 - Hose

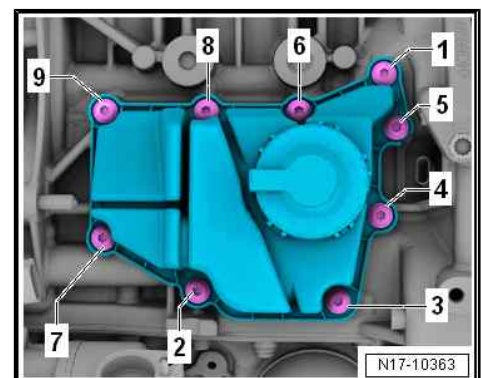
- ☐ For crankcase breather

7 - Non-return valve



Oil separator - tightening torque and sequence

- Tighten bolts in the sequence -1 ... 9- to 9 Nm.





3.2 Removing and installing oil separator

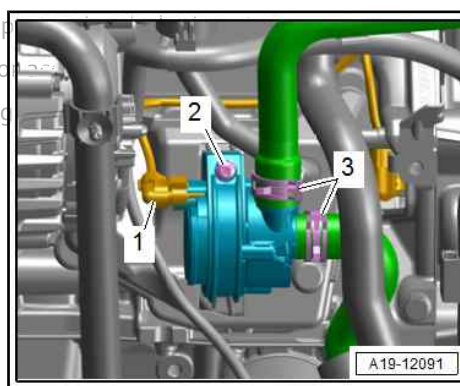
Special tools and workshop equipment required

- ◆ Electric drill with plastic brush attachment
- ◆ Safety goggles
- ◆ Studs, M6x20 mm
- ◆ Sealant ⇒ Electronic parts catalogue

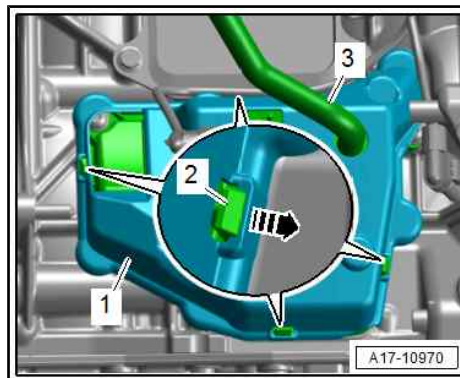
Removing

- Detach air conditioner compressor from bracket and tie up ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Detaching and attaching air conditioner compressor at bracket .
- Remove alternator ⇒ Electrical system; Rep. gr. 27 ; Alternator; Removing and installing alternator .

- Unplug electrical connector -1-.
- Remove bolt -2- and press continued coolant circulation pump - V51- to side.



- Disconnect crankcase breather hose -3-.
- Release fasteners -2- -arrow- on cover -1- for oil separator and detach cover.



- Slacken and remove bolts in the sequence: -9 ... 1-.
- Carefully release oil separator from bonded joint.

NOTICE

Protect lubrication system against contamination.

- Cover exposed parts of the engine.

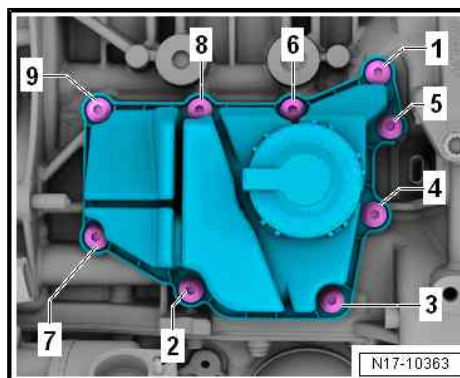
Installing

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

NOTICE

Risk of leaks if sealing surfaces are damaged

- Do not use a scraper or other tools to clean sealing surfaces.





⚠ CAUTION

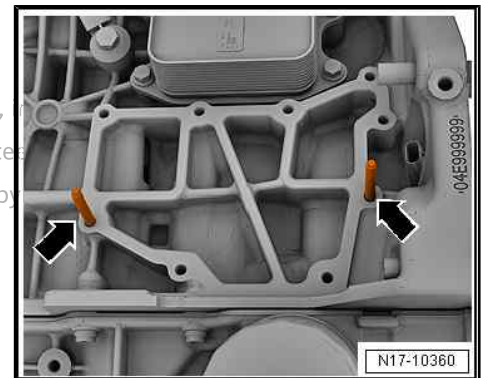
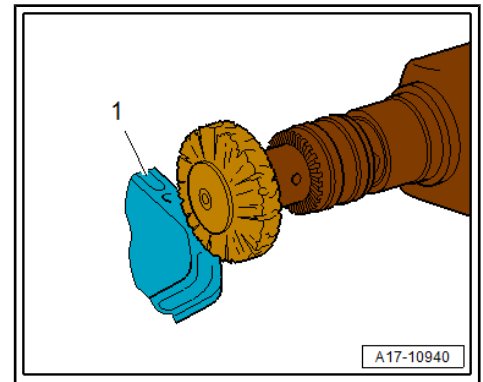
Risk of eye injury

- Put on safety goggles.
- Remove sealant residue from oil separator -1- and cylinder block using rotating plastic brush or similar.
- Clean sealing surfaces; they must be free of oil and grease.

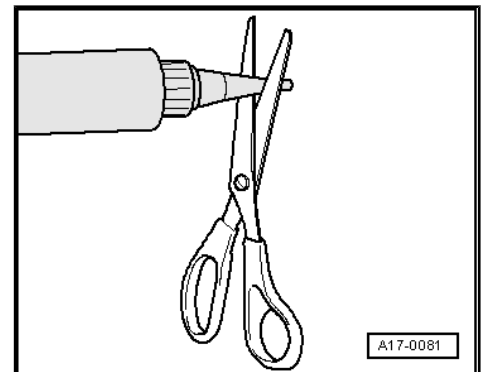


- Screw 2 studs a few turns into holes -arrows-.

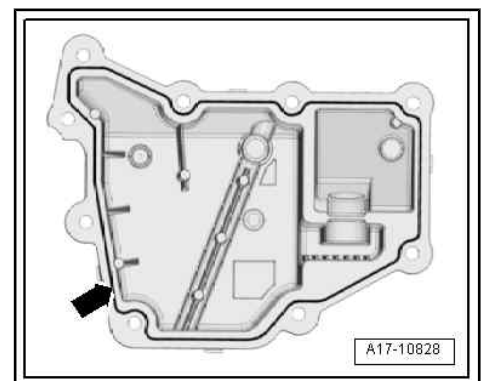
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- Note expiry date of sealant.
- Cut off nozzle of tube at front marking (nozzle Ø approx. 2 mm).



- Thickness of sealant bead: 2 ... 3 mm
- Apply bead of sealant -arrow- onto clean sealing surface of oil separator as shown in illustration.
- Install oil separator within 5 minutes after applying the sealant.



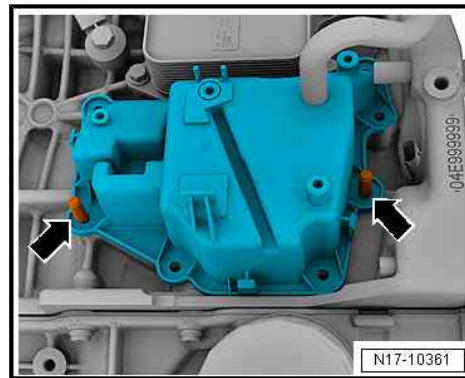


- Place oil separator onto studs -arrows- and position it on cylinder block.
- Remove studs again.
- Fit and tighten bolts
⇒ [Fig. “Oil separator - tightening torque and sequence”](#), [page 181](#) .

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

Tightening torques

- ◆ ⇒ [Fig. “Oil separator - tightening torque and sequence”](#), [page 181](#)
- ◆ ⇒ [“2.2 Exploded view - electric coolant pump”](#), [page 202](#)
- ◆ ⇒ Electrical system; Rep. gr. 27 ; Alternator; Exploded view - alternator
- ◆ ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Exploded view - air conditioner compressor drive unit



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4 Oil filter/oil pressure switches

⇒ [“4.1 Exploded view - oil filter/oil pressure switches”, page 185](#)

⇒ [“4.2 Removing and installing oil pressure sender G10”, page 186](#)

⇒ [“4.3 Removing and installing valve for oil pressure control N428”, page 187](#)

⇒ [“4.4 Checking oil pressure and oil pressure switch”, page 188](#)

4.1 Exploded view - oil filter/oil pressure switches

1 - Oil filter

- ☐ See note ⇒ [page 171](#)
- ☐ Removing and installing
⇒ Maintenance ; Book-
let 819

2 - Threaded connection

- ☐ If threaded connection
for oil filter in sump has
come loose, refer to
⇒ [Fig. “Securing threaded connection for oil filter”, page 186](#)

3 - Oil pressure sender - G10-

- ☐ Opening/closing pressure 0.3 ... 0.6 bar
- ☐ Black insulation
- ☐ Check in [Guided Fault Finding](#) ⇒ [Vehicle diagnostic tester](#)
- ☐ Removing and installing
⇒ [“4.2 Removing and installing oil pressure sender G10”, page 186](#)
- ☐ Renew after removing
- ☐ 10 Nm + turn +45° further

4 - Seal

- ☐ Cannot be renewed separately

5 - O-rings

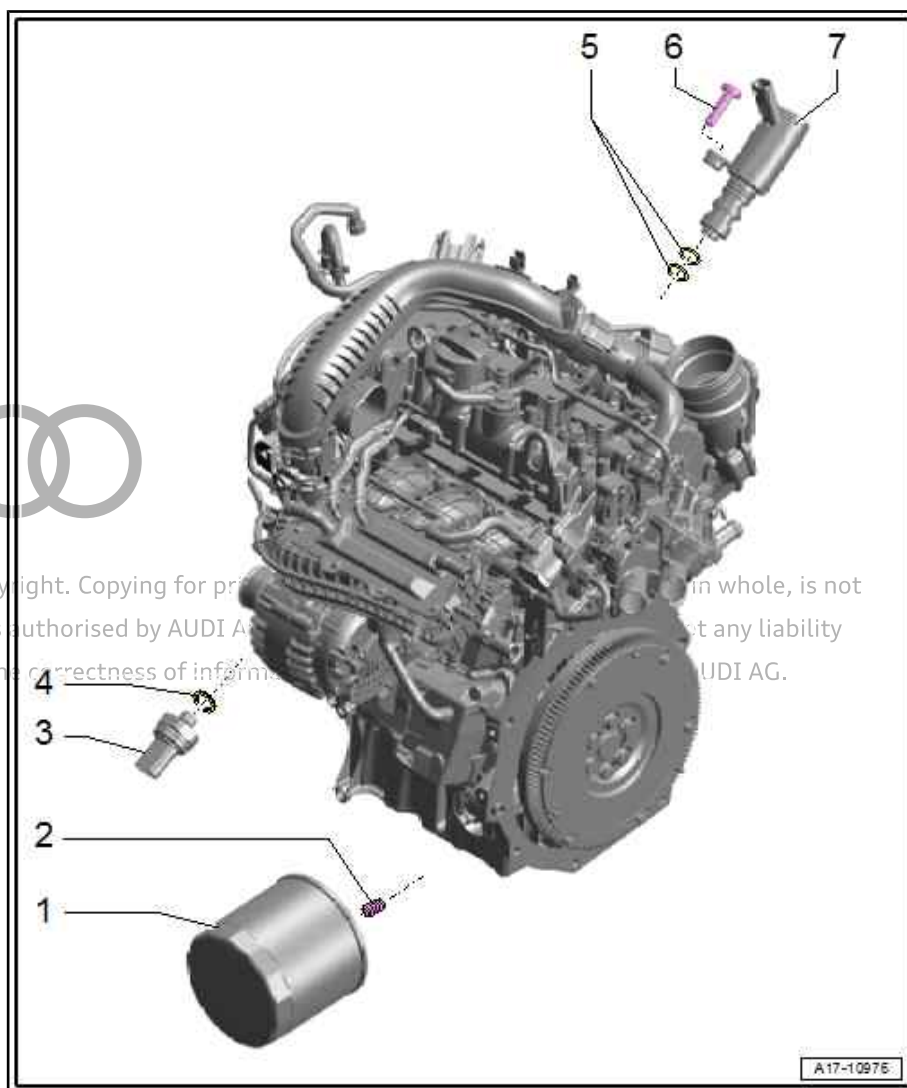
- ☐ Lubricate lightly with engine oil
- ☐ Check for damage and renew if necessary; supplied together with non-return valve ⇒ Electronic parts catalogue

6 - Bolt

- ☐ 8 Nm

7 - Valve for oil pressure control - N428-

- ☐ Removing and installing
⇒ [“4.3 Removing and installing valve for oil pressure control N428”, page 187](#)



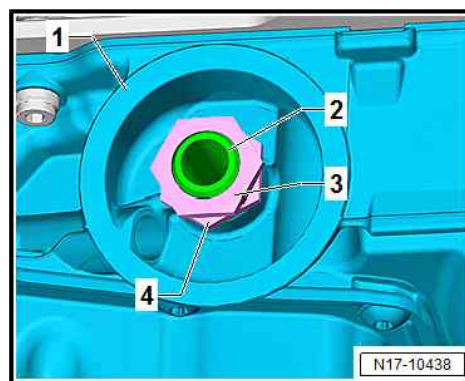


Securing threaded connection for oil filter

- Secure threaded connection -2- as described below if it has come loose from sump (top section) -1-.

Carry out this procedure using the two nuts -3 and 4- only.

- Hexagon nuts - 068 115 723- (2x) ⇒ Electronic parts catalogue
- Fit nuts -3- and -4- onto threaded connection -2- and screw them against one another to counter-lock.
- Tighten connection -2- via nut -3-.
- Unscrew and remove both nuts, taking care not to loosen connection when doing so.



Tightening torque

Threaded connection	Tightening torque
-2-	50 Nm

4.2 Removing and installing oil pressure sender -G10-

Special tools and workshop equipment required

- ♦ Articulated wrench, 24 mm - T40175 -





Removing

- Remove alternator ⇒ Electrical system; Rep. gr. 27 ; Alternator; Removing and installing alternator .
- Move fuel hose -2- clear at intake manifold.
- Unplug electrical connector -3-.

Note:

Place a cloth underneath to catch escaping engine oil.

- Use articulated wrench, 24 mm - G10- to unscrew oil pressure sender - T40175- -item 1-.

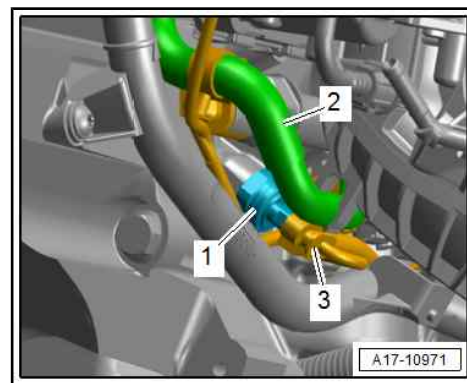
Installing

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

- A captive seal is attached to the oil pressure sender; the seal cannot be renewed.
 - The seal cannot be re-used; the oil pressure sender must be renewed after it is removed.
 - Fit the new oil pressure sender - G10- into the connection immediately to avoid loss of oil.
 - Secure all heat insulation sleeves in the same locations when installing.
- Check oil level ⇒ Maintenance ; Booklet 819 .

Tightening torques

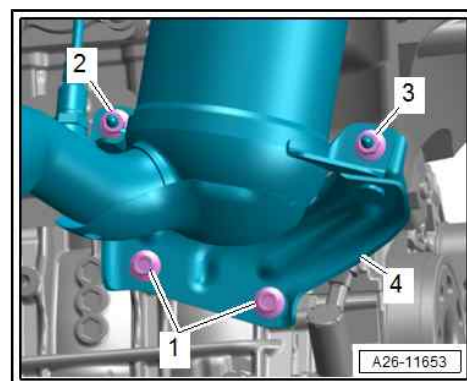
- ◆ ⇒ [“4.1 Exploded view - oil filter/oil pressure switches”, page 185](#)
- ◆ ⇒ Electrical system; Rep. gr. 27 ; Alternator; Exploded view - alternator



4.3 Removing and installing valve for oil pressure control - N428-

Removing

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Remove bolts -1- and nuts -2, 3- and detach bracket -4- for catalytic converter.
- Detach heat insulation sleeves.





- Unplug electrical connector -2-.
- Place a cloth underneath to catch escaping engine oil.
- Remove bolt -3- and detach valve for oil pressure control - N428- -item 1-.

Installing

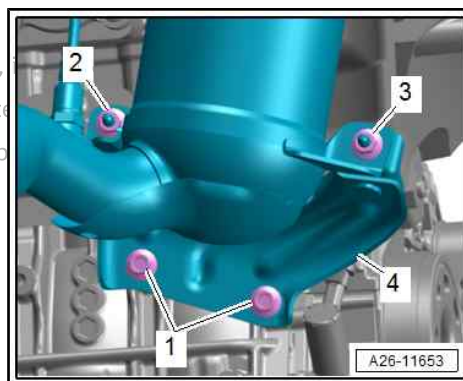
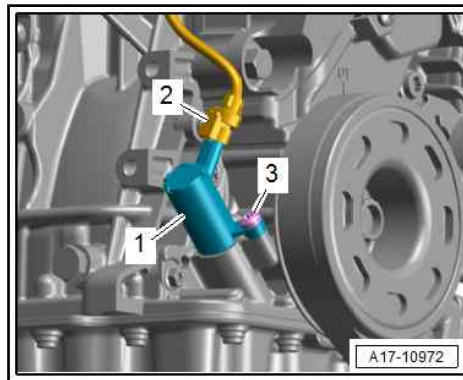
Installation is carried out in reverse order; note the following:

- Check O-ring for damage ⇒ [Item 5 \(page 185\)](#) .
- Secure all heat insulation sleeves in the same locations when installing.

- Move bracket for catalytic converter into installation position.
- Hand-tighten bolts -1- and nuts -2, 3- until they make contact.
- Tighten bolted connections for bracket -4- ⇒ ["2.1 Exploded view - emission control system", page 316](#)

Tightening torques

- ◆ ⇒ ["4.1 Exploded view - oil filter/oil pressure switches", page 185](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation



4.4 Checking oil pressure and oil pressure switch

- ◆ Oil pressure sender - G10- is installed on the engine.
- ◆ Oil pressure sender - G10- can be diagnosed.
- ◆ The sender and the oil pressure can be checked using the
⇒ Vehicle diagnostic tester.
- ◆ Any faults/abnormalities are stored in the event memory.
- ◆ A captive seal is attached to the oil pressure sender.
- ◆ The seal cannot be re-used; the oil pressure sender must be renewed after it is removed.



19 – Cooling

1 Cooling system/coolant

⇒ [“1.1 Connection diagram - coolant hoses”, page 189](#)

⇒ [“1.2 Checking cooling system for leaks”, page 190](#)

⇒ [“1.3 Draining and filling cooling system”, page 192](#)

1.1 Connection diagram - coolant hoses

- ◆ Blue = Large coolant circuit
- ◆ Red = Small coolant circuit
- ◆ Orange = Charge air cooling circuit.
- ◆ Brown = Heating circuit
- ◆ Arrows show direction of coolant flow.

1 - Water radiator for charge air cooling circuit

2 - Non-return valve

3 - Charge air cooler

4 - Cylinder head/cylinder block

5 - Coolant expansion tank

☐ With filler cap

6 - Filler cap

☐ For coolant expansion tank

☐ Checking pressure relief valve ⇒ [page 192](#)

7 - Turbocharger

8 - Coolant temperature sender - G62-

9 - Heat exchanger for heater

10 - Coolant pump

☐ With thermostat housing

11 - Non-return valve

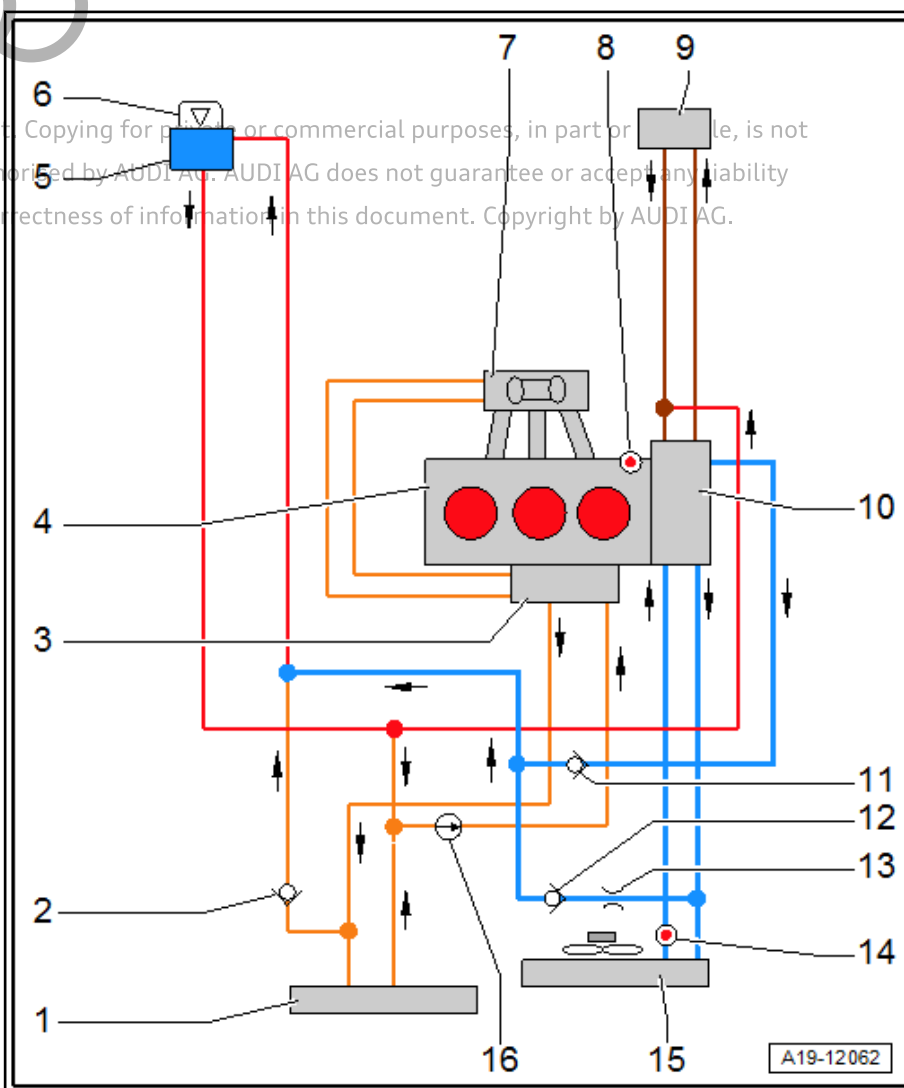
12 - Non-return valve

13 - Restrictor

14 - Radiator outlet coolant temperature sender - G83-

15 - Radiator

16 - Continued coolant circulation pump - V51-





1.2 Checking cooling system for leaks

Special tools and workshop
equipment required



- ◆ Adapter for cooling system tester - V.A.G 1274/8-
- ◆ Adapter for cooling system tester - V.A.G 1274/9-
- ◆ Cooling system tester - V.A.G 1274 B-

Procedure

- Engine must be warm.
- Ignition off

Risk of scalding as hot coolant can escape

The cooling system is under pressure when the power unit is hot.
Risk of scalding due to hot steam and hot coolant.

- Put on protective gloves.
- Put on safety goggles.
- Cover filler cap on expansion tank with a cloth and open carefully to release pressure.



Note

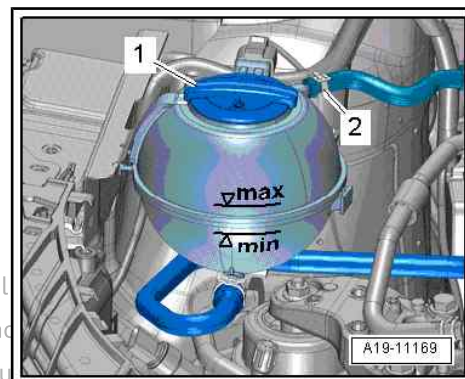
Different filler caps may be installed depending on model year.

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- Open filler cap -1- on coolant expansion tank.

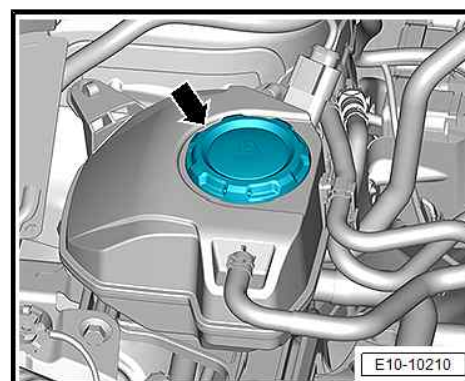


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- Open sealing cap -arrow-.

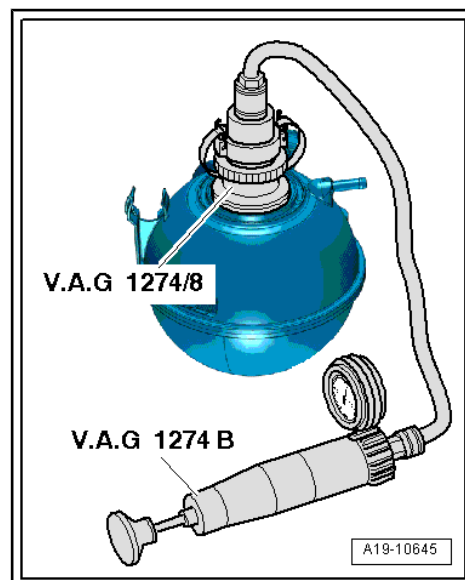


All vehicles (continued):

- Fit cooling system tester - V.A.G 1274 B- with adapter - V.A.G 1274/8- onto coolant expansion tank.
- Using hand pump on cooling system tester, build up a pressure of approx. 1.5 bar.
- The pressure should not drop more than 0.2 bar within 10 minutes.
- If the pressure drops more than 0.2 bar, locate leak and eliminate fault.

Note:

The drop in pressure of 0.2 bar within 10 minutes is caused by the decrease in coolant temperature. The colder the engine is, the less the pressure will fall. If necessary, check again when the engine is cold.





Checking pressure relief valve in filler cap

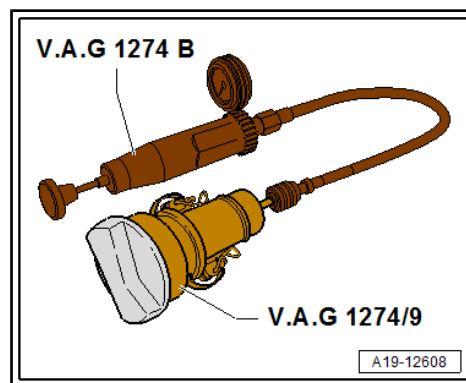
- Fit cooling system tester - V.A.G 1274 B- with adapter - V.A.G 1274/9- onto filler cap.
- Build up pressure with hand pump on cooling system tester.

Blue filler cap

- ◆ The pressure relief valve should open at a pressure of 1.4 ... 1.6 bar.

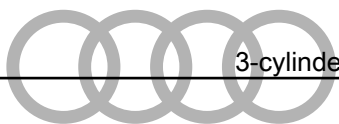
Black filler cap

- ◆ The pressure relief valve should open at a pressure of 1.6 ... 1.8 bar.
- Renew filler cap if pressure relief valve does not open as described.

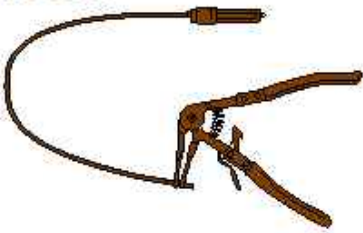
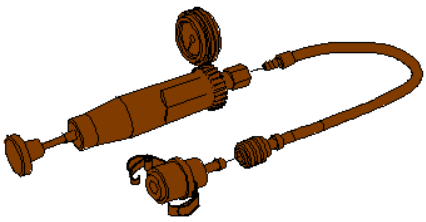


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1.3 Draining and filling cooling system



Special tools and workshop equipment required

T10007 A 	VA S 6208 
VA S 6340 	VA S 6096 
V.A.G 1274/8 	VA S 531 001  W19-10062
V.A.G 1274 B  W00-11247	

- ◆ Adapter for cooling system tester - V.A.G 1274/8-
- ◆ Cooling system charge unit - VAS 6096-
- ◆ Drip tray for workshop hoist - VAS 6208-
- ◆ Hose clip pliers - VAS 6362-
- ◆ Refractometer - T10007 A-
- ◆ Release tool - VAS 531 001-
- ◆ Cooling system tester - V.A.G 1274 B-



- ◆ Safety goggles
- ◆ Protective gloves

Draining

Risk of scalding as hot coolant can escape

The cooling system is under pressure when the power unit is hot.
Risk of scalding due to hot steam and hot coolant.

- Put on protective gloves.
- Put on safety goggles.
- Cover filler cap on expansion tank with a cloth and open carefully to release pressure.



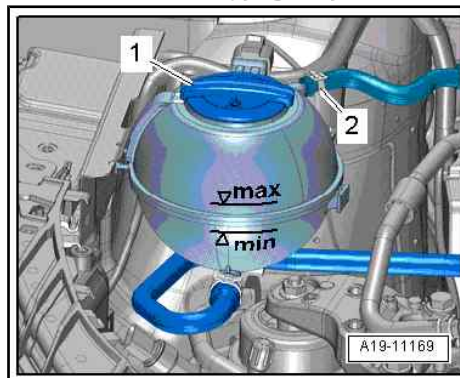
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Different filler caps may be installed depending on model year.

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- Open filler cap -1- on coolant expansion tank.

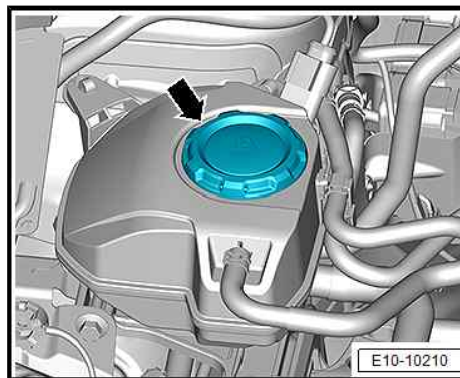


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- Open sealing cap -arrow-.

All vehicles (continued):

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Place collector tank from coolant collecting system -VAS 5014- or drip tray for workshop hoist - VAS 6208- underneath.

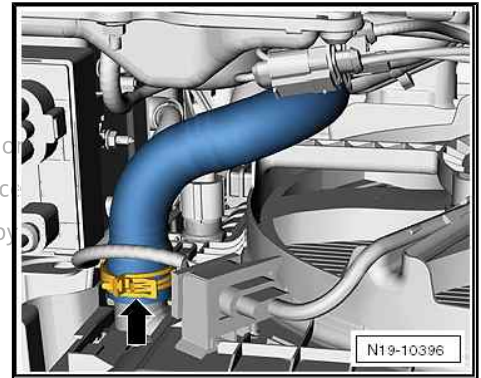




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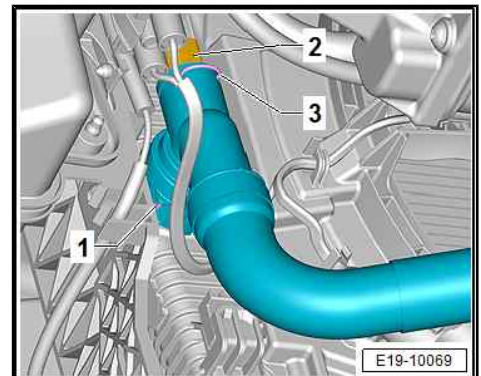
- Release hose clip -arrow-, disconnect coolant hose (bottom left) from radiator and drain off coolant.

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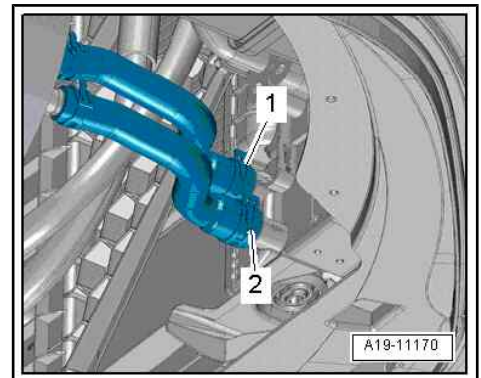
- Unplug electrical connector -2- at radiator outlet coolant temperature sender - G83- .
- Lift retaining clip -1- slightly, disconnect coolant hose from radiator (bottom left) and drain off coolant.



All vehicles (continued):

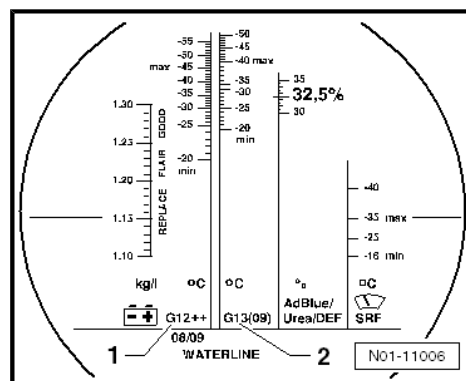
- Place collector tank from coolant collecting system -VAS 5014- or drip tray for workshop hoist - VAS 6208- underneath.
- Release hose clips -1 and 2- and detach coolant hoses (bottom right) from water radiator for charge air cooling circuit.
- Drain remaining coolant.

Filling





- ◆ The effectiveness of the coolant is greatly influenced by the quality of the water with which it is mixed. Because water may contain different substances depending on the country or even the region, the water quality to be used for cooling systems has been specified. Distilled water meets all the requirements and is therefore recommended for use when topping up or filling in with coolant.
- ◆ Use only coolant additives listed in the ⇒ Electronic parts catalogue (ETKA) . If you use other coolant additives, this can significantly impair in particular the corrosion protection effect. The resulting damage could lead to loss of coolant and consequently to serious damage to the power unit.
- ◆ Coolant with the recommended mixture ratio prevents frost and corrosion damage and stops scaling. At the same time it raises the boiling point of the fluid in the system. For this reason the cooling system must be filled all year round with the correct coolant additive.
- ◆ Because of its high boiling point, the coolant improves power unit reliability under heavy loads, particularly in countries with tropical climates.
- ◆ The refractometer - T10007A- MUST be used to determine the current level of frost protection.
- ◆ The mixture must guarantee frost protection down to at least -25 °C (in countries with arctic climate: down to -36 °C). The amount of antifreeze should only be increased if greater frost protection is required in very cold climates. This must only be down to -48 °C, however, as otherwise the cooling efficiency of the coolant is impaired.
- ◆ The coolant concentration must not be reduced by adding water even in warmer seasons and in warmer countries. Frost protection must be provided to at least -25 °C.
- ◆ Read off the level of frost protection on the scale for the relevant coolant additive.
- ◆ The temperature indicated on the refractometer - T10007A- corresponds to the temperature at which the first ice crystals can form in the coolant.
- ◆ Do not reuse coolant.
- ◆ Only use water/coolant additive as a lubricant for coolant hoses.



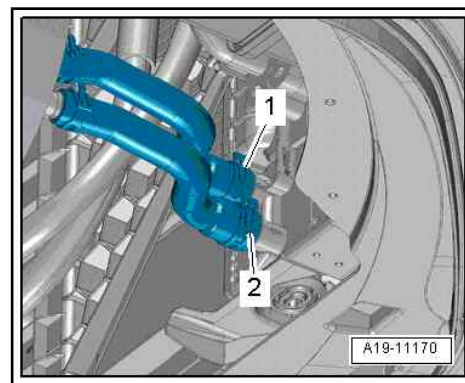
Recommended mixture ratio for coolant

- Coolant (40 %) and distilled water (60 %) for frost protection to -25 °C
- Coolant (50 %) and distilled water (50 %) for frost protection to -36 °C
- Coolant ⇒ Electronic parts catalogue



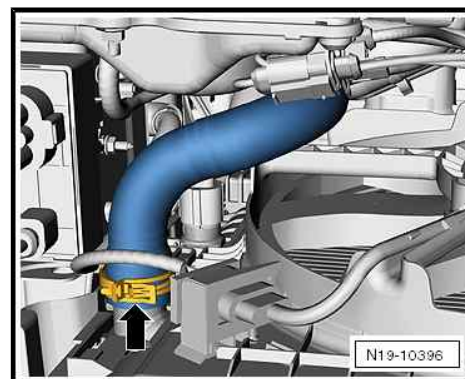
Procedure

- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .
- Connect coolant hoses to water radiator for charge air cooling circuit with hose clips -1 and 2-.



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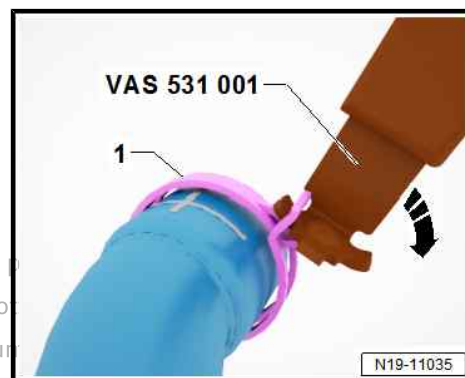
- Connect coolant hose to radiator (bottom) with hose clip -arrow-.



- Fasten hose clip -1- in direction of -arrow- using release tool -VAS 531 001- .

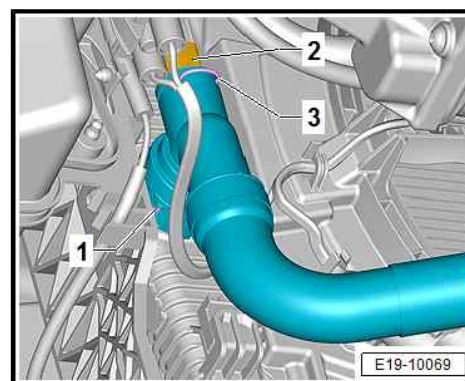


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- Unplug electrical connector -2- at radiator outlet coolant temperature sender - G83- .
- Disconnect coolant hose from radiator (bottom left); retaining clip -1- must engage audibly.





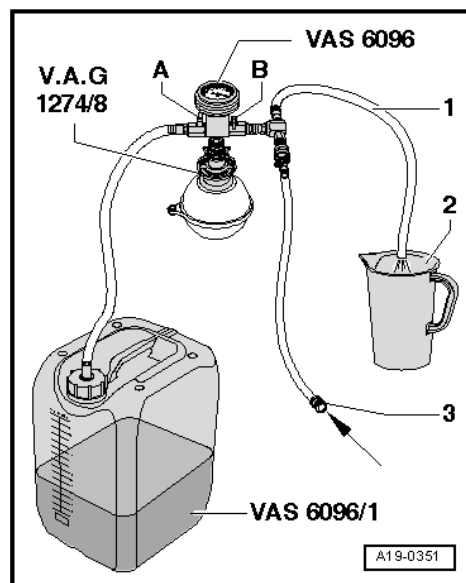
All vehicles (continued):

- Fill reservoir of -VAS 6096- with at least 8 litres of premixed coolant (according to recommended ratio).
- Fit adapter for cooling system tester - V.A.G 1274/8- onto coolant expansion tank.
- Attach cooling system charge unit - VAS 6096- to adapter - V.A.G 1274/8- .
- Run vent hose -1- into a small container -2-.

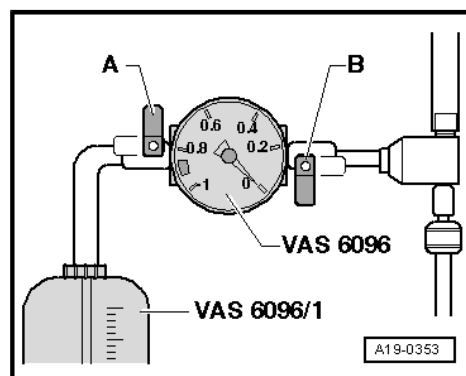
Note

The vented air draws along a small amount of coolant, which should be collected.

- Close both valves -A- and -B- (turn lever at right angles to direction of flow).
- Connect hose -3- to compressed air supply.
- Pressure: 7 ... 10 bar.



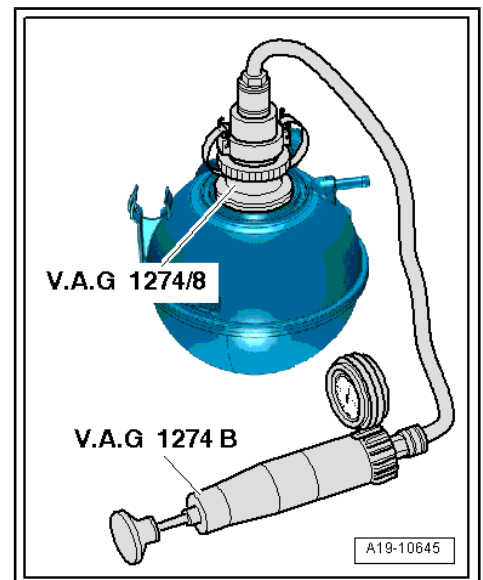
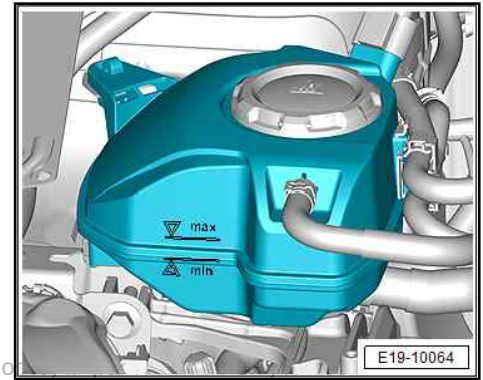
- Open valve -B- by setting lever in direction of flow.
- The suction jet pump generates a partial vacuum in the cooling system; the needle on the gauge should move into the green zone.
- Also briefly open valve -A- (turn lever in direction of flow) so that hose on reservoir of -VAS 6096- can fill with coolant.
- Close valve -A- again.
- Leave valve -B- open for another 2 minutes.
- The suction jet pump continues to generate a partial vacuum in the cooling system; the needle on the gauge should remain in the green zone.
- Close valve -B-.
- The needle on the gauge should stop in the green zone. The vacuum level in the cooling system is then sufficient for subsequent filling.
- If the needle does not reach the green zone, repeat the process.
- Check cooling system for leaks if the vacuum is not maintained.
- Detach compressed air hose.
- Open valve -A-.
- The vacuum in the cooling system causes the coolant to be drawn out of the reservoir of -VAS 6096- ; the cooling system is then filled.
- Detach cooling system charge unit - VAS 6096- from coolant expansion tank.



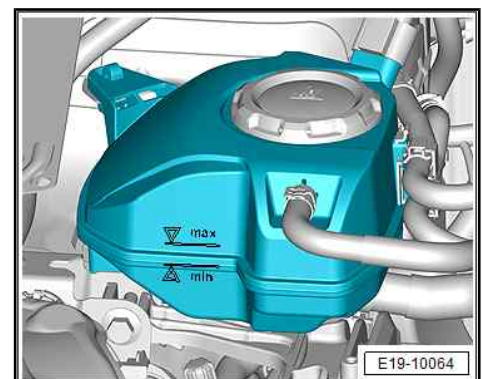
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- Top up coolant to "max" mark.
- Install noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation .
- Set temperature to "HI".
- Set fresh air blower to lowest setting.
- Switch off air conditioner compressor (press **AC** button).
- LED in button should not light up.
- Start engine and run alternately at approx. 1500 rpm and max. 2800 rpm until radiator fan cuts in.
- Top up coolant to overflow hole on expansion tank with engine running.
- Close filler cap -1- on coolant expansion tank (make sure it engages).
- Allow engine to run at idling speed until both large coolant hoses at radiator become warm.
- Switch off ignition and allow engine to cool down.
- Check coolant level.
- Fit cooling system tester - V.A.G 1274 B- with adapter - V.A.G 1274/8- onto coolant expansion tank.
- Using hand pump on tester, build up a pressure of approx. 1.0 bar.



- The coolant level must be between the "min" and "max" markings when the engine is cold.
- The coolant level can be at or above the "max" marking when the engine is warm.
- Top up with coolant again if necessary.





2 Coolant pump/thermostat assembly

⇒ [“2.1 Exploded view - coolant pump/thermostat”, page 200](#)

⇒ [“2.2 Exploded view - electric coolant pump”, page 202](#)

⇒ [“2.3 Exploded view - coolant temperature senders”, page 204](#)

⇒ [“2.4 Removing and installing electric coolant pump”, page 205](#)

⇒ [“2.5 Removing and installing coolant pump”, page 207](#)

⇒ [“2.6 Removing and installing thermostat”, page 210](#)

⇒ [“2.7 Removing and installing toothed belt sprocket for coolant pump”, page 213](#)

⇒ [“2.8 Removing and installing coolant temperature sender G62”, page 214](#)

⇒ [“2.9 Removing and installing radiator outlet coolant temperature sender G83”, page 216](#)

2.1 Exploded view - coolant pump/thermostat

1 - Thermostat housing

- ☐ Removing and installing
⇒ [“2.5 Removing and installing coolant pump”, page 207](#)

2 - Thermostat

- ☐ For small coolant circuit
- ☐ Removing and installing
⇒ [“2.6.2 Removing and installing thermostat for coolant circuit for cylinder block”, page 212](#)

3 - Gasket

- ☐ Renew after removing

4 - Coolant pump

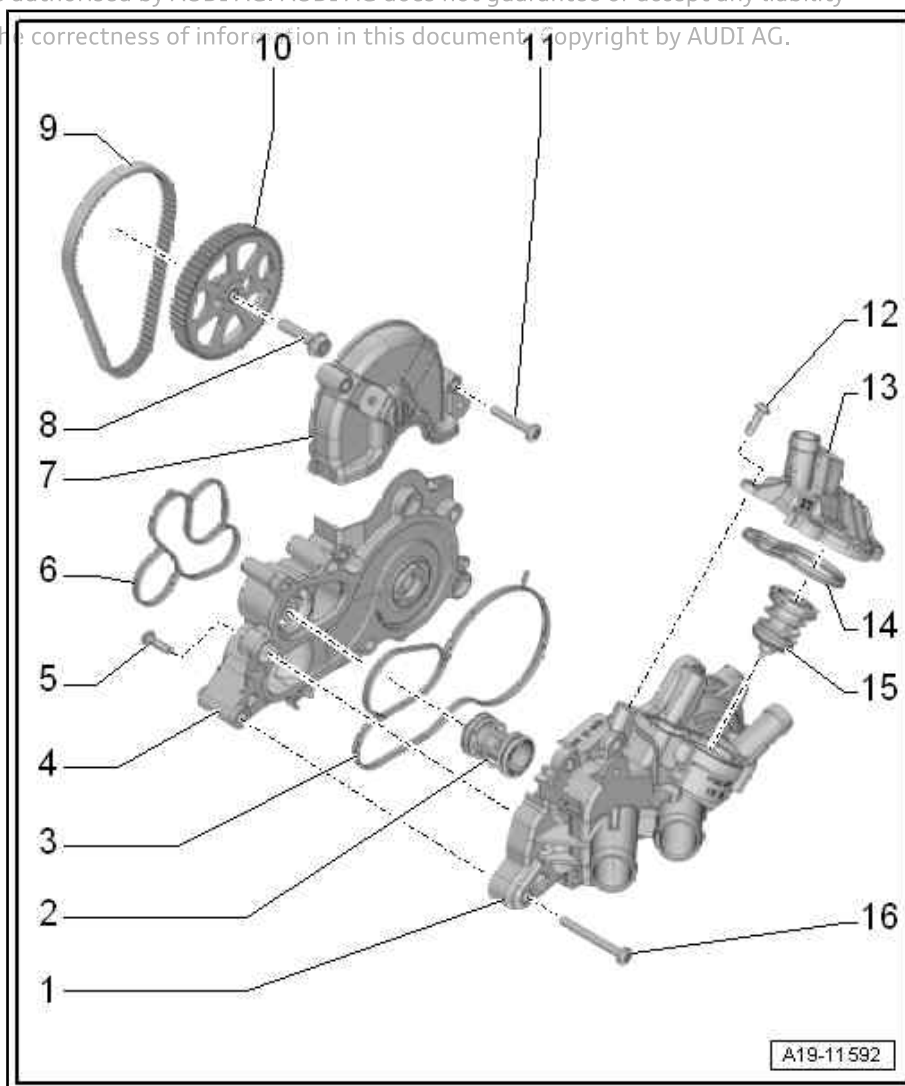
- ☐ Removing and installing
⇒ [“2.5 Removing and installing coolant pump”, page 207](#)

5 - Bolt

- ☐ Thread-forming
- ☐ Fit and screw in bolt by hand so that it is screwed into old thread. Then tighten bolt to torque
- ☐ Tightening torque and sequence
⇒ [Fig. “Thermostat housing to coolant pump - tightening torque and sequence””, page 202](#)

6 - Gasket

- ☐ Renew after removing





7 - Toothed belt cover

- ☐ For toothed belt for coolant pump

8 - Bolt

- ☐ Renew after removing
- ☐ 20 Nm +90°

9 - Toothed belt

- ☐ For coolant pump
- ☐ Before removing, mark direction of rotation with chalk or felt-tip pen
- ☐ When reinstalling, check for damage and renew if necessary

10 - Toothed belt sprocket

- ☐ For coolant pump
- ☐ Removing and installing
⇒ [“2.7 Removing and installing toothed belt sprocket for coolant pump”, page 213](#)
- ☐ Installation position ⇒ [page 214](#)
- ☐ Apply sealant when installing

11 - Bolt

- ☐ 8 Nm

12 - Bolt

- ☐ Thread-forming
- ☐ Fit and screw in bolt by hand so that it is screwed into old thread. Then tighten bolt to torque
- ☐ Tightening torque and sequence
⇒ [Fig. “Cover for thermostat to thermostat housing - tightening torque” , page 202](#)

13 - Cover

- ☐ For thermostat

14 - Gasket

- ☐ Renew after removing

15 - Thermostat

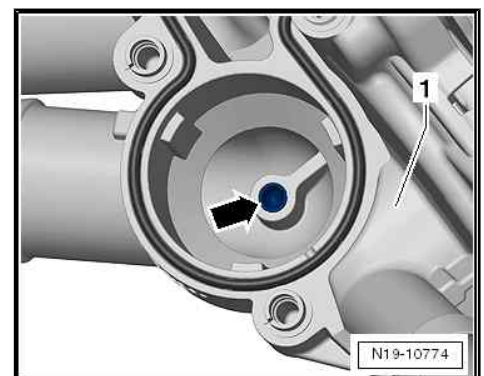
- ☐ For large coolant circuit
- ☐ Removing and installing
⇒ [“2.6.1 Removing and installing thermostat for primary coolant circuit \(radiator\)”, page 210](#)
- ☐ Installation position ⇒ [Fig. “Installation position of thermostat for large coolant circuit” , page 201](#)

16 - Bolt

- ☐ Tightening torque and sequence ⇒ [page 210](#)

Installation position of thermostat for large coolant circuit

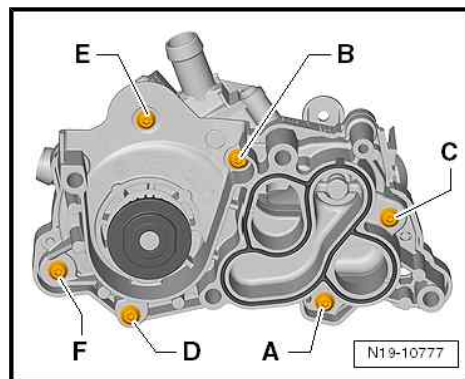
- Must be positioned with centring pin in guide -arrow- in thermostat housing.





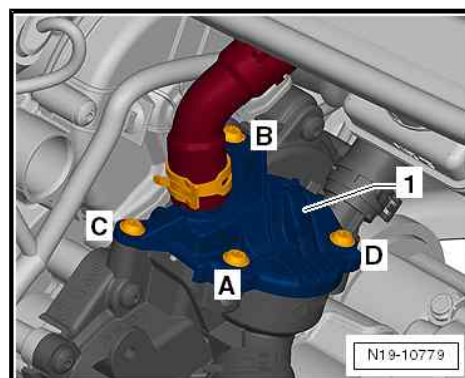
Thermostat housing to coolant pump - tightening torque and sequence

- Tighten bolts in the sequence -A ... F- to 7 Nm.



Cover for thermostat to thermostat housing - tightening torque

- Tighten bolts for cover -1- in the sequence -A ... D- to 7 Nm.



