Workshop Manual

Octavia III 2013 ➤
Octavia III 2014 ➤

1.4/81; 103 kW TSI engine									
Engine ID	CHP A	CPW A							

Edition 01.2015

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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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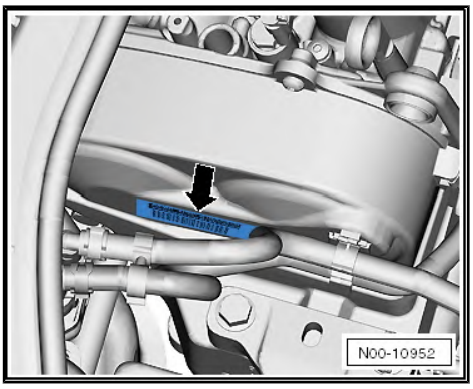
00 – Technical data

1 Denomination

(SRL000763; Edition 01.2015)

⇒ “1.1 Engine number, engine data”, page 1

1.1 Engine number, engine data



The engine code and the engine number can be found on the sticker -arrow- on the upper toothed belt guard.

The engine identification character is also indicated on the vehicle data sticker and on the crankcase above the joint.

The engine number consists of up to nine characters (alphanumeric). The first part (maximum 3 characters) makes up the “engine code”, and the second part (6 characters), the “serial number”. If more than 999 999 engines with the same engine code were produced then the first digit of the six part section will be replaced by a letter.

Vehicles with four-digit engine identification characters

Starting with the letter “C”, new four digit engine codes have been introduced. The first three digits denote the mechanical design of the engine and are stamped on the engine as before. The fourth digit denotes the performance and torque rating of the engine and depends on the engine control unit - J623- . The four digit engine code is on the identification plate, the vehicle data sticker and on the engine control unit.

Note

Fitting locations of vehicle data sticker ⇒ Maintenance ; Booklet Octavia III .

Engine identification characters		CHPA	CPWA
Manufactured		11.2012 ►	22.2014 ►
Emission standards		EU2 DDK,EU5	EU6
Capacity	cm^3	1395	1395
Output	kW at rpm	103/4500 - 6000	81/4800 - 6000
Torque	Nm at rpm	250/1500 - 3500	200/1500 - 3500
Bore	∅ mm	74,5	74,5
Stroke	mm	80,0	80,0
Compression ratio		10,5	10,5
Cylinder/valves per cylinder		4/4	4/4
Fuel - RON	at least	95 unleaded	95 unleaded and CNG to 140 [1)]
Ignition system/fuel injection		Motronic ME 17	Motronic ME 17
Firing order		1-3-4-2	1-3-4-2
Exhaust gas recirculation		no	no
Balancing shaft module		no	no
Intake manifold change-over		no	no
Camshaft adjustment		yes	yes
Exhaust gas turbocharger		yes	yes

[1)] Engine power and max. torque depend on the quality of the natural gas. Natural gases are separated between the quality groups H-gas and L-gas. H-gas has a higher heating value with a methane content of between 87.1 - 98.0 %. L-gas has a lower heating value with a methane content of between 79.8 - 87.0 %.

2 Safety instructions

⇒ “2.1 Safety precautions when working on fuel supply system”, page 4

⇒ “2.2 Reduce pressure in the high-pressure system”, page 5

⇒ “2.3 Safety measures for working on vehicles with start/stop system”, page 6

⇒ “2.4 Safety precautions during road tests in which testing and measuring equipment is used”, page 6

⇒ “2.5 Safety precautions when working on cooling system”, page 7

⇒ “2.6 Safety precautions when working on the injection system”, page 7

⇒ “2.7 Safety precautions when working on ignition system”, page 8

⇒ “2.8 General notes on the injection system”, page 8

⇒ “2.9 General notes on the ignition system”, page 9

⇒ “2.10 General instructions for charge air system”, page 9

⇒ “2.11 Additional instructions when undertaking assembly work on the air-conditioning system”, page 10

⇒ “2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)”, page 10

2.1 Safety precautions when working on fuel supply system

When working on the fuel supply observe the following:

WARNING

Fuel under very high pressure creates a risk of injury.

- *The injection system consists of a high pressure part (max. pressure of 12 MPa = 120 bar) and a low pressure part (pressure of approx. 0.6 MPa = 6 bar).*
- *The fuel system is under pressure! Before opening the injection system high-pressure system, the fuel pressure must be reduced to residual pressure, see procedure ⇒ “2.2 Reduce pressure in the high-pressure system”, page 5 .*
- *After the pressure has been reduced the connection point must be opened »immediately«. To do this place a cleaning cloth around the connection point to reduce the residual pressure (approximately 7 bar).*
- *Wear protective gloves.*
- *Wear safety goggles.*

Leaking fuel creates a fire hazard.

- *Because the fuel pump is activated by the when the door contact switch when the driver's door is opened the voltage supply to the fuel pump must be interrupted if the battery is NOT disconnected.*
- *Take out fuse for fuel pump control unit - J538- ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.*

Caution

Risk of damage to the electronic components when disconnecting the battery.

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

Disconnect the battery only when the ⇒ Electrical System; Rep. gr. 27 battery is disconnected.

Even slight contamination can lead to defects. For this reason it is essential to pay careful attention to the following rules of cleanliness when working on the fuel supply and on fuel injection systems:

- Clean connection points and their environment thoroughly with engine or brake cleaner and dry the cleaned area thoroughly before loosening.
- Open closed lines and connections immediately with suitable screen caps.
- Place removed parts on a clean surface and cover. Use only lint-free cloths!
- Only install clean components: Remove spare parts from their wrapping immediately before fitting. Do not use any parts which have been stored unwrapped (e.g. in tool boxes etc.).
- When the system is open: Do not work with compressed air. Avoid moving the vehicle.
- Protect electrical plug connections from dirt and moisture and only connect them when dry.

2.2 Reduce pressure in the high-pressure system

Caution

The injection system consists of a high pressure part (max. pressure of 12 MPa = 120 bar) and a low pressure part (pressure of approx. 0.7 MPa = 7 bar).

Before opening the high pressure system, e.g. removing the high pressure pump, the fuel distributor, the injection valves, the fuel pipes or the fuel pressure sender - G247- , the fuel pressure in the high pressure system with a remaining pressure of approx. 0.7 MPa (7 bar) must be reduced.

– Connect the ⇒ Vehicle diagnostic tester and carry out the targeted function “remove high fuel pressure”.

• The fuel pressure drops to a predetermined value.

– Switch off ignition.

– Before opening the fuel system, disconnect the plug from the fuel pump control unit.

– Before opening the high pressure system, lay cleaning cloths around the connection point.

– Open fuel system carefully to reduce the residual pressure of 0.7 MPa (7 bar) and when doing so collect fuel that is flowing out.

Note

- *If the high-pressure system is not opened immediately the pressure increases again as a result of the reheating effect.*
- *The ignition system must no longer be switched on, since otherwise the pressure will increase again.*
- *Interrogate the event memory of the engine control unit at the end of the following work and delete all the event memory entries.*
- *The readiness code must be generated if the event memory has been cleared ⇒ Vehicle diagnostic tester.*

2.3 Safety measures for working on vehicles with start/stop system

When working on vehicles with start/stop system, please observe the following:

WARNING

There is risk of injury from automatic engine starting on vehicles with start/stop system.

- *In vehicles with an activated start-stop system (indicated by a message in the dash panel insert), the engine can start automatically if necessary.*
- *It is therefore necessary to ensure that the start-stop system is deactivated when carrying out work on the vehicle (switch ignition off, if required switch ignition on again).*

2.4 Safety precautions during road tests in which testing and measuring equipment is used

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

WARNING

There is a risk of accident from deflection and insufficient securing of testers and measuring instruments.

There is also a hazard from the release of the passenger airbag in the event of an accident.

- *Using testers and measuring instruments during driving operation creates a risk of deflection.*
- *Increased risk of injury from unsecured testers and measuring instruments must be prevented.*
- *Testers and measuring instruments must always be secured on the rear seat using a seat belt and by a 2nd person on the rear seat.*

2.5 Safety precautions when working on cooling system

WARNING

Steam may escape when expansion tank is opened.

- *Wear safety goggles and safety clothing, in order to avoid eye injuries and scalding.*
- *Cover cap with cloth and open carefully.*

Caution

When doing any repair work, especially in the engine compartment, pay attention to the following due to the cramped conditions:

- *Route all the various lines (e.g. for fuel, hydraulics, activated charcoal filter system, coolant and refrigerant, brake fluid and vacuum) and electrical wiring in their original positions.*
- *To avoid damage to lines, ensure sufficient clearance from all moving or hot components.*

Note

- *When the engine is warm, the cooling system is under pressure. If necessary, release pressure before beginning repair work.*
- *Secure all hose connections with hose clamps, assignment⇒ Electronic Catalogue of Original Parts .*
- *Hose clip pliers - VAS 6362- are recommended to install spring-type clips.*
- *Always replace seals and gasket rings.*
- *When installing fit the coolant hoses free of stress, without them touching any other components (pay attention to the marking on the coolant connection and hose).*

2.6 Safety precautions when working on the injection system

WARNING

The fuel system is under pressure! Place a clean cleaning cloth around the connection point before detaching hose connections. Reduce pressure by carefully removing the hose.

The safety measures for the pressure reduction in the high pressure system must be observed *⇒ "2.2 Reduce pressure in the high-pressure system", page 5* *.*

To prevent injuries to persons and/or damage to the injection and ignition system, the following must be observed:

- Do not touch or disconnect ignition cables when the engine is running or being turned at starter speed.
- Ignition must be switched off before disconnecting and reconnecting the cables of the fuel injection and the ignition system as well as of the test equipment.
- If the engine must be operated at start speed without it starting, as for example, when checking the compression pressure, remove the fuse for the voltage supply of the injection valves and the ignition coils from the fuse holder ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

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

- Always secure the test and measuring devices on the rear seat and have a second person operate them there.
- If the test and measuring devices are operated from the passenger seat, the passenger could be injured by the release of the passenger airbag in the event of an accident.

2.7 Safety precautions when working on ignition system

WARNING

To prevent injuries to persons and/or damage to the injection and ignition system, the following must be observed:

Do not touch or disconnect ignition cables when the engine is running or being turned at starter speed.

Switch off ignition before connecting or disconnecting injection and ignition system wiring as well as test instrument cables.

The fuel delivery unit is activated when the ignition is switched on and by the door contact switch of the driver door. Therefore, if the battery power hasn't been disconnected, for safety reasons the plug of the fuel delivery unit must be disconnected, or the fuel pump fuse must be removed before opening the fuel system.

2.8 General notes on the injection system

Repairing ignition ⇒ “1 Ignition system”, page 441 .

- The engine control unit is equipped with self-diagnosis. Before repairs and also for fault finding, first of all interrogate the event memory. Also check the vacuum hoses and connections (unmetered air).
- Fuel hoses in the engine compartment must only be secured with spring-type clips ⇒ ETKA - Electronic catalogue of original parts . The use of clamp or screw-type clips is not permissible.
- A minimum voltage of 11.5 V is required for perfect functioning of the electrical components.
- Do not use sealants containing silicone. Traces of silicone elements drawn in by the engine are not burnt in the engine and damage the lambda probe.
- Certain inspections may cause the control unit to detect and store a fault. It is therefore necessary to interrogate the event memory after having completed all inspections and repairs, and if necessary delete ⇒ Vehicle diagnostic tester.

Safety precautions when working on the injection system
⇒ “2.6 Safety precautions when working on the injection system”, page 7 .

2.9 General notes on the ignition system

- Switch off the ignition before disconnecting and connecting the battery, as this may damage the engine control unit.
- The engine control unit and further components are equipped with self-diagnosis; inspect ⇒ Vehicle diagnostic tester
- A minimum voltage of 11.5 V is required for perfect functioning of the electrical components.
- Certain inspections may cause the control unit to detect and store a fault. It is therefore necessary to interrogate the event memory after having completed all inspections and repairs, and if necessary delete ⇒ Vehicle diagnostic tester.

Safety measures
⇒ “2.7 Safety precautions when working on ignition system”, page 8 .

Setting data, spark plugs ⇒ Maintenance ; Booklet Octavia III .

2.10 General instructions for charge air system

WARNING

When undertaking all installation work, particularly in the engine compartment because of its cramped construction, please observe the following:

- *Lay lines of all kinds (for example, for fuel, hydraulic fluid, cooling fluid and refrigerant, brake fluid, vacuum) and electrical lines in such a way that the original line guide is re-established.*
- *Ensure that there is adequate free access to all moving or hot components.*

Caution

In case a mechanical damage to the exhaust gas turbocharger is found, for example, damage to the compressor wheel, it is not sufficient to only replace the turbocharger. In order to avoid consequential damage, perform the following tasks:

- *Clean all oil lines.*
- *Change engine oil and oil filter.*
- *Inspect the air filter housing, the air filter element and the intake hoses for contaminations.*
- *Inspect the whole charge-air routing and the charge air cooler for foreign bodies.*

If foreign bodies are detected in the charge air system, the complete charge-air routing must be cleaned and if necessary the charge air cooler must also be replaced.

- The charge-air system must be tight.
- Renew self-locking nuts.

- Hose connections and hoses of the charge air system must be free of oil and grease before being installed.
- Only install approved clamps for securing the hose connections ⇒ ETKA - Electronic Catalogue of Original Parts .
- Spring-type clip pliers are recommended for installation of spring-type clips.
- Before connecting the oil feed line, fill the exhaust turbocharger via the connection fitting with engine oil.
- After installing the turbocharger, run engine at idling speed for about 1 minute to ensure that oil is supplied to the turbocharger.

2.11 Additional instructions when undertaking assembly work on the air-conditioning system

WARNING

Do not open the refrigerant circuit of the air conditioning system.

Note

To prevent damage to condenser or to refrigerant lines/hoses, ensure that the lines and hoses are not stretched, kinked or bent.

Steps which should be taken in order to remove and install the engine without opening the refrigerant circuit:

– Remove the holding clamp(s) of the refrigerant lines.
– Remove AC compressor ⇒ Heating, Air Conditioning; Rep. gr. 87 .
– Mount the AC compressor in such a way that the refrigerant lines/hoses are not under tension.

2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)

Before replacing the natural gas container or the valve for the natural gas container:

- If conditions permit, the customer should empty the natural gas container by driving.
- This reduces the costs for the customer, as well as the impact on the environment.

Safety measures

DANGER!

- *Service, installation and repair work on the natural gas system as well as their inspections must only be carried out by properly qualified personnel according to the relevant national legislation and standards!*
- *Service, installation and repair work on the natural gas system as well as their inspections must only be carried out by specialist garages with suitable safety elements according to the relevant national legislation and standards!*
- *All interventions must be made in safely ventilated rooms in accordance with national regulations and standards!*
- *Valid instructions, regulations, standards and recommendations for the service, assembly and repair work to the natural gas system CNG and their inspections can be found in: ⇒ Current notification 3/12, conditions for repair work at vehicles with CNG- and LPG drive . Or further information can be obtained from the importer in the relevant country.*
- *To prevent static charge when servicing, installing and repairing the gas system, you must wear protective gloves with cotton content, anti-static workwear made of mixed cotton fabric and anti-static safety boots.*

All work on the vehicle must be carried out in properly ventilated rooms.

Natural gas is highly flammable and forms ignitable mixtures with air.

As natural gas is lighter than air, it will always rise to the top.

No sources of ignition may be located close to the gas system (or other spark-, flame- or static charge-producing systems and objects).

The inhalation of natural gas can cause drowsiness and lung damage. In high concentrations, it results in a risk of asphyxia due to lack of oxygen.

Natural gas is not "odourless". For safety reasons it is saturated with odour intensive substances and even small quantities of natural gas can be detected.

WARNING

- *When working on the natural gas system, the battery earth strap must be disconnected.*
- *After the service, installation and repair work on the gas system (CNG), a leak tightness test on the natural gas system inspection must always be carried out ⇒ Maintenance ; Booklet Octavia III .*
- *Only system components of the same type and with the same design approval for the manufacture can be replaced.*
- *The components of the liquefied petroleum gas system (LPG), on which repair and installation work should be carried out, must first of all be emptied or the gas must be drained*
  ⇒ "5.8 Remove the pressure in the high-pressure line", page 347

When undertaking all installation work, particularly in the engine compartment due to its cramped construction, please observe the following:

- *Install the components of the natural gas system in such a way that the original cable guide of the natural gas system is re-established.*
- *Ensure that there is adequate free access to all moving or hot components, in order to avoid damage to the cables of the natural gas system.*
- *The cables on the natural gas system must not be bent.*

Every natural gas tank (CNG) is fitted with a solenoid valve, which closes automatically after switching off the ignition or in petrol mode.

A safety valve is also fitted to every natural gas tank (CNG) (heat and pressure protection). This safety valve prevents uncontrolled pressure build-up in the natural gas tank (CNG) in case of fire.

A flow limiter prevents a sudden emptying of the natural gas tank (CNG) in the event of damage to the pressure system.

– Observe the rules of cleanliness when working on the fuel supply system ⇒ "4.1 Cleanliness rules", page 20

Safety measures

DANGER!

Pay attention to the following regulations before emptying the natural gas containers:

- *Emptying the natural gas containers is closed rooms is prohibited.*
- *Before emptying them, set up a safe zone of 10m by 10m.*
- *The safe zone must be under supervised and monitored constantly.*
- *In the safe zone, all forms of potential sources of ignition must be prevented.*
- *If emptying the natural gas container is not possible, close the shut-off valves again.*
- *Do not carry out any other attempted repairs.*
- *In terms of how to proceed further in a natural gas container which is still full, you need to get in touch with the importer.*

DANGER!

There is the risk of gas escaping!

The system is under pressure:

- *The operating pressure reaches a max. value of around 16 - 20 MPa (160 - 200 bar) in the high-pressure system, i.e. in the natural gas containers (CNG), including connection lines down to the electromechanical high-pressure regulator.*
- *The operating pressure in low-pressure operation achieves a value of around 0.5 - 0.7 Mpa (5 - 10 bar) in low-pressure operation, i.e. at the output of the electromechanical high-pressure regulator.*

Before opening the system, it must first of all be emptied *⇒ "5.8 Remove the pressure in the high-pressure line", page 347* *.*

Even after emptying the system, residual pressure is still present in the system.

Before opening the system lay cleaning cloths around the connection point. Reduce pressure by carefully releasing the connection point.

- *You must wear safety goggles and anti-static protective gear.*

Note

Apply the correct tightening torque when tightening the union nuts. If excessive torque is applied, the screw connection may be damaged and the pressure line must then be replaced.

3 Inspecting the gas system (CNG)

⇒ “3.1 Inspection prerequisites for gas systems (CNG)”, page 14

⇒ “3.2 Inspecting the gas system for leaktightness”, page 17

3.1 Inspection prerequisites for gas systems (CNG)

⇒ “3.1.1 Determine the pressure in the natural gas system”, page 15

⇒ “3.1.2 Pressure in fuel system too low , ≤ 0.5 MPa (5 bar)”, page 15

⇒ “3.1.3 Preliminary pressure test, system pressure ≥ 0.5 MPa (5 bar)”, page 17

Special tools and workshop equipment required

- Gas leakage detector for natural gas vehicles - VAS 6227-

DANGER!

All screw connections which are undone and secured while work is carried out on the gas system (CNG) must be re-tightened again according to the regulations in the relevant work procedures.

After the service, installation and repair work on the gas system (CNG), a leak tightness test on the natural gas system inspection must always be carried out ⇒ Maintenance ; Booklet Octavia III .

Note

- *A distinction must be made between the leak tightness test on the liquefied petroleum gas system (LPG) ⇒ “3.2 Inspecting the gas system for leaktightness”, page 17 and the leak tightness test of the natural gas system ⇒ Maintenance ; Booklet Octavia III .*
- *The leak tightness test of the liquefied petroleum gas system (LPG) ⇒ “3.2 Inspecting the gas system for leaktightness”, page 17 ensures that the any leaks can be found in the system before fully filling up with natural gas (maximum pressure).*
- *Different inspection processes are carried out from the pressure in the natural gas system.*
- *To determine the pressure in the natural gas system, use ⇒ Vehicle diagnostic tester ⇒ “3.1.1 Determine the pressure in the natural gas system”, page 15 .*

Preliminary pressure test, system pressure 0.5 - 16 MPa (5 - 160 bar)
⇒ “3.1.3 Preliminary pressure test, system pressure ≥ 0.5 MPa (5 bar)”, page 17

Note

A preliminary pressure test is not a replacement for the leak tightness test of the natural gas system ⇒ Maintenance ; Booklet Octavia III .

If the system pressure is ≤ 0.5 MPa (5 bar), the system will not be activated and the test cannot be carried out. In this case, proceed as follows:
⇒ “3.1.2 Pressure in fuel system too low , ≤ 0.5 MPa (5 bar)”, page 15 .

If the system pressure is ≥ 0.5 MPa (5 bar), the system will be activated and a preliminary test can be carried out
⇒ “3.1.3 Preliminary pressure test, system pressure ≥ 0.5 MPa (5 bar)”, page 17 .

Leak tightness test on the natural gas system according to the manufacturer's specifications, system pressure 16 - 20 MPa (160 - 200 bar) ⇒ Maintenance ; Booklet Octavia III

- The leak tightness test on the natural gas system based on the manufacturer's specifications must be carried out at a maximum system pressure of 20 MPa (200 bar).

Note

- *Due to the different influence factors, it may be that not all of the tank devices generate the maximum pressure.*
- *The lower limit for the leak tightness test of the natural gas system is - based on the manufacturer's specifications - 16 MPa (160 bar).*

3.1.1 Determine the pressure in the natural gas system

– Switch on ignition.

– Connect the diagnostic unit ⇒ Vehicle diagnostic tester and start self-diagnosis with »ODIS«.

– Select the engine identification characters CPWA.

– 01 Engine electronics

– Tank pressure sensor G400

3.1.2 Pressure in fuel system too low , ≤ 0.5 MPa (5 bar)

Note

- *Preliminary pressure test is only possible when the system pressure lies above 0.5 MPa (5 bar).*
- *When the system pressure exceeds 0.5 MPa (5 bar), this results in a spontaneous activation of the gas drive.*

Build up the system pressure. To do so proceed in the following manner:

– Deactivate natural gas mode by removing the Relay for gas shut-off valves - J908- from the relay carrier.

DANGER!

if natural gas mode is not deactivated, there is a risk of explosion and danger of death from a natural gas system which has not been inspected.

Note

- *Removing the relay electrically seals the gas shut-off valves.*
- *You can still fill up with gas.*

– Drive to a service station offering natural gas in petrol mode.

– Refuel by filling up the natural gas system.

Note

- *The natural gas container should be filled to the top.*
- *The fill level must be a minimum of 16 MPa (160 bar), (80 %) after refuelling.*

– Drive back in petrol mode.

– Reactivate natural gas mode by inserting the Relay for gas shut-off valves - J908- into the relay carrier.

Note

- *The shut-off valves in the natural gas container are activated for approx. 2 seconds after turning on the ignition.*
- *When activating the shut-off valves in the natural gas container, listen out for any noises during discharge from individual parts of the natural gas system.*
- *The assistance of a 2nd mechanic is required to test for noises during discharge when switching on the ignition.*

– Switch on the ignition, at the same time monitor the discharge sounds of the individual parts of the natural gas system as required.

– Switch off ignition.

If you can hear noises during discharge:

– Check all screw fittings to see whether they were tightened according to the regulations.

– Remove any sources of leaks and repeat the inspection.

Note

After installation, use the gas leakage detector for natural gas vehicles - VAS 6227- to inspect all connections and parts which were opened or replaced
⇒ "3.2 Inspecting the gas system for leaktightness", page 17 .

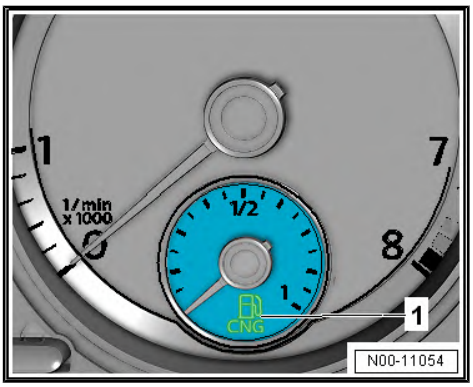
If you cannot hear noises during discharge:

– Definitively activate the natural gas system and carry out an adaptation drive.

♦ During the adaptation drive, drive several times into the engine's partial load ranges.

♦ When the adaptation drive has been made successfully, the mode is switched to natural gas mode. This is indicated by a symbol indicator -1-.

– Drive back to the workshop and carry out a leak tightness test on the natural gas system ⇒ Maintenance ; Booklet Octavia III .



3.1.3 Preliminary pressure test, system pressure ≥ 0.5 MPa (5 bar)

The preliminary pressure test finds any leaks before completing filling up the vehicle with natural gas (maximum pressure).

Note

♦ *Preliminary pressure test is only possible when the system pressure lies above 0.5 MPa (5 bar).*

♦ *When the system pressure exceeds 0.5 MPa (5 bar), this results in a spontaneous activation of the gas drive.*

♦ *A preliminary pressure test is not a replacement for the leak tightness test of the natural gas system ⇒ Maintenance ; Booklet Octavia III .*

– Carry out a leak tightness test on the liquefied petroleum gas system (LPG)
⇒ "3.2 Inspecting the gas system for leaktightness", page 17 .

3.2 Inspecting the gas system for leaktightness

Special tools and workshop equipment required

♦ Gas leakage detector for natural gas vehicles - VAS 6227-

♦ Commercially available leak search spray

The leak tightness test on the gas system takes place after repair of the natural gas system, before the natural gas system is filled up to the maximum pressure.

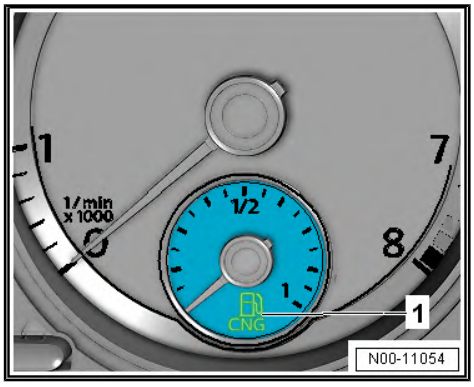
After filling the natural gas system to the maximum pressure, a leak tightness test is performed on the natural gas system ⇒ Maintenance ; Booklet Octavia III .

Note

- *Observe safety measures and other rules*
  ⇒ "2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)", page 10 .
- *A leak tightness test can only be carried out on the natural gas system when the pressure in the natural has system is greater than 0.5 MPa (5 bar)*
  ⇒ "3.1 Inspection prerequisites for gas systems (CNG)", page 14 .

– Valve 1 for tank shut-off - N361- and open Valve 2 for tank shut-off - N362- .

– Release the vehicle and activate the natural gas system.



Note

- *When the system pressure exceeds 0.5 MPa (5 bar), this results in a spontaneous activation of the gas drive.*
- *If the vehicle is operated in natural gas mode, the indicator light -1- in the natural gas vehicle will light up.*

Note

Inspect all connections and parts which were opened or replaced after the installation with gas leakage detector for natural gas vehicles - VAS 6227- .

Carry out a leak tightness test on the gas system as follows:

– Guide the gas leakage detector for natural gas vehicles - VAS 6227- at a clearance of up to 5 mm from the position to be measured and leave for at least 5 seconds and every 90°.

Note

- *The permissible result on the gas leakage detector for natural gas vehicles - VAS 6227- is that the green LED diode lights up with an »OK«. Once a yellow or red LED diode lights up, a leak search spray must be used to detect if gas is escaping from the gas system of the vehicle.*
- *No bubbles must escape from the sprayed area within a test period of 3 minutes, when using the leak search spray.*

– Spray the position to be inspected and wait around 3 minutes to see whether there is any bubble formation.

If no concentration of natural gas was found in the leak tightness test, and thereby no gas losses, the vehicle can be operated.

If gas losses were found in the leak tightness test, the fault must be remedied and a leak tightness test must be carried out again afterwards.

If other gas loses are detected after remedying the fault and carrying out another leak tightness test, carry out a leak-tightness test in the entire natural gas system ⇒ Maintenance ; Booklet Octavia III .

– Refuel by filling up the natural gas system.

Note

- *The natural gas container should be filled to the top.*
- *The fill level must be a minimum of 16 MPa (160 bar), (80 %) after refuelling.*

WARNING

After carrying out assembly work on the natural gas system, you must always carry out a leak tightness test as a final measure ⇒ Maintenance ; Booklet Octavia III .

4 Repair instructions

⇒ “4.1 Cleanliness rules”, page 20

⇒ “4.2 Foreign bodies in the engine”, page 20

⇒ “4.3 Contact corrosion”, page 20

⇒ “4.4 Cable routing and securing”, page 20

⇒ “4.5 Assembly of radiators and capacitors”, page 21

4.1 Cleanliness rules

Carefully observe the following “rules” for cleanliness when working on the fuel supply/injection system:

- Thoroughly clean the connection points and their surroundings before releasing.
- Place removed parts on a clean surface and cover. Do not use fuzzy cloths!
- Carefully cover or close opened components if the repair is not completed immediately.
- Only install clean components: Remove spare parts from their wrapping immediately before fitting. Do not use any parts which have been stored unwrapped.
- When the system is open, do not work with compressed air and do not move the vehicle.
- Ensure that no fuel runs onto the fuel hoses. If happens, clean the hoses immediately.
- Protect electrical plug connections from dirt and moisture and only connect them when dry.

4.2 Foreign bodies in the engine

To prevent the penetration of foreign bodies, open channels of the inlet connection and exhaust tract must be sealed with suitable plugs during assembly works on the engine, for example from the screw plug set for engine - VAS 6122- .

4.3 Contact corrosion

The use of unsuitable connection elements causes contact corrosion (screws, nuts, washers, …).

This is why only connection elements with a special surface coatings are fitted.

Therefore, the rubber or plastic parts and the adhesives are made from electrically non-conductive materials.

If you have any doubts about the suitability of parts, please use new parts in general ⇒ Electronic Catalogue of Original Parts ETKA .

4.4 Cable routing and securing

- To ensure the original installation position, e.g. lines for fuel, hydraulics, vacuum, activated charcoal filter system lines or electric cables must be marked before removal. Make sketches or take photographs if necessary.
- Sufficient clearance from all moving or hot components must be ensured in the engine compartment due to its cramped construction. This prevents damage to lines.

4.5 Assembly of radiators and capacitors

The radiator, capacitor and charge air cooler may have minor indentations on the fins, even if assembly is correct. This is not a case of damage. Radiator, capacitors or charge air cooler must not be replaced because of these indentations.

10 – Removing and installing engine

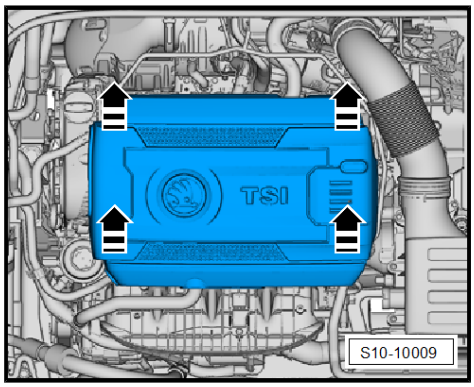
1 Engine trim panel

⇒ “1.1 Removing and installing engine trim panel”, page 22

1.1 Removing and installing engine trim panel

Removing

– Carefully pull the engine cover off the retaining bolts one after another -arrows-.



Install

– Position the engine cover paying attention to the oil fill supports and dipstick.

– Press the engine trim panel into the rubber sleeves, first left, then right.

2 Removing and installing engine

⇒ “2.1 Removing engine”, page 23

⇒ “2.2 Separate engine and gearbox”, page 33

⇒ “2.3 Securing the engine to the assembly stand”, page 34

⇒ “2.4 Installing engine”, page 35

2.1 Removing engine

Special tools and workshop equipment required

- Removal tool for inner lining of the door panel - MP8-602/1-
- Extension - 2024 A /1- of lifting device - MP9-201 (2024A)-
- Engine and gearbox jack - V.A.G 1383 A-
- Engine mount - T10497-
- Catch pan , e.g. -VAS 6208-
- Hose strap pliers , e.g. -VAS 6362-
- Locking pin - T10060A-
- Double ladder , e. g. -VAS 5085-
- Protective goggles and gloves

Note

- *The engine is removed downwards together with the gearbox.*
- *Fit all cable straps on again in the same place when installing.*

For natural gas vehicles (CNG)

DANGER!

Follow safety measures and rules of cleanliness when working on the natural gas system and general instructions for operating a natural gas vehicle (CNG)
⇒ “2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)”, page 10 .

– Empty gas line
⇒ “5.8 Remove the pressure in the high-pressure line”, page 347 .

Continued for all vehicles

– Remove both front wheels ⇒ Chassis; Rep. gr. 44 .

– Remove the sound dampening system ⇒ Body Work; Rep. gr. 66 .

– Remove the front left and right wheelhouse liner ⇒ Body Work; Rep. gr. 66 .

– Remove the cooling water tank cover ⇒ Body Work; Rep. gr. 66 .

– Remove engine cover
⇒ “1.1 Removing and installing engine trim panel”, page 22 .

WARNING

Fuel under very high pressure creates a risk of injury.

- *Before opening the injection system high-pressure system, the fuel pressure must be reduced to residual pressure.*

– Reduce the fuel pressure in the high pressure system ⇒ “2.2 Reduce pressure in the high-pressure system”, page 5 .

– Drain coolant ⇒ “1.2 Draining and filling coolant”, page 209 .

Caution

There is a risk of destruction through reversing the rotation direction of an already used V-ribbed belt.

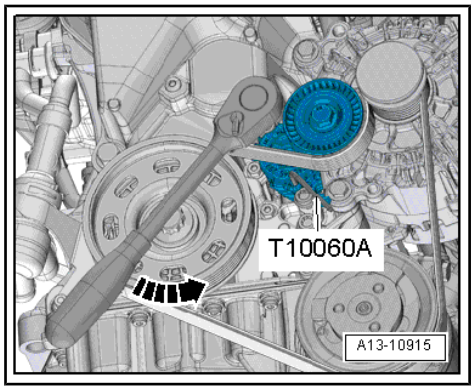
- *Mark the direction of rotation with chalk or a felt-tip pen for the re-installation before removing the V-ribbed belt.*

Vehicles with air conditioning

– To release the tension of the V-ribbed belt, swivel the tensioning device anticlockwise -arrow- and remove the V-ribbed belt from the V-ribbed belt pulley of the AC compressor.

– Lock tensioning device with locking pin - T10060A- .

– Remove poly V-belt.



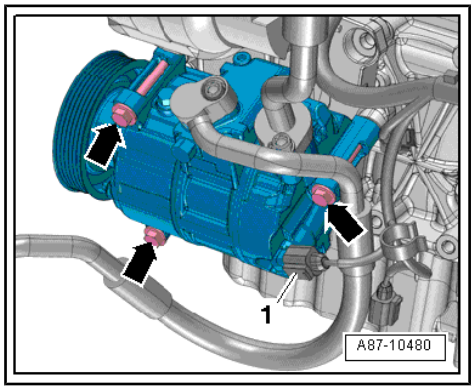
WARNING

Risk of injury through refrigerant.

- *Do not open the refrigerant circuit of the air conditioning system.*

– Remove plug -1- at the air conditioning unit compressor control valve - N280- .

– Release screws -arrows- for AC compressor.



Caution

Risk of damaging AC compressor, refrigerant lines and hoses.

- *Do not over-tension, buckle or bend refrigerant lines and hoses.*

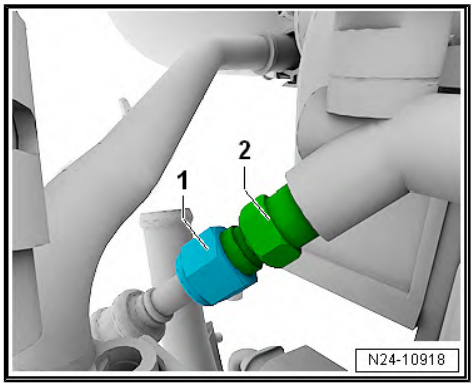
– Remove AC compressor with connected refrigerant hoses and strap up to the right side.

For natural gas vehicles (CNG)

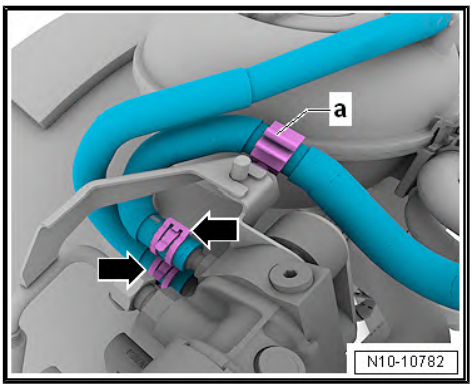
Note

When undoing the union nuts, counterhold the connection line using an open-end wrench.

– Carefully loosen the union nuts -1- so that any residual gas can escape.
– Unscrew nut -1-.

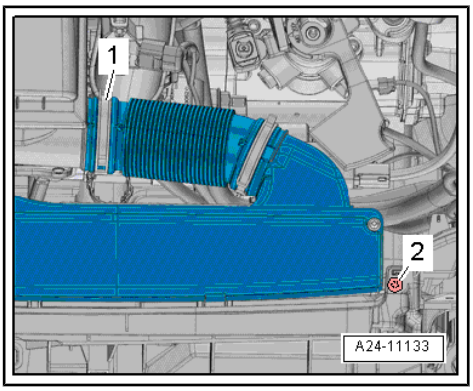


– Disconnect the terminal -a- from the mounting bracket and remove the coolant hose.
– Remove the coolant hoses -arrows- from the gas pressure regulator.
– Remove the gas pressure regulator ⇒ “4.2 Removing and installing gas pressure regulator”, page 395 .
– Remove the bracket for the gas pressure regulator ⇒ “4.1.1 Summary of components - gas pressure regulator”, page 393 .

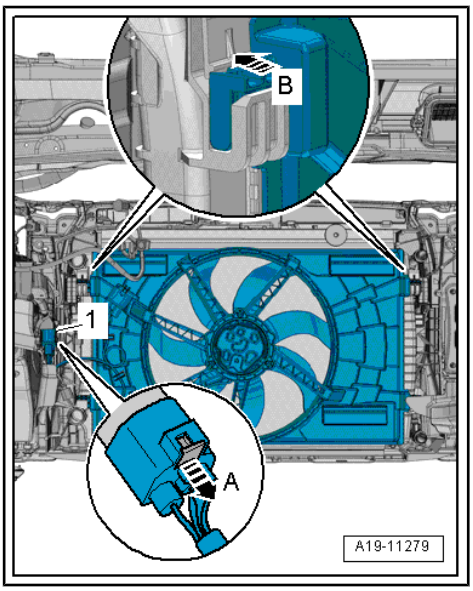


Continued for all vehicles

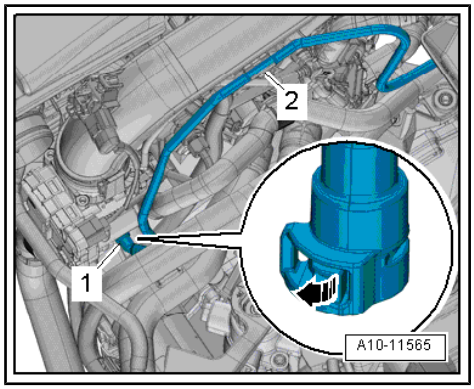
– Loosen hose clamp -1- and remove air guide hose.
– Release screw left and right arrow -2-.
– Unclip and remove the air guide on the lock carrier.



– Remove plug -1- for radiator fan, for this purpose slide screw clamp backwards arrow -A- and press release button down.
– Press locking lugs for fan shroud left and right simultaneously arrow -B- and remove fan shroud downwards from the radiator.
– Remove the battery with the battery tray ⇒ Electrical System; Rep. gr. 27 .

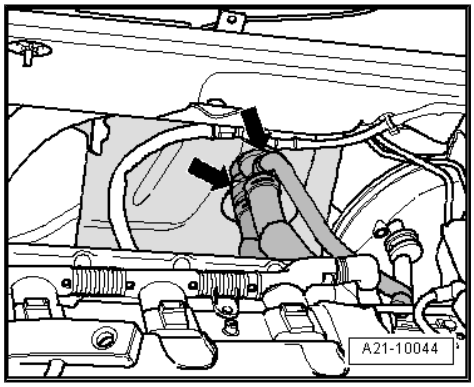


– Unlock catch -arrow- and remove vacuum hose -1-.
– Expose vacuum hose on the air guide pipe -2-.



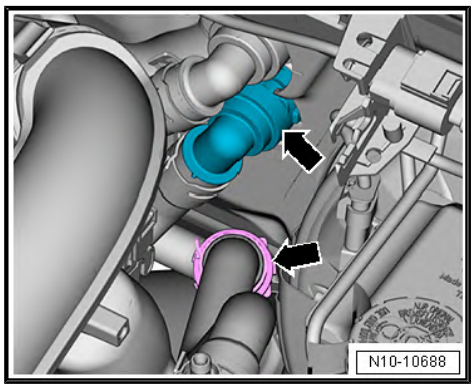
Vehicles without auxiliary heating

– Raise holding clamps -arrows- and remove coolant hoses from heat exchanger for heating.



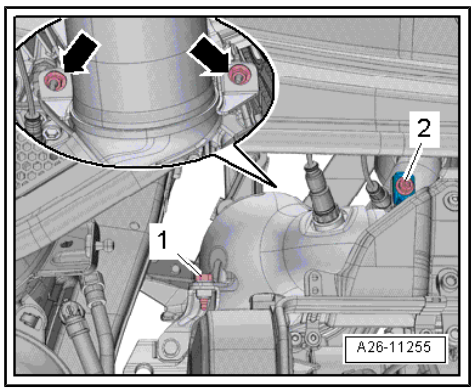
Vehicles with auxiliary heating

– Loosen holding clamp and holding clamps and pull off both coolant hoses -arrows-.



Continued for all vehicles

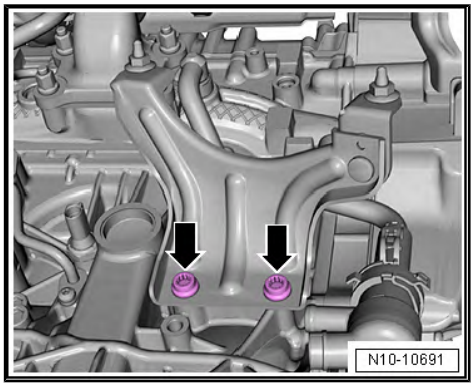
– Unscrew screw -2- and remove screw clamp.
– Remove screw -1-, remove nuts -arrows- and strap up catalytic converter to the bodyshell so as not to damage the decoupling element.



Note

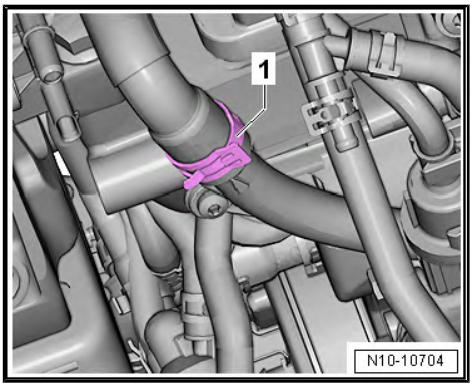
do not twist decoupling element in the exhaust pipe more than 10° - risk of damage

– Release screws -arrows- and remove holder.



Note

- *Place a cloth below to absorb leaking coolant.*
- *Loosen hose clamp -1- and remove coolant hose.*



WARNING

Risk of injury from fuel.

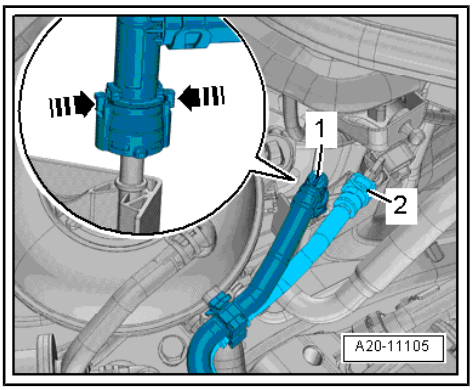
- ***To relieve the fuel pressure, place a clean cloth around the connection point and loosen the connection point carefully before opening the fuel system.***

Caution

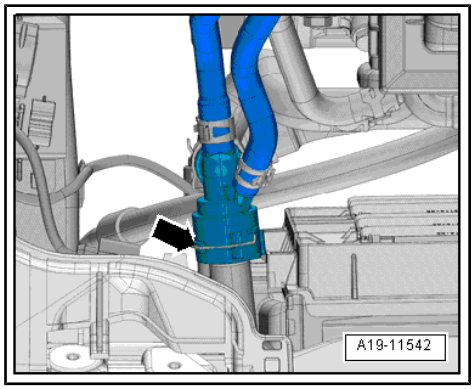
Risk of contamination.

- ***Rules of cleanliness when working on the fuel supply system***
  ⇒ "2.1 Safety precautions when working on fuel supply system", page 4 .

– Disconnect the fuel feed line -1- and the line -2- to the activated charcoal filter ⇒ "4 Quick couplings", page 298 .



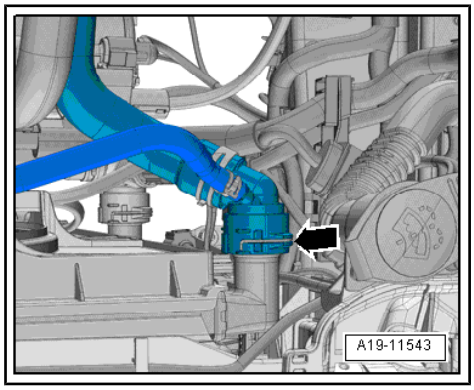
– Raise holding clamp -arrow- and disconnect coolant hose right above radiator for charge air circuit.
– Remove air filter housing
⇒ “2.2 Removing and installing air filter housing”, page 384 .



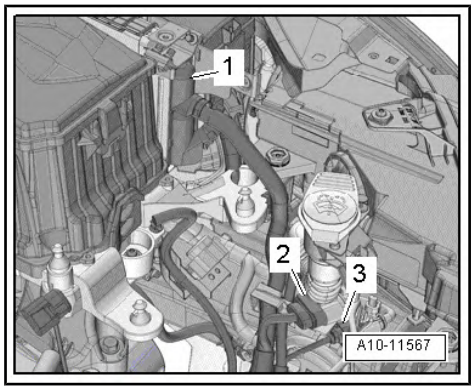
– Raise holding clamp -arrow- and remove top left coolant hose from radiator.

Note

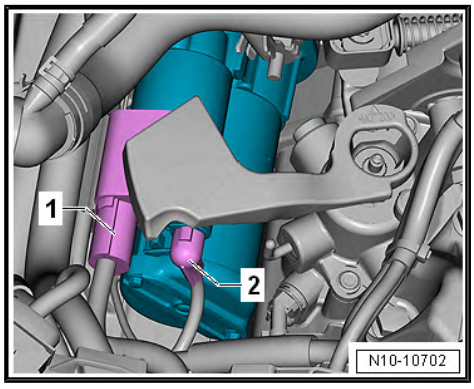
For the following clip unclipping procedure use the removal tool for inner door trim panel - MP8-602/1- .



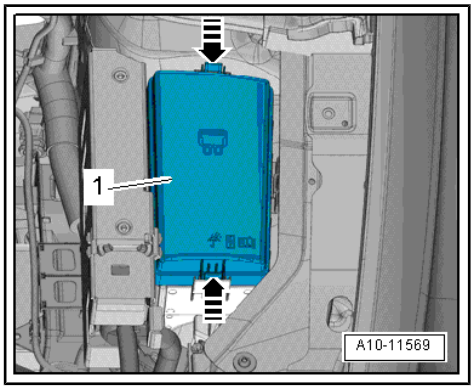
– Unplug connector -1- on the engine control unit - J623-
⇒ “10 Engine control unit”, page 424 .
– Take electrical plug connections -2- and -3- out of the holder and disconnect.
– Expose electric cables.



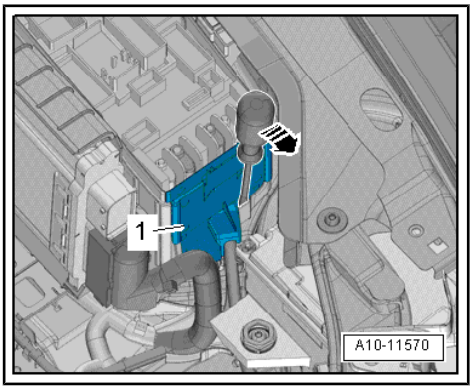
– Unplug connector -2-.
– Press back B+-pole protection -1- and unscrew B+-cable from the starter magnet switch.
– Unscrew the earth cable on the body.
– Remove upper plug from engine control unit
⇒ “10 Engine control unit”, page 424 .



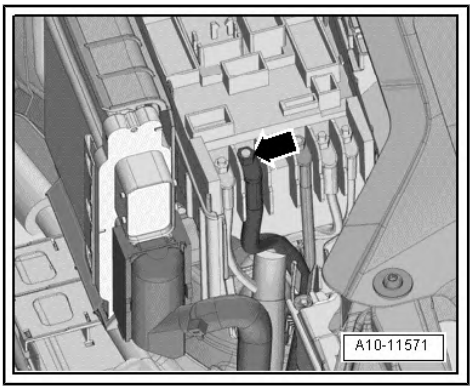
– Unlock catches -arrows-, remove cover -1- for E-box in the engine compartment.



– Unlock catch with a screwdriver -arrow- and pull cover -1- for E-box in the engine compartment upwards.



– Unscrew nut -arrow-, remove and expose electric cable.



– Disconnect plug connections -1- and -2-.

Vehicles fitted with a manual gearbox

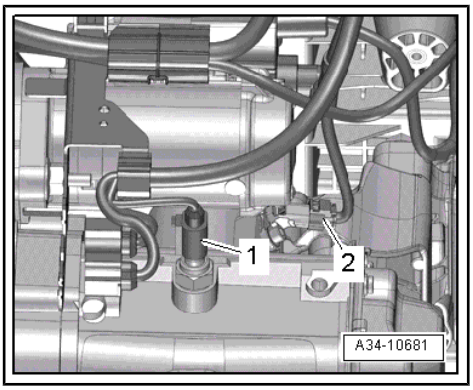
– Remove shift mechanism from gearbox ⇒ Gearbox; Rep. gr. 34 .

– Remove slave cylinder ⇒ Gearbox; Rep. gr. 30 .