2.2 Exploded view - electric coolant pump



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1 - Continued coolant circulation pump - V51-

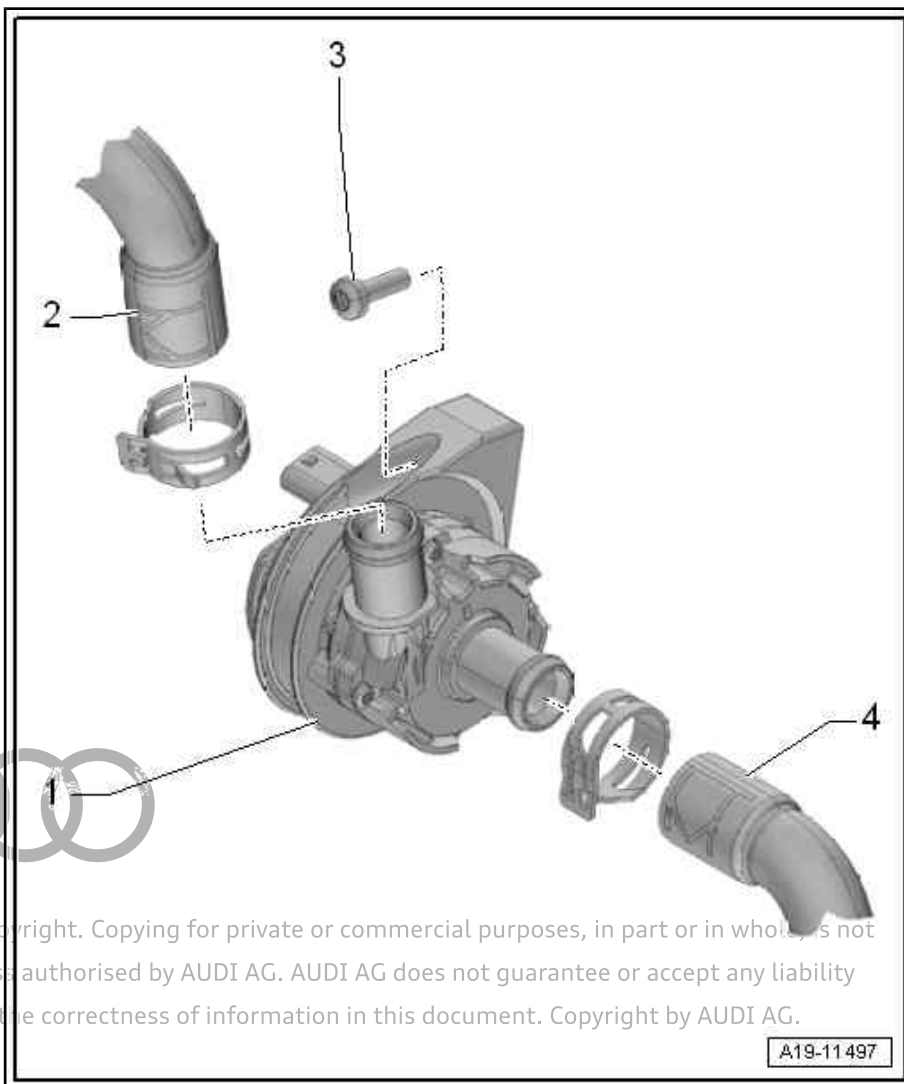
- ☐ With bracket
- ☐ Removing and installing
⇒ ["2.4 Removing and installing electric coolant pump"](#), page 205

2 - Coolant hose

3 - Bolt

- ☐ 8 Nm

4 - Coolant hose



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A19-11497



2.3 Exploded view - coolant temperature senders

⇒ [“2.3.1 Exploded view - coolant temperature senders, Audi A1 2011►”, page 204](#)

⇒ [“2.3.2 Exploded view - coolant temperature senders, Audi A1 2018►”, page 205](#)

2.3.1 Exploded view - coolant temperature senders, Audi A1 2011►

1 - Radiator

2 - Support ring

3 - O-ring

- ❑ Renew after removing

4 - Coolant temperature sender - G62-

- ❑ Removing and installing
⇒ [“2.8 Removing and installing coolant temperature sender G62”, page 214](#)

5 - Bolt

- ❑ 8 Nm

6 - Cylinder head

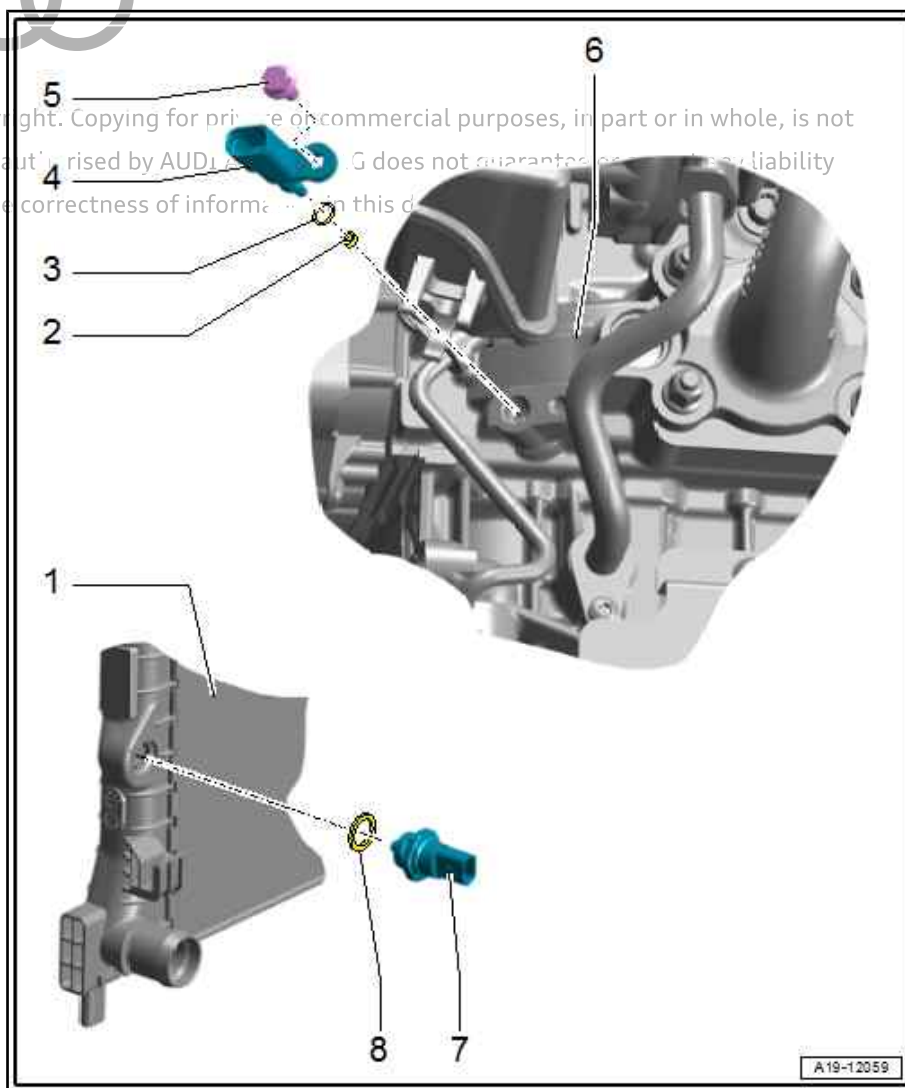
7 - Radiator outlet coolant temperature sender - G83-

- ❑ Removing and installing
⇒ [“2.9 Removing and installing radiator outlet coolant temperature sender G83”, page 216](#)

- ❑ Tightening torque
⇒ [Item 5 \(page 220\)](#)

8 - Seal

- ❑ Not fitted on all versions; for allocation, refer to ⇒ Electronic parts catalogue
- ❑ If fitted, renew after removal





2.3.2 Exploded view - coolant temperature senders, Audi A1 2018➤

1 - O-ring

- ☐ Renew

2 - Radiator outlet coolant temperature sender - G83-

- ☐ Removing and installing
⇒ ["2.9 Removing and installing radiator outlet coolant temperature sender G83"](#),
page 216

3 - Support ring

4 - O-ring

- ☐ Renew

5 - Coolant temperature sender - G62-

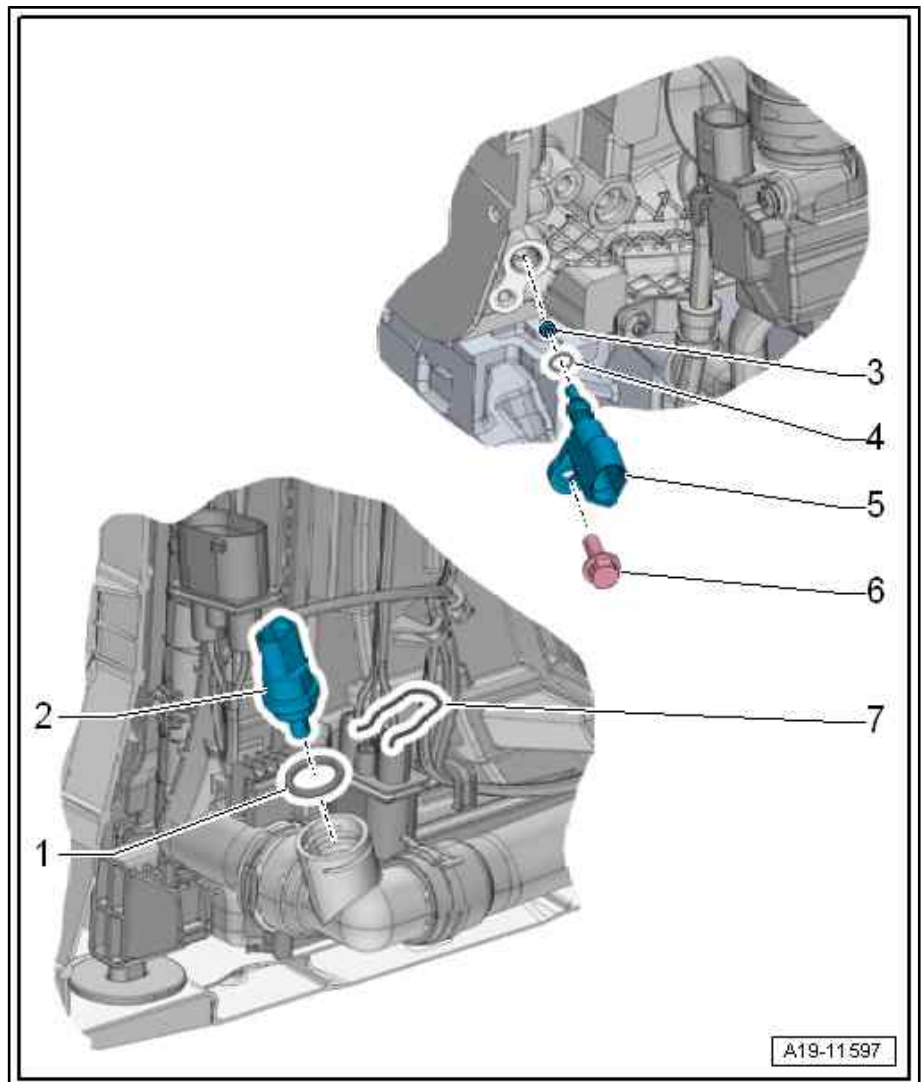
- ☐ Removing and installing
⇒ ["2.8 Removing and installing coolant temperature sender G62"](#),
page 214

6 - Bolt

- ☐ 8 Nm

7 - Retaining clip

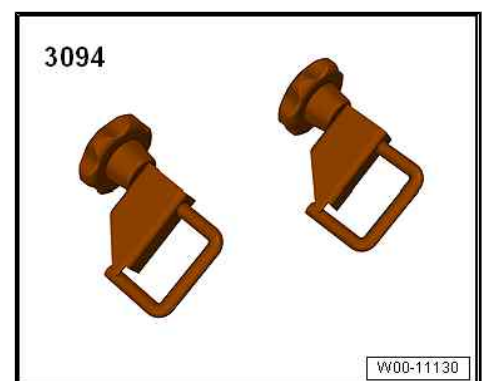
- ☐ Check for firm attachment



2.4 Removing and installing electric coolant pump

Special tools and workshop equipment required

- ◆ Hose clamps up to 25 mm - 3094-





- ◆ Coolant collecting system - VAS 5014- or drip tray for workshop hoist - VAS 6208-



- ◆ Hose clip pliers - VAS 6362-



Removing

Risk of scalding as hot coolant can escape

The cooling system is under pressure when the power unit is hot.
Risk of scalding due to hot steam and hot coolant.

- Put on protective gloves.
- Put on safety goggles.
- Cover filler cap on expansion tank with a cloth and open carefully to release pressure.

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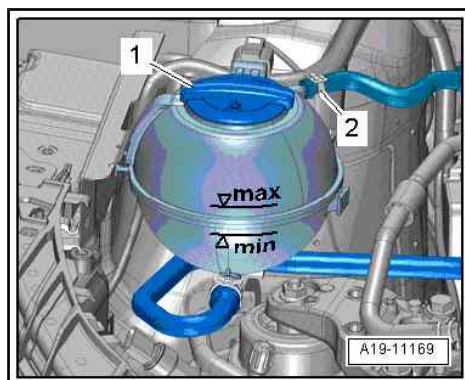


Note

Different filler caps may be installed depending on model year.

Audi A1 2011►

- Open filler cap -1- on coolant expansion tank.



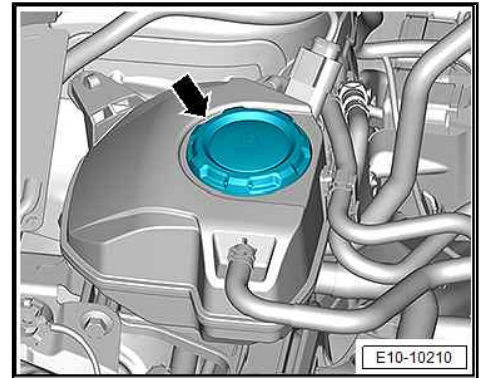


Audi A1 2018➤

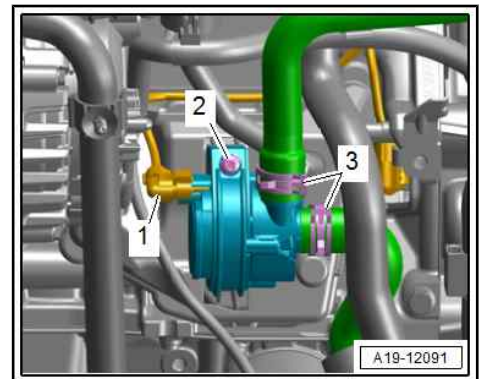
- Open sealing cap -arrow-.

All vehicles (continued):

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .



- Unplug electrical connector -1-.
- Place collector tank from coolant collecting system -VAS 5014- or drip tray for workshop hoist - VAS 6208- underneath.
- Use hose clamps up to 25 mm - 3094- to clamp off coolant hoses at continued coolant circulation pump - V51- .
- Release hose clips -3- and disconnect coolant hoses.
- Remove bolt -2- and detach continued coolant circulation pump - V51- .



Installing

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

- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .
- Check coolant level ⇒ [page 199](#) .

Tightening torques

- ◆ ⇒ [“2.2 Exploded view - electric coolant pump”, page 202](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation

2.5 Removing and installing coolant pump

Special tools and workshop equipment required

- ◆ Hose clip pliers - VAS 6362-

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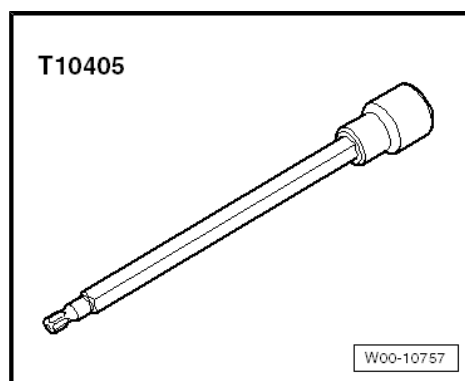




- ◆ Torque wrench - VAS 6583-

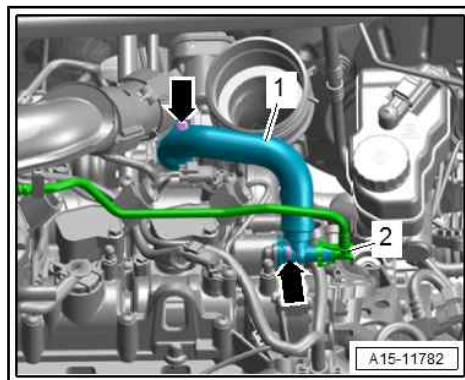


- ◆ Socket Torx T30 - T10405-

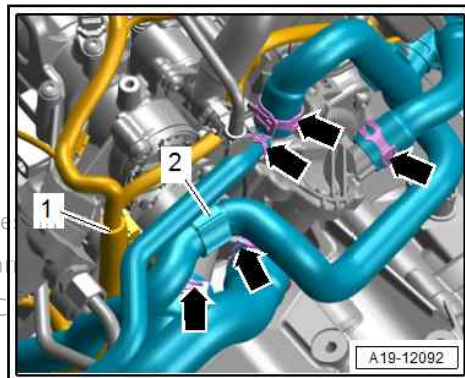


Removing

- Drain coolant
⇒ ["1.3 Draining and filling cooling system", page 192](#) .
- Remove air cleaner housing
⇒ ["2.2 Removing and installing air cleaner housing", page 265](#) .
- Remove bolts -arrows- and detach crankcase breather hose
-1- with hose -2- for activated charcoal filter system attached.



- Move clear electrical wiring harness -1- and coolant hose -2-.
- Release hose clips -arrows- and disconnect coolant hoses.



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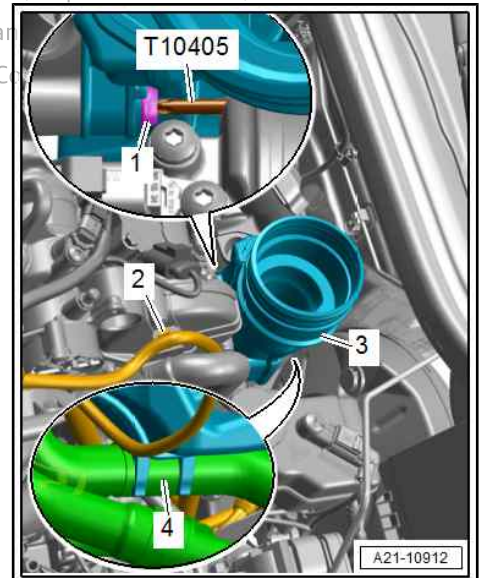
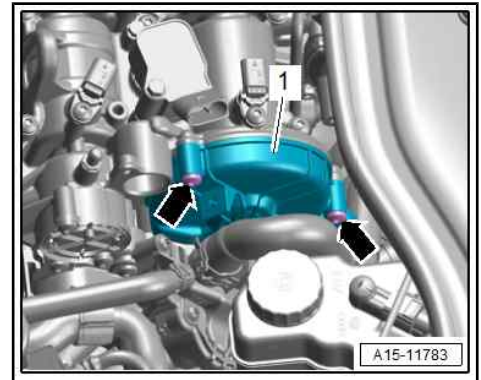


- Unscrew bolts -arrows- and remove cover -1- for toothed belt for coolant pump.



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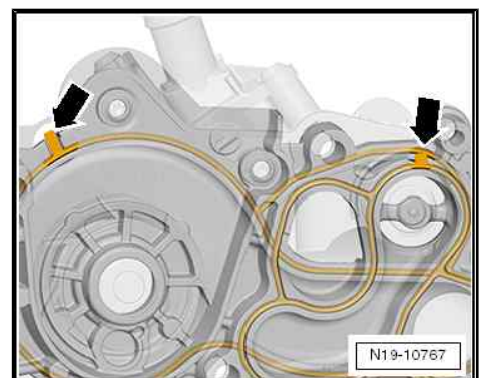
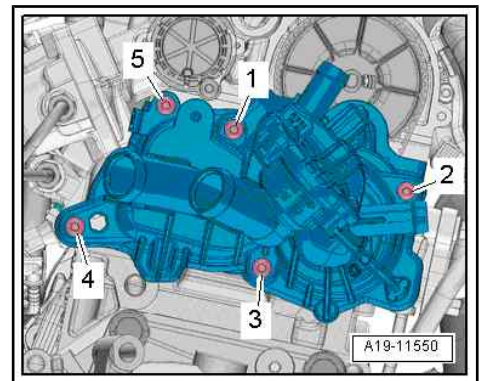
- Move electrical wiring harness -2- and coolant hose -4- clear and push to one side.
- Unscrew bolt -1- using socket Torx T30 - T10405- .
- Detach resonator -3- from turbocharger to left side and carefully lift it off upwards.



- Slacken and remove bolts in the sequence: -5 ... 1-.
- Mark rotation direction of toothed belt with chalk or felt-tip pen before removing.
- Detach coolant pump with toothed belt.

Installing

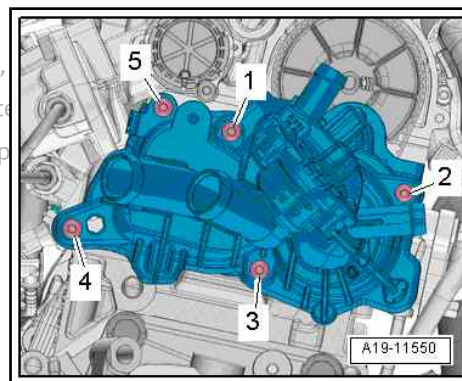
- Renew gasket and O-rings after removal.
- When reinstalling toothed belt of coolant pump, check it for damage and renew if necessary.
- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .
- Do not reuse coolant.
- Check that gaskets are correctly seated -arrows-.
- Lubricate gasket for coolant pump lightly with coolant.
- Position cylinder 1 at “TDC”.
⇒ [“4.7 Setting pistons to TDC position”, page 82](#)
- Fit toothed belt so that it is centred and move coolant pump into installation position.
- Attach coolant pump to cylinder head with securing bolts.



- Tighten bolts to initial torque in the specified sequence:

Stage	Bolts	Tightening torque
1.	-1 ... 5-	Screw in by hand until contact is made
2.	-1 ... 5-	10 Nm

- Loosen all bolts again by one turn.

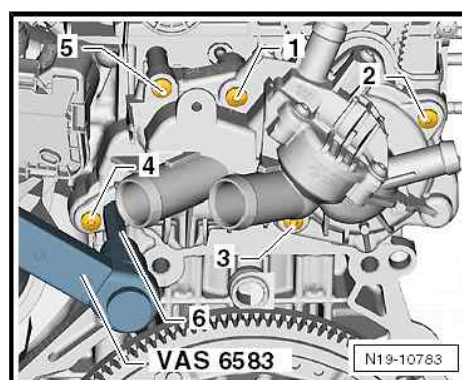


- Apply torque wrench -VAS 6583- with hexagon key (10 mm) -item 6- to coolant pump.

Note:

For ease of handling, apply torque wrench -VAS 6583- vertically.

- Have a second mechanic apply a torque of 30 Nm to coolant pump.
- Do not support torque wrench with your other hand.
- Do not apply excessive force to torque wrench.
- While keeping coolant pump under tension, tighten bolts for coolant pump in specified sequence:



Stage	Bolts	Tightening torque
3.	-2, 1, 5-	10 Nm
4.	-3, 4, 5, 1, 2-	12 Nm

Remaining installation steps are carried out in reverse sequence; note the following:

- Fill up with coolant ⇒ [page 195](#) .

Tightening torques

- ♦ Coolant pump ⇒ [page 210](#)
- ♦ ⇒ [“1.1 Exploded view - turbocharger”, page 235](#)
- ♦ ⇒ [“2.1 Exploded view - charge air system”, page 247](#)
- ♦ ⇒ [“2.1 Exploded view - air cleaner housing”, page 263](#)

2.6 Removing and installing thermostat

⇒ [“2.6.1 Removing and installing thermostat for primary coolant circuit \(radiator\)”, page 210](#)

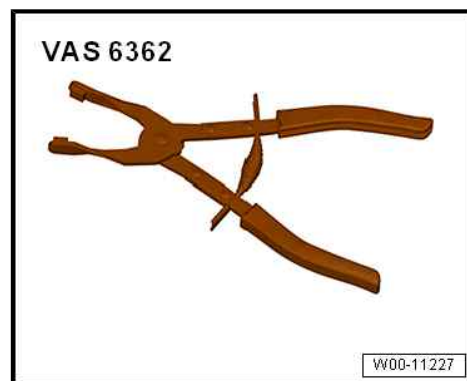
⇒ [“2.6.2 Removing and installing thermostat for coolant circuit for cylinder block”, page 212](#)

2.6.1 Removing and installing thermostat for primary coolant circuit (radiator)

Special tools and workshop equipment required



- ◆ Hose clip pliers - VAS 6362-



- ◆ Key - T10508-

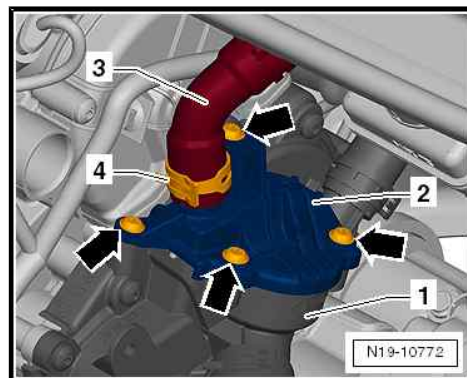
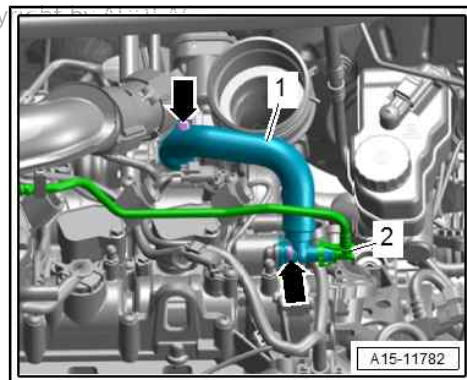


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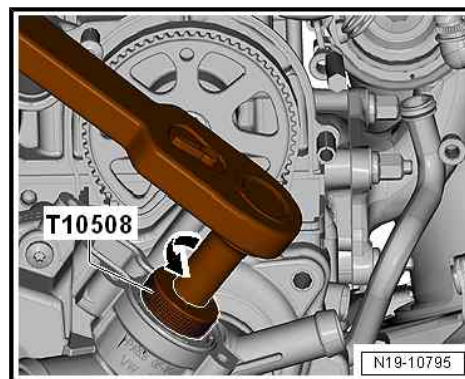
Removing

- Drain coolant
⇒ ["1.3 Draining and filling cooling system", page 192](#) .
- Remove air cleaner housing
⇒ ["2.2 Removing and installing air cleaner housing", page 265](#) .
- Remove bolts -arrows- and detach crankcase breather hose -1- with hose -2- for activated charcoal filter system attached.
- Disconnect coolant hose -3- from connection on turbocharger.
- Release hose clip -4- and detach coolant hose -3- from thermostat cover.
- Remove bolts -arrows- and detach cover -2- from thermostat housing -1-.





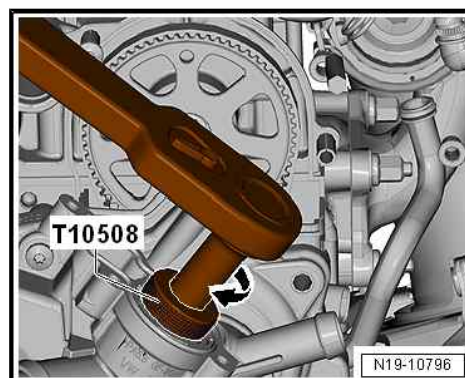
- Turn thermostat anti-clockwise -arrow- using special wrench - T10508- and detach.



Installing

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

- Renew gasket and O-rings after removal.
- Lubricate gasket lightly with coolant.
- Installation position of thermostat
⇒ Fig. ““Installation position of thermostat for large coolant circuit””, page 201 .
- Bring thermostat into position with special wrench - T10508- , press down slightly and turn clockwise -arrow- as far as stop.
- Fill up with coolant ⇒ page 195 .



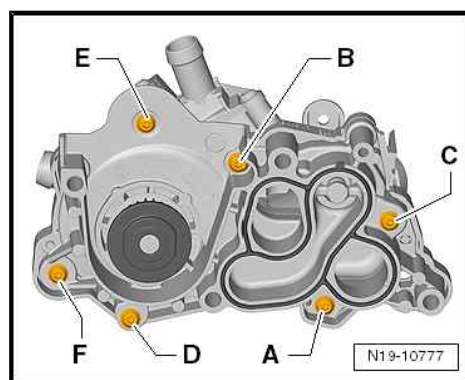
Tightening torques

- ♦ ⇒ Fig. ““Cover for thermostat to thermostat housing - tightening torque””, page 202
- ♦ ⇒ “1.1 Exploded view - turbocharger”, page 235
- ♦ ⇒ “2.1 Exploded view - air cleaner housing”, page 263

2.6.2 Removing and installing thermostat for coolant circuit for cylinder block

Removing

- Remove coolant pump
⇒ “2.5 Removing and installing coolant pump”, page 207 .
- Remove bolts in the sequence -F ... A-.
- Detach coolant pump from thermostat housing.



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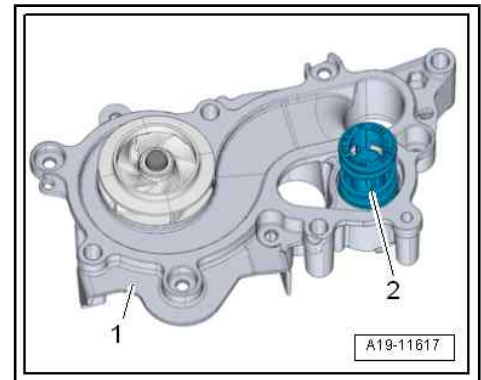


- Detach thermostat -2- from coolant pump -1-.

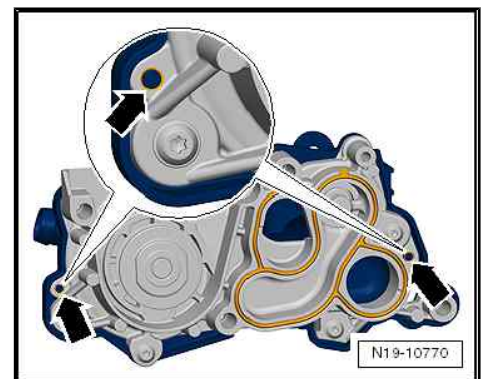
Installing

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

- Renew gasket after removing.
- Lubricate gasket lightly with coolant.



- Fit thermostat housing onto coolant pump.
- Centring pins on thermostat must be fitted in guides -arrows- on coolant pump.
- Tighten bolts for thermostat housing
⇒ [Fig. “Thermostat housing to coolant pump - tightening torque and sequence”](#), page 202 .
- Install coolant pump
⇒ [“2.5 Removing and installing coolant pump”](#), page 207 .
- Fill up with coolant ⇒ [page 195](#) .



Tightening torques

- ◆ ⇒ [Fig. “Thermostat housing to coolant pump - tightening torque and sequence”](#), page 202

2.7 Removing and installing toothed belt sprocket for coolant pump

Special tools and workshop equipment required

- ◆ Counterhold tool - T10172A- with adapters -T10172/2-

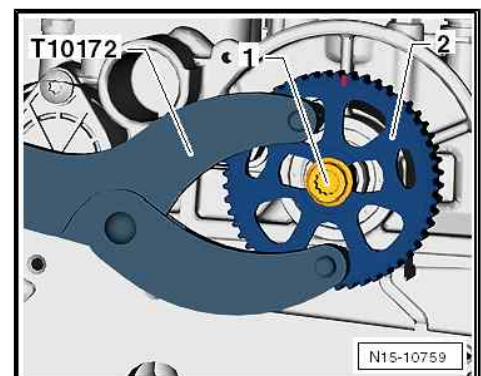


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Removing

- Remove coolant pump
⇒ [“2.5 Removing and installing coolant pump”](#), page 207 .
- Loosen bolt -1- using counterhold tool - T10172A- with adapters -T10172/2- .
- Remove bolt and take off toothed belt drive sprocket -2-.





Installing

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

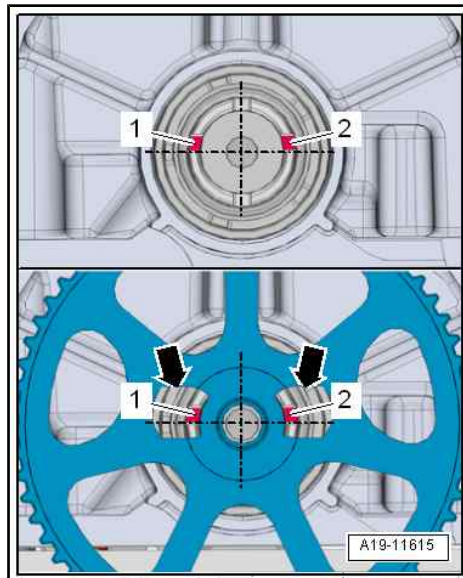
- Fit toothed belt drive sprocket:
- Grooves -1, 2- in camshaft are arranged asymmetrically.
- Openings -arrows- in toothed belt sprocket are also arranged asymmetrically.
- Fit toothed belt sprocket onto camshaft so that asymmetrical grooves are positioned exactly in centre of openings.

Tightening torques

- ♦ ⇒ ["2.1 Exploded view - coolant pump/thermostat", page 200](#)



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2.8 Removing and installing coolant temperature sender - G62-

Removing

- Engine cold.

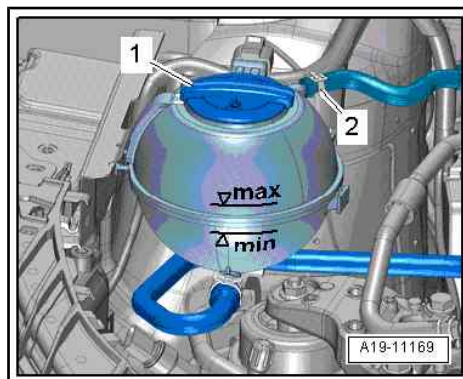


Note

Different filler caps may be installed depending on model year.

Audi A1 2011►

- To relieve residual pressure in cooling system, open filler cap -1- on coolant expansion tank briefly and then close cap again (it should click into place).

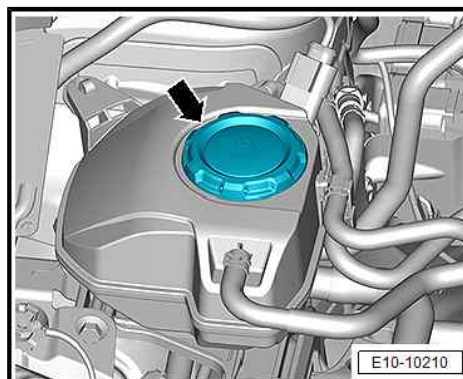


Audi A1 2018►

- To relieve residual pressure in cooling system, open filler cap -arrow- on coolant expansion tank briefly and then close cap again (it should click into place).

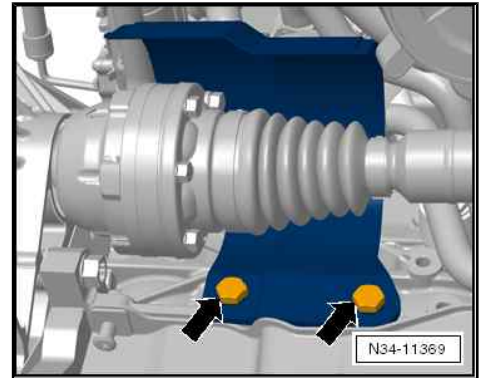
All vehicles (continued):

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .





- If fitted, remove bolts -arrows- and detach heat shield for drive shaft (right-side).

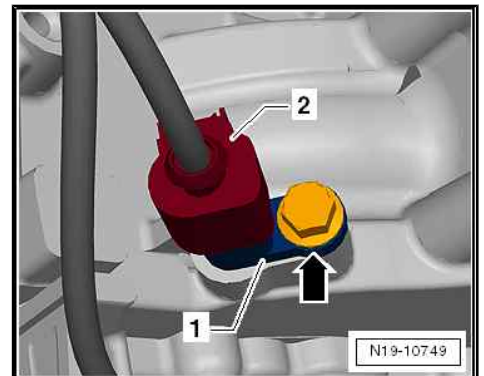


- Unplug electrical connector -2-.
- Place a cloth underneath to catch escaping coolant.
- Open heat insulation sleeve.
- Remove bolt -arrow- and detach coolant temperature sender - G62- -item 1-.

Note:

If O-ring with support ring remains lodged in cylinder head, lift it out using a piece of wire.

Insert new coolant temperature sender - G62- immediately into cylinder head to avoid loss of coolant.



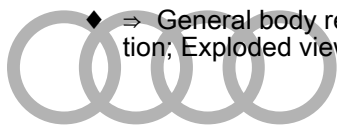
Installing

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

- Renew O-ring after removal.
- Reinstall heat insulation sleeves in the same locations when installing.
- Check coolant level ⇒ [page 199](#) .

Tightening torques

- ◆ ⇒ [“2.3 Exploded view - coolant temperature senders”, page 204](#)
- ◆ Heat shield for drive shaft ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Exploded view - drive shaft
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation



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2.9 Removing and installing radiator outlet coolant temperature sender - G83-

⇒ [“2.9.1 Removing and installing radiator outlet coolant temperature sender G83 - Audi A1 2011►”, page 216](#)

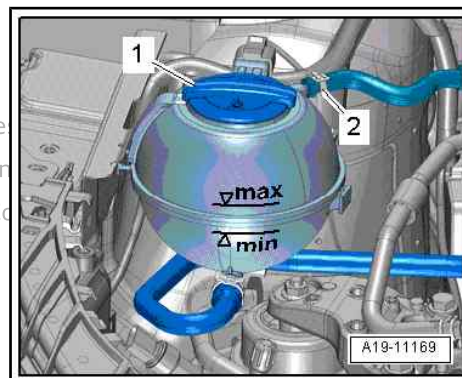
⇒ [“2.9.2 Removing and installing radiator outlet coolant temperature sender G83 - Audi A1 2018►”, page 216](#)

2.9.1 Removing and installing radiator outlet coolant temperature sender - G83- - Audi A1 2011►

Removing

- Engine cold.
- To relieve residual pressure in cooling system, open filler cap -1- on coolant expansion tank briefly and then close cap again (it should click into place).

with respect to the correctness of information in this document. Co



- Unplug electrical connector -arrow-.
- Place a cloth underneath to catch escaping coolant.
- Unscrew radiator outlet coolant temperature sender - G83- .

Installing

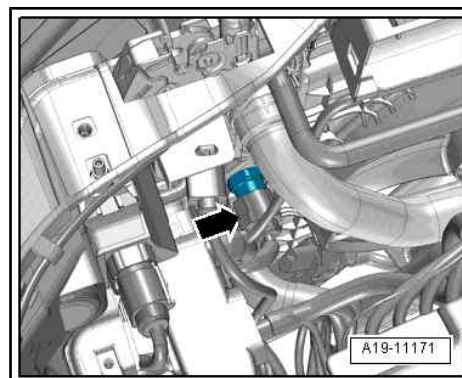
Installation is carried out in reverse order; note the following:

- Renew O-ring if fitted.

Note:

To avoid loss of coolant, screw in new radiator outlet coolant temperature sender - G83- immediately.

- Check coolant level ⇒ [page 199](#) .



Tightening torques

- ♦ ⇒ [“2.3 Exploded view - coolant temperature senders”, page 204](#)

2.9.2 Removing and installing radiator outlet coolant temperature sender - G83- - Audi A1 2018►

Removing

- Engine cold.



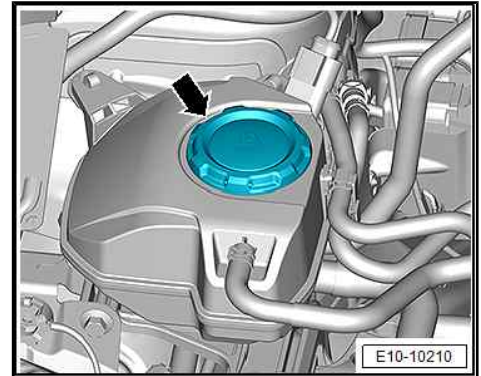
⚠ CAUTION

The cooling system is under pressure when the power unit is hot. Risk of scalding due to hot steam and hot coolant.

Danger of scalding skin and other parts of the body.

- Put on protective gloves.
- Put on safety goggles.
- Cover filler cap on coolant expansion tank with a cloth and open carefully to release pressure.

- Open sealing cap -arrow-.
- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation .



- Unplug electrical connector -2-.



Note

Place a cloth underneath to catch escaping coolant.

- Pull off retaining clip -3- and detach radiator outlet coolant temperature sender - G83- from connection.

Installing

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

- Renew O-ring if fitted.

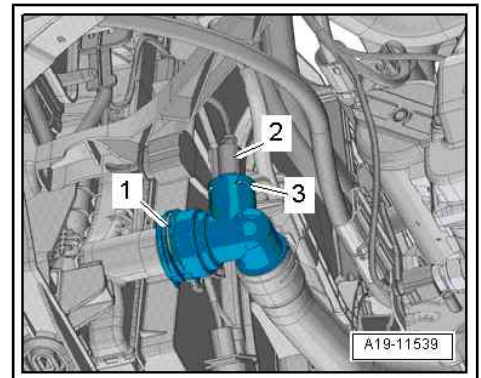
Note:

Fit new coolant temperature sender immediately so that as little coolant as possible is lost.

- Check coolant level ⇒ [page 199](#) .

Tightening torques

- ◆ ⇒ [“2.3 Exploded view - coolant temperature senders”, page 204](#)



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3 Coolant pipes

⇒ ["3.1 Exploded view - coolant pipes", page 218](#)

⇒ ["3.2 Removing and installing coolant pipes", page 218](#)

3.1 Exploded view - coolant pipes

- The arrow markings on coolant pipes and on ends of hoses must align.

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- 2 - Coolant pipe
 - ❑ Removing and installing
⇒ ["3.2 Removing and installing coolant pipes", page 218](#)

3 - Bolt

- ❑ 8 Nm

4 - Coolant hose

5 - Coolant hoses

6 - Coolant lines

- ❑ Clipped onto intake manifold (top)

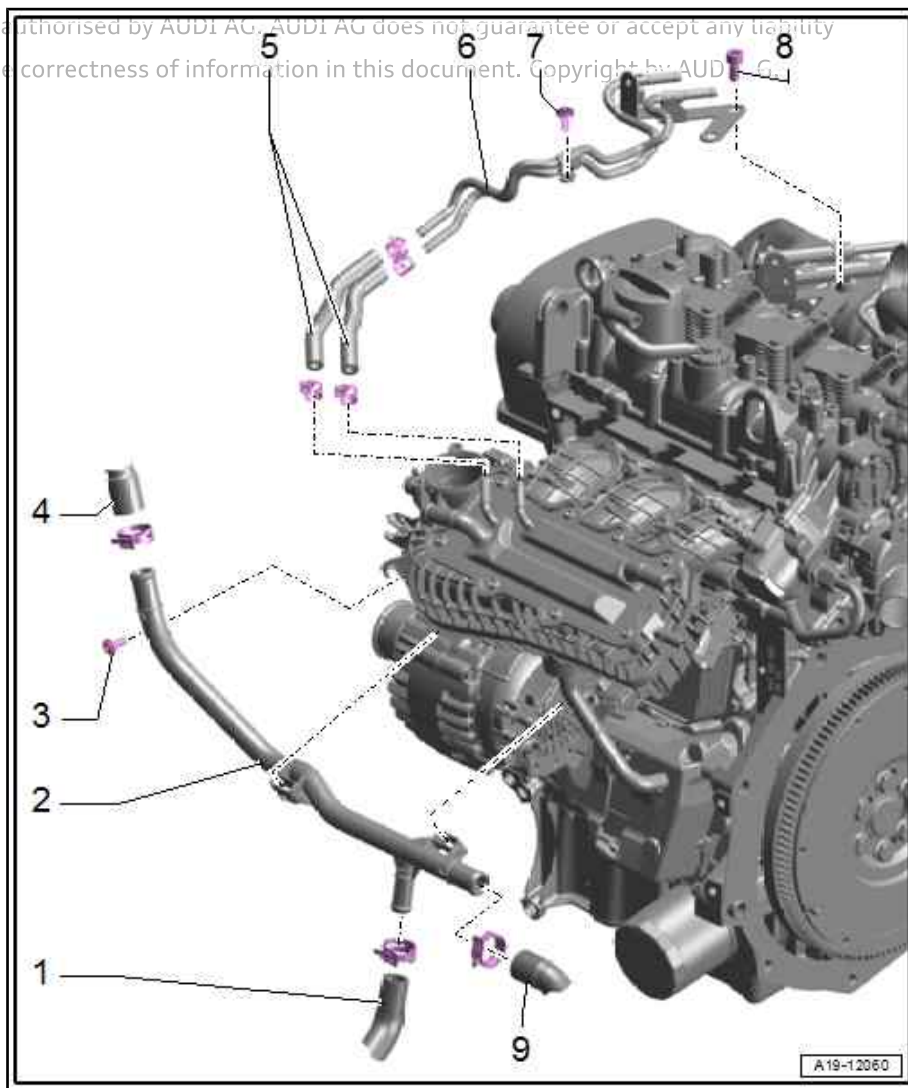
7 - Bolt

- ❑ 9 Nm

8 - Bolt

- ❑ Tightening torque
⇒ [Item 6 \(page 235\)](#)

9 - Coolant hose



3.2 Removing and installing coolant pipes

Removing

- Remove intake manifold
⇒ ["3.2 Removing and installing intake manifold", page 269](#) .



- Place intake manifold -1- on workbench (as shown in illustration).
- Place a piece of wood -2- (or similar) under intake manifold to support it.



NOTICE

Danger of damage to intake manifold and coolant pipe.

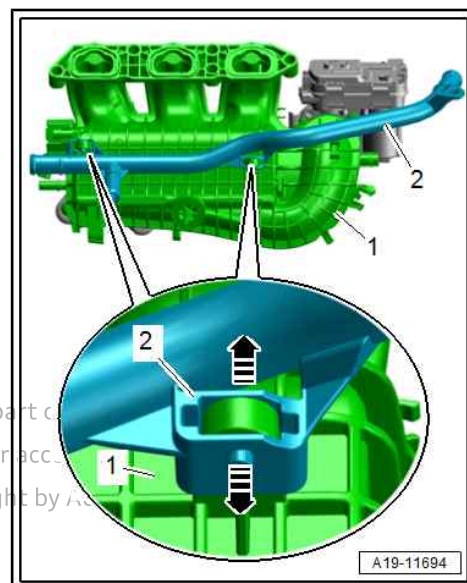
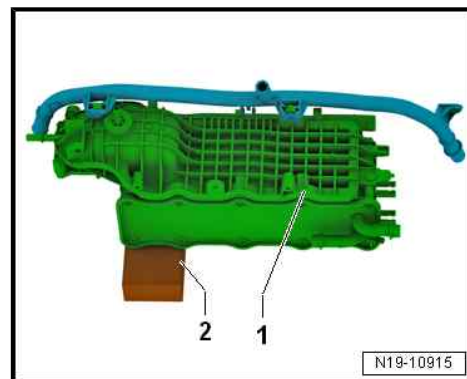
- Proceed very carefully when performing this work.

- Carefully release catches -arrows- and disconnect coolant pipe -2- from intake manifold -1-.

Installing

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

- Push coolant pipe onto intake manifold so that it engages audibly.
- Install intake manifold
⇒ [“3.2 Removing and installing intake manifold”, page 269](#) .



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4 Radiators/radiator fan

⇒ [“4.1 Exploded view - radiators/radiator fan”, page 220](#)

⇒ [“4.2 Radiator cowl and radiator fan”, page 224](#)

⇒ [“4.3 Removing and installing radiator”, page 225](#)

⇒ [“4.4 Removing and installing radiator cowl”, page 230](#)

⇒ [“4.5 Removing and installing radiator fan V7 ”, page 234](#)

4.1 Exploded view - radiators/radiator fan

⇒ [“4.1.1 Exploded view - radiators/radiator fan, Audi A1 2011►”, page 220](#)

⇒ [“4.1.2 Exploded view - radiators/radiator fan, Audi A1 2018►”, page 222](#)

4.1.1 Exploded view - radiators/radiator fan, Audi A1 2011►

Radiators

1 - Coolant hoses

- ☐ For charge air cooling circuit

2 - Air duct

3 - Water radiator for charge air cooling circuit

- ☐ Remove together with radiator
- ☐ Removing and installing ⇒ [“4.3 Removing and installing radiator”, page 225](#)
- ☐ If renewed, refill system with fresh coolant

4 - Coolant hose (bottom)

- ☐ Use release tool - VAS 531 001- to fasten
- ☐ Vulcanised hose clip

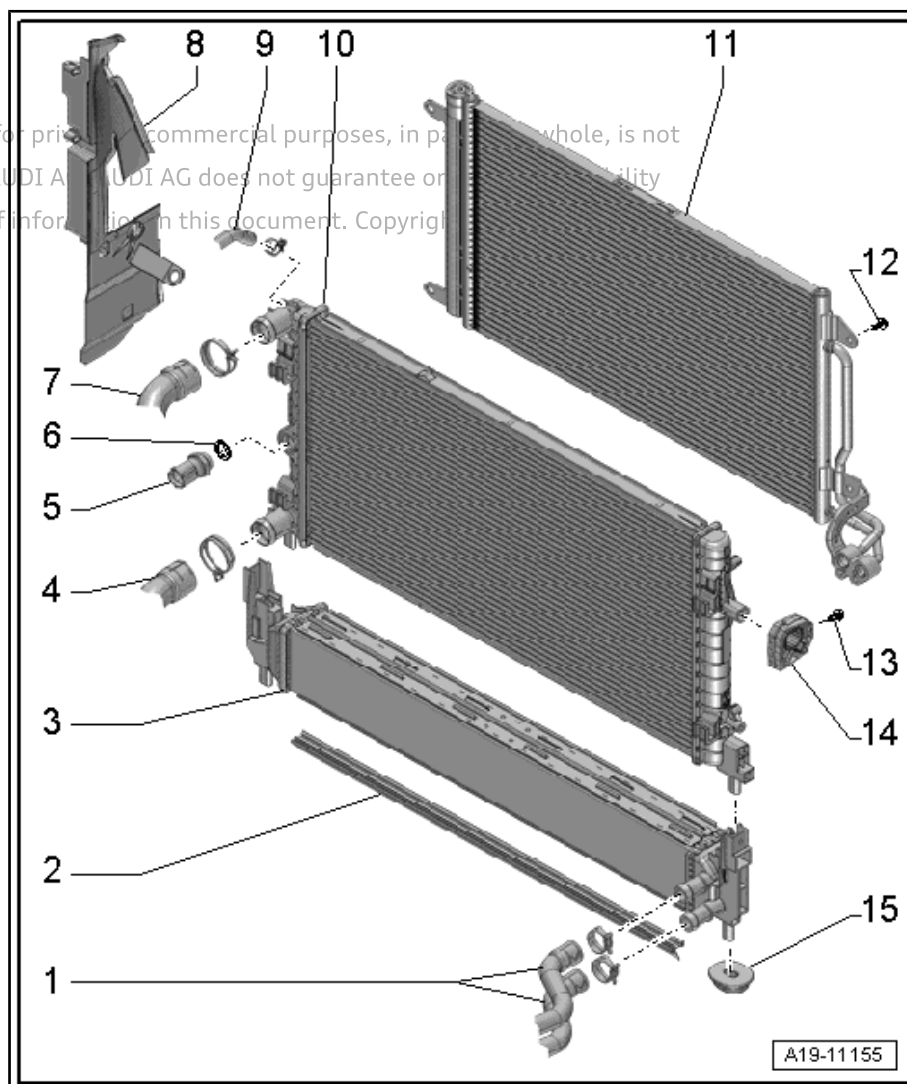
5 - Radiator outlet coolant temperature sender - G83-

- ☐ Removing and installing ⇒ [“2.9 Removing and installing radiator outlet coolant temperature sender G83 ”, page 216](#)

- ☐ 35 Nm

6 - Seal

- ☐ Not fitted on all versions; for allocation, refer to Electronic parts catalogue
- ☐ If fitted, renew after removal





7 - Coolant hose (top)

8 - Air duct

9 - Coolant hose

- ☐ To coolant expansion tank

10 - Radiator

- ☐ Removing and installing ⇒ ["4.3 Removing and installing radiator", page 225](#)
- ☐ If renewed, refill system with fresh coolant

11 - Condenser

- ☐ Removing and installing ⇒ Heating, air conditioning; Rep. gr. 87 ; Refrigerant circuit; Removing and installing condenser

12 - Bolt

- ☐ Tightening torque ⇒ Heating, air conditioning; Rep. gr. 87 ; Refrigerant circuit; Exploded view - condenser

13 - Bolt

- ☐ 5 Nm

14 - Retainer

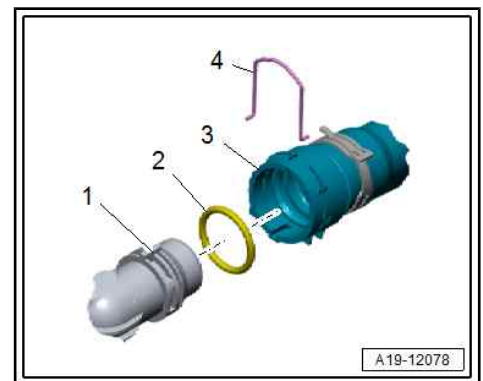
- ☐ Note installation position

15 - Retainer

- ☐ For water radiator for charge air cooling circuit

Connecting coolant hose with plug-in connector

- If damaged, renew retaining clip -4-.
- If damaged, renew O-ring. To do so, remove O-ring -2- from plug-in connector -3- using a suitable tool (do not use a sharp tool). Take care not to damage the plug-in connector or the surface on which the O-ring is seated.
- Lightly lubricate new O-ring with coolant and fit O-ring in plug-in connector.
- Press plug-in connector onto connection -1- until it engages audibly.
- Press plug-in connector in again and then pull to check that it is correctly engaged.



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4.1.2 Exploded view - radiators/radiator fan, Audi A1 2018➤

Radiators

1 - Radiator

- ☐ Must be removed together with water radiator for charge air cooling circuit
- ☐ Removing and installing ⇒ [“4.3 Removing and installing radiator”](#), page 225

2 - Coolant hose

- ☐ Lift retaining clip to detach
- ☐ Connecting ⇒ [Fig. “Connecting coolant hose with plug-in connector”](#), page 221

3 - Retaining clip

4 - O-ring

- ☐ Renew after removing
- ☐ Lubricate with coolant

5 - Radiator outlet coolant temperature sender - G83-

- ☐ Removing and installing ⇒ [“2.9 Removing and installing radiator outlet coolant temperature sender G83”](#), page 216

6 - O-ring

- ☐ Renew after removing
- ☐ Lubricate with coolant

7 - Coolant hose

- ☐ Lift retaining clip to detach
- ☐ Connecting ⇒ [Fig. “Connecting coolant hose with plug-in connector”](#), page 221

8 - O-ring

- ☐ Renew after removing
- ☐ Lubricate with coolant

9 - Coolant hose

- ☐ Lift retaining clip to detach
- ☐ Connecting ⇒ [Fig. “Connecting coolant hose with plug-in connector”](#), page 221

10 - Air duct

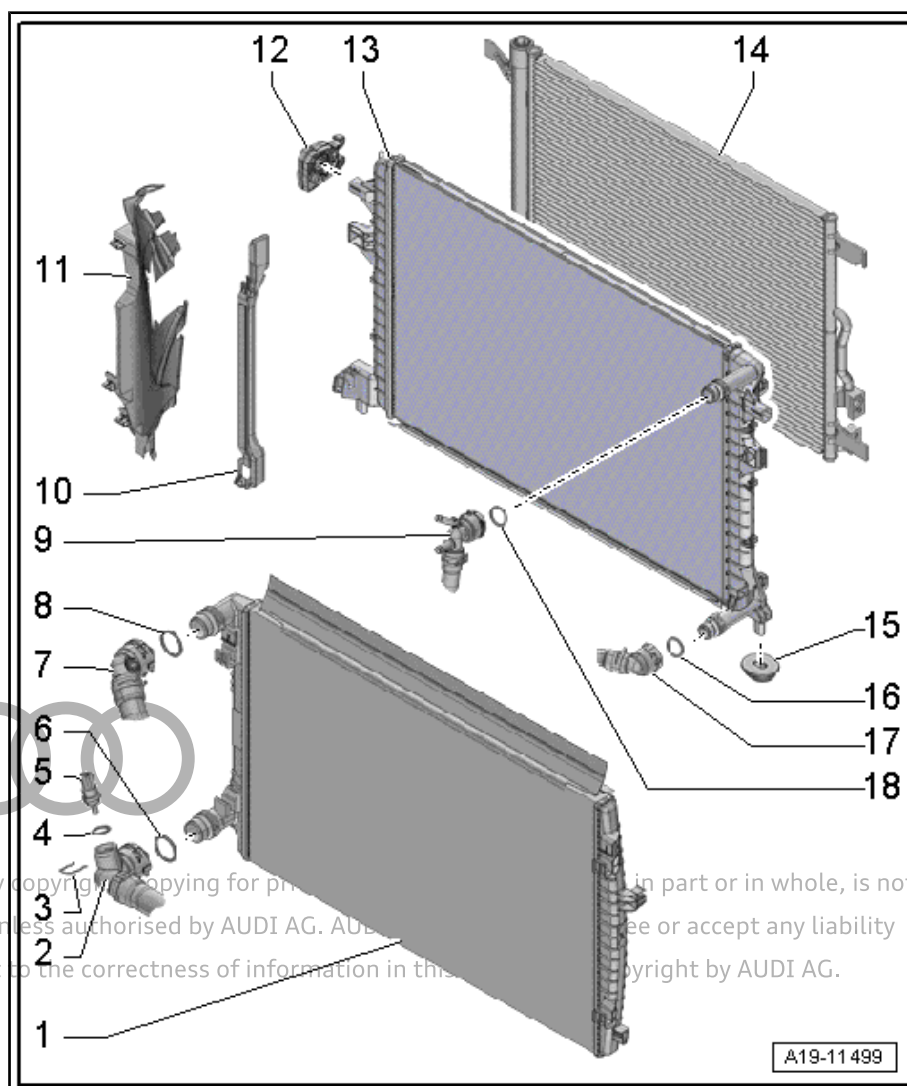
11 - Air duct

12 - Rubber mounting

- ☐ For radiator

13 - Water radiator for charge air cooling circuit

- ☐ Must be removed together with radiator
- ☐ Removing and installing ⇒ [“4.3 Removing and installing radiator”](#), page 225





14 - Condenser

- ☐ Removing and installing ⇒ Heating, air conditioning; Rep. gr. 87 ; Refrigerant circuit; Removing and installing condenser

15 - Rubber bush

- ☐ For radiator

16 - O-ring

- ☐ Renew after removing
- ☐ Lubricate with coolant

17 - Coolant hose

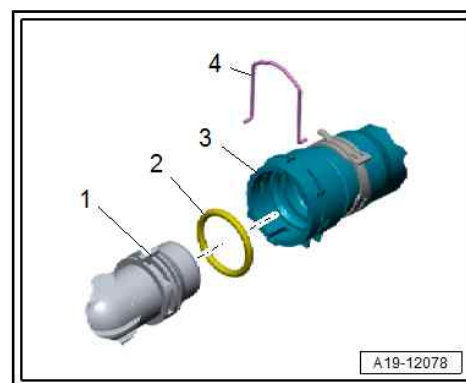
- ☐ Lift retaining clip to detach
- ☐ Connecting ⇒ [Fig. "Connecting coolant hose with plug-in connector", page 221](#)

18 - O-ring

- ☐ Renew after removing
- ☐ Lubricate with coolant

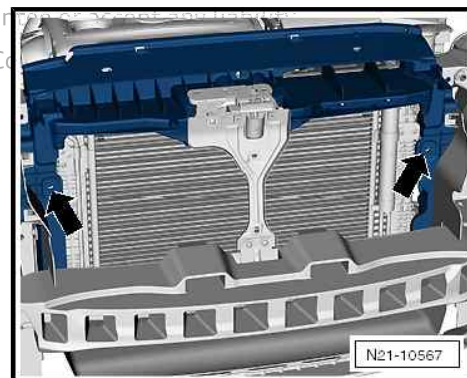
Connecting coolant hose with plug-in connector

- If damaged, renew retaining clip -4-.
- If damaged, renew O-ring. To do so, remove O-ring -2- from plug-in connector -3- using a suitable tool (do not use a sharp tool). Take care not to damage the plug-in connector or the surface on which the O-ring is seated.
- Lubricate new O-ring lightly with coolant and fit O-ring in coolant hose.
- Press coolant hose onto coolant pipe -1- until it engages with a click.
- Press coolant hose in again and then pull to check that plug-in connector is correctly engaged.



Radiator mountings with bolted connections

- Bolt radiator mountings with detached fasteners to lock carrier. For bolts, refer to ⇒ Electronic parts catalogue .
- ◆ Tightening torque: 5 Nm





4.2 Radiator cowl and radiator fan

⇒ [“4.2.1 Radiator cowl and radiator fan - Audi A1 2011►”, page 224](#)

⇒ [“4.2.2 Radiator cowl and radiator fan - Audi A1 2018►”, page 225](#)

4.2.1 Radiator cowl and radiator fan - Audi A1 2011►

1 - Pin

- ☐ For spreader clip

2 - Air flow ring

- ☐ Depending on version

3 - Radiator fan - V7-

- ☐ With radiator fan control unit - J293-

- ☐ Removing and installing
⇒ [“4.5 Removing and installing radiator fan V7”, page 234](#)

4 - Radiator cowl

- ☐ Removing and installing
⇒ [“4.4 Removing and installing radiator cowl”, page 230](#)

5 - Air flow flap

6 - Clip

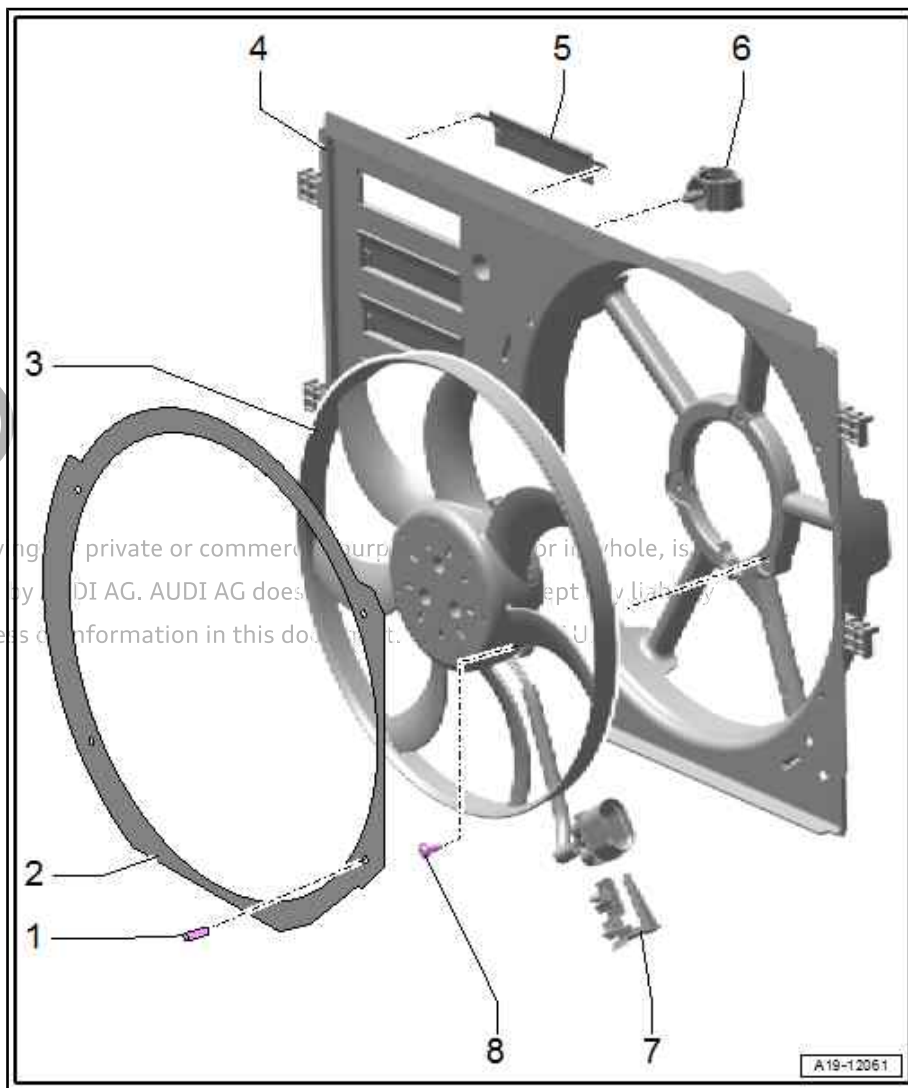
- ☐ For coolant hose

7 - Bracket

- ☐ For electrical connector

8 - Bolt

- ☐ 1.5 Nm





4.2.2 Radiator cowl and radiator fan - Audi A1 2018►

1 - Bolt

- 5 Nm

2 - Radiator cowl

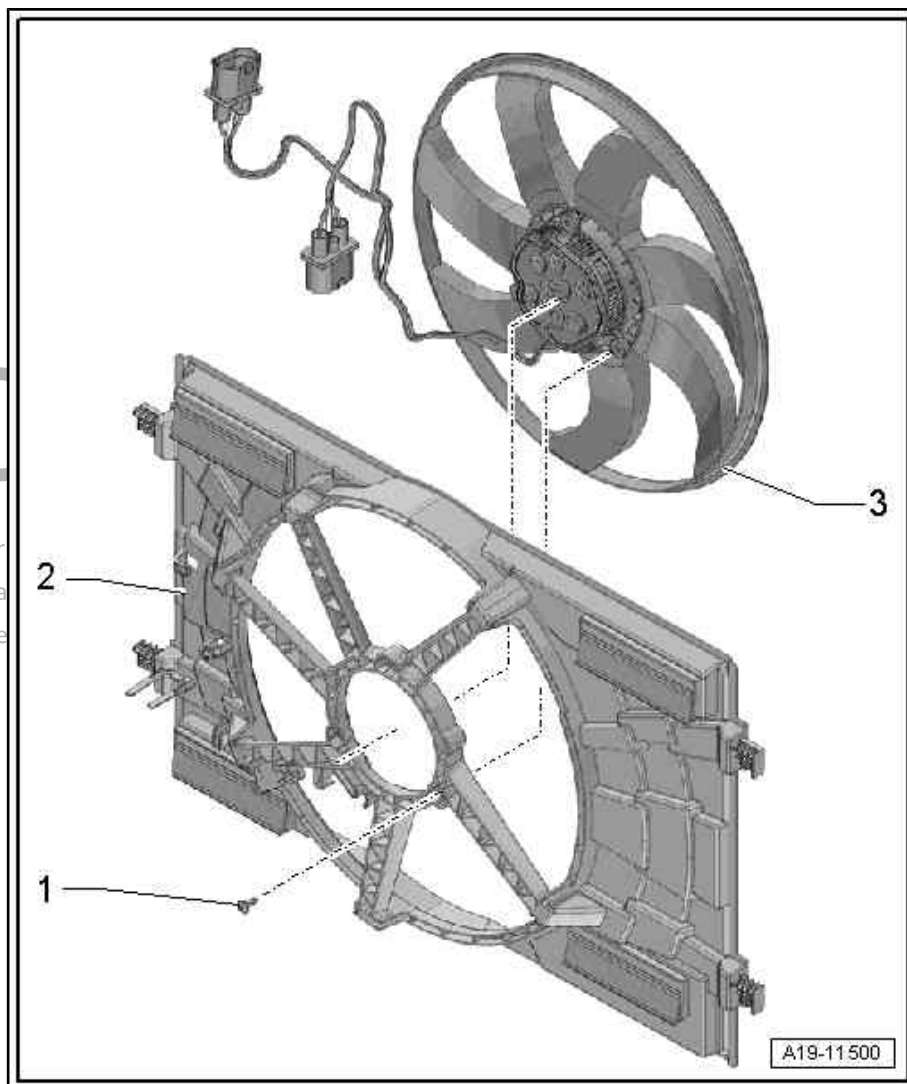
- Removing and installing
⇒ [“4.4 Removing and installing radiator cowl”](#),
[page 230](#)

3 - Radiator fan - V7-

- Removing and installing
⇒ [“4.5 Removing and installing radiator fan V7”](#),
[page 234](#)



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4.3 Removing and installing radiator

⇒ [“4.3.1 Removing and installing radiator - Audi A1 2011►”](#), [page 225](#)

⇒ [“4.3.2 Removing and installing radiator - Audi A1 2018►”](#), [page 228](#)

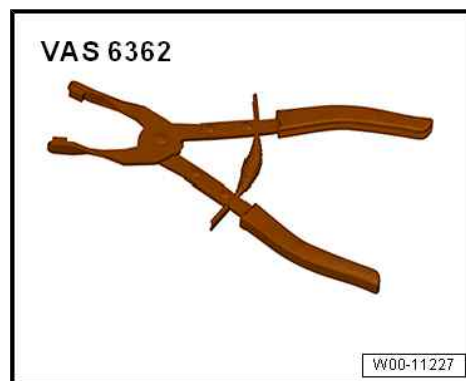
4.3.1 Removing and installing radiator - Audi A1 2011►

- Radiator and water radiator for charge air cooling circuit are removed together.

Special tools and workshop equipment required

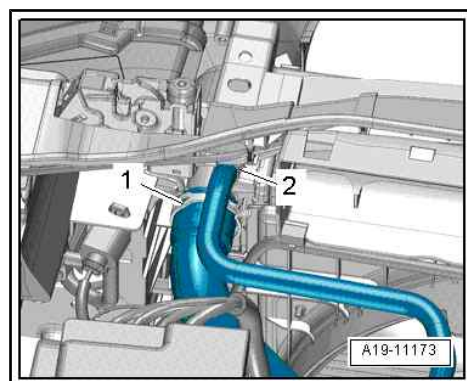


◆ Hose clip pliers - VAS 6362-

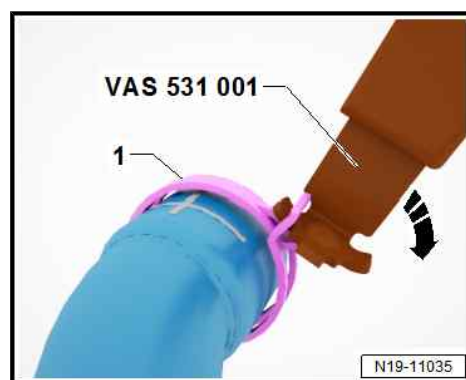


Removing

- Drain coolant
⇒ ["1.3 Draining and filling cooling system", page 192](#) .
- Remove bumper cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Removing and installing bumper cover .
- Remove radiator cowl
⇒ ["4.4 Removing and installing radiator cowl", page 230](#) .
- Release hose clips -1 and 2- and detach coolant hoses (top left) from radiator.



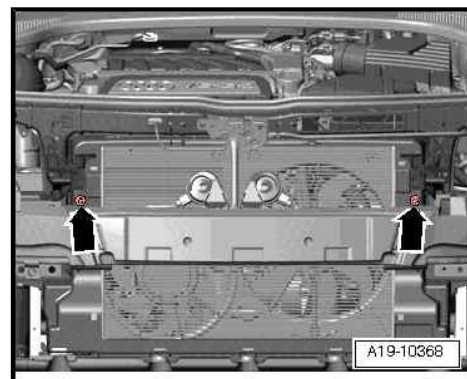
- Fasten hose clip -1- in direction of -arrow- using release tool - VAS 531 001- .



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- Remove bolts -arrows-.
- Swivel top edge of radiator slightly to rear.
- Lift radiator, disengage it from bottom mounting points and press it to the rear.



Vehicles with air conditioner:

⚠ CAUTION

Risk of injury caused by refrigerant.

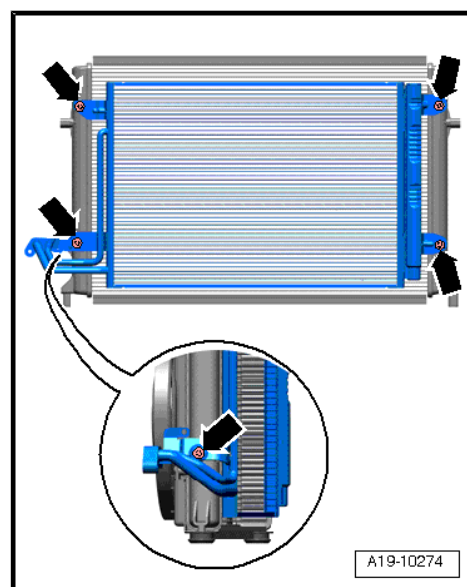
- The air conditioner refrigerant circuit must not be opened.

- Remove bolts -arrows-.

ⓘ NOTICE

Risk of damage to refrigerant lines and hoses

- Do NOT stretch, kink or bend refrigerant lines and hoses.
- Move condenser to front and place in lock carrier, then secure with cable ties to prevent from dropping.



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All vehicles (continued):

- Release fasteners at water radiator for charge air cooling circuit -1- -arrows A-.
- Pull water radiator for charge air cooling circuit off radiator -2- -arrow B- and disengage -arrow C-.
- Remove both radiators.

Installing

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

- If there are slight impressions on the fins, refer to [⇒ "3.10 Installing radiators and condensers", page 8](#) .
- Renew O-rings after removing.
- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .
- Vehicles with air conditioning: Install condenser ⇒ Heating, air conditioning; Rep. gr. 87 ; Refrigerant circuit; Removing and installing condenser .
- Install radiator cowl
⇒ ["4.4 Removing and installing radiator cowl", page 230](#) .
- Install bumper cover (front) ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Exploded view - bumper cover .
- Fill up with coolant ⇒ [page 199](#) .

Tightening torques

- ♦ ⇒ ["4.1 Exploded view - radiators/radiator fan", page 220](#)

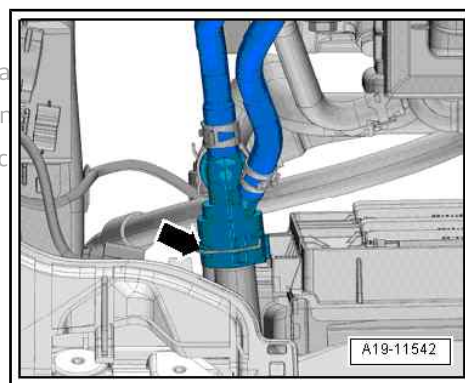
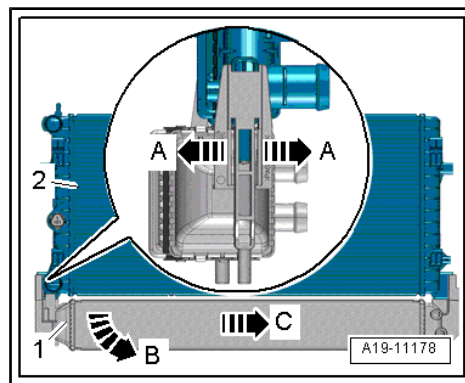
4.3.2 Removing and installing radiator - Audi A1 2018➤

Radiator and water radiator for charge air cooling circuit are removed together.

Removing

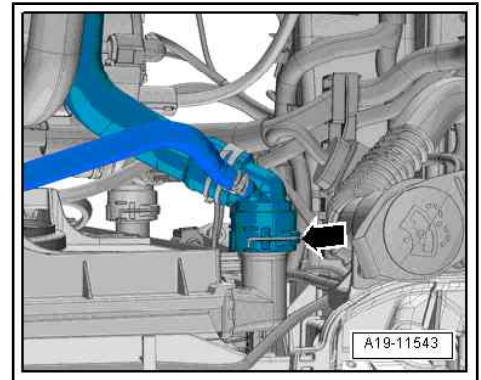
- Remove radiator cowl
⇒ ["4.4 Removing and installing radiator cowl", page 230](#) .
- Lift retaining clip -arrow- and disconnect coolant hose (top right) from water radiator for charge air cooling circuit.

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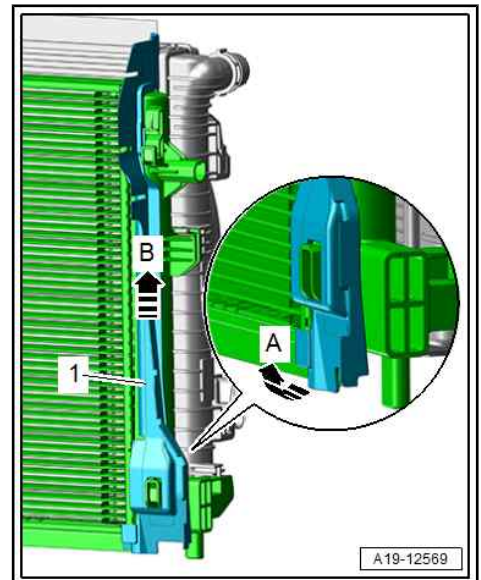


- Lift retaining clip -arrow- and disconnect coolant hose (top left) from radiator.
- Push radiator slightly towards rear together with charge air cooler.

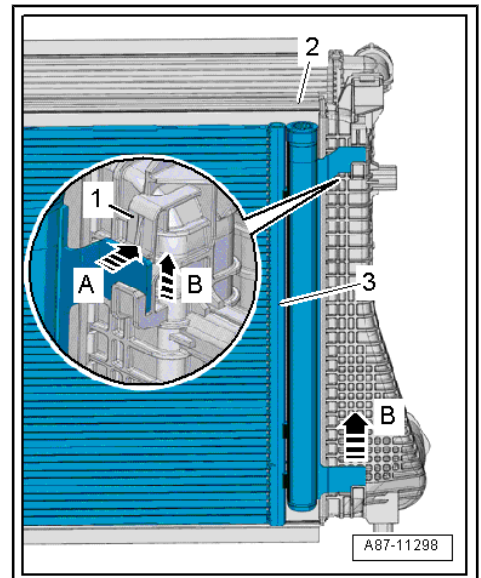


Continued:

- Release sealing lip -1- (both sides) at bottom of water radiator for charge air cooling circuit -arrow A- and disengage upwards at top -arrow B-.



- Release fasteners -1- on both sides -arrow A- and disengage condenser -3- at water radiator for charge air cooling circuit -2-.
- Tie up condenser to lock carrier.
- Take off radiator.



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- Press locking tabs on left and right sides of radiator simultaneously -arrow-, and detach radiator from water radiator for charge air cooling circuit.

Installing

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

- If there are slight impressions on the fins, refer to ⇒ [“3.10 Installing radiators and condensers”, page 8](#).
- The radiator mountings with removed fasteners can be re-used. They are bolted to the lock carrier. For bolts, refer to ⇒ Electronic parts catalogue.
- Renew O-rings after removing.
- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue.
- Do not reuse coolant.
- Vehicles with air conditioner: Install condenser ⇒ Heating, air conditioning; Rep. gr. 87 ; Refrigerant circuit; Removing and installing condenser.
- Install radiator cowl ⇒ [“4.4 Removing and installing radiator cowl”, page 230](#).
- Connect coolant hose with plug-in connector ⇒ [Fig. ““Connecting coolant hose with plug-in connector””, page 223](#).
- Install bumper cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Exploded view - bumper cover.
- Fill up with coolant ⇒ [“1.3 Draining and filling cooling system”, page 192](#).

Tightening torques

- ♦ ⇒ [“4.1 Exploded view - radiators/radiator fan”, page 220](#)
- ♦ ⇒ [Fig. ““Radiator mountings with bolted connections””, page 223](#)

4.4 Removing and installing radiator cowl

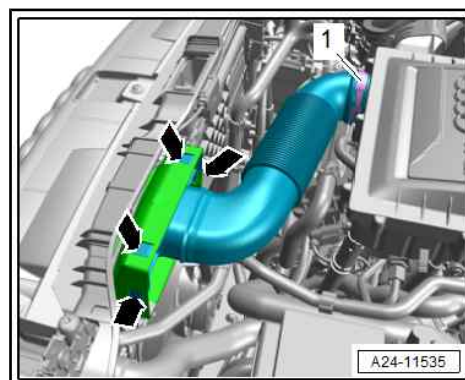
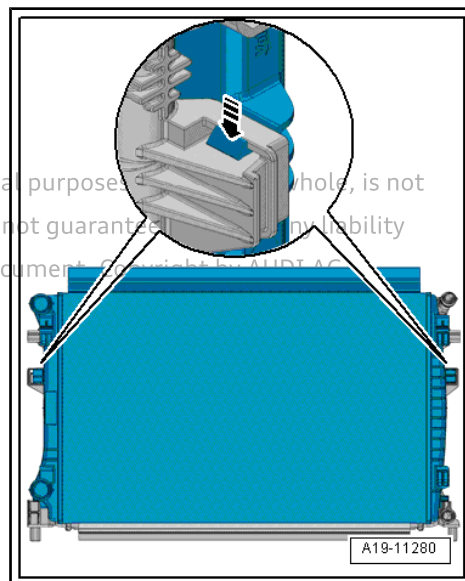
⇒ [“4.4.1 Removing and installing radiator cowl - Audi A1 2011►”, page 230](#)

⇒ [“4.4.2 Removing and installing radiator cowl - Audi A1 2018►”, page 232](#)

4.4.1 Removing and installing radiator cowl - Audi A1 2011►

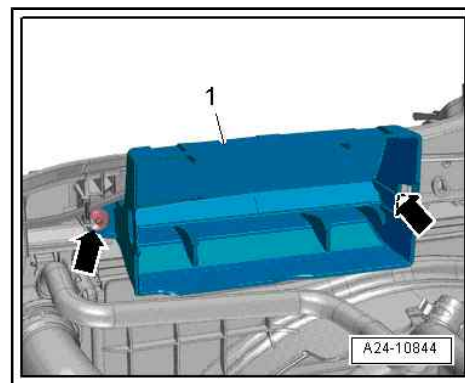
Removing

- Release fasteners -arrows- and detach air duct from lock carrier.
- Release hose clip -1- and detach air hose.

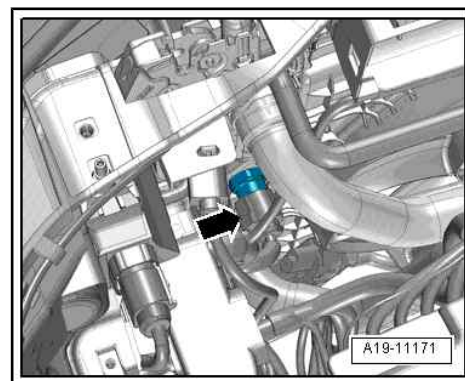




- Remove bolts -arrows- and detach air duct -1-.



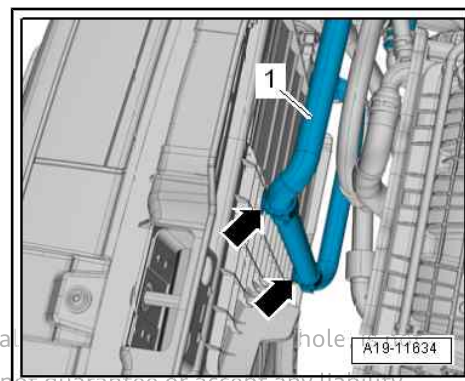
- Unplug electrical connector -arrow- for radiator outlet coolant temperature sender - G83- .



- Move coolant hose -1- clear at radiator cowl -arrows-.



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⚠ CAUTION

Your hands can be injured if the radiator fan starts up automatically.

- Do not reach into the radiator fan when unplugging the connector.

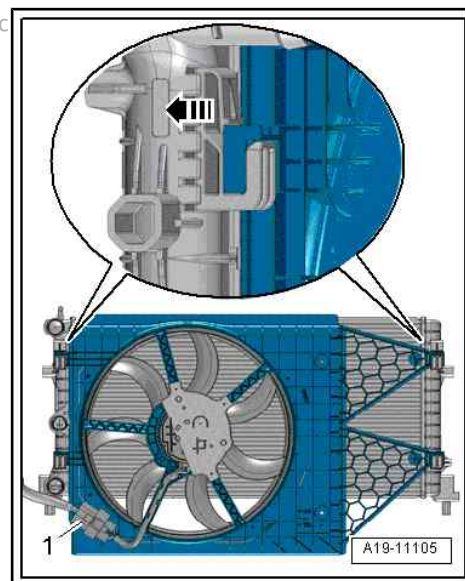
- Unplug electrical connector -1- for radiator fan at bottom of radiator cowl.
- Press locking tabs on left and right sides of radiator cowl together -arrow- and lift radiator cowl off radiator.

Installing

Installation is carried out in reverse sequence.

Tightening torques

- ◆ ⇒ [“2.1 Exploded view - air cleaner housing”, page 263](#)

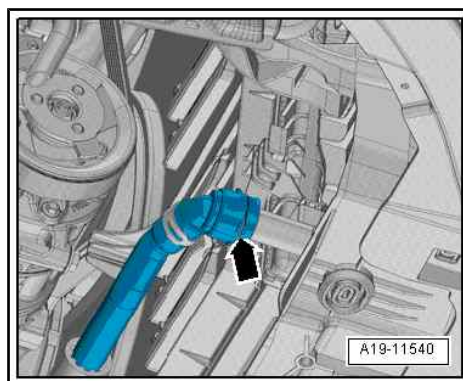




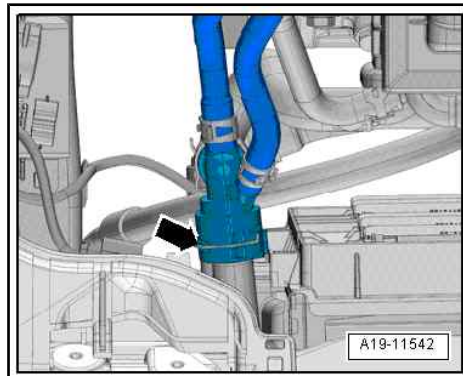
4.4.2 Removing and installing radiator cowl - Audi A1 2018 ➤

Removing

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation .
- Drain coolant ⇒ ["1.3 Draining and filling cooling system", page 192](#) .
- Remove air duct from lock carrier ⇒ ["2.3 Removing and installing air duct at lock carrier", page 266](#) .
- Remove bumper cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Exploded view - bumper cover .
- Place drip tray for workshop hoist - VAS 6208- underneath.
- Lift retaining clip -arrow- and disconnect coolant hose (bottom right) from water radiator for charge air cooling circuit.
- Drain off coolant.



- Lift retaining clip -arrow- and disconnect coolant hose (top right) from water radiator for charge air cooling circuit.



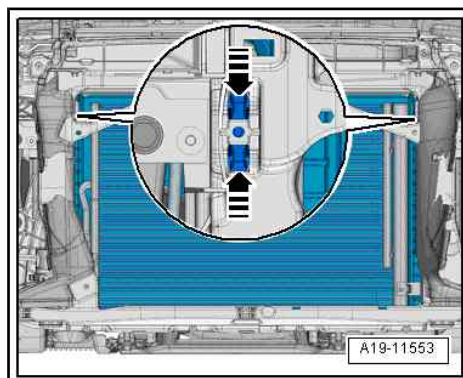
CAUTION

Risk of injury as the radiator fans may start up automatically.

- Unplug electrical connectors.

Radiator mountings with fasteners:

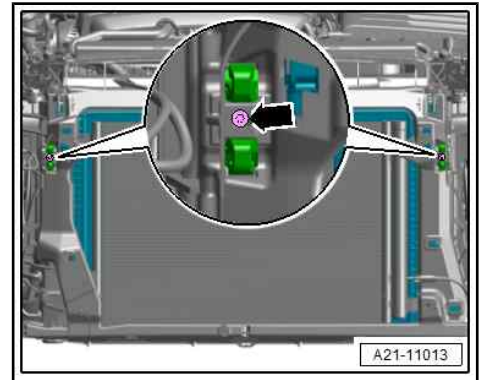
- Cut through fasteners (both sides) -arrows- for radiator mounting with side-cutting pliers; push radiator and water radiator for charge air cooling circuit slightly towards rear at top. Radiator mounting can be used again.





Radiator mountings with bolted connections:

- Unscrew bolt -arrow- (left and right) and push radiator with charge air cooler slightly towards rear.



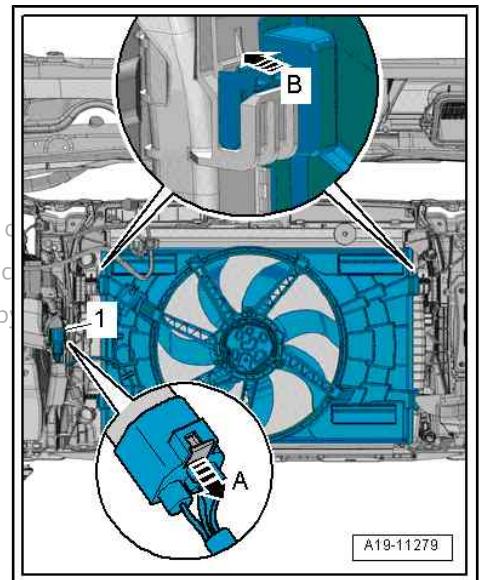
Continued:

CAUTION

Risk of injury as the radiator fans may start up automatically.

- Unplug electrical connectors.

- Unplug electrical connector -1- for radiator fan (push retainer to the rear -arrow A- and press down release catch).
- Press locking tabs on left and right sides of radiator cowl simultaneously -arrow B-, lift radiator cowl off radiator and detach.



Installing

Installation is carried out in reverse sequence.

- Fill up with coolant
⇒ [“1.3 Draining and filling cooling system”, page 192](#) .

Tightening torques

- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation
- ◆ ⇒ General body repairs, exterior; Rep. gr. 50 ; Lock carrier; Exploded view - lock carrier
- ◆ ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Exploded view - bumper cover .



4.5 Removing and installing radiator fan - V7-

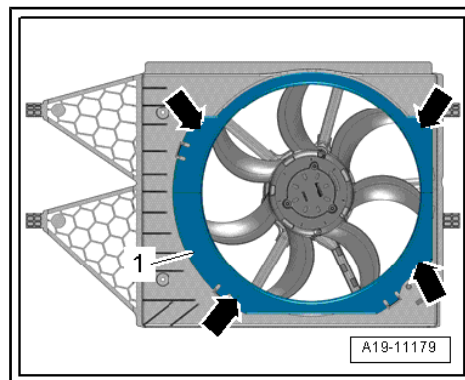
⇒ [“4.5.1 Removing and installing radiator fan V7 - Audi A1 2011►”, page 234](#)

⇒ [“4.5.2 Removing and installing radiator fan V7 - Audi A1 2018►”, page 234](#)

4.5.1 Removing and installing radiator fan - V7- - Audi A1 2011►

Removing

- Remove radiator cowl
⇒ [“4.4 Removing and installing radiator cowl”, page 230](#) .
- Press out pins -arrows- of fasteners and detach ring -1- from fan.



- Take electrical wiring -1- out of cable guide.
- Unscrew nuts -arrows- and detach radiator fan - V7- .

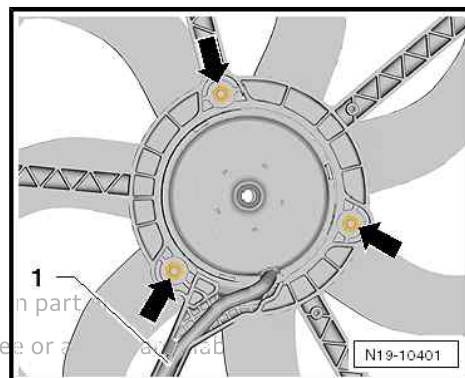
Installing

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

- Install radiator cowl
⇒ [“4.4 Removing and installing radiator cowl”, page 230](#) .

Tightening torques

- ◆ ⇒ [“4.1 Exploded view - radiators/radiator fan”, page 220](#)
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4.5.2 Removing and installing radiator fan - V7- - Audi A1 2018►

Removing

- Re-install all cable ties in original positions.
- Remove radiator cowl
⇒ [“4.4 Removing and installing radiator cowl”, page 230](#) .
- Move electrical wiring clear.
- Unscrew bolts -arrows- and remove radiator fan - V7- .

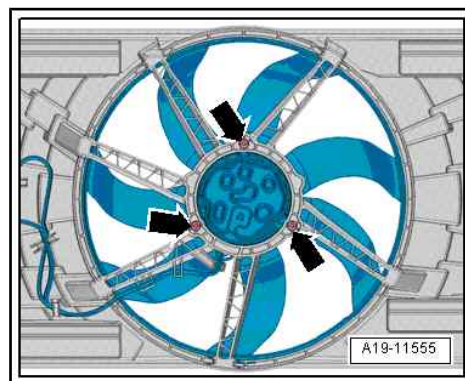
Installing

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

- Install radiator cowl
⇒ [“4.4 Removing and installing radiator cowl”, page 230](#) .

Tightening torques

- ◆ ⇒ [“4.1 Exploded view - radiators/radiator fan”, page 220](#)





21 – Turbocharging/supercharging

1 Turbocharger

⇒ [“1.1 Exploded view - turbocharger”, page 235](#)

⇒ [“1.2 Removing and installing turbocharger”, page 238](#)

⇒ [“1.3 Removing and installing charge pressure positioner V465”, page 243](#)

⇒ [“1.4 Removing and installing connection for turbocharger”, page 244](#)

1.1 Exploded view - turbocharger

⇒ [“1.1.1 Exploded view - turbocharger”, page 235](#)

⇒ [“1.1.2 Exploded view - pipes, lines and hoses on turbocharger”, page 237](#)

1.1.1 Exploded view - turbocharger

1 - Connection

- ☐ Removing and installing
⇒ [“1.4 Removing and installing connection for turbocharger”, page 244](#)

2 - Bolt

- ☐ 8 Nm

3 - O-ring

- ☐ Renew after removing
- ☐ Lubricate O-ring lightly with clean engine oil prior to installation

4 - Gasket

- ☐ Renew after removing

5 - Bracket

- ☐ For coolant lines

6 - Bolt

- ☐ 20 Nm

7 - Turbocharger

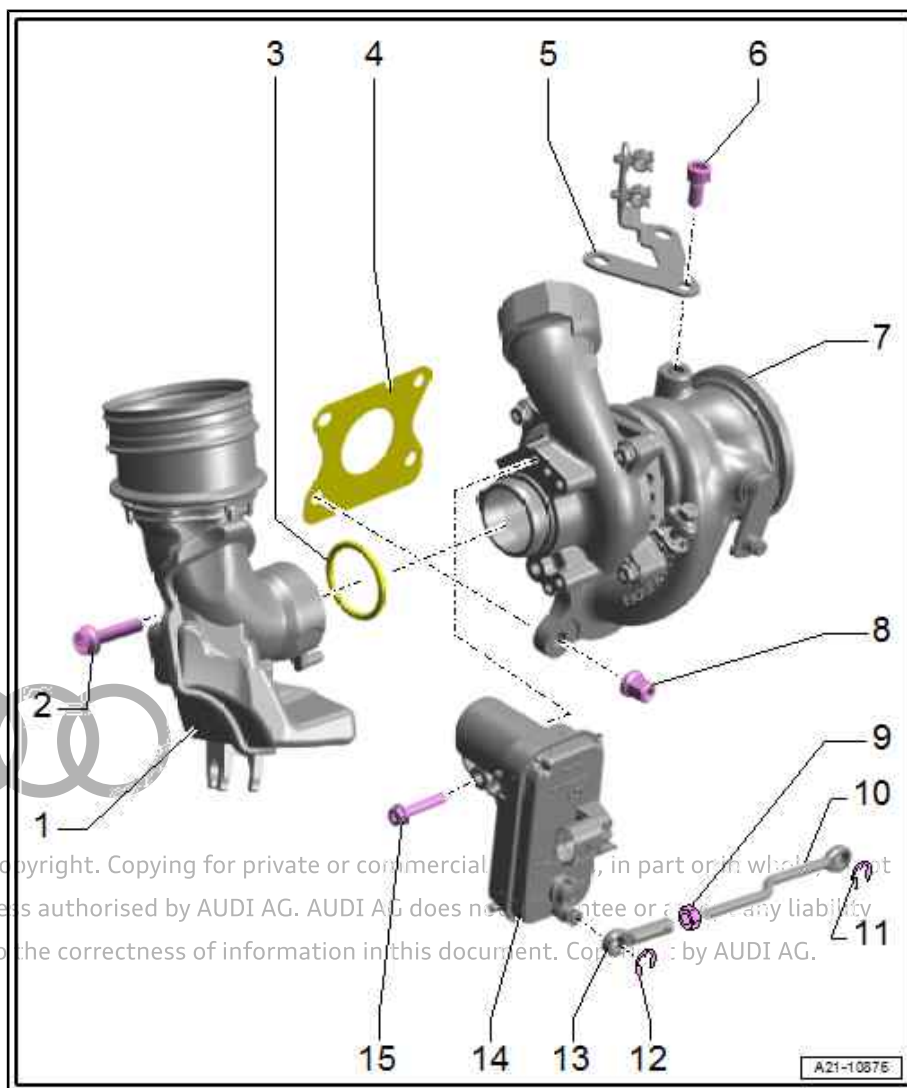
- ☐ Removing and installing
⇒ [“1.2 Removing and installing turbocharger”, page 238](#)

8 - Nut

- ☐ Renew after removing
- ☐ Tightening torque
⇒ [page 236](#)

9 - Lock nut

- ☐ For charge pressure positioner - V465-
- ☐ 10 Nm



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10 - Operating lever

- ❑ For charge pressure positioner - V465-

11 - Securing clip

12 - Securing clip

13 - Operating lever

- ❑ For charge pressure positioner - V465-

14 - Charge pressure positioner - V465-

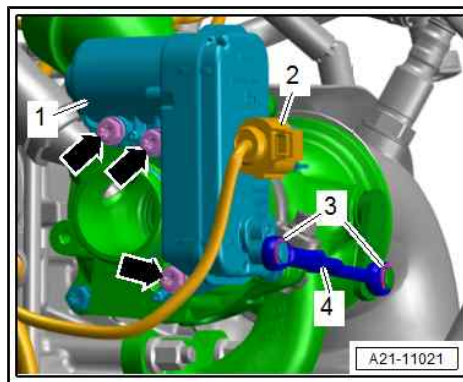
- ❑ Removing and installing ⇒ ["1.3 Removing and installing charge pressure positioner V465 ", page 243](#)

15 - Bolt

- ❑ Renew after removing
- ❑ Tightening torque ⇒ [page 236](#)
- Always renew all three bolts if one or more are loose.

Tightening torque for bolts securing charge pressure positioner - V465-

- Tighten new bolts -arrows- to 8 Nm + 45°.
- Always renew all three bolts -arrows- if one or more are loose.



Tightening torque - securing nuts for turbocharger

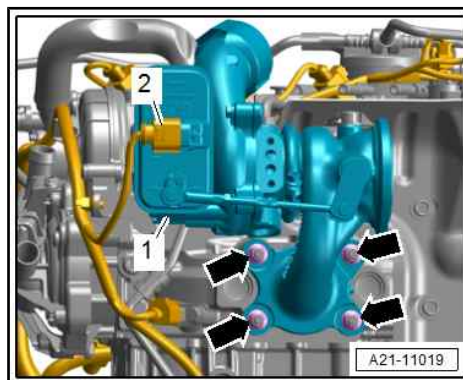
Tightening torque in three stages:

Use new nuts.

Stage 1: Screw nuts on by hand until turbocharger flange lies flat against wall of cylinder head. -

Stage 2: Pre-tighten nuts in diagonal sequence. 10 Nm

Stage 3: Final tightening torque 14 Nm





1.1.2 Exploded view - pipes, lines and hoses on turbocharger

1 - Turbocharger

- ☐ Removing and installing
 ⇒ ["1.2 Removing and installing turbocharger"](#),
 page 238

2 - O-ring

- ☐ Renew after removing

3 - Bolt

- ☐ 9 Nm

4 - Bolt

- ☐ 20 Nm

5 - Oil supply line

6 - O-ring

- ☐ Renew after removing

7 - Bolt

- ☐ 9 Nm

8 - O-ring

- ☐ Renew after removing
- ☐ Lubricate O-ring lightly
 with clean engine oil prior
 to installation

9 - Bolt

- ☐ 8 Nm

10 - Hose

- ☐ For crankcase breather

11 - Bolt

- ☐ 8 Nm

12 - O-rings

- ☐ Renew after removing
- ☐ Lubricate O-ring lightly with clean engine oil prior to installation

13 - Gasket

- ☐ Renew after removing

14 - Coolant lines

- ☐ Supply and return

15 - Bolt

- ☐ 8 Nm

16 - O-ring

- ☐ Renew after removing

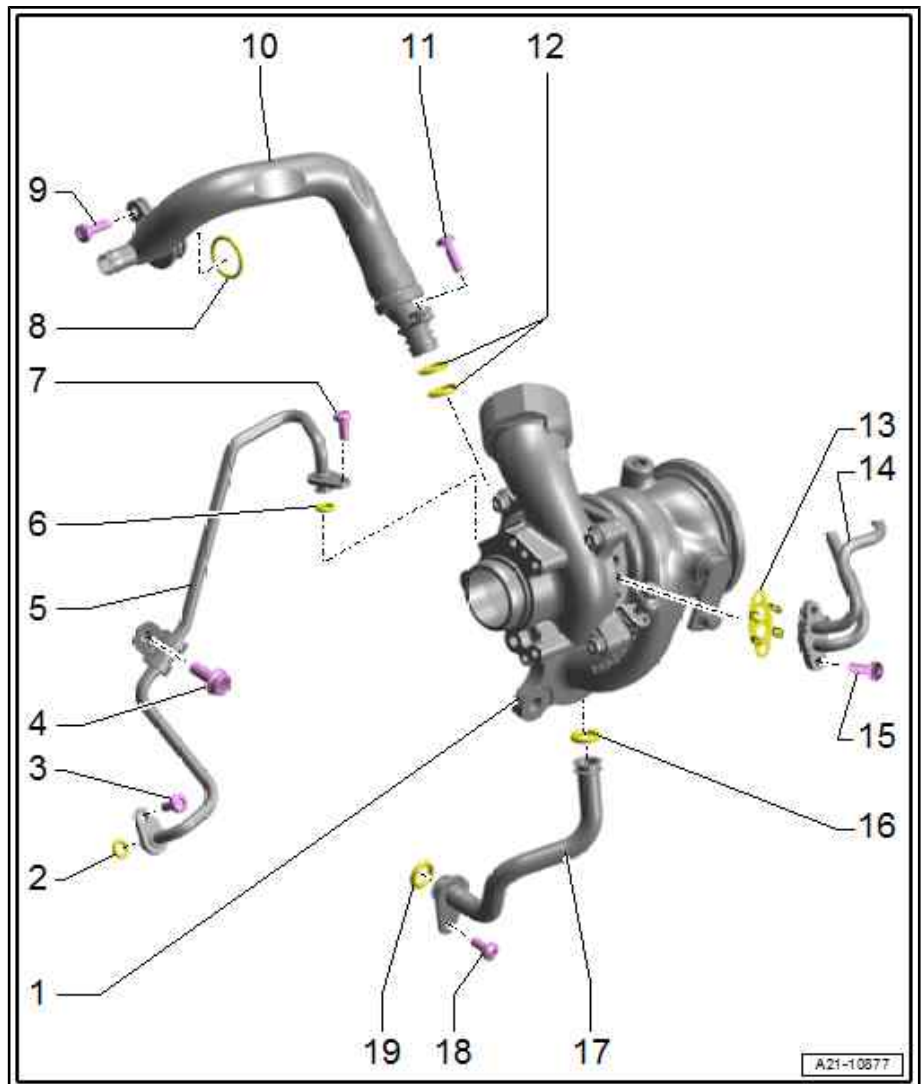
17 - Oil return line

18 - Bolt

- ☐ 9 Nm

19 - O-ring

- ☐ Renew after removing



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1.2 Removing and installing turbocharger

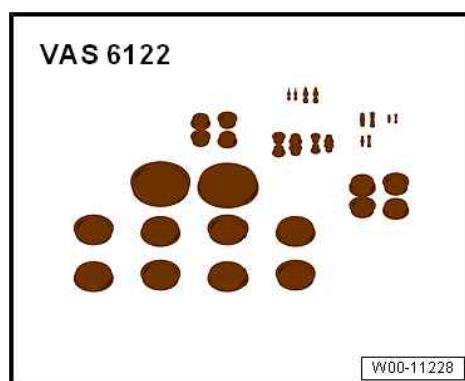
- If the turbocharger has suffered mechanical damage (e.g. damaged compressor wheel), it is not sufficient merely to fit a new turbocharger. The following work must be performed in order to avoid further damage:
- Check air cleaner housing, air filter element and air hoses for dirt and foreign particles.
- Check the entire charge air system (including the charge air cooler) for foreign matter.
- If foreign matter is found in the charge air system, clean all relevant ducts and hoses and renew charge air cooler if necessary.

Special tools and workshop equipment required

- ◆ Hose clamps up to 25 mm - 3094-



- ◆ Engine bung set - VAS 6122-



- ◆ Hose clip pliers - VAS 6362-



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- ◆ Socket Torx T30 - T10405-



- ◆ Release tool - T10527-



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Removing

- Observe rules for cleanliness
⇒ ["3.1 Rules for cleanliness", page 5](#) .
- Reinstall heat insulation sleeves in the same locations when installing.

If the turbocharger has suffered mechanical damage (e.g. damaged compressor wheel), it is not sufficient merely to fit a new turbocharger. The following work must be performed in order to avoid further damage:

- ◆ Check air cleaner housing, air filter element and air hoses for dirt and foreign particles.
- ◆ Check the entire charge air system (including the charge air cooler) for foreign matter.

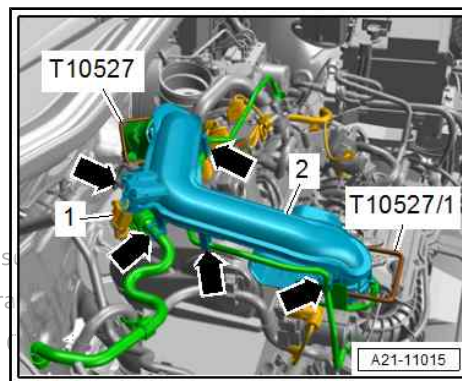
If foreign matter is found in the charge air system, clean all relevant ducts and hoses and renew the charge air cooler if necessary.

- Remove air cleaner housing
⇒ ["2.2 Removing and installing air cleaner housing", page 265](#) .

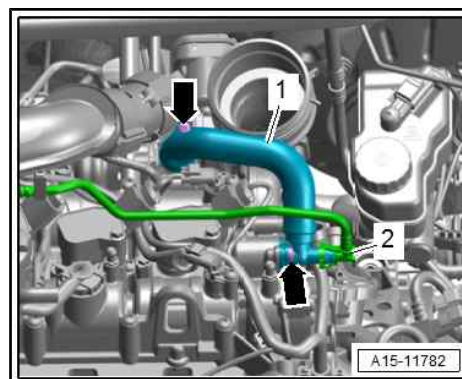


- Unplug electrical connector -1- for charge pressure sender - G31- / intake air temperature sender 2 - G299- and move electrical wiring clear.
- Move hoses -arrows- clear at air pipe -2-.
- Release fasteners using release tool - T10527- and detach air pipe.

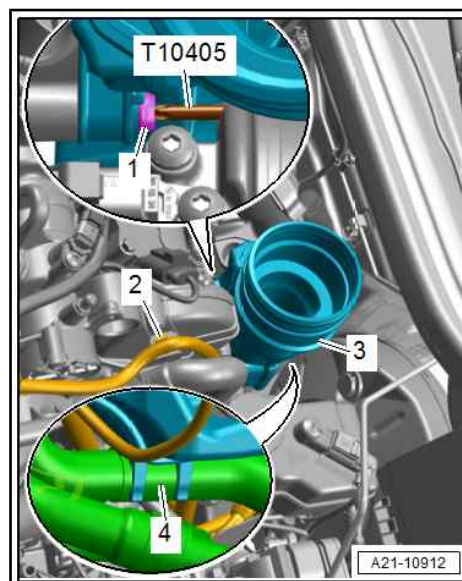
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- Remove bolts -arrows- and detach crankcase breather hose -1- with hose -2- for activated charcoal filter system attached.

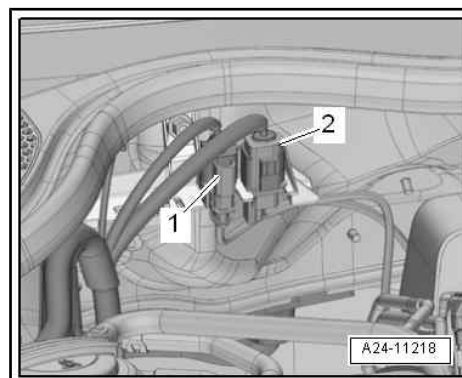


- Move electrical wiring harness -2- and coolant hose -4- clear and push to one side.
- Unscrew bolt -1- using socket Torx T30 - T10405- .
- Detach connection -3- from turbocharger to left side and press it towards rear.



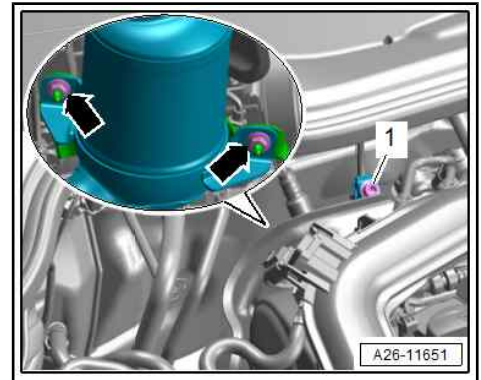
Audi A1 2011►

- Detach electrical connectors -1, 2- from bracket, unplug connectors and move electrical wiring clear.





- Open screw-type clip -1- and place it on intake funnel of catalytic converter.
- Remove nuts -arrows- and tie up catalytic converter.

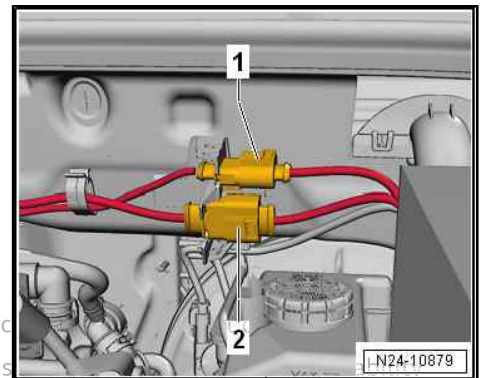


Audi A1 2018➤

- Unplug corresponding electrical connector:
- 1 - For Lambda probe 1 after catalytic converter - GX7-
- 2 - For Lambda probe 1 before catalytic converter - GX10-



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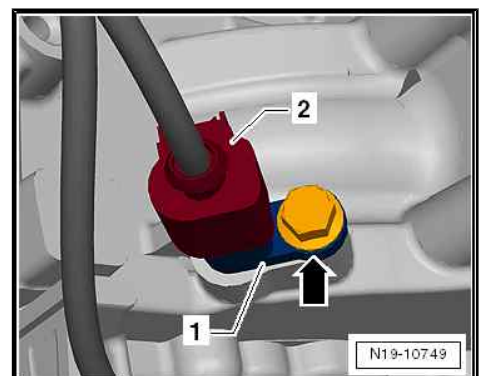
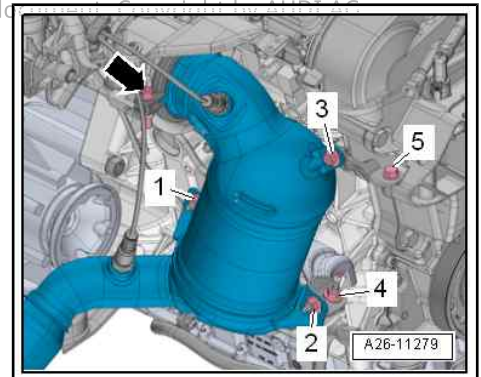
- Open screw-type clip -arrow- and place it on intake funnel of catalytic converter.
- Remove bolt -3-.
- Remove nuts -1- and -2- and tie up catalytic converter.



Note

Disregard -items 4 and 5-.

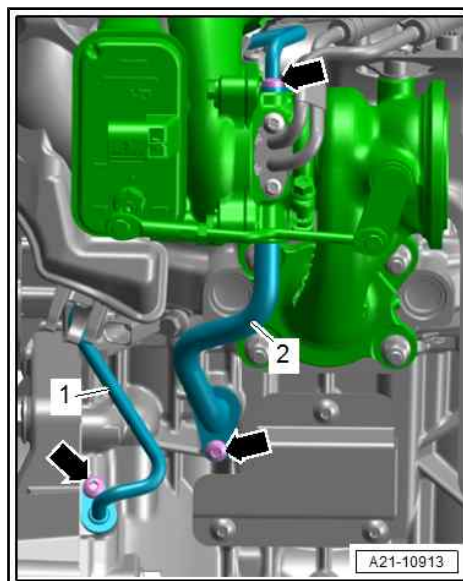
- Remove underbody trim for tunnel ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim; Exploded view - underbody trim .
- Open heat insulation sleeve of connector -2- for coolant temperature sender - G62- and remove.
- Release and unplug electrical connector -2-.



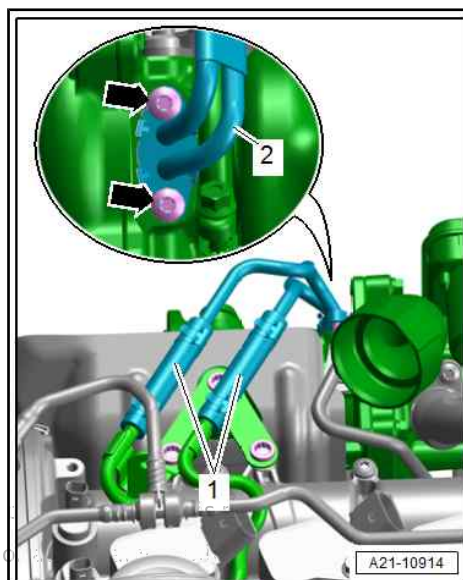


All vehicles (continued)

- Remove bolts -arrows- and detach oil supply line -1- and oil return line -2-.

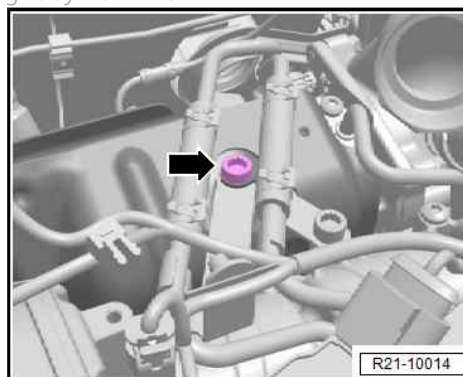


- Clamp off coolant hoses -1- with hose clamps up to 25 mm - 3094- .
- Remove bolts -arrows- and pivot coolant lines -2- to one side.



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- Remove bolt -arrow-.

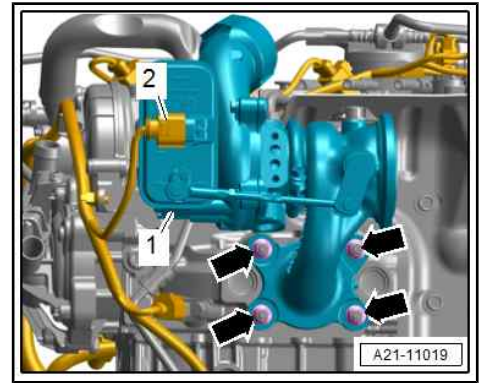




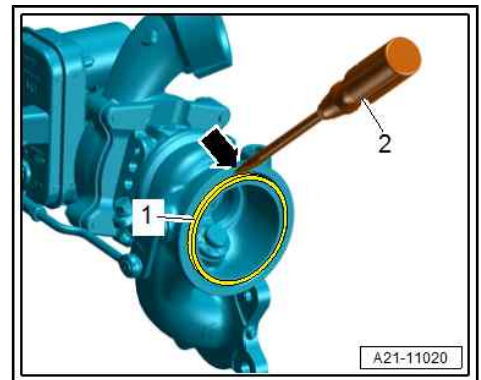
- Unscrew nuts -arrows-, detach turbocharger -1- and unplug electrical connector -2-.

Installing

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



- When reinstalling used turbocharger, insert screwdriver -2- into groove -arrow- on turbocharger and lever out seal -1-.
- Renew seals, nuts and O-rings after removal.
- Fill turbocharger with engine oil at connection for oil supply line.
- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .
- After installing the turbocharger, allow the engine to idle for approx. 1 minute without pressing the accelerator to ensure that the turbocharger is supplied with oil.
- Electrical connections and routing ⇒ Electrical system; Rep. gr. 97 ; Relay carriers, fuse carriers, electronics boxes; Overview of fitting locations - relay carriers, fuse carriers, electronics boxes and ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Fill up with coolant ⇒ [page 199](#) .



If turbocharger was renewed with charge pressure positioner:

- Select Guided Functions on ⇒ Vehicle diagnostic tester and perform function 0001 - Adapt/set charge air pressure actuator V465.

Tightening torques

- ◆ ⇒ [“1.1 Exploded view - turbocharger”, page 235](#)
- ◆ ⇒ [Fig. “Installing catalytic converter - tightening torque and sequence”, page 317](#)
- ◆ ⇒ [“2.1 Exploded view - coolant pump/thermostat”, page 200](#)
- ◆ ⇒ [“2.1 Exploded view - air cleaner housing”, page 263](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim; Overview of fitting locations - underbody trim

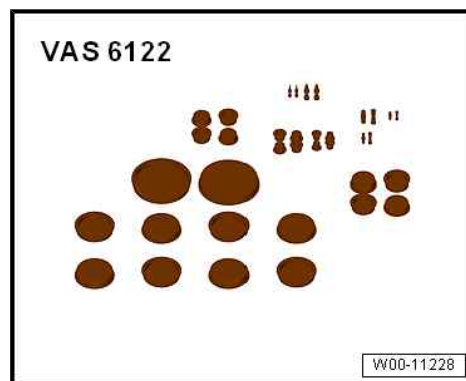
1.3 Removing and installing charge pressure positioner - V465-

Special tools and workshop equipment required

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- ◆ Engine bung set - VAS 6122-



- ◆ Socket Torx T30 - T10405-



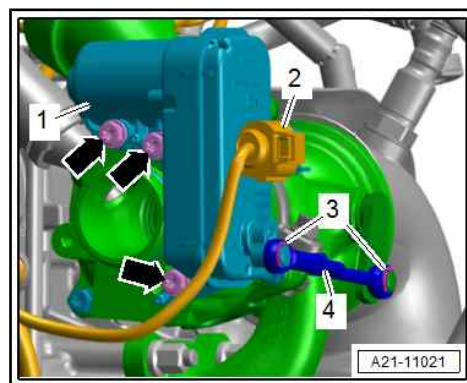
Removing

- Remove air cleaner housing
⇒ ["2.2 Removing and installing air cleaner housing", page 265](#).
- Remove connection for turbocharger
⇒ ["1.4 Removing and installing connection for turbocharger", page 244](#).
- Remove securing clips -3- and detach actuating lever -4-.
- Remove bolts -arrows-.
- Detach charge pressure positioner - V465- -item 1- and unplug electrical connector -2-.

Installing

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

- Renew O-rings after removing.
- Renew bolts securing charge pressure positioner - V465- .
- Select **Guided Functions** on ⇒ Vehicle diagnostic tester and perform function **0001 - Adapt/set charge air pressure actuator V465**.



Tightening torques

- ◆ ⇒ ["1.1 Exploded view - turbocharger", page 235](#)
- ◆ ⇒ ["2.1 Exploded view - coolant pump/thermostat", page 200](#)
- ◆ ⇒ ["2.1 Exploded view - air cleaner housing", page 263](#)

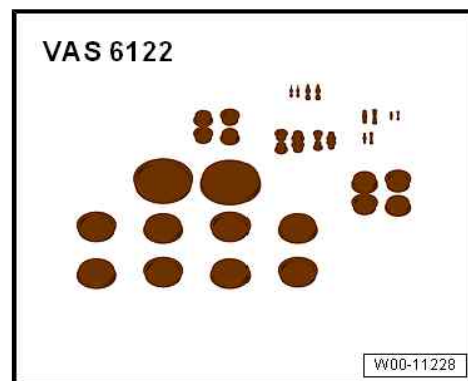
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1.4 Removing and installing connection for turbocharger

Special tools and workshop equipment required



- ◆ Engine bung set - VAS 6122-



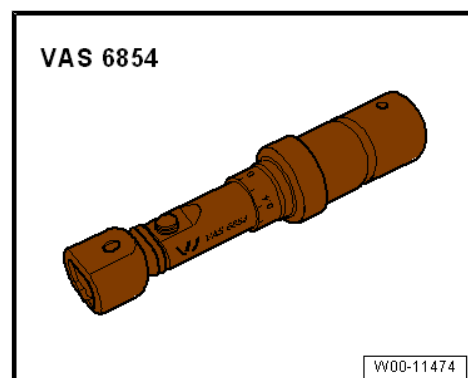
- ◆ Socket Torx T30 - T10405-



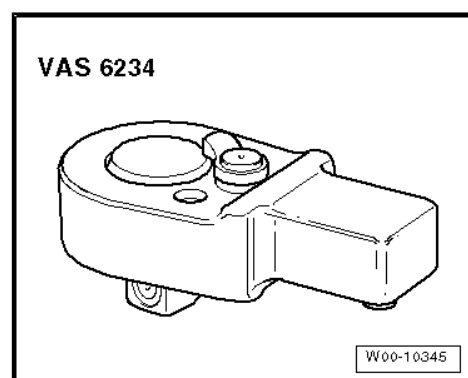
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- ◆ Torque wrench - VAS 6854-



- ◆ Ratchet insert 1/4" - VAS 6234-



Removing

- Remove air cleaner housing
⇒ ["2.2 Removing and installing air cleaner housing", page 265](#).



- Move electrical wiring harness -2- and coolant hose -4- clear and push to one side.
- Remove bolt -1- using torque wrench - VAS 6854- , ratchet insert 1/4" - VAS 6234- and Torx T30 socket - T10405- .
- Detach resonator -3- from turbocharger to left side and carefully lift it off.

Installing

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

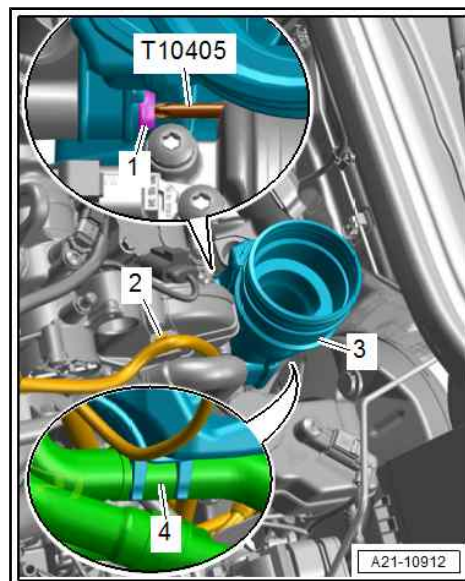


Note

Renew O-rings.

Tightening torques

- ♦ ⇒ [“2.1 Exploded view - air cleaner housing”, page 263](#)
- ♦ ⇒ [“1.1 Exploded view - turbocharger”, page 235](#)



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2 Charge air system

⇒ [“2.1 Exploded view - charge air system”, page 247](#)

⇒ [“2.2 Exploded view - hose connections for charge air system”, page 248](#)

⇒ [“2.3 Removing and installing air pipe”, page 249](#)

⇒ [“2.4 Removing and installing charge air cooler”, page 250](#)

⇒ [“2.5 Removing and installing charge pressure sender G31 / intake air temperature sender 2 G299”, page 252](#)

⇒ [“2.6 Checking charge air system for leaks”, page 252](#)

2.1 Exploded view - charge air system

- Check that all air pipes, air hoses and vacuum lines are correctly fitted and that there are no leaks before carrying out tests or repairs.
- Observe rules for cleanliness
⇒ [“3.1 Rules for cleanliness”, page 5](#) .

1 - Gasket

- ☐ Renew after removing

2 - Sealing lip

- ☐ Renew after removal
(apply thin coating of clean engine oil prior to installation)

3 - Charge air cooler

- ☐ Removing and installing
⇒ [“2.4 Removing and installing charge air cooler”, page 250](#)
- ☐ If renewed, refill system with fresh coolant

4 - Bolt

- ☐ Thread-forming
- ☐ Fit and screw in bolt by hand so that it is screwed into old thread. Then tighten bolt to torque
- ☐ 15 Nm

5 - Coolant hose

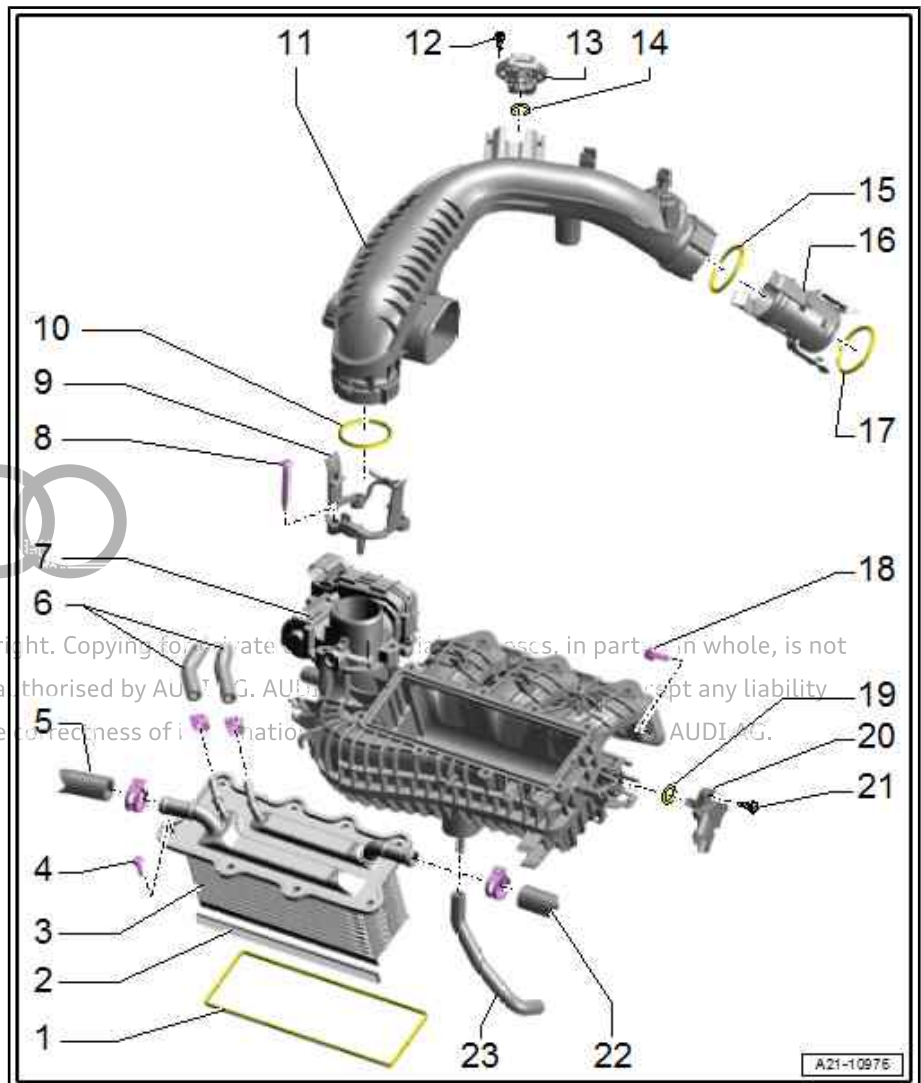
6 - Coolant hoses

7 - Intake manifold

- ☐ Removing and installing
⇒ [“3.2 Removing and installing intake manifold”, page 269](#)

8 - Bolt

- ☐ Thread-forming
- ☐ Fit and screw in bolt by hand so that it is screwed into old thread. Then tighten bolt to torque
- ☐ 7 Nm





9 - Retaining clip

- ☐ For air pipe

10 - O-ring

- ☐ Renew after removal (apply thin coating of clean engine oil prior to installation)

11 - Air pipe

- ☐ Removing and installing ⇒ [“2.3 Removing and installing air pipe”, page 249](#)

12 - Bolt

- ☐ Repair method if retaining tabs are broken off
- ☐ Thread-forming
- ☐ Fit and screw in bolt by hand so that it is screwed into old thread. Then tighten bolt to torque
- ☐ 7 Nm

13 - Charge pressure sender - G31- / intake air temperature sender 2 - G299-

- ☐ Removing and installing ⇒ [“2.5 Removing and installing charge pressure sender G31 / intake air temperature sender 2 G299”, page 252](#)

14 - O-ring

- ☐ If necessary, renew after removing

15 - O-ring

- ☐ Renew after removal (apply thin coating of clean engine oil prior to installation)

16 - Connection

17 - O-ring

- ☐ Renew after removal (apply thin coating of clean engine oil prior to installation)

18 - Bolt

- ☐ Tightening torque and sequence ⇒ [“3.1 Exploded view - intake manifold”, page 268](#)

19 - O-ring

- ☐ If necessary, renew after removing

20 - Intake manifold sender - GX9-

- ☐ Consists of:
 - Intake manifold pressure sender - G71-
 - Intake manifold temperature sender - G72-
- ☐ Removing and installing ⇒ [“5.3 Removing and installing intake manifold sender GX9”, page 285](#)

21 - Bolt

- ☐ Repair method if retaining tabs are broken off
- ☐ Thread-forming
- ☐ Fit and screw in bolt by hand so that it is screwed into old thread. Then tighten bolt to torque
- ☐ Tightening torque ⇒ [Item 13 \(page 269\)](#)

22 - Coolant hose

23 - Hose

- ☐ For crankcase breather

2.2 Exploded view - hose connections for charge air system

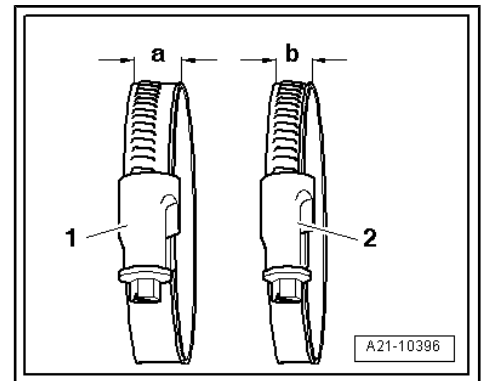
- Hose connections and air pipes/hoses must be free of oil and grease prior to fitting.
- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .



- The screw sections of used screw-type clips must be sprayed with rust remover prior to fitting so that the air hoses can be attached securely to the hose connections.

Tightening torque for

- 1 - Hose clip with width -a- = 13 mm: 5.5 Nm
- 2 - Hose clip with width -b- = 9 mm: 3 Nm



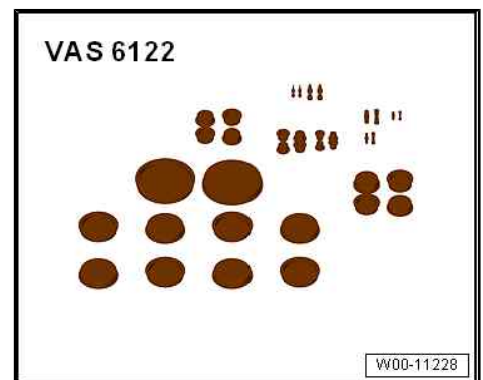
2.3 Removing and installing air pipe

Special tools and workshop equipment required

- ◆ Release tool - T10527-



- ◆ Engine bung set - VAS 6122-



Removing

- Remove air cleaner housing

⇒ ["2.2 Removing and installing air cleaner housing", page 265](#)

- Unplug electrical connector -1- for charge pressure sender - GX26- and move wiring clear.

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- Move hoses -arrows- clear at air pipe -2-.
- Release fasteners using release tool - T10527- and detach air pipe.
- Seal off open connections with clean plugs from engine bung set - VAS 6122- .

Installing

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

- Retaining clips with a damaged retaining tab must be renewed.
- If the retaining tabs of the charge pressure sender - GX26- are broken, the sender can be secured with 2 bolts ⇒ Electronic parts catalogue .
- Renew O-rings after removing
⇒ ["2.1 Exploded view - charge air system", page 247](#) .

Tightening torques:

- ◆ Securing bolts for sender ⇒ [Item 12 \(page 248\)](#)
- ◆ Securing bolt for air cleaner housing
⇒ ["2.1 Exploded view - air cleaner housing", page 263](#)

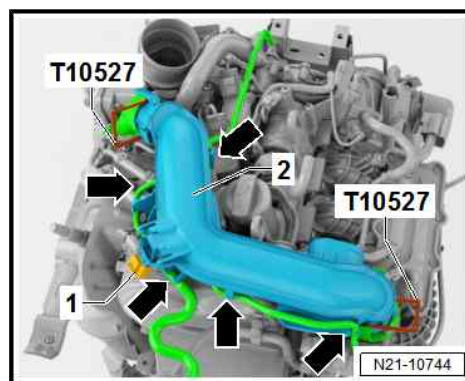
2.4 Removing and installing charge air cooler

Special tools and workshop equipment required

- ◆ Hose clamps up to 25 mm - 3094-



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- ◆ Hose clip pliers - VAS 6362-





- ◆ Drip tray for workshop hoist - VAS 6208-



Removing

- Remove air pipe
⇒ [“2.3 Removing and installing air pipe”, page 249](#) .

Audi A1 2018► vehicles

- Detach air duct from lock carrier.
⇒ [“2.3 Removing and installing air duct at lock carrier”, page 266](#)

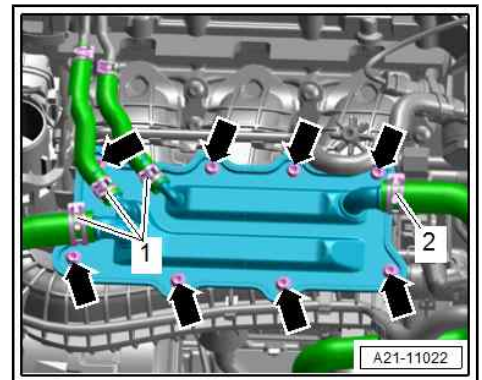
All vehicles (continued)

- Place a cloth underneath to catch escaping coolant.
- Clamp off coolant hoses on charge air cooler with hose clamps up to 25 mm - 3094- .
- Release hose clips -1, 2- and disconnect coolant hoses.
- Remove bolts -arrows- and detach charge air cooler.

Installing

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

- If there are slight impressions on the fins, refer to
⇒ [“3.10 Installing radiators and condensers”, page 8](#)
- Renew gasket after removing
⇒ [“2.1 Exploded view - charge air system”, page 247](#) .
- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ [Electronic parts catalogue](#) .
- Fill up with coolant ⇒ [page 199](#) .



Tightening torques

- ◆ ⇒ [“2.1 Exploded view - charge air system”, page 247](#)
- ◆ ⇒ [“2.1 Exploded view - air cleaner housing”, page 263](#)



2.5 Removing and installing charge pressure sender - G31- / intake air temperature sender 2 - G299-

Removing

- Unplug electrical connector -1-.

Version A:

- Release catches -arrows- and detach charge pressure sender - G31- / intake air temperature sender 2 - G299- .

Version B:

- Unscrew bolts -2- and remove charge pressure sender - G31- / intake air temperature sender 2 - G299- .

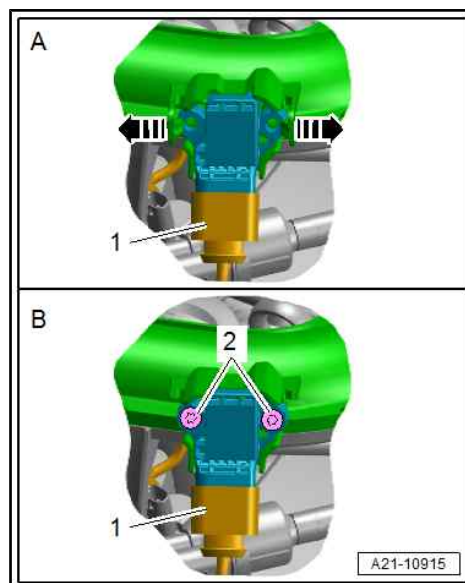
Installing

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

- If necessary, renew O-ring after removal.
- If fasteners on air pipe have broken off, secure charge pressure sender - G31- / intake air temperature sender 2 - G299- with bolts -2-; for bolts, refer to ⇒ Electronic parts catalogue .

Tightening torques

- ♦ ⇒ [Item 13 \(page 269\)](#)



2.6 Checking charge air system for leaks

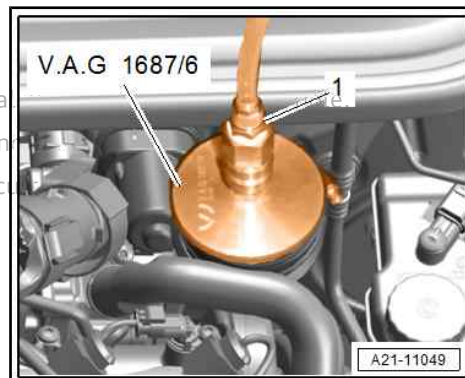
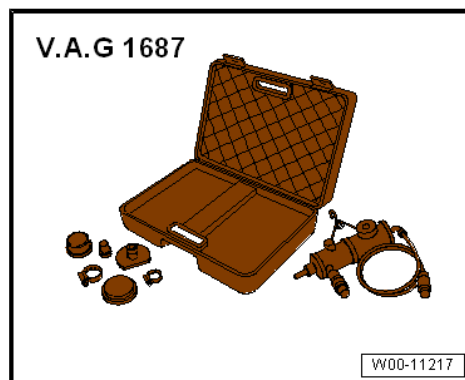
Special tools and workshop equipment required

- ♦ Charge air system tester - V.A.G 1687-



Procedure

- Remove air cleaner housing
⇒ ["2.2 Removing and installing air cleaner housing"](#), page 265 .
- Attach end piece - V.A.G 1687/6- to connection.
- Connect hose -1- of charge air system tester -V.A.G 1687- to end piece.





Prepare charge air system tester - V.A.G 1687- as follows:

- Unscrew pressure control valve -2- completely and close valves -3- and -4-.
- Make sure knob is pulled out before turning pressure control valve -2-.
- Using a commercially available connection piece, connect charge air system tester - V.A.G 1687- to compressed air -1-.
- If there is water in sight glass, remove drain plug -6- and drain water.
- Open valve -3-.

Risk of damage if pressure is set too high.

- The pressure must not exceed 0.2 bar.
- Adjust pressure to 0.2 bar via pressure control valve -2-.
- Open valve -4- and wait until test system is pressurised. If necessary, adjust pressure to 0.2 bar again.
- Check charge air system for audible leaks or leaks that can be felt with the hand; apply commercially available leak detection spray or use ultrasonic tester - V.A.G 1842- . (Refer to ⇒ operating instructions -V.A.G 1842- .)

Note:

A small amount of air escapes through the valves and enters the engine. Therefore it is not possible to perform a pressure retention test.

- Release pressure in test circuit by detaching hose coupling from adapter before removing adapter.

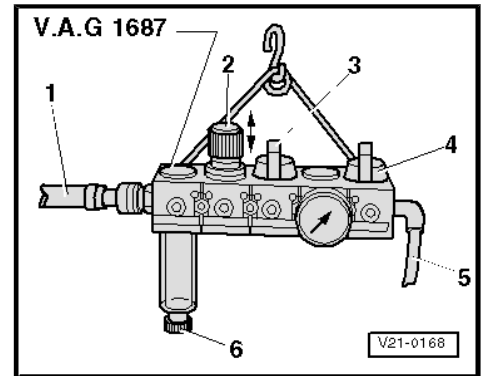
Assembling

Assembly is performed in reverse sequence; note the following:

- Renew seal and O-rings after removal.
- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .

Tightening torques

- ◆ ⇒ [“2.1 Exploded view - air cleaner housing”, page 263](#)



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24 – Mixture preparation - injection

1 Injection system

⇒ [“1.1 Overview of fitting locations - injection system”, page 254](#)

1.1 Overview of fitting locations - injection system

⇒ [“1.1.1 Overview of fitting locations - engine compartment”, page 254](#)

⇒ [“1.1.2 Overview of fitting locations - injection system, components in vehicle, Audi A1 2011►”, page 256](#)

⇒ [“1.1.3 Overview of fitting locations - injection system, components in vehicle, Audi A1 2018►”, page 257](#)

⇒ [“1.1.4 Overview of fitting locations - engine \(view from above\), vehicles without particulate filter”, page 258](#)

⇒ [“1.1.5 Overview of fitting locations - engine \(view from above\), vehicles with particulate filter”, page 260](#)

⇒ [“1.1.6 Overview of fitting locations - engine \(inlet side\)”, page 261](#)

⇒ [“1.1.7 Overview of fitting locations - engine \(exhaust side\)”, page 262](#)

1.1.1 Overview of fitting locations - engine compartment



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1 - Charge pressure sender - G31- / intake air temperature sender 2 - G299-

- ❑ Exploded view
⇒ [“2.1 Exploded view - charge air system”, page 247](#)

2 - Lambda probe 1 before catalytic converter - GX10-

- ❑ Consists of:
Lambda probe - G39-
Lambda probe heater - Z19-
- ❑ Exploded view
⇒ [“7.1 Exploded view - Lambda probe”, page 295](#)

3 - Lambda probe 1 after catalytic converter - GX7-

- ❑ Consists of:
Lambda probe after catalytic converter - G130-
Lambda probe 1 heater after catalytic converter - Z29-
- ❑ Exploded view
⇒ [“7.1 Exploded view - Lambda probe”, page 295](#)

4 - Brake servo pressure sensor - G294-

- ❑ Fitting location on Audi A1 2011►
⇒ [Fig. “Fitting location of brake servo pressure sensor -G294- ”, page 257](#)
- ❑ Fitting location on Audi A1 2018►
⇒ [Fig. “Fitting location of brake light switch -F- / vacuum sender -G608- ”, page 258](#)

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

- ❑ Fitting location on Audi A1 2011►
⇒ [Fig. “Accelerator position sender -G79- and accelerator position sender 2 -G185- ”, page 256](#)
- ❑ Fitting location on Audi A1 2018►
⇒ [Fig. “Accelerator position sender -G79- and accelerator position sender 2 -G185- ”, page 257](#)

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

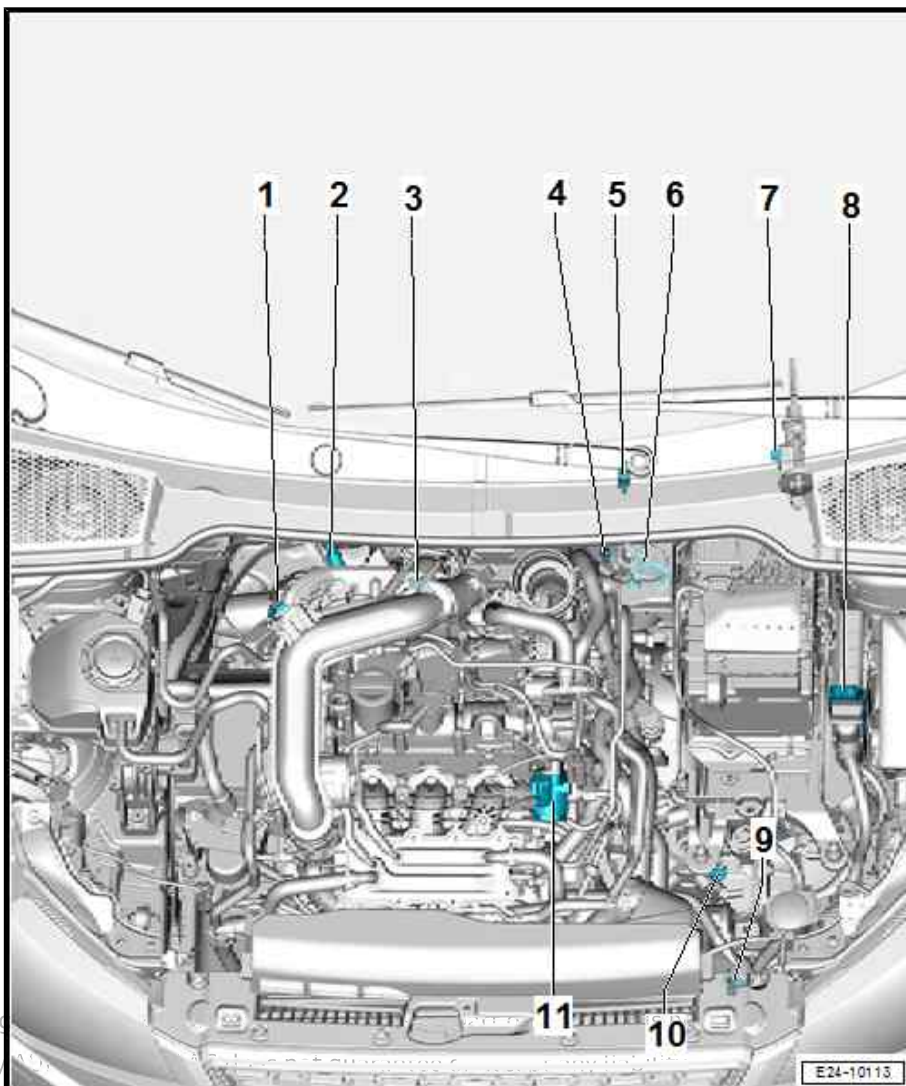
- ❑ Fitting location on Audi A1 2011►
⇒ [Fig. “Fitting location of brake light switch -F- / brake pedal switch -F47- ”, page 256](#)
- ❑ Fitting location on Audi A1 2018►
⇒ [Fig. “Fitting location of brake light switch -F- / vacuum sender -G608- ”, page 258](#)

7 - Clutch position sender - G476-

- ❑ Fitting location on Audi A1 2011►
⇒ [Fig. “Fitting location of clutch position sender -G476- ”, page 257](#)
- ❑ Fitting location on Audi A1 2018►
⇒ [Fig. “Fitting location of clutch position sender -G476- ”, page 258](#)

8 - Engine control unit - J623-

- ❑ Removing and installing ⇒ [“8.2 Removing and installing engine control unit J623 ”, page 302](#)





9 - Radiator outlet coolant temperature sender - G83-

- ❑ Exploded view ⇒ [“2.3 Exploded view - coolant temperature senders”, page 204](#)

10 - Gearbox neutral position sender - G701- / reversing light switch - F4-

- ❑ Fitting location on Audi A1 2011►
⇒ Fig. [“Fitting location of gearbox neutral position sender -G701- / reversing light switch -F4- ””, page 257](#)
- ❑ Fitting location on Audi A1 2018►
⇒ Fig. [“Fitting location of gearbox neutral position sender -G701- / reversing light switch -F4- ””, page 258](#)

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11 - High-pressure pump

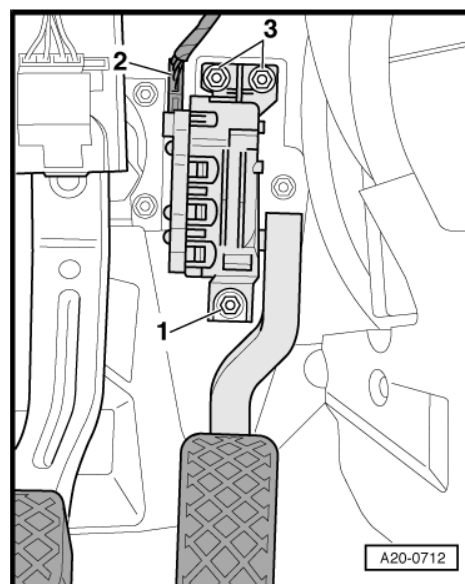
- ❑ Exploded view ⇒ [“6.1 Exploded view - high-pressure pump”, page 289](#)
- ❑ Removing and installing ⇒ [“6.2 Removing and installing high-pressure pump”, page 290](#)

1.1.2 Overview of fitting locations - injection system, components in vehicle, Audi A1 2011►

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

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

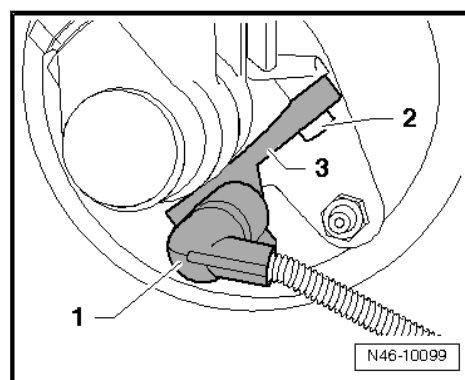
Removing and installing ⇒ Fuel supply system, petrol engines; Rep. gr. 20 ; Accelerator mechanism; Removing and installing accelerator pedal module with accelerator position sender -G79- / -G185-



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

- ◆ -Item 3- on brake master cylinder

Removing and installing ⇒ Brake system; Rep. gr. 45 ; Sensors; Removing and installing brake light switch



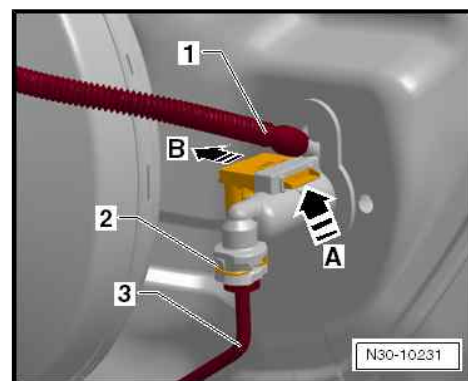


Fitting location of clutch position sender - G476-

- ◆ On clutch master cylinder, next to brake servo

Removing and installing ⇒ Rep. gr. 30 ; Clutch mechanism; Removing and installing clutch position sender - G476-

- ◆ At plenum chamber partition panel -arrow-.

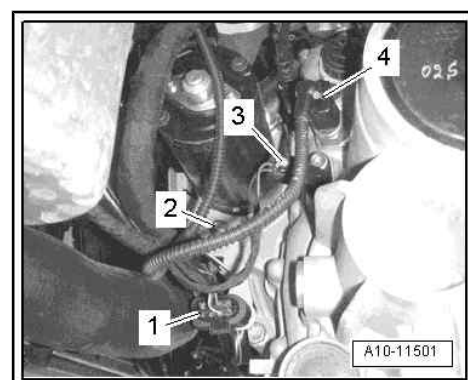


Fitting location of gearbox neutral position sender - G701- / reversing light switch - F4-

- ◆ On gearbox (front left)

3 - Electrical connector for gearbox neutral position sender - G701-

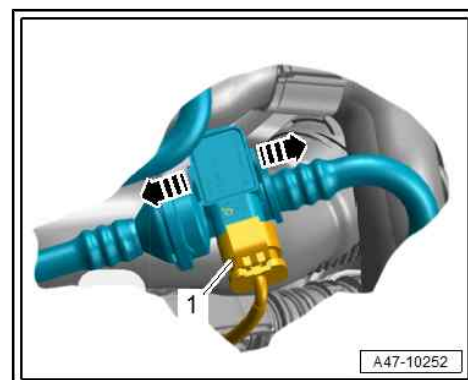
4 - Electrical connector for reversing light switch - F4-



Fitting location of brake servo pressure sensor - G294-

- ◆ In vacuum line

1 - Electrical connector for brake servo pressure sensor - G294-

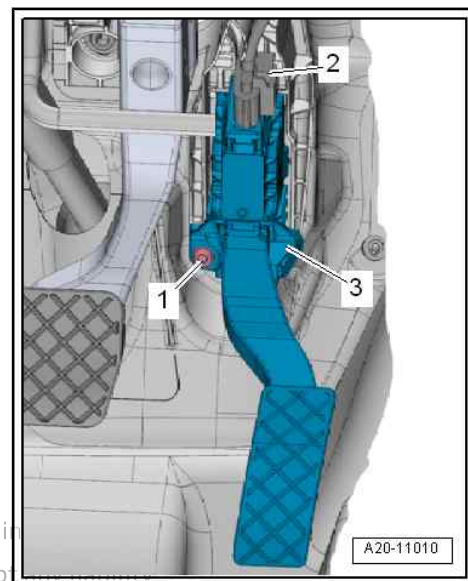


1.1.3 Overview of fitting locations - injection system, components in vehicle, Audi A1 2018➤

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

- ◆ Integrated in accelerator pedal module -3-. Accelerator position senders cannot be renewed separately if defective.

Exploded view ⇒ Fuel supply system; Rep. gr. 20 ; Accelerator mechanism; Exploded view - accelerator pedal module





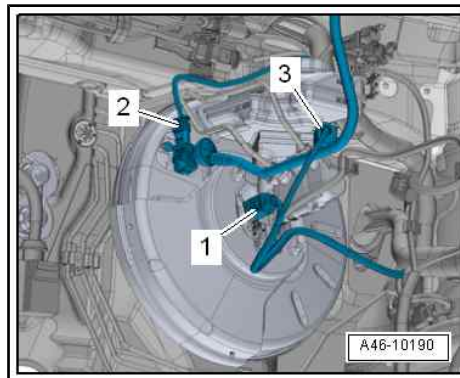
Fitting location of brake light switch - F- / vacuum sender - G608-

◆ In engine compartment on brake master cylinder

1 - Brake light switch - F-

2 - Vacuum sender - G608-

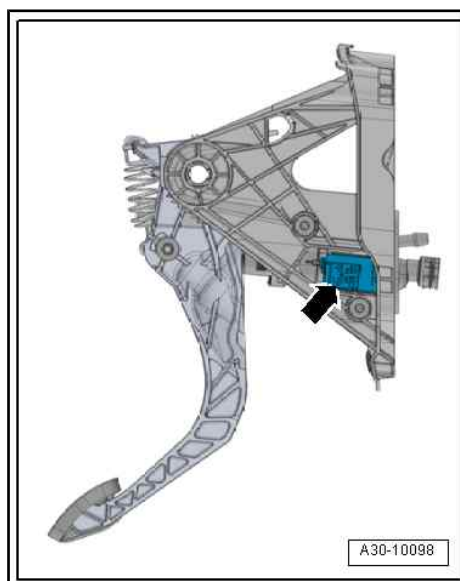
Exploded view ⇒ Brake system; Rep. gr. 47 ; Brake servo/brake master cylinder; Exploded view - brake servo/brake master cylinder



Fitting location of clutch position sender - G476-

• On mounting bracket for clutch pedal -arrow-

Exploded view ⇒ Manual gearbox; Rep. gr. 30 ; Clutch mechanism; Exploded view - pedal cluster .



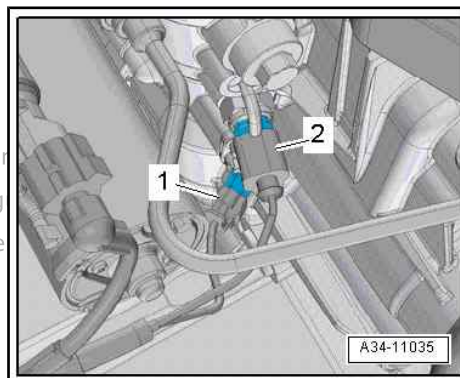
Fitting location of gearbox neutral position sender - G701- / reversing light switch - F4-

◆ On gearbox (front left)

1 - Electrical connector for gearbox neutral position sender - G701-

2 - Electrical connector for reversing light switch - F4-

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1.1.4 Overview of fitting locations - engine (view from above), vehicles without particulate filter



1 - Camshaft control valve 1 - N205-

- ❑ Exploded view
 ⇒ [“3.1 Exploded view - valve gear”, page 145](#)

2 - Exhaust camshaft control valve 1 - N318-

- ❑ Exploded view
 ⇒ [“3.1 Exploded view - valve gear”, page 145](#)

3 - Activated charcoal filter solenoid valve 1 - N80-

4 - Ignition coil 1 with output stage - N70-

- ❑ Exploded view
 ⇒ [“1.1 Exploded view - ignition system”, page 326](#)

5 - Ignition coil 2 with output stage - N127-

- ❑ Exploded view
 ⇒ [“1.1 Exploded view - ignition system”, page 326](#)

6 - Ignition coil 3 with output stage - N291-

- ❑ Exploded view
 ⇒ [“1.1 Exploded view - ignition system”, page 326](#)

7 - Hall sender 2 - G163-

- ❑ Exploded view
 ⇒ [“1.1 Exploded view - ignition system”, page 326](#)

8 - Hall sender - G40- (camshaft position sensor)

- ❑ Exploded view ⇒ [“1.1 Exploded view - ignition system”, page 326](#)

9 - Fuel pressure regulating valve - N276-

- ❑ Exploded view ⇒ [“6.1 Exploded view - high-pressure pump”, page 289](#)

10 - Injector, cylinder 3 - N32-

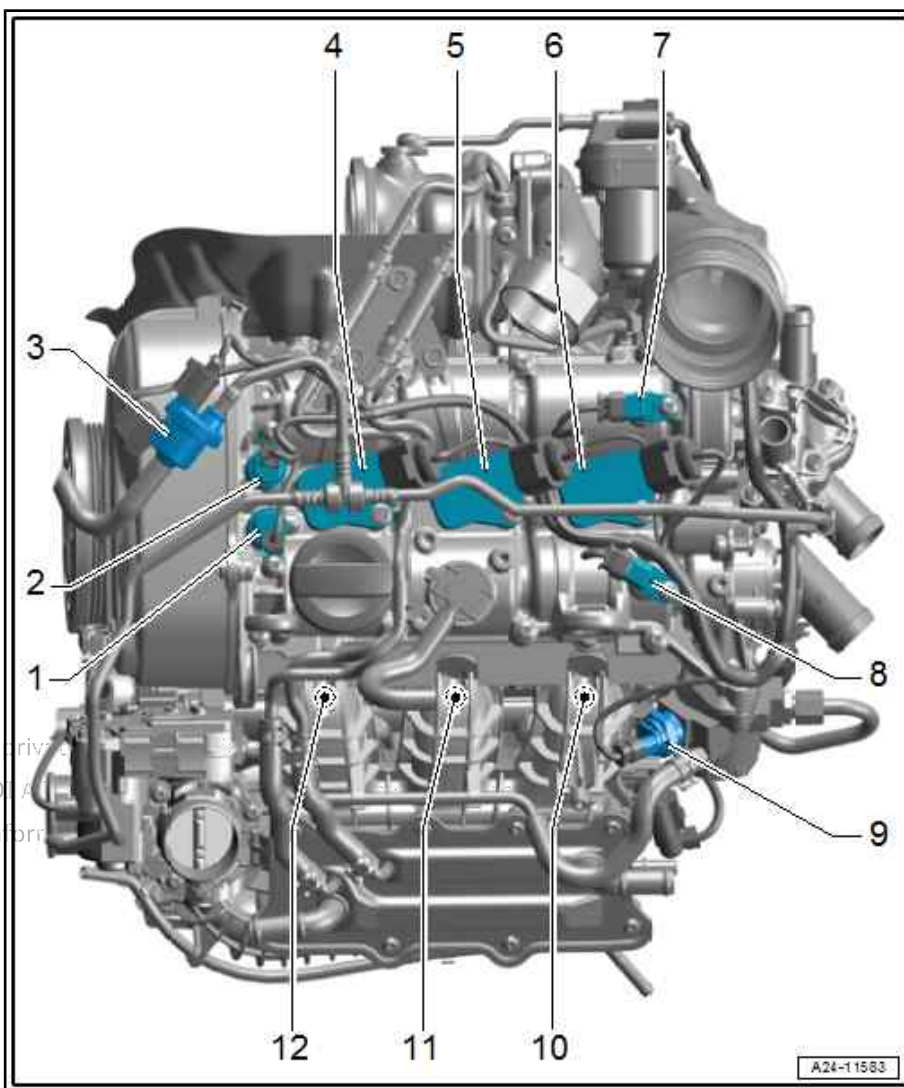
- ❑ Exploded view ⇒ [“4.1 Exploded view - fuel rail with injectors”, page 275](#)

11 - Injector, cylinder 2 - N31-

- ❑ Exploded view ⇒ [“4.1 Exploded view - fuel rail with injectors”, page 275](#)

12 - Injector, cylinder 1 - N30-

- ❑ Exploded view ⇒ [“4.1 Exploded view - fuel rail with injectors”, page 275](#)



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1.1.5 Overview of fitting locations - engine (view from above), vehicles with particulate filter

1 - Camshaft control valve 1 - N205-

- ❑ Exploded view
⇒ ["3.1 Exploded view - valve gear", page 145](#)

2 - Exhaust camshaft control valve 1 - N318-

- ❑ Exploded view
⇒ ["3.1 Exploded view - valve gear", page 145](#)

3 - Charge pressure sender - G31- / intake air temperature sender 2 - G299-

- ❑ Exploded view
⇒ ["2.1 Exploded view - charge air system", page 247](#)

4 - Ignition coil 1 with output stage - N70-

- ❑ Exploded view
⇒ ["1.1 Exploded view - ignition system", page 326](#)

5 - Pressure and temperature sensor

- ❑ Not fitted on all versions

6 - Exhaust gas pressure sensor 1 - G450-

- ❑ Exploded view
⇒ ["1.2 Exploded view - camshaft housing", page 87](#)

7 - Ignition coil 2 with output stage - N127-

- ❑ Exploded view ⇒ ["1.1 Exploded view - ignition system", page 326](#)

8 - Ignition coil 3 with output stage - N291-

- ❑ Exploded view ⇒ ["1.1 Exploded view - ignition system", page 326](#)

9 - Activated charcoal filter solenoid valve 1 - N80-

10 - Hall sender 2 - G163-

- ❑ Exploded view ⇒ ["1.1 Exploded view - ignition system", page 326](#)

11 - Hall sender - G40- (camshaft position sensor)

- ❑ Exploded view ⇒ ["1.1 Exploded view - ignition system", page 326](#)

12 - Fuel pressure regulating valve - N276-

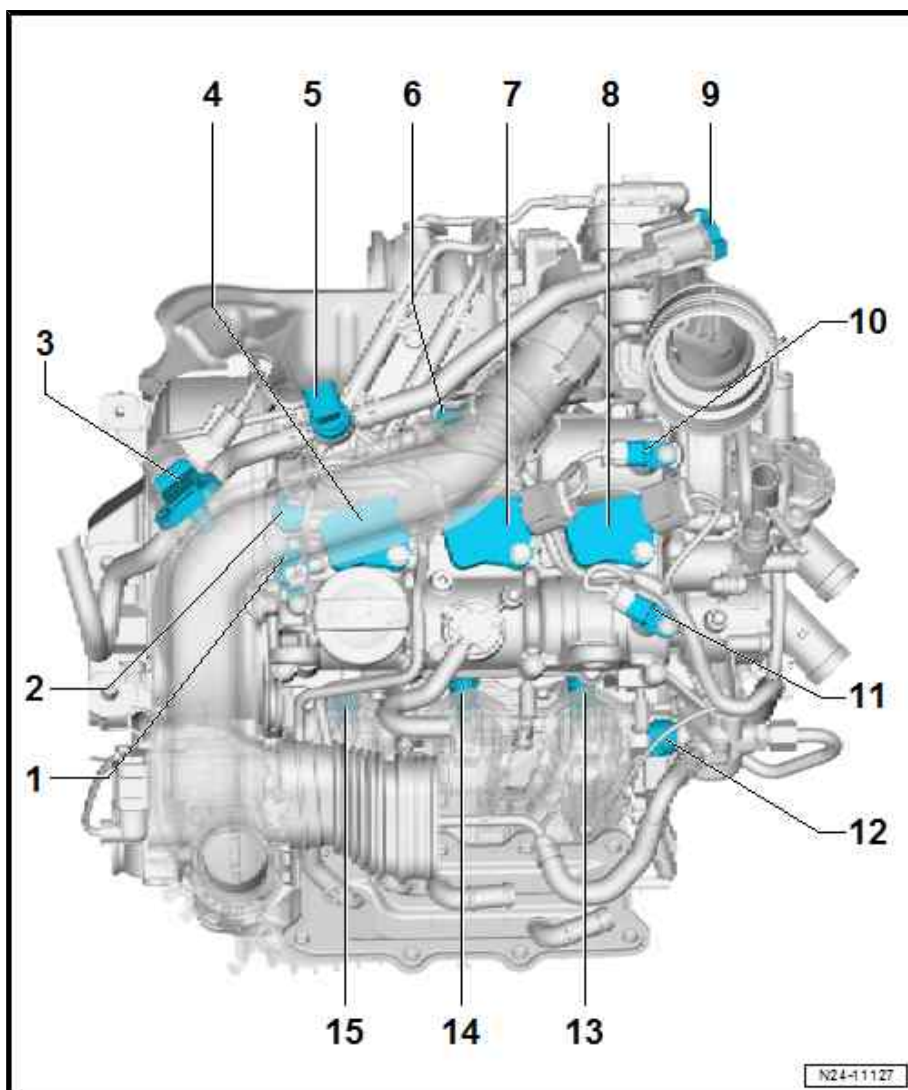
- ❑ Exploded view ⇒ ["6.1 Exploded view - high-pressure pump", page 289](#)
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13 - Injector, cylinder 3 - N32-

- ❑ Exploded view ⇒ ["4.1 Exploded view - fuel rail with injectors", page 275](#)

14 - Injector, cylinder 2 - N31-

- ❑ Exploded view ⇒ ["4.1 Exploded view - fuel rail with injectors", page 275](#)





15 - Injector, cylinder 1 - N30-

- ❑ Exploded view ⇒ [“4.1 Exploded view - fuel rail with injectors”, page 275](#)

1.1.6 Overview of fitting locations - engine (inlet side)

1 - Oil pressure sender - G10-

- ❑ Exploded view
⇒ [“4.1 Exploded view - oil filter/oil pressure switches”, page 185](#)

2 - Fuel pressure sender - G247-

- ❑ Exploded view
⇒ [“4.1 Exploded view - fuel rail with injectors”, page 275](#)

3 - Throttle valve module - J338-

- ❑ Including throttle valve drive for electric throttle - G186-, throttle valve drive angle sender 1 for electric throttle - G187- and throttle valve drive angle sender 2 for electric throttle - G188-

- ❑ Exploded view
⇒ [“3.1 Exploded view - intake manifold”, page 268](#)

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

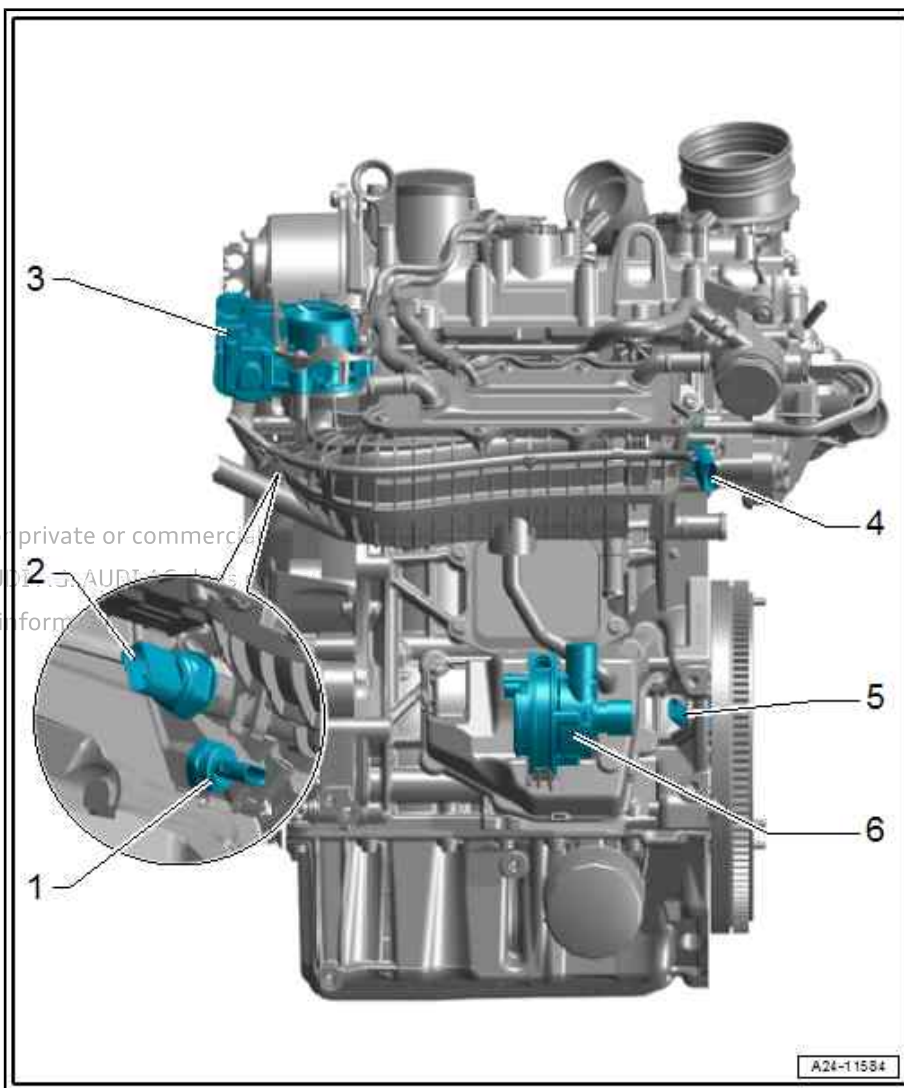
- ❑ Exploded view
⇒ [“3.1 Exploded view - intake manifold”, page 268](#)

5 - Engine speed sender - G28-

- ❑ Exploded view
⇒ [“1.1 Exploded view - ignition system”, page 326](#)

6 - Continued coolant circulation pump - V51-

- ❑ Exploded view ⇒ [“2.2 Exploded view - electric coolant pump”, page 202](#)





1.1.7 Overview of fitting locations - engine (exhaust side)

1 - Oil level and oil temperature sender - G266-

- ❑ Exploded view
⇒ [“1.1 Exploded view - sump/oil pump”, page 171](#)

2 - Knock sensor 1 - G61-

- ❑ Exploded view
⇒ [“1.1 Exploded view - ignition system”, page 326](#)

3 - Coolant temperature sender - G62-

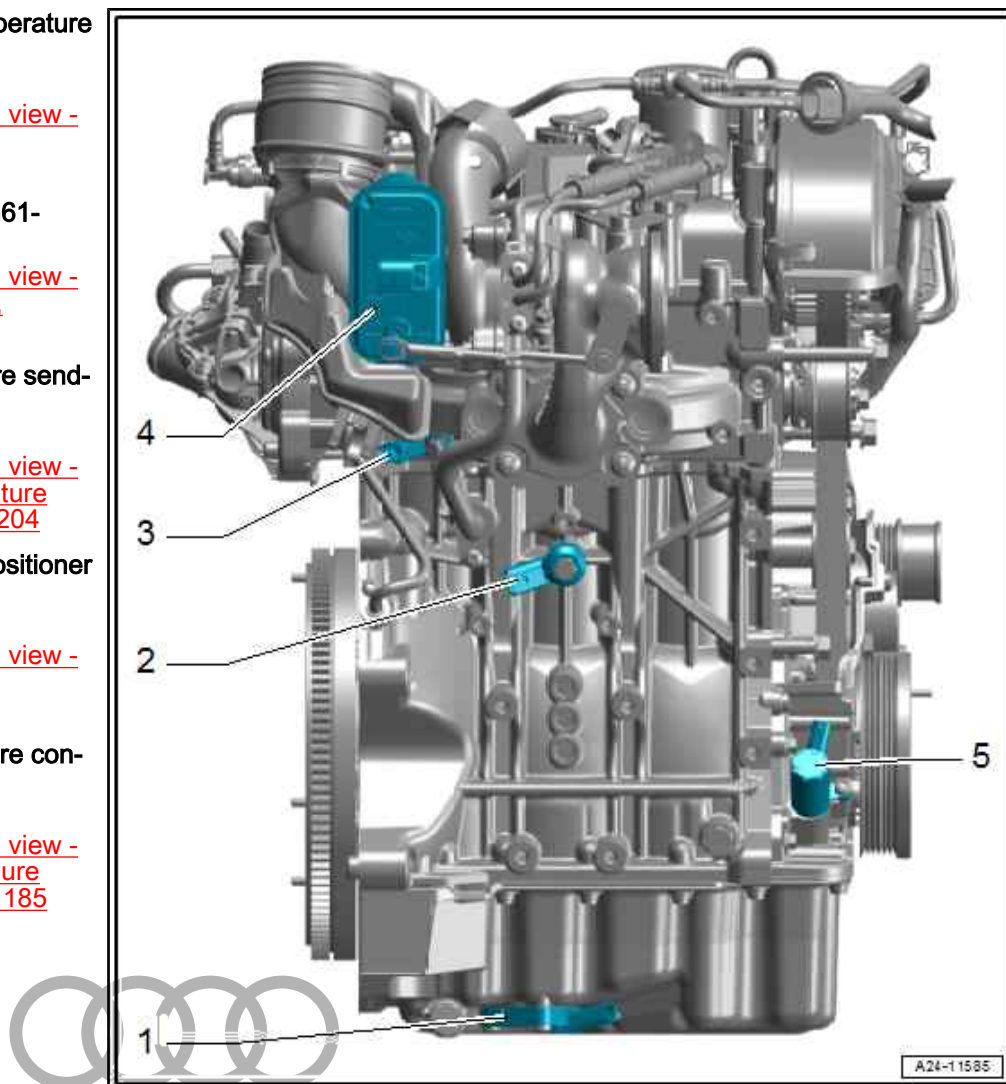
- ❑ Exploded view
⇒ [“2.3 Exploded view - coolant temperature senders”, page 204](#)

4 - Charge pressure positioner - V465-

- ❑ Exploded view
⇒ [“1.1 Exploded view - turbocharger”, page 235](#)

5 - Valve for oil pressure control - N428-

- ❑ Exploded view
⇒ [“4.1 Exploded view - oil filter/oil pressure switches”, page 185](#)



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2 Air cleaner

⇒ "2.1 Exploded view - air cleaner housing", page 263

⇒ "2.2 Removing and installing air cleaner housing", page 265

⇒ "2.3 Removing and installing air duct at lock carrier",
page 266

2.1 Exploded view - air cleaner housing

⇒ "2.1.1 Exploded view - air cleaner housing, Audi A1 2011►",
page 263

⇒ "2.1.2 Exploded view - air cleaner housing, Audi A1 2018►",
page 264

2.1.1 Exploded view - air cleaner housing, Audi A1 2011►

1 - Air duct (front section)

- ☐ On lock carrier

2 - Bolt

- ☐ 4.5 Nm

3 - Air duct (rear section)

- ☐ On lock carrier

4 - Air hose

5 - Air cleaner (bottom section)

- ☐ Remove any salt residue, dirt and leaves

6 - Air filter element

- ☐ Use genuine air filter element ⇒ Electronic parts catalogue
- ☐ Change intervals ⇒ Maintenance tables
- ☐ Removing and installing ⇒ Maintenance ; Booklet '819

7 - Hose

- ☐ For crankcase breather

8 - Air cleaner (top section)

- ☐ Check for dirt

9 - Rubber buffer

10 - Bolt

- ☐ 1.5 Nm

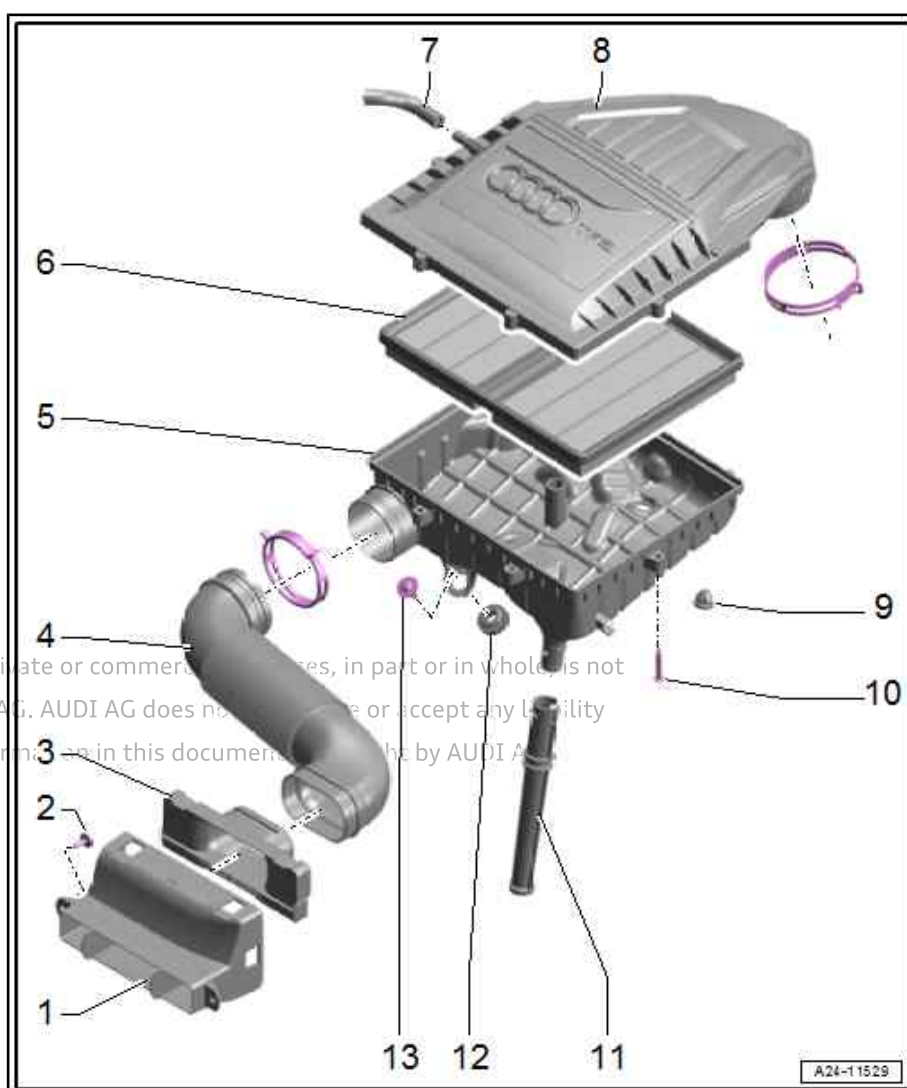
11 - Water drain pipe

- ☐ With water drain valve
- ☐ Clean

12 - Rubber grommet

13 - Bolt

- ☐ 9 Nm





2.1.2 Exploded view - air cleaner housing, Audi A1 2018►

1 - Air duct (top section)

- ☐ On lock carrier

2 - Bolt

- ☐ 2 Nm

3 - Fastener for bonnet prop

4 - Air hose

5 - Rubber buffer

- ☐ Check for damage and renew if necessary
- ☐ Check position after installing

6 - Bolt

- ☐ 5 Nm

7 - Air cleaner (bottom section)

- ☐ Remove any salt residue, dirt and leaves

8 - Air filter element

- ☐ Use genuine air filter element ⇒ Electronic parts catalogue
- ☐ Change intervals ⇒ Maintenance tables
- ☐ Removing and installing ⇒ Maintenance ; Booklet KJ1

9 - Flexible pipe

- ☐ For crankcase breather

10 - Air cleaner (top section)

- ☐ Remove any salt residue, dirt and leaves

11 - Rubber buffer

- ☐ Check for damage and renew if necessary
- ☐ Check position after installing

12 - Bolt

- ☐ 9x
- ☐ 1.5 Nm

13 - Water drain hose

- ☐ Clean

14 - Strainer

15 - O-ring

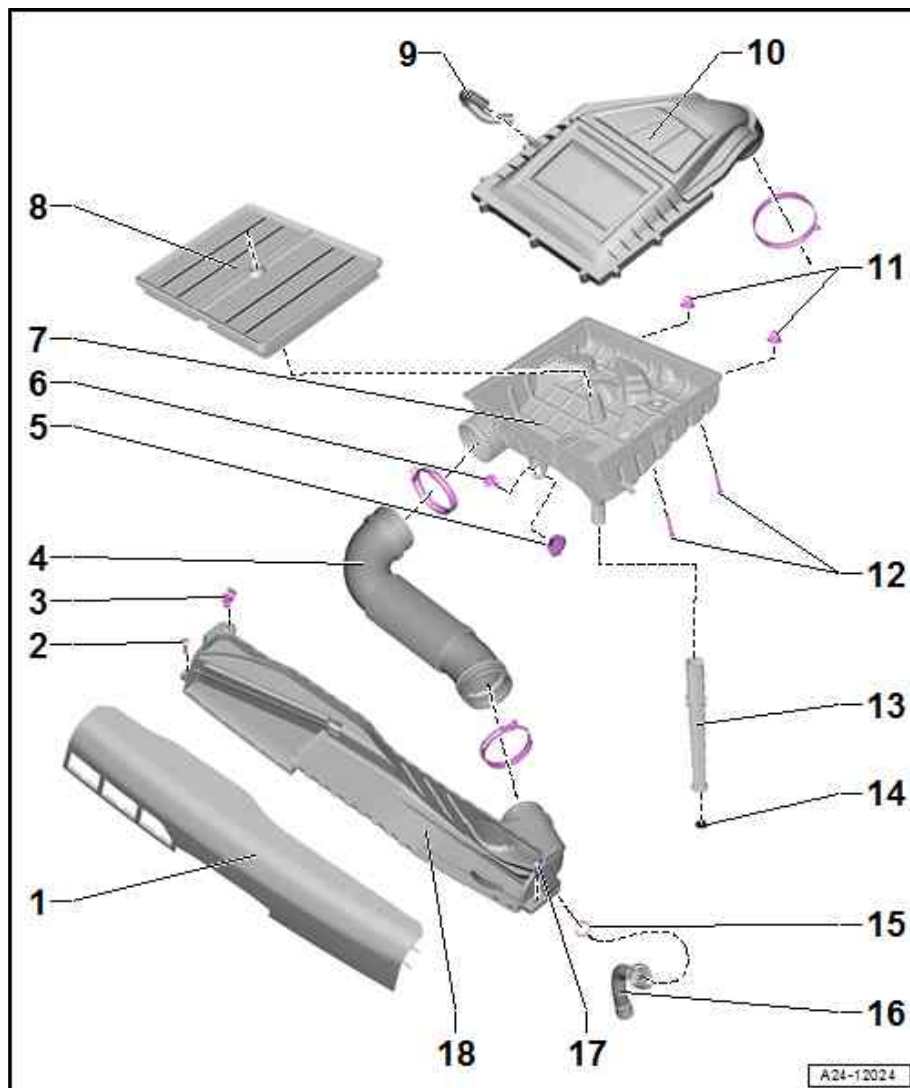
- ☐ Renew if damaged

16 - Water drain hose

- ☐ Clean

17 - Bolt

- ☐ 2 Nm



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18 - Air duct (bottom section)

- On lock carrier

2.2 Removing and installing air cleaner housing

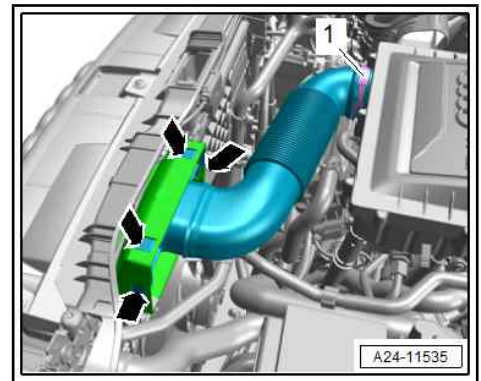
⇒ [“2.2.1 Removing and installing air cleaner housing - Audi A1 2011►”, page 265](#)

⇒ [“2.2.2 Removing and installing air cleaner housing - Audi A1 2018►”, page 265](#)

2.2.1 Removing and installing air cleaner housing - Audi A1 2011►

Removing

- Release fasteners -arrows- and detach air duct from lock carrier.

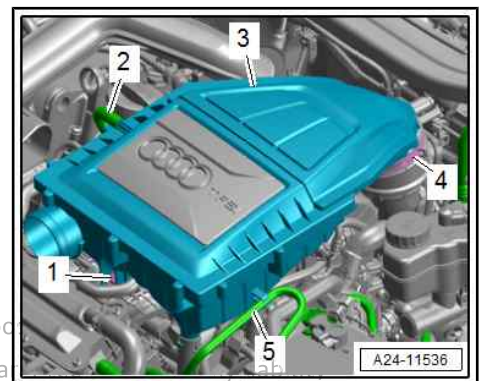


- Disconnect crankcase breather hose -2-.
- Move vacuum line -5- clear.
- Remove bolt -1-.
- Release hose clip -4-.
- Lift air cleaner housing -3- off ball studs and detach.

Installing

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

- Hose connections and air pipes/hoses must be free of oil and grease prior to fitting.
- Use a lubricant (silicone-free) when installing air hoses.
- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .



Tightening torques

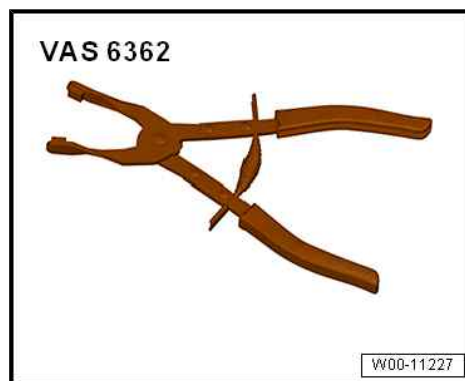
- ◆ ⇒ [“2.1 Exploded view - air cleaner housing”, page 263](#)

2.2.2 Removing and installing air cleaner housing - Audi A1 2018►

Special tools and workshop equipment required

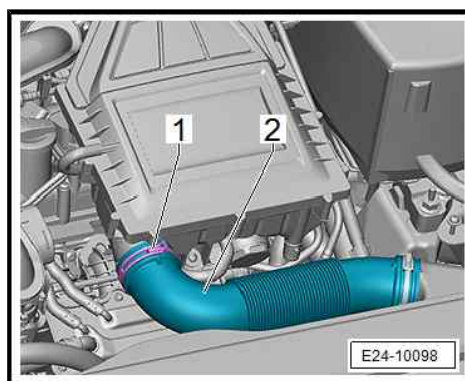


- ◆ Hose clip pliers - VAS 6362-



Removing

- Loosen hose clip -1- and pull air intake hose -2- off air cleaner housing.

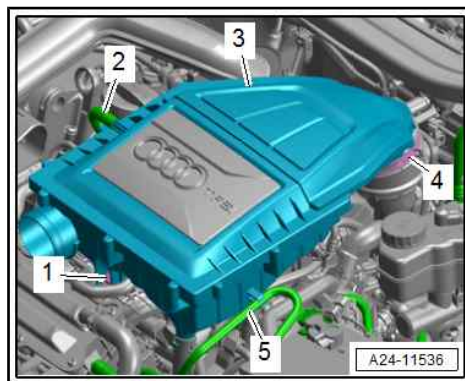


- Disconnect crankcase breather hose -2-.
- Disconnect vacuum line -5- from air cleaner housing and move clear.
- Remove bolt -1-.
- Release hose clip -4-.
- Lift air cleaner housing -3- off ball studs and detach.

Installing

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

- Hose connections and air pipes/hoses must be free of oil and grease prior to fitting.
- Use a lubricant (silicone-free) when installing air hoses.
- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .



Tightening torques

- ◆ ⇒ [“2.1 Exploded view - air cleaner housing”, page 263](#)

2.3 Removing and installing air duct at lock carrier

Special tools and workshop equipment required

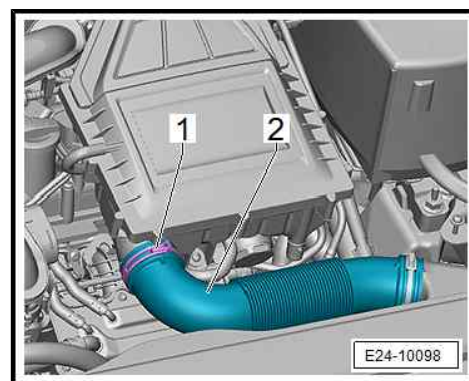


- ◆ Hose clip pliers - VAS 6362-



Removing

- Loosen hose clip -1- and pull air intake hose -2- off air cleaner housing.



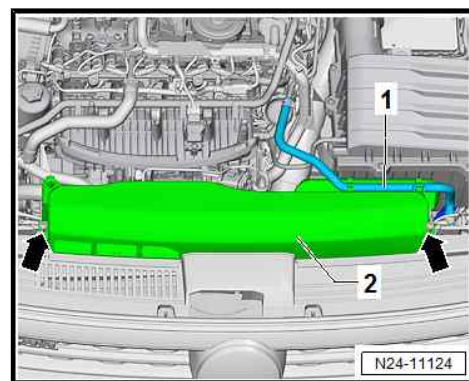
- Remove bolt -arrow- on both sides.
- Unclip air duct -2- and detach.

Installing

- Installation is carried out in reverse sequence.

Tightening torques

- ◆ ⇒ [“2.1 Exploded view - air cleaner housing”, page 263](#)



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3 Intake manifold

⇒ ["3.1 Exploded view - intake manifold", page 268](#)

⇒ ["3.2 Removing and installing intake manifold", page 269](#)

⇒ ["3.3 Removing and installing throttle valve module J338", page 272](#)

⇒ ["3.4 Cleaning throttle valve module", page 273](#)

3.1 Exploded view - intake manifold

1 - Coolant pipe

- ❑ Clipped onto intake manifold

2 - Bolt

- ❑ Tightening torque
⇒ [Item 3 \(page 218\)](#)

3 - Intake manifold

- ❑ Combined with charge air cooler
- ❑ Removing and installing
⇒ ["3.2 Removing and installing intake manifold", page 269](#)

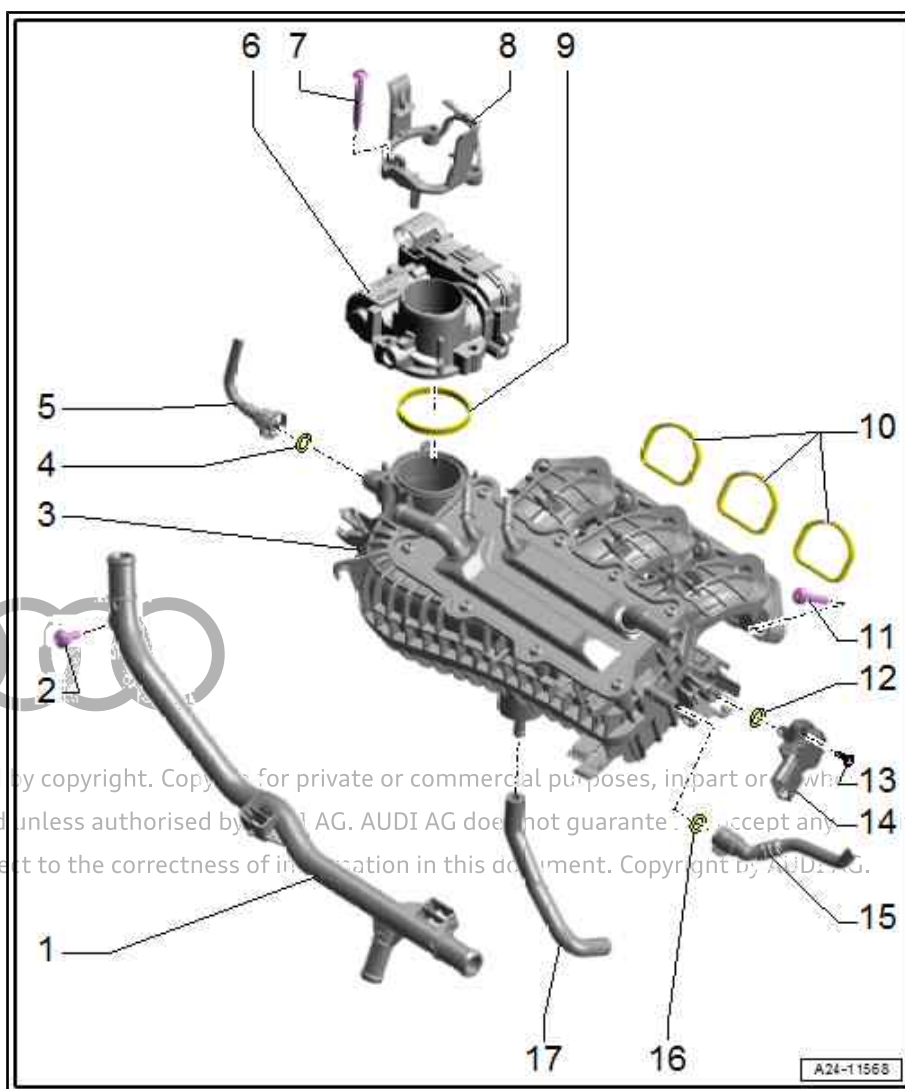
4 - O-ring

- ❑ Check for damage and renew if necessary

5 - Vacuum line

6 - Throttle valve module - J338-

- ❑ Removing and installing
⇒ ["3.3 Removing and installing throttle valve module J338", page 272](#)
- ❑ Cleaning
⇒ ["3.4 Cleaning throttle valve module", page 273](#)
- ❑ After throttle valve module - J338- has been renewed, it must be re-adapted to engine control unit - J623-. Use vehicle diagnostic tester



7 - Bolt

- ❑ Thread-forming
- ❑ Fit and screw in bolt by hand so that it is screwed into old thread. Then tighten bolt to torque
- ❑ 7 Nm

8 - Retaining clip

- ❑ For air pipe

9 - Seal

- ❑ Renew after removing



10 - Gaskets

- ☐ Renew after removing

11 - Bolt

- ☐ Tightening torque and sequence
⇒ Fig. “Intake manifold - tightening torque and sequence”, page 269

12 - O-ring

- ☐ If necessary, renew after removing

13 - Bolt

- ☐ Repair method if retaining tabs are broken off
- ☐ Thread-forming
- ☐ Fit and screw in bolt by hand so that it is screwed into old thread. Then tighten bolt to torque
- ☐ 7 Nm

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

- ☐ Removing and installing ⇒ “5.3 Removing and installing intake manifold sender GX9”, page 285

15 - Vacuum line

16 - O-ring

- ☐ Check for damage and renew if necessary

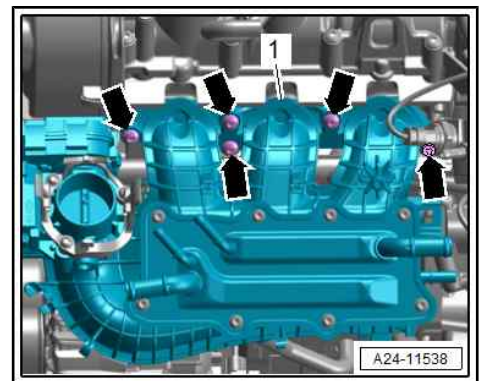
17 - Hose

- ☐ For crankcase breather

Intake manifold - tightening torque and sequence

- Tighten bolts in stages as follows:

Stage	Bolts	Tightening torque
1.	-Arrows-	Starting in centre, screw in bolts alternately by hand until they make contact
2.	-Arrows-	Starting in centre, screw in bolts alternately: 8 Nm

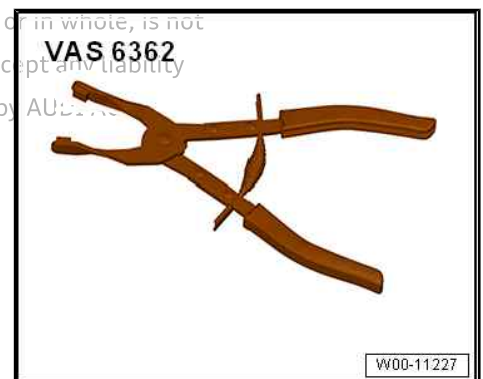


3.2 Removing and installing intake manifold

Special tools and workshop equipment required

- ◆ Hose clip pliers - VAS 6362

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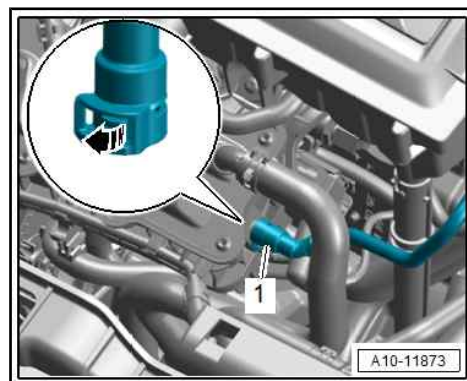


- ◆ Release tool - T10527-

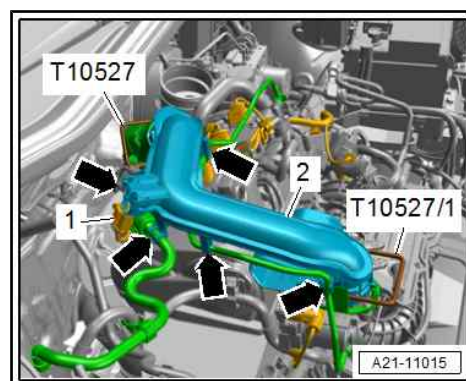


Removing

- Observe ⇒ [“3.1 Rules for cleanliness”, page 5](#) .
- Drain coolant
⇒ [“1.3 Draining and filling cooling system”, page 192](#) .
- Remove air cleaner housing
⇒ [“2.2 Removing and installing air cleaner housing”, page 265](#) .
- Release catch -arrow- and disconnect vacuum hose -1-.



- Unplug electrical connector -1- for charge pressure sender - G31- / intake air temperature sender 2 - G299- and move electrical wiring clear.
- Move hoses -arrows- clear at air pipe -2-.
- Release fasteners using release tool - T10527- and detach air pipe.



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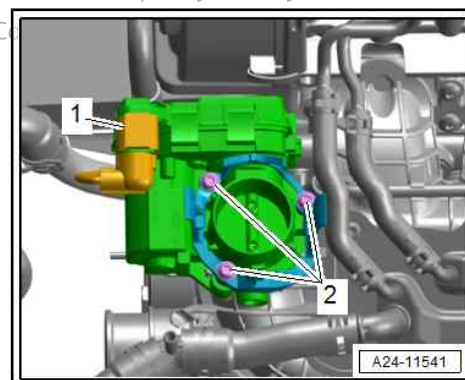
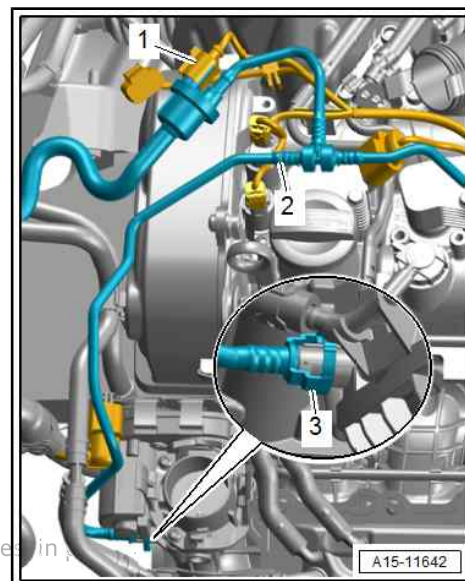


- Press release tabs -3- on both sides and disconnect line -2- for activated charcoal filter system.

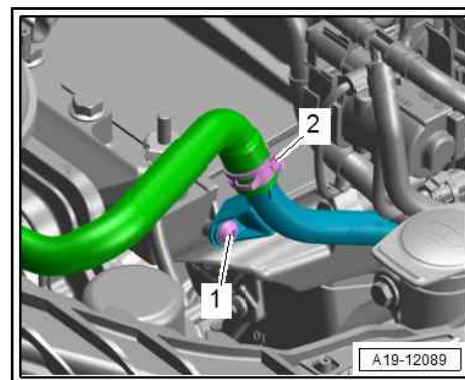


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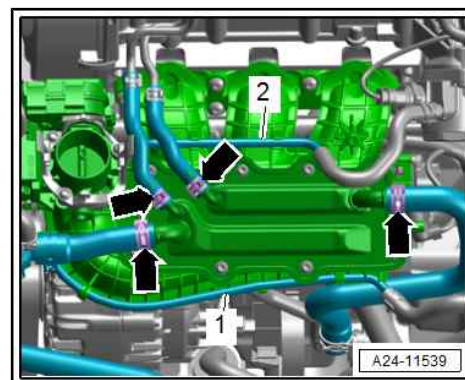
- Unplug electrical connector -1- for throttle valve module -J338- .



- Remove bolt -1-.
- Release hose clip -2- and disconnect coolant hose.

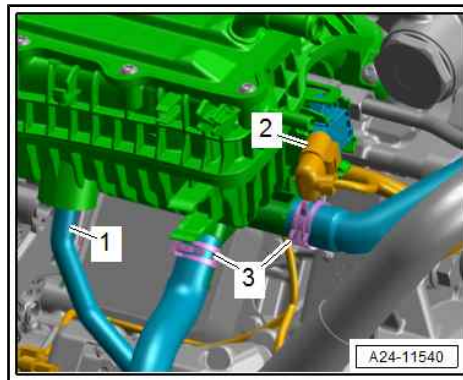


- Release hose clips -arrows- and disconnect coolant hoses.
- Move coolant line -1- and fuel line -2- clear at intake manifold.





- Unplug electrical connector -2- for intake air temperature sender - G42- .
- Disconnect crankcase breather hose -1-.
- Release hose clips -3- and disconnect coolant hoses.

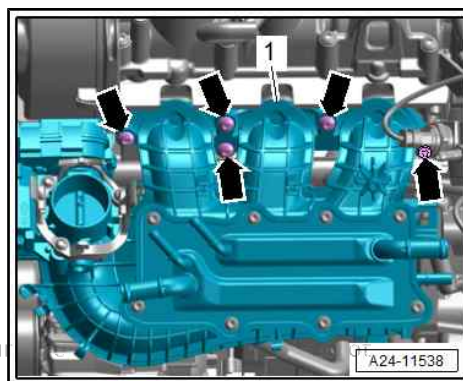


- Remove bolts -arrows-.
- Detach intake manifold -1-.

Installing

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

- Renew gaskets, seals and O-rings after removal, or check them for damage and renew as necessary
⇒ [“3.1 Exploded view - intake manifold”, page 268](#) .
- Do not reuse coolant.
- Electrical connections and routing ⇒ [Electrical system](#); Rep. gr. 97 ; Relay carriers, fuse carriers, electronics boxes; Overview of fitting locations - relay carriers, fuse carriers, electronics boxes and ⇒ [Current flow diagrams](#), [Electrical fault finding](#) and [Fitting locations](#).
- Fill up with coolant ⇒ [page 199](#) .



Tightening torques

- ◆ ⇒ [“3.1 Exploded view - coolant pipes”, page 218](#)
- ◆ ⇒ [“2.1 Exploded view - air cleaner housing”, page 263](#)
- ◆ ⇒ [“3.1 Exploded view - intake manifold”, page 268](#)

3.3 Removing and installing throttle valve module - J338-

Special tools and workshop equipment required

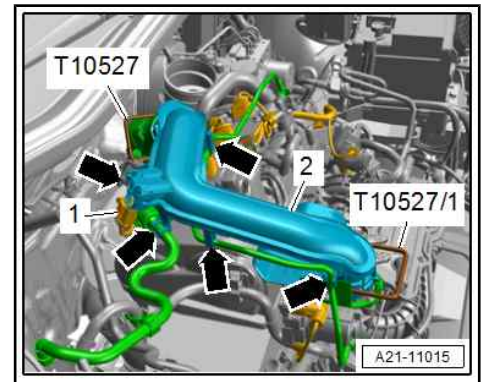
- ◆ Release tool - T10527-





Removing

- Unplug electrical connector -1- for charge pressure sender - G31- / intake air temperature sender 2 - G299- and move electrical wiring clear.
- Move hoses -arrows- clear at air pipe -2-.
- Release fasteners using release tool - T10527- and detach air pipe.

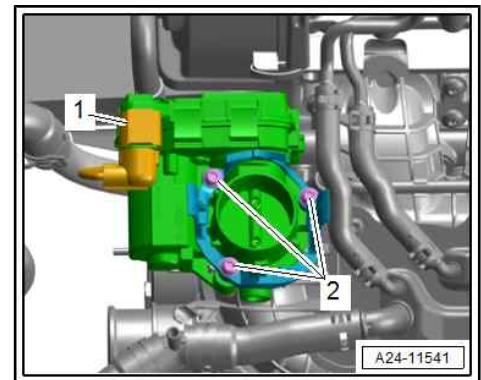


- Unplug electrical connector -1-.
- Remove bolts -2- and detach throttle valve module - J338- .

Installing

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

- Renew O-rings after removing.
- After throttle valve module - J338- has been renewed, it must be re-adapted to engine control unit - J623- . Use a vehicle diagnostic tester .



Tightening torques

- ◆ ⇒ [“3.1 Exploded view - intake manifold”, page 268](#)

3.4 Cleaning throttle valve module

Note:

Carbon deposits and dirt in the limit stop can lead to incorrect adaption values.

- 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-
⇒ [“3.3 Removing and installing throttle valve module J338 ”, page 272](#) .
- Open throttle valve by hand and lock it in open position with a wedge (plastic or wood) -arrow-.

CAUTION

Risk of injury caused by acetone. Acetone is highly flammable and can cause irritation to the eyes and skin.

- Put on safety goggles.
- Put on protective gloves.

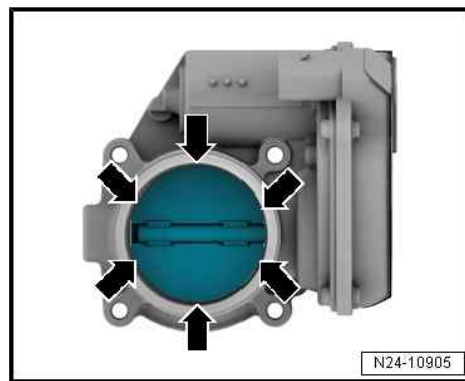


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- Clean throttle valve housing thoroughly, especially around the points -arrows- where the throttle valve closes, using commercially available acetone and a small brush.
- Wipe out throttle valve housing with a lint-free cloth.
- Allow acetone to flash off completely.
- Install throttle valve module - J338-
⇒ ["3.3 Removing and installing throttle valve module J338", page 272](#).
- Erase learnt values and adapt engine control unit - J623- to throttle valve module - GX3- . Use a vehicle diagnostic tester .



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4 Injectors

⇒ [“4.1 Exploded view - fuel rail with injectors”, page 275](#)

⇒ [“4.2 Removing and installing fuel rail”, page 276](#)

⇒ [“4.3 Removing and installing injectors”, page 276](#)

⇒ [“4.4 Cleaning injectors”, page 280](#)

4.1 Exploded view - fuel rail with injectors

1 - Fuel rail

- ☐ Removing and installing
⇒ [“4.2 Removing and installing fuel rail”, page 276](#)

2 - Bolt

- ☐ Renew after removing
- ☐ 8 Nm + 90°

3 - Fuel pressure sender - G247-

- ☐ Renew after removing
- ☐ Checking
⇒ [“5.2 Checking fuel pressure sender G247”, page 283](#)
- ☐ Removing and installing
⇒ [“5.1 Removing and installing fuel pressure sender G247”, page 282](#)
- ☐ Lubricate taper and threads lightly with clean engine oil
- ☐ 35 Nm

4 - Support ring

- ☐ Renew after removing
- ☐ Via this support ring, the fuel rail exerts the clamping force that holds the injector in the cylinder head
- ☐ Clipped to -item 7-

5 - O-ring

- ☐ Renew after removing
- ☐ Lubricate lightly with clean engine oil

6 - Spacer ring

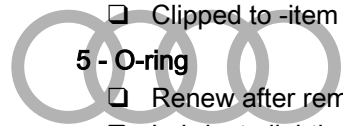
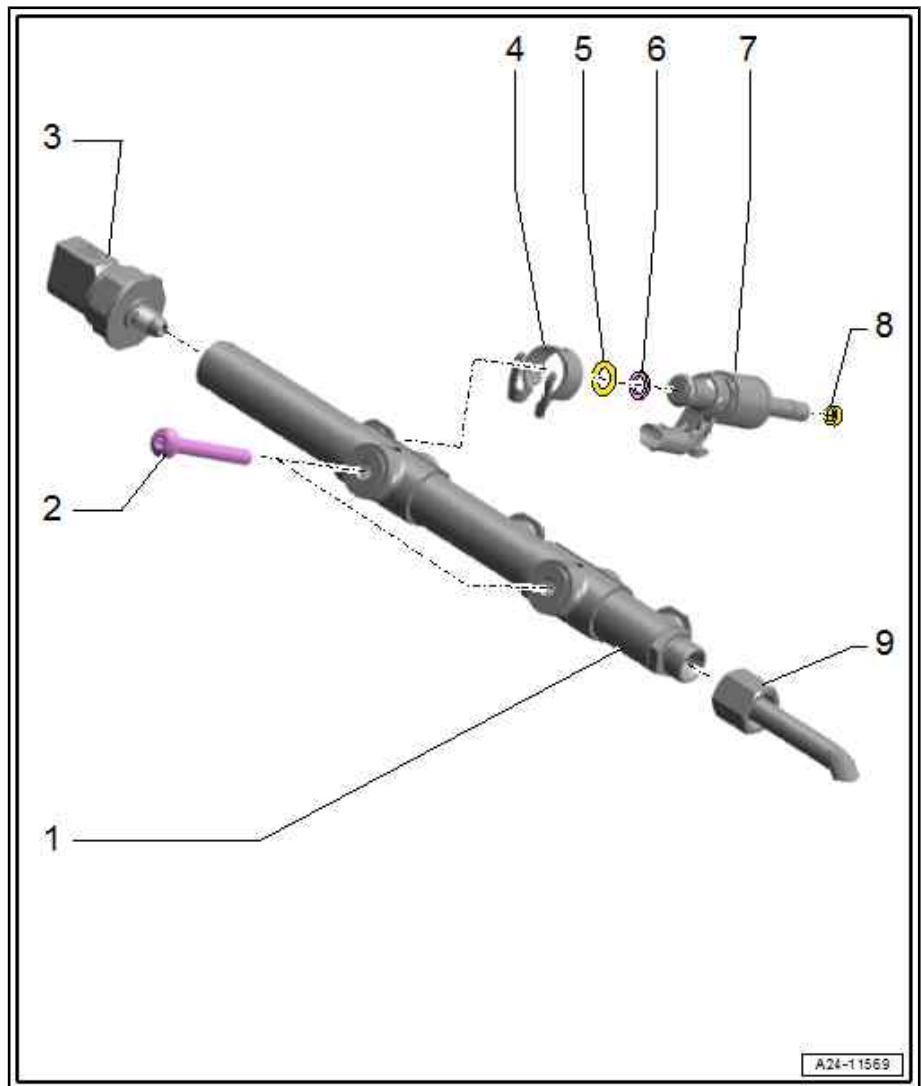
- ☐ Renew if damaged

7 - Injector

- ☐ Removing and installing ⇒ [“4.3 Removing and installing injectors”, page 276](#)

8 - Combustion chamber ring seal

- ☐ Do not apply grease or use any other lubricants
- ☐ Renewing ⇒ [“4.3 Removing and installing injectors”, page 276](#)



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9 - High-pressure pipe

- ☐ Can be reinstalled
- ☐ Connections must not be damaged
- ☐ Do not alter shape
- ☐ Removing and installing ⇒ [“6.3 Removing and installing high-pressure pipe”, page 291](#)
- ☐ Lubricate threads of union nuts with clean engine oil
- ☐ 16 Nm + 45°

4.2 Removing and installing fuel rail

Removing

- Observe ⇒ [“3.1 Rules for cleanliness”, page 5](#) .
- Remove intake manifold
⇒ [“3.2 Removing and installing intake manifold”, page 269](#) .
- Remove high-pressure pipe
⇒ [“6.3 Removing and installing high-pressure pipe”, page 291](#) .
- Unplug electrical connector -1-.
- Place a cloth underneath to catch escaping fuel.
- Remove bolts -arrows- and pull fuel rail off injectors -2-.
- If necessary, unplug electrical connectors at injectors.

Installing

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

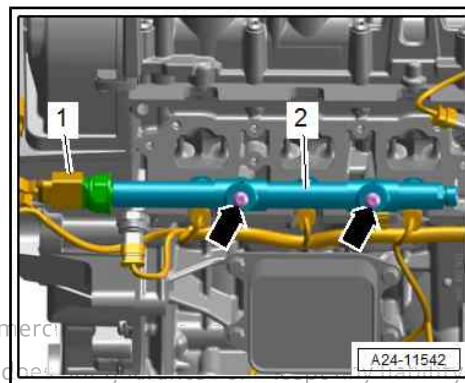
- Renew O-rings after removing.
- Renew support rings after removing.
- Apply mountings on fuel rail onto injectors.
- Press fuel rail onto injectors as far as stop (first on right side, then on left side).
- Press fuel rail down firmly in vicinity of bracket and hold, and screw bolts in up to base.
- Tighten bolts to specified torque.
- The fuel rail must not be pulled on using the bolts.
- Install high-pressure pipe
⇒ [“6.3 Removing and installing high-pressure pipe”, page 291](#) .
- Install intake manifold
⇒ [“3.2 Removing and installing intake manifold”, page 269](#) .

Tightening torques

- ◆ ⇒ [“4.1 Exploded view - fuel rail with injectors”, page 275](#)

4.3 Removing and installing injectors

Special tools and workshop equipment required





- ◆ Tool set for FSI engines - T10133 C- with -T10133/16A- and -T10133/19-

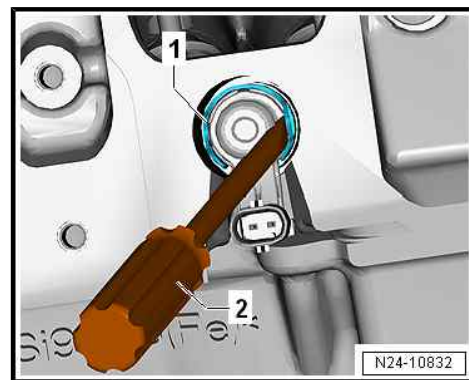


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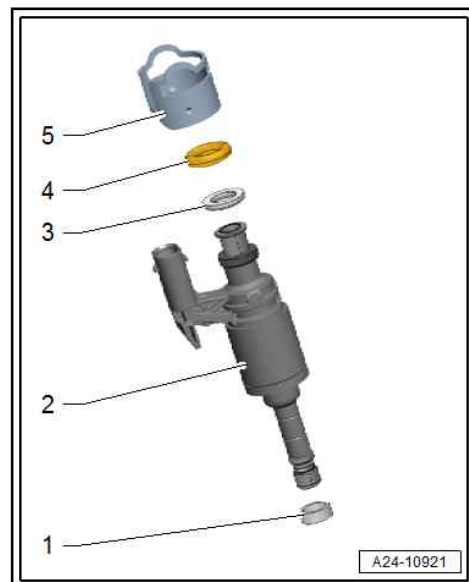


Removing

- Observe ⇒ [“3.1 Rules for cleanliness”, page 5](#) .
- Injectors must only be installed when engine is cold.
- Remove fuel rail
⇒ [“4.2 Removing and installing fuel rail”, page 276](#) .
- Unplug electrical connector from corresponding injector.
- Use screwdriver -2- to prise support ring -1- off injector.



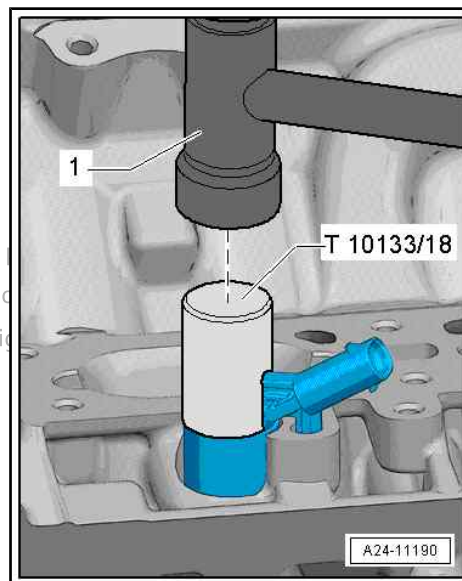
- Remove O-ring -4- from injector -2-.



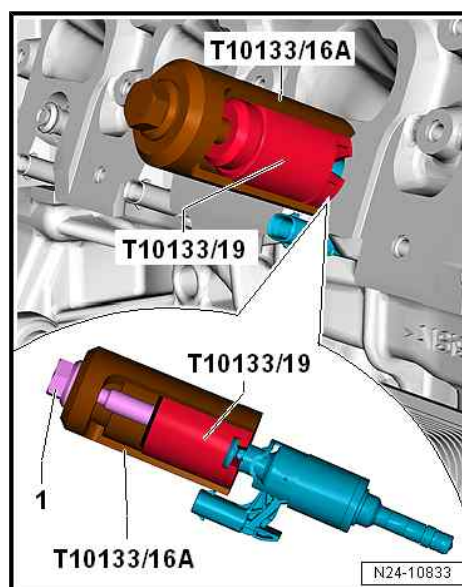


- Slide sleeve -T10133/18- over injector.
- Carefully knock against stop sleeve several times with a plastic hammer -1- to loosen injector.
- Adjust torque wrench to 5 Nm.

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- Apply puller -T10133/19- to groove on injector.
- Attach removal tool -T10133/16A- to puller.
- Pull out injector by screwing in bolt -1- on puller.
- If injector does not come loose after torque limit of 5 Nm is reached, remove puller again.
- Repeat procedure using stop sleeve to loosen injector.
- Repeat procedure for each injector.
- Observe correct torque to avoid irreparable damage to injector.

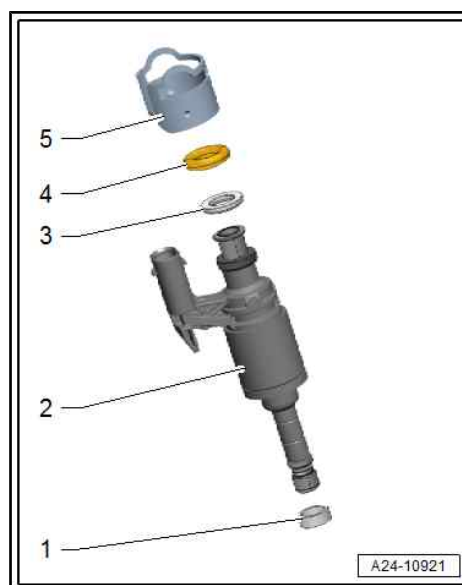


Dismantling injector

- Pull support ring -5- and spacer ring -3- off injector -2-.
- Carefully remove old combustion chamber ring seal -1-. To do so, cut open 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.

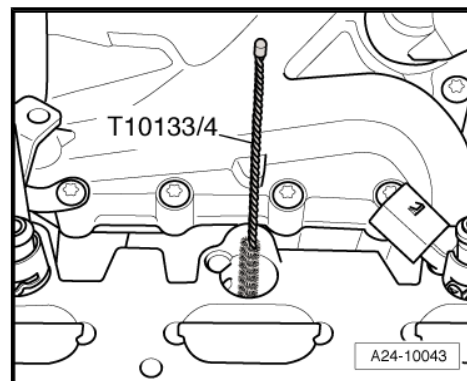
Installing

- Use complete repair set when installing.
- Renew support rings.
- Renew combustion chamber ring seal before re-installing injector.
- Lightly lubricate O-rings for injectors with clean engine oil.

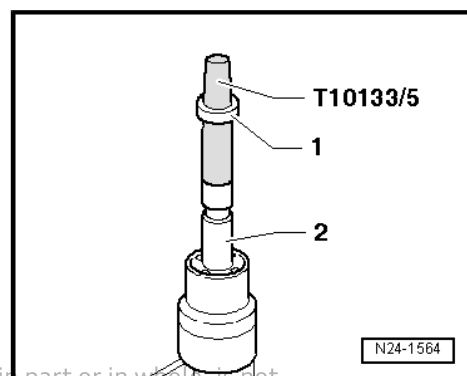




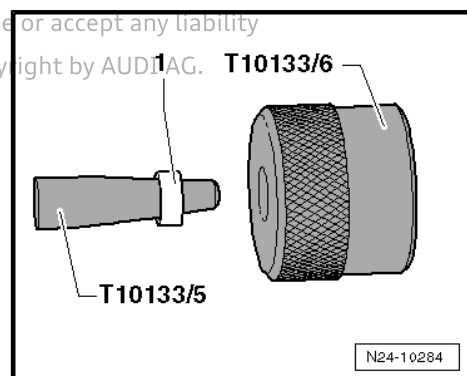
- Clean bore in cylinder head with nylon cylinder brush - T10133/4- .
- When re-installing an injector, clean any combustion residue off groove for combustion chamber ring seal and injector stem with a clean cloth.



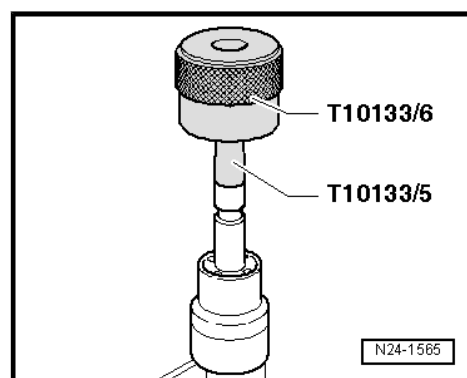
- Fit assembly cone -T10133/5- with new combustion chamber ring seal -1- onto injector -2-.



- Using assembly sleeve -T10133/6- , push combustion chamber ring seal onto assembly cone -T10133/5- as far as it will go.

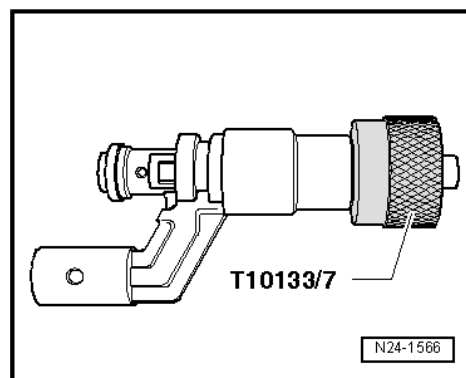


- Turn round assembly sleeve -T10133/6- and slide combustion chamber ring seal into groove.

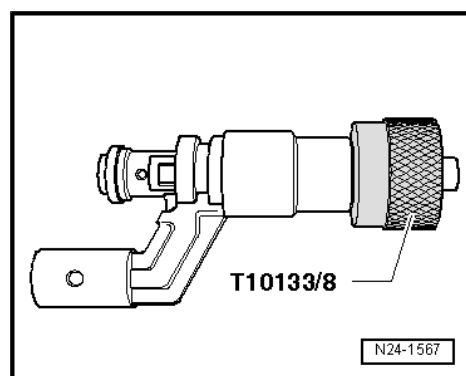




- The combustion chamber ring seal is widened when it is pushed onto the injector. After pushing it on, it therefore has to be compressed again. This is done in two stages, as described below.
- Push calibration sleeve -T10133/7- onto injector as far as it will go and simultaneously turn it slightly (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.



- Before installing new injector -2-, lubricate new O-ring -4- lightly with clean engine oil.
- The combustion chamber ring seal -1- must not be lubricated.
- 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.
- Electrical connector of injector must engage in recess in cylinder head.
- It should be possible to insert injector easily. If necessary wait until the combustion chamber ring seal has contracted sufficiently.

- Install fuel rail

⇒ ["4.2 Removing and installing fuel rail", page 276](#).

- Connect → Vehicle diagnostic tester and perform the function "Delete adaption values for injectors" in Guided Functions.



4.4 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

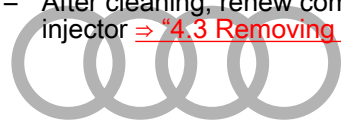
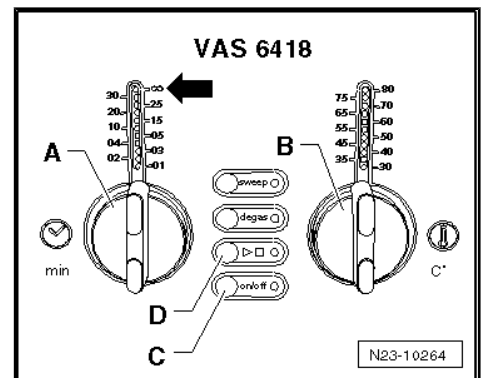
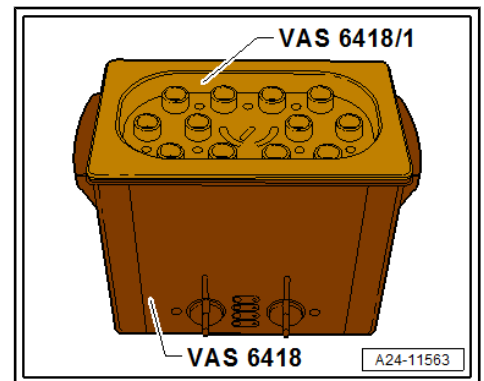
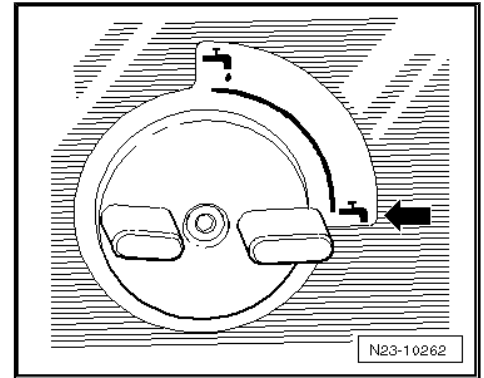
⇒ ["4.3 Removing and installing injectors", page 276](#).



- 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.
- 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.
- 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 ➤ [4.3 Removing and installing injectors](#), page 276 .



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5 Senders and sensors

⇒ ["5.1 Removing and installing fuel pressure sender G247", page 282](#)

⇒ ["5.2 Checking fuel pressure sender G247", page 283](#)

⇒ ["5.3 Removing and installing intake manifold sender GX9", page 285](#)

⇒ ["5.4 Removing and installing exhaust gas pressure sensor 1 G450", page 287](#)

5.1 Removing and installing fuel pressure sender - G247-

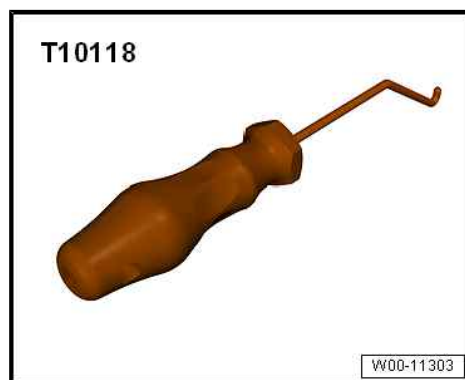
Special tools and workshop equipment required

- ◆ Assembly tool - T10118-



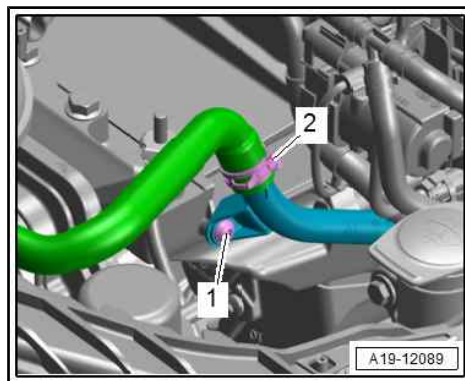
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- ◆ ~~Socket - T40218-~~ authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



Removing

- Remove bolt -1- for coolant pipe (front).



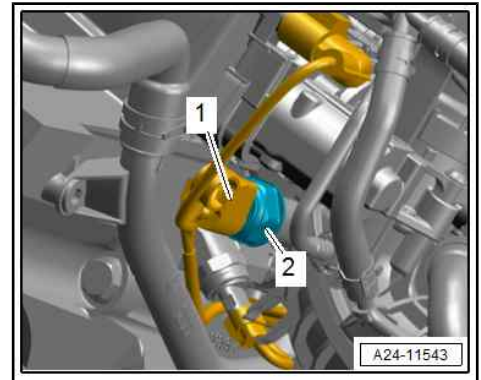


- Move fuel hose clear and press to one side.
- Unplug electrical connector -1-.

CAUTION

The fuel system is pressurised.
Risk of injury as fuel may spray out.

- Put on safety goggles.
- Put on protective gloves.
- Release pressure (wrap a clean cloth around connection and open connection carefully).



- Unscrew fuel pressure sender - G247- -item 2- using socket, 27 mm - T40218- .

Installing

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

- Lubricate taper and threads lightly with clean engine oil

Tightening torques

- ◆ ⇒ [“4.1 Exploded view - fuel rail with injectors”, page 275](#)
- ◆ ⇒ [“3.1 Exploded view - coolant pipes”, page 218](#)

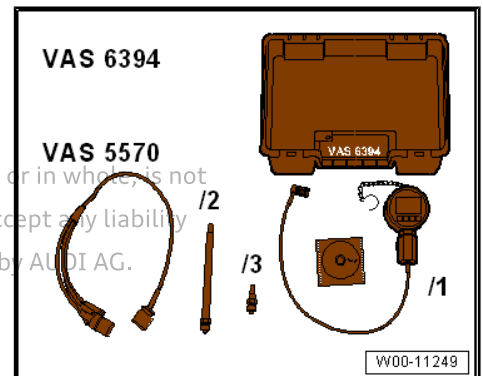
5.2 Checking fuel pressure sender - G247-

Special tools and workshop equipment required

- ◆ Vehicle diagnostic tester
- ◆ Test instrument adapter/DSO (3-pin) - VAS 5570-



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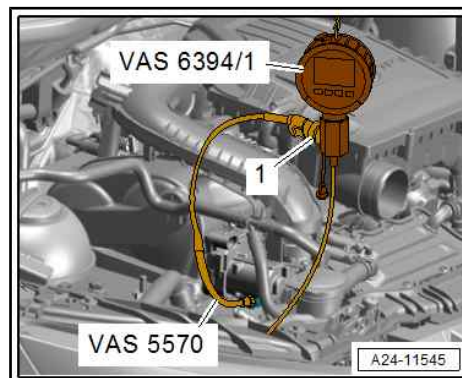
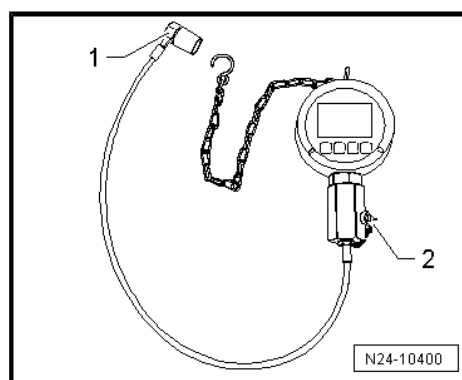
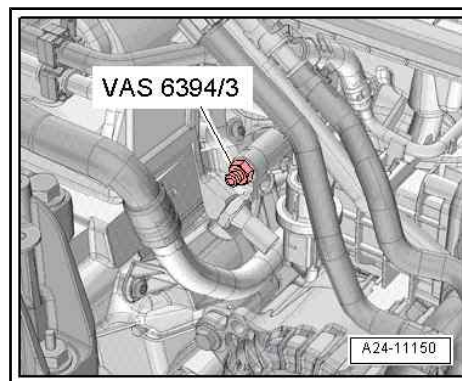
- ◆ Pressure sensor tester - VAS 6394-

Procedure

- Observe rules for cleanliness
⇒ [“3.1 Rules for cleanliness”, page 5](#)
- Remove fuel pressure sender - G247-
⇒ [“5.1 Removing and installing fuel pressure sender G247 ”, page 282](#) .



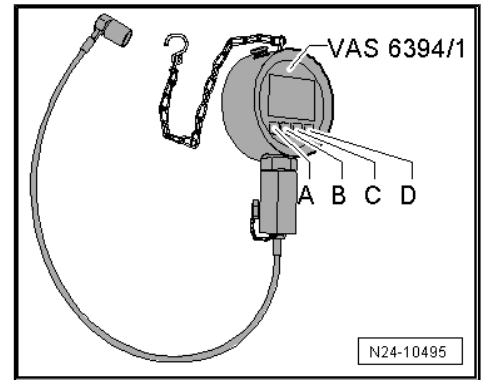
- Lubricate taper seal of adapter -VAS 6394/3- with clean engine oil and screw into fuel rail (22 Nm).
- Unscrew plug -2- and screw fuel pressure sender - G247- into tester -VAS 6394/1- .
- Connect pressure line -1- of tester to adapter - VAS 6394/3- .
- Connect vehicle and fuel pressure sender - G247- -item 1- electrically using test instrument adapter/DSO (3-pin) - VAS 5570- .



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- Switch on tester -VAS 6394/1- by pressing button -A- once briefly.
- You can press and hold button -A- for 2 seconds to switch on the illumination for 20 seconds.
- If tester -VAS 6394/1- does not indicate 0 bar, zero the tester ⇒ Operating instructions .
- Connect a vehicle diagnostic tester .
- Start engine and run at idling speed.
- Select “Engine electronics” in vehicle self-diagnosis.
- Then select “Measured values”.
- Select “Fuel pressure” from the list.
- Compare fuel pressure indicated on tester -VAS 6394/1- with actual value displayed on vehicle diagnostic tester .
- Observe fuel pressure displayed on vehicle diagnostic tester.
 - The pressure readings must not deviate by more than 5 bar.
- If deviation is more than 5 bar, renew fuel pressure sender - G247- .
- Repeat the test with the new fuel pressure sender - G247- and compare the two pressure values.
- If measured values are now the same, install new fuel pressure sender - G247- .
- If measured values are not the same again, check electrical connection between fuel pressure sender - G247- and engine control unit - J623- ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.



5.3 Removing and installing intake manifold sender - GX9-

⇒ [“5.3.1 Removing and installing intake manifold sender GX9 - Audi A1 2011►”, page 285](#)

⇒ [“5.3.2 Removing and installing intake manifold sender GX9 - Audi A1 2018►”, page 286](#)

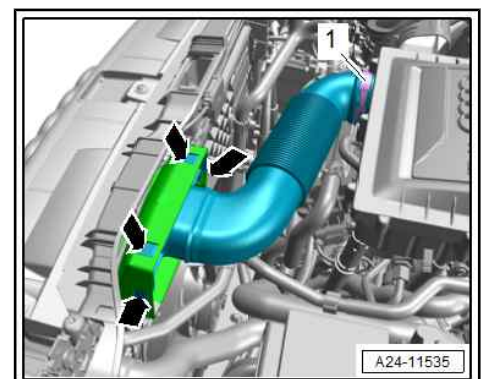
5.3.1 Removing and installing intake manifold sender - GX9- - Audi A1 2011►

Intake manifold sender - GX9- consists of:

- ◆ Intake air temperature sender 2 - G299-
- ◆ Intake manifold pressure sender - G71-

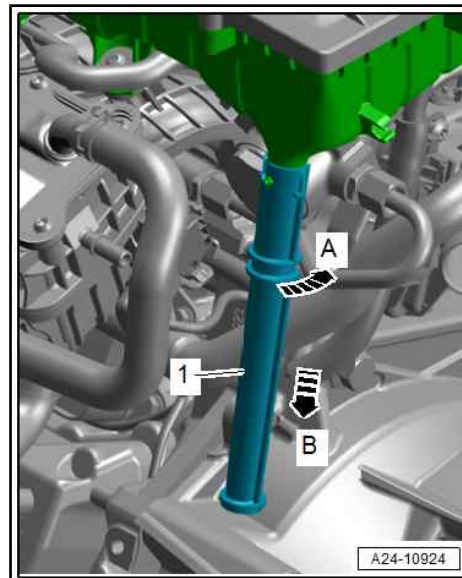
Removing

- Release fasteners -arrows- and detach air duct from lock carrier.
- Release hose clip -1- and detach air hose.





- Remove water drain pipe -1- by turning it slightly in direction of -arrow A- and detaching it downwards -arrow B-.



- Unplug electrical connector -1-.

Version A:

- Release fasteners -arrows- and remove intake manifold sender - GX9-.

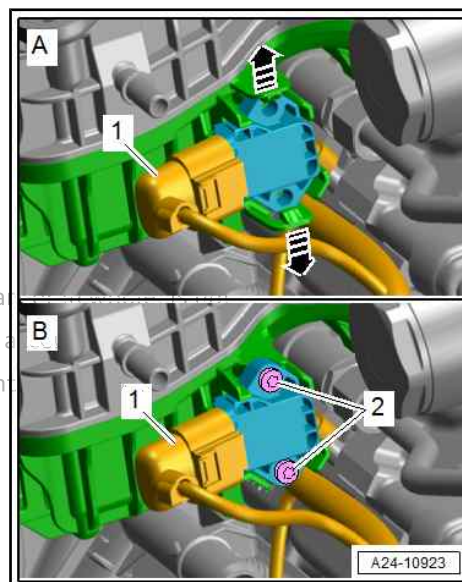
Version B:

- Remove bolts -2- and detach intake manifold sender - GX9- .

Installing

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

- Renew O-ring after removal.
- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .
- If fasteners on intake manifold have broken off, secure intake manifold sender - GX9- with bolts -2-; for bolts, refer to ⇒ Electronic parts catalogue .



Tightening torques

- ♦ ⇒ [“2.1 Exploded view - air cleaner housing”, page 263](#)
- ♦ ⇒ [“3.1 Exploded view - intake manifold”, page 268](#)

5.3.2 Removing and installing intake manifold sender - GX9- - Audi A1 2018➤

Intake manifold sender - GX9- consists of:

- ♦ Intake air temperature sender 2 - G299-
- ♦ Intake manifold pressure sender - G71-
- Remove air cleaner housing
⇒ [“2.2 Removing and installing air cleaner housing”, page 265](#) .



- Unplug electrical connector -1-.

Version A:

- Release fasteners -arrows- and remove intake manifold sender - GX9- .

Version B:

- Remove bolts -2- and detach intake manifold sender - GX9- .

Installing

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

- Renew O-ring after removal.
- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .
- If fasteners on intake manifold have broken off, secure intake manifold sender - GX9- with bolts -2-; for bolts, refer to ⇒ Electronic parts catalogue .

Tightening torques

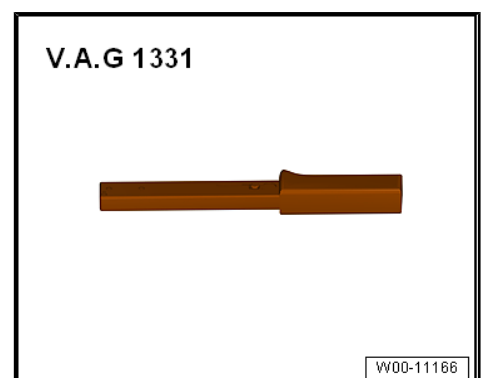
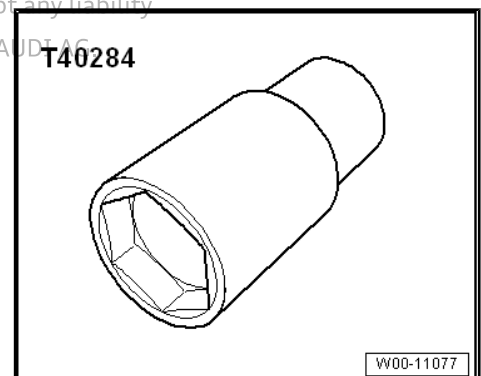
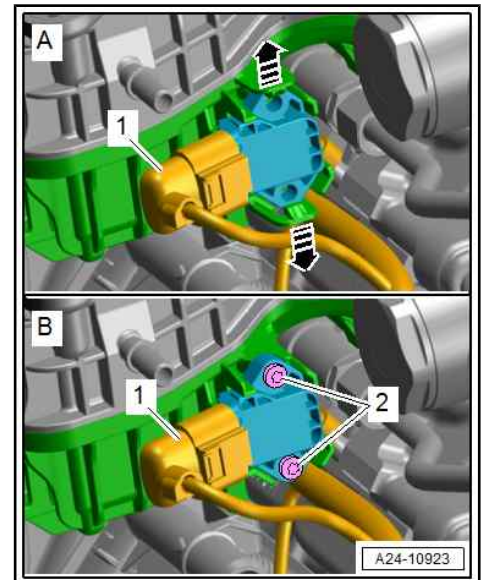
- ◆ ⇒ [“2.1 Exploded view - air cleaner housing”, page 263](#)
- ◆ ⇒ [“3.1 Exploded view - intake manifold”, page 268](#)

5.4 Removing and installing exhaust gas pressure sensor 1 - G450-

Special tools and workshop equipment required

- ◆ Socket, AF 24 mm - T40284-

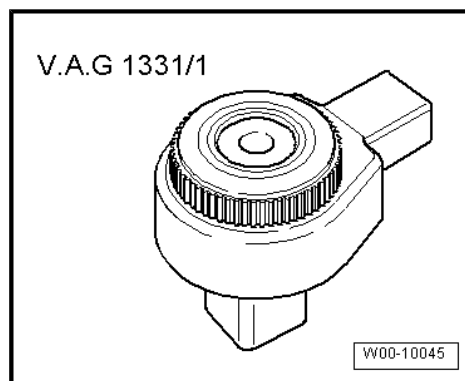
- ◆ Torque wrench - V.A.G 1331-



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◆ Ratchet - V.A.G 1331/1-



Removing

- Unplug electrical connector -1-.
- Use socket, 24 mm - T40284- to unscrew exhaust gas pressure sensor 1 - G450- -2-.

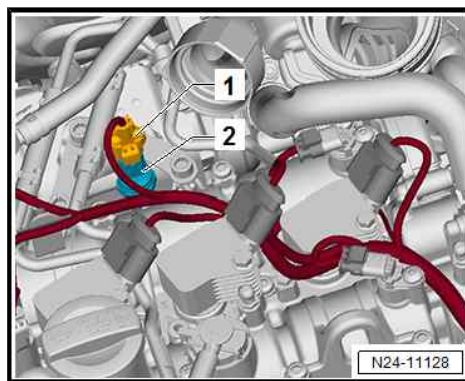
Installing

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



Note

- ◆ *Renew exhaust gas pressure sensor 1 - G450- after removal.*
- ◆ *Check hole in camshaft housing for dirt before installing exhaust gas pressure sensor 1 - G450- .*
- Install air pipe
⇒ [“2.3 Removing and installing air pipe”, page 249](#) .



Tightening torques:

- ◆ ⇒ [“1.2 Exploded view - camshaft housing”, page 87](#)

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6 High-pressure pump

⇒ [“6.1 Exploded view - high-pressure pump”, page 289](#)

⇒ [“6.2 Removing and installing high-pressure pump”, page 290](#)

⇒ [“6.3 Removing and installing high-pressure pipe”, page 291](#)

6.1 Exploded view - high-pressure pump

1 - Fuel supply hose

- ☐ Always renew hose clip if removed

2 - Electrical connector

3 - High-pressure pump

- ☐ With fuel pressure regulating valve - N276-
- ☐ Do not dismantle
- ☐ Removing and installing
⇒ [“6.2 Removing and installing high-pressure pump”, page 290](#)

4 - Roller tappet

- ☐ When installing lubricate lightly with clean engine oil

5 - O-ring

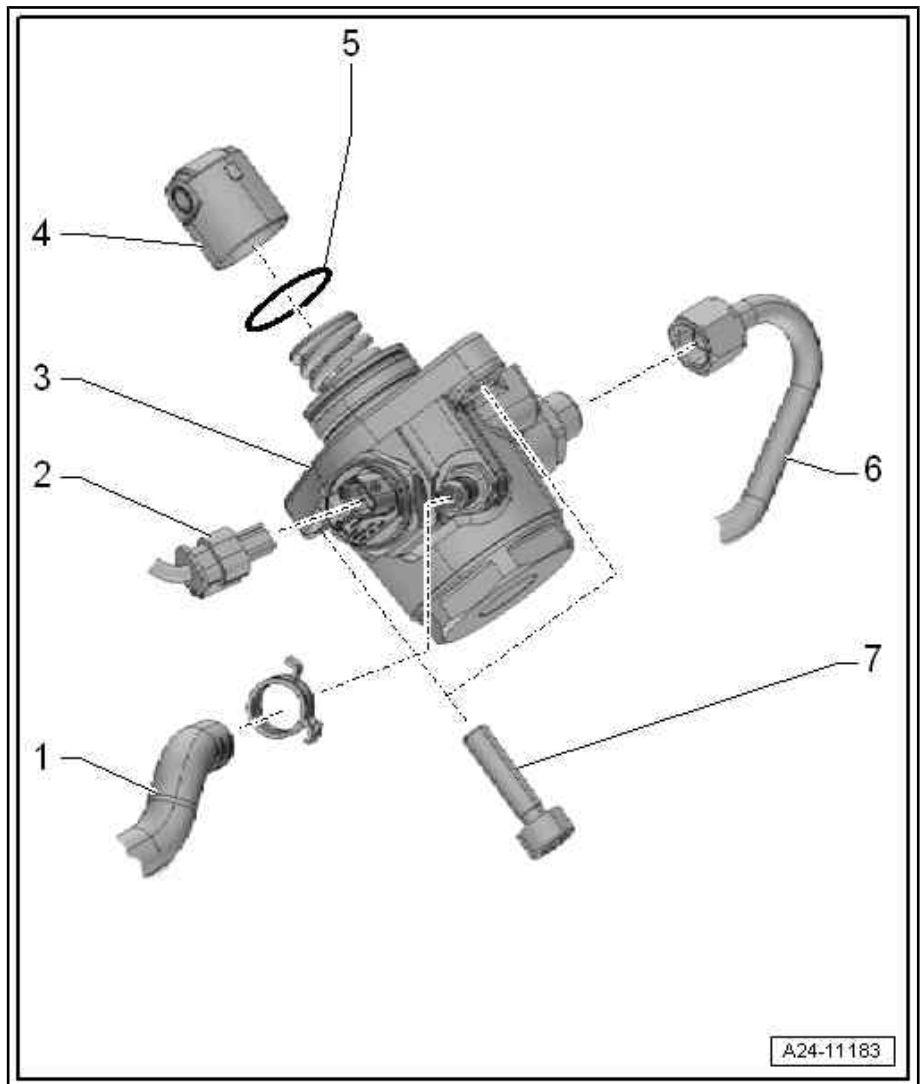
- ☐ Renew after removing
- ☐ When installing lubricate lightly with clean engine oil

6 - High-pressure pipe

- ☐ Can be reinstalled
- ☐ Check for damage before installing
- ☐ When re-installing used high-pressure pipes, give them a thorough visual check for leaks
- ☐ Removing and installing
⇒ [“6.3 Removing and installing high-pressure pipe”, page 291](#)
- ☐ Do not alter shape
- ☐ Connections must not be damaged
- ☐ Lubricate threads of union nuts with clean engine oil
- ☐ 16 Nm +45°

7 - Bolt

- ☐ Renew after removing
- ☐ Tightening torque and sequence
⇒ [Fig. “High-pressure pump - tightening torque and sequence” , page 290](#)





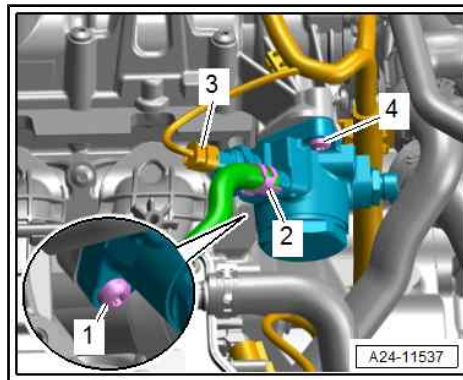
High-pressure pump - tightening torque and sequence

To prevent flange of high-pressure pump from being deformed during installation, fit high-pressure pump as follows:

- Tighten new bolts in stages as follows:

Tighten bolts with M6 thread in stages as follows:

Stage	Bolts	Tightening torque/angle specification
1.	-1, 4-	Screw in by hand until contact is made
2.	-1, 4-	Tighten one turn alternately until flange of high-pressure pump makes contact with camshaft housing
3.	-1, 4-	Bolts with M6 thread: 8 Nm
4.	-1, 4-	Turn 90° further



Tighten bolts with M8 thread in stages as follows:

Stage	Bolts	Tightening torque/angle specification
1.	-1, 4-	Screw in by hand until contact is made
2.	-1, 4-	Tighten one turn alternately until flange of high-pressure pump makes contact with camshaft housing
3.	-1, 4-	Bolts with M8 thread: 20 Nm
4.	-1, 4-	Turn 90° further

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6.2 Removing and installing high-pressure pump

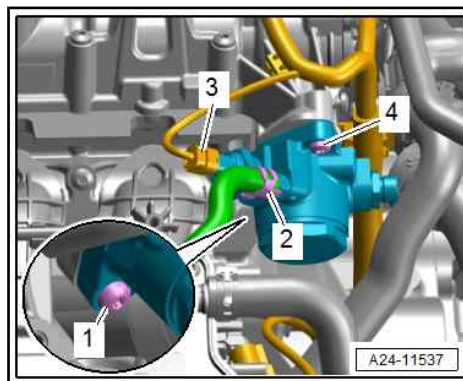
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Special tools and workshop equipment required

- ◆ Spring-type clip pliers - VAS 6922-

Removing

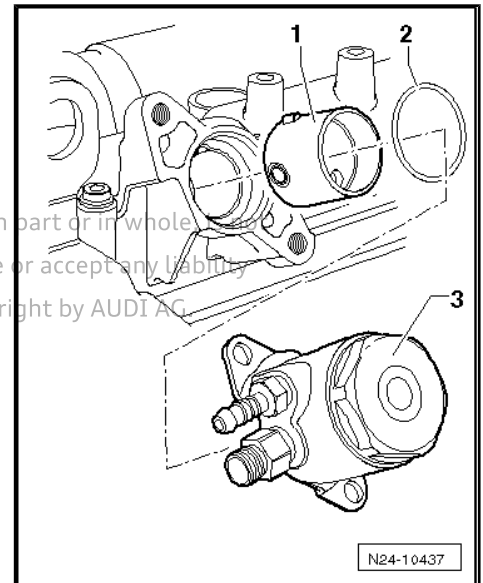
- Engine cold.
- Observe rules for cleanliness
⇒ [“3.1 Rules for cleanliness”, page 5](#) .
- Remove air cleaner housing
⇒ [“2.2 Removing and installing air cleaner housing”, page 265](#) .
- Remove high-pressure pipe
⇒ [“6.3 Removing and installing high-pressure pipe”, page 291](#) .
- Unplug electrical connector -3-.
- Place a cloth underneath to catch escaping fuel.
- Release hose clip -2- and detach fuel supply hose.
- Unscrew bolts -1, 4- and detach high-pressure pump and roller tappet.



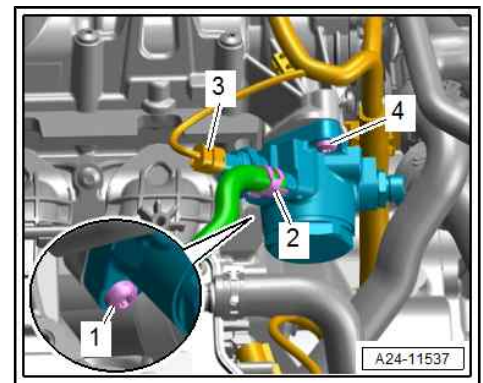


Installing

- Renew O-ring after removal.
- Check roller tappet -1- for damage and renew if necessary.
- Lubricate roller tappet -1- lightly with clean engine oil.
- Insert lubricated roller tappet -1- into camshaft housing.
- Turn crankshaft in direction of engine rotation until roller tappet is positioned at lowest point.
- Insert a new, oiled O-ring -2- into groove on high-pressure pump -3-.



- Fit high-pressure pump and tighten bolts -1 ... 4- hand-tight in diagonal sequence
⇒ [Fig. "High-pressure pump - tightening torque and sequence"](#), page 290 .
- Tighten bolts -1 and 4- to specified torque
⇒ [Fig. "High-pressure pump - tightening torque and sequence"](#), page 290 .
- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ [Electronic parts catalogue](#) .
- Install high-pressure pipe
⇒ ["6.3 Removing and installing high-pressure pipe"](#), page 291 .
- Check fuel system for leaks.



Tightening torques

- ◆ ⇒ [Fig. "High-pressure pump - tightening torque and sequence"](#), page 290
- ◆ ⇒ ["2.1 Exploded view - air cleaner housing"](#), page 263

6.3 Removing and installing high-pressure pipe

⇒ ["6.3.1 Removing and installing high-pressure pipe - Audi A1 2011►"](#), page 291

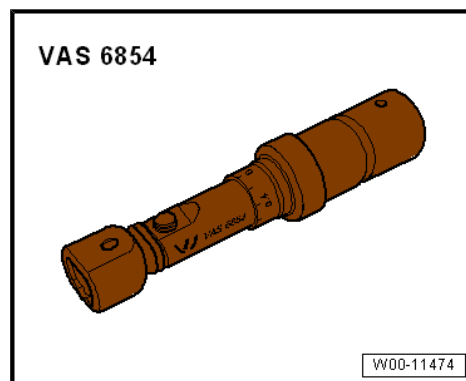
⇒ ["6.3.2 Removing and installing high-pressure pipe - Audi A1 2018►"](#), page 293

6.3.1 Removing and installing high-pressure pipe - Audi A1 2011►

Special tools and workshop equipment required



- ◆ Torque wrench - VAS 6854-

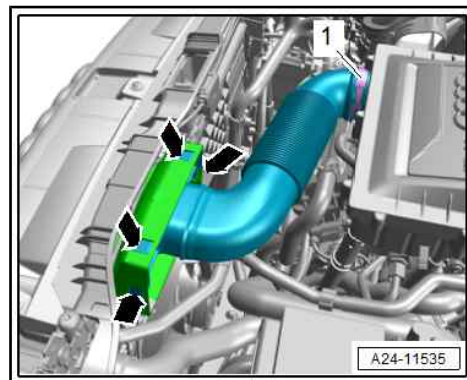


- ◆ Tool set - T10395A-



Removing

- Release fasteners -arrows- and detach air duct from lock carrier.
- Release hose clip -1- and detach air hose.

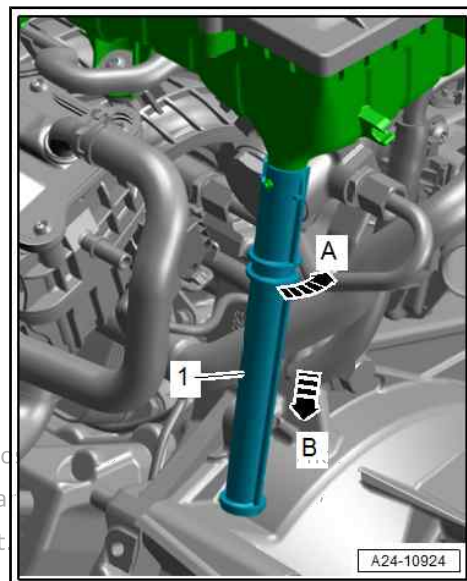


- Remove water drain pipe -1- by turning it slightly in direction of -arrow A- and detaching it downwards -arrow B-.
- Observe rules for cleanliness
⇒ ["3.1 Rules for cleanliness", page 5](#) .

CAUTION

The fuel system is pressurised.
Risk of injury as fuel may spray out.

- Put on safety goggles.
- Put on protective gloves.
- Release pressure (wrap a clean cloth around connection and open connection carefully).



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- Unscrew union nuts -arrows- and detach high-pressure pipe.

Installing

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

- Counterhold connection on high-pressure pump when tightening.
- Secure all hose connections with correct type of hose clips (as original equipment) ➔ [Electronic parts catalogue](#)
- High-pressure pipe does not have to be renewed after removal.
- When re-installing used high-pressure pipes, give them a thorough visual check for leaks.
- Lubricate threads of union nuts with clean engine oil.
- Hand-tighten union nuts for high-pressure pipe (make sure that pipe is not under tension).
- First tighten union nut at high-pressure pump and then at high-pressure pipe.

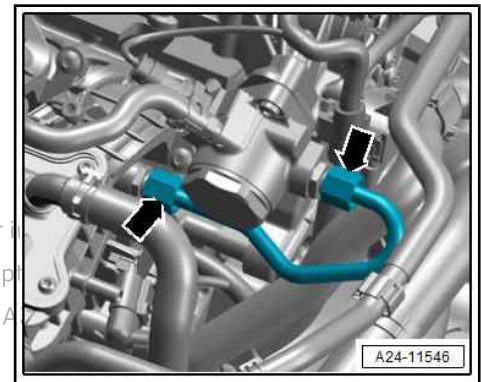
Tightening torques

- ◆ ➔ ["6.1 Exploded view - high-pressure pump", page 289](#)

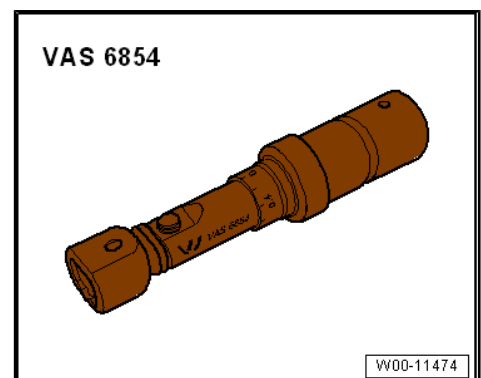
6.3.2 Removing and installing high-pressure pipe - Audi A1 2018➤

Special tools and workshop equipment required

- ◆ Torque wrench - VAS 6854-



- ◆ Tool set - T10395A-



Removing

- Remove air cleaner housing
➔ ["2.2 Removing and installing air cleaner housing", page 265](#) .



- Remove air duct from lock carrier
⇒ [“2.3 Removing and installing air duct at lock carrier”, page 266](#).
- Observe rules for cleanliness
⇒ [“3.1 Rules for cleanliness”, page 5](#).

CAUTION

The fuel system is pressurised.
Risk of injury as fuel may spray out.

- Put on safety goggles.
- Put on protective gloves.
- Release pressure (wrap a clean cloth around connection and open connection carefully).

- Unscrew union nuts -arrows- and detach high-pressure pipe.

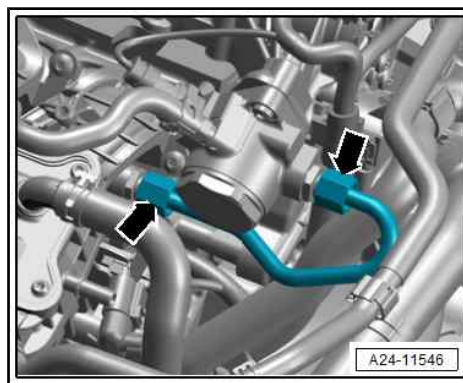
Installing

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

- Counterhold connection on high-pressure pump when tightening.
- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .
- High-pressure pipe does not have to be renewed after removal.
- When re-installing used high-pressure pipes, give them a thorough visual check for leaks.
- Lubricate threads of union nuts with clean engine oil.
- Hand-tighten union nuts for high-pressure pipe (make sure that pipe is not under tension).
- First tighten union nut at high-pressure pump and then at high-pressure pipe.

Tightening torques

- ♦ ⇒ [“6.1 Exploded view - high-pressure pump”, page 289](#)





7 Lambda probe

⇒ [“7.1 Exploded view - Lambda probe”, page 295](#)

⇒ [“7.2 Removing and installing Lambda probe”, page 297](#)

7.1 Exploded view - Lambda probe

⇒ [“7.1.1 Exploded view - Lambda probe, Audi A1 2011►”, page 295](#)

⇒ [“7.1.2 Exploded view - Lambda probe, Audi A1 2018►”, page 296](#)

7.1.1 Exploded view - Lambda probe, Audi A1 2011►

- New Lambda probes are coated with an assembly paste. The paste must not get into the slots on the Lambda 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; for high-temperature paste refer to ⇒ Electronic parts catalogue .
- The electrical wiring of the lambda probe must be secured at the original locations when installing. The wiring must NOT come into contact with the exhaust pipe.



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

- ❑ Removing and installing
⇒ ["7.2.1 Removing and installing Lambda probe - Audi A1 2011►"](#),
[page 297](#)

- ❑ 55 Nm

2 - Electrical connector

- ❑ For Lambda probe - G39- with Lambda probe heater - Z19-

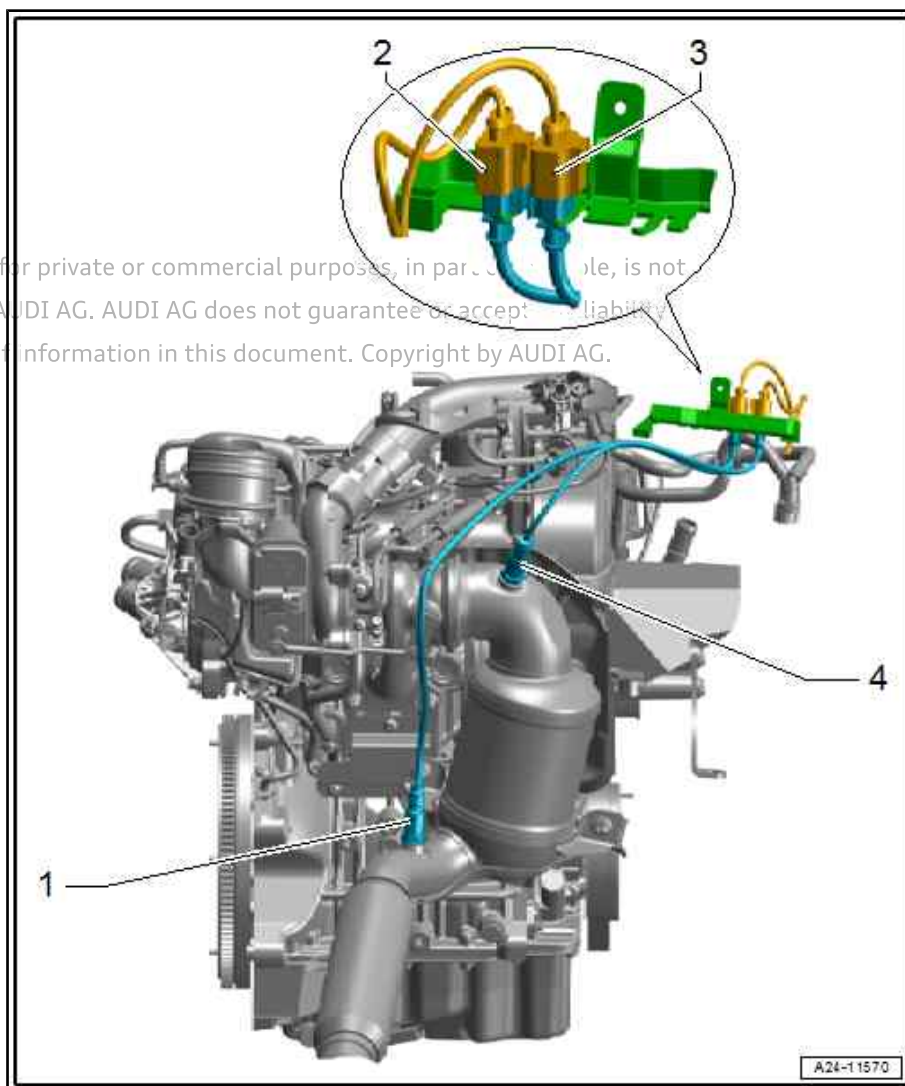
3 - Electrical connector

- ❑ For Lambda probe after catalytic converter - G130- with Lambda probe 1 heater after catalytic converter - Z29-

4 - Lambda probe - G39- with Lambda probe heater - Z19-

- ❑ Removing and installing
⇒ ["7.2.1 Removing and installing Lambda probe - Audi A1 2011►"](#),
[page 297](#)

- ❑ 55 Nm



7.1.2 Exploded view - Lambda probe, Audi A1 2018►

- New Lambda probes are coated with an assembly paste. The paste must not get into the slots on the Lambda 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; for high-temperature paste refer to ⇒ Electronic parts catalogue .
- The electrical wiring of the lambda probe must be secured at the original locations when installing. The wiring must NOT come into contact with the exhaust pipe.



1 - Lambda probe 1 after catalytic converter - GX7-

- ❑ Consists of:

Lambda probe after catalytic converter - G130-

Lambda probe 1 heater after catalytic converter - Z29-

- ❑ Removing and installing
⇒ ["7.2.2 Removing and installing Lambda probe - Audi A1 2018►", page 299](#)

- ❑ 55 Nm

2 - Electrical connector (brown)

- ❑ For Lambda probe 1 before catalytic converter - GX10-

3 - Electrical connector (black)

- ❑ For Lambda probe 1 after catalytic converter - GX7-

4 - Lambda probe 1 before catalytic converter - GX10-

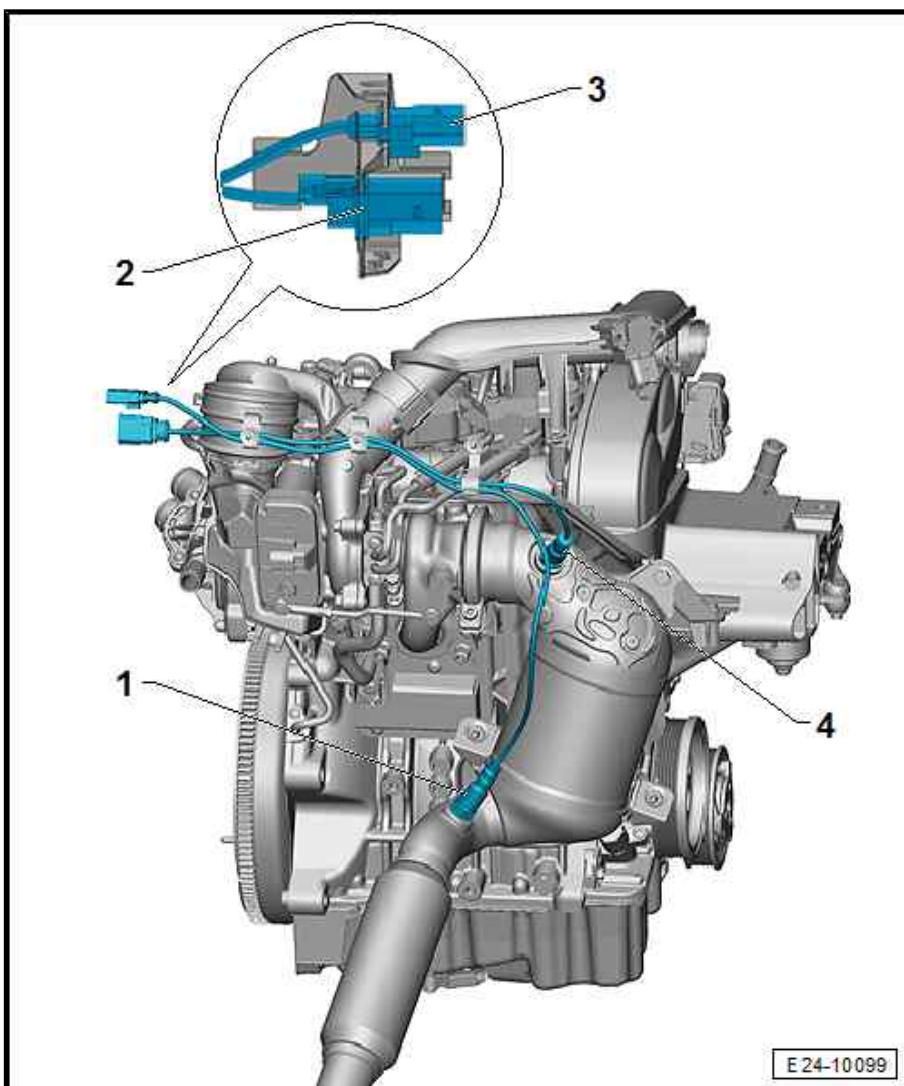
- ❑ Consists of:

Lambda probe - G39-

Lambda probe heater - Z19-

- ❑ Removing and installing
⇒ ["7.2.2 Removing and installing Lambda probe - Audi A1 2018►", page 299](#)

- ❑ 55 Nm



7.2 Removing and installing Lambda probe

⇒ ["7.2.1 Removing and installing Lambda probe - Audi A1 2011►", page 297](#)

⇒ ["7.2.2 Removing and installing Lambda probe - Audi A1 2018►", page 299](#)

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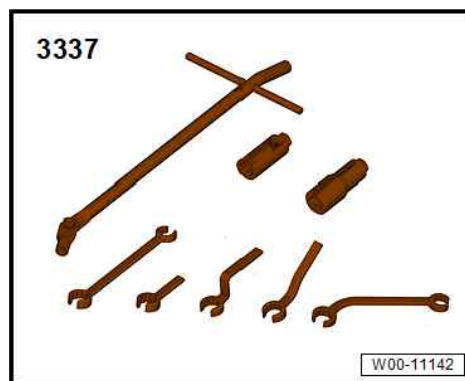
7.2.1 Removing and installing Lambda probe - Audi A1 2011►

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Special tools and workshop equipment required



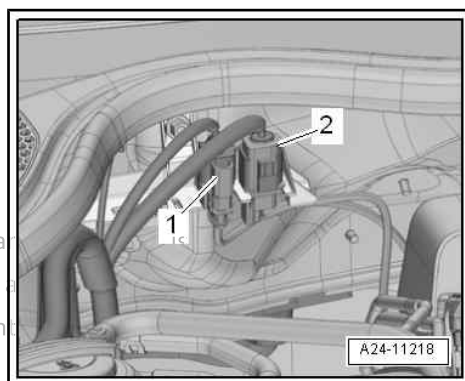
- ◆ Lambda probe open ring spanner set - 3337-



Removing

- Unplug corresponding electrical connector:
- 1 - For Lambda probe - G39- and Lambda probe heater - Z19-
- 2 - For Lambda probe after catalytic converter - G130- and Lambda probe heater 1 after catalytic converter - Z29-

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- Unscrew corresponding Lambda probe using a tool from Lambda probe open ring spanner set - 3337- .

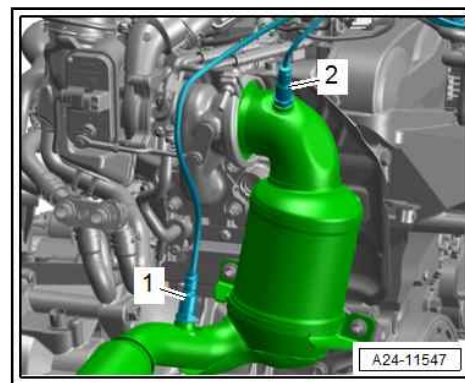
1 - Lambda probe after catalytic converter - G130-

2 - Lambda probe - G39-

Installing

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

- New Lambda probes are coated with an assembly paste. The paste must not get into the slots on the Lambda 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. For high-temperature paste refer to ⇒ Electronic parts catalogue
- The electrical wiring of the lambda probe must be secured at the original locations when installing. The wiring must NOT come into contact with the exhaust pipe.



Note

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Adaption may be required after renewing, depending on version.

- Connect vehicle diagnostic tester .
- Switch on ignition and select following menu option on ⇒ Vehicle diagnostic tester:
 - ◆ **0001 - Heated oxygen sensor adaption**
 - ◆ If the function “Heated oxygen sensor adaption” is not available, erase entry in event memory.

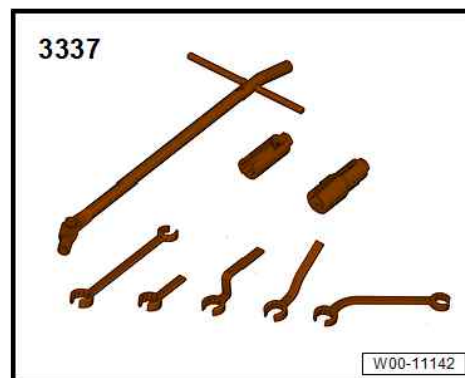
Tightening torques

- ◆ ⇒ [“7.1.1 Exploded view - Lambda probe, Audi A1 2011►”, page 295](#)

7.2.2 Removing and installing Lambda probe - Audi A1 2018►

Special tools and workshop equipment required

- ◆ Lambda probe open ring spanner set - 3337-

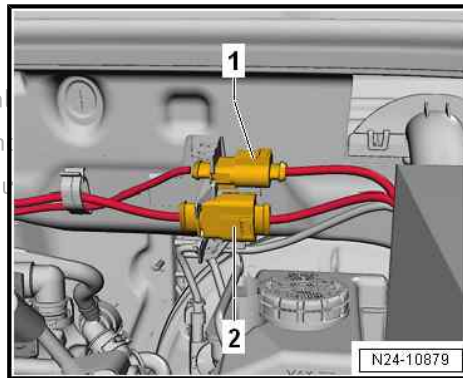




Removing

- Unplug corresponding electrical connector:

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



- Unscrew corresponding Lambda probe using a tool from Lambda probe open ring spanner set - 3337/7- .

- 1 - Lambda probe 1 after catalytic converter - GX7-
- 2 - Lambda probe 1 before catalytic converter - GX10-

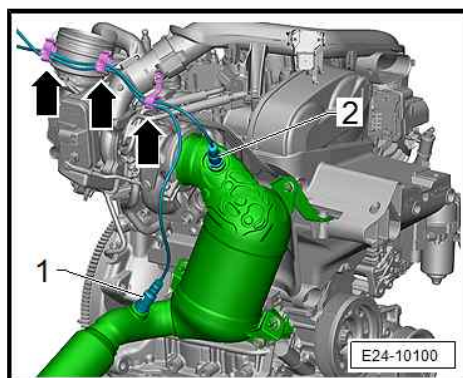
Installing

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



Note

- ◆ *New Lambda probes are coated with an assembly paste. The paste must not get into the slots on the Lambda 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 → Electronic parts catalogue (ETKA)*
 - ◆ *The electrical wiring of the lambda probe must be secured at the original locations when installing. The wiring must NOT come into contact with the exhaust pipe.*
- If Lambda probe was renewed, erase learnt values and adapt Lambda probe to engine control unit ⇒ Vehicle diagnostic tester .
 - Switch on ignition and select following menu option on ⇒ Vehicle diagnostic tester:
 - ◆ 01 - Engine electronics
 - ◆ 0001 - Functions
 - ◆ 0001 - Basic setting
 - ◆ 0001 - Erase adaption values
 - ◆ 0001 - Heated oxygen sensor adaption



Tightening torque

- ◆ ⇒ [“7.1.2 Exploded view - Lambda probe, Audi A1 2018➤”, page 296](#)



8 Engine control unit

⇒ ["8.1 Exploded view - engine control unit", page 301](#)

⇒ ["8.2 Removing and installing engine control unit J623 ", page 302](#)

8.1 Exploded view - engine control unit

1 - Bracket

2 - Engine control unit - J623-

- ❑ Removing and installing
⇒ ["8.2 Removing and installing engine control unit J623 ", page 302](#)

3 - Locking element

- ❑ Whether a locking element is fitted depends on the vehicle equipment; refer to ⇒ Electronic parts catalogue (ETKA)

4 - Bolt

- ❑ Screw in shear bolts evenly until head shears off
- ❑ Renew after removing; for correct version refer to ⇒ Electronic parts catalogue (ETKA)

5 - Bolt

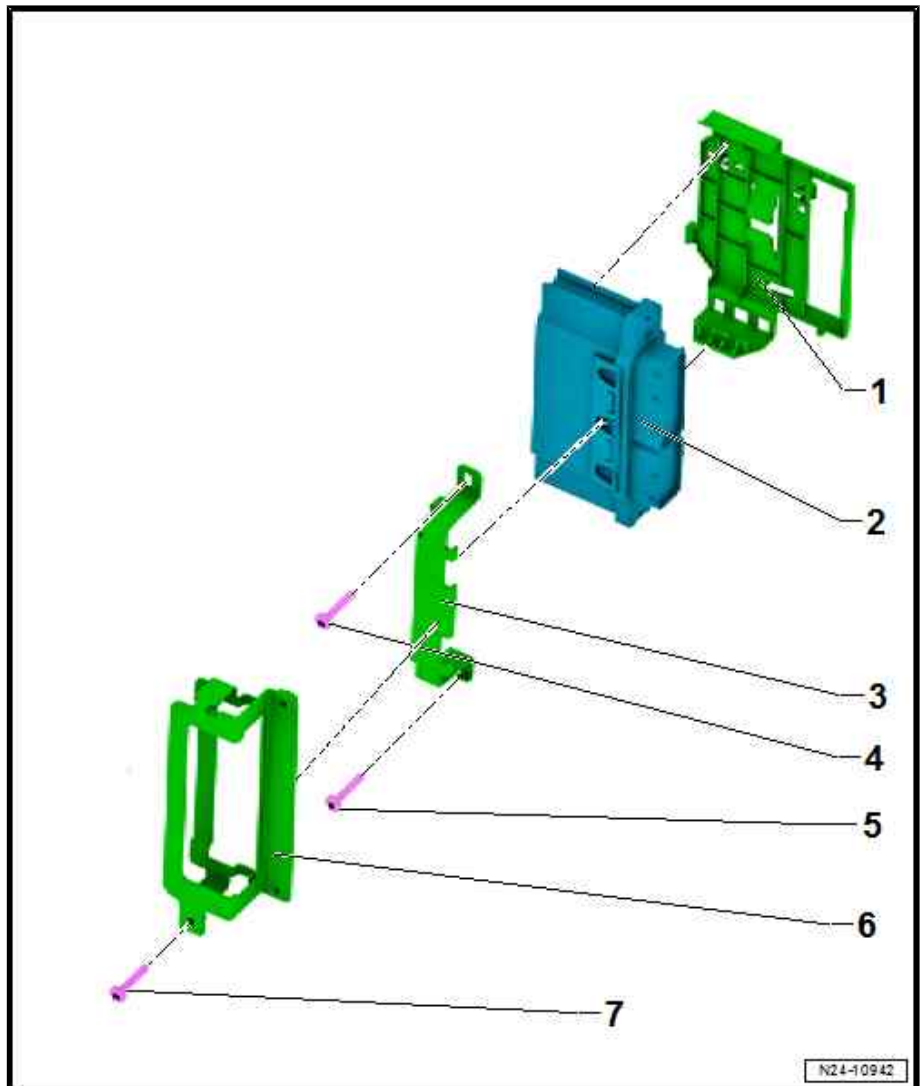
- ❑ Screw in shear bolts evenly until head shears off
- ❑ Renew after removing; for correct version refer to ⇒ Electronic parts catalogue (ETKA)

6 - Protective housing

Whether a protective housing is fitted depends on the vehicle equipment; refer to ⇒ Electronic parts catalogue (ETKA)

7 - Bolt

- ❑ Screw in shear bolts evenly until head shears off
- ❑ Renew after removing; for correct version refer to ⇒ Electronic parts catalogue (ETKA)



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8.2 Removing and installing engine control unit - J623-

⇒ ["8.2.1 Removing and installing engine control unit J623 - Audi A1 2011►", page 302](#)

⇒ ["8.2.2 Removing and installing engine control unit J623 - Audi A1 2018►", page 303](#)

8.2.1 Removing and installing engine control unit - J623- - Audi A1 2011►

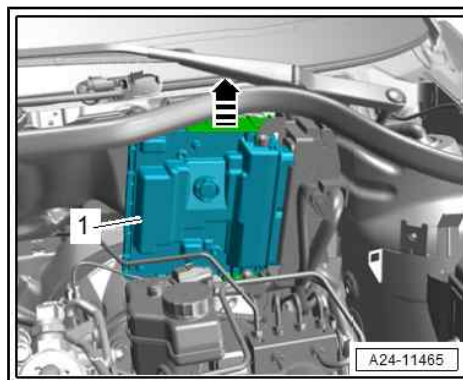
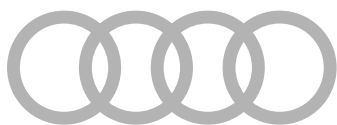
- ◆ Not every engine control unit is bolted to a protective housing. Whether a protective housing is fitted depends on the vehicle equipment; refer to ⇒ Electronic parts catalogue (ETKA) .

Special tools and workshop equipment required

- ◆ Vehicle diagnostic tester
- ◆ Vice-grip pliers (commercially available)

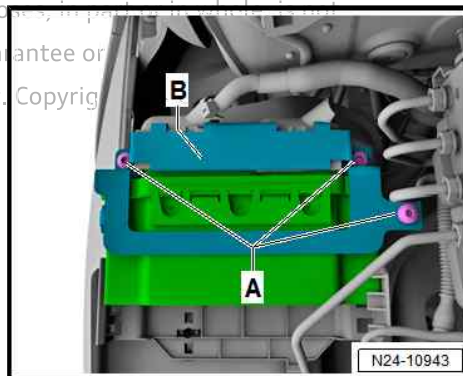
Removing

- If engine control unit is to be renewed, select test sequence/ function "Replace engine control unit" in "Guided Functions" mode ⇒ Vehicle diagnostic tester.
- Switch off ignition and remove ignition key.
- Remove air cleaner housing
⇒ ["2.2 Removing and installing air cleaner housing", page 265](#) .
- Release catch -arrow- and detach engine control unit - J623- -item 1- from bracket.
- Press tab (not visible in illustration) downwards if necessary and move engine control unit - J623- clear.



Engine control unit with protective housing

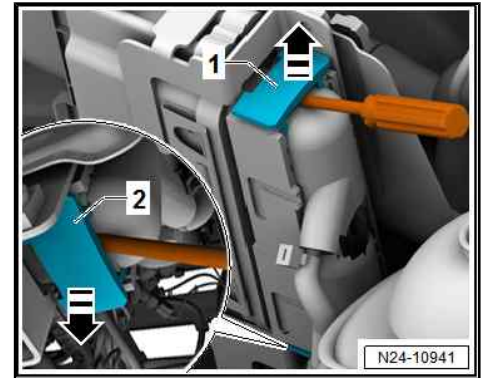
- Move wiring harness clear and push as far to side as possible.
- Unscrew bolts -A- with vice-grip pliers or similar. Detach locking element -B-.
- Take engine control unit out of protective housing.





All versions

- Lever locking bar -1- of top wiring harness in direction of -arrow- using a screwdriver.
- Lever locking bar -2- of bottom wiring harness in direction of -arrow- using a screwdriver.
- Unplug connectors from engine control unit.
- Remove engine control unit.



Installing

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

- If previously fitted, re-install protective housing on engine control unit.
- Use new shear bolts.
- Install air cleaner housing
⇒ ["2.2 Removing and installing air cleaner housing", page 265](#).

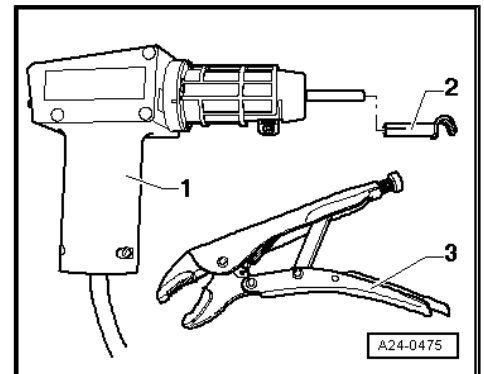
The procedure required after connecting the new engine control unit is described in "Guided Fault Finding" or "Guided Functions".
Use ⇒ Vehicle diagnostic tester.

8.2.2 Removing and installing engine control unit - J623- - Audi A1 2018➤

- ◆ Not every engine control unit is bolted to a protective housing. Whether a protective housing is fitted depends on the vehicle equipment; refer to ⇒ Electronic parts catalogue (ETKA).

Special tools and workshop equipment required

- ◆ Vehicle diagnostic tester
- ◆ Required if engine control unit has a protective housing:
- ◆ Hot air blower - VAS 1978/14A- -item 1- with nozzle attachment -2- from wiring harness repair set - VAS 1978 B-



- ◆ Small grinder (commercially available)

Removing

If engine control unit - J623- is to be renewed, adaption values must be read out:

- Connect vehicle diagnostic tester, switch on ignition and select Replace engine control module in Guided functions mode.
- Switch off ignition.
- Remove battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery .



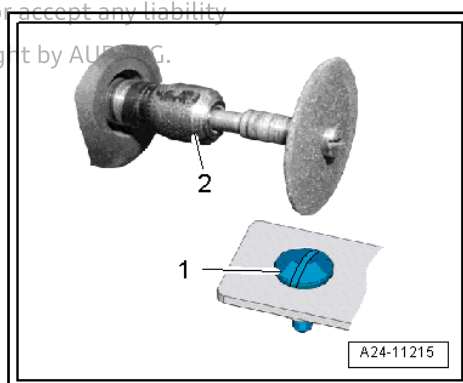
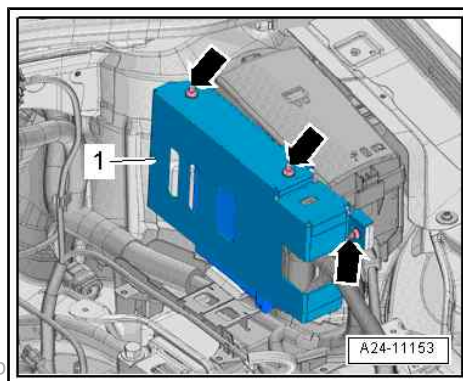
Engine control unit - J623- version with protective housing

To remove protective housing -1-, unscrew shear bolts -arrows- as follows:



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- Make groove (for a screwdriver) in head of shear bolt -1- using a small grinder -2-.

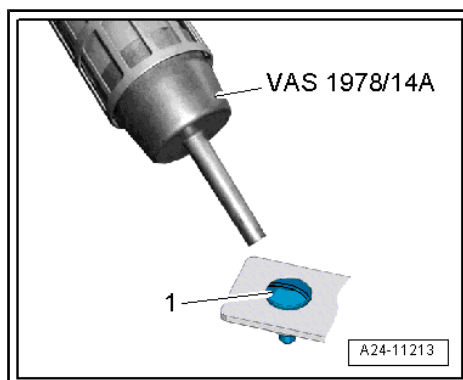
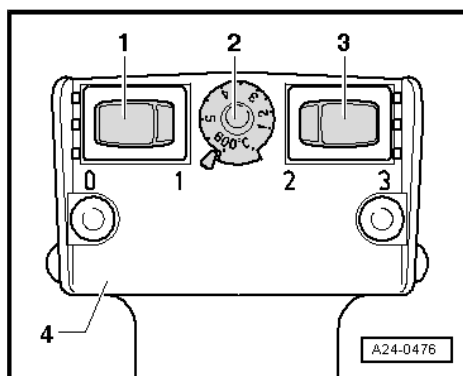


- The threads of the shear bolts are secured with locking fluid. To unscrew these bolts, the threads must be heated with the hot air blower.
- Set potentiometer -2- for temperature adjustment on hot air blower to maximum heating output and set switch -3- for air flow to setting "3".

NOTICE

Risk of damage to surrounding components caused by hot air blower (overheating).

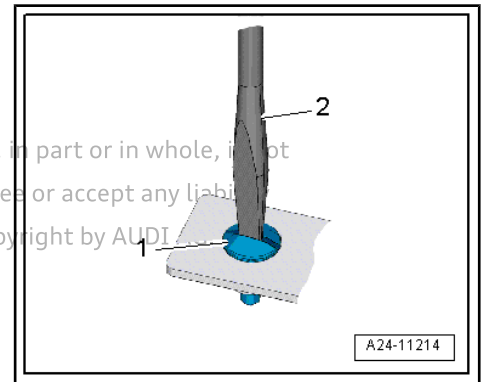
- Cover surrounding components if necessary.
- Heat head of shear bolt -1- for 20 to 30 seconds.





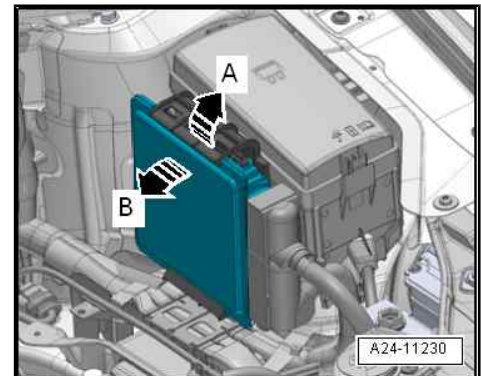
- Unscrew shear bolt -1- using screwdriver -2-.
- Detach protective housing from engine control unit - J623- .

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All versions (continued)

- Release retainer -arrow A- and take out engine control unit - J623- -arrow B-.
- Release and unplug connectors for engine control unit - J623- .



Installing

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

- Insert engine control unit - J623- -item 1- bottom edge first into bracket -2- -arrow A- and lock at top edge.
- Lugs on engine control unit must engage in notches at top and bottom of bracket -arrows B-.

Engine control unit - J623- version with protective housing

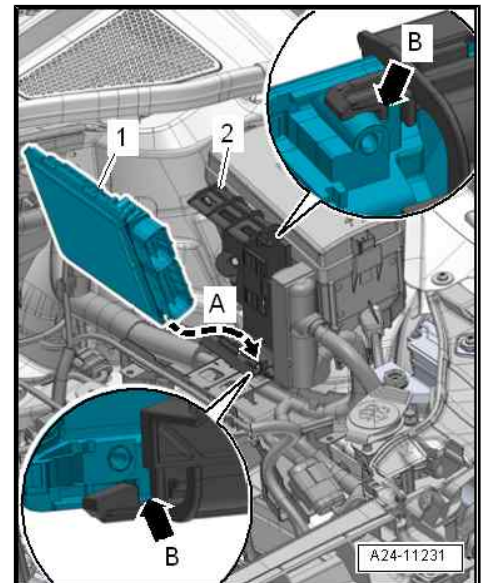
- Make sure you fit protective housing back on engine control unit - J623- .
- Clean threaded holes for shear bolts to remove any residue from locking fluid. This can be done using a thread tap.
- Always use new shear bolts.

All versions (continued)

- Install battery ➤ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery .

After installing a new engine control unit:

- Activate engine control unit ➤ Vehicle diagnostic tester, Guided Functions, Replace engine control unit.





26 – Exhaust system

1 Exhaust pipes/silencers

- ⇒ [“1.1 Exploded view - silencers”, page 306](#)
- ⇒ [“1.2 Removing and installing silencers”, page 309](#)
- ⇒ [“1.3 Installation position of clamp”, page 312](#)
- ⇒ [“1.4 Separating exhaust pipes/silencers”, page 313](#)
- ⇒ [“1.5 Stress-free alignment of exhaust system”, page 314](#)
- ⇒ [“1.6 Checking exhaust system for leaks”, page 315](#)

1.1 Exploded view - silencers

- ⇒ [“1.1.1 Exploded view - silencers, Audi A1 2011►”, page 306](#)
- ⇒ [“1.1.2 Exploded view - silencers, Audi A1 2018►”, page 308](#)

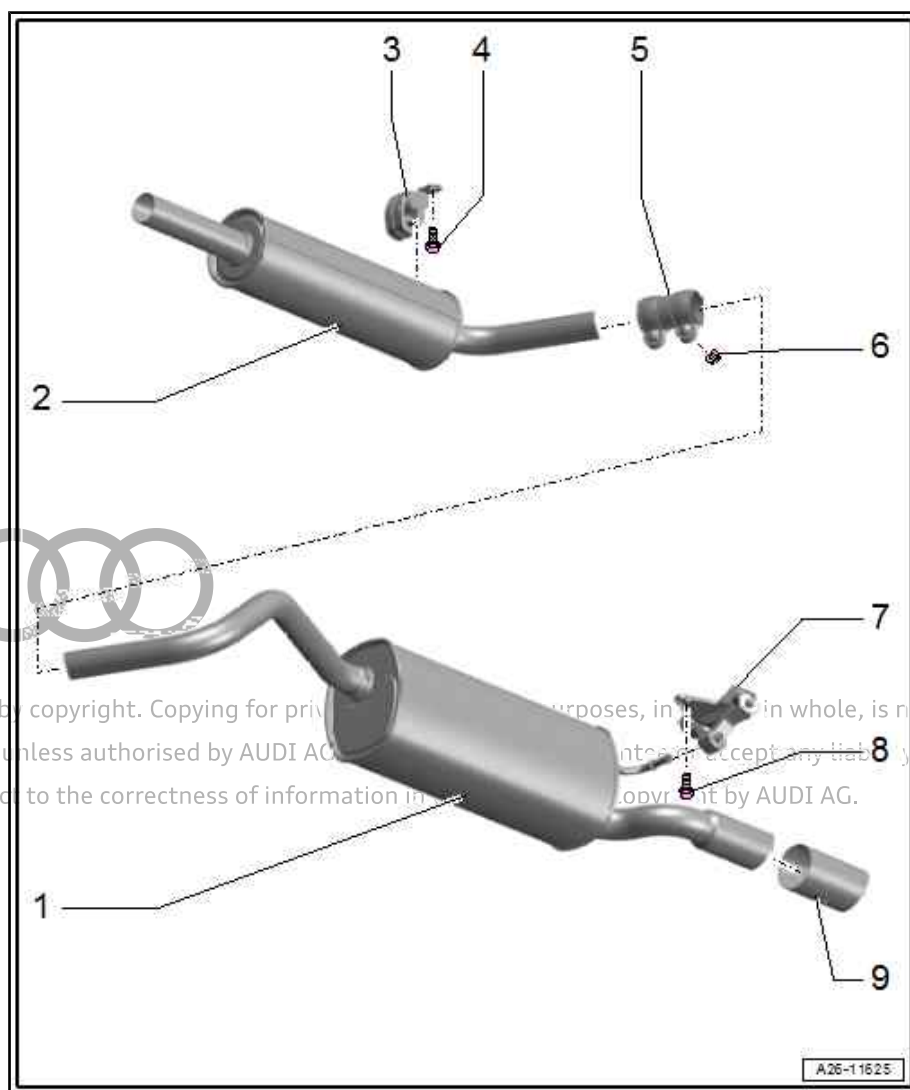
1.1.1 Exploded view - silencers, Audi A1 2011►

1 - Rear silencer

- ❑ Combined in one unit with centre silencer as original equipment. Can be renewed separately for repair purposes
- ❑ Removing and installing
⇒ [“1.2 Removing and installing silencers”, page 309](#)
- ❑ Disconnecting exhaust pipes/silencers
⇒ [“1.4 Separating exhaust pipes/silencers”, page 313](#)
- ❑ Align exhaust system so it is free of stress
⇒ [“1.5 Stress-free alignment of exhaust system”, page 314](#)

2 - Centre silencer

- ❑ Combined in one unit with rear silencer as original equipment. Can be renewed separately for repair purposes
- ❑ Removing and installing
⇒ [“1.2 Removing and installing silencers”, page 309](#)
- ❑ Disconnecting exhaust pipes/silencers
⇒ [“1.4 Separating exhaust pipes/silencers”, page 313](#)
- ❑ Align exhaust system so it is free of stress
⇒ [“1.5 Stress-free alignment of exhaust system”, page 314](#)





3 - Rubber mounting

- ☐ Renew if damaged

4 - Bolt

- ☐ 23 Nm

5 - Clamp (rear)

- ☐ Before tightening, align exhaust system so it is free of stress
⇒ [“1.5 Stress-free alignment of exhaust system”, page 314](#)
- ☐ Installation position ⇒ [“1.3 Installation position of clamp”, page 312](#)
- ☐ Tighten bolted connections evenly

6 - Nut

- ☐ 23 Nm

7 - Mounting

- ☐ Renew if damaged

8 - Bolt

- ☐ 23 Nm

9 - Trim

- ☐ For tailpipe
- ☐ Slide onto tailpipe as far as stop

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1.1.2 Exploded view - silencers, Audi A1 2018►

1 - Bolt

- ❑ 20 Nm

2 - Mounting

- ❑ Renew if damaged
- ❑ Check preload
⇒ ["1.5 Stress-free alignment of exhaust system", page 314](#)

3 - Rear silencer

- ❑ Combined in one unit with front silencer and rear silencer as original equipment. Can be renewed separately for repair purposes
- ❑ Removing and installing
⇒ ["1.2 Removing and installing silencers", page 309](#)
- ❑ Disconnecting exhaust pipes/silencers
⇒ ["1.4 Separating exhaust pipes/silencers", page 313](#)
- ❑ Align exhaust system so it is free of stress
⇒ ["1.5 Stress-free alignment of exhaust system", page 314](#)

4 - Clamp

- ❑ For repair purposes
- ❑ Before tightening, align exhaust system so it is free of stress
⇒ ["1.5 Stress-free alignment of exhaust system", page 314](#)
- ❑ Installation position ⇒ ["1.3 Installation position of clamp", page 312](#)
- ❑ Tighten bolted connections evenly
- ❑ Tightening torque ⇒ [Fig. "Tightening torque of clamp", page 309](#)

5 - Front silencer

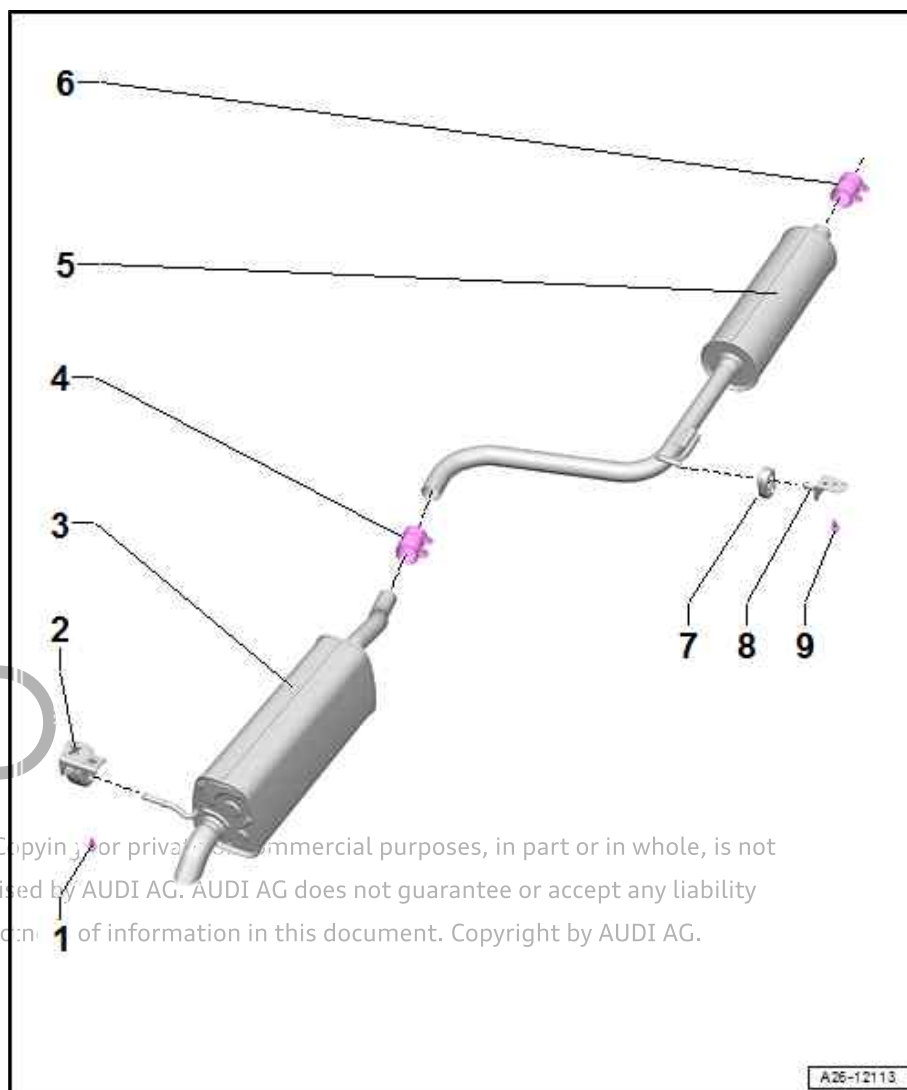
- ❑ Combined in one unit with front silencer and rear silencer as original equipment. Can be renewed separately for repair purposes
- ❑ Removing and installing ⇒ ["1.2 Removing and installing silencers", page 309](#)
- ❑ Disconnecting exhaust pipes/silencers ⇒ ["1.4 Separating exhaust pipes/silencers", page 313](#)
- ❑ Align exhaust system so it is free of stress ⇒ ["1.5 Stress-free alignment of exhaust system", page 314](#)

6 - Clamp

- ❑ Before tightening, align exhaust system so it is free of stress
⇒ ["1.5 Stress-free alignment of exhaust system", page 314](#)
- ❑ Installation position ⇒ ["1.3 Installation position of clamp", page 312](#)
- ❑ Tightening torque ⇒ [Fig. "Tightening torque of clamp", page 309](#)

7 - Rubber mounting

- ❑ Renew if damaged





- ☐ Align exhaust system so it is free of stress ⇒ [“1.5 Stress-free alignment of exhaust system”, page 314](#)

8 - Bracket

- ☐ For rubber mounting

9 - Bolt

- ☐ 20 Nm

Tightening torque of clamp

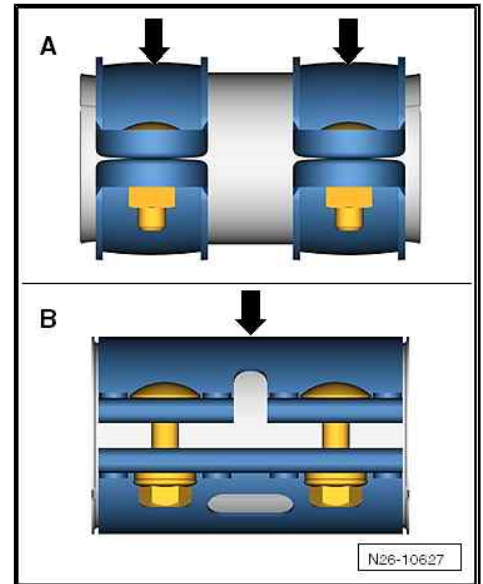
Version A

- ◆ 25 Nm

Version B

- ◆ 30 Nm

Tighten bolted connections evenly.



1.2 Removing and installing silencers

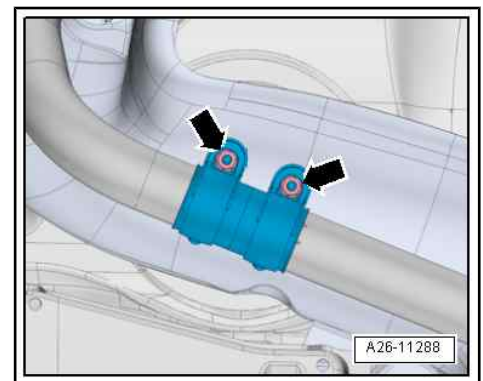
⇒ [“1.2.1 Removing and installing silencers - Audi A1 2011►”, page 309](#)

⇒ [“1.2.2 Removing and installing silencers - Audi A1 2018►”, page 311](#)

1.2.1 Removing and installing silencers - Audi A1 2011►

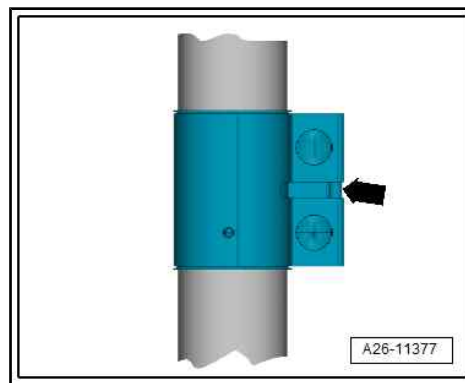
Removing centre silencer

- Remove tunnel cross-piece (rear) ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim; Exploded view - underbody struts.
- Vehicles without connection point: separate exhaust pipe/silencer
⇒ [“1.4 Separating exhaust pipes/silencers”, page 313](#).
- Vehicles with connection point: release clamp -arrows- and push to right side.

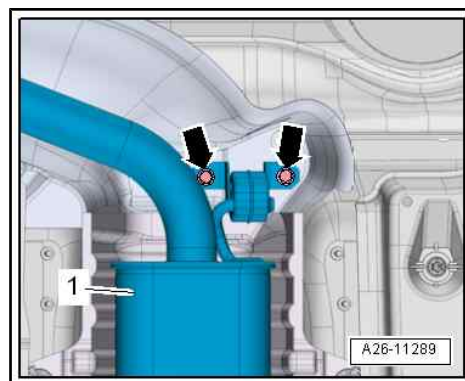




- Loosen clamp -arrow- and push towards rear.

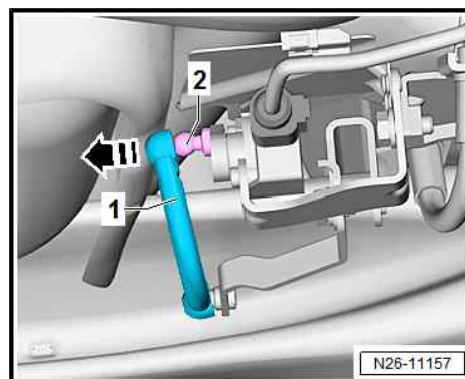


- Remove bolts -arrows- and detach centre silencer -1-.

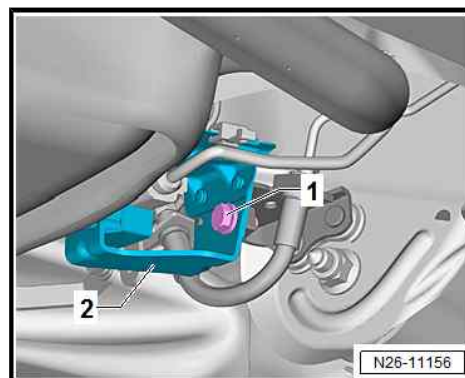


Removing rear silencer

- Press coupling rod of rear left vehicle level sender -G76- off ball stud -2- -arrow-.



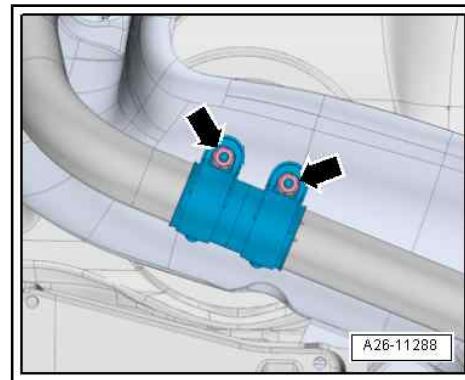
- Remove bolt -1- and press bracket -2- with rear left vehicle level sender - G76- to one side.



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- Vehicles without connection point: separate exhaust pipe/silencer
⇒ [“1.4 Separating exhaust pipes/silencers”, page 313](#) .
- Vehicles with connection point: release clamp -arrows- and push to right side.



- Unscrew bolts -1- and detach rear silencer -2-.

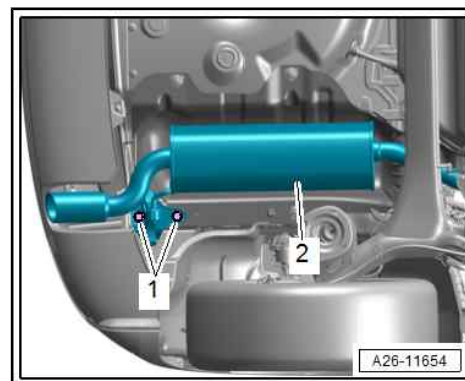
Installing

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

- Align the exhaust system so it is free of stress
⇒ [“1.5 Stress-free alignment of exhaust system”, page 314](#) .

Tightening torques

- ◆ ⇒ [“1.1 Exploded view - silencers”, page 306](#)
- ◆ ⇒ [“2.1 Exploded view - emission control system”, page 316](#)
- ◆ ⇒ Running gear, axles, steering; Rep. gr. 43 ; Vehicle level sender; Exploded view - rear vehicle level sender
- ◆ Tunnel cross-piece ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim; Exploded view - underbody struts



1.2.2 Removing and installing silencers - Audi A1 2018➤

Removing

- Vehicles without connection point: Separate front silencer/centre silencer
⇒ [“1.4 Separating exhaust pipes/silencers”, page 313](#) .
- Remove underbody trim (rear left) ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim; Overview of fitting locations - underbody trim .

CAUTION

Risk of accident caused by weight of silencers.

- Perform the following work with the assistance of a second mechanic.



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Rear silencer:

- Vehicles with connection point: Release clamp -1- and push towards front.
- Remove bolt -arrow-.
- Remove rear silencer.

Front silencer:

- Remove tunnel cross-piece (rear) ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim; Exploded view - underbody struts .
- Remove underbody trim for tunnel ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim; Exploded view - underbody trim .



- Vehicles with connection point: Release clamp -1- and push towards front.
- Release clamp -4- and push to rear.
- Remove bolt -3-.
- Detach front silencer -2-.

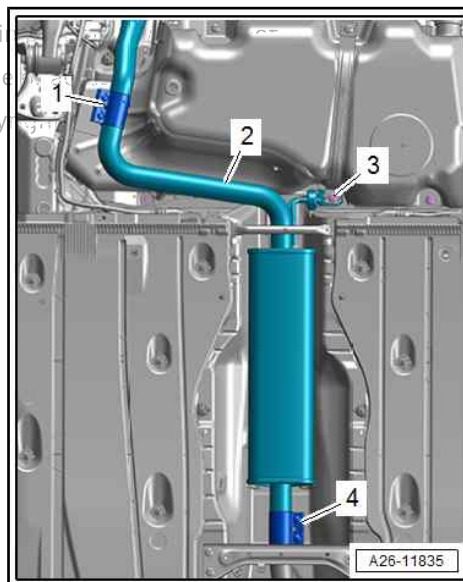
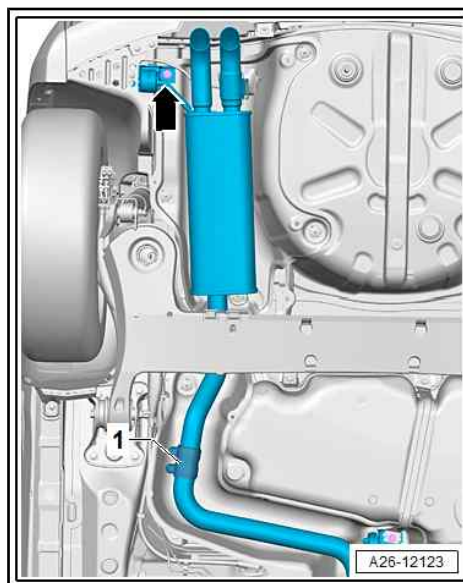
Installing

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

- Align the exhaust system so it is free of stress
⇒ ["1.5 Stress-free alignment of exhaust system", page 314](#) .

Tightening torques

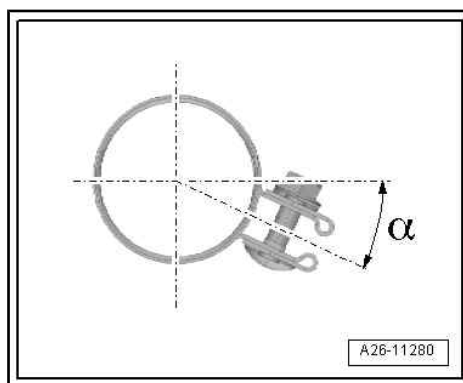
- ♦ ⇒ ["1.1 Exploded view - silencers", page 306](#)
- ♦ ⇒ ["2.1 Exploded view - emission control system", page 316](#)
- ♦ Tunnel cross-piece ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim; Exploded view - underbody struts



1.3 Installation position of clamp

Installation position of front clamp

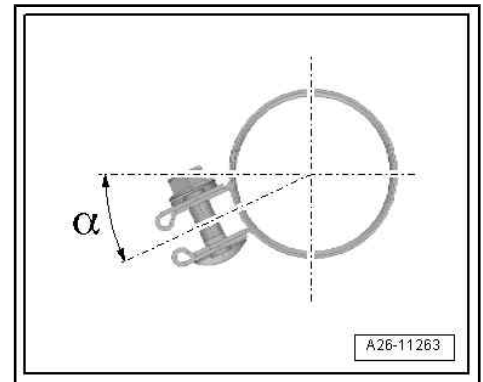
- Fit clamp in position shown.
- Angle - α - = approx. 20°
- Bolted connection facing towards right
- Nuts facing upwards





Installation position of rear clamp

- Fit clamp in position shown.
- Angle α = approx. 20°
- Bolt connections face to rear.
- Nuts facing upwards



1.4 Separating exhaust pipes/silencers

⇒ ["1.4.1 Separating exhaust pipes/silencers - Audi A1 2011►", page 313](#)

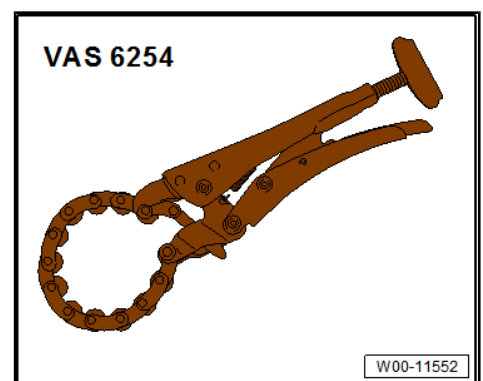
⇒ ["1.4.2 Separating exhaust pipes/silencers - Audi A1 2018►", page 313](#)

1.4.1 Separating exhaust pipes/silencers - Audi A1 2011►

- ◆ The connecting pipe can be cut through at the cutting location in order to renew the centre and rear silencers separately.
- ◆ The cutting point is marked by an indentation on the circumference of the exhaust pipe.

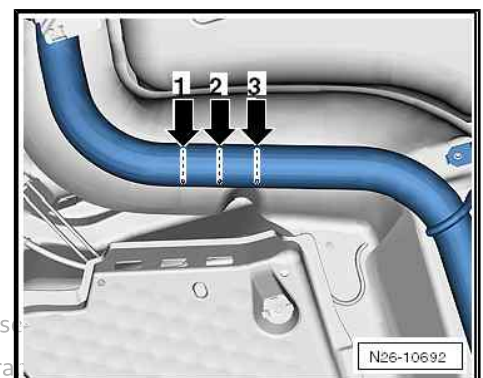
Special tools and workshop equipment required

- ◆ Chain pipe cutter - VAS 6254-



Procedure

- Cut through exhaust pipe at right angles at the position marked -arrow 2- using chain pipe cutter - VAS 6254- .
- Position clamp centrally at side marks -arrows 1, 3- when installing.
- Fit rear clamp
⇒ ["1.3 Installation position of clamp", page 312](#) .
- Align the exhaust system so it is free of stress
⇒ ["1.5 Stress-free alignment of exhaust system", page 314](#)



1.4.2 Separating exhaust pipes/silencers - Audi A1 2018►

- ◆ The connecting pipe can be cut through at the cutting point in order to renew the front or rear silencer separately.

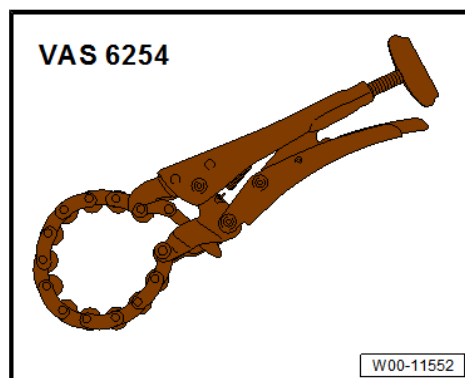
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- ◆ The cutting point is marked by indentations on the circumference of the exhaust pipe.

Special tools and workshop equipment required

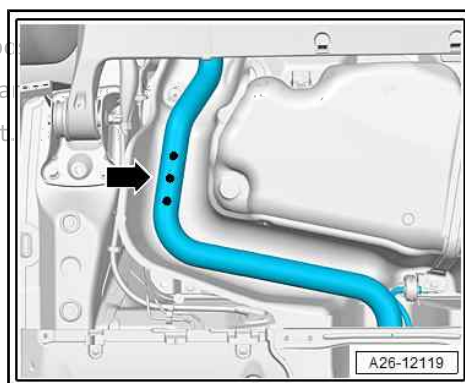
- ◆ Chain pipe cutter - VAS 6254-



Procedure

- Cut through exhaust pipe at right angles at the position marked -arrow- using chain pipe cutter - VAS 6254-.

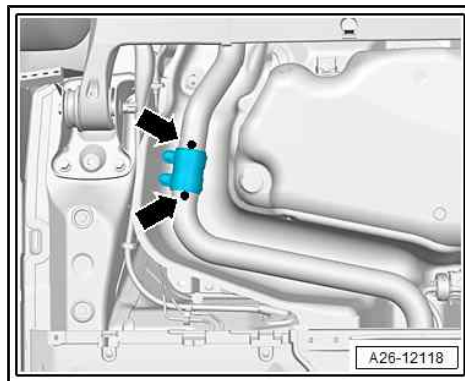
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- Position clamp centrally at side marks -arrows- when installing.
- Fit rear clamp
⇒ ["1.3 Installation position of clamp", page 312](#) .
- Align the exhaust system so it is free of stress
⇒ ["1.5 Stress-free alignment of exhaust system", page 314](#) .

Tightening torques

- ◆ ⇒ ["1.1 Exploded view - silencers", page 306](#)



1.5 Stress-free alignment of exhaust system

Procedure

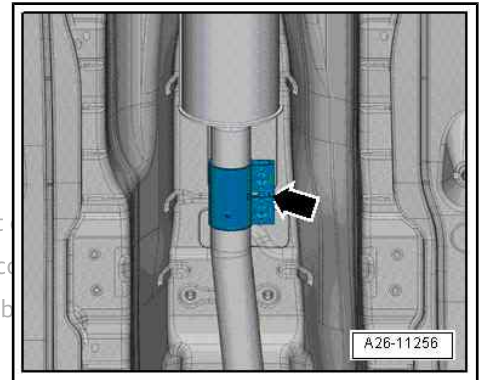
- The exhaust system must be aligned when it is cool.



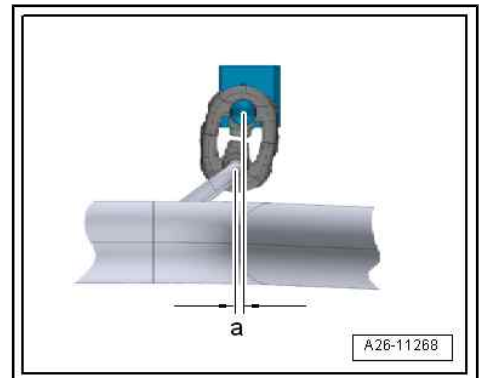
- Loosen bolt connections for front clamp -arrow-.



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- Push exhaust system towards front of vehicle until preloading at mounting for exhaust pipe -a- = 5 mm.
- Fit front clamp
⇒ ["1.3 Installation position of clamp", page 312](#) .

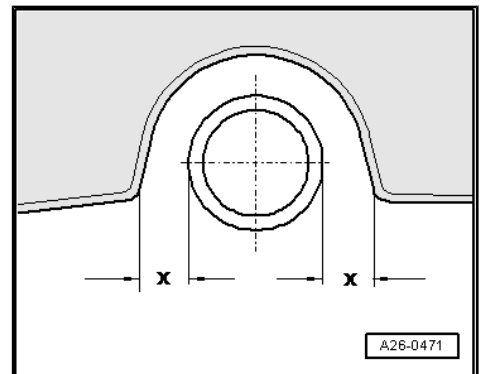


Aligning tailpipes

- Adjust rear silencer so that there is an even distance between bumper cut-out and tailpipes.
- -x- = -x-
- Unfasten rear silencer mounting to align tailpipes.

Tightening torques

- ◆ ⇒ ["2.1 Exploded view - emission control system", page 316](#)



1.6 Checking exhaust system for leaks

Procedure

- Start the engine and run at idling speed.
- Plug tailpipes during leak test (e.g. with cloth or plug).
- Listen for noise at the connection points of cylinder head/exhaust manifold, turbocharger/front exhaust pipe etc. to locate any leaks.
- Rectify any leaks that are found.



2 Emission control system

⇒ [“2.1 Exploded view - emission control system”, page 316](#)

⇒ [“2.2 Removing and installing catalytic converter”, page 320](#)

⇒ [“2.3 Removing and installing particulate filter”, page 325](#)

2.1 Exploded view - emission control system

⇒ [“2.1.1 Exploded view - emission control system, Audi A1 2011►”, page 316](#)

⇒ [“2.1.2 Exploded view - emission control system, Audi A1 2018►”, page 318](#)

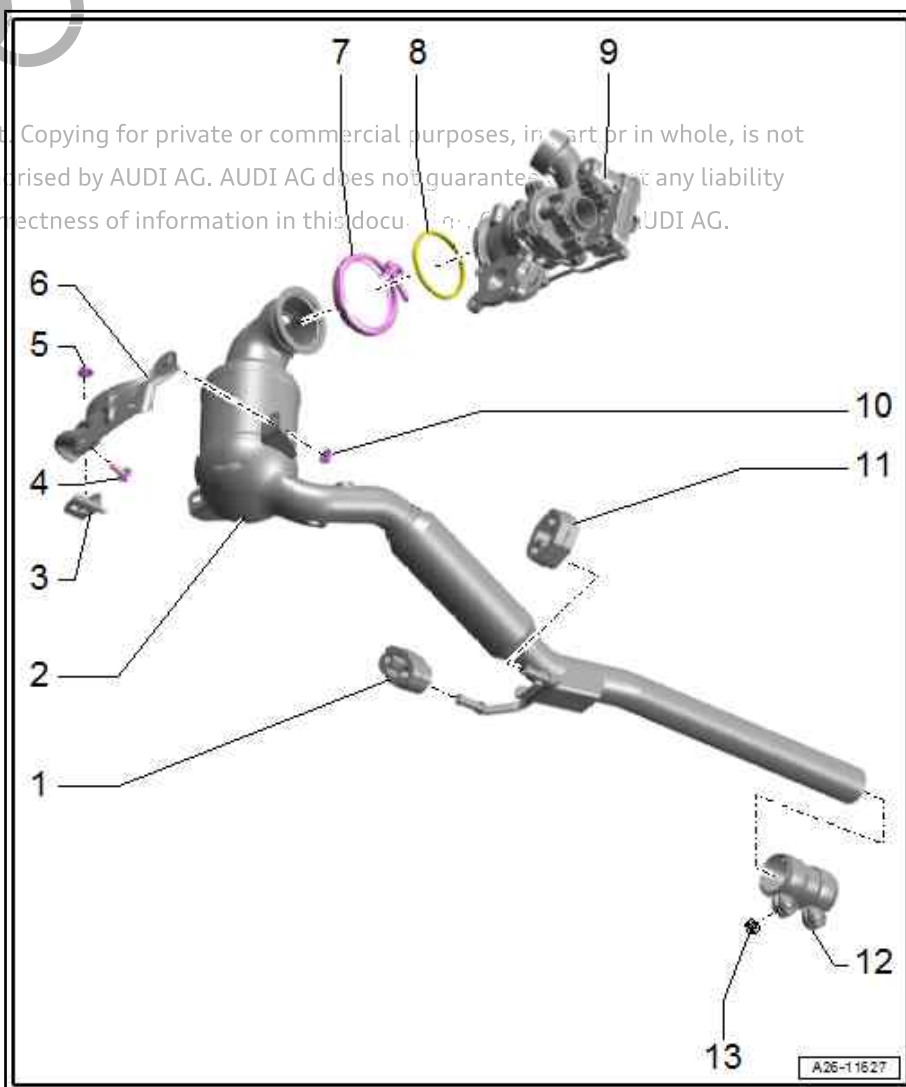
2.1.1 Exploded view - emission control system, Audi A1 2011►

1 - Rubber mounting

- ❑ Renew if damaged

2 - Front exhaust pipe with catalytic converter

- ❑ On vehicles with particulate filter, particulate filter and front exhaust pipe with catalytic converter are one unit
- ❑ Do not bend flexible joint more than 10° - otherwise it can be damaged
- ❑ Install flexible joint so that it is not under tension.
- ❑ Take care not to damage wire mesh on flexible joint
- ❑ Protect catalytic converter from damage by knocks and impact
- ❑ Removing and installing
⇒ [“2.2 Removing and installing catalytic converter”, page 320](#)
- ❑ Do not remove protective packaging from replacement part until you are ready to fit the flexible joint
- ❑ Align exhaust system so it is free of stress
⇒ [“1.5 Stress-free alignment of exhaust system”, page 314](#)
- ❑ If a particulate filter is fitted, learnt values must be re-adapted after renewal using ⇒ Vehicle diagnostic tester via [Guided Engine Functions](#), [Adapt particulate filter adaptation values](#).



3 - Bracket

4 - Bolt

- ❑ 20 Nm



5 - Nut

- ☐ Tightening torque and sequence
⇒ Fig. ““Installing catalytic converter - tightening torque and sequence””, page 317

6 - Bracket

7 - Screw-type clip

- ☐ Tightening torque and sequence
⇒ Fig. ““Installing catalytic converter - tightening torque and sequence””, page 317

8 - Seal

- ☐ Renew after removing

9 - Turbocharger

10 - Nut

- ☐ Tightening torque and sequence
⇒ Fig. ““Installing catalytic converter - tightening torque and sequence””, page 317

11 - Rubber mounting

- ☐ Renew if damaged

12 - Clamp (front)

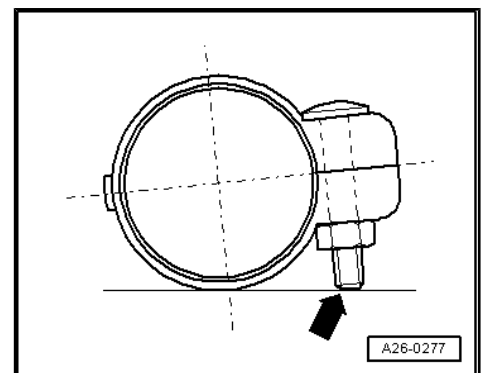
- ☐ Before tightening, align exhaust system so it is free of stress
⇒ “1.5 Stress-free alignment of exhaust system”, page 314
- ☐ Installation position ⇒ Fig. ““Installation position of front clamp””, page 317
- ☐ Tighten bolted connections evenly

13 - Nut

- ☐ 30 Nm

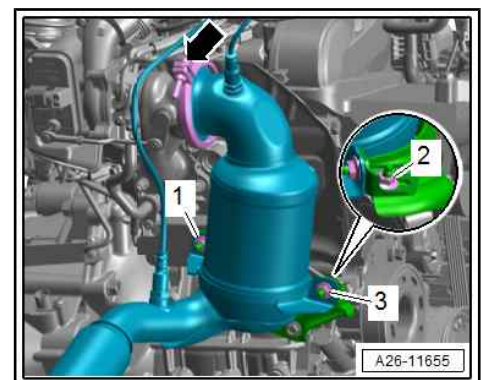
Installation position of front clamp

- Install clamp so that ends of bolts do not protrude beyond bottom of clamp -arrow-.
- Bolted connection facing towards right
- Tighten bolted connections evenly.



Installing catalytic converter - tightening torque and sequence

1.	– Fit catalytic converter to turbocharger, attach screw-type clip -arrow- without tightening	
2.	– Fit nuts -1, 2, 3- by hand without tightening	• It must still be possible to move catalytic converter and bracket
3.	– Tighten screw-type clip -arrow-	15 Nm
4.	– Tighten nuts in the sequence -1, 2, 3-	20 Nm

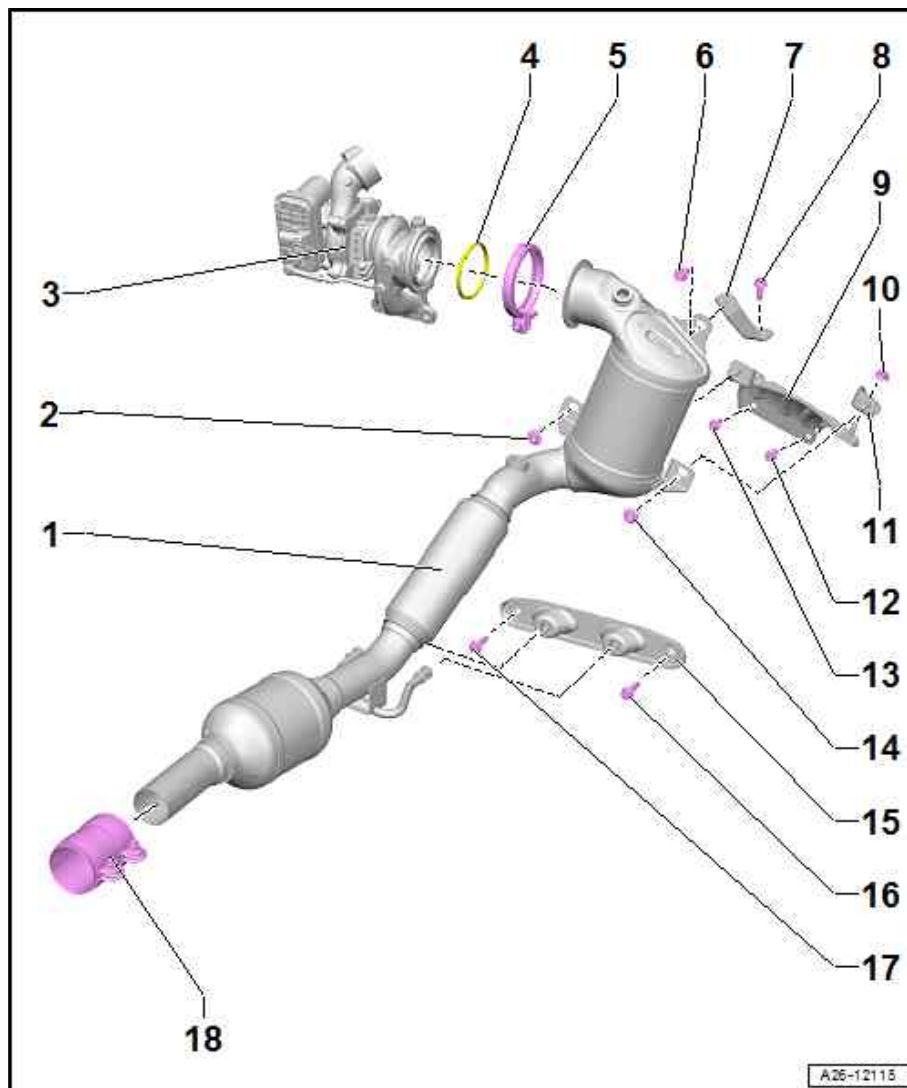




2.1.2 Exploded view - emission control system, Audi A1 2018➤

1 - Front exhaust pipe

- ☐ On vehicles with particulate filter, particulate filter and front exhaust pipe with catalytic converter are one unit
- ☐ Do not bend flexible joint more than 10° - otherwise it can be damaged.
- ☐ Install flexible joint so that it is not under tension.
- ☐ Take care not to damage wire mesh on flexible joint.
- ☐ Protect catalytic converter from damage by knocks and impact
- ☐ Removing and installing ⇒ ["2.2 Removing and installing catalytic converter", page 320](#)
- ☐ Do not remove protective packaging from replacement part until you are ready to fit the flexible joint
- ☐ Align exhaust system so it is free of stress
⇒ ["1.5 Stress-free alignment of exhaust system", page 314](#)
- ☐ If a particulate filter is fitted, learnt values must be re-adapted after renewal using ⇒ Vehicle diagnostic tester via [Guided Engine Functions](#), [Adapt particulate filter adaptation values](#).



2 - Nut

- ☐ Tightening torque and sequence
⇒ [Fig. "Installing catalytic converter - tightening torque and sequence", page 320](#)

3 - Turbocharger

- ☐ Exploded view ⇒ ["1.1 Exploded view - turbocharger", page 235](#)
- ☐ Removing and installing ⇒ ["1.2 Removing and installing turbocharger", page 238](#)

4 - Seal

- ☐ Renew after removing
- ☐ Removing and installing ⇒ [page 243](#)

5 - Screw-type clip

- ☐ Renew after removing
- ☐ Tightening torque and sequence
⇒ [Fig. "Installing catalytic converter - tightening torque and sequence", page 320](#)

6 - Bolt

- ☐ Tightening torque and sequence
⇒ [Fig. "Installing catalytic converter - tightening torque and sequence", page 320](#)



7 - Bracket

8 - Bolt

- ☐ Tightening torque and sequence

⇒ [Fig. "Installing catalytic converter - tightening torque and sequence"](#) , page 320

9 - Bracket

10 - Nut

- ☐ Tightening torque and sequence

⇒ [Fig. "Installing catalytic converter - tightening torque and sequence"](#) , page 320

11 - Bracket

12 - Bolt

- ☐ 20 Nm

13 - Bolt

- ☐ 20 Nm

14 - Nut

- ☐ Tightening torque and sequence

⇒ [Fig. "Installing catalytic converter - tightening torque and sequence"](#) , page 320

15 - Bracket

- ☐ Renew if damaged

16 - Bolt

- ☐ 20 Nm

17 - Bolt

- ☐ 20 Nm

18 - Clamp

- ☐ Before tightening, align exhaust system so it is free of stress

⇒ ["1.5 Stress-free alignment of exhaust system"](#) , page 314

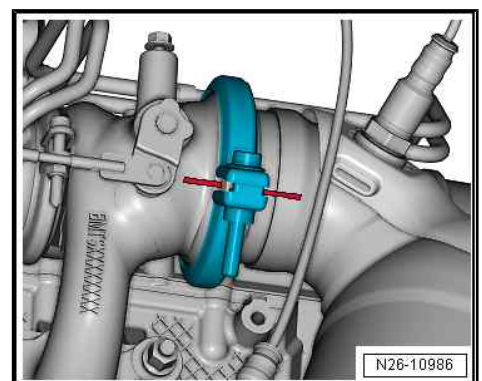
- ☐ Installation position ⇒ ["1.3 Installation position of clamp"](#) , page 312

- ☐ Tighten bolted connections evenly

- ☐ Tightening torque ⇒ ["1.1 Exploded view - silencers"](#) , page 306

Positioning of clip

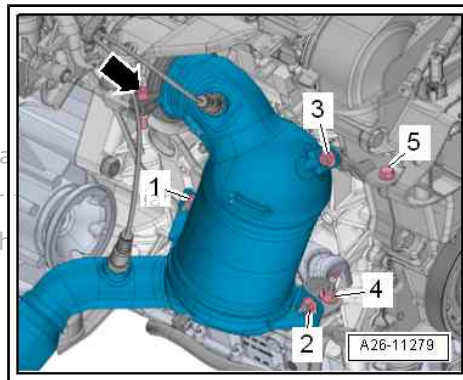
- Before releasing the connecting clip between the catalytic converter and the turbocharger, the position of the clip
⇒ [Fig. "Positioning of clip"](#) , page 319 must be marked!
- A marking must be made on the component located opposite, depending on the component to be renewed.
- Position clip in the same position again.
- Mark installation position of turbocharger and catalytic converter as shown.
- If new parts are installed, markings must be transferred.





Installing catalytic converter - tightening torque and sequence

1.	– Fit catalytic converter to turbocharger, attach new screw-type clip -arrow- without tightening it	
2.	– Loosely screw in bolts 3, 5 and bolts -1, 2, 4- by hand	• It must still be possible to move catalytic converter and bracket
3.	– Tighten screw-type clip -arrow-	15 Nm
4.	– Tighten bolts and nuts in the sequence -1 ... 5-	20 Nm



2.2 Removing and installing catalytic converter

⇒ [“2.2.1 Removing and installing catalytic converter - Audi A1 2011►”, page 320](#)

⇒ [“2.2.2 Removing and installing catalytic converter - Audi A1 2018►”, page 322](#)

2.2.1 Removing and installing catalytic converter - Audi A1 2011►

- The catalytic converter is removed together with the front exhaust pipe.
- On vehicles with particulate filter, particulate filter and front exhaust pipe with catalytic converter are one unit.

Special tools and workshop equipment required

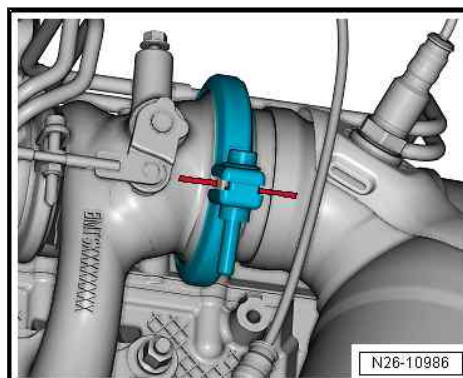
- ◆ High-temperature paste ⇒ Electronic parts catalogue

Removing

- Re-install all cable ties in original positions.

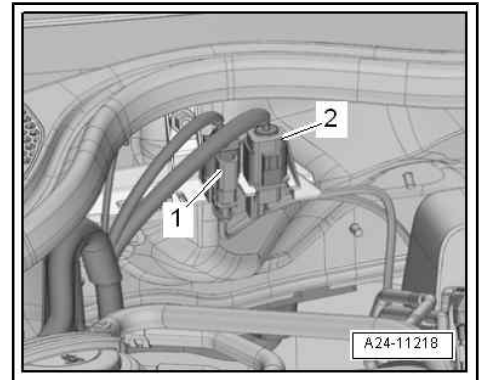
Positioning of clip

- The installation position of the clip varies depending on the vehicle.
 - Before releasing the connecting clip between the catalytic converter and the turbocharger, the position of the clip must be marked!
 - The marking must be made on the component opposite the one which may need to be renewed.
 - The clip must be installed in the same position when performing re-installation.
- Mark installation position of clip.

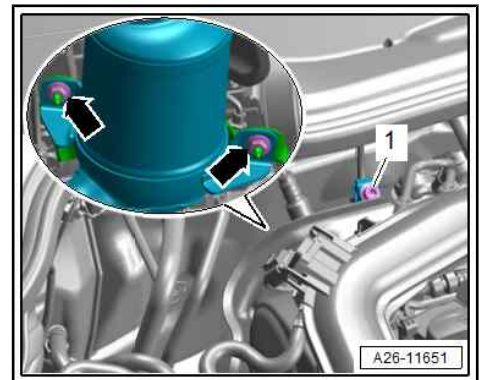




- Detach electrical connectors -1, 2- from bracket, unplug connectors and move electrical wiring clear.

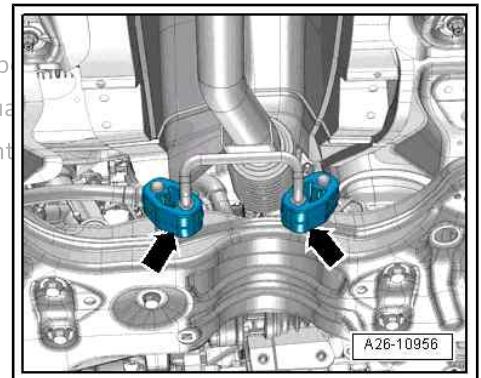


- Open screw-type clip -1- and place it on intake funnel of catalytic converter.
- Remove nuts -arrows-.
- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Remove tunnel cross-piece (front) ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim; Exploded view - underbody struts .
- Unfasten underbody trim panels (both sides) by unscrewing nuts on inside ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim; Overview of fitting locations - underbody trim .

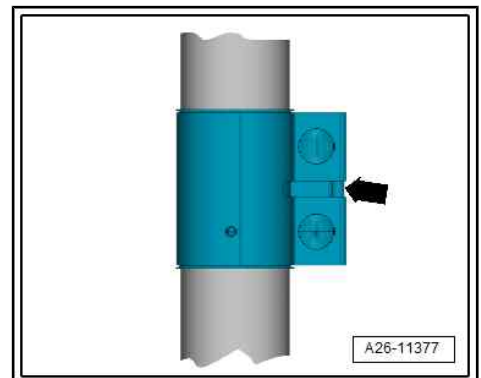


- Detach catalytic converter with front exhaust pipe from rubber mountings -arrows-.

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- Loosen clamp -arrow- and push towards rear.
- Remove heat shield (front) ⇒ General body repairs, exterior; Rep. gr. 66 ; Strips / trim panels / extensions; Exploded view - heat shield .
- Detach catalytic converter with front exhaust pipe.

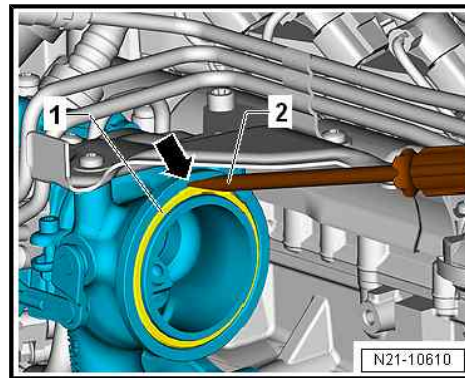




Installing

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

- Renew gasket and self-locking nuts after removal.
- Lubricate exhaust manifold studs with high-temperature paste; for high-temperature paste refer to ⇒ Electronic parts catalogue .
- The electrical wiring of the lambda probe must be secured at the original locations when installing. The wiring must NOT come into contact with the exhaust pipe.
- Insert screwdriver -2- into groove -arrow- on turbocharger and lever out seal -1-.
- Note positioning of clip ⇒ [page 320](#) .
- Align the exhaust system so it is free of stress
⇒ [“1.5 Stress-free alignment of exhaust system”, page 314](#) .



Vehicles with particulate filter:

- If the particulate filter has been renewed, the ash deposit volume must be reset using ⇒ Vehicle diagnostic tester.

◆ [Guided Engine Functions](#)

◆ [Adapt particulate filter adaptation values](#)

Tightening torques

- ◆ ⇒ [Fig. “Installing catalytic converter - tightening torque and sequence”](#) , [page 317](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim; Exploded view - underbody trim
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Strips / trim panels / extensions; Exploded view - heat shield

2.2.2 Removing and installing catalytic converter - Audi A1 2018➤

- The catalytic converter is removed together with the front exhaust pipe.
- On vehicles with particulate filter, particulate filter and front exhaust pipe with catalytic converter are one unit.

Special tools and workshop equipment required

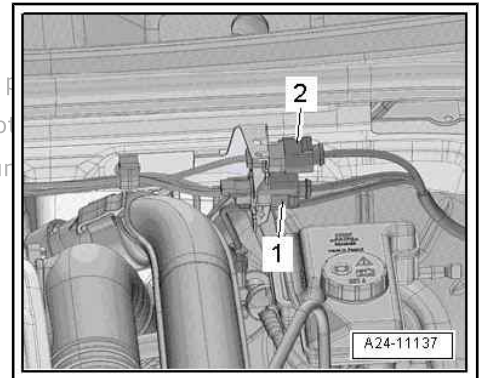
- ◆ High-temperature paste ⇒ [Electronic parts catalogue](#)
- Re-install all cable ties in original positions.



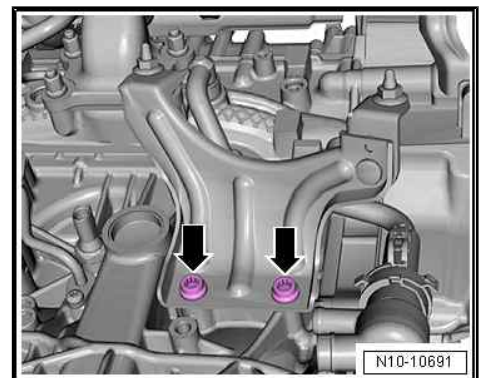
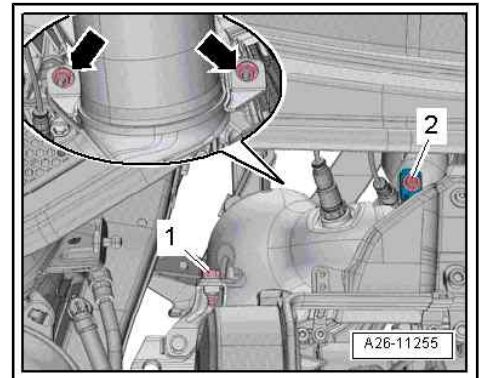
Removing

- Detach electrical connectors -1 and 2- from bracket, unplug and move electrical wiring clear.

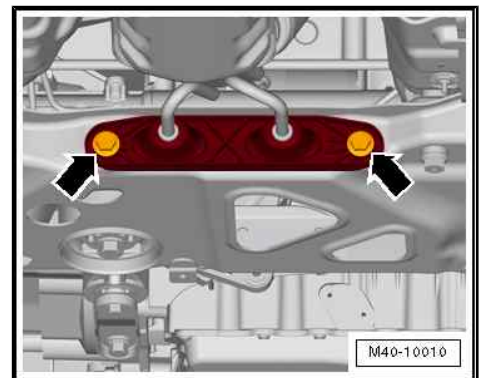
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- Mark installation position of screw-type clip -2- between turbocharger and catalytic converter
⇒ Fig. “Positioning of clip”, page 319 .
- Release and remove screw-type clip -2-.
- Remove bolt -1-.
- Remove nuts -arrows-.
- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation .
- Remove underbody trim for tunnel ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim; Exploded view - underbody trim .
- Remove heat shield for drive shaft ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Removing and installing heat shield for drive shaft .
- Remove bolts -arrows- from bracket.
- Remove bracket.



- Remove bolts -arrows-.



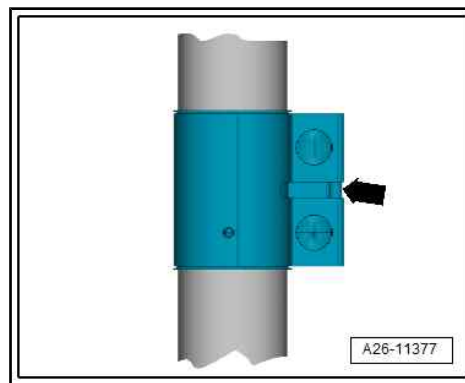


- Loosen clamp -arrow- and push towards rear.
- Guide out catalytic converter. To do so, turn catalytic converter with front exhaust pipe accordingly.

Installing

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

- Lubricate studs and bolts for catalytic converter with high-temperature paste ⇒ Electronic parts catalogue .
- Pry out and renew seal between turbocharger and catalytic converter ⇒ [page 243](#) .
- Position catalytic converter on turbocharger and engine ⇒ [Fig. “Installing catalytic converter - tightening torque and sequence”](#) , [page 320](#) .
- Renew screw-type clip between turbocharger and catalytic converter ⇒ [Item 5 \(page 318\)](#) .
- Install screw-type clip between turbocharger and catalytic converter in installation position marked previously ⇒ [Fig. “Positioning of clip”](#) , [page 319](#) .
- Align the exhaust system so it is free of stress ⇒ [“1.5 Stress-free alignment of exhaust system”](#) , [page 314](#) .



Vehicles with particulate filter:

- If the particulate filter has been renewed, the ash deposit volume must be reset using ⇒ Vehicle diagnostic tester.

◆ [Guided Engine Functions](#)

◆ [Adapt particulate filter adaptation values](#)

Tightening torques

- ◆ ⇒ [Fig. “Installing catalytic converter - tightening torque and sequence”](#) , [page 320](#)
- ◆ ⇒ [“2.1 Exploded view - emission control system”](#) , [page 316](#)
- ◆ ⇒ [“1.1 Exploded view - turbocharger”](#) , [page 235](#)
- ◆ ⇒ [“7.1 Exploded view - Lambda probe”](#) , [page 295](#)
- ◆ ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Removing and installing heat shield for drive shaft
- ◆ ⇒ Rear final drive; Rep. gr. 39 ; Propshaft; Removing and installing propshaft
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim; Exploded view - underbody trim

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2.3 Removing and installing particulate filter



Note

- ◆ *On vehicles with particulate filter, particulate filter and front exhaust pipe with catalytic converter are one unit.*
- ◆ *The removal and installation procedures for the particulate filter are the same as the removal and installation procedures for the catalytic converter. Consequently, only the removal and installation procedures for the catalytic converter are described here
⇒ ["2.2 Removing and installing catalytic converter", page 320](#).*
- ◆ *If the particulate filter has been renewed, the ash deposit volume must be reset using ⇒ Vehicle diagnostic tester.*





28 – Ignition system

1 Ignition system

⇒ [“1.1 Exploded view - ignition system”, page 326](#)

⇒ [“1.2 Removing and installing ignition coils with output stages”, page 327](#)

⇒ [“1.3 Removing and installing knock sensor 1 G61”, page 330](#)

⇒ [“1.4 Removing and installing Hall senders”, page 331](#)

⇒ [“1.5 Removing and installing engine speed sender G28”, page 332](#)

1.1 Exploded view - ignition system

1 - Spark plug

- ☐ Remove and install with spark plug socket and extension - 3122 B-
⇒ Maintenance ; Book-let 819
- ☐ Change interval ⇒ Maintenance tables
- ☐ Tightening torque
⇒ Maintenance ; Book-let 819

2 - Ignition coil with output stage

- ◆ Ignition coil 1 with output stage - N70-
- ◆ Ignition coil 2 with output stage - N127-
- ◆ Ignition coil 3 with output stage - N291-
- ☐ Removing and installing
⇒ [“1.2 Removing and installing ignition coils with output stages”, page 327](#)

3 - Bolt

- ☐ 8 Nm

4 - Knock sensor 1 - G61-

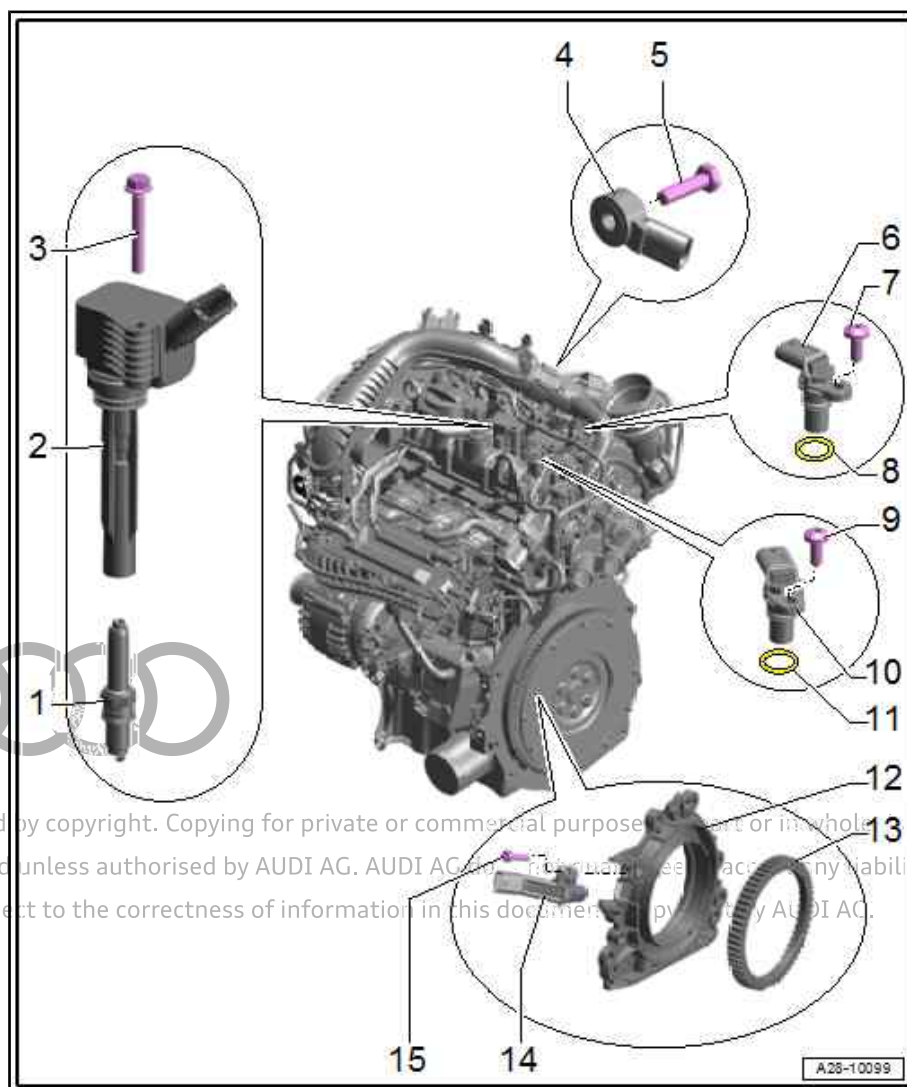
- ☐ Removing and installing
⇒ [“1.3 Removing and installing knock sensor 1 G61”, page 330](#)

5 - Bolt

- ☐ Tightening torque influences the function of the knock sensor
- ☐ 20 Nm

6 - Hall sender 2 - G163-

- ☐ Camshaft position sensor



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- ❑ Removing and installing ⇒ [“1.4 Removing and installing Hall senders”, page 331](#)

7 - Bolt

- ❑ 8 Nm

8 - O-ring

- ❑ Renew if damaged

9 - Bolt

- ❑ 8 Nm

10 - Hall sender - G40-

- ❑ Camshaft position sensor
- ❑ Removing and installing ⇒ [“1.4 Removing and installing Hall senders”, page 331](#)

11 - O-ring

- ❑ Renew if damaged

12 - Sealing flange (gearbox end)

- ❑ Removing and installing ⇒ [“2.3 Removing and installing sealing flange \(gearbox end\)”, page 66](#)

13 - Sender wheel

- ❑ For engine speed sender - G28-
- ❑ Removing and installing ⇒ [“2.3 Removing and installing sealing flange \(gearbox end\)”, page 66](#)

14 - Engine speed sender - G28-

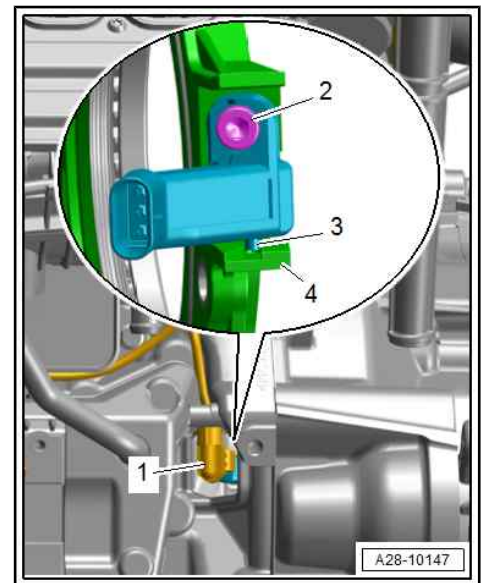
- ❑ Removing and installing ⇒ [“1.5 Removing and installing engine speed sender G28 ”, page 332](#)
- ❑ Note installation position ⇒ [page 327](#)

15 - Bolt

- ❑ 4.5 Nm

Installation position of engine speed sender - G28- :

- Lug -3- must be seated in guide on sealing flange -4-, as shown in illustration.



1.2 Removing and installing ignition coils with output stages

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◆ Release tool - T10527-



◆ Puller - T10530-



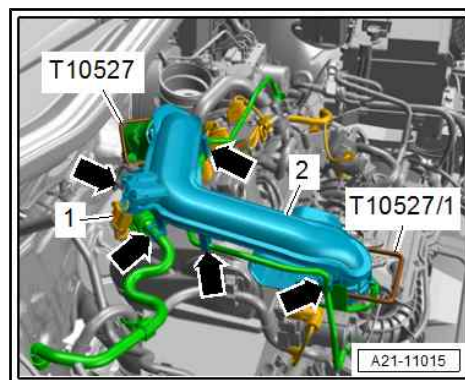
Removing

Ignition coils (cylinders 2 and 3):

- Remove air cleaner housing
⇒ [“2.2 Removing and installing air cleaner housing”, page 265](#).

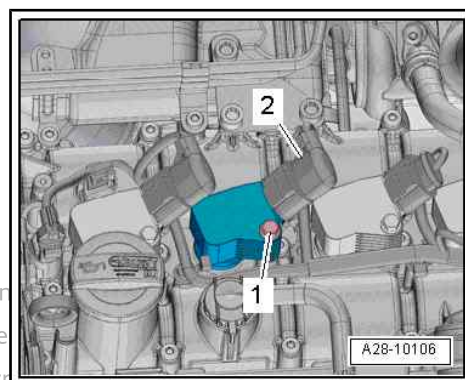
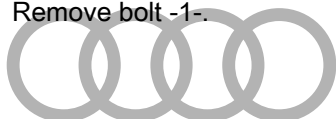
Ignition coil (cylinder 1 only):

- Unplug electrical connector -1- for charge pressure sender - G31- / intake air temperature sender 2 - G299- and move electrical wiring clear.
- Move hoses -arrows- clear at air pipe -2-.
- Release fasteners using release tool - T10527- and detach air pipe.

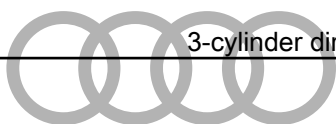


All ignition coils (continued):

- Unplug electrical connector -2-.
- Remove bolt -1-.

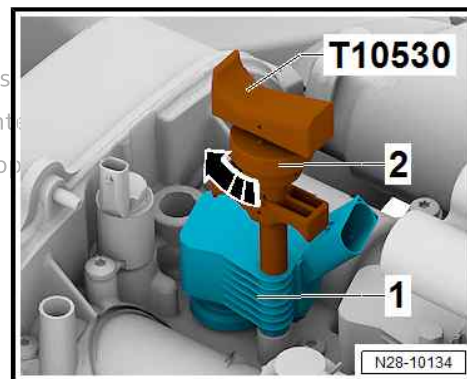


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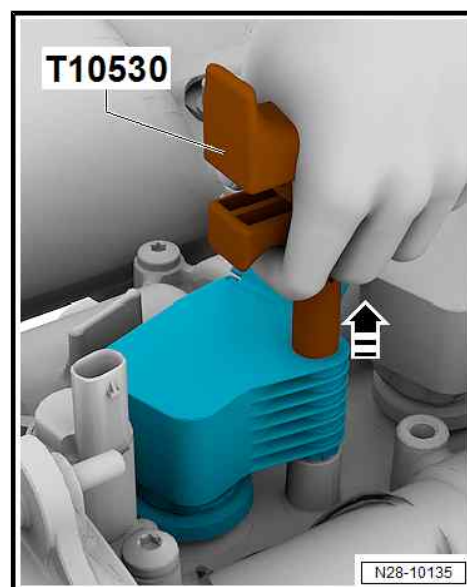


- Press puller - T10530- into hole in ignition coil -1- as far as stop.
- Tighten knurled nut -2- in direction of -arrow-.

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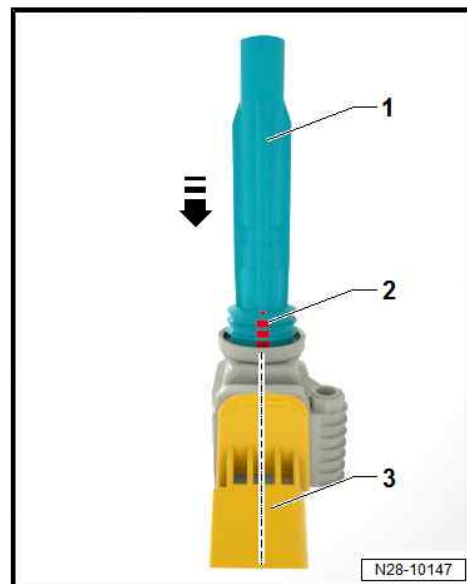
- Pull ignition coil out of camshaft housing with puller - T10530- in direction of -arrow-.



Installing

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

- Renew O-rings after removing.
- Push spark plug connector -1- onto ignition coil by hand as far as stop.
- Vent channel -2- must be positioned so that it is aligned centrally with connector housing -3-.





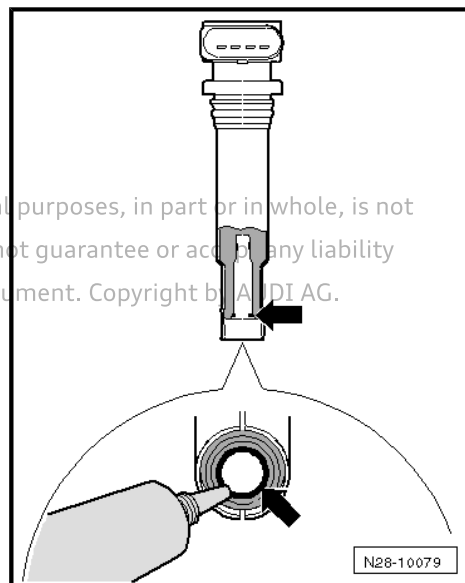
- Apply a thin bead of silicone paste all around end of sealing hose of ignition coil with output stage -arrow-.

Silicone paste ⇒ Electronic parts catalogue (ETKA) .

- Fit all ignition coils loosely into spark plug holes.
- Align ignition coils with connectors and attach all connectors onto ignition coils simultaneously.
- Press ignition coils onto spark plugs by hand evenly (do not knock in with tools).

Tightening torques

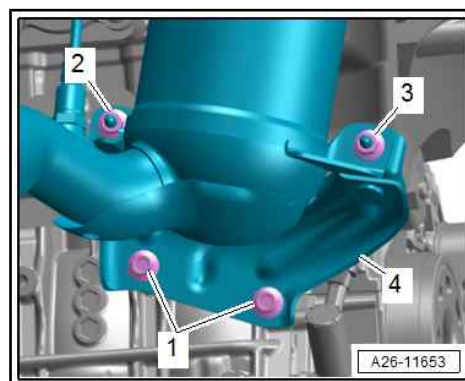
- ♦ ⇒ ["1.1 Exploded view - ignition system", page 326](#)
- ♦ ⇒ ["2.1 Exploded view - air cleaner housing", page 263](#)



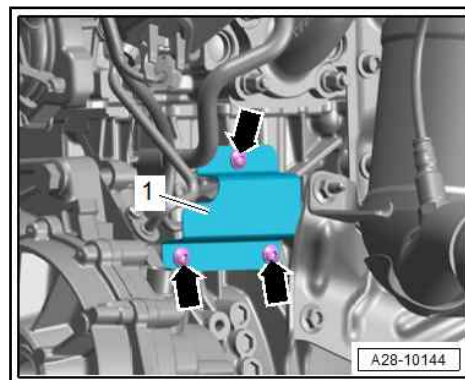
1.3 Removing and installing knock sensor 1 - G61-

Removing

- Reinstall heat insulation sleeves in the same locations when installing.
- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Remove bolts -1- and nuts -2, 3- and detach bracket -4- for catalytic converter.



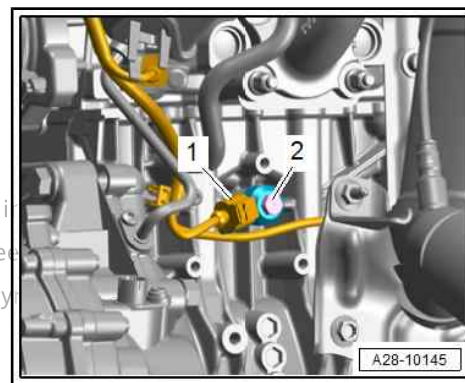
- Remove bolts -arrows- and detach heat shield -1-.
- Detach heat insulation sleeve.





- Unplug electrical connector -1-.
- Unscrew bolt -2- and remove knock sensor 1 - G61- .

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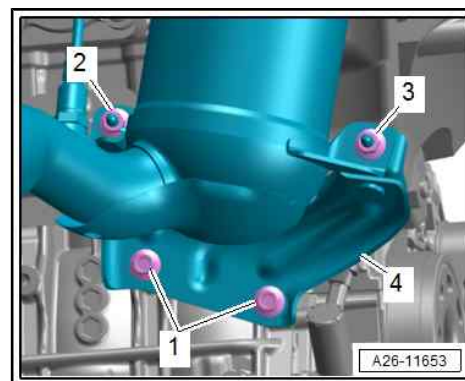
Installing

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

- Move bracket for catalytic converter into installation position.
- Hand-tighten bolts -1- and nuts -2, 3- until they make contact.
- Tighten bolted connections for bracket -4-.

Tightening torques

Component	Tightening torque
Bolts securing heat shield for knock sensor 1 - G61-	12 Nm



- ◆ ⇒ [“1.1 Exploded view - ignition system”, page 326](#)
- ◆ ⇒ [“2.1 Exploded view - emission control system”, page 316](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation

1.4 Removing and installing Hall senders

Removing

- Remove air cleaner housing
⇒ [“2.2 Removing and installing air cleaner housing”, page 265](#) .

Hall sender - G40- :

- Unplug electrical connector -1-.
- Unscrew bolt -2- and remove Hall sender - G40- .

Hall sender 2 - G163- :

- Unplug electrical connector -3-.
- Unscrew bolt -4- and remove Hall sender 2 - G163- .

Installing

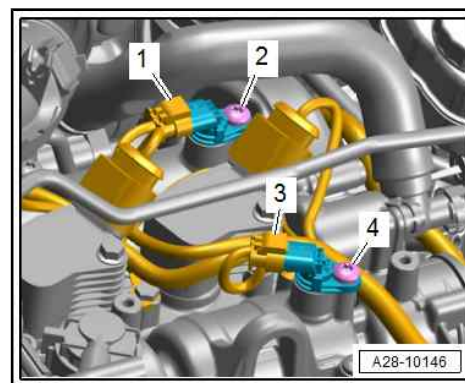
Installation is carried out in reverse order; note the following:

- Connect ⇒ Vehicle diagnostic tester.
- Switch on ignition, and select and run following menu option on ⇒ Vehicle diagnostic tester:

- ◆ `0001 Camshaft position sensor adaptation`

Tightening torques

- ◆ ⇒ [“1.1 Exploded view - ignition system”, page 326](#)
- ◆ ⇒ [“2.1 Exploded view - air cleaner housing”, page 263](#)





1.5 Removing and installing engine speed sender - G28-

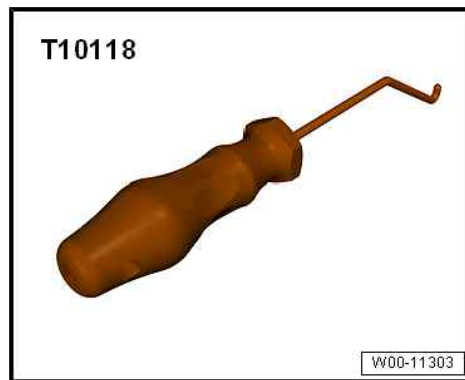
⇒ [“1.5.1 Removing and installing engine speed sender G28 - Audi A1 2011►”, page 332](#)

⇒ [“1.5.2 Removing and installing engine speed sender G28 - Audi A1 2018►”, page 333](#)

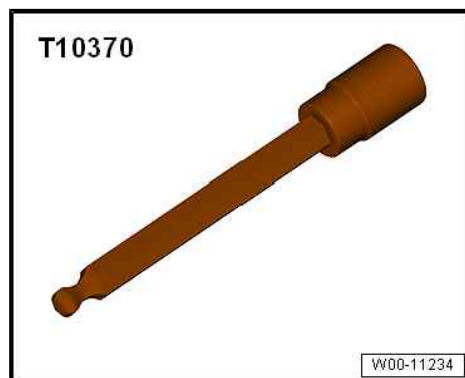
1.5.1 Removing and installing engine speed sender - G28- - Audi A1 2011►

Special tools and workshop equipment required

◆ Assembly tool - T10118-



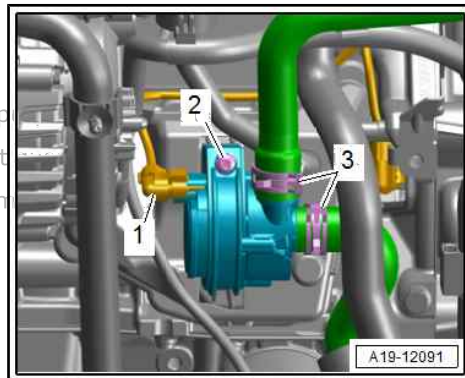
◆ Socket, 4 mm - T10370-



Removing

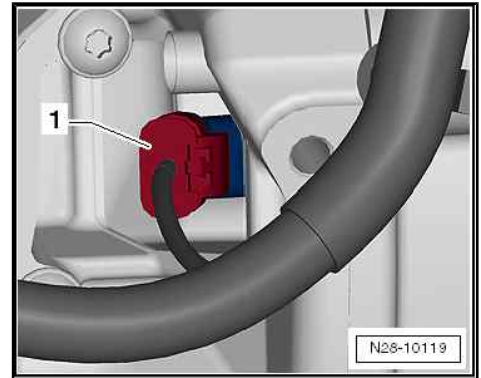
- Remove intake manifold
⇒ [“3.2 Removing and installing intake manifold”, page 269](#) .
- Unplug electrical connector -1-
- Remove bolt -2- and press continued coolant circulation pump - V51- to side.

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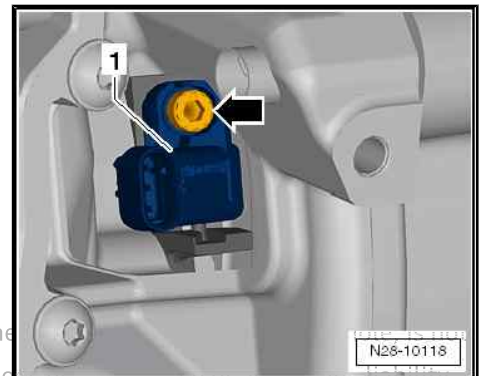
- Release and unplug electrical connector -1-.



- Unscrew bolt -arrow- using socket, AF 4 mm - T10370- and detach engine speed sender - G28- -item 1-.



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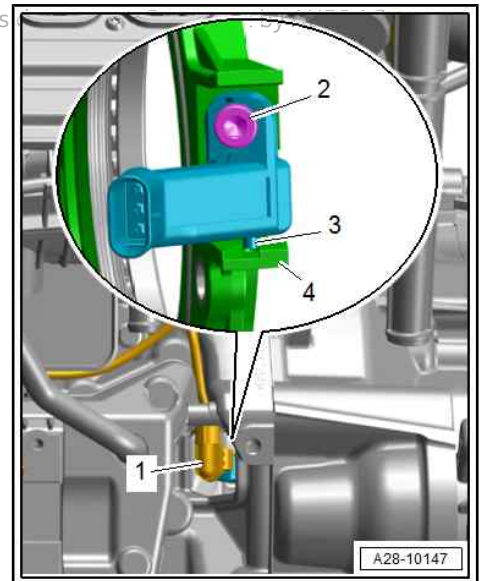
Installing

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

- Move engine speed sender - G28- into installation position, ensuring that tab -3- slides into guide slot on sealing flange -4-, as shown in illustration.
- Tighten bolt -2- and plug in electrical connector -1-.

Tightening torques

- ◆ ⇒ [“3.1 Exploded view - intake manifold”, page 268](#)
- ◆ ⇒ [“1.1 Exploded view - ignition system”, page 326](#)
- ◆ ⇒ [“2.2 Exploded view - electric coolant pump”, page 202](#)

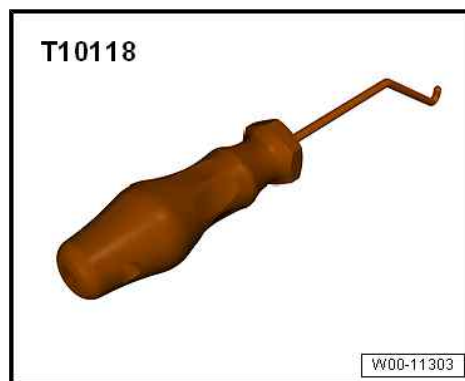


1.5.2 Removing and installing engine speed sender - G28- - Audi A1 2018➤

Special tools and workshop equipment required



◆ Assembly tool - T10118-



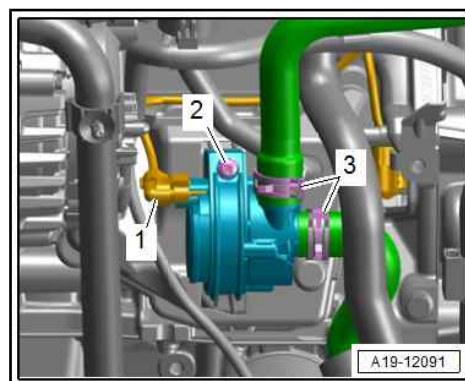
◆ Socket, 4 mm - T10370-

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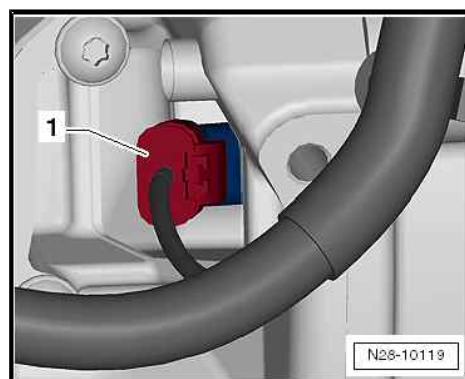


Removing

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Unplug electrical connector -1-.
- Remove bolt -2- and press continued coolant circulation pump - V51- to side.

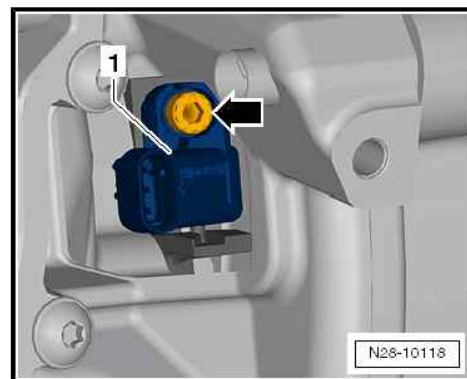


- Release and unplug electrical connector -1-.





- Unscrew bolt -arrow- using socket, AF 4 mm - T10370- and detach engine speed sender - G28- -item 1-.



Installing

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

- Move engine speed sender - G28- into installation position, ensuring that tab -3- slides into guide slot on sealing flange -4-, as shown in illustration.
- Tighten bolt -2- and plug in electrical connector -1-.

Tightening torques

- ◆ ⇒ [“1.1 Exploded view - ignition system”, page 326](#)
- ◆ ⇒ [“2.2 Exploded view - electric coolant pump”, page 202](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation