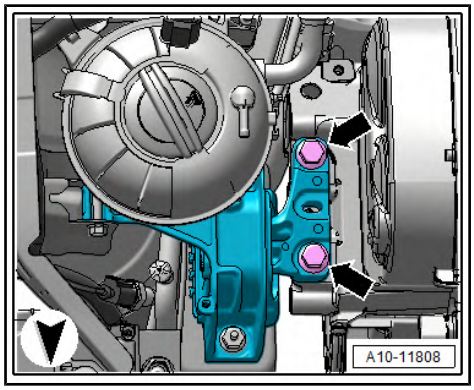
Vehicles with automatic gearbox

– Remove selector lever linkage, pull off mechatronics plug and remove all holders from the gearbox ⇒ Gearbox; Rep. gr. 37 .

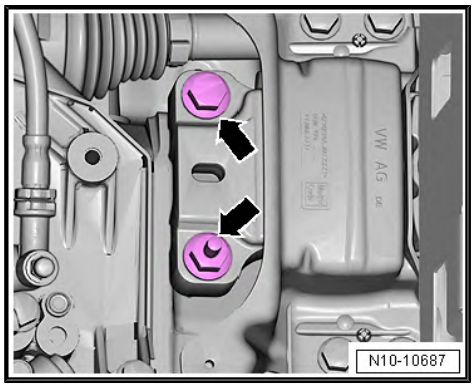
Continued for all vehicles



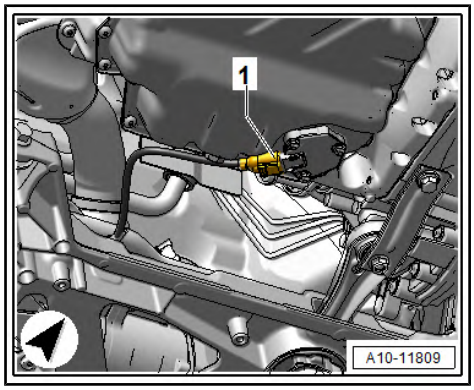
– Screw out screws -arrows- on engine mount by approximately 2 turns.



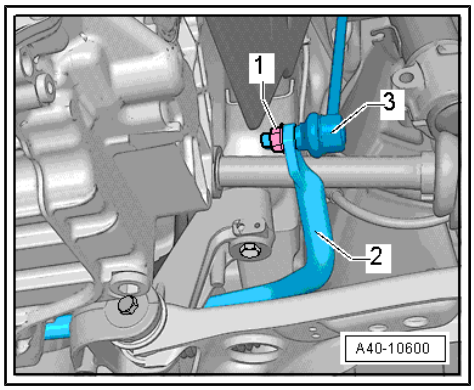
– Screw out screws -arrows- on gearbox mount by approximately 2 turns.



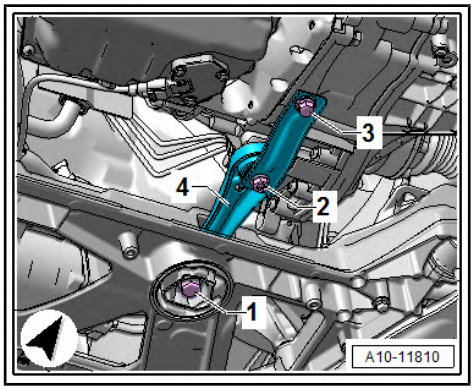
– Disconnect plug -1- at the oil level and oil temperature sender - G266- .



– Unscrew nut arrow on left and right -1- for coupling rod -3- on anti-roll bar -2-.



– Undo screws -1-, -2-, -3- and remove the pendulum support.

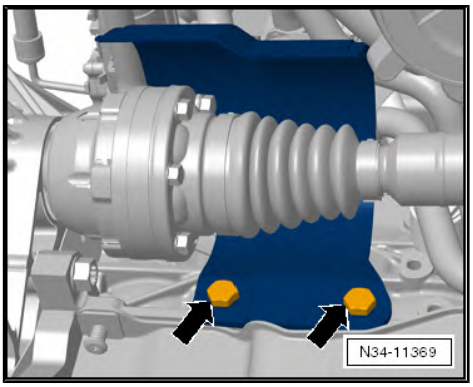


– Release screws -arrows- and remove heat shield for right drive shaft.

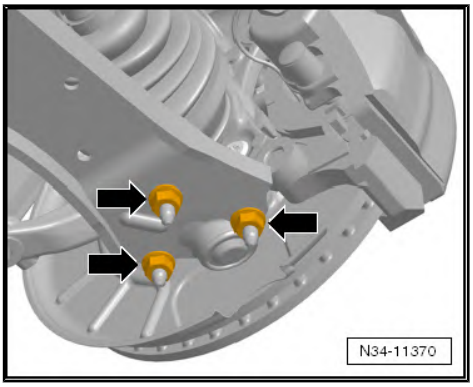
For models with automatic gearbox

– Remove the assembly carrier ⇒ Chassis; Rep. gr. 40 .

Continued for all vehicles



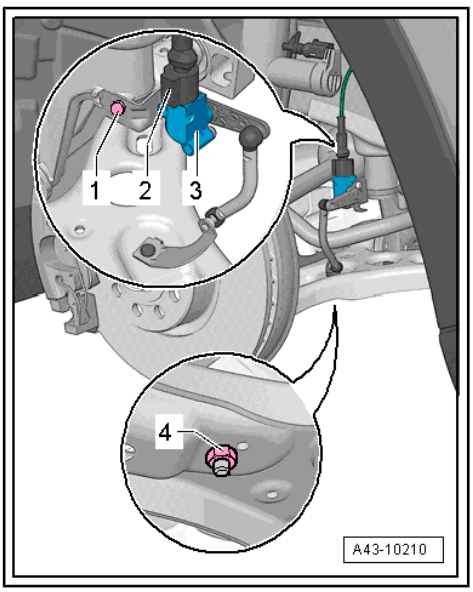
– Release nut -arrow- on left and right for swivel hub.



– If present, unscrew nuts -4- and screw -1- from the front left vehicle level sensor - G78- -3- and place to one side.
– Unhook swivel hub from track control arm on left and right for swivel hub.
– Unscrew left and right cardan shaft from the gearbox ⇒ Chassis; Rep. gr. 40 and strap up.

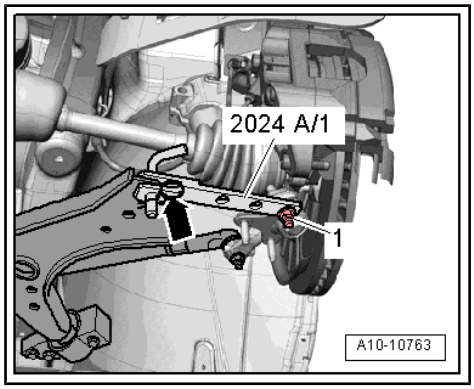
Note

Ensure that the surface protection of the cardan shaft is not damaged.



Volkswagen Technical Site: http://vwts.ru http://vwts.info
огромный архив документации по автомобилям Volkswagen, Skoda, Seat, Audi

– Swivel suspension strut left towards the outside and support with extension -2024 A /1- , as shown in the illustration.

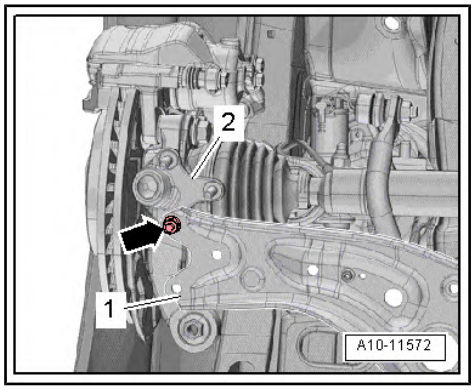


WARNING

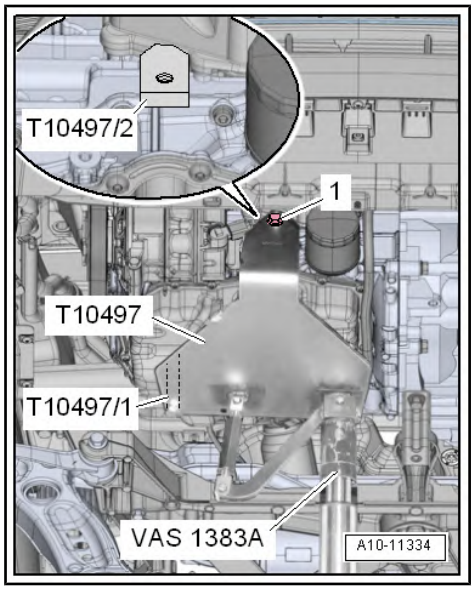
There is a risk of accident from loose parts of the support.

- ***Secure rig pin with plug-in lock and swivel hub-arrow- and nut-1-.***

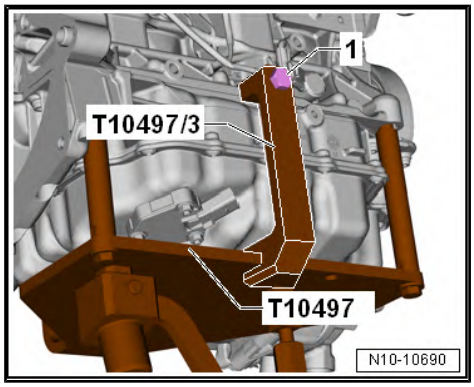
– Screw swivel hub -2- right at the track control arm -1- tight using the nut -arrow-, as shown in the illustration.



– Position clamping piece T10497/2 on the housing fin of the cylinder block, as shown in the illustration.
– Position engine mount - T10497- with bolts T10497/1 at the cylinder block.
– Screw clamping piece T10497/2 with screw -1- onto the engine mount T10497 and tighten it to 20 Nm.



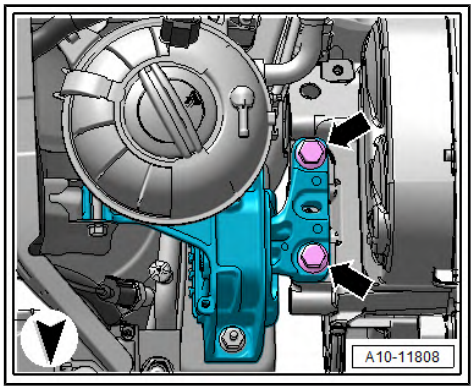
– Fit the adapter - T10497/3- to the engine mount - T10497- and tighten screw -1- to 20 Nm.
– Insert engine mount engine - T10497- onto the engine and gearbox jack - V.A.G 1383A- and lift engine/gearbox unit a little.



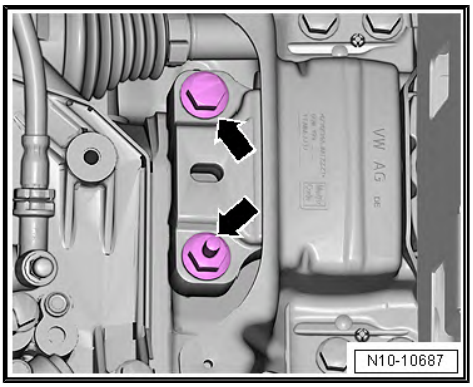
Note

To remove the screws for the assembly mountings, use a commercially available double ladder , e. g. -VAS 5085- .

– Screw out engine mount screws -arrows- fully.



– Screw out gearbox mount screws -arrows- fully.



Caution

Risk of damaging vacuum lines or electric cables and the engine compartment.

- *Check that all vacuum lines and electric cables between engine, gearbox, assembly bracket and body have been loosened.*
- *Guide the engine/gearbox unit with assembly carrier out of the engine compartment carefully when lowering.*

– Drain engine/gearbox unit a little.

– Push the gearbox side of the engine/gearbox unit forwards and drain it slowly and carefully.

2.2 Separate engine and gearbox

Special tools and workshop equipment required

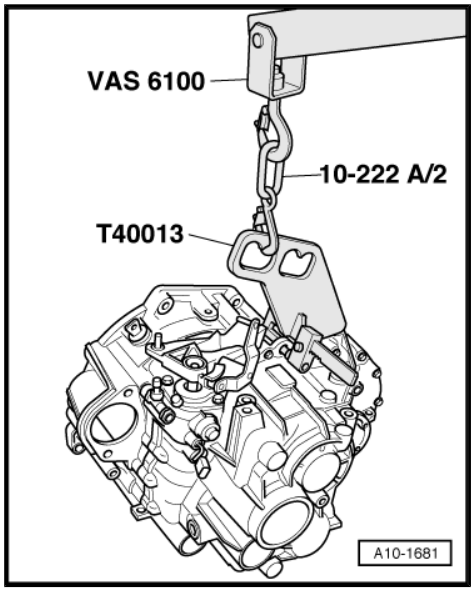
- Additional hook - MP9-200/10 (10-222A/2)-
- Workshop crane , e.g. -VAS 6100-
- Lifting device - T40013-

Work procedure

- Engine/gearbox unit removed and attached to engine mount - T10497- .

– Removing starter ⇒ Electrical System; Rep. gr. 27 .

– Attach lifting device - T40013- to gearbox and close safety mechanism.
– Attach workshop crane - VAS 6100- with additional hook - MP9-200/10 (10-222A/2)- to the lifting device - T40013- .
– Unscrew engine/gearbox connecting screws ⇒ Gearbox; Rep. gr. 34
– Remove gearbox from engine.



2.3 Securing the engine to the assembly stand

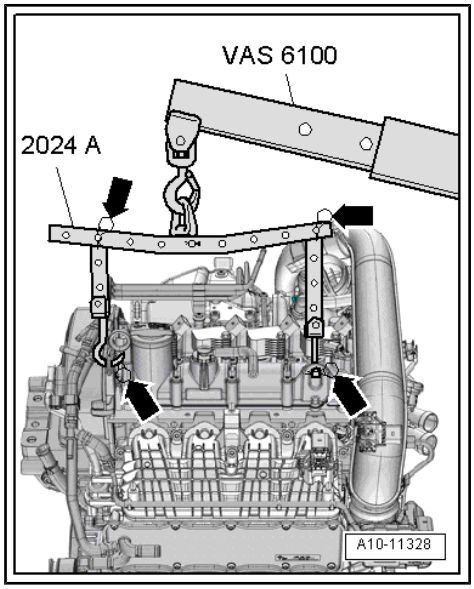
Special tools and workshop equipment required

- Lifting device - MP9-201 (2024 A)-
- Engine and gearbox support - VAS 6095-
- Workshop crane , e.g. -VAS 6100-

Work procedure

- Gearbox disconnected from engine
⇒ “2.2 Separate engine and gearbox”, page 33

– Suspend lifting device - MP9-201 (2024 A)- from the engine and workshop crane - VAS 6100- as shown in the illustration.



Note

For coordination with the unit centre of gravity position the perforated rails must be placed as shown in the illustration.

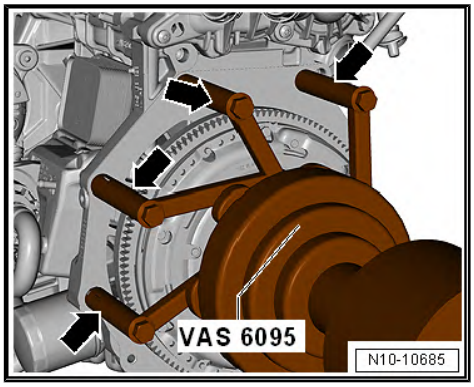
WARNING

There is a risk of accident from loose parts of the lifting device.

- ***The suspension hooks and rig pin on the lifting must be secured using plug-in locks -arrows-.***

– Lift engine down from engine mount - T10497- using workshop crane - VAS 6100- .

– Secure engine using bolts -arrows- to the engine and gearbox mount - VAS 6095- .



2.4 Installing engine

Special tools and workshop equipment required

- Double ladder
- Pliers for spring strap clamps
- Grease - G 000 100-
- Cable strap

For natural gas vehicles (CNG)

Special tools and workshop equipment required

- Handwheel - T50026-
- Gas leakage detector for natural gas vehicles , e.g. -VAS 6227-

Installation is carried out in the reverse order. Pay attention to the following:

Note

- *Replace screws which have been tightened firmly to a torquing angle.*
- *Replace self-locking nuts, gasket rings, gaskets and O-rings.*
- *Secure all hose connection ends with spring-type clips that comply with the series design ⇒ ETKA - Electronic Catalogue of Original Parts .*
- *All cable straps should be fastened again in the same place when installing.*

– Installing intermediate plate ⇒ page 70 .

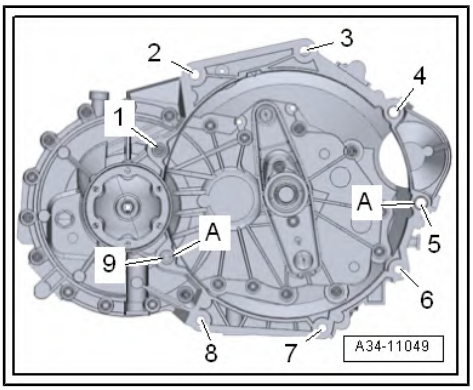
– If there are no dowel sleeves -A- are available in the cylinder block for centering the engine and gearbox, insert dowel sleeves.

– Screw gearbox securely onto engine at positions -1-, -2-, -3-, -6-, -7-, -8- and -9-.

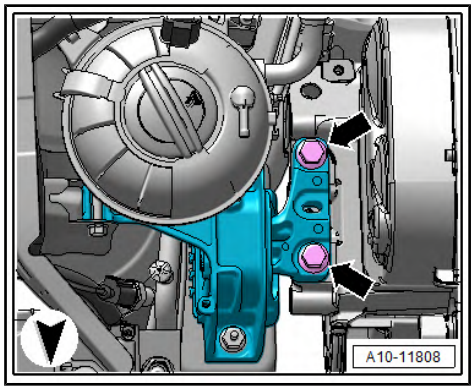
– Install gearbox support bracket.

– Attach engine/gearbox unit to engine mount - T10497- .

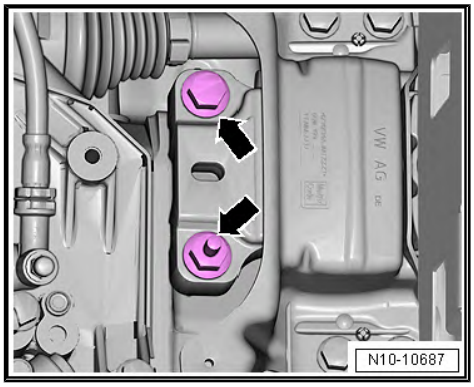
– Insert engine/gearbox unit into the body.



– Initially insert screws -arrows- for engine mount by hand as far as the stop.



– Initially insert screws -arrows- for gearbox mount by hand as far as the stop.



Note

The screws must not be permanently tightened until the assembly bracket is adjusted
⇒ “3.6 Adjusting the unit mounting”, page 47 .

– Remove engine mount - T10497- from engine.
– Install the starter motor ⇒ Electrical System; Rep. gr. 27 .
– Install pump for coolant recirculation - V188-
⇒ “2.7 Removing and installing coolant recirculation pump V188 ”, page 226 .
– Install air guide pipe
⇒ “2.1 Summary of components - charge air system”, page 370 .
– Install air guide ⇒ page 372

Vehicles fitted with a manual gearbox

– Install slave cylinder ⇒ Gearbox; Rep. gr. 30 .
– Install linkages with linkage support ⇒ Gearbox; Rep. gr. 34 .

Vehicles with automatic gearbox

– Install the assembly carrier ⇒ Chassis; Rep. gr. 40 .
– Install selector lever linkage, attach mechatronics plug and all holders to the gearbox: ⇒ Chassis; Rep. gr. 37 .

Continued for all vehicles

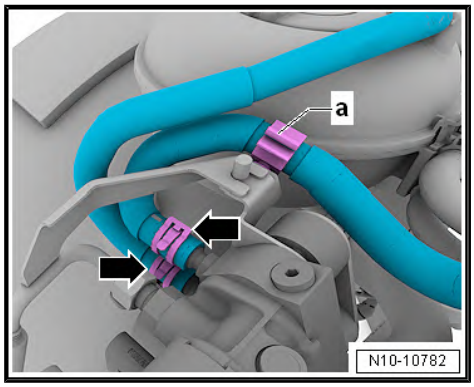
– Install exhaust pipe with catalytic converter
⇒ “1.2 Removing and installing pre-exhaust pipe with catalytic converter ”, page 430 .
– Install drive shafts ⇒ Chassis; Rep. gr. 40 .
– Install track control arm, swivel hub and coupling rod ⇒ Chassis; Rep. gr. 40 .
– Install AC compressor ⇒ Heating, Air Conditioning; Rep. gr. 87 .
– Install the V-ribbed belt
⇒ “1.2 Removing and installing poly V-belt”, page 55 .
– Electrical connections and proper routing ⇒ Electrical System; Rep. gr. 97 and ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
– Installing the engine control unit - J623-
⇒ “10 Engine control unit”, page 424 .
– Connect coolant hoses with quick coupling ⇒ page 234 .
– Install pendulum support
⇒ “3.4 Removing and installing pendulum support”, page 46 .
– Remove the front left and right wheelhouse liner ⇒ Body Work; Rep. gr. 66 .
– Attach front wheels ⇒ Chassis; Rep. gr. 44 .
– Adjust the assembly bracket
⇒ “3.6 Adjusting the unit mounting”, page 47 .

For natural gas vehicles (CNG)

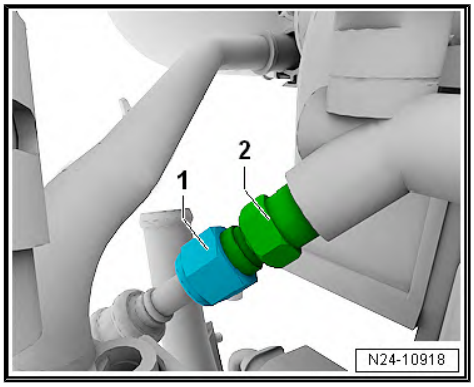
– Install the gas pressure regulator
⇒ “4.2 Removing and installing gas pressure regulator”, page 395 .

– Install the bracket for the gas pressure regulator
⇒ “4.1.1 Summary of components - gas pressure regulator”, page 393 .

– Connect the coolant hoses -arrows- to the gas pressure regulator and fix the hose with mounting bracket -a-.



– Connect and tighten the union nut -1-, to the prescribed torque ⇒ “5.1 Summary of components - gas distribution line with gas inlet valves”, page 399 .



Continued for all vehicles

– Install the battery with the battery tray ⇒ Electrical System; Rep. gr. 27 .

– Install air filter housing ⇒ “2.2 Removing and installing air filter housing”, page 384 .

– Checking the oil level ⇒ Maintenance ; Booklet Octavia III .

Caution

Risk of damaging control units as a result of overvoltage.

- *Do not use charger for jump starting!*

– Top up and bleed cooling system ⇒ “1.2 Draining and filling coolant”, page 209 .

– Install the engine cover ⇒ “1.1 Removing and installing engine trim panel”, page 22 .

– Install the plenum chamber cover ⇒ Body Work; Rep. gr. 66 .

For natural gas vehicles (CNG)

– Open the valves for tank shut-off -N361- and -N362- again with handwheel - T50026- .

Caution

Carry out a leak tightness test on the liquefied petroleum gas system (LPG) ⇒ “3.2 Inspecting the gas system for leaktightness”, page 17 .

Inspect natural gas system for leak-tightness ⇒ Maintenance ; Booklet Octavia III .

Continued for all vehicles

– Interrogate all event memories and delete all event entries which are caused by removing and installing the engine ⇒ Vehicle diagnostic tester.

– After deleting the event memory of the engine control unit the readiness code must be re-generated.

Tightening torques

Note

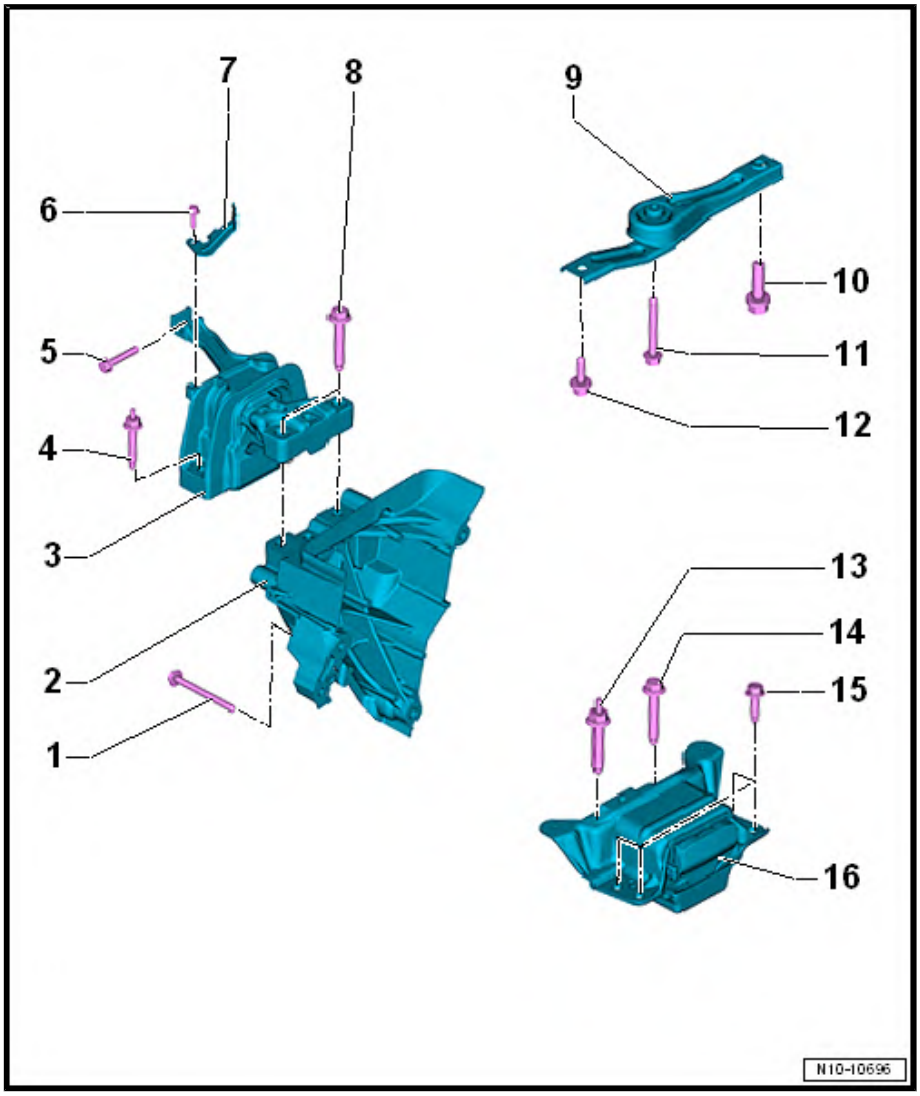
- *Tightening torques apply only for lightly greased, oiled, phosphatized or blackened nuts and screws.*
- *Other lubricants such as engine and gearbox oil are allowed, but no lubricants containing graphite.*
- *Do not use degreased parts.*

Component		Nm
Screws and nuts	M6	9
	M7	15
	M8	20
	M10	40
	M12	65
deviations:		
Engine/gearbox connecting screws ⇒ Gearbox; Rep. gr. 34		
Screws for assembly bracket: ◆ Assembly bracket ⇒ “3.1 Assembly overview - assembly mountings”, page 41 .		

3 Assembly bracket

⇒ “3.1 Assembly overview - assembly mountings”, page 41
⇒ “3.2 Removing and installing engine mount”, page 43
⇒ “3.3 Removing and installing gearbox mount”, page 44
⇒ “3.4 Removing and installing pendulum support”, page 46
⇒ “3.5 Check assembly bracket setting”, page 47
⇒ “3.6 Adjusting the unit mounting”, page 47

3.1 Assembly overview - assembly mountings



1 - Screw
- ❑ replace after removal
- ❑ order of tightening ⇒ page 42
- ❑ 40 Nm + torque a further 90° (1/4 turn)

2 - Engine support bracket
- ❑ Tightening torque and tightening order ⇒ page 42
- ❑ Removing and installing ⇒ “1.5 Removing and installing engine support”, page 59

3 - Engine mounting
- ❑ with supporting arm
- ❑ Removing and installing ⇒ “3.2 Removing and installing engine mount”, page 43

4 - Screw
- ❑ replace after removal
- ❑ 40 Nm + torque a further 90° (1/4 turn)

5 - Screw
- ❑ replace after removal
- ❑ 20 Nm + torque a further 90° (1/4 turn)

6 - Screw
- ❑ 8 Nm

7 - Bracket

8 - Screw
- ❑ replace after removal
- ❑ 60 Nm + torque a further 90° (1/4 turn)

9 - Pendulum support
- ❑ Removing and installing ⇒ “3.4 Removing and installing pendulum support”, page 46

10 - Screw
- ❑ replace after removal

- ❑ Tightening torque and tightening order ⇒ page 42

11 - Screw

- ❑ replace after removal
- ❑ Tightening torque and tightening order ⇒ page 42

12 - Screw

- ❑ replace after removal
- ❑ Tightening torque and tightening order ⇒ page 42

13 - Screw

- ❑ replace after removal
- ❑ 60 Nm + torque a further 90° ($^1/_4$ turn)

14 - Screw

- ❑ Replace
- ❑ 60 Nm + torque a further 90° ($^1/_4$ turn)

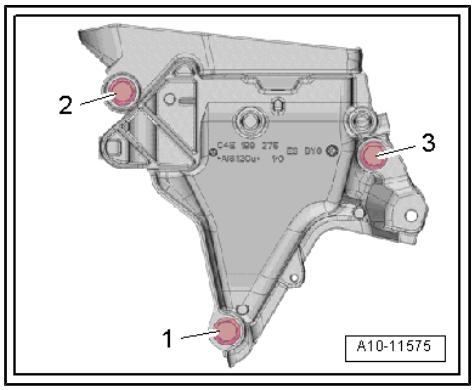
15 - Screw

- ❑ replace after removal
- ❑ 50 Nm + torque a further 90° ($^1/_4$ turn)

16 - Gearbox mount

- ❑ with supporting arm
- ❑ Removing and installing ⇒ “3.3 Removing and installing gearbox mount”, page 44

Engine support bracket - tightening torque and tightening order



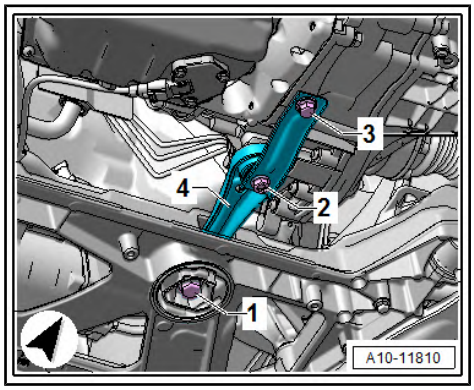
Note

Replace screws which have been tightened firmly to a torquing angle.

– Tighten screws gradually in the given sequence:

Stage	Screws	Tightening torque/torquing angle
1.	-1…3-	7 Nm
2.	-1…3-	40 Nm
3.	-1…3-	90° (torque a further 90° ($^1/_4$ turn)

Install pendulum support



Note

Replace screws which have been tightened firmly to a torquing angle.

– Tighten screws gradually in the given sequence:

Stage	Screws	Tightening torque/torquing angle
1.	-2-, -3-	50 Nm
2.	-1-	130 Nm
3.	-1…3-	90° (torque a further 90° ($^1/_4$ turn)

3.2 Removing and installing engine mount

Special tools and workshop equipment required

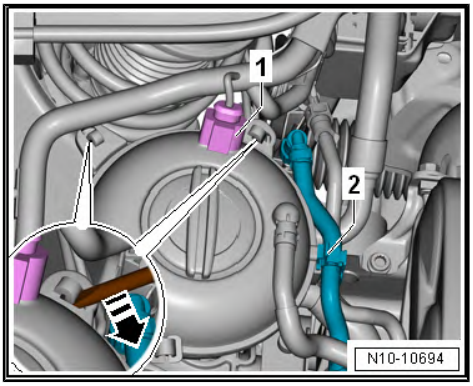
- Supporting device - T30099-
- Adapter - T40091/3-
- Hook - MP9-200/10-
- Adapter - MP9-200/18-
- Support - 10-222A/31-
- Surface - T30119-

Removing

– Unplug connector -1-.

– Expose hose -2- of the activated charcoal filter.

– Unlock catches using a screwdriver -arrow- and lay coolant expansion tank to the side.



For natural gas vehicles (CNG)

DANGER!

Follow safety measures and rules of cleanliness when working on the natural gas system and general instructions for operating a natural gas vehicle (CNG) *⇒ "2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)", page 10* .

– Remove the gas pressure regulator ⇒ "4.2 Removing and installing gas pressure regulator", page 395 .

– Remove the bracket for the gas pressure regulator ⇒ "4.1.1 Summary of components - gas pressure regulator", page 393 .

Continued for all vehicles

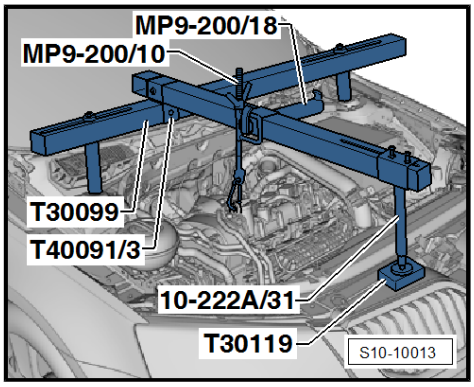
– Remove the cooling water tank cover ⇒ Body Work; Rep. gr. 50 .

– Remove caps of the screw connections of the front suspension strut dome.

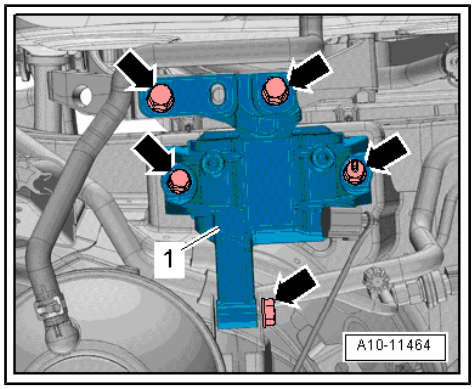
– Install adapter - MP9-200/18 (10-222A/18)- with hook for MP9-200 and T30099 - MP9-200/10 (10-222A/10)- and support - 10-222A/31-3- .

– Set the supporting device - T30099- with the support - 10-222A/31- and supporting device - T30119- onto the front screw fittings of the suspension strut dome as shown.

– Slightly pre-tension engine/gearbox unit with the spindle, do not raise.



– Release screws -arrows- and remove engine mount -1-.



Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

– Check assembly bracket setting
⇒ “3.5 Check assembly bracket setting”, page 47 .

For natural gas vehicles (CNG)

– Open the valves for tank shut-off -N361- and -N362- again with handwheel - T50026- .

Caution

Carry out a leak tightness test on the liquefied petroleum gas system (LPG)
⇒ “3.2 Inspecting the gas system for leaktightness”, page 17 .

Inspect natural gas system for leak-tightness ⇒ Maintenance ; Booklet Octavia III .

3.3 Removing and installing gearbox mount

Special tools and workshop equipment required

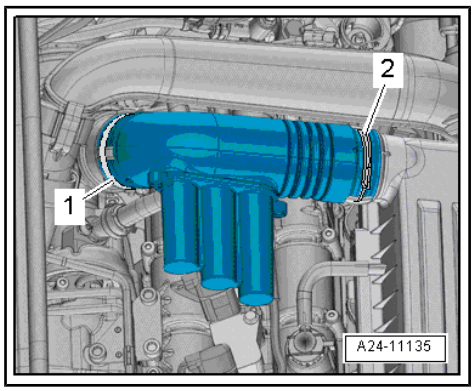
- Supporting device - T30099-
- Adapter - T40091/3-
- Hook for MP9-200 and T30099 - MP9-200/10 (10-222A/10)-
- Adapter - MP9-200/18 (10-222A/18)-
- Support - 10-222A/31-
- Surface - T30119-

Removing

– Remove the cooling water tank cover ⇒ Body Work; Rep. gr. 50 .

– Remove engine cover
⇒ “1.1 Removing and installing engine trim panel”, page 22 .

– Loosen hose clamps -1-, -2- and remove air guide pipes.

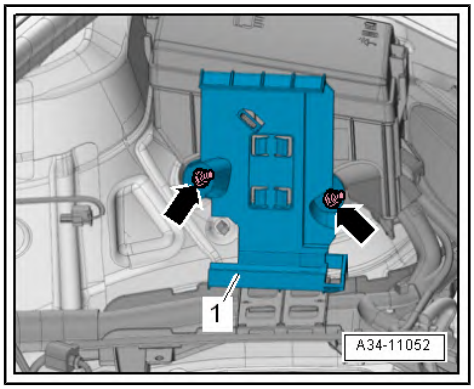


– Remove air filter housing
⇒ “2.2 Removing and installing air filter housing”, page 384 .

– Remove the battery with the battery tray ⇒ Electrical System; Rep. gr. 27 .

– Remove engine control unit
⇒ “10 Engine control unit”, page 424 .

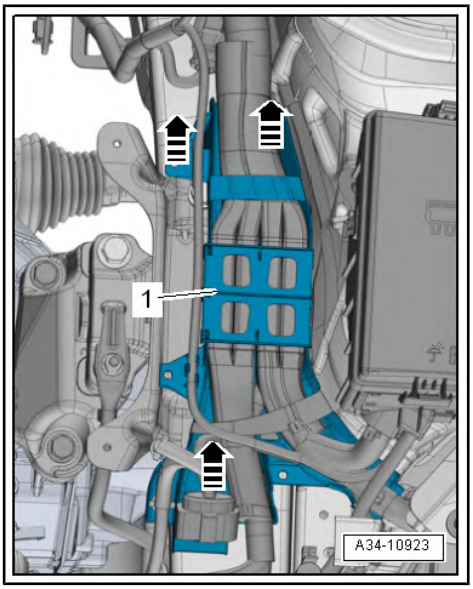
– Unscrew screws -arrows- and remove holder -1-.



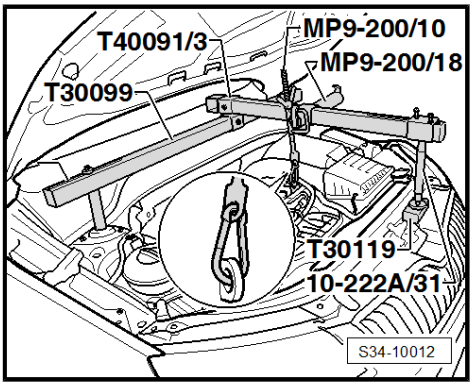
Note

Holders are installed differently according to build version.

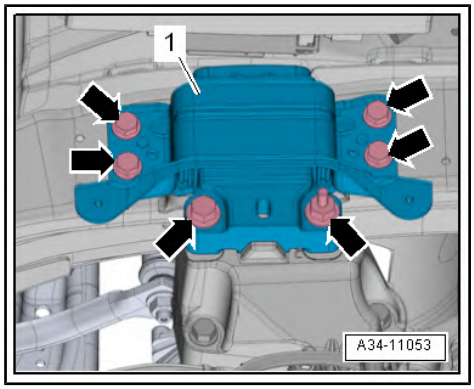
– Unscrew screw -1-, unclip upwards -arrows- and push slightly to the side.
– Remove caps of the screw connections of the front suspension strut dome.
– Install adapter - MP9-200/18 (10-222A/18)- with hook for MP9-200 and T30099 - MP9-200/10 (10-222A/10)- and support - 10-222A/31-3- .



– Set the supporting device - T30099- with the support - 10-222A/31- and supporting device - T30119- onto the front screw fittings of the suspension strut dome as shown.
– Attach spindle snap hook to the engine suspension eye.
– Pre-tension engine/gearbox unit with the spindle, do not raise.



– Release screws -arrows- and remove gearbox mount -1-.



Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

Note

Replace screws which have been tightened firmly to a torquing angle.

Caution

There is a risk of damaging the thread in the gearbox support bracket by positioning the bolts obliquely.

- ***Before screwing in the screws -arrows- the gearbox support bracket and supporting arm of the gearbox mount must be absolutely parallel to each other. If necessary, push up gearbox at the rear using a hydraulic trolley jack.***
- ***Do not remove support bracket - T30099- until the bolts securing the assembly mounting have been tightened to specified torque.***

– Lift gearbox with the support bracket spindle until the gearbox support bracket is touching the supporting arm of the gearbox mount.

– Check assembly bracket setting
⇒ “3.5 Check assembly bracket setting”, page 47 .

– Remove supporting device - T30099- .

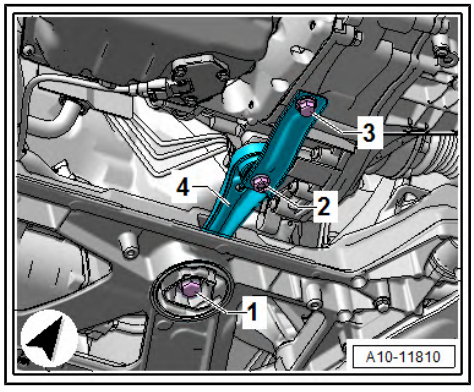
Tightening torques

- Assembly bracket
⇒ “3.1 Assembly overview - assembly mountings”, page 41
- Air filter housing
⇒ “2.1 Assembly overview - air filter housing”, page 383
- ⇒ Electrical System; Rep. gr. 27
- Engine control unit ⇒ “10 Engine control unit”, page 424

3.4 Removing and installing pendulum support

– Remove the sound dampening system ⇒ Body Work; Rep. gr. 66 .

– Undo screws -1-, -2-, -3- and remove the pendulum support.



Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

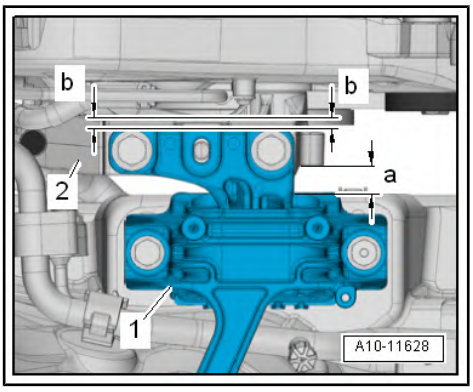
Tightening torques

- Screws for pendulum support
⇒ “3.1 Assembly overview - assembly mountings”, page 41

3.5 Check assembly bracket setting

Work procedure

The following dimensions must be reached:



- A distance of -a- = 13 mm must be present between engine support -2- and engine mount -1-.
- The cast edge on the engine support -2- must be parallel with the engine mount supporting arm -1-.
- Dimension -b- = -b-.

Note

The distance -a- = 10 mm can be checked, for example with suitable round bars.

– If the measured distance is too great or too small, adjust the assembly bracket
⇒ “3.6 Adjusting the unit mounting”, page 47 .

3.6 Adjusting the unit mounting

Special tools and workshop equipment required

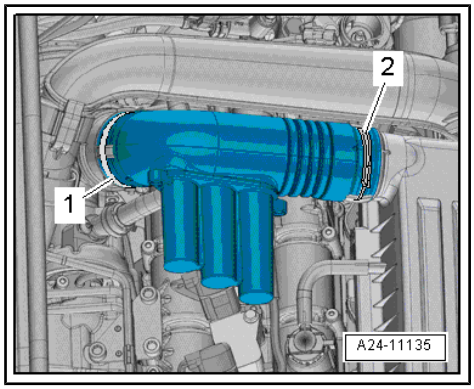
- Supporting device - T30099-
- Adapter - T40091/3-
- Hook for MP9-200 and T30099 - MP9-200/10 (10-222A/10)-
- Adapter - MP9-200/18 (10-222A/18)-
- Support - 10-222A/31-
- Surface - T30119-

Work procedure

– Remove battery tray ⇒ Electrical System; Rep. gr. 27 .

– Loosen hose clamps -1-, -2- and remove air guide pipes.

– Remove air filter housing
⇒ “2.2 Removing and installing air filter housing”, page 384 .



For natural gas vehicles (CNG)

DANGER!

Follow safety measures and rules of cleanliness when working on the natural gas system and general instructions for operating a natural gas vehicle (CNG) ⇒ “2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)”, page 10 .

– Remove the gas pressure regulator
⇒ “4.2 Removing and installing gas pressure regulator”, page 395 .

– Remove the bracket for the gas pressure regulator
⇒ “4.1.1 Summary of components - gas pressure regulator”, page 393 .

Continued for all vehicles

– Remove the cooling water tank cover ⇒ Body Work; Rep. gr. 50 .

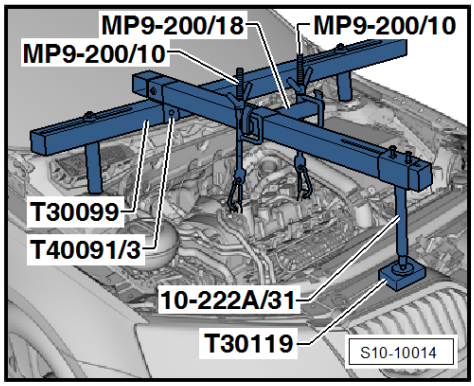
– Remove caps of the screw connections of the front suspension strut dome.

– Install adapter - MP9-200/18 (10-222A/18)- with hook for MP9-200 and T30099 - MP9-200/10 (10-222A/10)- and support - 10-222A/31-3- .

– Set the supporting device - T30099- with the support - 10-222A/31- and supporting device - T30119- onto the front screw fittings of the suspension strut dome as shown.

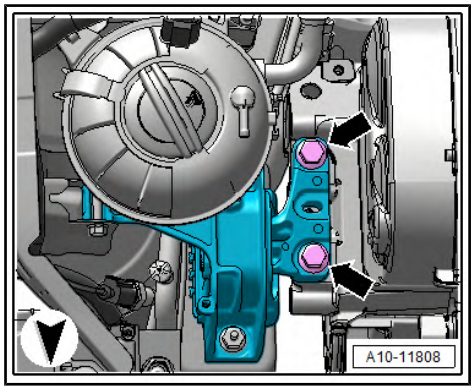
– Attach snap hook to the engine suspension eyes.

– Slightly pre-tension engine/gearbox unit with the spindles, do not raise.

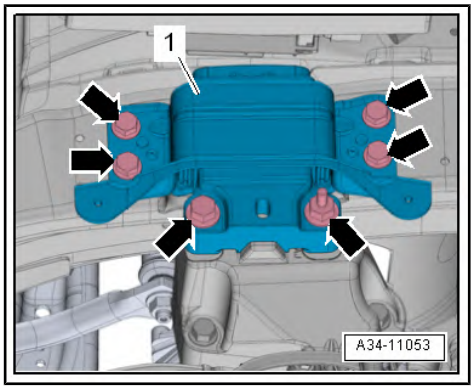


– Unscrew screws -arrows- for engine mount one after another and replace (if not already done during engine installation).

– Initially, loosely insert the screws.



– Unscrew screws -arrows- for gearbox mount -1- after another and replace (if not already done during engine installation).
– Initially, loosely insert the screws.

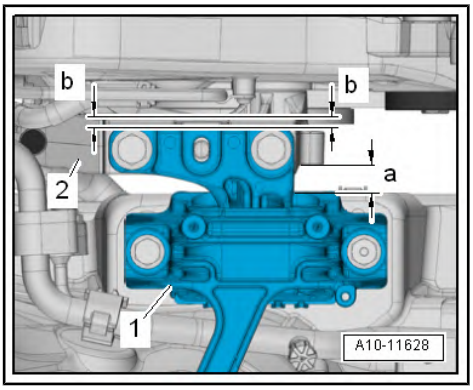


– Move engine/gearbox unit with an assembly lever until the following dimensions are set:

A distance of -a- = 13 mm must be present between engine support -2- and engine mount -1-.

The cast edge on the engine support -2- must be parallel with the engine mount supporting arm -1-.

Dimension -b- = -b-.



Note

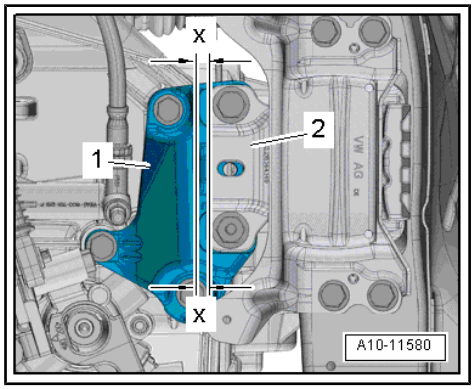
The distance -a- = 10 mm can be checked, for example with suitable round bars.

– Tighten engine mount screws.

– Make sure that on the gearbox side the edges of the supporting arm -2- and gearbox support -1- are parallel.

• Dimension -x- = -x-.

– Tighten gearbox mount screws.



For natural gas vehicles (CNG)

– Open the valves for tank shut-off -N361- and -N362- again with handwheel - T50026- .

Caution

Carry out a leak tightness test on the liquefied petroleum gas system (LPG)
⇒ "3.2 Inspecting the gas system for leaktightness", page 17 .

Inspect natural gas system for leak-tightness ⇒ Maintenance ; Booklet Octavia III .

Continued for all vehicles

Installation is carried out in the reverse order.

Tightening torques

- Assembly bracket
  ⇒ "3.1 Assembly overview - assembly mountings", page 41
- Charge-air system
  ⇒ "2.1 Summary of components - charge air system", page 370
- Battery tray ⇒ Electrical system; Rep. gr. 27
- Air filter
  ⇒ "2.1 Assembly overview - air filter housing", page 383

13 – Crankshaft group

1 Cylinder block on belt pulley side

⇒ “1.1 Assembly overview - poly V-belt drive”, page 51

⇒ “1.2 Removing and installing poly V-belt”, page 55

⇒ “1.3 Removing and installing tensioning device for V-ribbed belt”, page 57

⇒ “1.4 Removing and installing ribbed belt pulley”, page 58

⇒ “1.5 Removing and installing engine support”, page 59

⇒ “1.6 Summary of components - sealing flange on the belt pulley side”, page 63

⇒ “1.7 Replacing crankshaft seal on belt pulley side”, page 65

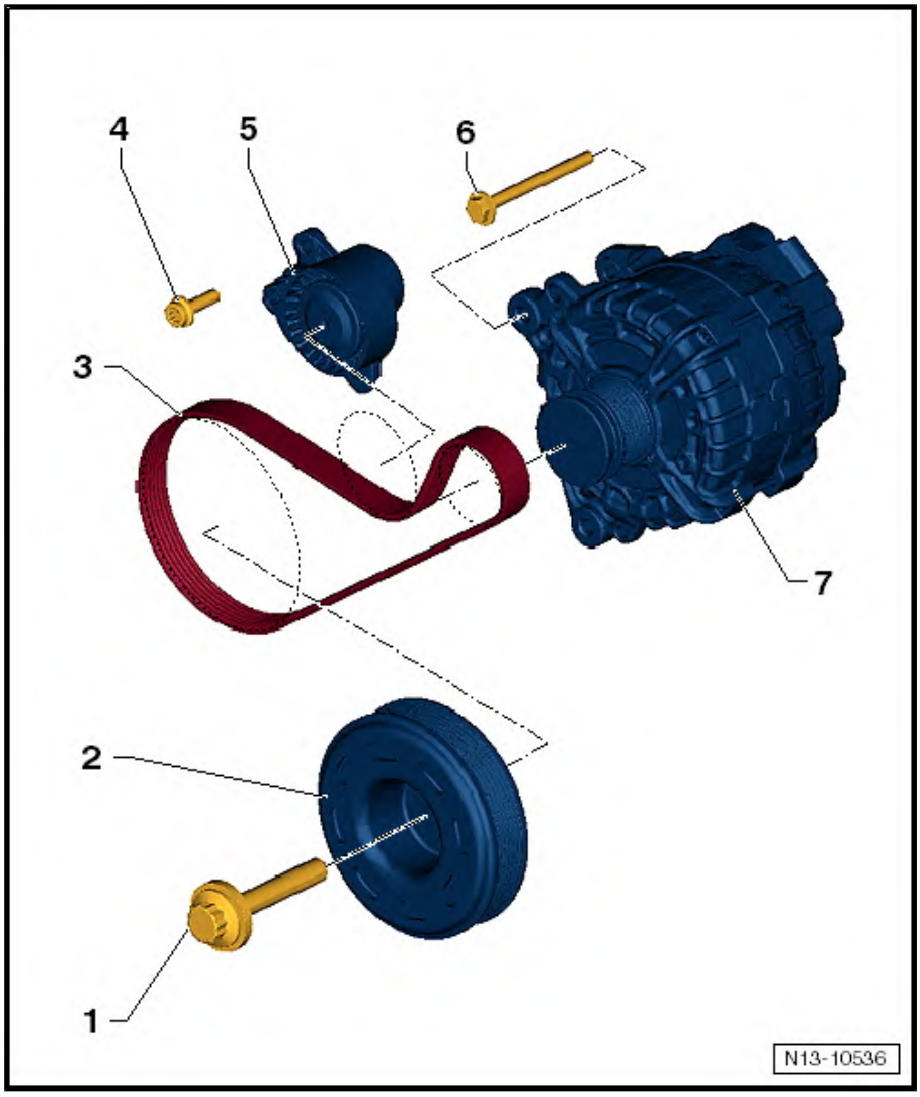
⇒ “1.8 Removing and installing the sealing flange on the belt pulley side”, page 67

1.1 Assembly overview - poly V-belt drive

⇒ “1.1.1 Summary of components - V-ribbed belt drive for vehicles without air conditioning system”, page 51

⇒ “1.1.2 Summary of components - V-ribbed belt drive for vehicles with air conditioning system”, page 54

1.1.1 Summary of components - V-ribbed belt drive for vehicles without air conditioning system



1 - Screw

- ❑ replace after removal
- ❑ to release and tighten use counterholder - T10475-
- ❑ 150 Nm + torque a further 180° (1/2 turn)

> **Caution**
> *Risk of destruction of the engine.*
> *So as not to adjust the timing the crankshaft must not be turned while the screws are removed.*

2 - Crankshaft V-ribbed belt pulley

- ❑ with vibration damper
- ❑ Removing and installing ⇒ “1.4 Removing and installing ribbed belt pulley”, page 58

> **Caution**
> *Risk of destruction of the engine.*
> *So as not to adjust the timing the crankshaft must not be turned out of the “TDC” position while the ribbed belt pulley is removed.*

3 - V-ribbed belt

- ❑ check for wear
- ❑ mark the direction of rotation with chalk or a felt-tip pen before removing
- ❑ do not kink
- ❑ Routing of the ribbed V-belt ⇒ page 56
- ❑ Removing and installing ⇒ “1.2 Removing and installing poly V-belt”, page 55
- ❑ pay attention to the correct position on the belt pulley when installing it.

4 - Screw

- ❑ replace after removal
- ❑ 20 Nm + torque a further 90° (1/4 turn)

5 - Tensioning device for V-ribbed belt

- ❑ Swivel tensioning device for V-ribbed belt with socket insert to slacken the V-ribbed belt
- ❑ lock with locking pin - T10060A-
- ❑ Removing and installing ⇒ “1.3 Removing and installing tensioning device for V-ribbed belt”, page 57

6 - Screw

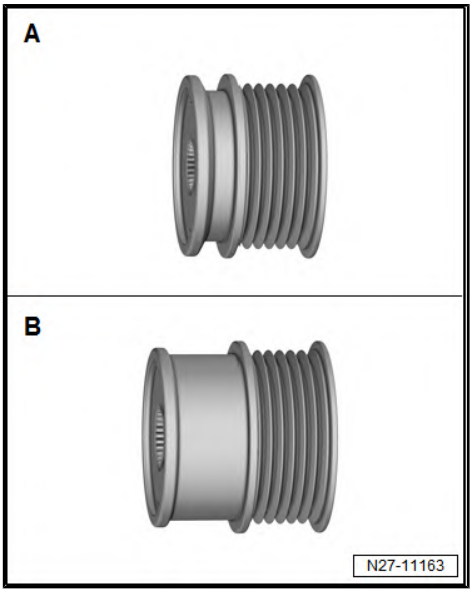
- ❑ 23 Nm

7 - Alternator

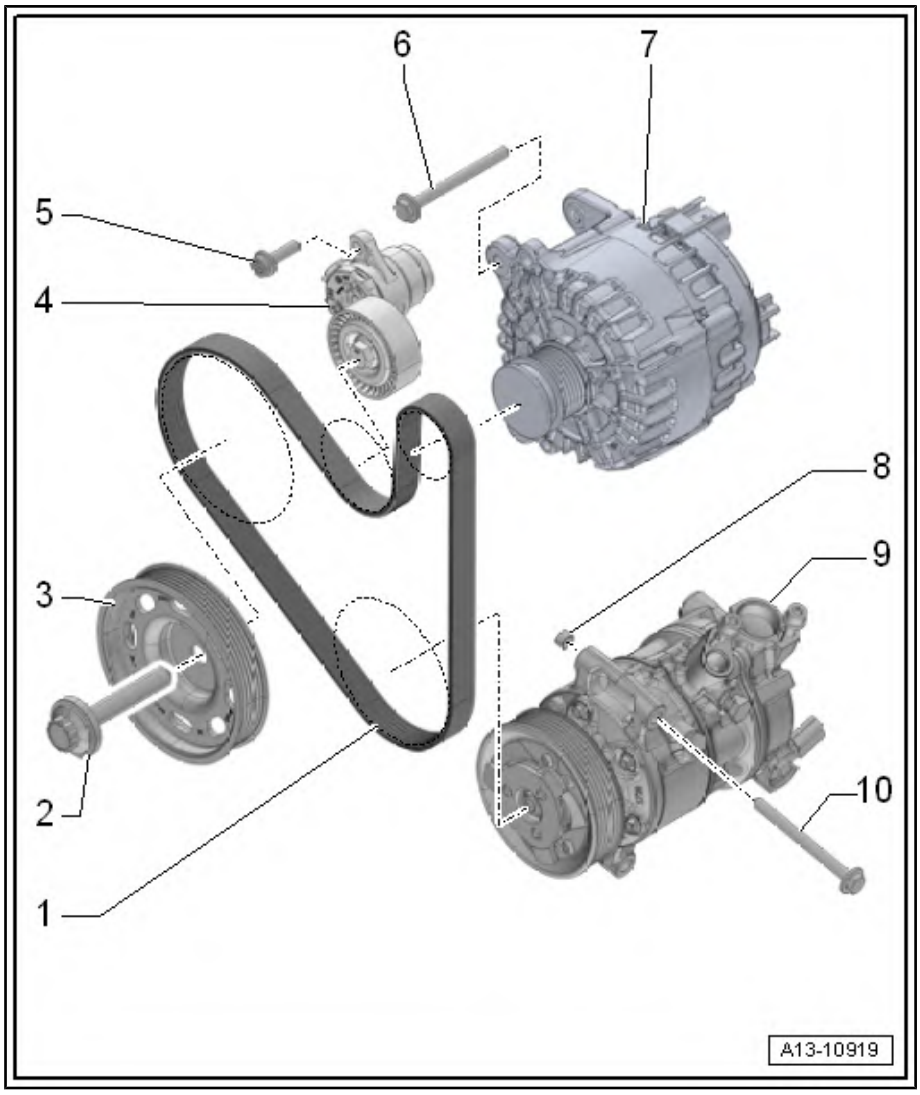
- ❑ removing and installing ⇒ Electrical System; Rep. gr. 27
- ❑ Depending on the model of the alternator, different separation V-ribbed belt pulleys can be fitted with freewheel -A- and -B- ⇒ page 53

- ❑ depending on the model of the belt pulley for alternator, the correct length of the V-ribbed belt must be assigned ⇒ ETKA - Electronic Catalogue of Original Parts

Model of the V-ribbed belt pulley with freewheel



1.1.2 Summary of components - V-ribbed belt drive for vehicles with air conditioning system



1 - V-ribbed belt

- ❑ check for wear
- ❑ mark the direction of rotation with chalk or a felt-tip pen before removing
- ❑ do not kink
- ❑ Routing of the ribbed V-belt ⇒ page 57
- ❑ Removing and installing ⇒ “1.2.1 Removing and installing V-ribbed belt on vehicles without air conditioning system”, page 55
- ❑ pay attention to the correct position on the belt pulley when installing it.

2 - Screw

- ❑ replace after removal
- ❑ to release and tighten use counterholder - T10475-

> **Caution**
> *Risk of destruction of the engine.*
> *So as not to adjust the timing the crankshaft must not be turned while the screws are removed.*

- ❑ 150 Nm + torque a further 180° ($^1/_2$ turn)

3 - Crankshaft V-ribbed belt pulley

- ❑ with vibration damper
- ❑ Removing and installing ⇒ “1.4 Removing and installing ribbed belt pulley”, page 58

> **Caution**
> *Risk of destruction of the engine.*
> *So as not to adjust the timing the crankshaft must not be turned out of the “TDC” position while the ribbed belt pulley is removed.*

4 - Tensioning device for V-ribbed belt

- ❑ Swivel tensioning device for V-ribbed belt with socket insert to slacken the V-ribbed belt
- ❑ lock with locking pin - T10060A-
- ❑ Removing and installing ⇒ “1.3 Removing and installing tensioning device for V-ribbed belt”, page 57

5 - Screw

- ❑ replace after removal
- ❑ 20 Nm + torque a further 90° ($^1/_4$ turn)

6 - Screw

- ❑ 23 Nm

7 - Alternator

- ❑ removing and installing ⇒ Electrical System; Rep. gr. 27
- ❑ Depending on the model of the alternator, different separation V-ribbed belt pulleys can be fitted with freewheel -A- and -B- ⇒ page 55
- ❑ depending on the model of the belt pulley for alternator, the correct length of the V-ribbed belt must be assigned ⇒ ETKA - Electronic Catalogue of Original Parts

8 - Fitting sleeve

- ❑ for the AC compressor

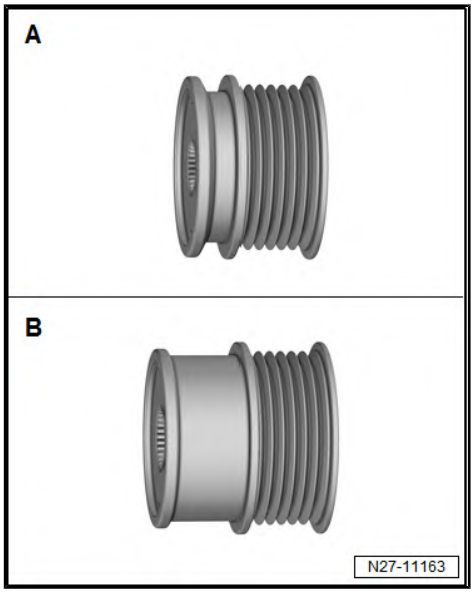
9 - AC compressor

- ❑ Do not unscrew or disconnect refrigerant lines
- ❑ removing and installing ⇒ Heating, Air Conditioning; Rep. gr. 87

10 - Screw

- ❑ 23 Nm

Model of the V-ribbed belt pulley with freewheel



1.2 Removing and installing poly V-belt

⇒ "1.2.1 Removing and installing V-ribbed belt on vehicles without air conditioning system", page 55

⇒ "1.2.2 Removing and installing V-ribbed belt on vehicles with air conditioning system", page 56

1.2.1 Removing and installing V-ribbed belt on vehicles without air conditioning system

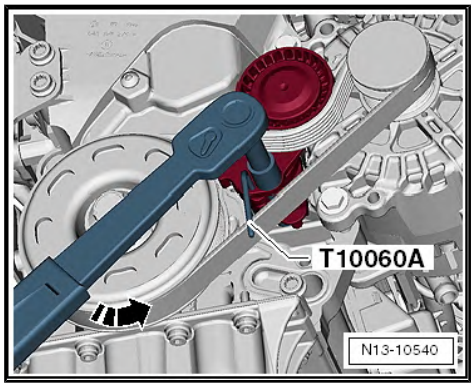
Special tools and workshop equipment required

- ♦ Locking pin - T10060A-

Removing

– Swivel tensioning device in -direction of arrow- in order to slacken the V-ribbed belt.

– Lock tensioning device with locking pin - T10060A- .



Caution

There is a risk of destruction through reversing the rotation direction of an already used V-ribbed belt.

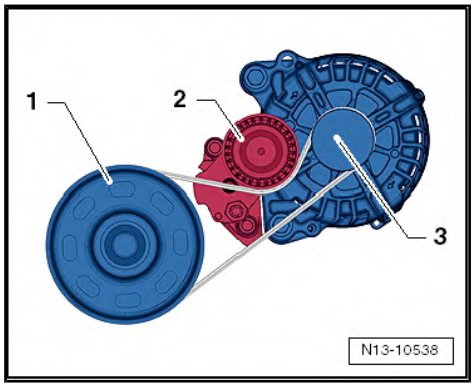
- *Mark the direction of rotation with chalk or a felt-tip pen for the re-installation before removing the V-ribbed belt.*

– Remove poly V-belt.

Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

– Lay the V-ribbed belt as shown in the illustration.



1 - Poly V-belt pulley

2 - Tensioning device for V-ribbed belt

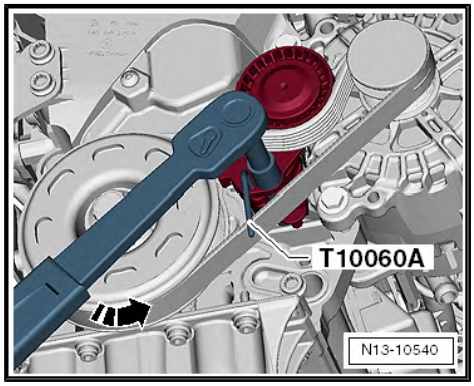
3 - Alternator

– Turn the tensioning element in the -direction of the arrow- and pull out the locking pin - T10060A- .

– Release pressure on tensioning device.

– Check that the V-ribbed belt is positioned correctly.

– Start end and check that the V-ribbed belt is running correctly.



1.2.2 Removing and installing V-ribbed belt on vehicles with air conditioning system

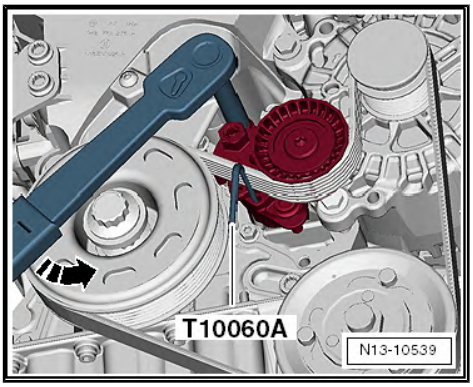
Special tools and workshop equipment required

- Locking pin - T10060A-

Removing

– Swivel tensioning device in -direction of arrow- in order to slacken the V-ribbed belt.

– Lock tensioning device with locking pin - T10060A- .



Caution

There is a risk of destruction through reversing the rotation direction of an already used V-ribbed belt.

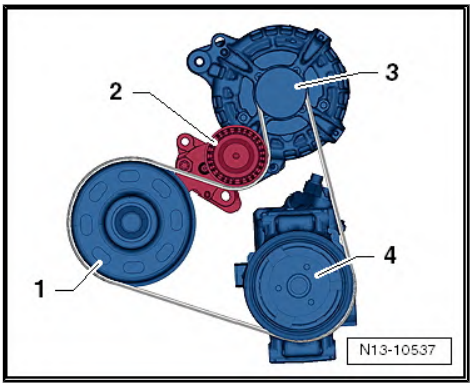
- *Mark the direction of rotation with chalk or a felt-tip pen for the re-installation before removing the V-ribbed belt.*

– Remove poly V-belt.

Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

– Lay the V-ribbed belt as shown in the illustration:



1 - Poly V-belt pulley

2 - Tensioning device for V-ribbed belt

3 - Alternator

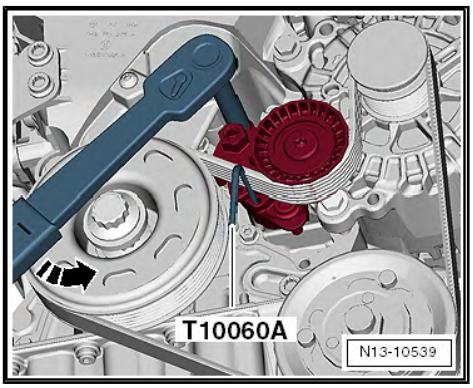
4 - AC compressor

– Turn the tensioning element in the -direction of the arrow- and pull out the locking pin - T10060A- .

– Release pressure on tensioning device.

– Check that the V-ribbed belt is positioned correctly.

– Start end and check that the V-ribbed belt is running correctly.



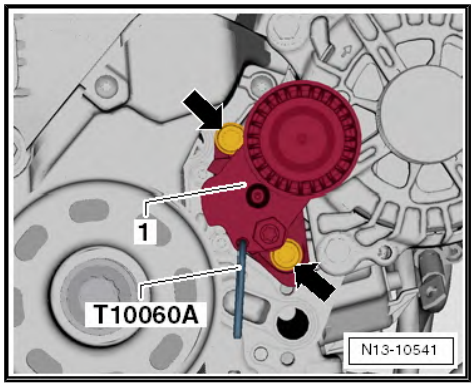
1.3 Removing and installing tensioning device for V-ribbed belt

Removing

– Remove the V-ribbed belt from the tensioning device .

- vehicles without air conditioning
  ⇒ “1.2.1 Removing and installing V-ribbed belt on vehicles without air conditioning system”, page 55
- Vehicles with air conditioning
  ⇒ “1.1.2 Summary of components - V-ribbed belt drive for vehicles with air conditioning system”, page 54

– Release screws -arrows- and pull off tensioning device -1- for V-ribbed belt.



Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

– Install the V-ribbed belt.

- vehicles without air conditioning
  ⇒ “1.2.1 Removing and installing V-ribbed belt on vehicles without air conditioning system”, page 55
- Vehicles with air conditioning
  ⇒ “1.2.2 Removing and installing V-ribbed belt on vehicles with air conditioning system”, page 56

Tightening torques

- Tensioning device screws - vehicles without air conditioning system
  ⇒ “1.1.1 Summary of components - V-ribbed belt drive for vehicles without air conditioning system”, page 51
- Tensioning device screws - vehicles with air conditioning
  ⇒ “1.1.2 Summary of components - V-ribbed belt drive for vehicles with air conditioning system”, page 54

1.4 Removing and installing ribbed belt pulley

Special tools and workshop equipment required

- Counterholder - T10475-

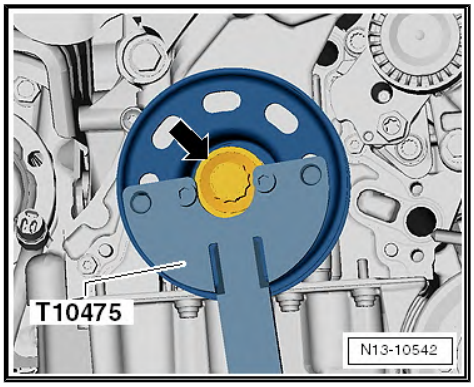
Removing

– Remove the sound dampening system ⇒ Body Work; Rep. gr. 66 .

– Remove V-ribbed belt
  ⇒ “1.2 Removing and installing poly V-belt”, page 55 .

– Loosen screw -arrow- for crankshaft-belt pulley; to do so, use counterholder - T10475- .

– Unscrew screw and remove ribbed belt pulley.



Caution

Risk of destruction of the engine.

- *So as not to adjust the timing the crankshaft must not be turned while the ribbed belt pulley is removed.*

Install

Note

- *Replace screws which have been tightened firmly to a torquing angle.*
- *All contact surfaces between screws, ribbed belt pulley and crankshaft toothed belt pulley must be free of oil and grease.*

Assembling is performed continuing in the reverse order, while paying attention to the following:

– Install the V-ribbed belt
⇒ “1.2 Removing and installing poly V-belt”, page 55 .

Tightening torques

- Screw for the poly V-ribbed belt pulley crankshaft
⇒ “1.1 Assembly overview - poly V-belt drive”, page 51

1.5 Removing and installing engine support

Special tools and workshop equipment required

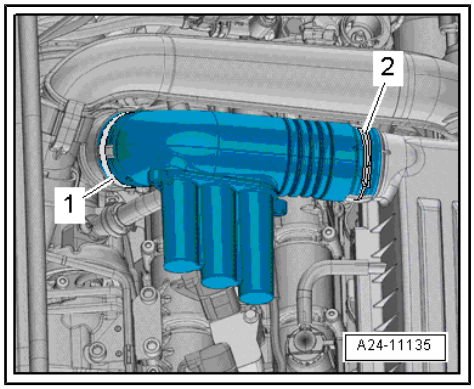
- Supporting device - T30099-
- Adapter - T40091/3-
- Hook - MP9-200/10-
- Adapter - MP9-200/18-
- Support - 10-222A/31-
- Surface - T30119-

Removing

– Remove the battery with the battery tray ⇒ Electrical System; Rep. gr. 27 .

– Drain coolant ⇒ “1.2 Draining and filling coolant”, page 209 .

– Loosen hose clamps -1-, -2- and remove air guide pipes.



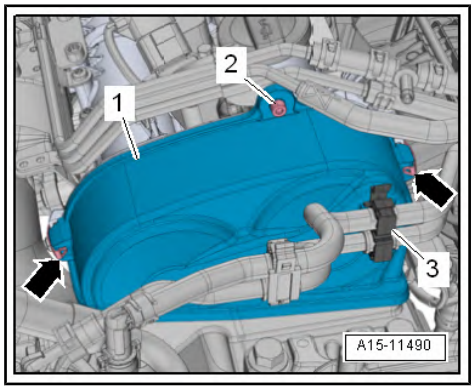
– Remove air filter housing
⇒ “2.2 Removing and installing air filter housing”, page 384 .

– Remove ribbed V-belt tensioning device
⇒ “1.3 Removing and installing tensioning device for V-ribbed belt”, page 57 .

– Expose vacuum hose on the holder -3-.

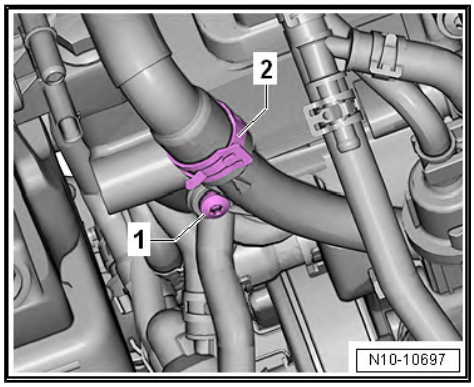
– Unscrew screw -2-.

– Loosen clips -arrows- and remove toothed belt guard -1- upwards.

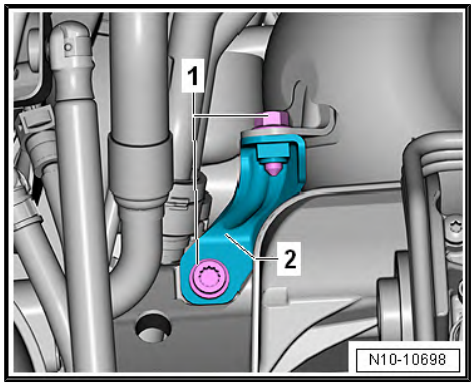


– Unscrew screw -1-.

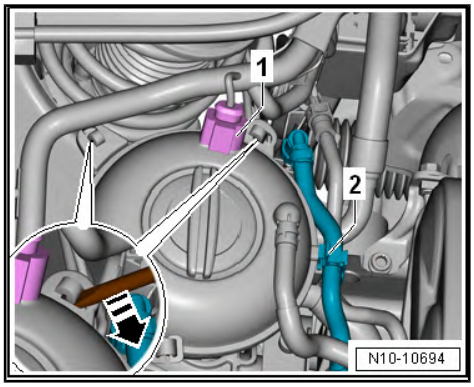
– Loosen hose clamp -2- and remove coolant hose.



– Unscrew screws -1- and remove the catalytic converter holder -2-.



– Separate plug connection -1-.
– Expose hose -2- of the activated charcoal filter.
– Unlock catches using a screwdriver -arrow- and lay coolant expansion tank to the side.



For natural gas vehicles (CNG)

DANGER!

Follow safety measures and rules of cleanliness when working on the natural gas system and general instructions for operating a natural gas vehicle (CNG) ⇒ "2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)", page 10 .

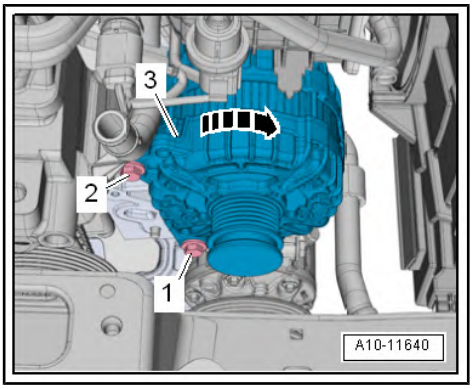
– Remove the gas pressure regulator ⇒ "4.2 Removing and installing gas pressure regulator", page 395 .
– Remove the bracket for the gas pressure regulator ⇒ "4.1.1 Summary of components - gas pressure regulator", page 393 .

For vehicles with air conditioning

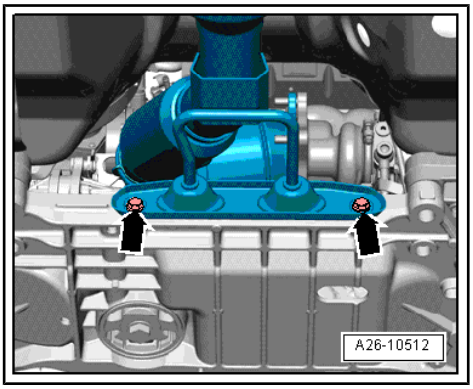
– Open holding clamps on the air conditioning system pipes.

Continued for all vehicles

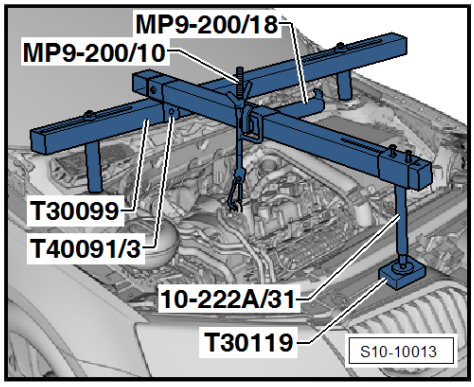
– Loosen screw -1-, but do not remove it.
– Unscrew screw -2-.
– Swivel generator -3- forward in -direction of the arrow-.



– Release screws -arrows- at holder for pre-exhaust pipe.
– Remove pendulum support ⇒ "3.4 Removing and installing pendulum support", page 46 .
– Remove the cooling water tank cover ⇒ Body Work; Rep. gr. 50 .
– Remove caps of the screw connections of the front suspension strut dome.
– Install adapter - MP9-200/18 (10-222A/18)- with hook for MP9-200 and T30099 - MP9-200/10 (10-222A/10)- and support - 10-222A/31-3- .



– Set the supporting device - T30099- with the support - 10-222A/31- and supporting device - T30119- onto the front screw fittings of the suspension strut dome as shown.

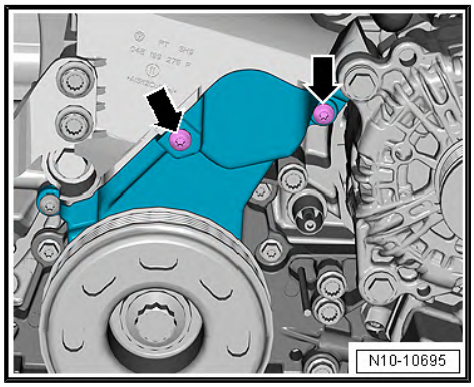


– Attach snap hook to the engine suspension eye, right.

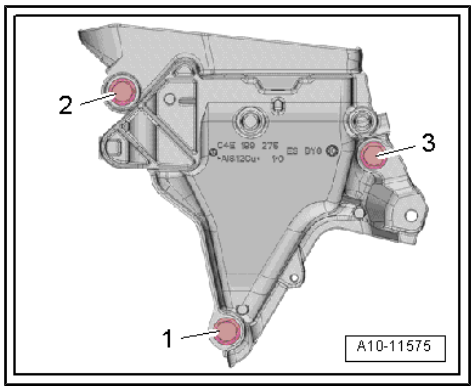
– Slightly pre-tension engine/gearbox unit with the spindle, do not raise.

– Remove engine mounts
⇒ “3.2 Removing and installing engine mount”, page 43 .

– Remove bolts -arrows-.

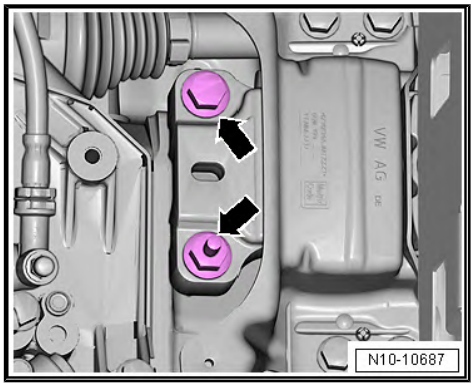


– Unscrew screws -1-, -2-, -3-.



– Release screws -arrows-.

– Press engine/gearbox unit slightly to the left and remove engine support.



Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

For natural gas vehicles (CNG)

– Open the valves for tank shut-off -N361- and -N362- again with handwheel - T50026- .

Caution

Carry out a leak tightness test on the liquefied petroleum gas system (LPG)
⇒ "3.2 Inspecting the gas system for leaktightness", page 17 .

Inspect natural gas system for leak-tightness ⇒ Maintenance ; Booklet Octavia III .

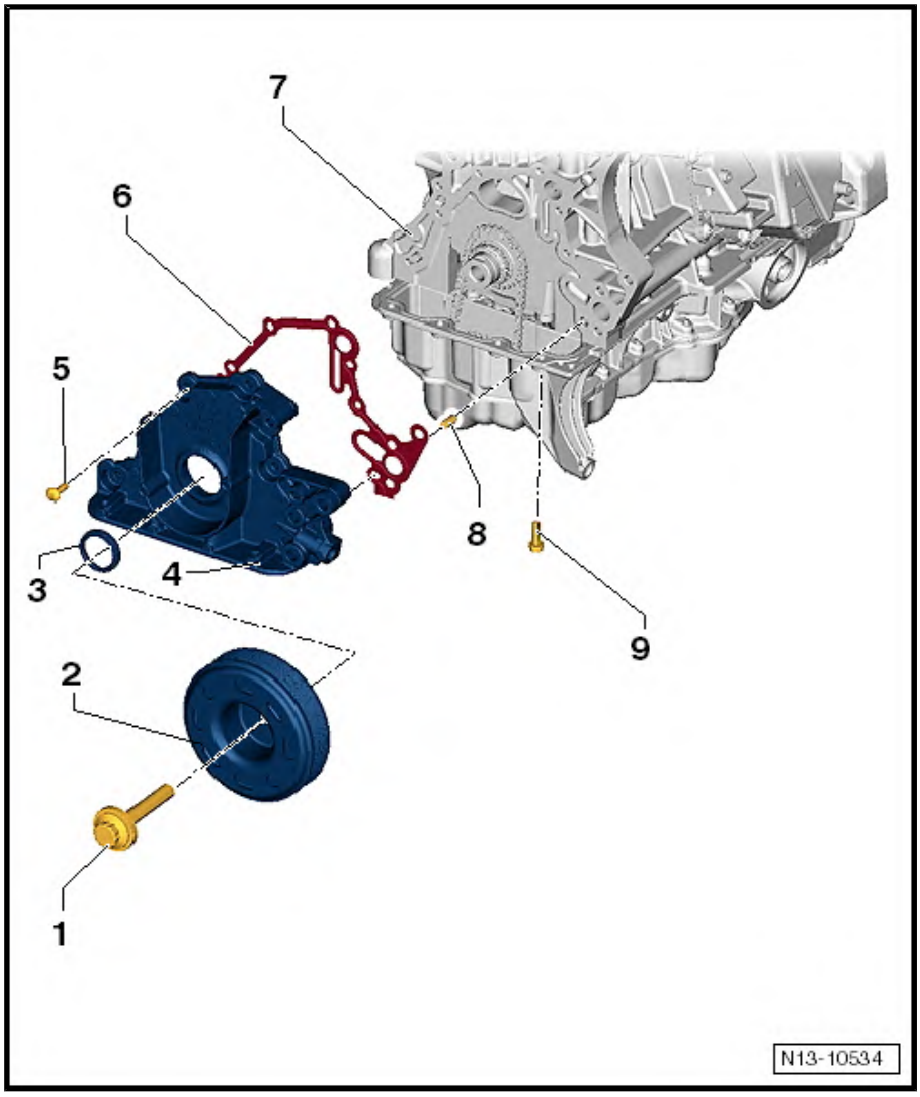
Continued for all vehicles

– Check assembly bracket setting
⇒ "3.5 Check assembly bracket setting", page 47 .

Tightening torques

- Assembly bracket
⇒ "3.1 Assembly overview - assembly mountings", page 41
- Cylinder block on belt pulley side
⇒ "1.1 Assembly overview - poly V-belt drive", page 51
- Toothed belt drive
⇒ "2.1 Summary of components - toothed belt guard", page 106
- Coolant pipes
⇒ "3.1 Summary of components - coolant pipe", page 230
- Charge-air system
⇒ "2.1 Summary of components - charge air system", page 370
- Air filter
⇒ "2.1 Assembly overview - air filter housing", page 383
- Removing and installing exhaust pipes/silencers
⇒ "1.1 Summary of components - Pre-exhaust pipe with catalytic converter", page 427
- Battery tray ⇒ Electrical system; Rep. gr. 27
- Wiper arms ⇒ Electrical system; Rep. gr. 92

1.6 Summary of components - sealing flange on the belt pulley side



1 - Screw

- ❑ replace after removal
- ❑ to release and tighten use counterholder - T10475-
- ❑ 150 Nm + torque a further 180° ($^1/_2$ turn)

> **Caution**
> *Risk of destruction of the engine.*
> *So as not to adjust the timing the crankshaft must not be turned while the ribbed belt pulley is removed.*

2 - Poly V-belt pulley

- ❑ with vibration damper
- ❑ Removing and installing ⇒ “1.4 Removing and installing ribbed belt pulley”, page 58

> **Caution**
> *Risk of destruction of the engine.*
> *So as not to adjust the timing the crankshaft must not be turned out of the “TDC” position while the ribbed belt pulley is removed.*

3 - Sealing ring

- ❑ for crankshaft on the belt pulley side
- ❑ replace after removal ⇒ “1.7 Replacing crankshaft seal on belt pulley side”, page 65
- ❑ do not oil

4 - Sealing flange on the belt pulley side

- ❑ must be positioned on dowel pins
- ❑ Removing and installing ⇒ “1.8 Removing and installing the sealing flange on the belt pulley side”, page 67

5 - Screw

- ❑ Different diameters⇒ ETKA - Electronic Catalogue of Original Parts
- ❑ replace after removal
- ❑ Tightening torque and tightening order ⇒ page 65

6 - Gasket

- ❑ replace after removal

7 - Cylinder block

- ❑ After replacing, renew all coolant ⇒ “1.2 Draining and filling coolant”, page 209

8 - Fit pin

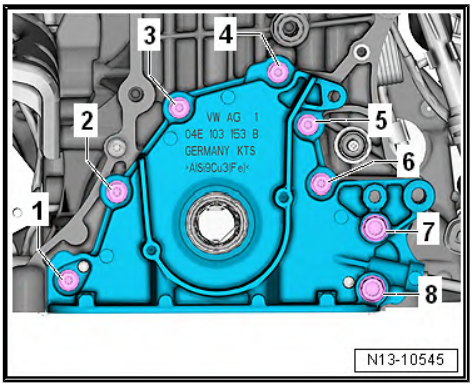
- ❑ 2 pieces

9 - Screw

- ❑ replace after removal

❑ Tightening torque and tightening order ⇒ page 65

Sealing flange on the belt pulley side - tightening torque and tightening order



Note

Replace screws which have been tightened firmly to a torquing angle.

– Tighten screws gradually:

Stage	Screws	Tightening torque/torquing angle
1.	-1…8-	by hand as far as the stop
2.	-1…8-	crosswise 8 Nm
3.	-7-, -8-	20 Nm
4.	-1…8-	90° (torque a further 90° ($^1/_4$ turn)

1.7 Replacing crankshaft seal on belt pulley side

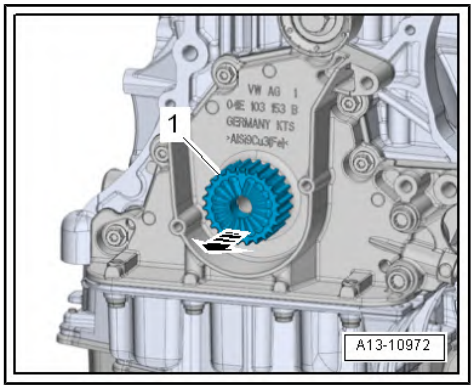
Special tools and workshop equipment required

- Assembly tool - T10485/1,2 a 3-
- Extraction hook - T20143-

Work procedure

– Remove toothed belt
⇒ “2.5 Removing and installing toothed belt”, page 140 .

– Remove crankshaft toothed belt pulley -1- -arrow-.

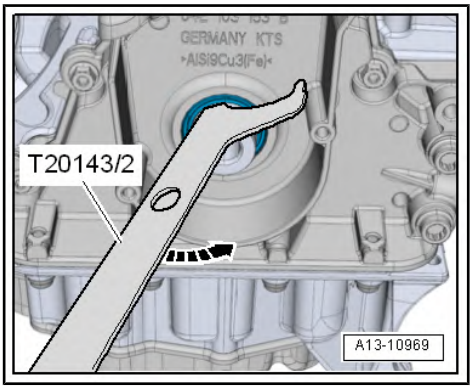


Caution

Risk of destruction of the engine.

- ***So as not to adjust the timing the crankshaft must not be turned out of the “TDC” position while the ribbed belt pulley is removed.***

– Lift out sealing ring using the extractor hook -T20143/2- -arrow-.



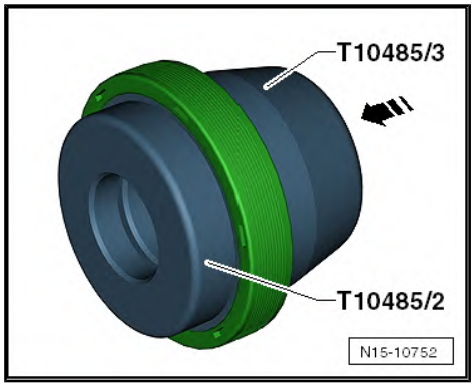
– Clean the contact and sealing surfaces.

Note

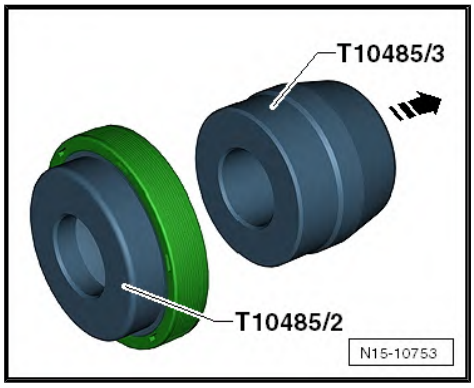
Do not oil new sealing ring.

– Push new sealing ring in -direction of the arrow- over the assembly sleeve - T10485/3- onto the guide bushing - T10485/2- .

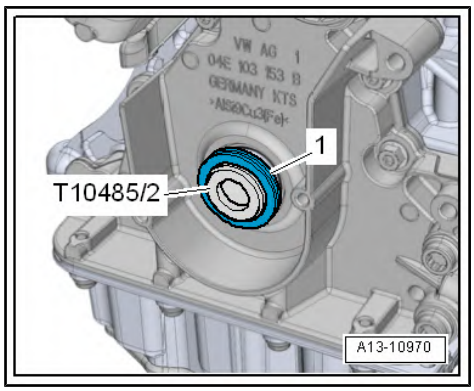
• Fitting position: Closed side of sealing ring points to the thrust piece. - T10485/1-



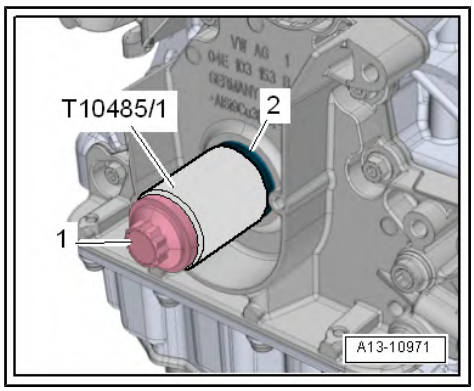
– Pull off assembly sleeve - T10485/3- in -direction of arrow-.



– Fit guide bushing - T10485/2- with seal -1- onto crankshaft journal.



– Pull sealing ring -2- in to the stop using the thrust piece - T10485/1- and the belt pulley screw -1-.

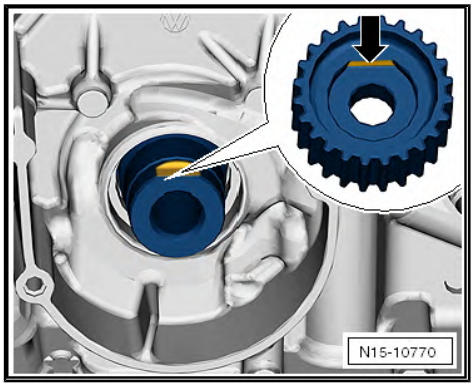


– Fit crankshaft toothed belt pulley onto the crankshaft.

• The contact surface between the V-ribbed belt pulley and the crankshaft toothed belt pulley must be free of oil and grease.

• Milled surface -arrow- on the crankshaft toothed belt must be positioned on the crankshaft stub.

– install (set the timing)
⇒ “2.5 Removing and installing toothed belt”, page 140 .



1.8 Removing and installing the sealing flange on the belt pulley side

Special tools and workshop equipment required

♦ Cleaning and degreasing agent , e.g. -D 009 401 04-

Removing

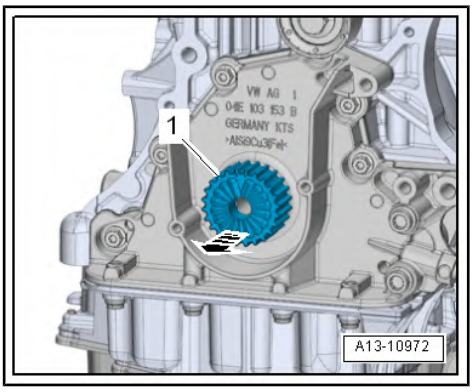
– Remove toothed belt
⇒ “2.5 Removing and installing toothed belt”, page 140 .

– Remove crankshaft toothed belt pulley -1- -arrow-.

Caution

Risk of destruction of the engine.

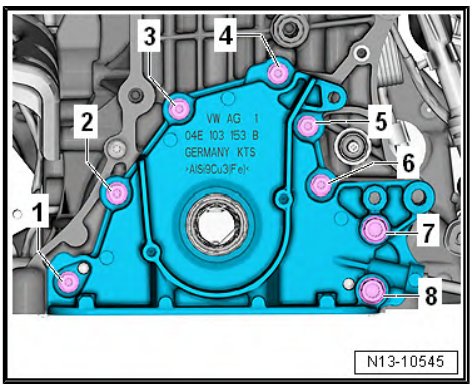
♦ *So as not to adjust the timing the crankshaft must not be turned out of the “TDC” position while the ribbed belt pulley is removed.*



– Remove sump top part
⇒ “1.5 Removing and installing oil sump top part”, page 190 .

– Unscrew the screws -1- to -8- and carefully loosen the sealing flange from the bonding.

– Drive out the gasket ring from the removed sealing flange.



Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

Caution

Risk of contamination of the lubrication system by sealant residues.

– Remove sealant residues from the cylinder block.

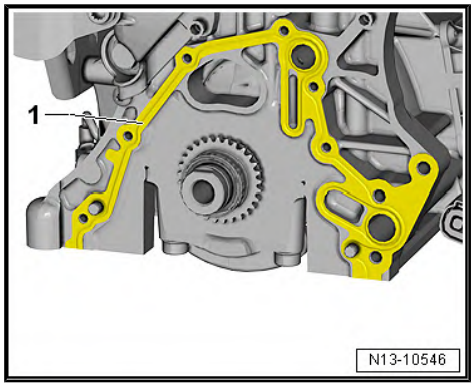
– Clean oil and grease from sealing surfaces.

– Push gasket -1- onto the dowel pins on the cylinder block.

– Carefully push sealing flange onto the dowel pins on the cylinder block.

– Tighten sealing flange screws ⇒ page 65 .

– Install the gasket ring for the crankshaft on the belt pulley side ⇒ “1.7 Replacing crankshaft seal on belt pulley side”, page 65 .

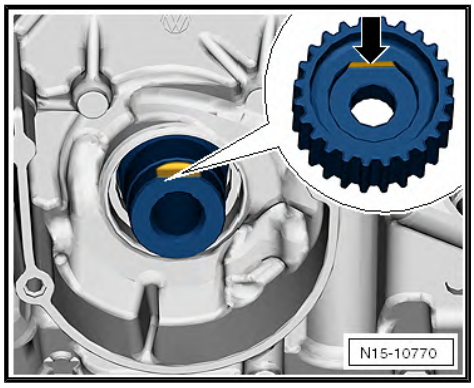


– Fit crankshaft toothed belt pulley onto the crankshaft.

- The contact surface between the V-ribbed belt pulley and the crankshaft toothed belt pulley must be free of oil and grease.
- Milled surface -arrow- on the crankshaft toothed belt must be positioned on the crankshaft stub.

– Install sump top part ⇒ “1.5 Removing and installing oil sump top part”, page 190 .

– install (set the timing) ⇒ “2.5 Removing and installing toothed belt”, page 140 .



Tightening torques

- Sealing flange on the belt pulley side ⇒ page 65
- Sump top part ⇒ “1.1 Summary of components - oil sump and oil pump”, page 184

2 Cylinder block on gearbox side

⇒ “2.1 Assembly overview - cylinder block, gearbox end”, page 69

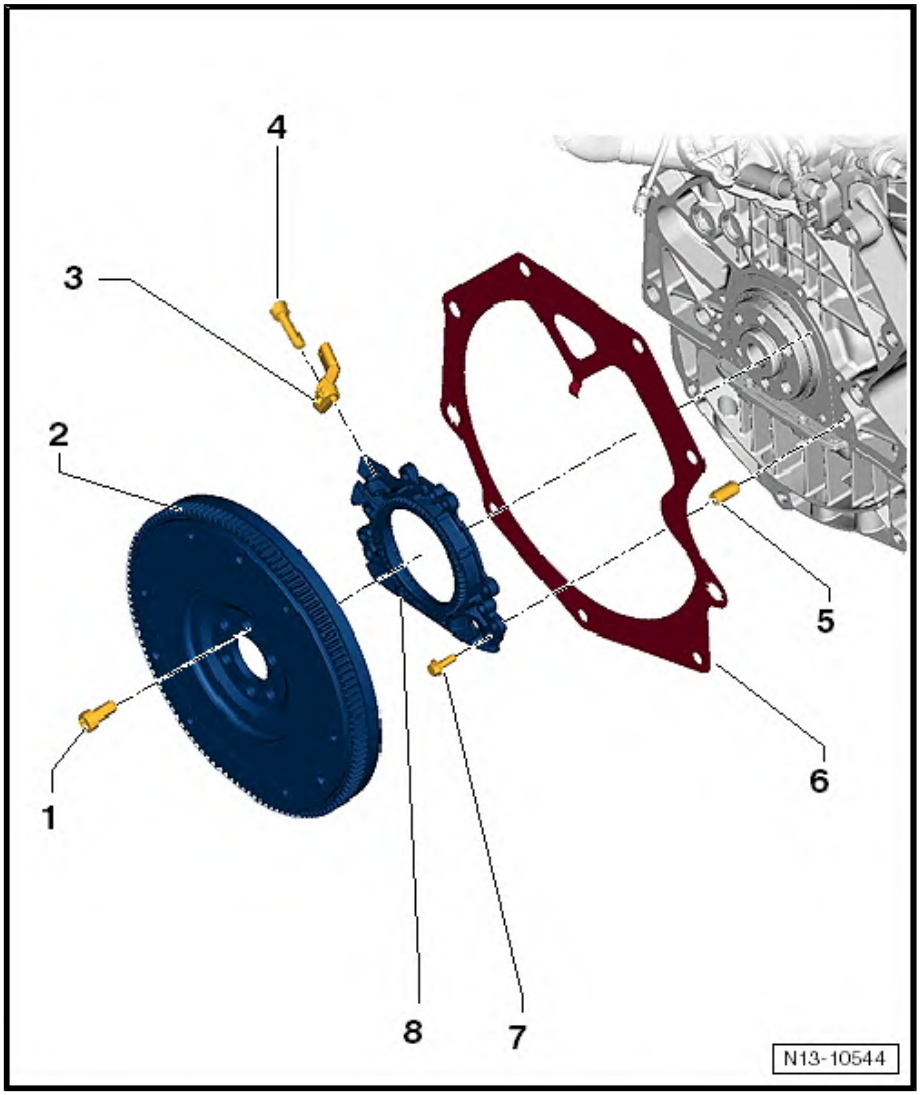
⇒ “2.2 Removing and installing flywheel”, page 70

⇒ “2.3 Removing and installing the sealing flange on the gearbox side”, page 72

2.1 Assembly overview - cylinder block, gearbox end

Note

Secure engine to engine and gearbox mount for assembly work on the engine ⇒ “2.3 Securing the engine to the assembly stand”, page 34 .



1 - Screw

- ❑ replace after removal
- ❑ 60 Nm + torque a further 90° (1/4 turn)

2 - Flywheel

- ❑ on vehicles with automatic gearbox - DSG two-mass flywheel version
- ❑ Removing and installing ⇒ “2.2 Removing and installing flywheel”, page 70
- ❑ can be installed only in one position

3 - Engine speed sender - G28-

- ❑ Removing and installing ⇒ “1.6 Removing and installing engine speed sender G28 ”, page 445

4 - Screw

- ❑ 5 Nm

5 - Fit pin

- ❑ 2 pieces

6 - Intermediate plate

- ❑ do not damage or bend during assembly work
- ❑ installing ⇒ page 70

7 - Screw

- ❑ Tightening torque and tightening order ⇒ page 70

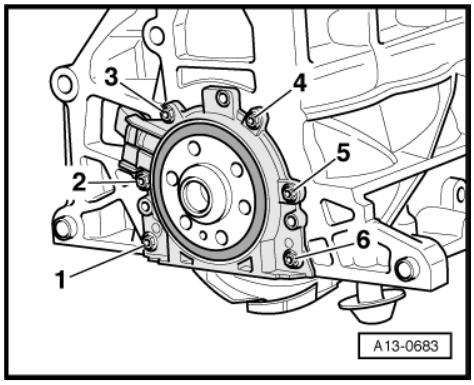
8 - Sealing flange with sender wheel and oil seal

- ❑ Renew sealing flange complete with oil seal and sender wheel only
- ❑ Removing and installing ⇒ “2.3 Removing and installing the sealing flange on the gearbox side”, page 72

Sealing flange on the gearbox side - tightening torque and tightening order

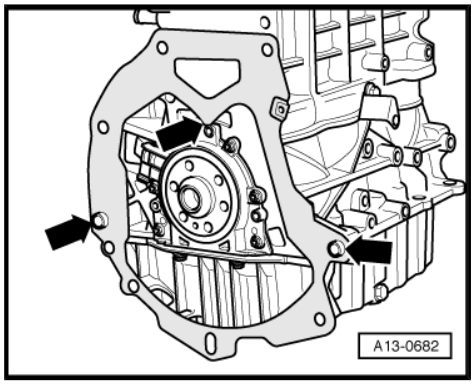
– Tighten screws gradually as follows:

Stage	Screws	Tightening torque
1.	-1…6-	by hand as far as the stop
2.	-1…6-	tighten crosswise in steps up to 10 Nm



Installing intermediate plate

– Insert intermediate plate on sealing flange top -arrow - and push onto the dowel sleeves bottom -arrows -



2.2 Removing and installing flywheel

Special tools and workshop equipment required

♦ Counterholder - MP1-223 (3067)-

or

♦ Engine mount - MP 1-202 (VW 540)-

♦ Bushing - T30010 (VW 540/1B)-

♦ Flywheel lock - MP 1-504-

Removing

• Gearbox removed

– Remove clutch on vehicles with manual gearbox ⇒ Gearbox; Rep. gr. 30 .

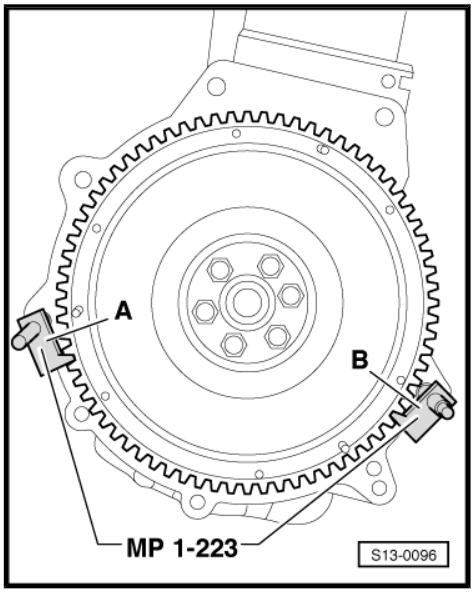
Engine installed

– Insert the counterholder - MP1-223 (3067)- into the bore hole on the cylinder block.

• Fitting position of the counterholder:

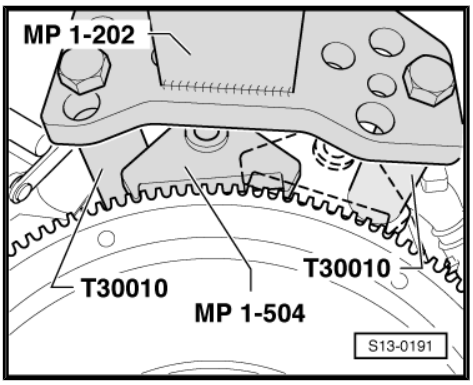
A - for tightening

B - for slackening



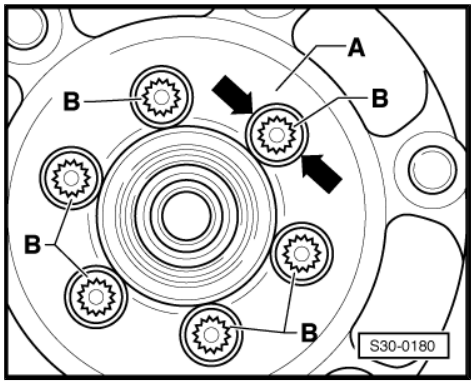
Engine removed

– Position the flywheel lock - MP 1-504- on the starter ring gear of the flywheel and turn crankshaft until the lock rests against the sleeve - T30010 - .



Vehicles with two-mass flywheel

– Rotate the secondary side -A- of the two-mass flywheel in such a way that the screws -B- are positioned in the middle of the holes -arrows-.



Caution

- *Do not unscrew screws -B- using a pneumatic power wrench or impact wrench - unscrew by hand.*
- *When unscrewing the screws -B-, ensure that no screw head catches on the secondary side -A- of the two-mass flywheel, otherwise the flywheel will be damaged.*
- *Rotate flywheel -A- so that the screws -B- are positioned in the centre of the bores -arrows-.*

Continued for all vehicles

– Release screws and remove flywheel.

Install

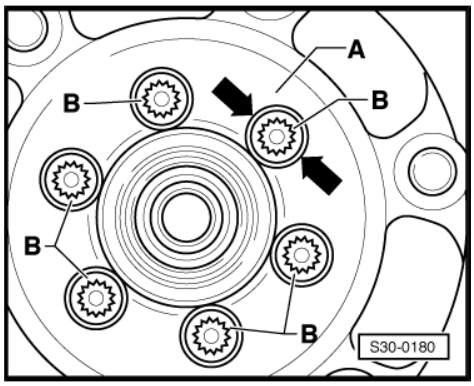
Installation is performed in the reverse order, pay attention to the following points:

Note

Use new screws for attaching.

Vehicles with two-mass flywheel

– Rotate the secondary side -A- of the two-mass flywheel in such a way that the screws -B- are positioned in the middle of the holes -arrows-.



Continued for all vehicles

1. Screw in all the screws by hand.
2. Tighten all the screws crosswise to 60 Nm.
3. Torque all the screws crosswise a further 90° ($^1/_4$ turn).

2.3 Removing and installing the sealing flange on the gearbox side

Special tools and workshop equipment required

- Depth gauges , e.g. -VAS 6082-
- Assembly device - T10134-
- Fixing screw - T10340-
- Spark plug wrench , e.g. -3122 B-
- 3x Screw M6 x 35

Work procedure

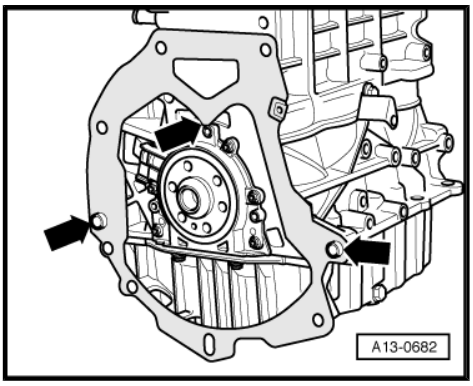
- Gearbox removed ⇒ Gearbox.; Rep. gr. 34

Note

- *For reasons of clarity, the work was performed with the engine removed.*
- *The work sequences are identical with the engine installed and gearbox removed.*

– Remove flywheel or driver disc
⇒ “2.2 Removing and installing flywheel”, page 70 .

– Remove the intermediate plate from the dowel sleeves -arrows - and place to one side.



Position crankshaft to “TDC”.

– Remove ignition coil with power output stage 1
⇒ “1.2 Removing and installing ignition coils with output stage”, page 442 .

– Remove ignition plug cylinder 1 with spark plug socket wrench , e. g. -3122 B- .

Set the correct position of the crankshaft for screwing in the fixing screw.

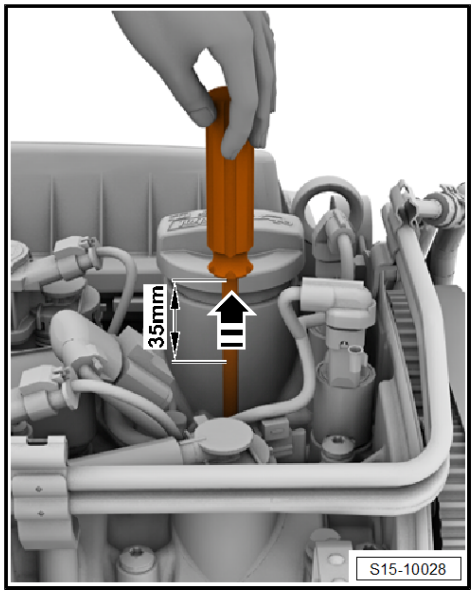
– Carefully insert a screwdriver into the opening of the ignition plug, minimum length of shaft 250 mm, in -direction of arrow- so that it touches the piston head.

– Rotate the crankshaft in direction of rotation of engine on “TDC” for cylinder 1.



– Turn engine shaft further in direction of arrow so that the screwdriver just out at the top by approx 35 mm in the -direction of the arrow-.

– Unscrew locking screw “TDC” bore at the cylinder block.



Caution

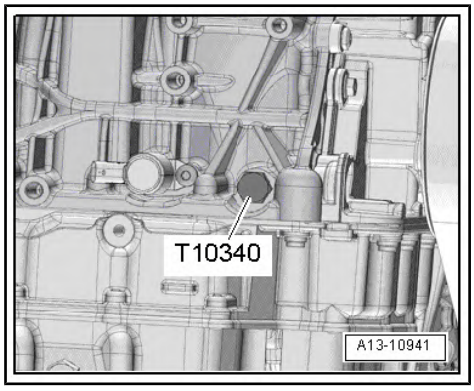
Risk of engine damage.

- *If the fixing screw - T10340- cannot be screwed in up to the stop, the crankshaft is not in the correct position!*
- *In this case, proceed as follows:*
- *Unscrew the fixing screw.*
- *Set the correct position of the crankshaft for screwing in the fixing screw.*

– Turn the fixing screw - T10340- up to the stop in the cylinder block and tighten to 30 Nm.

– Turn crankshaft up to the stop in direction of rotation of engine.

• The crankshaft sprocket now lies on the fixing screw and the “TCD” position is set.

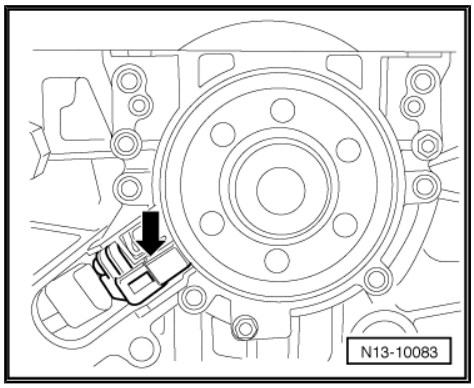


Note

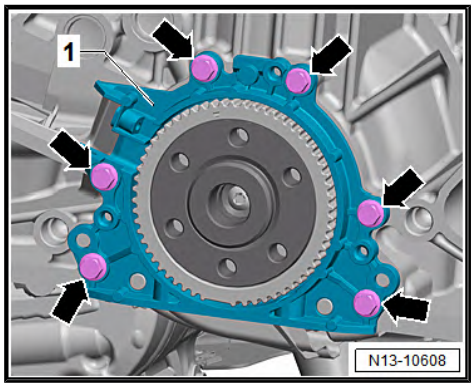
The crankshaft is only locked in direction of rotation of engine using the fixing screw - T10340- .

– Remove sump top part
⇒ “1.5 Removing and installing oil sump top part”, page 190 .

– Remove the engine speed sender - G28- -arrow-
⇒ “1.6 Removing and installing engine speed sender G28 ”, page 445 .



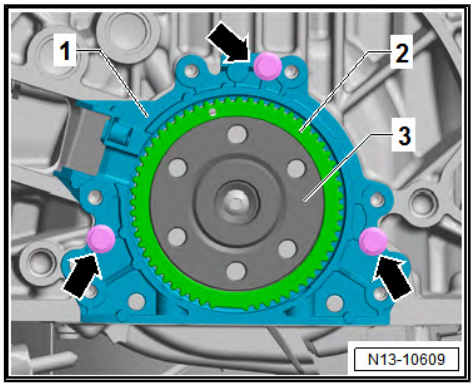
– Unscrew fixing screws on the sealing flange -arrows-.



Note

Sealing flange and rotor are pressed together with 3 M6x35 mm screws from the crankshaft.

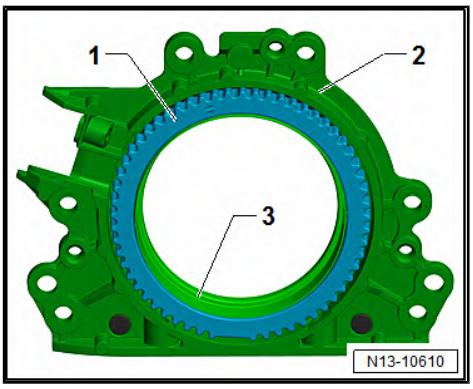
– In turns, screw in three screws -arrows- (max. $^{1}/_{2}$ turn (180°) per screw) into the threaded holes of the sealing flange -1- and remove the sealing flange together with the rotor -2- from the crankshaft -3-.



Sealing flange with rotor

Note

- *The sealing flange with PTFE gasket ring is provided with sealing lip supporting ring -2-. This support ring serves as a fitting sleeve and must not be removed prior to installation.*
- *Do not separate or turn the sealing flange and rotor -1- after removing them from the spare part package.*
- *The rotor is given its fitting location by fixing the assembly tool - T10134- to the positioning pin.*
- *Sealing flange and oil seal form one unit and must only be renewed together with the sender wheel.*
- *The rotor has an elastomer layer on its sealing surface with the crankshaft. This layer must not be brought into contact with dirt or grease.*
- *The assembly tool - T10134- is given its fitting location to the crankshaft by means of a guide bolt, which is guided into the threaded bore of the crankshaft.*



Assembly tool - T10134-

A - Clamping surface

B - Hexagon nut

C - Assembly housing

D - Locating pin

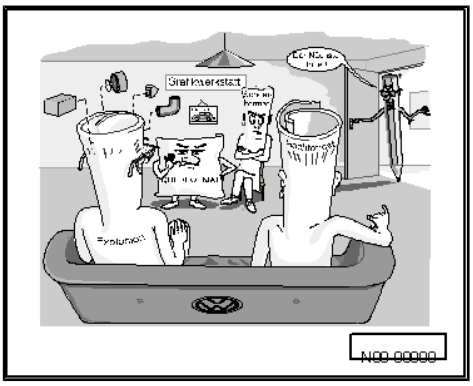
E - Allan screws (2 pieces)

F - Guide bolts for petrol engines

G - Guide bolts for diesel engines

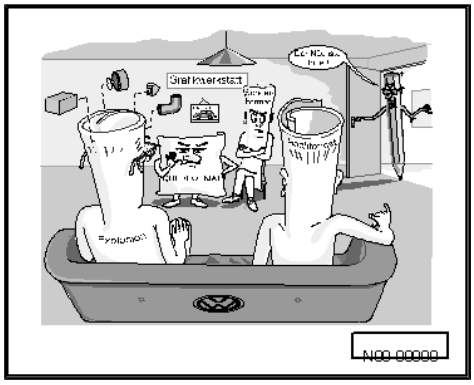
H - Knurled screws (3 pieces)

I - Inner part

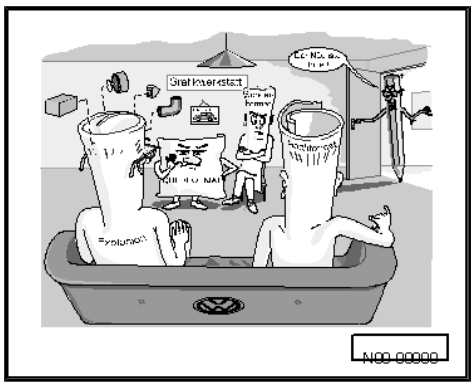


A - Attach sealing flange with rotor on the assembly device - T10134-

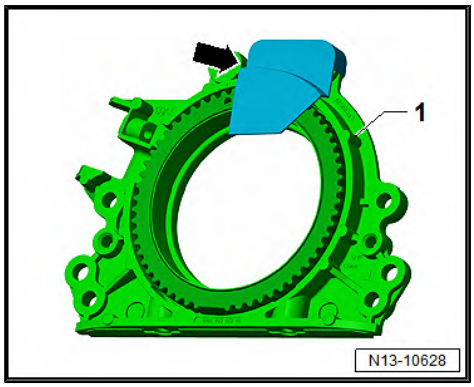
– Screw on nut -B- until just before it touches the clamping surface -A- of the threaded spindle.



– Grip assembly tool - T10134- at clamping surface -A- of the threaded spindle in a vice.
– Press assembly housing -C- downwards until it lies on hexagon nut -B-.
– Screw nut onto threaded spindle until inner part of assembly tool and assembly housing are at same height.



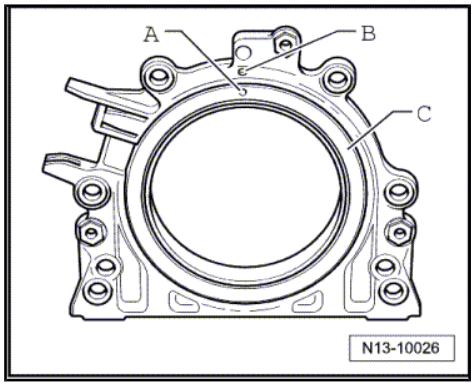
– Remove the securing clip -arrow- from the new sealing flange.



Note

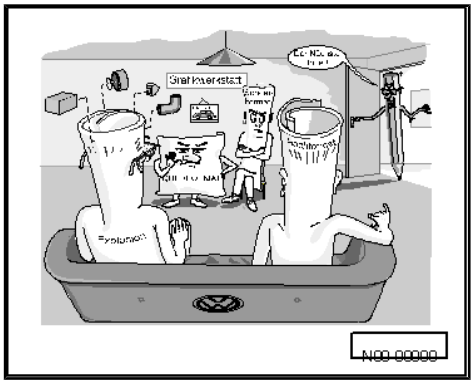
Do not remove or turn the rotor from the sealing flange.

• Locating hole -A- on sender wheel -C- must align with marking -B- on sealing flange.

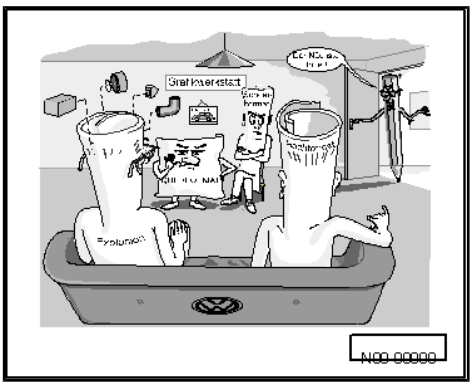


– Place sealing flange with front side facing down on a clean level surface.

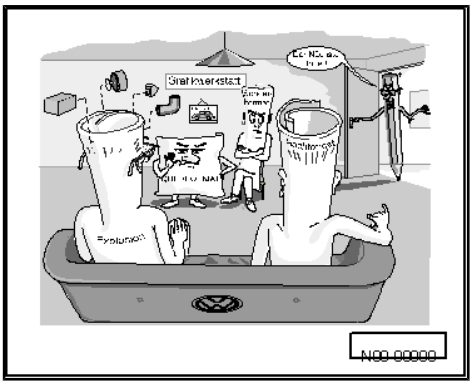
– Press down sealing lips supporting ring -1- in -direction of the arrow-, until it rests on the level surface.



• Upper edge of sealing lip support ring -1- and front edge of sealing flange -2- must align -arrows-.



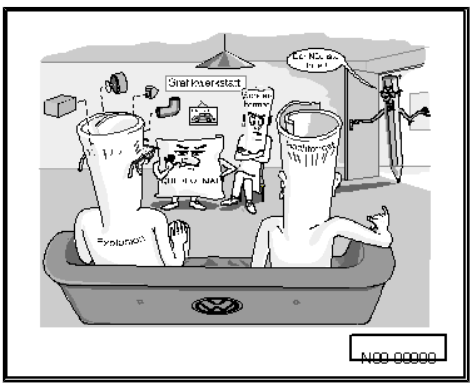
– Lay the sealing flange -1- with the front side on the assembly tool - T10134- in such a way that the positioning pin -D- engages into the hole -3- of the rotor -2-.



Note

Sealing flange must lie straight on the assembly tool.

– Press on the sealing flange -1- and sealing lip supporting ring -2- by tightening the 3 knurled screws -H- onto the surface of the assembly tool - T10134- .



Note

- *This prevents locating pin from slipping out of sender wheel hole.*
- *When installing sealing flange, ensure that sender wheel remains fixed in assembly tool.*

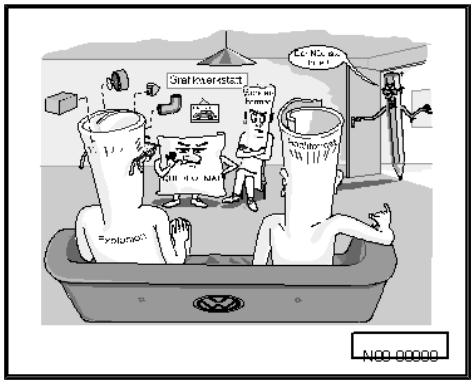
B - secure assembly tool - T10134- with sealing flange onto the crankshaft flange and cylinder block

- Crankshaft flange free from oil and grease
- Engine on “TDC.”

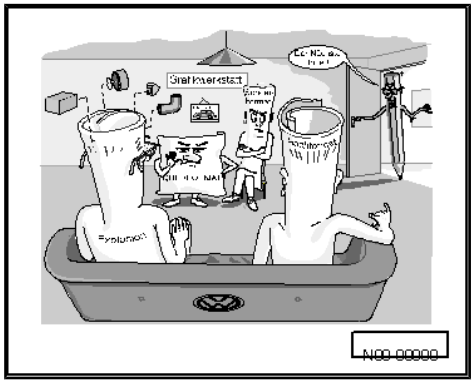
– Screw nut -B- on until it reaches end of threaded spindle.

– Press the threaded spindle on the assembly tool - T10134- in -direction of arrow- until the nuts -B- rest against the assembly cup -C-.

– Align flat side of assembly housing to the cylinder block sealing surface on the oil sump side.



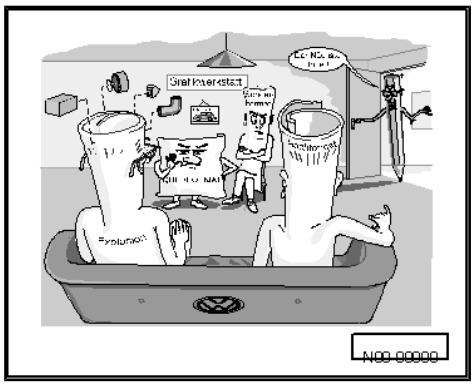
– Secure the assembly tool - T10134- together with the sealing flange -1- with Allan screws -E- to the crankshaft flange.



Note

Screw in Allan screws -E- into the crankshaft flange by approx. five thread turns.

– Screw in two M6x35 mm screws -2- by about 3 turns for sealing flange guide -1- into the cylinder block.



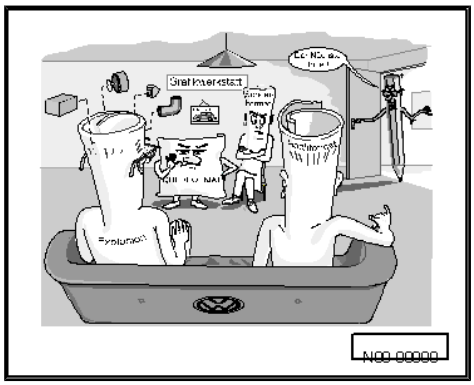
Screw C - attach assembly tool - T10134- onto crankshaft flange

– Push the assembly cup -C- by hand in the -direction of the arrow- until the sealing lip supporting ring -1- rests on the crankshaft flange -2-.

– Push guide pin for petrol engines (red knob) -F- into hole in crankshaft. This ensures that the sender wheel reaches its final installation position.

– Tighten the two hexagon socket head bolts hand-tight.

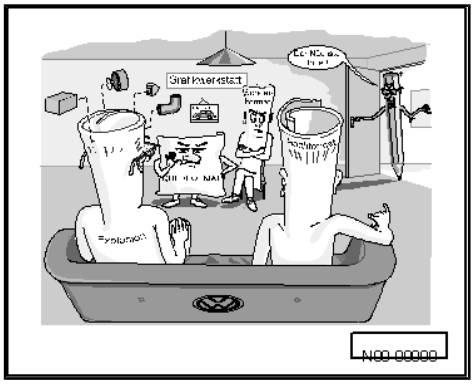
– Screw nut -B- onto threaded spindle by hand until it lies against assembly housing -C-.



D - Press sender wheel onto crankshaft flange using assembly device - T10134-

– Tighten nuts -B- on the assembly tool - T10134- with torque wrench to 35 Nm.

• After tightening the nut to 35 mm there must still be a narrow air gap between the cylinder block and the sealing flange.



E - Inspect the installation position of the rotor on the crankshaft

– Screw nut -B- on until it reaches end of threaded spindle.

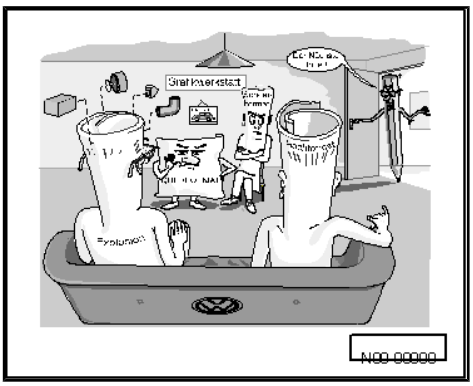
– Unscrew bolts-2- from the intake manifold.

– Unscrew three knurled screws -H- from the sealing flange.

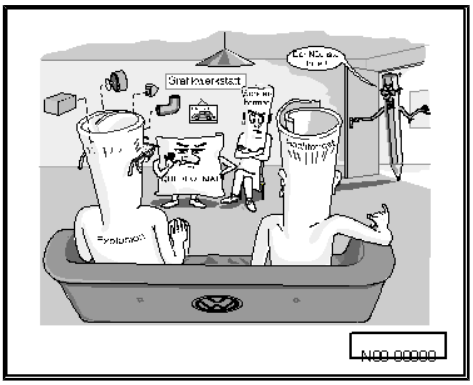
– Unscrew Allan screws -E- from the crankshaft flange.

– Remove assembly tool - T10134- .

– Remove sealing lip support ring.



– Place caliper gauge on crankshaft flange.



– Measure distance -a- between crankshaft flange -2- and sensor rotor -1-.

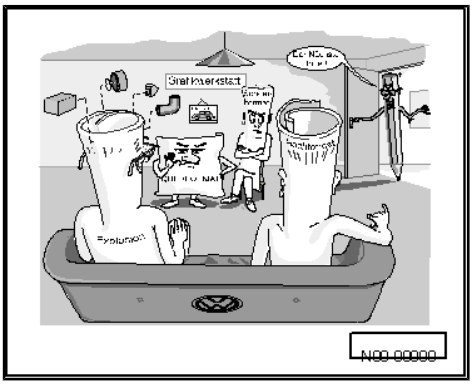
• Specified value: Dimension -a- = 0.5 mm

If dimension »a« is too small:

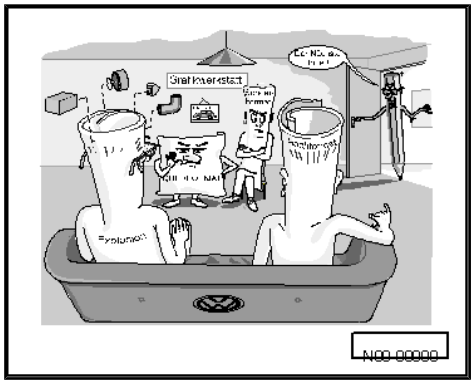
– Press down rotor ⇒ page 80 .

If dimension »a« is achieved:

– Complete the remaining installation ⇒ page 81 .



F - Pressing down the rotor



– Secure assembly tool - T10134- to crankshaft flange with hexagon socket head bolts -E-.

Note

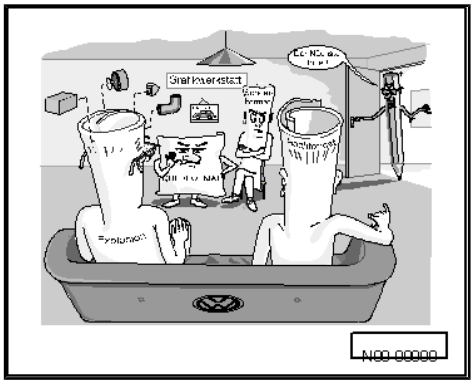
Make sure the positioning pin on the assembly tool - T10134- engages in the bore of the sensor rotor.

– Tighten the two hexagon socket head bolts -E- hand-tight.
– Screw the knurled screws -H- into the sealing flange -1-.
– Screw nut -B- onto threaded spindle by hand until it lies against the assembly housing.

– Tighten nut -B- of the assembly tool - T10134- to 40 Nm.
– Again inspect the fitting position of the rotor on the crankshaft ⇒ page 79 .

If the dimension »a« is too small again:

– Tighten nut -B- of the assembly tool - T10134- to 45 Nm.
– Again inspect the fitting position of the rotor on the crankshaft ⇒ page 79 .



Assembling

– Tighten screws for sealing flange crosswise.
– Installing the oil pan ⇒ “1.3 Removing and installing oil sump bottom part”, page 186 .
– Installing intermediate plate ⇒ page 70 .
– Install flywheel ⇒ “2.2 Removing and installing flywheel”, page 70 .

Caution

After completing work, make sure that the locating screw - T10340- has been removed.

Tightening torques

- Sealing flange on the gearbox side ⇒ “2.1 Assembly overview - cylinder block, gearbox end”, page 69 ⇒ page 70
- Engine speed sender - G28- ⇒ “2.1 Assembly overview - cylinder block, gearbox end”, page 69
- Flywheel to crankshaft ⇒ “2.1 Assembly overview - cylinder block, gearbox end”, page 69
- Screw for ignition coil with power output stage ⇒ “1.1 Assembly overview - ignition system”, page 441
- Spark plug ⇒ “1.1 Assembly overview - ignition system”, page 441

Component	Tightening torque
Locking screw for bore in the cylinder block	30 Nm
Locating screw - T10340-	30 Nm

3 Crankshaft

⇒ “3.1 Measuring axial play of crankshaft”, page 82

⇒ “3.2 Replace needle bearing for crankshaft”, page 82

3.1 Measuring axial play of crankshaft

Caution

There is a risk of bearing pedestal deformation.

- *The crankshaft must not be removed. Merely releasing the screws of the crankshaft bearing cover will result in deformations of the bearing seats of the cylinder block.*
- *If the bearing cap bolts are loosened, the cylinder block must be renewed complete with the crankshaft.*
- *Measuring the main bearing clearance is not possible with normal workshop equipment.*

Special tools and workshop equipment required

- Universal dial gauge holder - MP3-447 (VW 387)-
- Dial gauge , e.g. -VAS 6079-

Work procedure

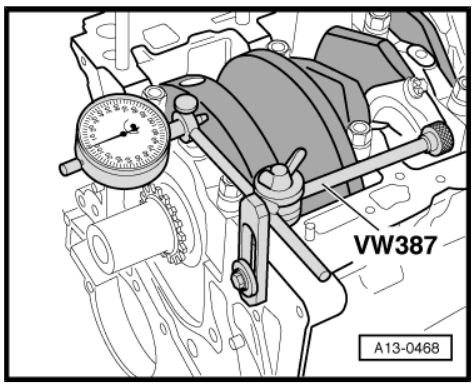
– Secure dial gauge - VAS 6079- with the universal dial gauge bracket to the camshaft housing - VW 387- , as shown in the illustration.

– Place dial gauge against the crankshaft cheek.

– Press crankshaft against the dial gauge and set dial gauge to “0”.

– Press the crankshaft off the dial gauge and read the measured value.

• Axial clearance: 0.066 … 0.233 mm



3.2 Replace needle bearing for crankshaft

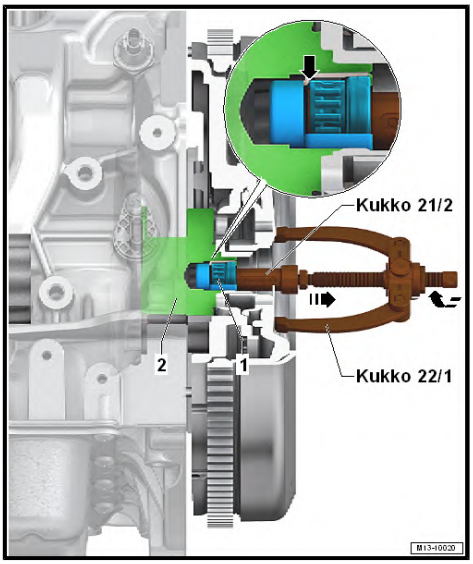
Only for vehicles with automatic gearbox

Special tools and workshop equipment required

- Centering mandrel -T30029 (3176)-
- Interior extractor -Kukko 21/2-
- Countersupport -Kukko 22/1-

Removing

– Remove needle bearing -1- with internal extractor -Kukko 21/2- and countersupport -Kukko 22/1- from crankshaft -2-.



Attach the internal extractor -Kukko 21/2- after the needle rim -arrow-.

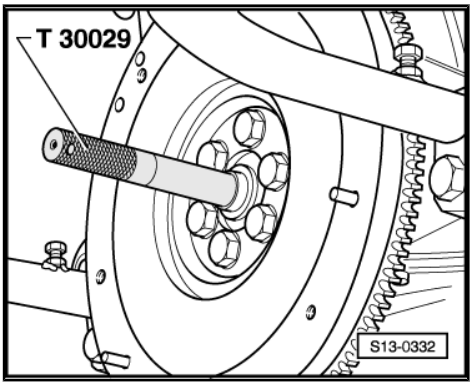
Install

Fitting position of the needle bearing:

♦ The marked side of the needle bearing should be visible when in its installed condition.

– Clean the bearing in the crankshaft.

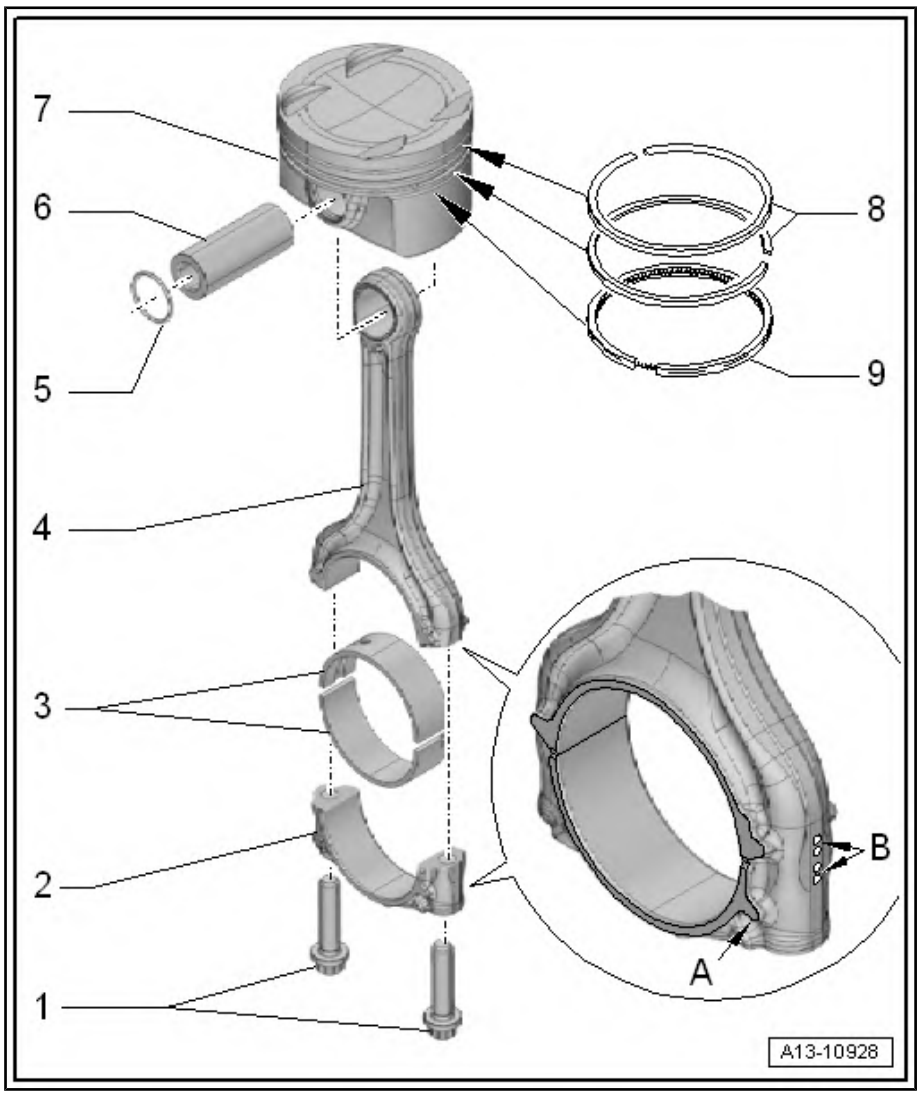
– Drive in needle bearing with centring mandrel -T30029 (3176)- flush with the crankshaft face.



4 Pistons and conrods

⇒ “4.1 Assembly overview - piston and conrod”, page 84
⇒ “4.2 Removing and installing the piston”, page 86
⇒ “4.3 Removing and installing oil injection nozzles”, page 87
⇒ “4.4 Checking piston and cylinder bore”, page 88

4.1 Assembly overview - piston and conrod



1 - Screw

- ❑ replace after removal
- ❑ Oil threads and contact surface
- ❑ 30 Nm + torque a further 90° ($^1/_4$ turn)

2 - Conrod bearing cap

- ❑ as a result of the conrods separated in the cracking process, the conrod bearing cap fits only in one position and only to the relevant conrod
- ❑ Mark assignment to the cylinder and to the conrod in colour -B-
- ❑ Fitting position: Peg -A- on the conrod bearing cap points to the belt pulley side

3 - Bearing shells

- ❑ Fitting position ⇒ page 85
- ❑ replace used bearing shells
- ❑ check for firm seating

4 - Conrod

- ❑ with cracked conrod bearing cap
- ❑ Renew as set only
- ❑ Mark assignment to the cylinder and to the conrod bearing cap in colour -B-
- ❑ separate new connecting rod ⇒ page 86
- ❑ Fitting position: Peg -A- on the conrod bearing cap points to the belt pulley side

5 - Circlip

- ❑ 2 pieces
- ❑ replace after removal

6 - Piston pin

- ❑ Removing and installing ⇒ “4.2 Removing and installing the piston”, page 86

7 - Piston

- ❑ Mark the installation position and the assignment to cylinder ⇒ page 85

- ❑ Removing and installing ⇒ “4.2 Removing and installing the piston”, page 86
- ❑ Check piston and cylinder bore ⇒ “4.4 Checking piston and cylinder bore”, page 88

8 - Piston rings

- ❑ Compression rings
- ❑ Measure end gap ⇒ page 89
- ❑ Measure vertical gap ⇒ page 89
- ❑ use commercially available piston ring pliers for removing and installing
- ❑ Fitting position: Identification “TOP” or labelled side for piston crown
- ❑ Offset gaps by 120°

9 - Piston ring

- ❑ Oil scraper ring
- ❑ Measure end gap ⇒ page 89
- ❑ Measure vertical gap ⇒ page 89
- ❑ use piston ring pliers for removing and installing
- ❑ Fitting position: Identification “TOP” or labelled side for piston crown
- ❑ Offset joint 120° to bottom compression ring

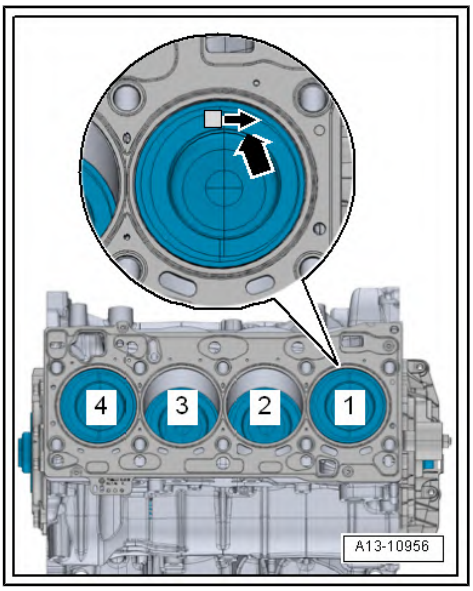
Fitting position of piston and assignment of piston to cylinder

Caution

Risk of damaging the piston crown.

- ◆ *For re-installation, mark the assignment in colour on the piston crown of cylinders that have already been used. Do not mark piston crown not using centre punch, scratch, nick or similar.*

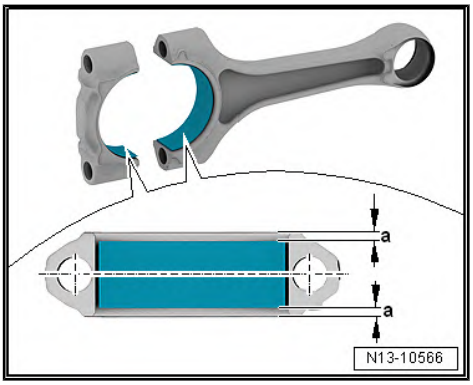
- Arrow on the piston crown to the belt pulley side -arrow-.



Bearing shell installation position

– Insert bearing shells centrally in the conrod and conrod bearing cap.

- Dimension -a- = 2.5 mm



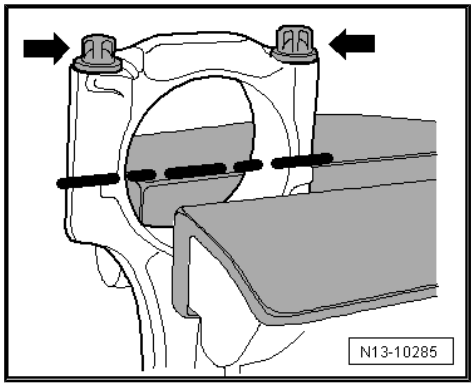
Separating new conrod bearing cap

On new conrods it is possible that the breaking point is not fully separated. If the conrod bearing cap cannot be removed by hand, proceed as follows:

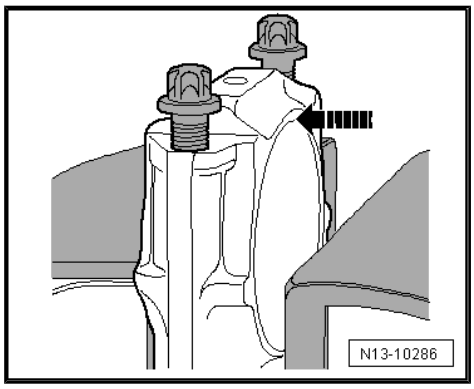
– To prevent damage, tension the conrod only slightly in a vice with protective jaws as shown.

• Tension the conrod below the dotted line.

– Unscrew screws -arrows- by approx. 5 turns.



– Knock against the conrod bearing cap carefully with a plastic hammer -arrow- in order to loosen it.



4.2 Removing and installing the piston

Special tools and workshop equipment required

♦ Drift , e.g. -T10046-

♦ Commercially available piston ring tensioning strap

Removing

• Engine attached to engine and gearbox mount - VAS 6095-
⇒ “2.3 Securing the engine to the assembly stand”, page 34 .

– Remove cylinder head
⇒ “1.3 Removing and installing cylinder head”, page 93 .

– Remove oil sump top part
⇒ “1.5 Removing and installing oil sump top part”, page 190
and remove baffle.

– Mark installation position and assignment of the piston to the cylinder
⇒ “4.1 Assembly overview - piston and conrod”, page 84 .

– Mark the installation position and assignment of the conrod to the cylinder and to the conrod bearing cap
⇒ “4.1 Assembly overview - piston and conrod”, page 84 .

– Remove conrod bearing cap and pull out piston with conrod upwards.

Note

If the piston pin is stiff, heat the piston to approximately 60 °C.

– Remove securing rings from the piston pin eye.

– Drive off piston pin with a drift , e.g. -T10046- .

Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

Note

Replace screws which have been tightened firmly to a torquing angle.

– Oil the contact surfaces of the bearing shells.

– Install piston with commercially available piston ring tensioning strap, check installation position ⇒ page 85 .

– Install conrod bearing cap, check installation position ⇒ “4.1 Assembly overview - piston and conrod”, page 84 .

– Install cylinder head ⇒ “1.3 Removing and installing cylinder head”, page 93 .

– Install sump top part ⇒ “1.5 Removing and installing oil sump top part”, page 190 .

Tightening torques

♦ Conrod bearing cap screws ⇒ “4.1 Assembly overview - piston and conrod”, page 84

4.3 Removing and installing oil injection nozzles

Special tools and workshop equipment required

♦ Torx insert T40 - T10545-

Removing

– Remove oil sump top part ⇒ “1.5 Removing and installing oil sump top part”, page 190 and remove baffle.

Note

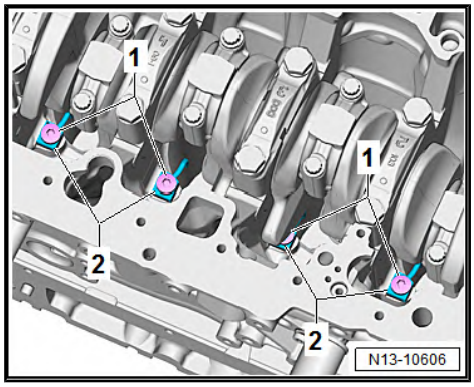
♦ *The crankshaft must be turned so that the Torx insert T40 - T10545- can be inserted into the applicable pressure relief valve.*

♦ *The teeth of Torx insert T40 - T10545- and the pressure relief valve must engage correctly.*

– Turn the crankshaft using the fixing screw of the vibration damper in direction of rotation of engine until the pressure relief valve is accessible.

– Unscrew and remove the pressure relief valves -1- with Torx insert T40 - T10545- .

– Remove oil spray nozzles -2-.

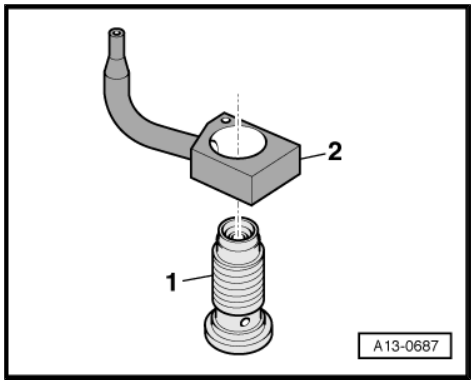


Install

> **Caution**
>
> *Risk of damaging the oil injection nozzles.*
>
> - *Do not bend oil injection nozzles.*
> - *Replace the oil injection nozzles if they are bent.*
> - *Check clearance of pistons from oil injection nozzles after reinstalling the piston and nozzles.*

Installation is performed in the reverse order, pay attention to the following points:

- Fitting position: Align the guide edge of the oil injection nozzle to the area of the cylinder block being worked on.



1 - Pressure relief valve

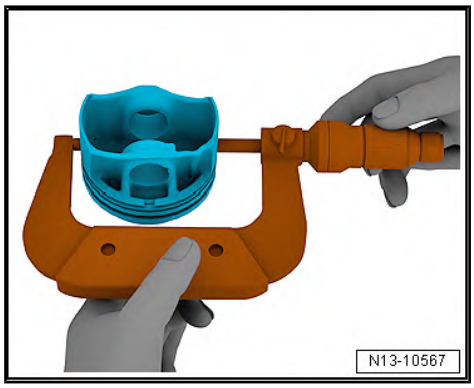
2 - Oil spray nozzle (for cooling piston)

– Fit baffle plate and install sump top part
⇒ “1.5 Removing and installing oil sump top part”, page 190 .

Tightening torques

Component	Tightening torque
Pressure relief valve	27 Nm

4.4 Checking piston and cylinder bore



Checking piston

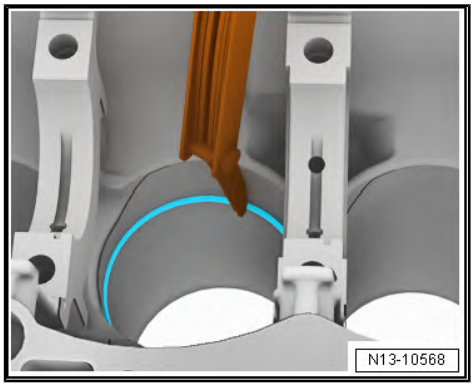
– Using an external micrometer, measure pistons approx. 10 mm from the lower edge of skirt, at 90° to the piston pin axis.

- Maximum deviation from nominal dimension: 0.04 mm

Piston ∅ mm	
Nominal dimension	74,42 [1)]

- [1)] dimensions without coating
- Manufacturer of the piston Federal Mogul (thickness 0.018 mm per side)
- Manufacturer of the piston Mahle (thickness 0.015 mm per side)

Measure piston ring end gap

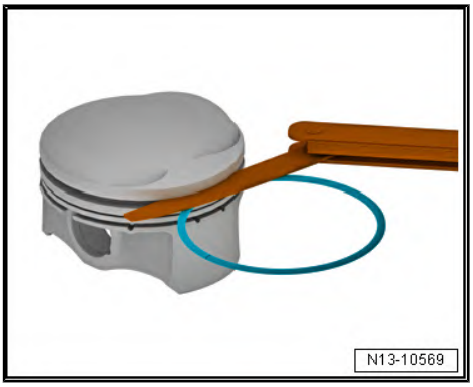


– Push the piston ring into the bottom cylinder opening at right angles to the cylinder wall from above to about 15 mm from the cylinder edge.

– To insert, use a piston without piston ring.

Piston ring	New mm	Wear limit mm
Compression ring	0,20 + 0,15	1,0
2-part oil scraper ring	0,20 + 0,20	3,0
3-part oil scraper ring	0,50 + 0,20	3,0

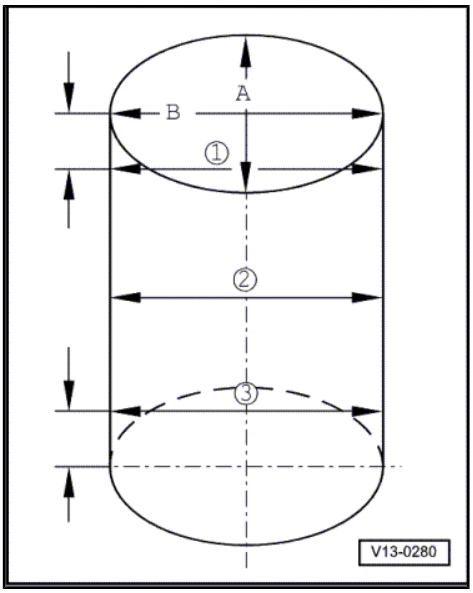
Measure piston ring vertical gap



– Clean before inspecting the annular groove of the piston.

Piston ring	New mm	Wear limit mm
1. Compressor ring (manufacturer of piston rings is Federal Mogul)	0,05 … 0,09	0,15
1. Compressor ring (manufacturer of piston rings is Mahle)	0,035 … 0,085	0,15
2. Compression ring	0,030 ...0,070	0,15
3-part oil scraper rings	Not measurable	
2-part oil scraper rings	0,04 ...0,08	

Measure cylinder bore



Caution

There is risk of damaging the cylinder bore surface.

- *Do not use normal workshop equipment to work on cylinder bore (boring, honing, grinding).*

– Using the internal precision instrument - VAS 6078- , measure crosswise at 3 points in the transverse direction -A- and longitudinal direction -B-.

• Maximum deviation from nominal dimension: 0.08 mm

Cylinder bore ∅ mm	
Nominal dimension	74,5 + 0,015 1) +0,005

Note

Cylinder bores must not be measured when cylinder block is mounted on engine and gearbox support - VAS 6095- , as measurements may be incorrect.

Volkswagen Technical Site: http://vwts.ru http://vwts.info
огромный архив документации по автомобилям Volkswagen, Skoda, Seat, Audi

15 – Cylinder head, valve gear

1 Cylinder head

⇒ “1.1 Summary of components - cylinder head”, page 90

⇒ “1.2 Summary of components - camshaft housing”, page 92

⇒ “1.3 Removing and installing cylinder head”, page 93

⇒ “1.4 Removing and installing camshaft housing”, page 97

⇒ “1.5 Checking compression”, page 102

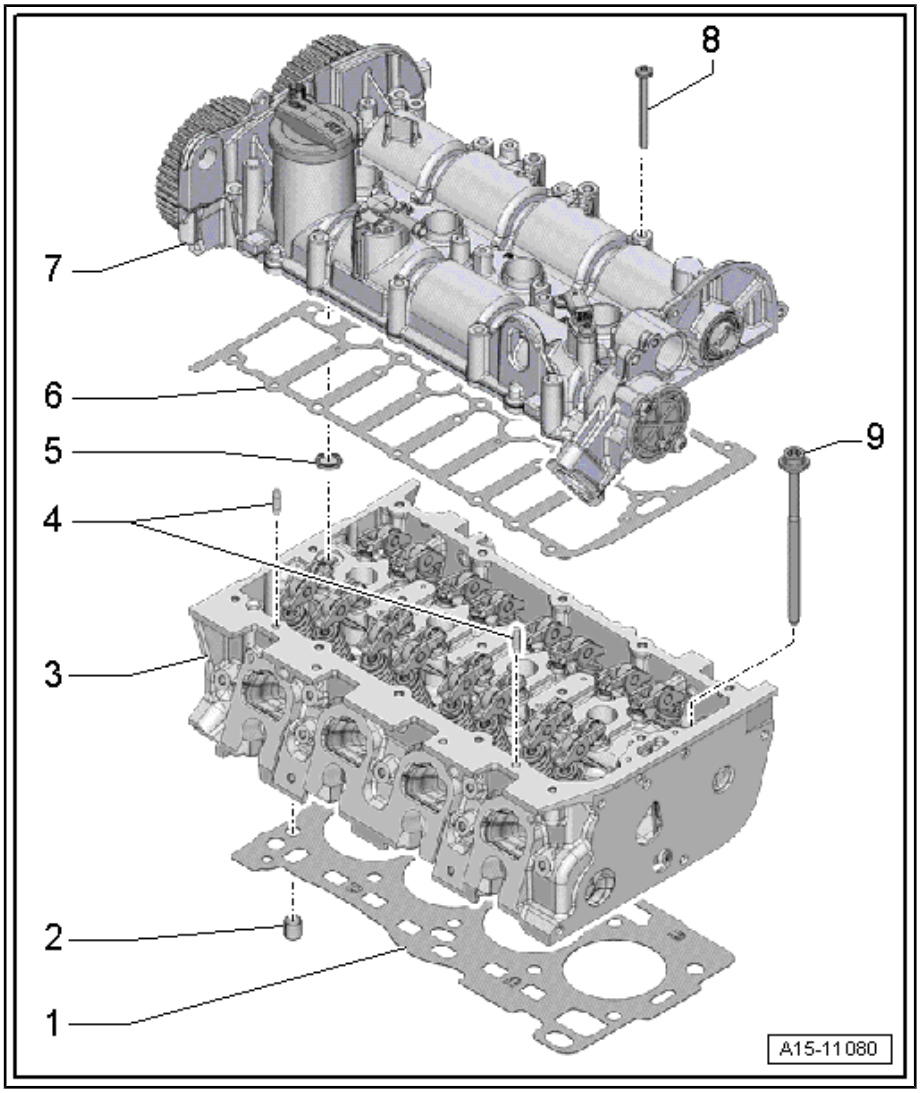
⇒ “1.6 Testing the combustion chamber for tightness”, page 104

1.1 Summary of components - cylinder head

Caution

The camshafts must not be removed individually.

When carrying out repairs the camshaft housing must be completely replaced.



1 - Cylinder head gasket

- ❑ replace after removal ⇒ “1.3 Removing and installing cylinder head”, page 93
- ❑ check fitting position: Cylinder head part number

2 - Fitting sleeve

- ❑ 2 pieces

3 - Cylinder head

- ❑ Removing and installing ⇒ “1.3 Removing and installing cylinder head”, page 93
- ❑ check for distortion ⇒ page 92
- ❑ Different versions ⇒ ETKA - Electronic Catalogue of Original Parts
- ❑ After replacing, renew all coolant ⇒ “1.2 Draining and filling coolant”, page 209

4 - Dowel pins

5 - Gasket

- ❑ With oil strainer
- ❑ inserted into the cylinder head
- ❑ No longer present as of 05.2013 and is integrated into camshaft control valve 1 - N205- .

6 - Gasket

- ❑ replace after removal
- ❑ Different versions ⇒ ETKA - Electronic Catalogue of Original Parts

7 - Camshaft housing

- ❑ Removing and installing ⇒ “1.4 Removing and installing camshaft housing”, page 97

8 - Screw for camshaft housing

- ❑ replace after removal
- ❑ Tightening torque and tightening order ⇒ page 102

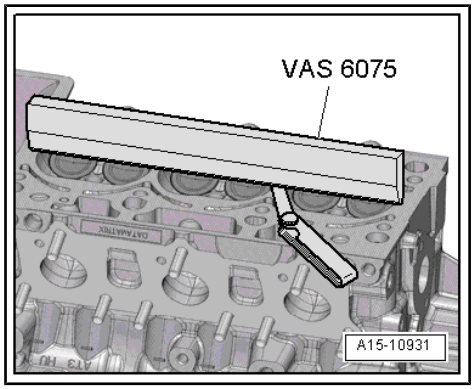
9 - Cylinder head bolt

- ❑ replace after removal
- ❑ Tightening torque and tightening order ⇒ “1.3 Removing and installing cylinder head”, page 93

Checking cylinder head for distortion

– Inspect cylinder head at several points for distortion using a 500 mm knife-edge straightedge - VAS 6075- and feeler gauge.

• Max. permissible distortion: 0.05 mm.



1.2 Summary of components - camshaft housing

1 - Screw for camshaft housing

- ❑ replace after removal
- ❑ Tightening torque and tightening order ⇒ page 102

2 - Inlet camshaft control valve 1 - N205-

- ❑ Removing and installing ⇒ “3.2 Removing and installing the camshaft adjustment valves”, page 169
- ❑ For engine identification characters CHPA, also camshaft control valve 1 in the exhaust - N318-

3 - Screw

- ❑ 8 Nm

4 - Camshaft housing

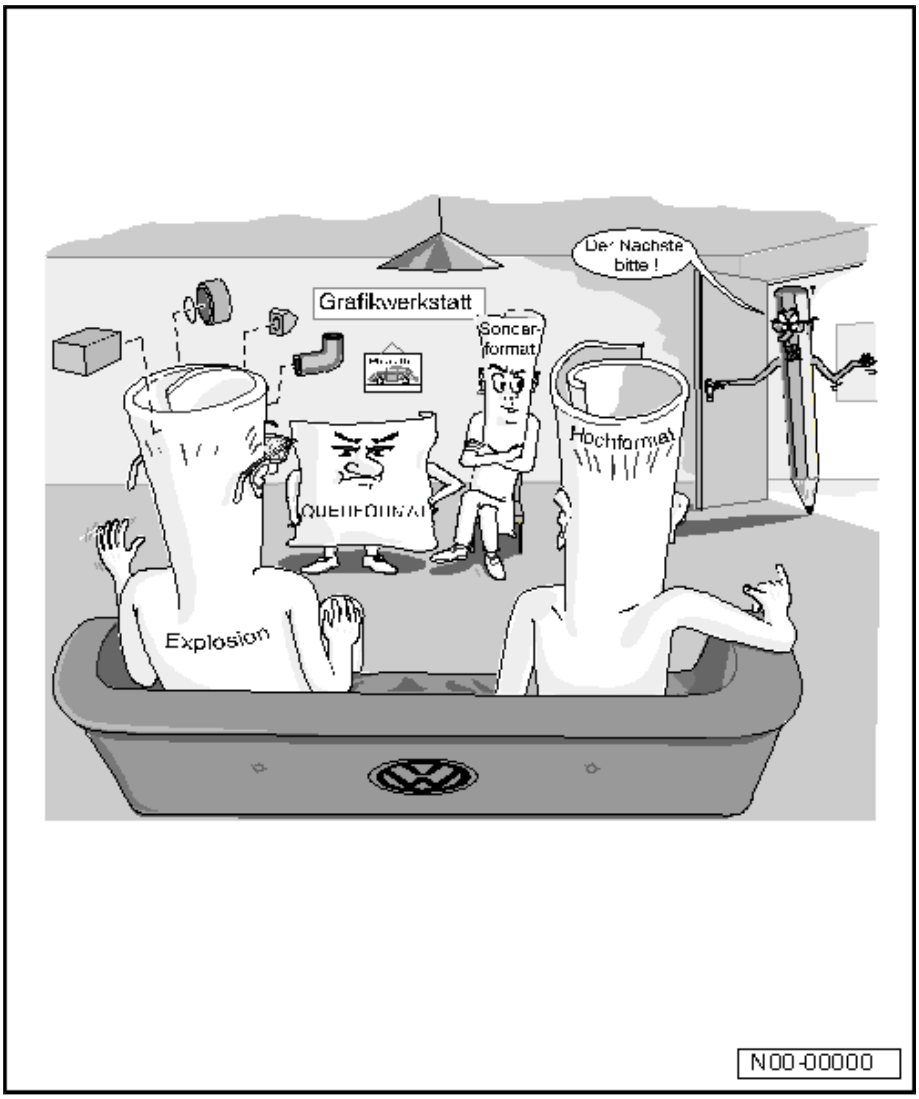
- ❑ Removing and installing ⇒ “1.4 Removing and installing camshaft housing”, page 97

5 - Hall sender - G40-

- ❑ Removing and installing ⇒ “1.4 Removing and installing Hall sender G40”, page 444
- ❑ For engine identification characters CHPA, also Hall sender 3 - G300-

6 - Screw

- ❑ 8 Nm



7 - Sealing ring

- ❑ for exhaust camshaft on the gearbox side
- ❑ Removing and installing ⇒ “3.5.3 Removing and installing the exhaust camshaft on the gearbox side”, page 176

8 - Toothed belt pulley

- ❑ For coolant pump
- ❑ Removing and installing ⇒ “2.5 Removing and installing toothed belt pulley for coolant pump drive”, page 222

9 - Screw

- ❑ replace after removal
- ❑ 20 Nm + torque a further 90° ($^1/_4$ turn)

10 - Screw

- ❑ 8 Nm

11 - Screw cap

12 - O-ring

- ❑ replace after removal

13 - Gasket

- ❑ replace after removal
- ❑ Different versions ⇒ ETKA - Electronic Catalogue of Original Parts

14 - Fit pin

15 - Gasket

- ❑ With oil strainer
- ❑ inserted into the cylinder head
- ❑ No longer present as of 05.2013 and is integrated into camshaft control valve 1 - N205- Pos. -8-

16 - Sealing ring

- ❑ For inlet camshaft
- ❑ replace after removal
  ⇒ “3.5.1 Removing and installing the inlet camshaft on the belt pulley side”, page 172

17 - Sealing ring

- ❑ for exhaust camshaft on the belt pulley side
- ❑ replace after removal
  ⇒ “3.5.2 Removing and installing the exhaust camshaft on the belt pulley side”, page 174

18 - Screw cap

1.3 Removing and installing cylinder head

Removing

Note

Fit all heat protection sleeves on again in the same place when installing.

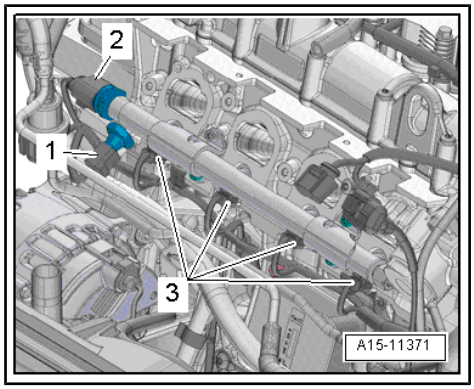
– Remove the camshaft housing
  ⇒ “1.4 Removing and installing camshaft housing”, page 97 .
– Removing the intake manifold
  ⇒ “3.2 Removing and installing intake manifold”, page 386 .

– Disconnect the plug connections:

1 - On the oil pressure switch for reduced oil pressure - F378-

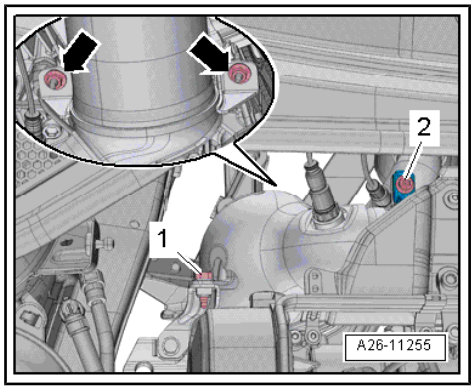
2 - On the fuel pressure sender - G247-

3 - On the injectors



– Unscrew screw -2- and remove screw clamp.

– Remove screw -1-, remove nuts -arrows- and strap up catalytic converter to the bodyshell so as not to damage the decoupling element.

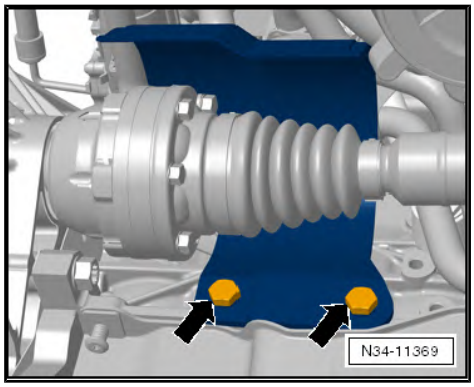


Note

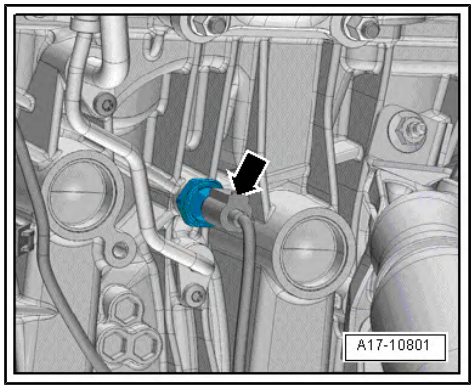
do not twist decoupling element in the exhaust pipe more than 10° - risk of damage

– Release screws -arrows- and remove heat shield for right drive shaft.

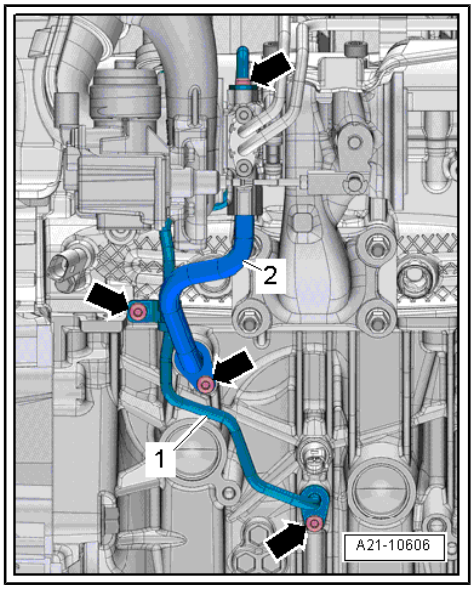
– Remove heat protection sleeve.



– Disconnect electrical plug connection -arrow- at the oil pressure switch - F1- .



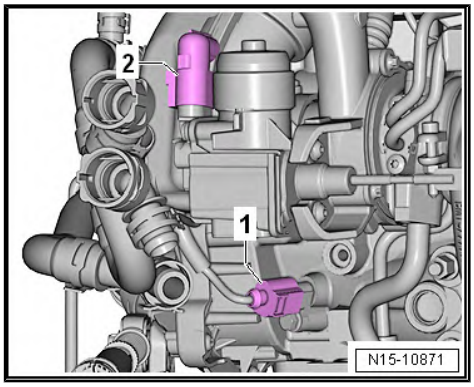
– Screw out the screws -arrows-, remove oil feed line -1- and oil return pipe -2-.



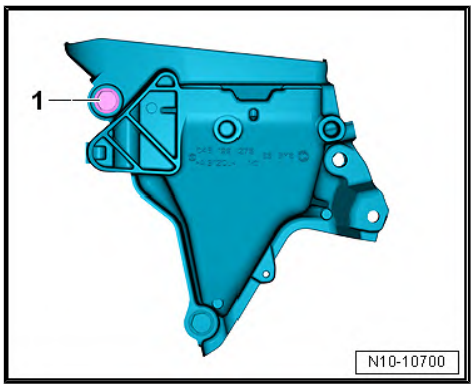
– Disconnect the plug connections:

1 - for coolant temperature sender - G62-

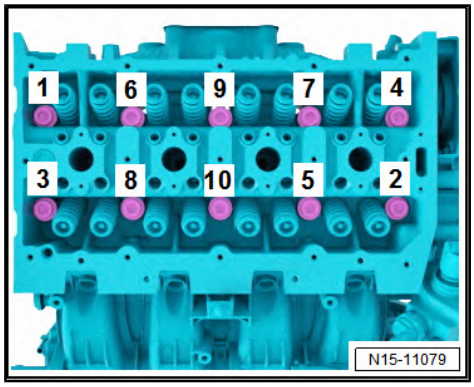
2 - For charge pressure regulator - V465-



– Unscrew screw -1- at the engine support.



– Loosen and unscrew the screws for the cylinder head in the sequence -1- to -10-.



– Remove cylinder head and place it on a clean base (foam).

Install

Caution

Risk of damaging sealing surfaces.

- *Remove residual sealant from the cylinder head and cylinder block.*
- *Make sure this does not cause any extended scoring or scratching.*

Risk of damaging the cylinder block.

- *There must be no oil or coolant in the blind holes for the cylinder head bolts in the cylinder block.*

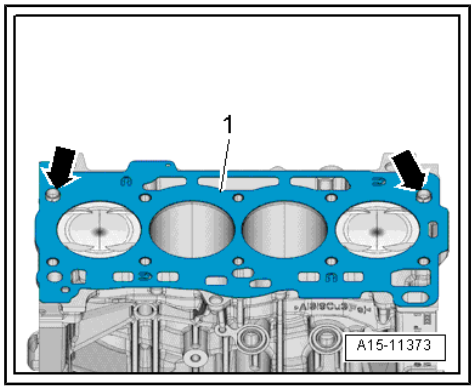
There is a risk of leakage on the cylinder head gasket.

- *Remove the new cylinder head gasket from its wrapping immediately before fitting.*
- *To prevent the silicon layer and the area of the bead from being damaged, handle the gasket with the utmost care.*

Note

- *Replace screws which have been tightened firmly to a torquing angle.*
- *Replace self-locking nuts, gasket rings, gaskets and O-rings.*
- *If a replacement cylinder head must be installed, the contact surfaces between hydraulic balancing elements, roller rocker fingers and camshaft slideways must be oiled before the camshaft housing is installed.*
- *Secure all hose connection ends with spring-type clips that comply with the series design ⇒ ETKA - Electronic Catalogue of Original Parts .*
- *When the cylinder head or the cylinder head gasket is replaced, all the coolant and engine oil must be replaced.*

– Fit on cylinder head gasket -1-.



- Pay attention to centring pins in cylinder block -arrows-.
- Check installation position of the cylinder head gasket, identification: Part number must be legible from the inlet side.

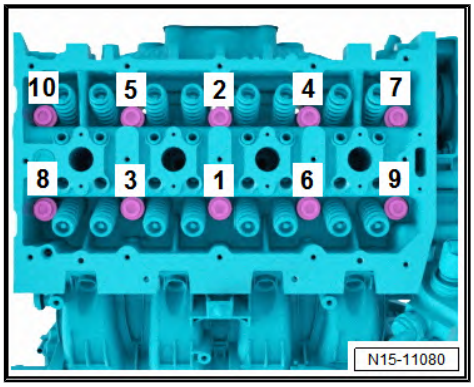
– If the crankshaft has been turned in the meantime: Set No. 1 cylinder piston to top dead centre and then turn crankshaft back slightly.

– Insert the cylinder head.

– Insert cylinder head bolts and tighten hand-tight.

Cylinder head - tightening sequence

Cylinder head cover - tightening torque and tightening sequence



– Tighten screws gradually in the given sequence:

Stage	Screws	Tightening torque/torquing angle
1.	-1…10-	40 Nm
2.	-1…10-	90° (torque a further 90° ($^1/_4$ turn)
3.	-1…10-	90° (torque a further 90° ($^1/_4$ turn)
4.	-1…10-	90° (torque a further 90° ($^1/_4$ turn)

Note

Tightening up the cylinder head bolts after doing repair work is not necessary.

Assembling is performed continuing in the reverse order, while paying attention to the following:

– Install camshaft housing
⇒ “1.4 Removing and installing camshaft housing”, page 97 .

– Installing the intake manifold
⇒ “3.2 Removing and installing intake manifold”, page 386 .

– Change engine oil ⇒ Maintenance ; Booklet Octavia III .

Caution

Replace all the coolant when installing a new cylinder head ⇒ “1.2 Draining and filling coolant”, page 209 .

– Replenish coolant
⇒ “1.2 Draining and filling coolant”, page 209 .

Tightening torques

- Engine support bracket ⇒ page 42
- Cylinder head
⇒ “1.1 Summary of components - cylinder head”, page 90
- Exhaust gas turbocharger
⇒ “1.1 Summary of components - exhaust gas turbocharger”, page 362
- Injection system ⇒ “1 Injection system”, page 377
- Install catalytic converter ⇒ page 433
- Drive shaft protection ⇒ Suspension; Rep. gr. 40

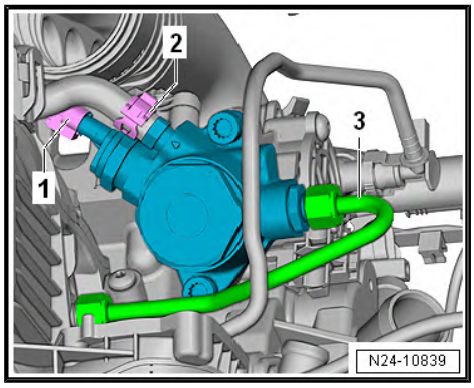
1.4 Removing and installing camshaft housing

Removing

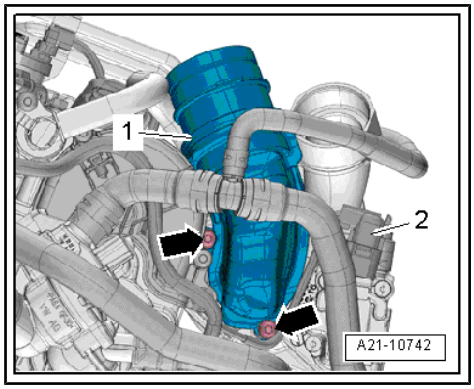
– Remove coolant pump
⇒ “2.4 Removing and installing coolant pump”, page 219 .

– Remove air filter housing
⇒ “2.2 Removing and installing air filter housing”, page 384 .

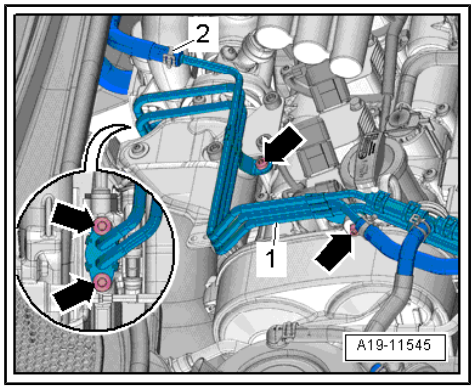
– Removing ignition coils
⇒ “1.2 Removing and installing ignition coils with output stage”, page 442 .
– Remove the toothed belt from the camshafts
⇒ “2.4 Remove the toothed belt from the camshaft”, page 114
– Unplug connector -1-.
– Loosen hose clamp -2- and disconnect hose.
– Remove high pressure pipe -3-
⇒ “8.3 Removing and installing high pressure pipe”, page 419 .
– Unplug connector -2-.



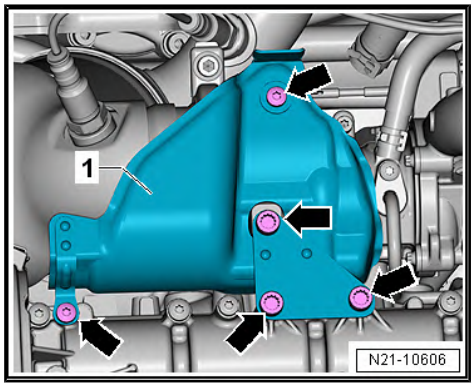
– Release screws -arrows- and remove connection piece -1-.



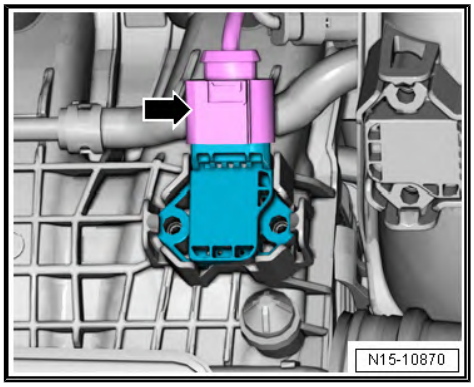
– Loosen hose clamp -2- and remove coolant hose.
– Unscrew -arrows- screws and swivel coolant lines -1- to the right side.



– Release screws -arrows- and remove heat shield -1-.

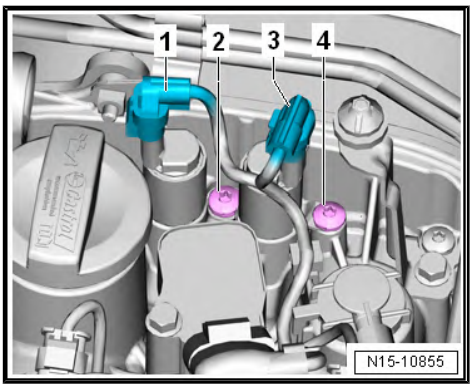


– Remove connector -arrow- from manifold pressure sender - GX9- .

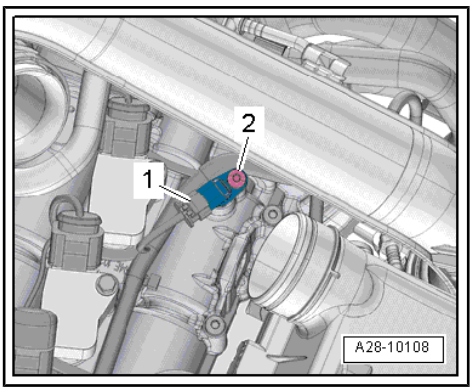


Only for petrol vehicles

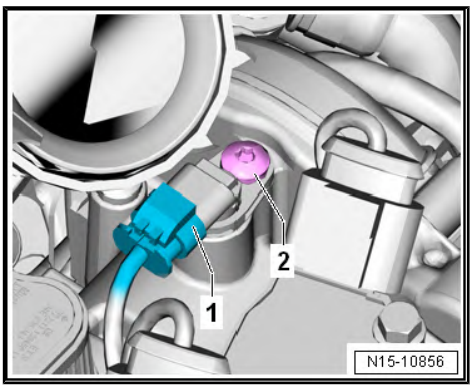
– Pull off plug -1- for valve 1 for camshaft adjustment - N205- and -3- valve 1 for camshaft adjustment in the exhaust - N318- .



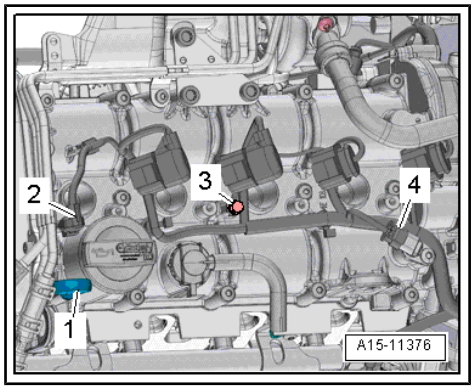
– Remove plug -1- for Hall sender - G40- .



– Remove plug -1- for Hall sender - G300- .

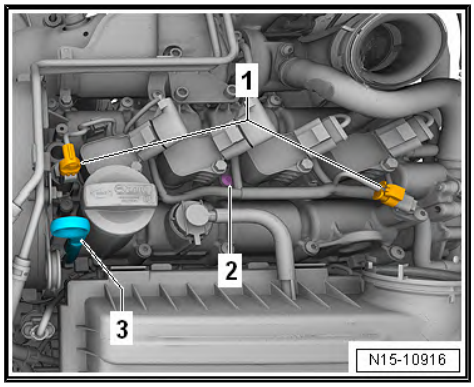


– Unscrew screw -3- and expose the wiring loom and lay it to the side.
– Pull out oil dipstick -1-.



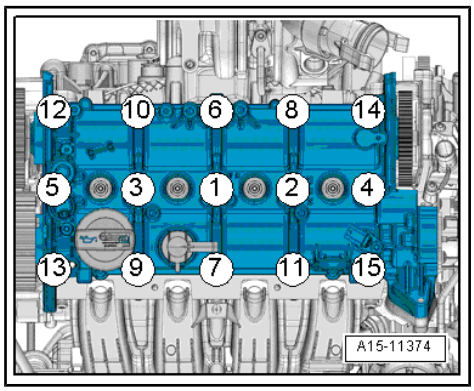
For natural gas vehicles (CNG)

– Disconnect the connector -1- for Camshaft control valve 1 - N205- and disconnect Hall sender - G40- .
– Unscrew screw -2-, expose the electric wiring harness and place to one side.
– Pull out oil dipstick -3-.



Continued for all vehicles

– Loosen and unscrew screws for camshaft housing in the sequence -15- to -1-.
– Carefully unscrew the camshaft housing and remove from the bonding.
– When installing again, mark the assignment of the roller rocker finger and the balancing elements.
– Remove the roller rocker finger together with the balancing elements and lay aside on a clean surface.



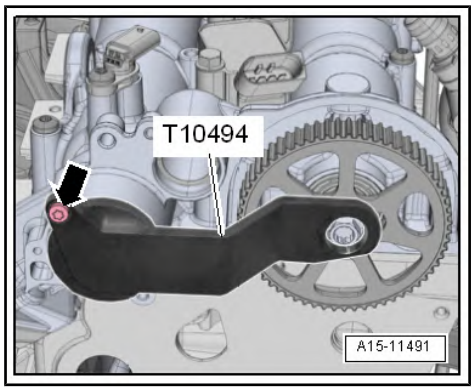
Install

Note

- *Replace screws which have been tightened firmly to a torquing angle.*
- *Replace gasket with oil strainer.*

– "Check TDC" position of camshaft and crankshaft:

• Camshaft clamp -T10494- attached to camshaft housing.

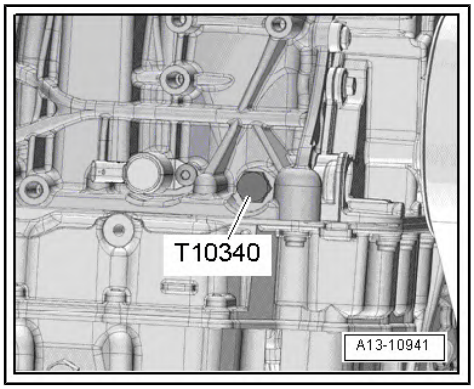


Caution

Risk of damaging the valve gear.

- ***When turning, the camshafts must not be moved axially.***

- Fixing screw - T10340- turned up to the stop in the cylinder block and tightened to 30 Nm.
- Crankshaft in engine direction of rotation applied to the fixing screw - T10340- = “TDC” position.

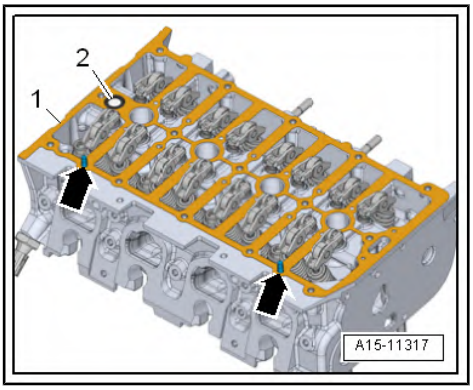


– Check that all roller rocker fingers are lying flat correctly on the end of the valve stem and are clipped into the respective balancing element.
– Insert gasket with oil strainer -2- into the cylinder head -1-.

Note

♦ *Seal with oil strainer no longer present as of 05.2013 and is integrated into camshaft control valve 1 - N205- .*

♦ *The cylinder head does not need a countersink in this case.*

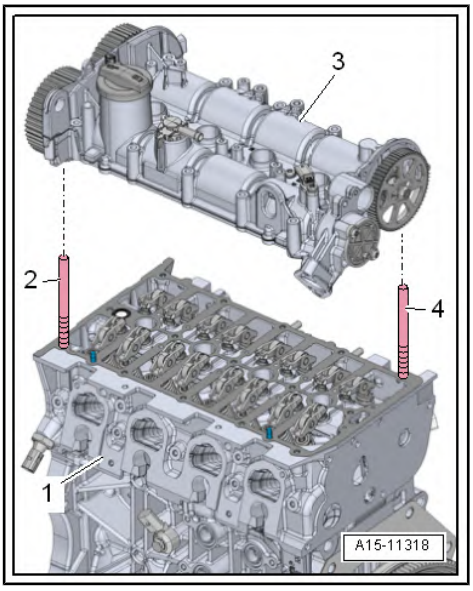


– Fit gasket onto dowel pins -arrows-.
– Screw 2 threaded bolts -2- and -4-, e.g. centering tool, -T10288/4- into the cylinder head.
– Carefully place camshaft housing -3- vertically from above onto the threaded bolts in the cylinder head.

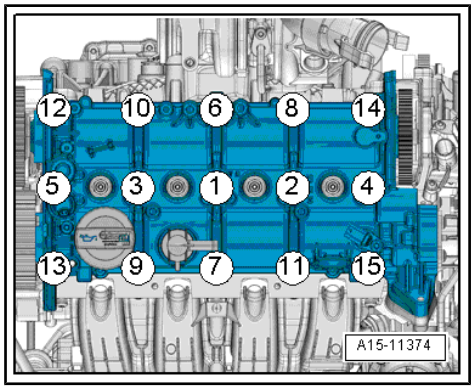
Note

Make sure that the camshaft housing does not tilt.

– Tighten camshaft housing screws.



Camshaft housing - tightening torque and tightening order



Note

Replace screws which have been tightened firmly to a torquing angle.

– Tighten screws gradually in the given sequence:

Stage	Screws	Tightening torque/torquing angle
1.	-1…15-	10 Nm
2.	-1…15-	180° (torque a further 180° ($^1/_2$ turn)

Installation is carried out in the reverse order. When installing, note the following:

– Install high pressure pipe
⇒ “8.3 Removing and installing high pressure pipe”, page 419 .

– install (set the timing)
⇒ “2.4 Remove the toothed belt from the camshaft”, page 114 .

– Install ignition coils
⇒ “1.2 Removing and installing ignition coils with output stage”, page 442 .

– Install coolant pump
⇒ “2.4 Removing and installing coolant pump”, page 219 .

– Electrical connections and proper routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

Caution

Risk of damaging valves and piston crowns after work on the valve gear.

- ***To ensure that no valve is set during starting, turn the engine carefully by at least 2 turns.***

Tightening torques

- Valve gear
⇒ “3.1 Assembly overview - valve gear”, page 168
- Exhaust gas turbocharger
⇒ “1.1 Summary of components - exhaust gas turbocharger”, page 362
- Air filter
⇒ “2.1 Assembly overview - air filter housing”, page 383

1.5 Checking compression

Special tools and workshop equipment required

- Spark plug wrench - 3122B- , e.g. -3122B-
- Compression tester - V.A.G 1763-

Test prerequisite

- Engine oil temperature at least 30°C
- Battery voltage at least 12.5 volts

– Remove fuse for fuel pump control unit from the fuse holder. Fuse assignment ⇒ Current flow diagrams, Electrical fault finding and Fitting locations

Note

Removing fuse interrupts the voltage supply of the fuel pump control unit.

For natural gas vehicles (CNG)

– Deactivate natural gas mode by removing the Relay for gas shut-off valves - J908- from the relay carrier.

Note

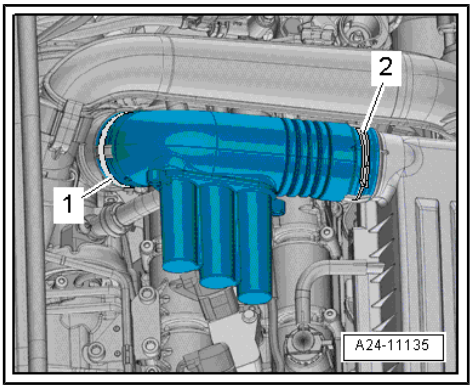
Removing the relay electrically seals the gas shut-off valves.

Continued for all vehicles

– Start engine and allow to run until it has cut out.

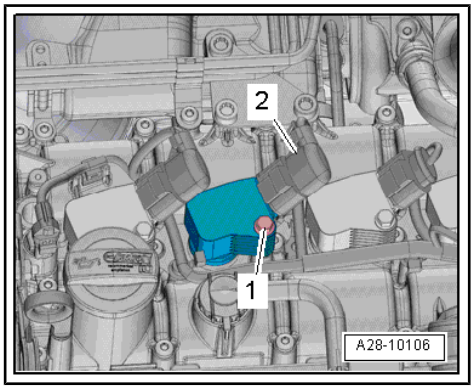
– Switch off ignition.

– Loosen hose clamps -1-, -2- and remove air guide pipes.



– Disconnect plug -2- and remove screw -1-.

– Pull out ignition coils at power output stage ⇒ “1.2 Removing and installing ignition coils with output stage”, page 442 .



– Remove the spark plugs with spark plug wrench - 3122 B- .

– Check the compression pressure using the compression tester - V.A.G 1763- ; handling, ⇒ Operating Manual .

– 2nd mechanic depresses the accelerator pedal fully and at the same time actuates the starter until the tester shows no further pressure rise.

– Repeat the work procedure for each cylinder.

Compression readings

New engine	Wear limit	Maximum difference between cylinders
1.0…1.5 MPa (10…15 bar)	0.7 MPa (7 bar)	0.3 MPa (3 bar)

If the specified values are not reached, test the combustion chamber for tightness

⇒ “1.6 Testing the combustion chamber for tightness”, page 104 .

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

– Install spark plugs.

– Install ignition coils at power output stages.

Because the electrical plug connections were disconnected and the engine started, faults are stored in the event memory of the engine control unit.

– Clear event memory and re-generate the readiness code ⇒ Vehicle diagnostic tester.

Tightening torques

- Screw for ignition coil with power output stage ⇒ “1.1 Assembly overview - ignition system”, page 441
- Spark plugs ⇒ “1.1 Assembly overview - ignition system”, page 441

1.6 Testing the combustion chamber for tightness

Special tools and workshop equipment required

- Spark plug wrench , e.g. -3122 B-
- Pressure hose - MP1-210 (VW 653/3)- (replace gasket ring with a spark plug gasket ring)

– Remove ignition coils with power output stage ⇒ “1.2 Removing and installing ignition coils with output stage”, page 442 .

– Unscrew the spark plugs with spark plug wrench - 3122 B- .

– Carefully insert a screwdriver into the opening of the ignition plug of the appropriate cylinder, minimum length of shaft 250 mm, in -direction of arrow- so that it touches the piston head.
– Turn the crankshaft until the piston is at “TDC”.
– Screw the pressure hose MP 1-210 into the spark plug thread.
– Connect pressure hose to compressed air supply.
– With the aid of a second mechanic, lock the screw at the crankshaft to the “TDC” position -2- ⇒ “1.1.2 Summary of components - V-ribbed belt drive for vehicles with air conditioning system”, page 54 in order to avoid the displacement of the piston after pressure build-up in the combustion chamber.



Note

Perform a pressure build-up in the “TDC” position when the induction and outlet valves are closed.

– Build up a pressure of 0.3 MPa (3 bar) in the combustion chamber.
– Repeat the test for the remaining cylinder.
– Determine how the pressure escapes:

1 - Via the inlet valve(s) - the pressure enters the throttle valve.
2 - Via the outlet valve(s) - the pressure enters the exhaust system.
3 - Via the piston rings - the pressure enters the cylinder block.

Tightening torques

♦ Spark plugs ⇒ “1.1 Assembly overview - ignition system”, page 441
♦ Screw for ignition coil with power output stage ⇒ “1.1 Assembly overview - ignition system”, page 441

2 Toothed belt drive

⇒ “2.1 Summary of components - toothed belt guard”, page 106

⇒ “2.2 Assembly overview - toothed belt drive ”, page 107

⇒ “2.3 Checking valve timing”, page 110

⇒ “2.4 Remove the toothed belt from the camshaft”, page 114

⇒ “2.5 Removing and installing toothed belt”, page 140

2.1 Summary of components - toothed belt guard

1 - Bottom toothed belt guard

2 - Screw

- ❑ 8 Nm

3 - Engine support bracket

- ❑ Tightening torque and tightening order ⇒ page 42

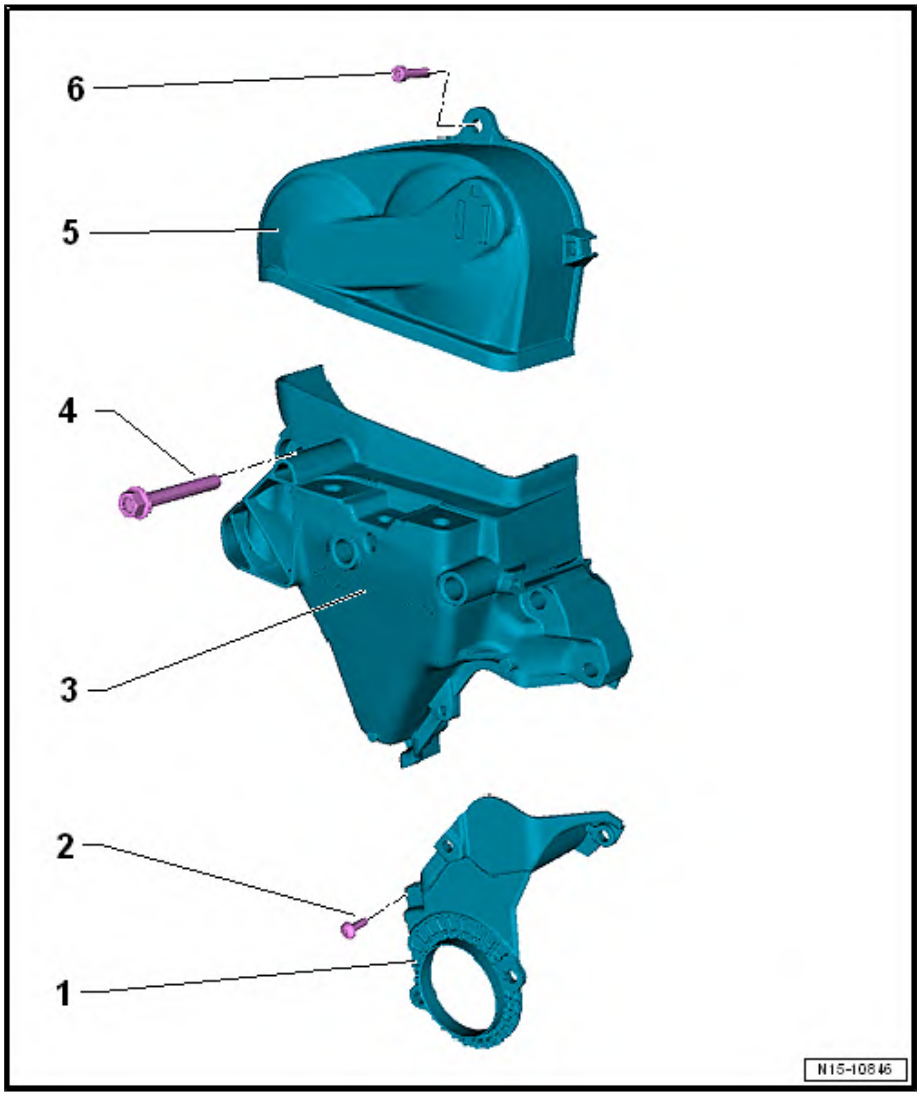
4 - Screw

- ❑ replace after removal
- ❑ Tightening torque and tightening order ⇒ page 42
- ❑ 40 Nm + torque a further 90° ($^1/_4$ turn)

5 - Top toothed belt guard

6 - Screw

- ❑ 8 Nm

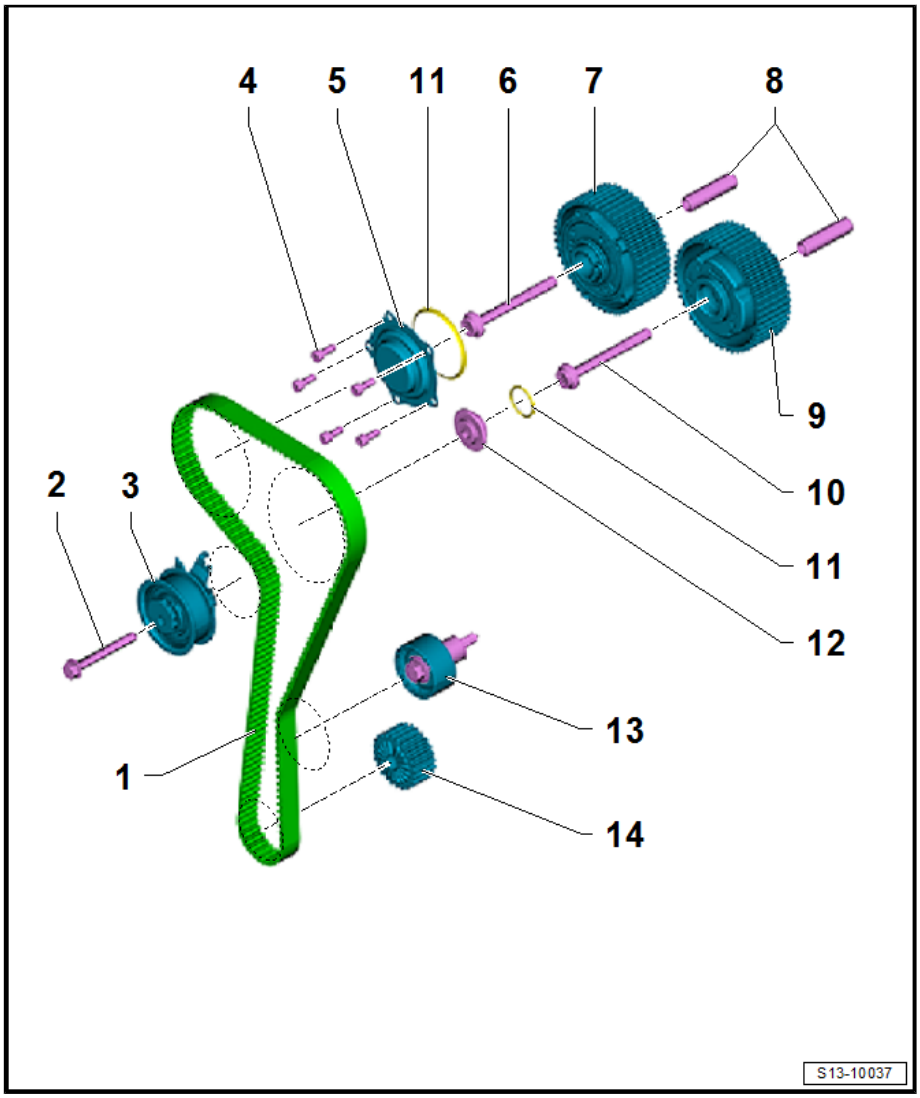


2.2 Assembly overview - toothed belt drive

⇒ "2.2.1 Summary of components - toothed belt for engine with identification characters CHPA", page 107

⇒ "2.2.2 Summary of components - toothed belt for engine with identification characters CPWA ", page 109

2.2.1 Summary of components - toothed belt for engine with identification characters CHPA



1 - Toothed belt

- ❑ mark the direction of rotation with chalk or a felt-tip pen before removing
- ❑ check for wear
- ❑ removing and installing (setting the timing) ⇒ "2.5 Removing and installing toothed belt", page 140

2 - Screw for tensioning pulley

- ❑ Tightening torque and tightening order ⇒ "2.4 Remove the toothed belt from the camshaft", page 114

3 - Tensioning pulley

- ❑ for removing and installing, remove engine support ⇒ "1.5 Removing and installing engine support", page 59

4 - Screw

- ❑ 8 Nm + torque a further 45° ($^1/_8$ turn)

5 - Screw cap

6 - Screw

- ❑ replace after removal
- ❑ 50 Nm + torque a further 135° ($^3/_8$ turn)

7 - Toothed belt pulley, exhaust camshaft

- ❑ With camshaft control
- ❑ Removing and installing camshaft control ⇒ "3.3 Removing and installing camshaft control", page 170

8 - Guide bushing

9 - Toothed belt pulley, inlet camshaft

- ❑ With camshaft control
- ❑ Removing and installing camshaft control ⇒ "3.3 Removing and installing camshaft control", page 170

10 - Screw

- ❑ replace after removal
- ❑ 50 Nm + torque a further 135° ($^3/_8$ turn)

11 - O-ring

- ❑ replace after removal

12 - Screw plug

- ❑ 20 Nm

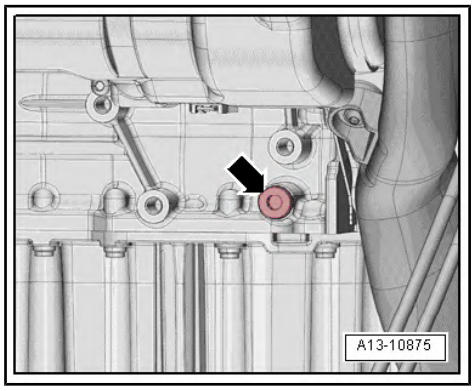
13 - Guide pulley

- ❑ 45 Nm

14 - Crankshaft - toothed belt sprocket

- ❑ there must not be any oil present on the contact surface between the toothed belt sprocket and the crankshaft
- ❑ can be installed only in one position

Unscrew locking screw “TDC” bore at the cylinder block - tightening torque

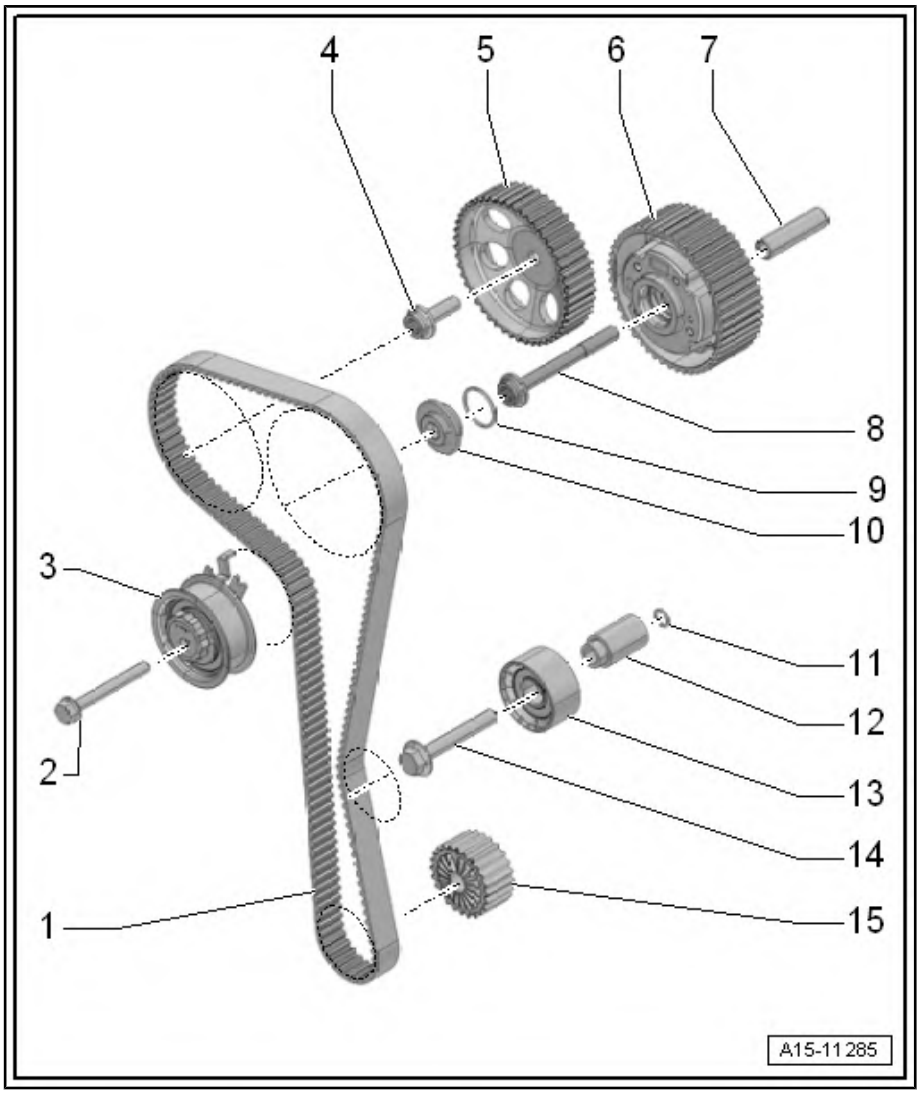


Note

Replace the O-ring if it is damaged.

– Tighten bolts -arrows- to 30 Nm.

2.2.2 Summary of components - toothed belt for engine with identification characters CPWA



1 - Toothed belt

- ❑ mark the direction of rotation with chalk or a felt-tip pen before removing
- ❑ check for wear
- ❑ removing ⇒ “2.5 Removing and installing toothed belt”, page 140
- ❑ install (set the timing) ⇒ page 146

2 - Screw

- ❑ 25 Nm

3 - Tensioning pulley

- ❑ for removing and installing, remove engine support ⇒ “1.5 Removing and installing engine support”, page 59

4 - Screw

- ❑ replace after removal
- ❑ 50 Nm + torque a further 90° ($^{1}/_{4}$ turn)

5 - Toothed belt pulley, exhaust camshaft

6 - Toothed belt pulley, inlet camshaft

- ❑ With camshaft control

7 - Guide bushing

8 - Screw

- ❑ replace after removal
- ❑ 50 Nm + torque a further 135° ($^{3}/_{8}$ turn)

9 - O-ring

- ❑ replace after removal

10 - Screw plug

- ❑ 20 Nm

11 - O-ring

- ❑ replace after removal

12 - Distance sleeve

13 - Guide pulley

14 - Screw

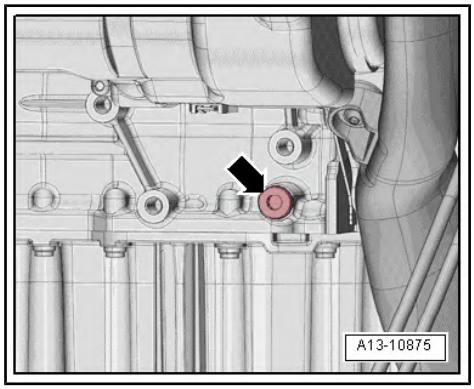
- ❑ 45 Nm

15 - Crankshaft - toothed belt sprocket

- ❑ there must not be any oil present on the contact surface between the toothed belt sprocket and the crankshaft

❑ can be installed only in one position

Tightening torque of locking screw for recess “OT” in the cylinder block



Note

Replace the O-ring if it is damaged.

– Tighten screws -arrows- to 30 Nm.

2.3 Checking valve timing

Special tools and workshop equipment required

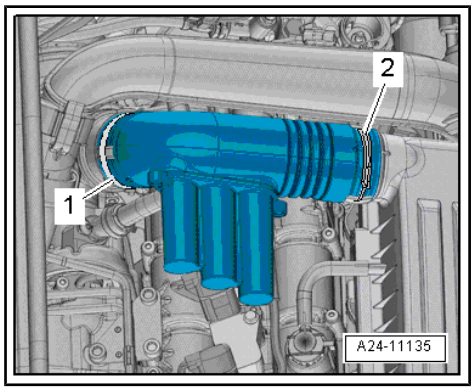
- Fixing screw - T10340-
- Camshaft clamp - T10494-
- Release tool -T10527-
- Assembly tool - T10487-

Work procedure

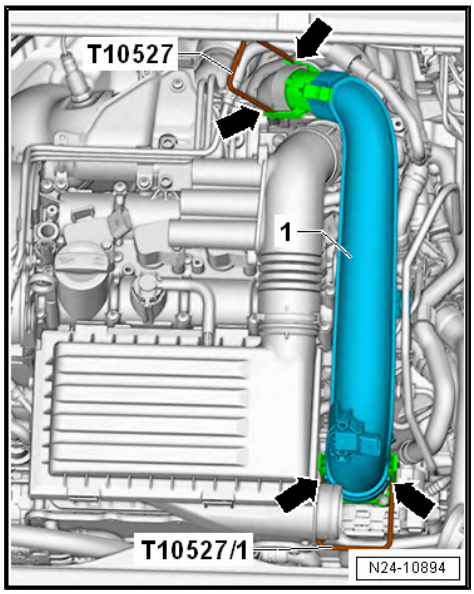
– Loosen hose clamps -1-, -2- and remove air guide pipes.

– Expose air guide hoses at the air guide pipe.

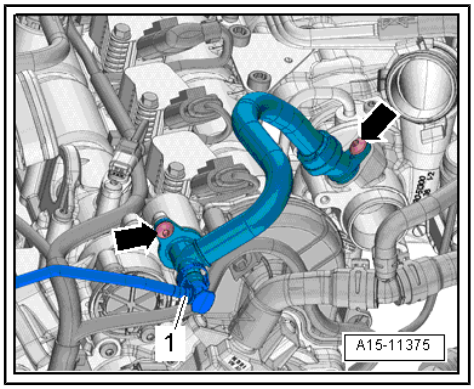
– Remove plug from charge pressure sender - GX26- .



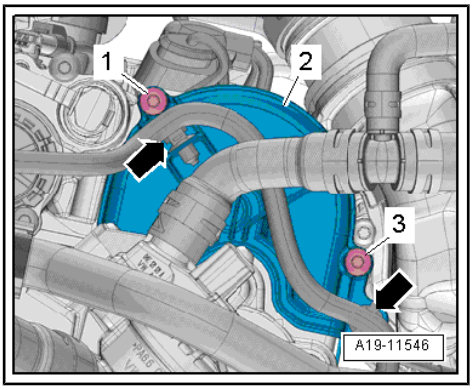
– Release catches -arrows- with release tool -T10527- and remove air guide pipe.



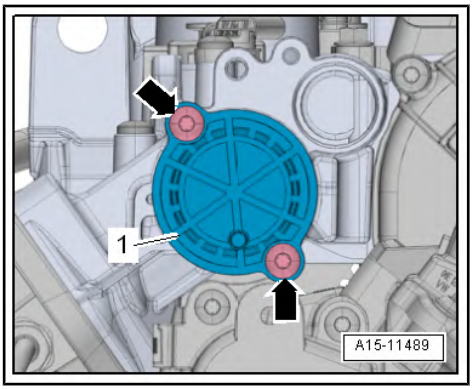
– Press release buttons and remove hose -1- to the activated charcoal filter.
– Unscrew screws -arrows- and remove hose for crankcase ventilation.



– Expose wiring loom -arrows-.
– Unscrew screws -1-, -3- and remove toothed belt guard -2- for coolant pump toothed belt.



– Release screws -arrows- and remove cap -1-.
– Drain coolant ⇒ “1.2 Draining and filling coolant”, page 209 .

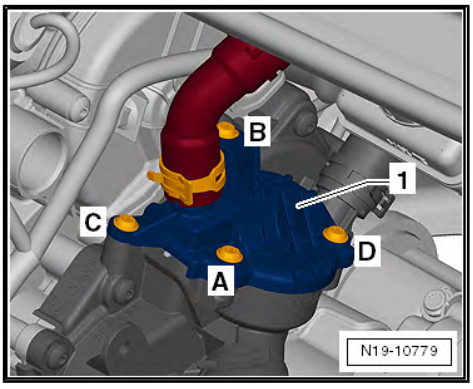


– Unscrew screws -A-, -B-, -C- and -D- and push thermostat cover -1- to the side.

Set the crankshaft to “OT”:

– Remove ignition coil with power output stage 1 ⇒ “1.2 Removing and installing ignition coils with output stage”, page 442 .
– Remove ignition plug cylinder 1 with spark plug socket wrench , e. g. -3122 B- .

Set the correct position of the crankshaft for screwing in the fixing screw.



– Carefully insert a screwdriver into the opening of the ignition plug, minimum length of shaft 250 mm, in -direction of arrow- so that it touches the piston head.
– Rotate the crankshaft in direction of rotation of engine on “TDC” for cylinder 1.

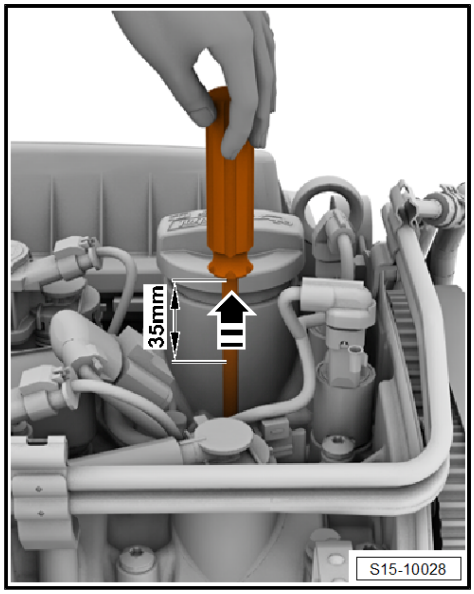


– Turn engine shaft further in direction of arrow so that the screwdriver just out at the top by approx 35 mm in the -direction of the arrow-.
– Unscrew locking screw “TDC” bore at the cylinder block.

Caution

Risk of engine damage.

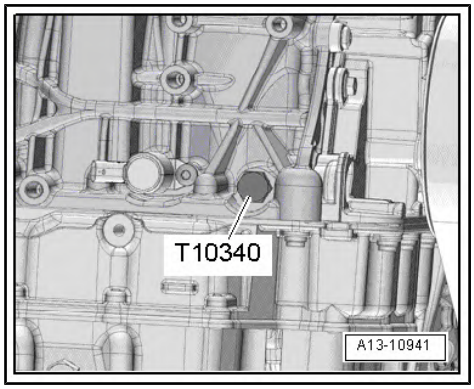
- *If the fixing screw - T10340- cannot be screwed in up to the stop, the crankshaft is not in the correct position!*
- *In this case, proceed as follows:*
- *Unscrew the fixing screw.*
- *Set the correct position of the crankshaft for screwing in the fixing screw.*



– Turn the fixing screw - T10340- up to the stop in the cylinder block and tighten to 30 Nm.
– Turn crankshaft up to the stop in direction of rotation of engine.
• The crankshaft sprocket now lies on the fixing screw and the “TCD” position is set.

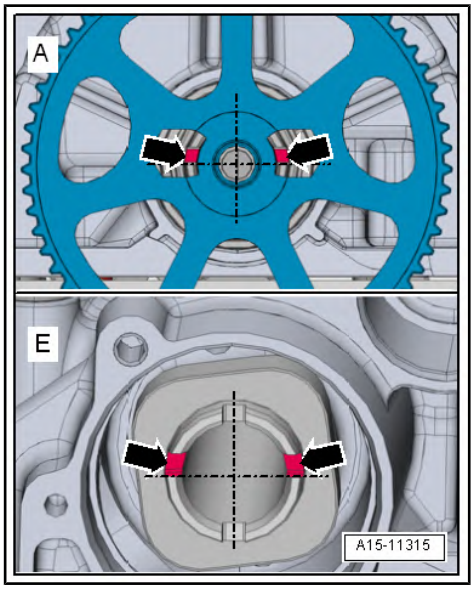
Note

The crankshaft is only locked in direction of rotation of engine using the fixing screw - T10340- .



- With the exhaust camshaft -A- and inlet valve -E-, the asymmetrically arranged grooves -arrows- must be above the camshaft centre.
- On the exhaust camshaft -A-, the grooves -arrows- are accessible through the recesses in the coolant pump driving wheel.

– If the camshafts are not positioned as described, unscrew the fixing screw - T10340- and turn the camshaft by one more turn and set it to “TDC” again.

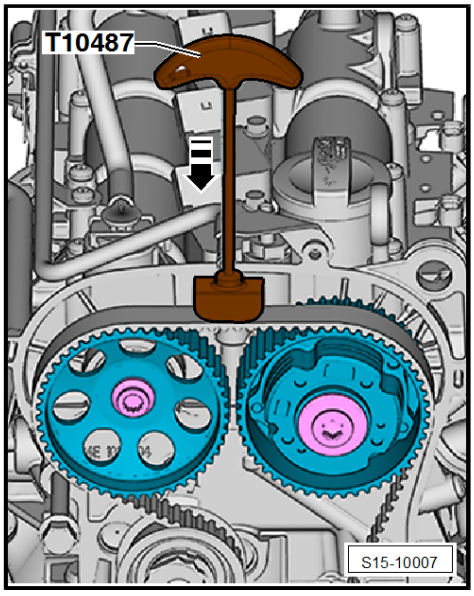


Note

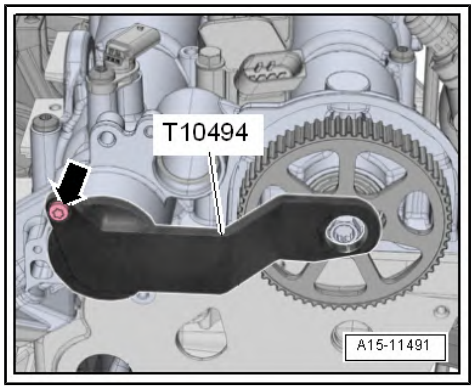
- *The camshaft clamp - T10494- must move into position easily.*
- *The camshaft clamp must not be positioned using any kind of hammer.*

If camshaft clamp - T10477- cannot be installed:

– Using the assembly tool - T10487- in -direction of arrow- press on the toothed belt.



– At the same time, insert the camshaft clamp -T10494- up to stop into the camshafts and fix with the screw -arrow-.



If camshaft clamp cannot be fitted:

– Set timing and remove the toothed belt from the camshaft ⇒ “2.4 Remove the toothed belt from the camshaft”, page 114 .

If camshaft clamp can be fitted:

– Valve timing is OK.

Caution

Risk of destruction of the engine.

- *To complete the work, check that the fixing screw - T10340- and camshaft clamp - T10494- have been removed from the engine.*

Further installation occurs in reverse order.

Note

- *Replace screws which have been tightened firmly to a torquing angle.*
- *Renew O-ring of locking screw if damaged.*

Tightening torques

- Toothed belt drive ⇒ “2.2 Assembly overview - toothed belt drive ”, page 107
- Screw plug for bore in the cylinder block ⇒ page 108
- Camshaft housing ⇒ “1.2 Summary of components - camshaft housing”, page 92
- Crankcase ventilation ⇒ “3.1 Summary of components - crankcase ventilation”, page 195
- Coolant pump ⇒ “2.1 Summary of components - coolant pump and coolant thermostat”, page 215
- Charge-air system ⇒ “2.1 Summary of components - charge air system”, page 370

2.4 Remove the toothed belt from the camshaft

⇒ “2.4.1 Removing the toothed belt from the camshaft - for engines with identification characters CHPA”, page 114

⇒ “2.4.2 Removing the toothed belt from the camshaft - for engines with identification characters CPWA”, page 126

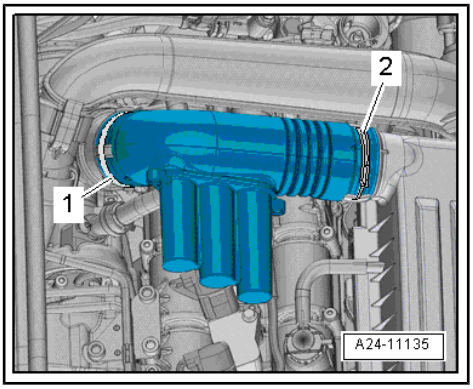
2.4.1 Removing the toothed belt from the camshaft - for engines with identification characters CHPA

Special tools and workshop equipment required

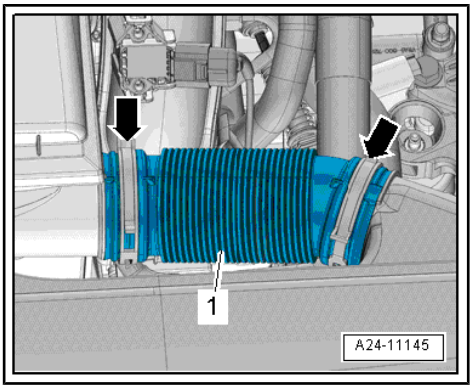
- Counterholder - T10172- with adapters -T10172/1-
- Locating screw - T10340-
- Key - T10499-
- Insertion tool - T10500-
- Torque wrench - V.A.G 1410- or -VAS 6583-
- Camshaft clamp - T10494-
- Release tool -T10527-
- Assembly tool - T10487-
- Spark plug wrench , e.g. -3122 B-

Work procedure

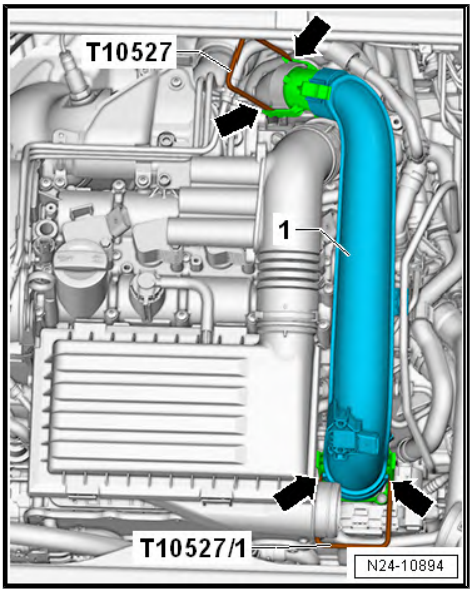
– Loosen hose clamps -1- and -2- and remove air guide pipes.



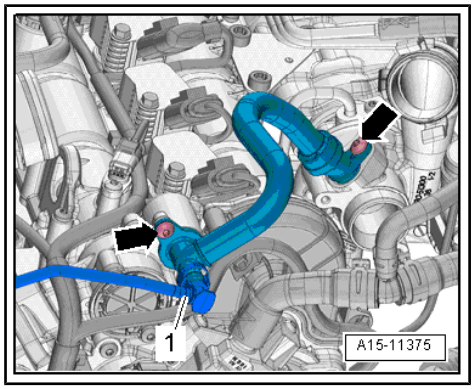
– Undo hose clamps -arrows-, remove air guide hose -1-.
– Remove plug from charge pressure sender - GX26- .



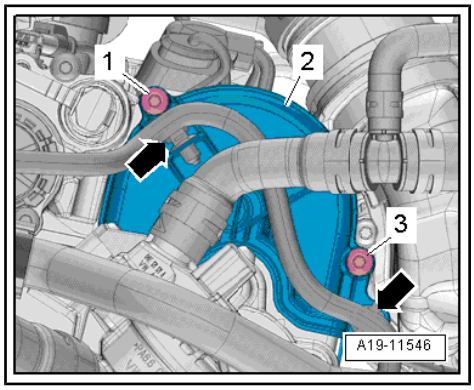
– Release catches -arrows- with release tool -T10527- and remove air guide pipe.



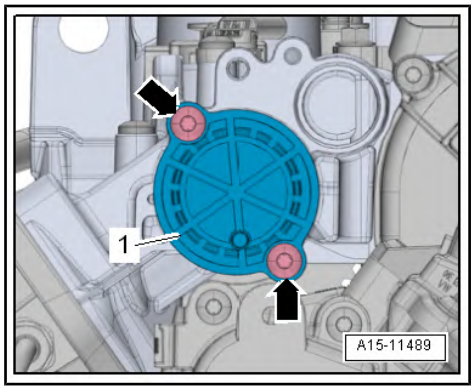
– Press release buttons and pull off hose -1-.
– Unscrew screws -arrows- and remove hose for crankcase ventilation.



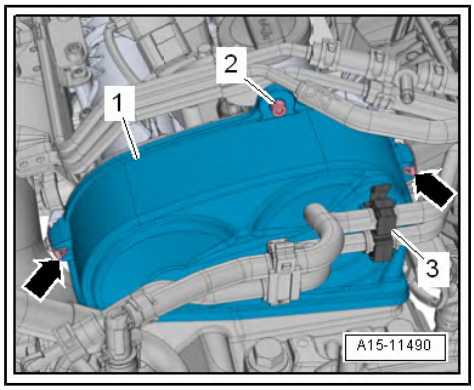
– Expose wiring loom -arrows-.
– Unscrew screws -1-, -3- and remove toothed belt guard -2- for coolant pump toothed belt.



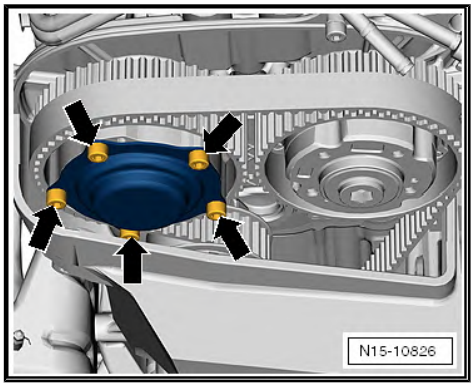
– Release screws -arrows- and remove cap -1-.
– Expose vacuum hose on the holder -3-.



– Unscrew screw -2-.
– Loosen clips -arrows- and remove toothed belt guard -1- upwards.



– Unscrew screws -arrows- and remove the cover from the camshaft control of the exhaust camshaft.



Caution

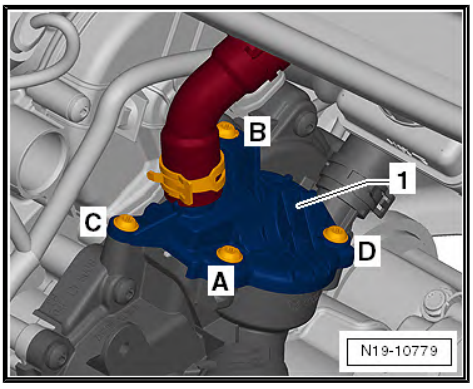
Leaking engine oil!

To protect the toothed belt, place a cleaning cloth below the camshaft control to collect any oil that is flowing out.

Contact points of the toothed belt, camshaft sprocket, crankshaft toothed belt sprocket, tensioning pulley and guide pulley are to be kept free of oil.

– Drain coolant ⇒ “1.2 Draining and filling coolant”, page 209 .

– Unscrew screws -A-, -B-, -C- and -D- and push thermostat cover -1- to the side.



Set the crankshaft to “OT”:

– Remove ignition coil with power output stage 1 ⇒ “1.2 Removing and installing ignition coils with output stage”, page 442 .

– Remove ignition plug cylinder 1 with spark plug socket wrench , e. g. -3122 B- .

Set the correct position of the crankshaft for screwing in the fixing screw.

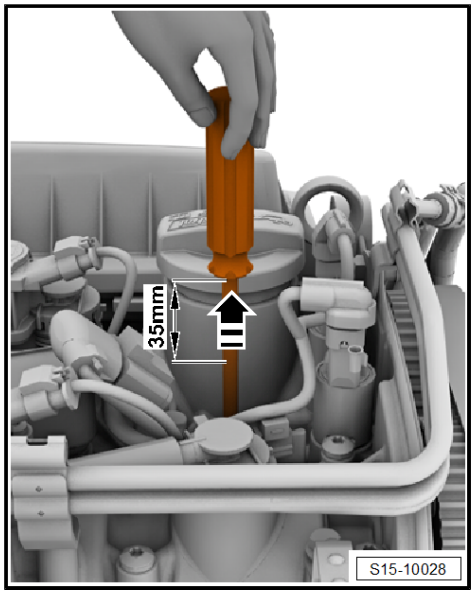
– Carefully insert a screwdriver into the opening of the ignition plug, minimum length of shaft 250 mm, in -direction of arrow- so that it touches the piston head.

– Rotate the crankshaft in direction of rotation of engine on “TDC” for cylinder 1.



– Turn engine shaft further in direction of arrow so that the screwdriver just out at the top by approx 35 mm in the -direction of the arrow-.

– Unscrew locking screw “TDC” bore at the cylinder block.



Caution

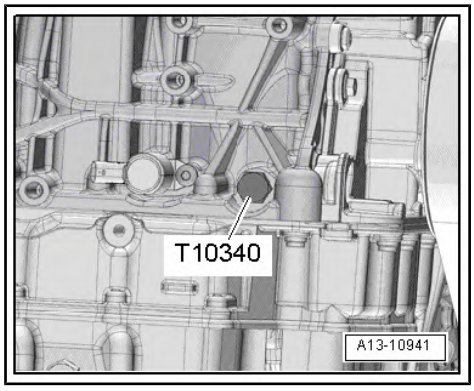
Risk of engine damage.

- *If the fixing screw - T10340- cannot be screwed in up to the stop, the crankshaft is not in the correct position!*
- *In this case, proceed as follows:*
- *Unscrew the fixing screw.*
- *Set the correct position of the crankshaft for screwing in the fixing screw.*

– Turn the fixing screw - T10340- up to the stop in the cylinder block and tighten to 30 Nm.

– Turn crankshaft up to the stop in direction of rotation of engine.

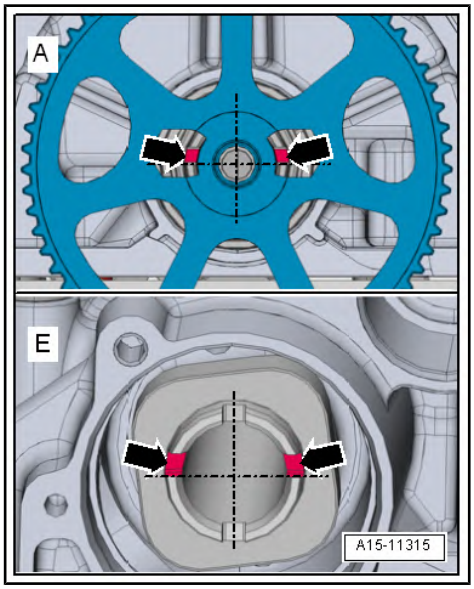
• The crankshaft sprocket now lies on the fixing screw and the “TCD” position is set.



Note

The crankshaft is only locked in direction of rotation of engine using the fixing screw - T10340- .

- With the exhaust camshaft -A- and inlet valve -E-, the asymmetrically arranged grooves -arrows- must be above the camshaft centre.
- On the exhaust camshaft -A-, the grooves -arrows- are accessible through the recesses in the coolant pump driving wheel.



Note

The camshafts have one symmetrically and one asymmetrically arranged pair of grooves. In the "TDC" position the asymmetrically arranged pair of grooves must by above the imaginary horizontal centre line.

If the camshafts are not as described:

– Remove fixing screw - T10340- and turn crankshaft another turn, set back to "TDC" .

If the camshafts are as described:

– Insert camshaft clamp -T10494- to stop into camshafts and tighten bolt -arrow- by hand.

Note

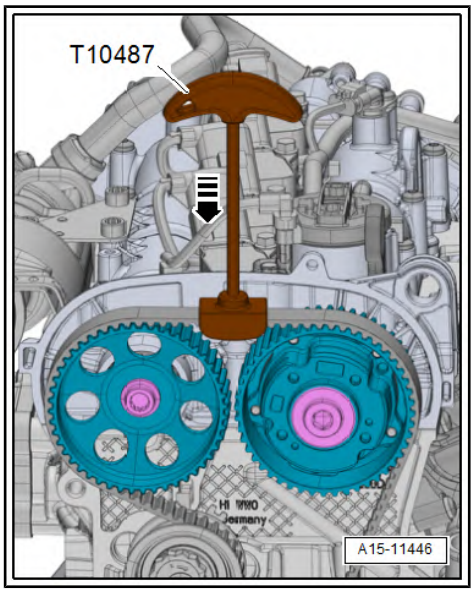
- *The camshaft clamp - T10494- must move into position easily.*
- *The camshaft clamp must not be positioned using any kind of hammer.*

If camshaft clamp - T10494- cannot be installed:

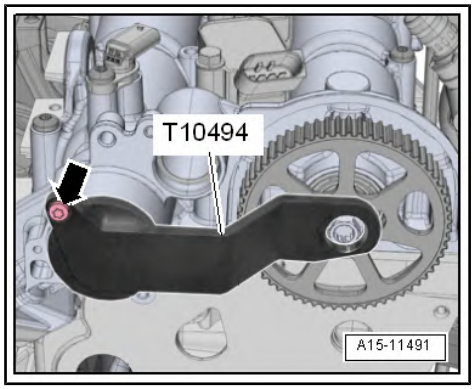
Caution

To prevent damage to the belt, do not use sharp-edged tools!

– Using the assembly tool - T10487- in -direction of arrow- press on the toothed belt.



– While doing so, insert camshaft control -T10494- to stop into camshafts and tighten screw -arrow- hand-tight.



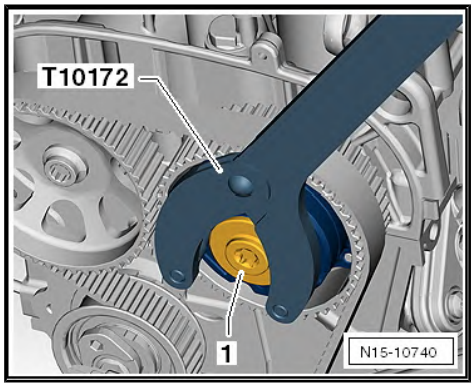
Caution

Risk of damaging the camshaft.

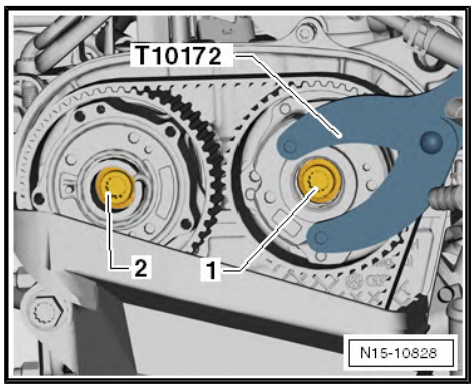
- *Do not use the camshaft fixer/locator - T10494- as a counterholder.*

– Tighten screw -arrow- hand-tight.

– Unscrew locking screw -1- on the camshaft sprocket fitting position. Use counterholder - T10172- with adapters - T10172/1- to do so.



– Undo screws -1- and -2- by around one turn. Use counterholder - T10172- with adapters -T10172/2- and -T10172/1- to do this.



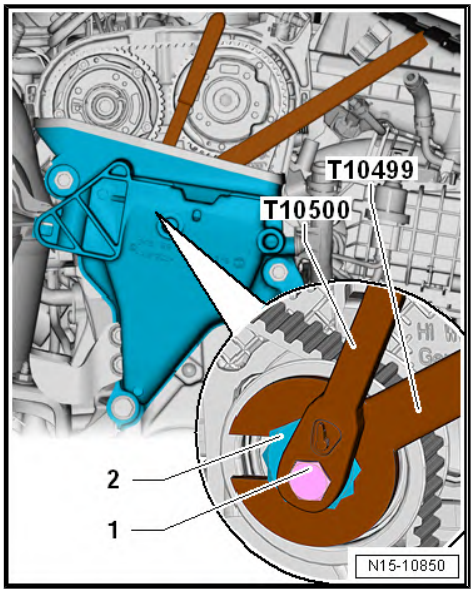
Caution

Risk of damage due to reversing the rotation direction of an already used toothed belt.

- *Mark the direction of rotation with chalk or a felt-tip pen for the re-installation before removing the toothed belt pulley.*

– Release screw -1- using insertion tool - T10500- .

– Slacken the tensioning pulley at the eccentric -2- using the wrench - T10499- .



Caution

There is a risk of damage to the toothed belt!

- *The toothed belt contains glass fibre cores. For this reason, the diameter of the toothed belt should never fall beneath 50 mm. Otherwise this may reduce the life time of the toothed belt.*

– Remove the toothed belt from the camshaft sprockets.

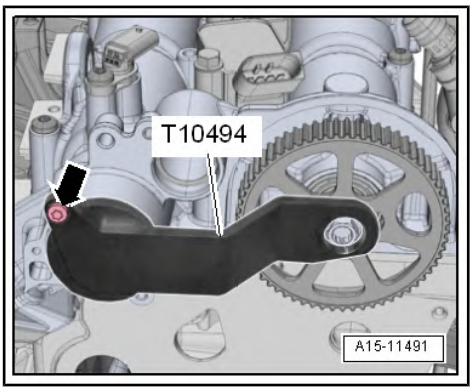
Installing (set the timing)

Note

- *Replace screws which have been tightened firmly to a torquing angle.*
- *Renew O-ring of locking screw if damaged.*

– “Check TDC” position of camshaft and crankshaft:

• Camshaft clamp -T10494- attached to camshaft housing.



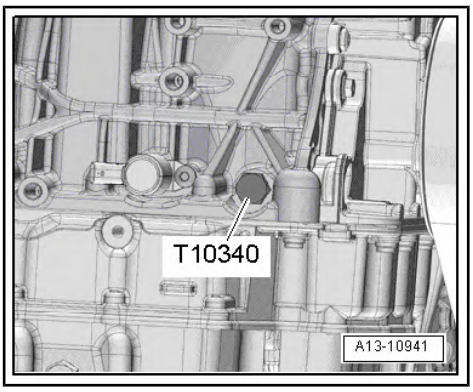
Caution

Risk of damaging the camshafts.

- *Do not use the camshaft clamp -T10494- as a counter-holder.*

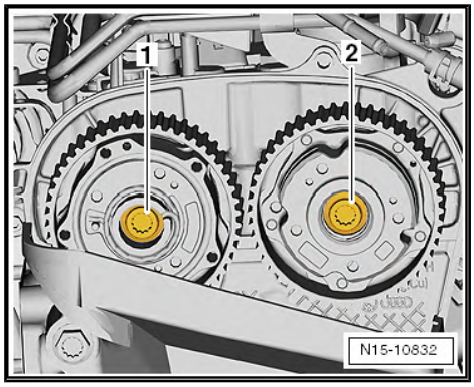
• Fixing screw - T10340- turned up to the stop in the cylinder block and tightened to 30 Nm.

• Crankshaft in engine direction of rotation applied to the fixing screw - T10340- = “TDC” position.

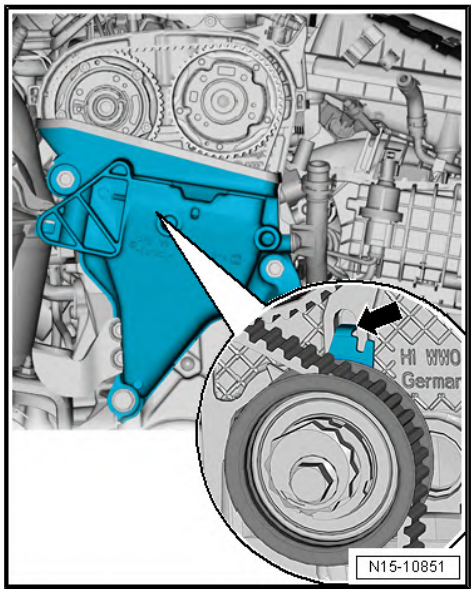


– Replace camshaft sprocket screws -1- and -2- and insert new screws loosely.

• It must still be possible to turn the camshaft sprockets on the camshafts, however they must not hang loose.



• Sheet peg arrow of the tensioning pulley must engage in the cast iron recess -arrow- of the cylinder head.



Caution

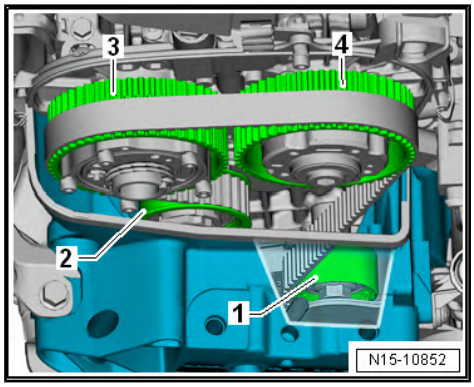
There is a risk of damage to the toothed belt!

- *The toothed belt contains glass fibre cores. For this reason, the diameter of the toothed belt should never fall beneath 50 mm. Otherwise this may reduce the life time of the toothed belt.*

Note

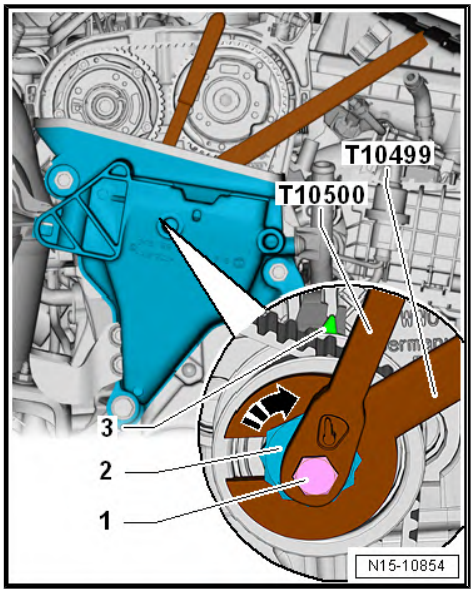
Observe sequence when fitting the toothed belt.

– Pull toothed belt upwards, then fit the tensioning pulley -2- and camshaft sprockets -3- and -4- onto the guide roller -1-.



– Rotate the eccentric -2- of the tensioning pulley with the wrench - T10499- in -direction of arrow- until the adjustment pointer -3- is located approx. 10 mm to the right from the adjustment window.

– Push eccentric so far back that the adjustment pointer is positioned exactly in the adjustment window.



Caution

Risk of engine damage!

To tighten, the torque wrench - VAS 6583- or torque wrench - V.A.G 1410- must be used!

To tighten, no other torque wrench may be used!

Tighten with torque wrench VAS 6583

Caution

Only use the torque wrench together with insertion tool - T10500- !

When setting the tightening torque on the torque wrench - VAS 6583- the actual dimension specified on the tool insert - T10500- must be put into the torque wrench!

– Keep eccentric in this position and tighten screw -1- to 25 Nm. Use tool insert - T10500- with torque wrench - VAS 6583- to do this.

Tighten with torque wrench VAG 1410

Caution

Only use the torque wrench together with insertion tool - T10500- !

Set the reduced tightening torque of 12 Nm on the torque wrench - V.A.G 1410-

The required tightening torque of 25 Nm is achieved by the extending the torque wrench - V.A.G 1410- around the tool insert - T10500- !

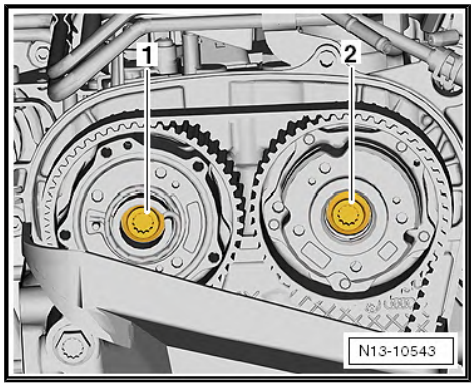
– Keep eccentric in this position and tighten screw -1- to 12 Nm. Use tool insert - T10500- with torque wrench - V.A.G 1410- to do this.

Continued

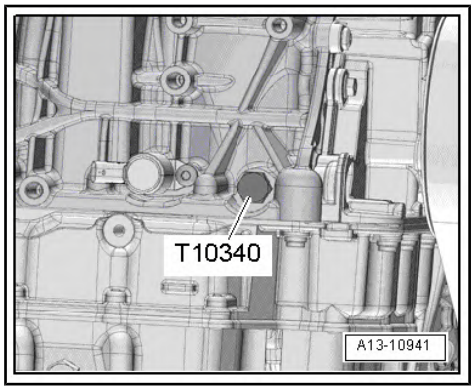
Note

If the engine continued to turn or has run, there may be slight deviations of the adjustment pointer -3- setting in the adjustment window. This has no influence on the toothed belt tensioning.

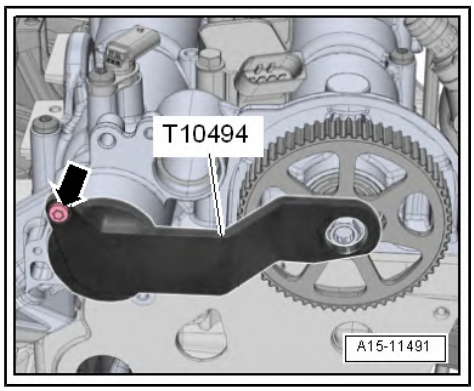
– Pre-tighten screws -1- and -2- to 50 Nm, to do so, use the counterholder - T10172- with adapters -T10172/1- .



– Unscrew positioning screw - T10340- .



– Unscrew bolt -arrow- and remove camshaft clamp -T10494- .



Checking valve timing

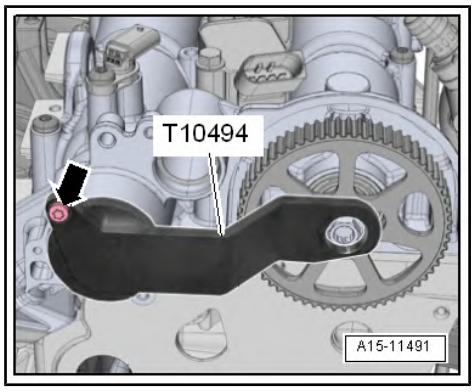
– Turn crankshaft 2 turns in the direction of running of the engine until the piston for cylinder 1 is again on “TDC”.

• The crankshaft cheek must now be resting on the fixing screw.

Note

The crankshaft is only locked in direction of rotation of engine using the fixing screw - T10340- .

– The camshaft clamp -T10494- must move into position easily.



The camshaft clamp must not be positioned using any kind of hammer.

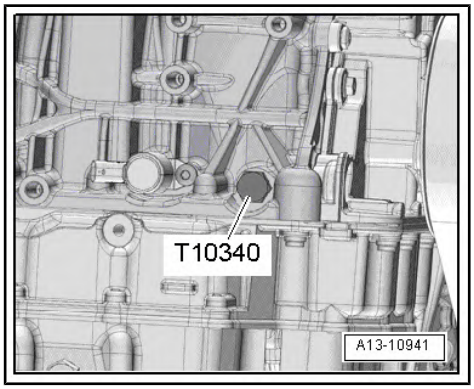
– Insert camshaft control -T10494- to stop into camshafts and tighten screw -arrow- hand-tight.

If it is not possible to insert the camshaft clamp -T10494- , the timing is NOK:

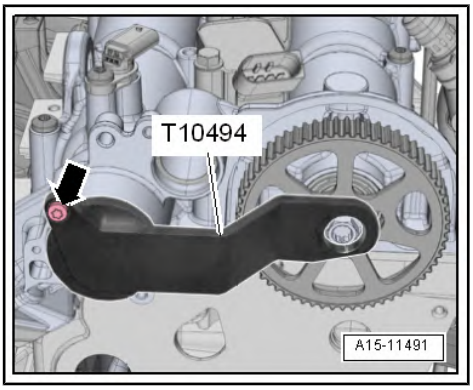
– Repeat control time settings.

If it is possible to insert the camshaft clamp -T10494- , the timing is OK:

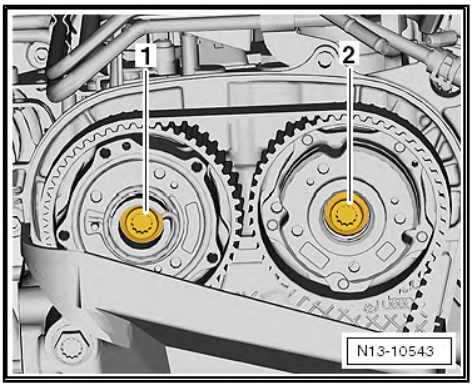
– Unscrew positioning screw - T10340- .



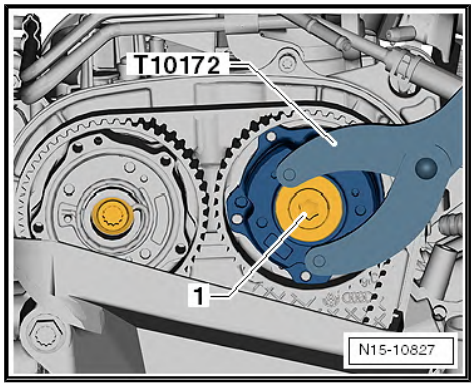
– Unscrew bolt -arrow- and remove camshaft clamp -T10494- .



– Tighten screws -1- and -2- to end stop tightening torque
⇒ “2.2 Assembly overview - toothed belt drive ”, page 107 .



– Tighten locking screw -1-. Use counterholder - T10172- with adapters -T10172/1- to do so.



Caution

Risk of destruction of the engine.

- *To complete the work, check that the fixing screw - T10340- and camshaft clamp - T10494- have been removed from the engine.*

The further assembly is carried out in the reverse order, while paying attention to the following:

Tightening torques

- Toothed belt drive
  ⇒ “2.2 Assembly overview - toothed belt drive ”, page 107
- Screw plug for bore in the cylinder block ⇒ page 108
- Camshaft housing
  ⇒ “1.2 Summary of components - camshaft housing”, page 92
- Crankcase ventilation
  ⇒ “3.1 Summary of components - crankcase ventilation”, page 195
- Coolant pump
  ⇒ “2.1 Summary of components - coolant pump and coolant thermostat”, page 215
- Charge-air system
  ⇒ “2.1 Summary of components - charge air system”, page 370

2.4.2 Removing the toothed belt from the camshaft - for engines with identification characters CPWA

Special tools and workshop equipment required

- Counterholder - T10172- with adapters -T10172/1-
- Locating screw - T10340-
- Key - T10499-
- Insertion tool - T10500-
- Torque wrench - V.A.G 1410- or -VAS 6583-
- Camshaft clamp - T10494-
- Release tool -T10527-
- Assembly tool - T10487-
- Spark plug wrench , e.g. -3122 B-

Work procedure

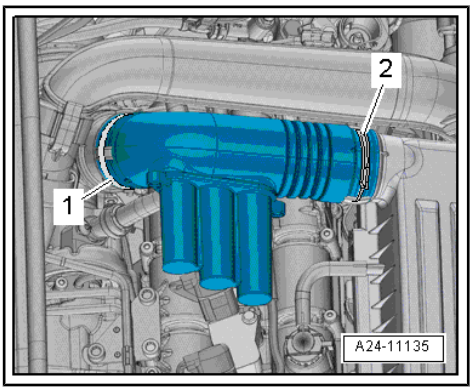
DANGER!

Follow safety measures and rules of cleanliness when working on the natural gas system and general instructions for operating a natural gas vehicle (CNG)
⇒ "2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)", page 10 .

– Remove the gas pressure regulator
⇒ "4.2 Removing and installing gas pressure regulator", page 395 .

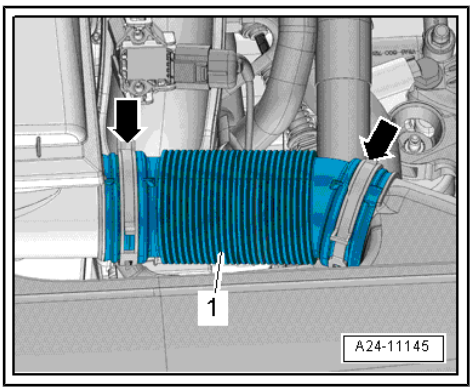
– Remove the bracket for the gas pressure regulator
⇒ "4.1.1 Summary of components - gas pressure regulator", page 393 .

– Loosen hose clamps -1- and -2- and remove air guide pipes.

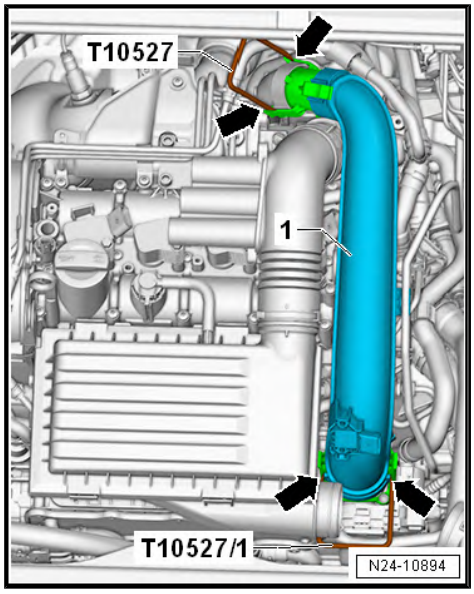


– Undo hose clamps -arrows-, remove air guide hose -1-.

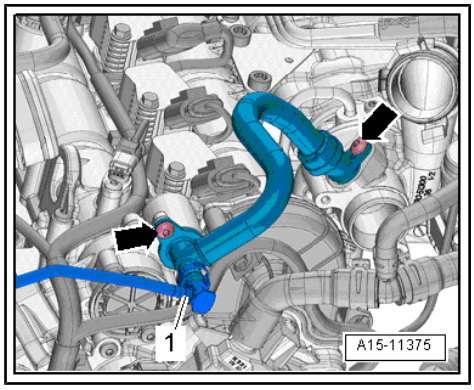
– Remove plug from charge pressure sender - GX26- .



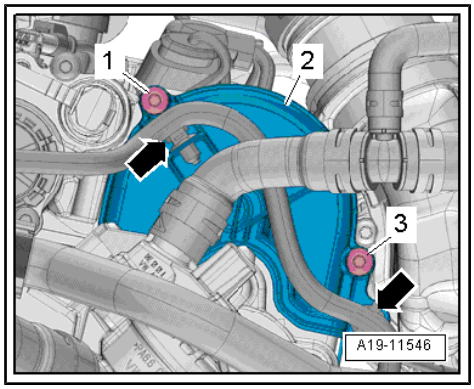
– Release catches -arrows- with release tool -T10527- and remove air guide pipe.



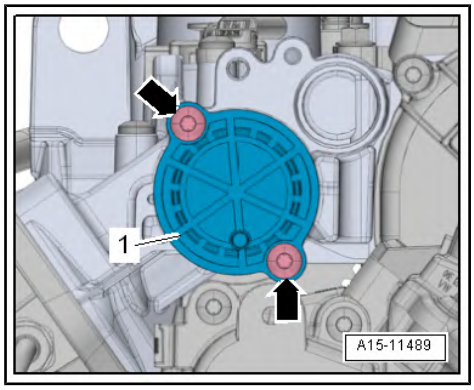
– Press release buttons and pull off hose -1-.
– Unscrew screws -arrows- and remove hose for crankcase ventilation.



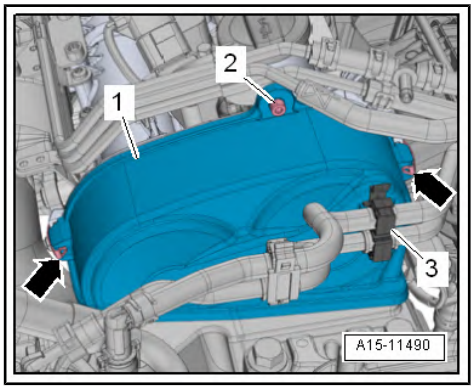
– Expose wiring loom -arrows-.
– Unscrew screws -1-, -3- and remove toothed belt guard -2- for coolant pump toothed belt.



– Release screws -arrows- and remove cap -1-.



– Expose the fuel hoses at the mounting bracket -3-.
– Release screw -2-.
– Loosen clips -arrows- and remove toothed belt guard -1- upwards.
– Drain coolant ⇒ “1.2 Draining and filling coolant”, page 209 .

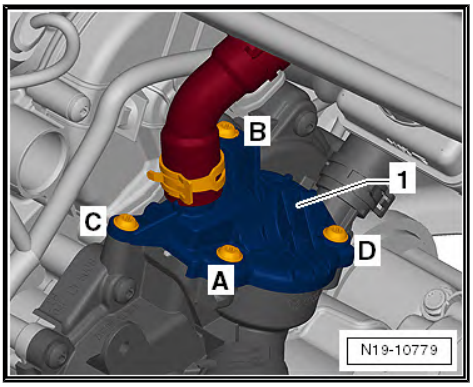


– Unscrew screws -A-, -B-, -C- and -D- and push thermostat cover -1- to the side.

Set the crankshaft to “OT”:

– Remove ignition coil with power output stage 1 ⇒ “1.2 Removing and installing ignition coils with output stage”, page 442 .
– Remove ignition plug cylinder 1 with spark plug socket wrench , e. g. -3122 B- .

Set the correct position of the crankshaft for screwing in the fixing screw.

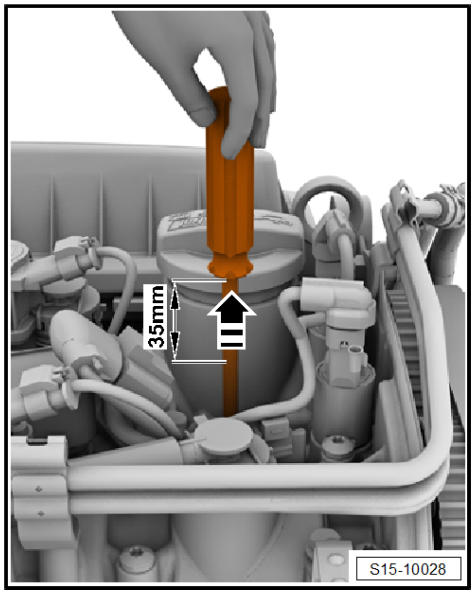


– Carefully insert a screwdriver into the opening of the ignition plug, minimum length of shaft 250 mm, in -direction of arrow- so that it touches the piston head.
– Rotate the crankshaft in direction of rotation of engine on “TDC” for cylinder 1.



– Turn engine shaft further in direction of arrow so that the screwdriver just out at the top by approx 35 mm in the -direction of the arrow-.

– Unscrew locking screw “TDC” bore at the cylinder block.



Caution

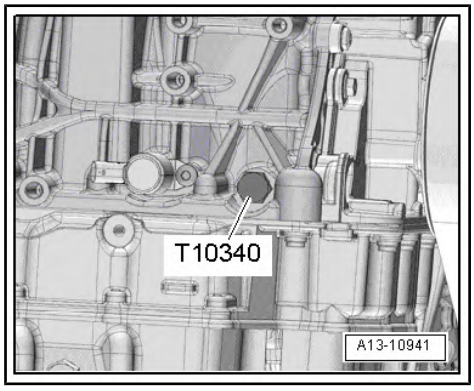
Risk of engine damage.

- *If the fixing screw - T10340- cannot be screwed in up to the stop, the crankshaft is not in the correct position!*
- *In this case, proceed as follows:*
- *Unscrew the fixing screw.*
- *Set the correct position of the crankshaft for screwing in the fixing screw.*

– Turn the fixing screw - T10340- up to the stop in the cylinder block and tighten to 30 Nm.

– Turn crankshaft up to the stop in direction of rotation of engine.

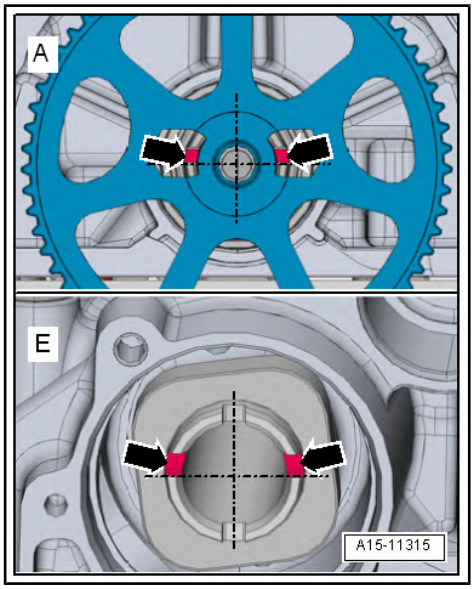
• The crankshaft sprocket now lies on the fixing screw and the “TCD” position is set.



Note

The crankshaft is only locked in direction of rotation of engine using the fixing screw - T10340- .

- With the exhaust camshaft -A- and inlet valve -E-, the asymmetrically arranged grooves -arrows- must be above the camshaft centre.
- On the exhaust camshaft -A-, the grooves -arrows- are accessible through the recesses in the coolant pump driving wheel.



Note

The camshafts have one symmetrically and one asymmetrically arranged pair of grooves. In the "TDC" position the asymmetrically arranged pair of grooves must by above the imaginary horizontal centre line.

If the camshafts are not as described:

– Remove fixing screw - T10340- and turn crankshaft another turn, set back to "TDC" .

If the camshafts are as described:

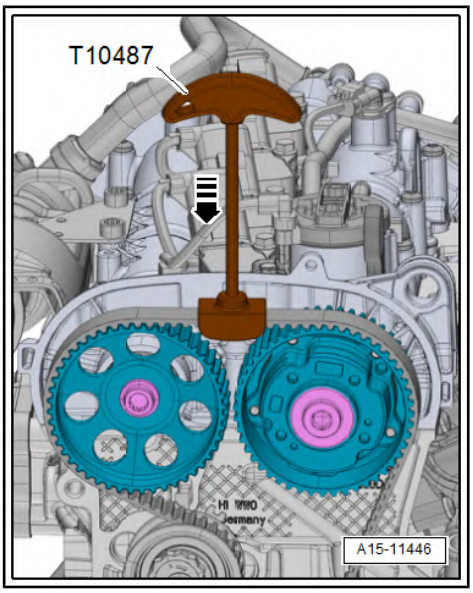
– Insert camshaft clamp -T10494- to stop into camshafts and tighten bolt -arrow- by hand.

Note

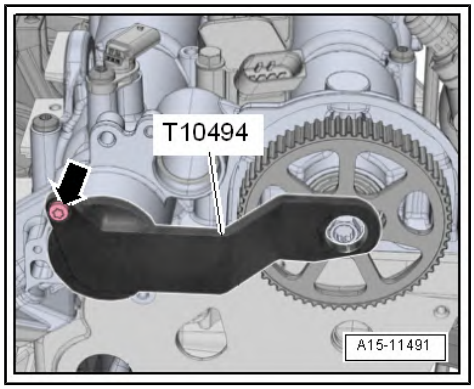
- *The camshaft clamp - T10494- must move into position easily.*
- *The camshaft clamp must not be positioned using any kind of hammer.*

If camshaft clamp - T10494- cannot be installed:

– Using the assembly tool - T10487- in -direction of arrow- press on the toothed belt.



– While doing so, insert camshaft control -T10494- to stop into camshafts and tighten screw -arrow- hand-tight.



Caution

Risk of damaging the camshaft.

- *Do not use the camshaft fixer/locator - T10494- as a counterholder.*

– Tighten screw -arrow- hand-tight.

Caution

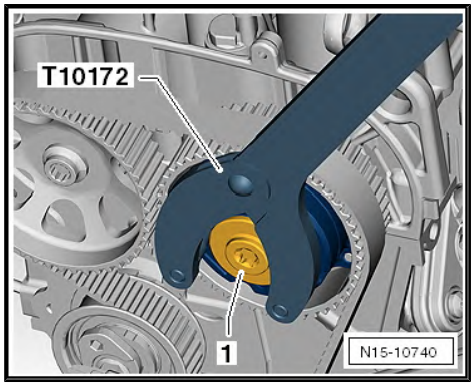
A minor loss of oil may result when opening the locking screw using the wheel of the exhaust camshaft.

This has no technical importance!

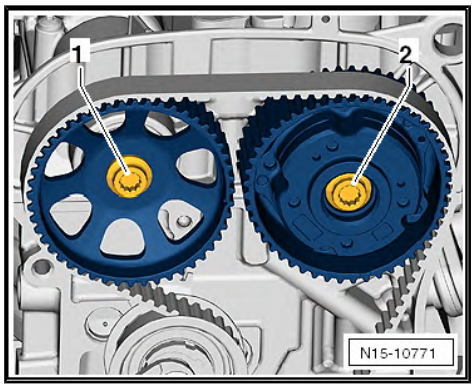
Contact points of the toothed belt, camshaft sprocket, crankshaft toothed belt sprocket, tensioning pulley and guide pulley are to be kept free of oil.

The place of the oil leak must be covered with cloths.

– Unscrew locking screw -1- on the camshaft sprocket fitting position. Use counterholder - T10172- with adapters - T10172/1- to do so.



– Undo screws -1- and -2- by around one turn. Use counterholder - T10172- with adapters -T10172/2- and -T10172/1- to do this.



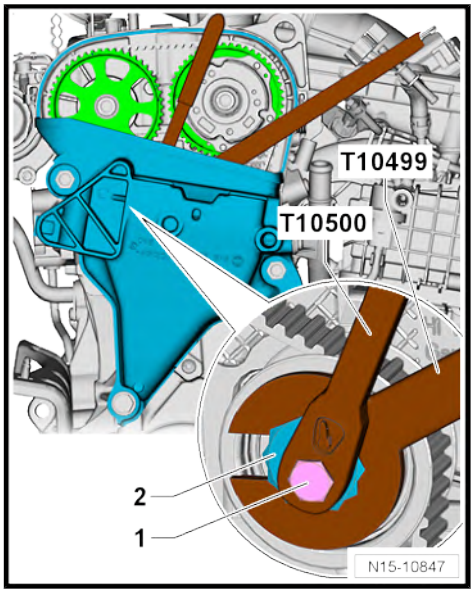
Caution

Risk of damage due to reversing the rotation direction of an already used toothed belt.

- *Mark the direction of rotation with chalk or a felt-tip pen for the re-installation before removing the toothed belt pulley.*

– Release screw -1- using insertion tool - T10500- .

– Slacken the tensioning pulley at the eccentric -2- using the wrench - T10499- .



Caution

There is a risk of damage to the toothed belt!

- *The toothed belt contains glass fibre cores. For this reason, the diameter of the toothed belt should never fall beneath 50 mm. Otherwise this may reduce the life time of the toothed belt.*

– Remove the toothed belt from the camshaft sprockets.

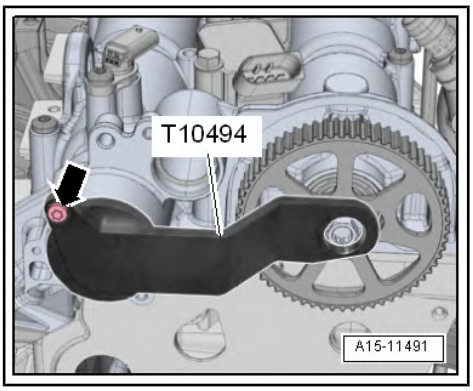
Installing (set the timing)

Note

- *Replace screws which have been tightened firmly to a torquing angle.*
- *Renew O-ring of plug if damaged.*

– "Check TDC" position of camshaft and crankshaft:

• Camshaft clamp -T10494- attached to camshaft housing.



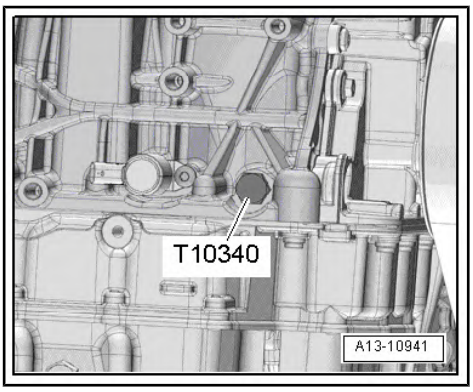
Caution

Risk of damaging the camshafts.

- *Do not use the camshaft clamp -T10494- as a counter-holder.*

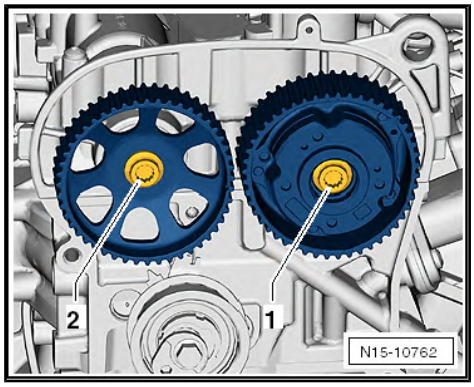
• Fixing screw - T10340- turned up to the stop in the cylinder block and tightened to 30 Nm.

• Crankshaft in engine direction of rotation applied to the fixing screw - T10340- = "TDC" position.



– Replace camshaft sprocket screws -1- and -2- and insert new screws loosely.

• It must still be possible to turn the camshaft sprockets on the camshafts, however they must not hang loose.

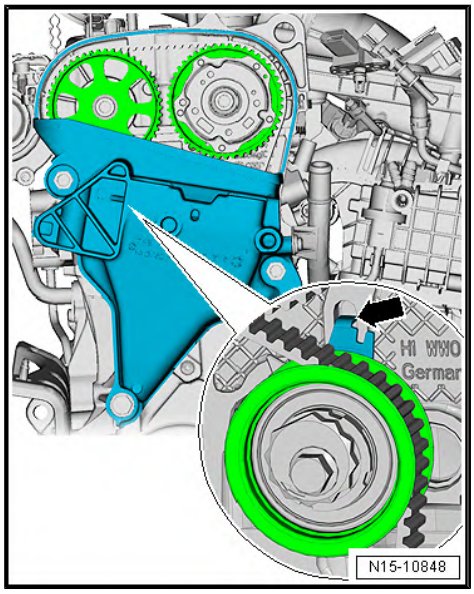


• Sheet peg arrow of the tensioning pulley must engage in the cast iron recess -arrow- of the cylinder head.

Caution

There is a risk of damage to the toothed belt!

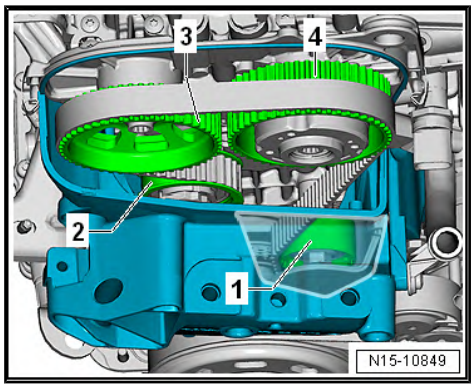
- ***The toothed belt contains glass fibre cores. For this reason, the diameter of the toothed belt should never fall beneath 50 mm. Otherwise this may reduce the life time of the toothed belt.***



Note

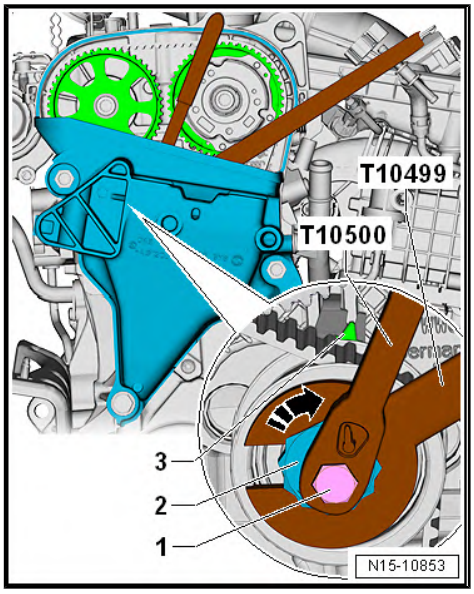
Observe sequence when fitting the toothed belt.

– Pull toothed belt upwards, then fit the tensioning pulley -2- and camshaft sprockets -3- and -4- onto the guide roller -1-.



– Rotate the eccentric -2- of the tensioning pulley with the wrench - T10499- in -direction of arrow- until the adjustment pointer -3- is located approx. 10 mm to the right from the adjustment window.

– Push eccentric so far back that the adjustment pointer is positioned exactly in the adjustment window.



Caution

Risk of engine damage!

To tighten, the torque wrench - VAS 6583- or torque wrench - V.A.G 1410- must be used!

To tighten, no other torque wrench may be used!

Tighten with torque wrench VAS 6583

Caution

Only use the torque wrench together with insertion tool - T10500- !

When setting the tightening torque on the torque wrench - VAS 6583- the actual dimension specified on the tool insert - T10500- must be put into the torque wrench!

– Keep eccentric in this position and tighten screw -1- to 25 Nm. Use tool insert - T10500- with torque wrench - VAS 6583- to do this.

Tighten with torque wrench VAG 1410

Caution

Only use the torque wrench together with insertion tool - T10500- !

Set the reduced tightening torque of 12 Nm on the torque wrench - V.A.G 1410-

The required tightening torque of 25 Nm is achieved by the extending the torque wrench - V.A.G 1410- around the tool insert - T10500- !

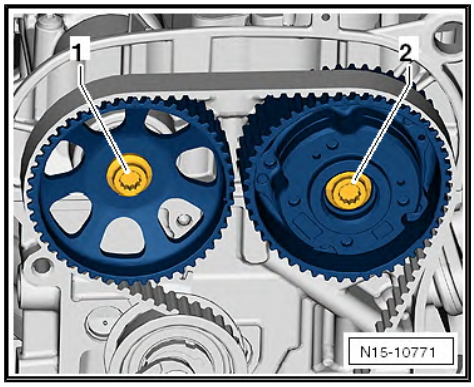
– Keep eccentric in this position and tighten screw -1- to 12 Nm. Use tool insert - T10500- with torque wrench - V.A.G 1410- to do this.

Continued

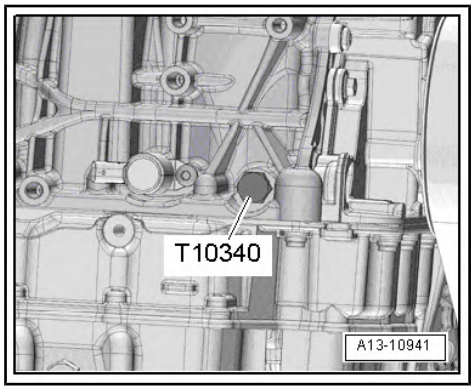
Note

If the engine continued to turn or has run, there may be slight deviations of the adjustment pointer -3- setting in the adjustment window. This has no influence on the toothed belt tensioning.

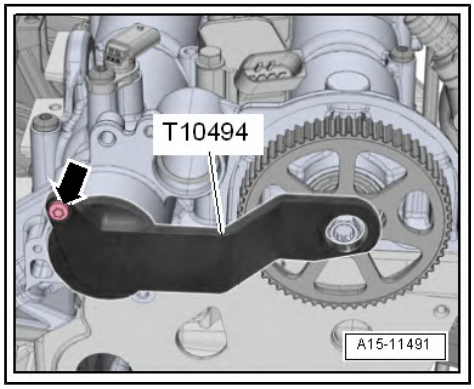
– Pre-tighten screws -1- and -2- to 50 Nm, to do so, use the counterholder - T10172- with adapters -T10172/1- .



– Unscrew positioning screw - T10340- .



– Unscrew bolt -arrow- and remove camshaft clamp -T10494- .



Checking valve timing

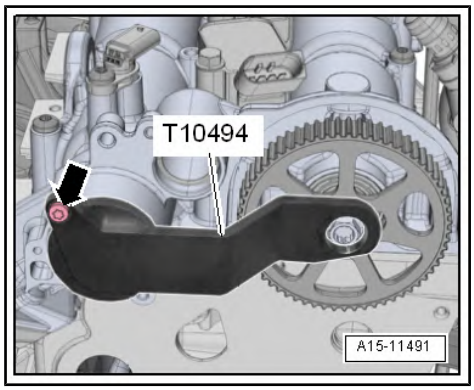
– Turn crankshaft 2 turns in the direction of running of the engine until the piston for cylinder 1 is again on “TDC”.

• The crankshaft cheek must now be resting on the fixing screw.

Note

The crankshaft is only locked in direction of rotation of engine using the fixing screw - T10340- .

– Insert camshaft control -T10494- to stop into camshafts and tighten screw -arrow- hand-tight.



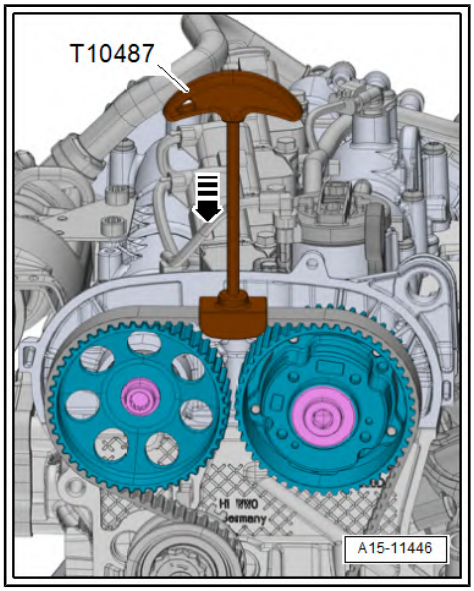
Note

♦ *The camshaft clamp -T10494- must move into position easily.*

♦ *The camshaft clamp must not be positioned using any kind of hammer.*

When the camshaft clamp -T10494- cannot easily be inserted:

– Using the assembly tool - T10487- in -direction of arrow- press on the toothed belt.

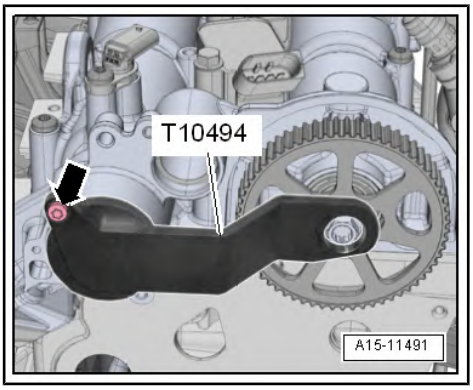


– While doing so, insert camshaft control -T10494- to stop into camshafts and tighten screw -arrow- hand-tight.

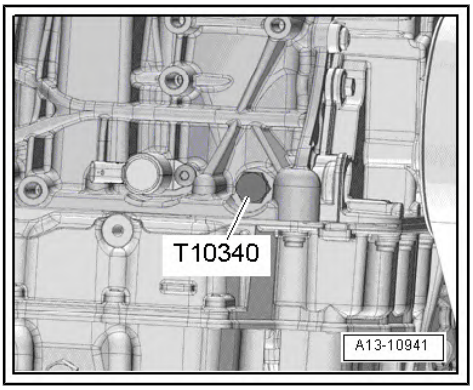
If it is not possible to insert the camshaft clamp -T10494- , the timing is NOK:

– Repeat control time settings.

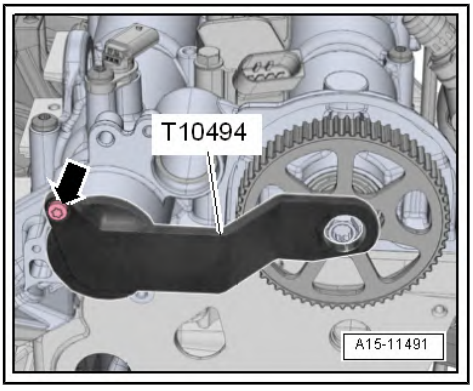
If it is possible to insert the camshaft clamp -T10494- , the timing is OK:



– Unscrew positioning screw - T10340- .

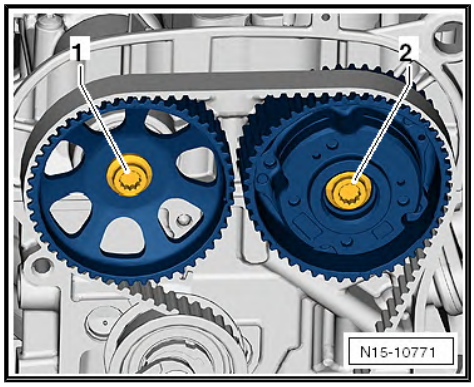


– Unscrew bolt -arrow- and remove camshaft clamp -T10494- .



Volkswagen Technical Site: http://vwts.ru http://vwts.info
огромный архив документации по автомобилям Volkswagen, Skoda, Seat, Audi

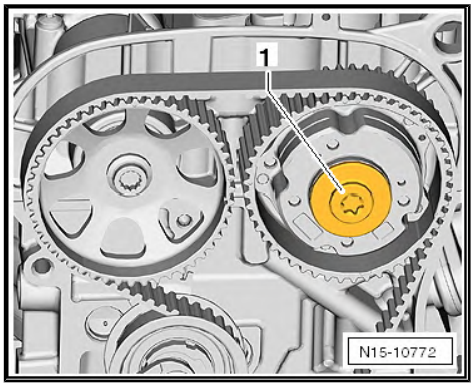
– Tighten screws -1- and -2- to end stop tightening torque ⇒ “2.2.2 Summary of components - toothed belt for engine with identification characters CPWA ”, page 109 .



– Tighten locking screw -1-. Use counterholder - T10172- with adapters -T10172/1- to do so.

– Install the gas pressure regulator
⇒ “4.2 Removing and installing gas pressure regulator”, page 395 .

– Install the bracket for the gas pressure regulator
⇒ “4.1.1 Summary of components - gas pressure regulator”, page 393 .



Caution

Risk of destruction of the engine.

- *To complete the work, check that the fixing screw - T10340- and camshaft clamp - T10494- have been removed from the engine.*

The further assembly is carried out in the reverse order, while paying attention to the following:

– Open the valves for tank shut-off -N361- and -N362- again with handwheel - T50026- .

Caution

Carry out a leak tightness test on the liquefied petroleum gas system (LPG)
⇒ “3.2 Inspecting the gas system for leaktightness”, page 17 .

Inspect natural gas system for leak-tightness ⇒ Maintenance ; Booklet Octavia III .

Tightening torques

- Toothed belt drive
⇒ “2.2 Assembly overview - toothed belt drive ”, page 107
- Screw plug for bore in the cylinder block ⇒ page 108
- Camshaft housing
⇒ “1.2 Summary of components - camshaft housing”, page 92
- Crankcase ventilation
⇒ “3.1 Summary of components - crankcase ventilation”, page 195
- Coolant pump
⇒ “2.1 Summary of components - coolant pump and coolant thermostat”, page 215
- Charge-air system
⇒ “2.1 Summary of components - charge air system”, page 370
- Gas pressure regulator
⇒ “4.1.2 Summary of components - gas pressure regulator with attached parts”, page 394
- Bracket for the gas pressure regulator
⇒ “4.1.1 Summary of components - gas pressure regulator”, page 393

2.5 Removing and installing toothed belt

⇒ “2.5.1 Removing and installing toothed belts - for engine with identification characters CHPA”, page 140

⇒ “2.5.2 Removing and installing toothed belts - for engine with identification characters CPWA”, page 152

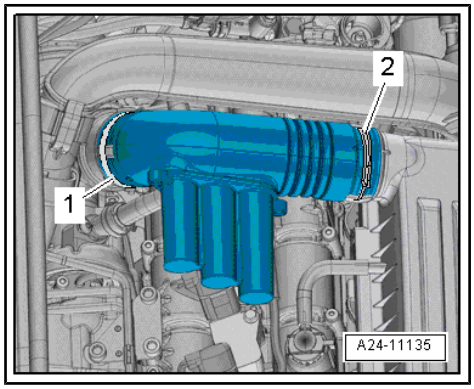
2.5.1 Removing and installing toothed belts - for engine with identification characters CHPA

Special tools and workshop equipment required

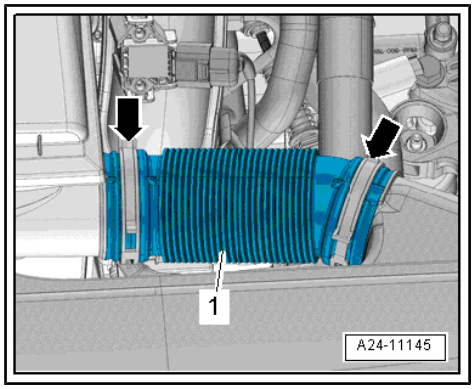
- Counterholder - T10172- with adapters -T10172/1-
- Locating screw - T10340-
- Key - T10499-
- Insertion tool - T10500-
- Torque wrench - V.A.G 1410- or -VAS 6583-
- Camshaft clamp - T10494-
- Spark plug wrench , e.g. -3122 B-

Removing

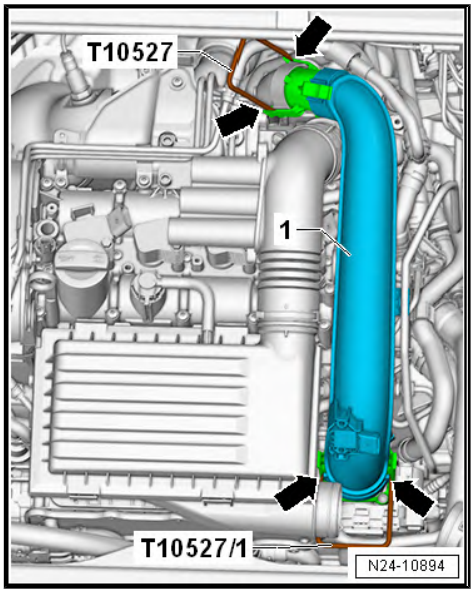
– Loosen hose clamps -1- and -2- and remove air guide pipes.



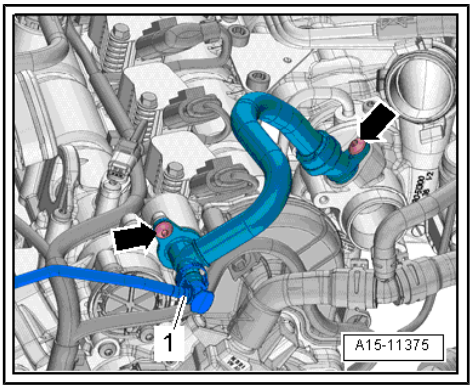
– Undo hose clamps -arrows-, remove air guide hose -1-.
– Remove plug from charge pressure sender - GX26- .



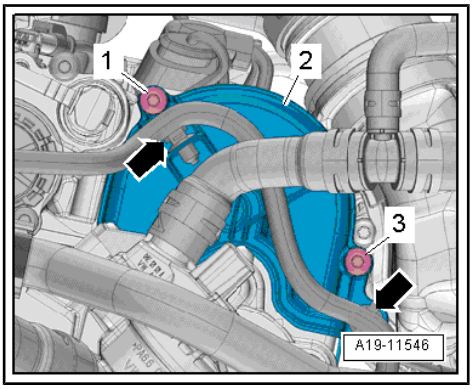
– Release catches -arrows- with release tool -T10527- and remove air guide pipe.



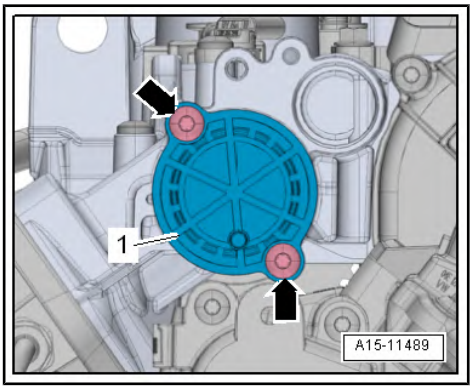
– Press release buttons and remove hose -1- to the activated charcoal filter.
– Unscrew screws -arrows- and remove hose for crankcase ventilation.



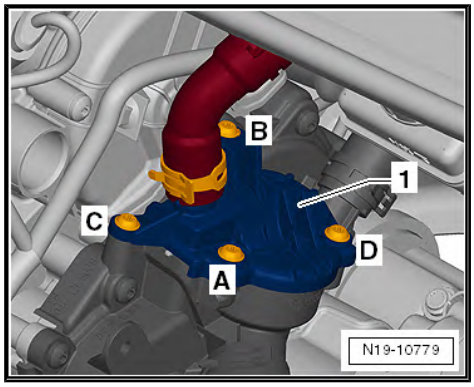
– Expose wiring loom -arrows-.
– Unscrew screws -1-, -3- and remove toothed belt guard -2- for coolant pump toothed belt.



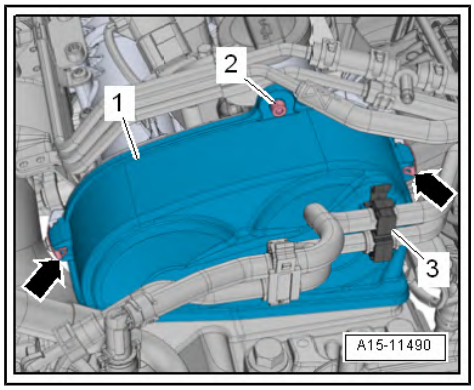
– Release screws -arrows- and remove cap -1-.
– Drain coolant ⇒ “1.2 Draining and filling coolant”, page 209 .



– Unscrew screws -A-, -B-, -C- and -D- and push thermostat cover -1- to the side.



– Expose vacuum hose on the holder -3-.
– Unscrew screw -2-.
– Loosen clips -arrows- and remove toothed belt guard -1- upwards.



Set the crankshaft to “OT”:

– Remove ignition coil with power output stage 1 ⇒ “1.2 Removing and installing ignition coils with output stage”, page 442 .
– Remove ignition plug cylinder 1 with spark plug socket wrench , e. g. -3122 B- .

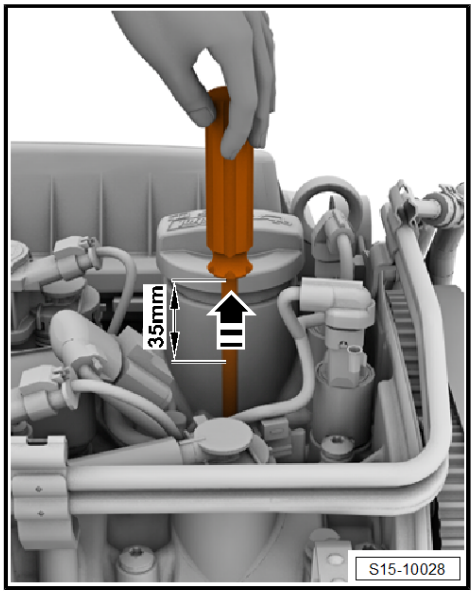
Set the correct position of the crankshaft for screwing in the fixing screw.

– Carefully insert a screwdriver into the opening of the ignition plug, minimum length of shaft 250 mm, in -direction of arrow- so that it touches the piston head.
– Rotate the crankshaft in direction of rotation of engine on “TDC” for cylinder 1.



– Turn engine shaft further in direction of arrow so that the screwdriver just out at the top by approx 35 mm in the -direction of the arrow-.

– Unscrew locking screw “TDC” bore at the cylinder block.



Caution

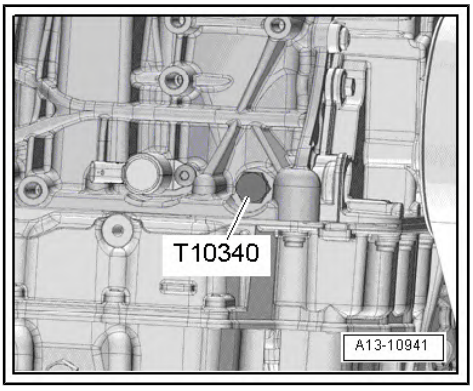
Risk of engine damage.

- *If the fixing screw - T10340- cannot be screwed in up to the stop, the crankshaft is not in the correct position!*
- *In this case, proceed as follows:*
- *Unscrew the fixing screw.*
- *Set the correct position of the crankshaft for screwing in the fixing screw.*

– Turn the fixing screw - T10340- up to the stop in the cylinder block and tighten to 30 Nm.

– Turn crankshaft up to the stop in direction of rotation of engine.

• The crankshaft sprocket now lies on the fixing screw and the “TCD” position is set.



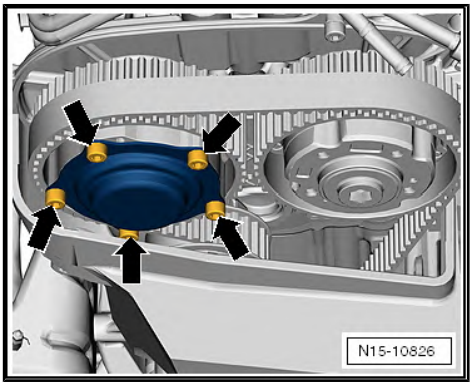
Caution

Leaking engine oil!

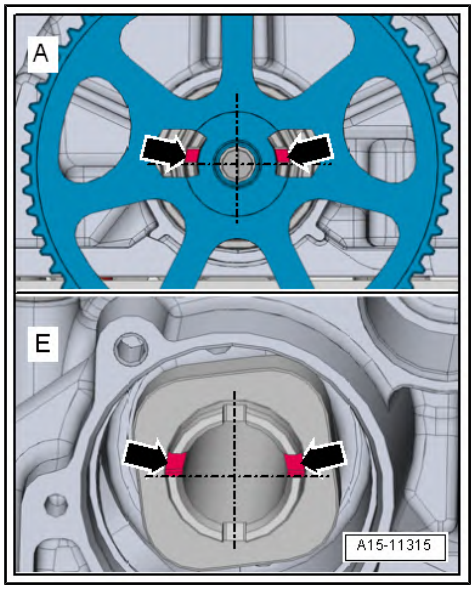
To protect the toothed belt, place a cleaning cloth below the camshaft control to collect any oil that is flowing out.

Contact points of the toothed belt, camshaft sprocket, crankshaft toothed belt sprocket, tensioning pulley and guide pulley are to be kept free of oil.

– Unscrew screws -arrows- and remove the cover from the camshaft control of the exhaust camshaft.



- On both camshafts the asymmetrically arranged grooves -arrows- on the gearbox side must now be at the top, as shown in the illustration.
- On the exhaust camshafts -A- the top grooves -arrows- are accessible through the recesses in the coolant pump driving wheel.
- On the inlet camshaft -E- the grooves -arrows- below are above the camshaft centre.



Note

The camshafts have one symmetrically and one asymmetrically arranged pair of grooves. In the "TDC" position the asymmetrically arranged pair of grooves must by above the imaginary horizontal centre line.

If the camshafts are not as described:

– Remove fixing screw - T10340- and turn crankshaft another turn, set back to "TDC" .

If the camshafts are as described:

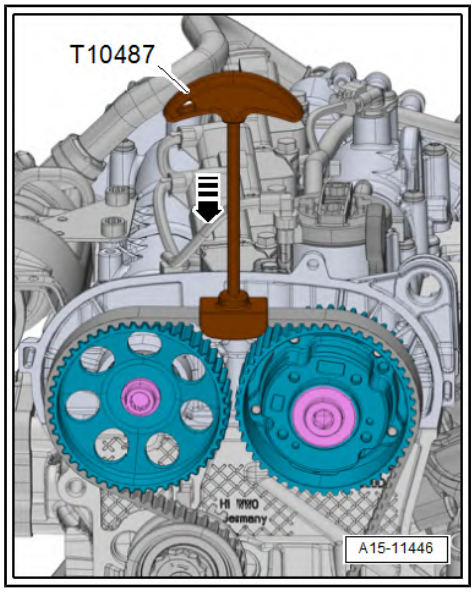
– Insert camshaft clamp -T10494- to stop into camshafts and tighten bolt arrow by hand.

Note

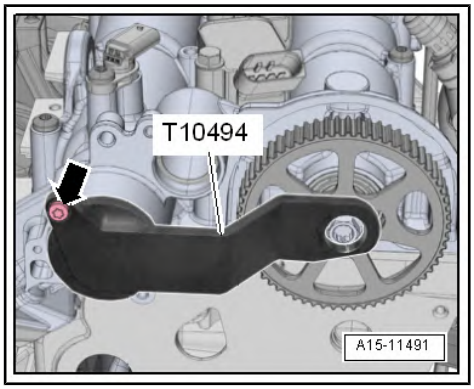
- *The camshaft clamp - T10494- must move into position easily.*
- *The camshaft clamp must not be positioned using any kind of hammer.*

If camshaft clamp - T10494- cannot be installed:

– Using the assembly tool - T10487- in -direction of arrow- press on the toothed belt.



– While doing so, insert camshaft control -T10494- to stop into camshafts and tighten screw -arrow- hand-tight.



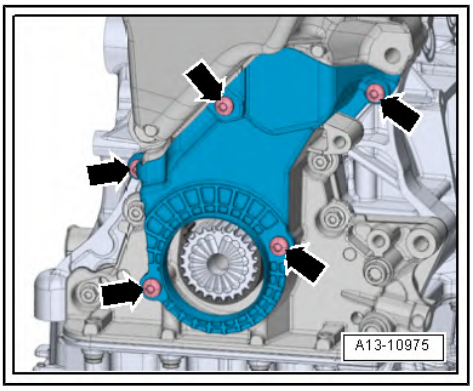
Caution

Risk of damaging the camshaft.

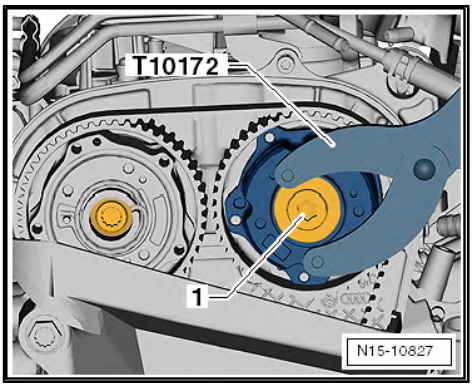
- *Do not use the camshaft fixer/locator - T10494- as a counterholder.*

– Remove poly V-belt pulley from crankshaft
⇒ “1.4 Removing and installing ribbed belt pulley”, page 58 .

– Release screws -arrows- and remove bottom toothed belt guard.



– Unscrew locking screw -1-on the camshaft sprocket fitting position. Use counterholder - T10172- with adapters -T10172/1- to do so.

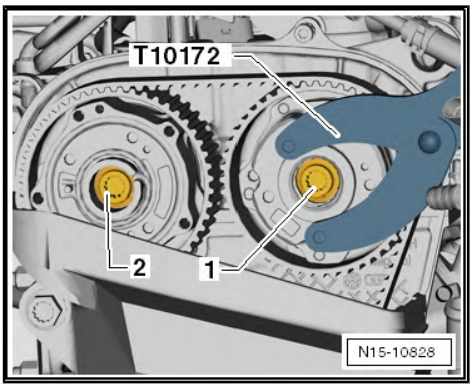


Caution

Risk of damaging the camshaft.

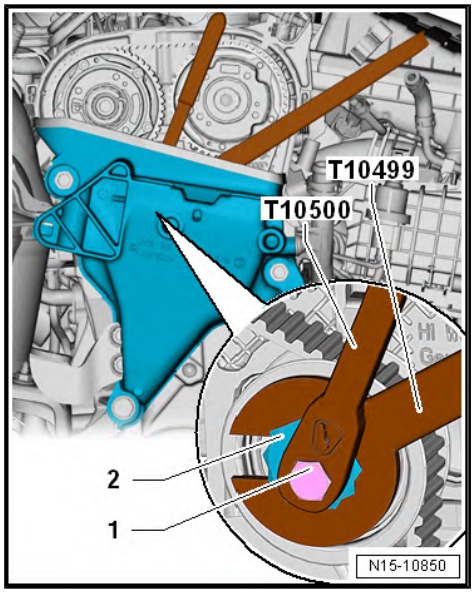
- *Do not use the camshaft fixer/locator - T10494- as a counterholder.*

– Loosen screws -1- and -2- by approximately one turn. To do so, use counterholder - T10172- with adapters -T10172/1- .



– Release screw -1- using insertion tool - T10500- .

– Slacken the tensioning pulley at the eccentric -2- using the wrench - T10499- .



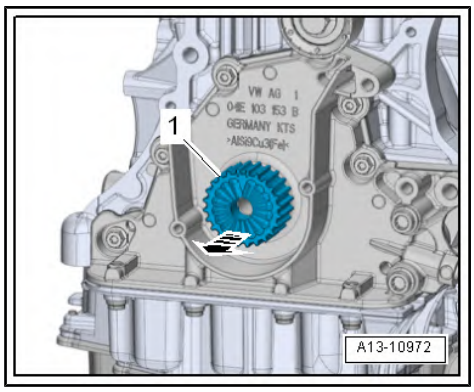
Caution

There is a risk of destruction through reversing the rotation direction of an already used toothed belt.

- *Mark the direction of rotation with chalk or a felt-tip pen for the re-installation before removing the toothed belt pulley.*

– Remove timing belt.

– Remove crankshaft toothed belt pulley -1- -arrow-.



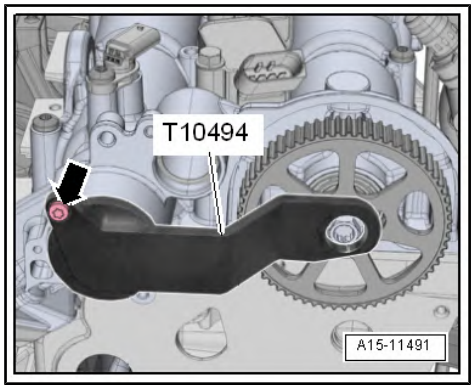
Installing (set the timing)

Note

- *Replace screws which have been tightened firmly to a torquing angle.*
- *Renew O-ring of locking screw if damaged.*

– "Check TDC" position of camshaft and crankshaft:

• Camshaft clamp - T10494- attached to camshaft housing



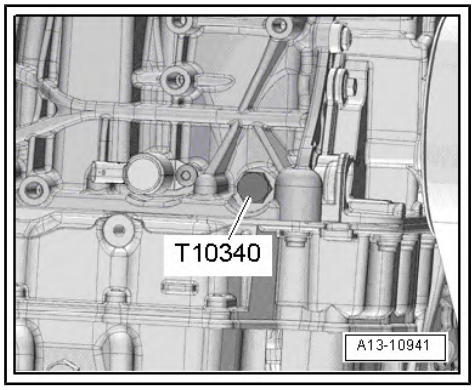
Caution

Risk of damaging the camshafts.

- *Do not use the camshaft fixer/locator - T10494- as a counterholder.*

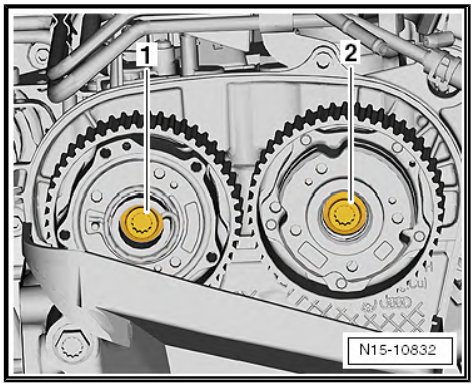
• Fixing screw - T10340- turned up to the stop in the cylinder block and tightened to 30 Nm.

• Crankshaft in engine direction of rotation applied to the fixing screw - T10340- = "TDC" position.

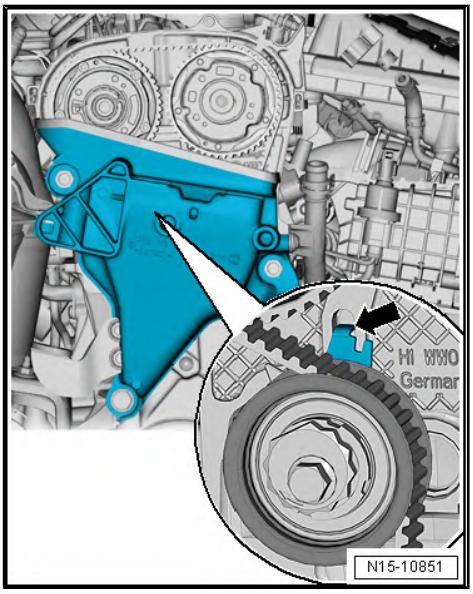


– Replace camshaft sprocket screws -1- and -2- and insert new screws loosely.

• It must still be possible to turn the camshaft sprockets on the camshafts, however they must not hang loose.



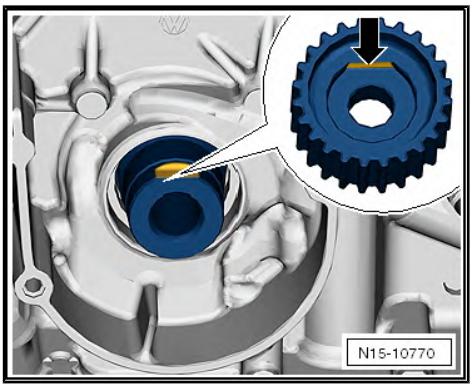
• Sheet peg arrow of the tensioning pulley must engage in the cast iron recess -arrow- of the cylinder head.



– Fit crankshaft toothed belt pulley onto the crankshaft.

• The contact surface between the V-ribbed belt pulley and the crankshaft toothed belt pulley must be free of oil and grease.

• Milled surface -arrow- on the crankshaft toothed belt must be positioned on the crankshaft stub.

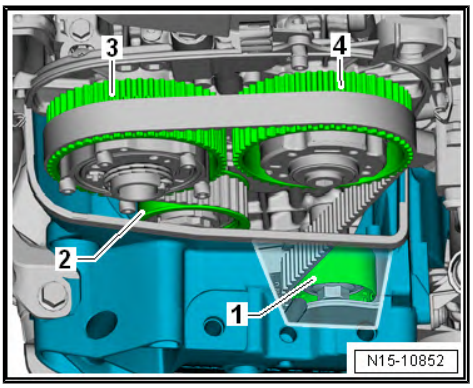


Note

Observe sequence when fitting the toothed belt.

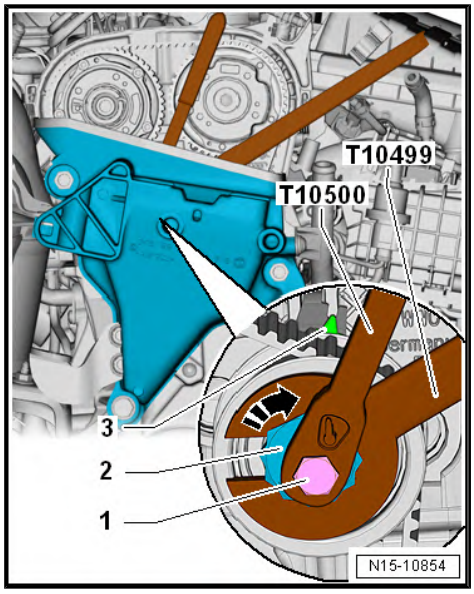
– Initially fit toothed belt from below on the crankshaft toothed belt pulley.

– Pull toothed belt upwards, then fit the tensioning pulley -2- and camshaft sprockets -3- and -4- onto the guide roller -1-.



– Rotate the eccentric -2- of the tensioning pulley with the wrench - T10499- in -direction of arrow- until the adjustment pointer -3- is located approx. 10 mm to the right from the adjustment window.

– Push eccentric so far back that the adjustment pointer is positioned exactly in the adjustment window.



Caution

Risk of engine damage!

To tighten, the torque wrench - VAS 6583- or torque wrench - V.A.G 1410- must be used!

To tighten, no other torque wrench may be used!

Tighten with torque wrench VAS 6583

Caution

Only use the torque wrench together with insertion tool - T10500- !

When setting the tightening torque on the torque wrench - VAS 6583- the actual dimension specified on the tool insert - T10500- must be put into the torque wrench!

– Keep eccentric in this position and tighten screw -1- to 25 Nm. Use tool insert - T10500- with torque wrench - VAS 6583- to do this.

Tighten with torque wrench VAG 1410

Caution

Only use the torque wrench together with insertion tool - T10500- !

Set the reduced tightening torque of 12 Nm on the torque wrench - V.A.G 1410-

The required tightening torque of 25 Nm is achieved by the extending the torque wrench - V.A.G 1410- around the tool insert - T10500- !

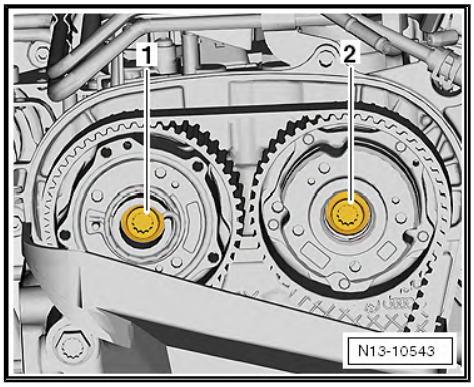
– Keep eccentric in this position and tighten screw -1- to 12 Nm. Use tool insert - T10500- with torque wrench - V.A.G 1410- to do this.

Continued

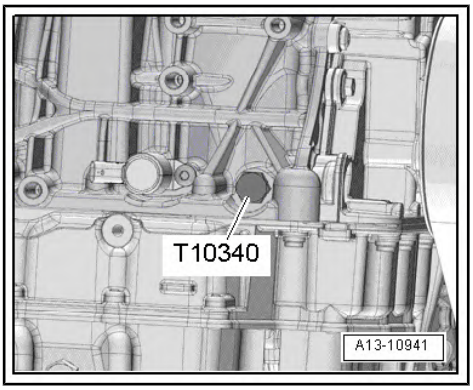
Note

If the engine continued to turn or has run, there may be slight deviations of the adjustment pointer -3- setting in the adjustment window. This has no influence on the toothed belt tensioning.

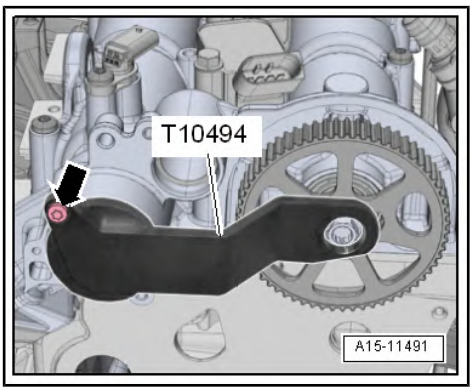
– Pre-tighten screws -1- and -2- to 50 Nm, to do so, use the counterholder - T10172- with adapters -T10172/1- .



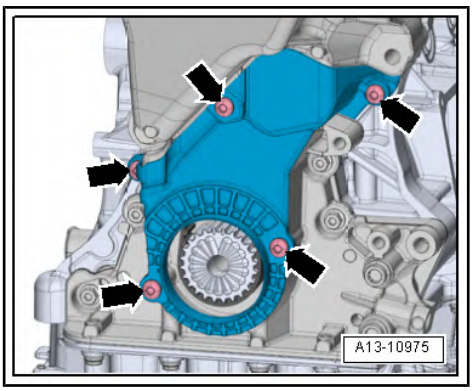
– Unscrew locating screw - T10340- .



– Unscrew bolt -arrow- and remove camshaft clamp - T10494- .



– Install the bottom toothed belt guard -arrows-.



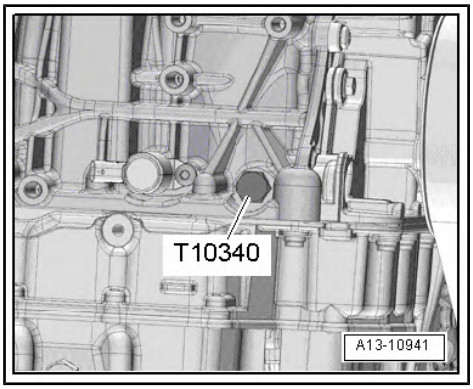
– Installing the V-ribbed belt pulley
⇒ “1.4 Removing and installing ribbed belt pulley”, page 58 .

Checking valve timing

– Turn the crankshaft in direction of rotation of engine by 2 turns.

– Turn the fixing screw - T10340- up to the stop in the cylinder block and tighten to 30 Nm.
– Turn crankshaft further up to the stop in direction of rotation of engine.

• The crankshaft cheek must now be resting on the fixing screw.



Note

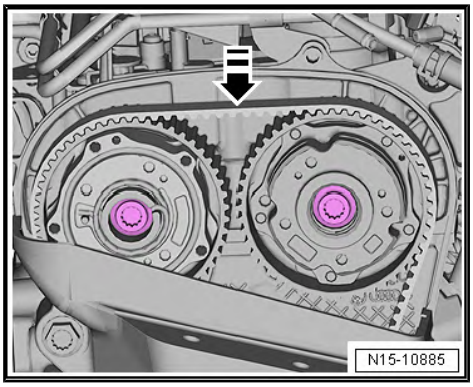
The crankshaft is only locked in direction of rotation of engine using the fixing screw - T10340- .

Note

♦ *The camshaft clamp - T10494- must move into position easily.*
♦ *The camshaft clamp must not be positioned using any kind of hammer.*

If camshaft clamp - T10494- cannot be installed:

– Using the assembly tool - T10487- in -direction of arrow- press on the toothed belt.

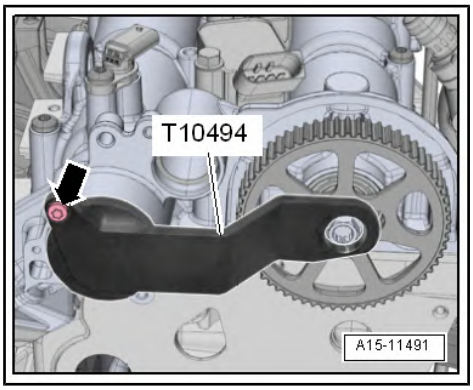


– Insert camshaft control -T10494- to stop into camshafts and tighten screw -arrow- hand-tight.

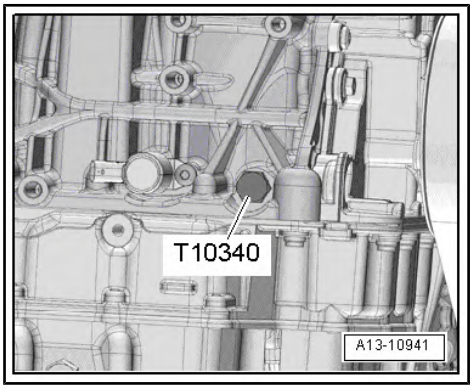
If it is not possible to insert the camshaft clamp - T10494- , the timing is NOK:

– Repeat control time settings.

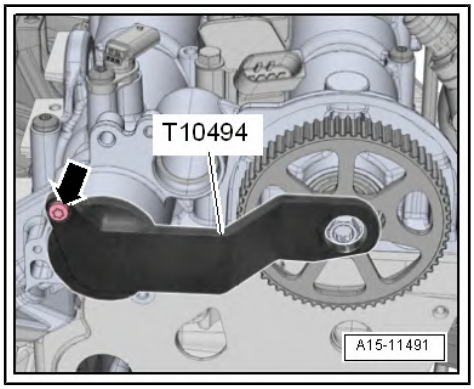
If it is possible to insert the camshaft clamp - T10494- , the timing is OK:



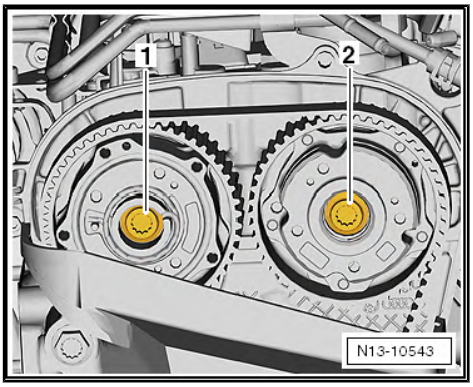
– Unscrew positioning screw - T10340- .



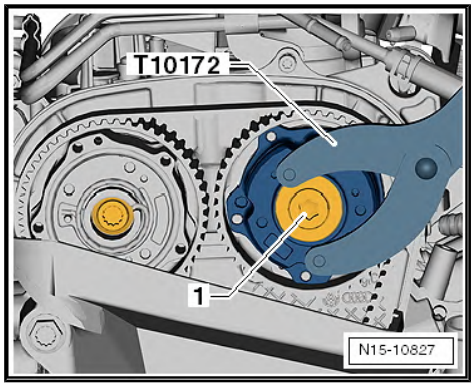
– Unscrew bolt -arrow- and remove camshaft clamp -T10494- .



– Initially tighten screws -1- and -2- to the end stop tightening torque
⇒ “2.2.1 Summary of components - toothed belt for engine with identification characters CHPA”, page 107 . To do so, use counterholder - T10172- with adapters -T10172/1- .



– Tighten locking screw -1-. Use counterholder - T10172- with adapters -T10172/1- to do so.



Caution

Risk of destruction of the engine.

- *To complete the work, check that the fixing screw - T10340- and camshaft clamp - T10494- have been removed from the engine.*

The further assembly is carried out in the reverse order, while paying attention to the following:

Tightening torques

- V-ribbed belt drive
  ⇒ “1.1 Assembly overview - poly V-belt drive”, page 51
- Toothed belt guard
  ⇒ “2.1 Summary of components - toothed belt guard”, page 106
- Toothed belt drive
  ⇒ “2.2 Assembly overview - toothed belt drive ”, page 107
- Screw plug for bore in the cylinder block ⇒ page 108
- Camshaft housing
  ⇒ “1.2 Summary of components - camshaft housing”, page 92
- Crankcase ventilation
  ⇒ “3.1 Summary of components - crankcase ventilation”, page 195
- Coolant pump
  ⇒ “2.1 Summary of components - coolant pump and coolant thermostat”, page 215
- Exhaust gas turbocharger
  ⇒ “1.1 Summary of components - exhaust gas turbocharger”, page 362
- Charge-air system
  ⇒ “2.1 Summary of components - charge air system”, page 370

2.5.2 Removing and installing toothed belts - for engine with identification characters CPWA

Special tools and workshop equipment required

- Counterholder - T10172- with adapters -T10172/1-
- Locating screw - T10340-
- Key - T10499-
- Insertion tool - T10500-
- Torque wrench - V.A.G 1410- or -VAS 6583-
- Camshaft clamp - T10494-
- Spark plug wrench , e.g. -3122 B-

Removing

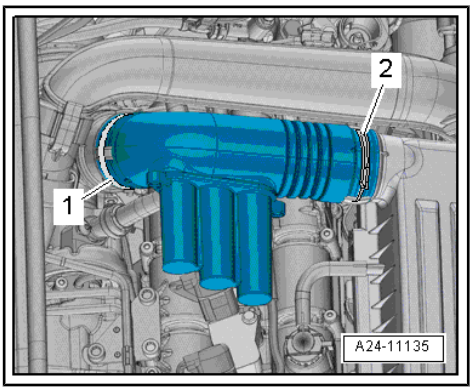
DANGER!

Follow safety measures and rules of cleanliness when working on the natural gas system and general instructions for operating a natural gas vehicle (CNG)
⇒ "2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)", page 10 .

– Remove the gas pressure regulator
⇒ "4.2 Removing and installing gas pressure regulator", page 395 .

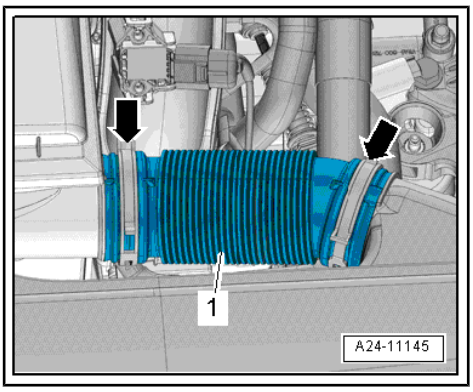
– Remove the bracket for the gas pressure regulator
⇒ "4.1.1 Summary of components - gas pressure regulator", page 393 .

– Loosen hose clamps -1- and -2- and remove air guide pipes.

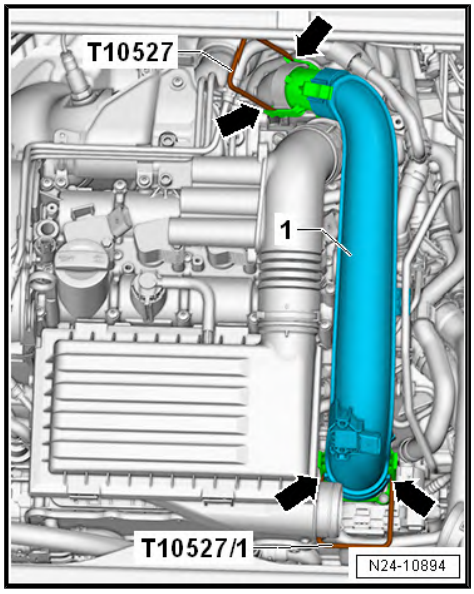


– Undo hose clamps -arrows-, remove air guide hose -1-.

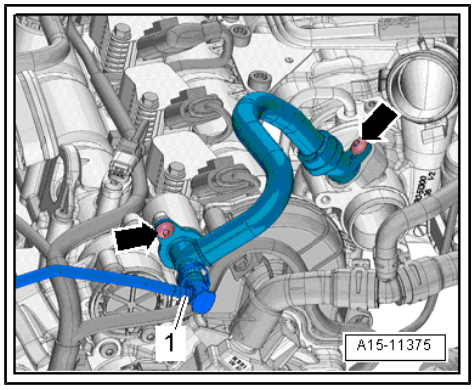
– Remove plug from charge pressure sender - GX26- .



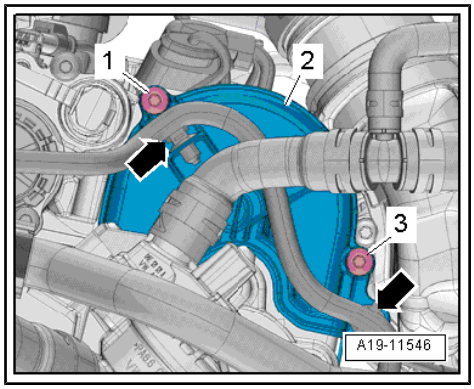
– Release catches -arrows- with release tool -T10527- and remove air guide pipe.



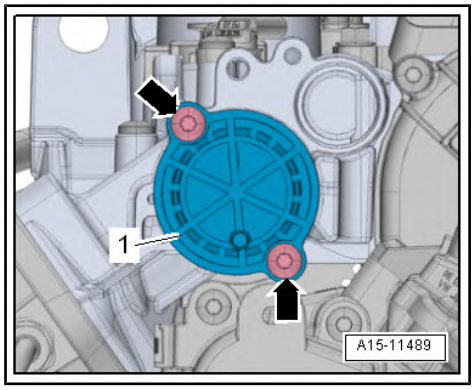
– Press release buttons and remove hose -1- to the activated charcoal filter.
– Unscrew screws -arrows- and remove hose for crankcase ventilation.



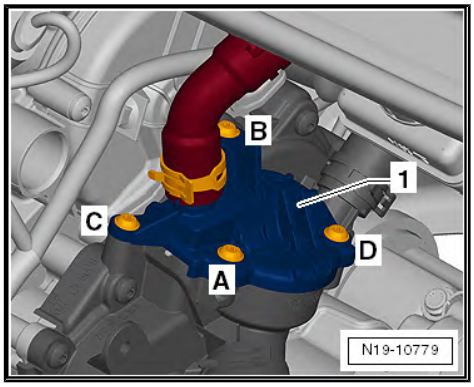
– Expose wiring loom -arrows-.
– Unscrew screws -1-, -3- and remove toothed belt guard -2- for coolant pump toothed belt.



– Release screws -arrows- and remove cap -1-.
– Drain coolant ⇒ “1.2 Draining and filling coolant”, page 209 .



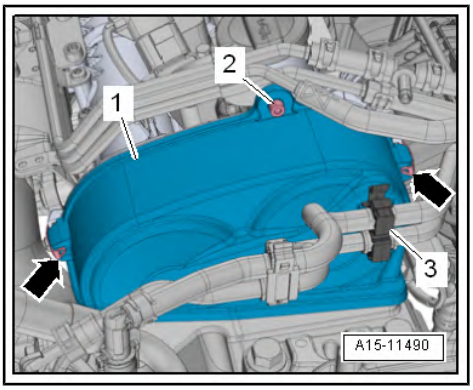
– Unscrew screws -A-, -B-, -C- and -D- and push thermostat cover -1- to the side.



– Expose vacuum hose on the holder -3-.
– Unscrew screw -2-.
– Loosen clips -arrows- and remove toothed belt guard -1- upwards.

Set the crankshaft to “OT”:

– Remove ignition coil with power output stage 1 ⇒ “1.2 Removing and installing ignition coils with output stage”, page 442 .
– Remove ignition plug cylinder 1 with spark plug socket wrench , e. g. -3122 B- .



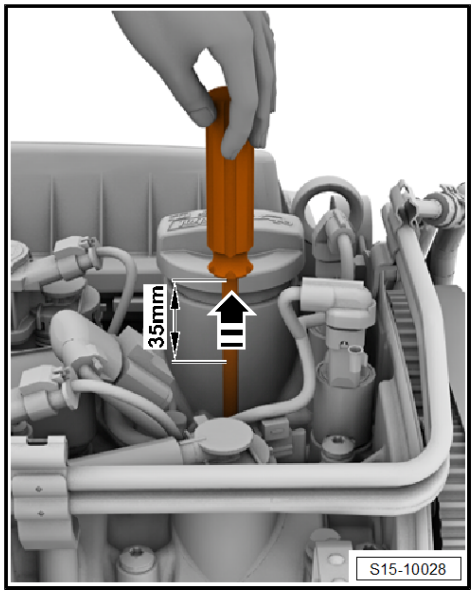
Set the correct position of the crankshaft for screwing in the fixing screw.

– Carefully insert a screwdriver into the opening of the ignition plug, minimum length of shaft 250 mm, in -direction of arrow- so that it touches the piston head.
– Rotate the crankshaft in direction of rotation of engine on “TDC” for cylinder 1.



– Turn engine shaft further in direction of arrow so that the screwdriver just out at the top by approx 35 mm in the -direction of the arrow-.

– Unscrew locking screw “TDC” bore at the cylinder block.



Caution

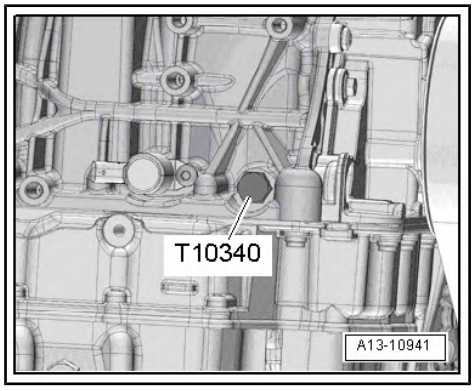
Risk of engine damage.

- *If the fixing screw - T10340- cannot be screwed in up to the stop, the crankshaft is not in the correct position!*
- *In this case, proceed as follows:*
- *Unscrew the fixing screw.*
- *Set the correct position of the crankshaft for screwing in the fixing screw.*

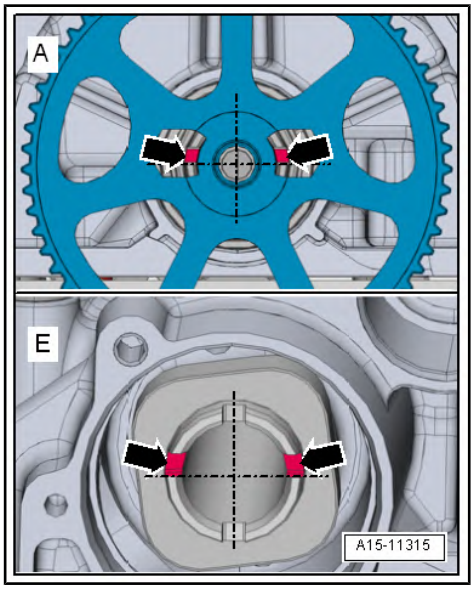
– Turn the fixing screw - T10340- up to the stop in the cylinder block and tighten to 30 Nm.

– Turn crankshaft up to the stop in direction of rotation of engine.

• The crankshaft sprocket now lies on the fixing screw and the “TCD” position is set.



- On both camshafts the asymmetrically arranged grooves -arrows- on the gearbox side must now be at the top, as shown in the illustration.
- On the exhaust camshafts -A- the top grooves -arrows- are accessible through the recesses in the coolant pump driving wheel.
- On the inlet camshaft -E- the grooves -arrows- below are above the camshaft centre.



Note

The camshafts have one symmetrically and one asymmetrically arranged pair of grooves. In the "TDC" position the asymmetrically arranged pair of grooves must by above the imaginary horizontal centre line.

If the camshafts are not as described:

– Remove fixing screw - T10340- and turn crankshaft another turn, set back to "TDC" .

If the camshafts are as described:

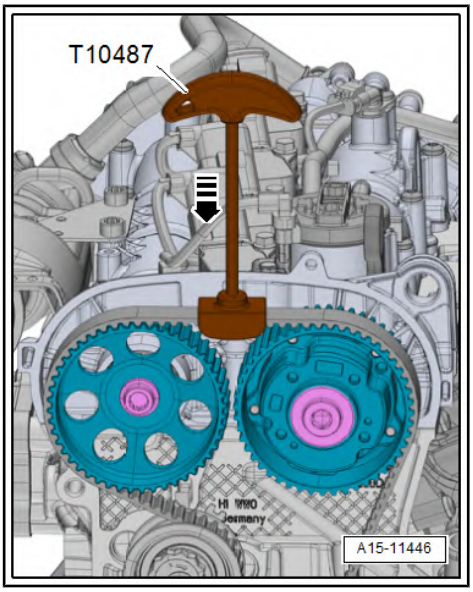
– Insert camshaft clamp -T10494- to stop into camshafts and tighten bolt arrow by hand.

Note

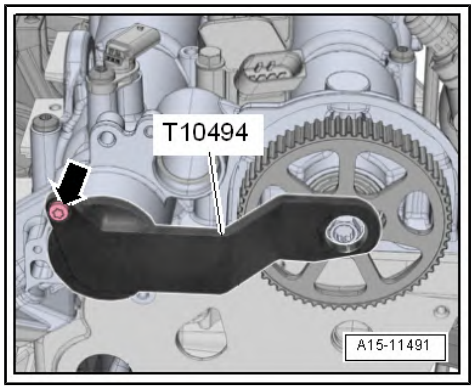
- *The camshaft clamp - T10494- must move into position easily.*
- *The camshaft clamp must not be positioned using any kind of hammer.*

If camshaft clamp - T10494- cannot be installed:

– Using the assembly tool - T10487- in -direction of arrow- press on the toothed belt.



– While doing so, insert camshaft control -T10494- to stop into camshafts and tighten screw -arrow- hand-tight.



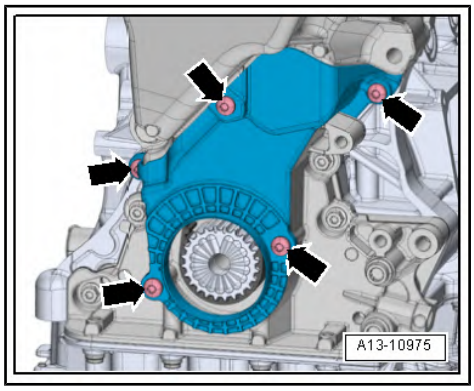
Caution

Risk of damaging the camshaft.

- *Do not use the camshaft fixer/locator - T10494- as a counterholder.*

– Remove poly V-belt pulley from crankshaft
⇒ “1.4 Removing and installing ribbed belt pulley”, page 58 .

– Release screws -arrows- and remove bottom toothed belt guard.



Caution

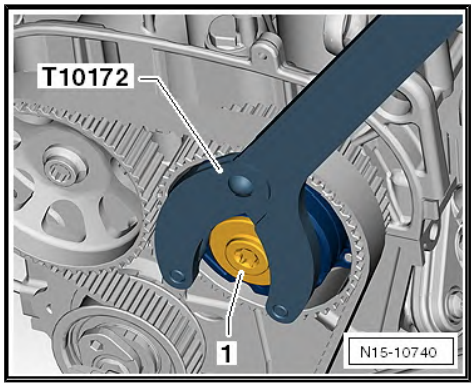
A minor loss of oil may result when opening the locking screw using the eel of the exhaust camshaft.

This has no technical importance!

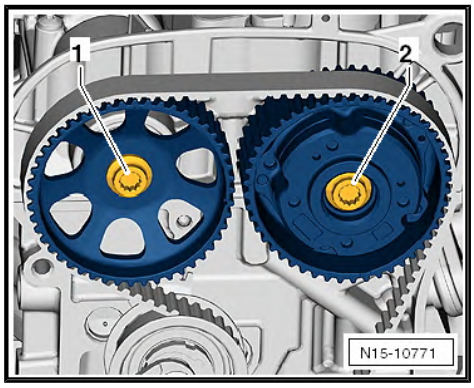
Contact points of the toothed belt, camshaft sprocket, crankshaft toothed belt sprocket, tensioning pulley and guide pulley are to be kept free of oil.

The place of the oil leak must be covered with cloths.

– Unscrew locking screw -1- on the camshaft sprocket fitting position. Use counterholder - T10172- with adapters - T10172/1- to do so.

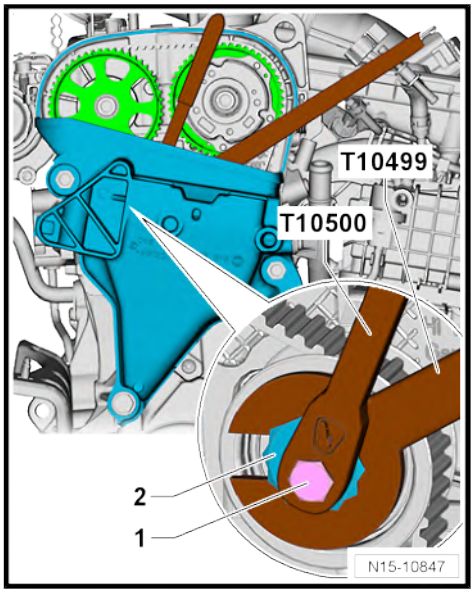


– Loosen screws -1- and -2- by approximately one turn. To do so, use counterholder - T10172- with adapters -T10172/1- .



– Release screw -1- using insertion tool - T10500- .

– Slacken the tensioning pulley at the eccentric -2- using the wrench - T10499- .



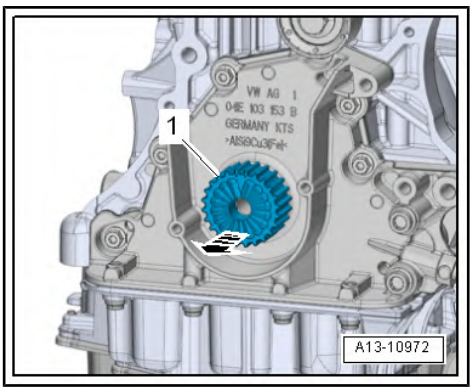
Caution

There is a risk of destruction through reversing the rotation direction of an already used toothed belt.

- *Mark the direction of rotation with chalk or a felt-tip pen for the re-installation before removing the toothed belt pulley.*

– Remove timing belt.

– Remove crankshaft toothed belt pulley -1- -arrow-.



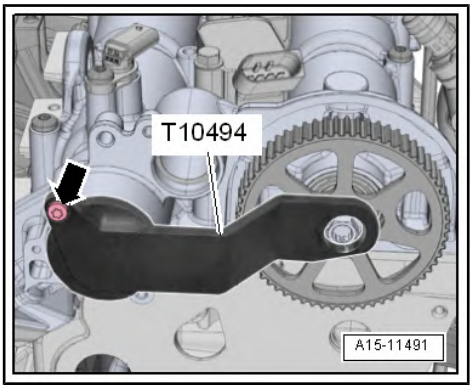
Installing (set the timing)

Note

- *Replace screws which have been tightened firmly to a torquing angle.*
- *Renew O-ring of plug if damaged.*

– "Check TDC" position of camshaft and crankshaft:

• Camshaft clamp - T10494- attached to camshaft housing.



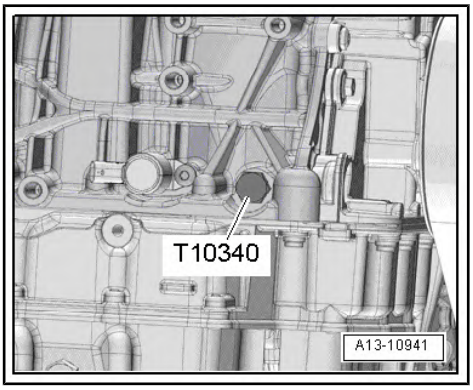
Caution

Risk of damaging the camshafts.

- *Do not use the camshaft fixer/locator - T10494- as a counterholder.*

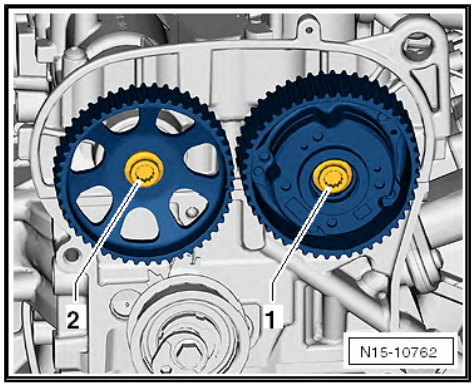
• Fixing screw - T10340- turned up to the stop in the cylinder block and tightened to 30 Nm.

• Crankshaft in engine direction of rotation applied to the fixing screw - T10340- = "TDC" position.

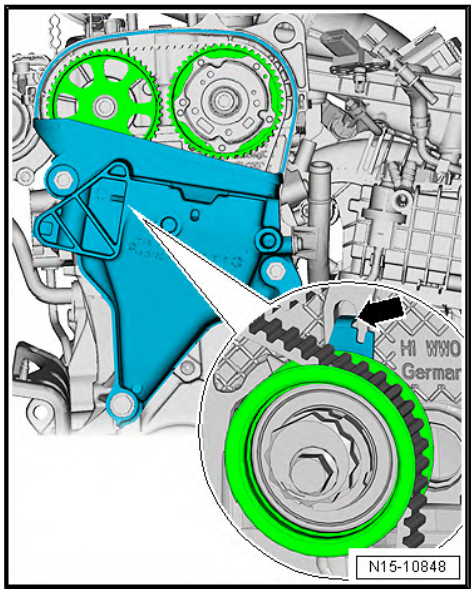


– Replace camshaft sprocket screws -1- and -2- and insert new screws loosely.

• It must still be possible to turn the camshaft sprockets on the camshafts, however they must not hang loose.



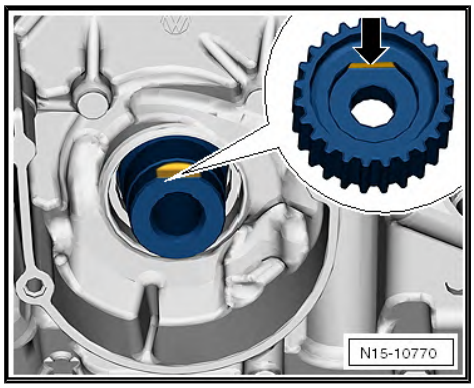
• Sheet peg arrow of the tensioning pulley must engage in the cast iron recess -arrow- of the cylinder head.



– Fit crankshaft toothed belt pulley onto the crankshaft.

• The contact surface between the V-ribbed belt pulley and the crankshaft toothed belt pulley must be free of oil and grease.

• Milled surface -arrow- on the crankshaft toothed belt must be positioned on the crankshaft stub.



Caution

There is a risk of damage to the toothed belt!

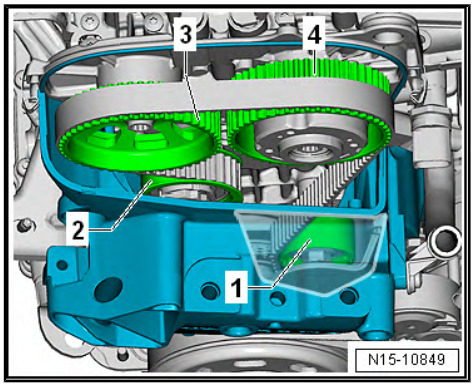
- *The toothed belt contains glass fibre cores. For this reason, the diameter of the toothed belt should never fall beneath 50 mm. Otherwise this may reduce the life time of the toothed belt.*

Note

Observe sequence when fitting the toothed belt.

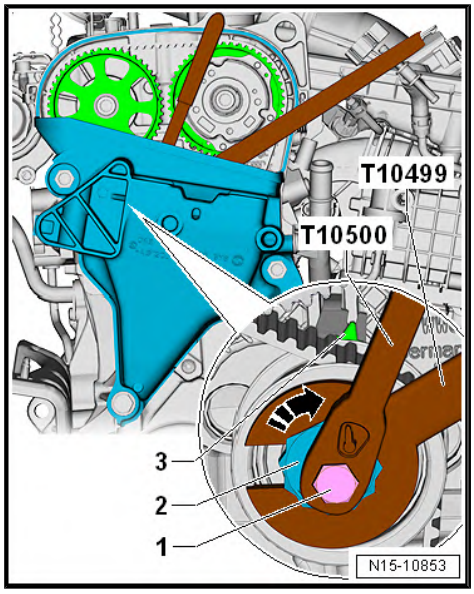
– Initially fit toothed belt from below on the crankshaft toothed belt pulley.

– Pull toothed belt upwards, then fit the tensioning pulley -2- and camshaft sprockets -3- and -4- onto the guide roller -1-.



– Rotate the eccentric -2- of the tensioning pulley with the wrench - T10499- in -direction of arrow- until the adjustment pointer -3- is located approx. 10 mm to the right from the adjustment window.

– Push eccentric so far back that the adjustment pointer is positioned exactly in the adjustment window.



Caution

Risk of engine damage!

To tighten, the torque wrench - VAS 6583- or torque wrench - V.A.G 1410- must be used!

To tighten, no other torque wrench may be used!

Tighten with torque wrench VAS 6583

Caution

Only use the torque wrench together with insertion tool - T10500- !

When setting the tightening torque on the torque wrench - VAS 6583- the actual dimension specified on the tool insert - T10500- must be put into the torque wrench!

– Keep eccentric in this position and tighten screw -1- to 25 Nm. Use tool insert - T10500- with torque wrench - VAS 6583- to do this.

Tighten with torque wrench VAG 1410

Caution

Only use the torque wrench together with insertion tool - T10500- !

Set the reduced tightening torque of 12 Nm on the torque wrench - V.A.G 1410-

The required tightening torque of 25 Nm is achieved by the extending the torque wrench - V.A.G 1410- around the tool insert - T10500- !

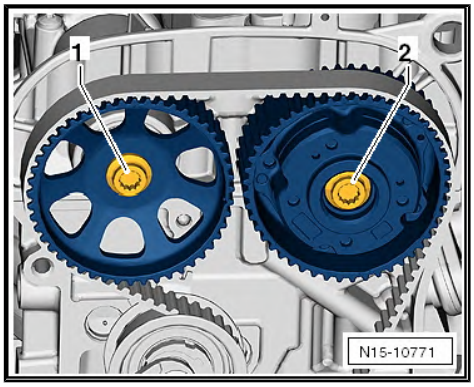
– Keep eccentric in this position and tighten screw -1- to 12 Nm. Use tool insert - T10500- with torque wrench - V.A.G 1410- to do this.

Continued

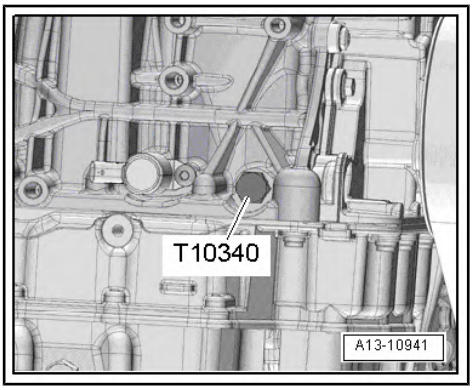
Note

If the engine continued to turn or has run, there may be slight deviations of the adjustment pointer -3- setting in the adjustment window. This has no influence on the toothed belt tensioning.

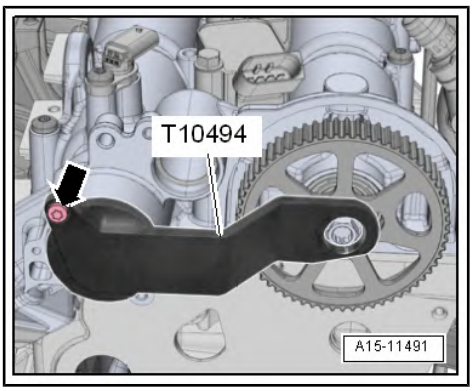
– Pre-tighten screws -1- and -2- to 50 Nm, to do so, use the counterholder - T10172- with adapters -T10172/1- .



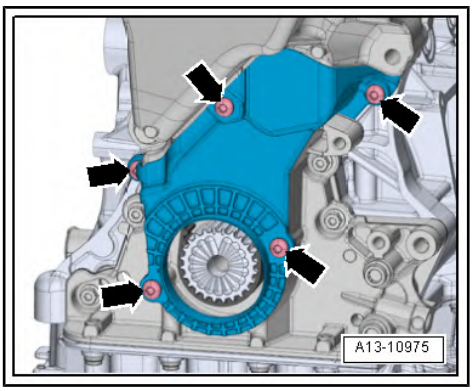
– Unscrew locating screw - T10340- .



– Unscrew bolt -arrow- and remove camshaft clamp - T10494- .



– Install the bottom toothed belt guard -arrows-.



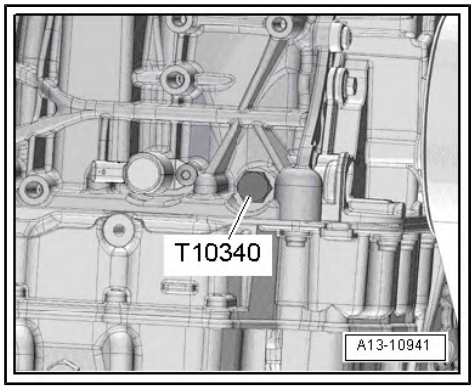
– Installing the V-ribbed belt pulley
⇒ “1.4 Removing and installing ribbed belt pulley”, page 58 .

Checking valve timing

– Turn the crankshaft in direction of rotation of engine by 2 turns.

– Turn the fixing screw - T10340- up to the stop in the cylinder block and tighten to 30 Nm.
– Turn crankshaft further up to the stop in direction of rotation of engine.

• The crankshaft cheek must now be resting on the fixing screw.



Note

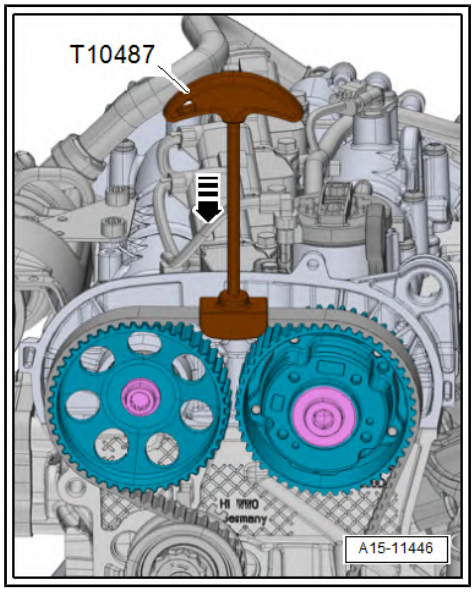
The crankshaft is only locked in direction of rotation of engine using the fixing screw - T10340- .

Note

♦ *The camshaft clamp - T10494- must move into position easily.*
♦ *The camshaft clamp must not be positioned using any kind of hammer.*

If camshaft clamp - T10494- cannot be installed:

– Using the assembly tool - T10487- in -direction of arrow- press on the toothed belt.

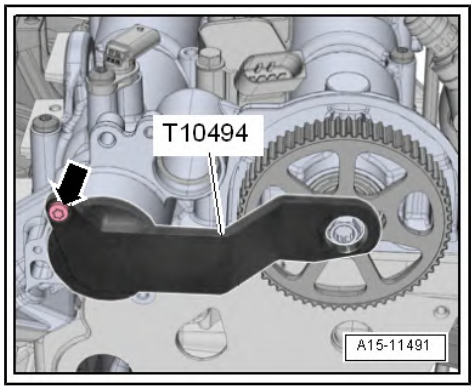


– Insert the camshaft clamp -T10494- up to stop into the camshafts and fix with the screw -arrow- hand-tight.

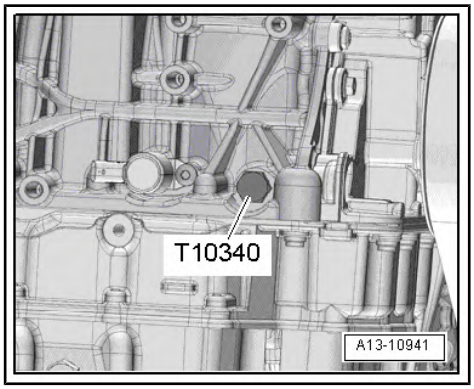
If it is not possible to insert the camshaft clamp - T10494- , the timing is NOK:

– Repeat control time settings.

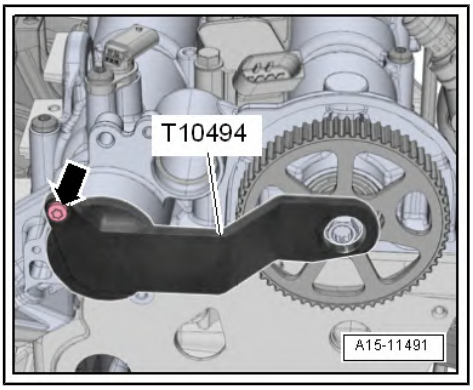
If it is possible to insert the camshaft clamp - T10494- , the timing is OK:



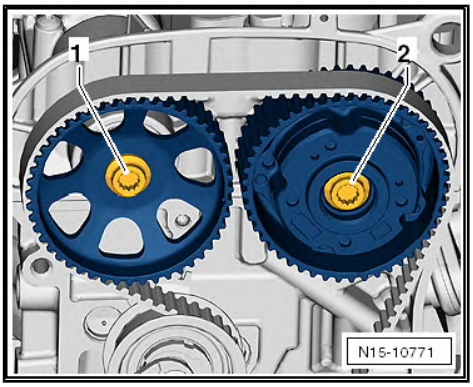
– Unscrew positioning screw - T10340- .



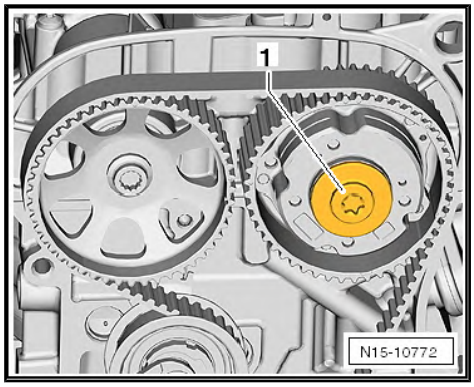
– Unscrew bolt -arrow- and remove camshaft clamp -T10494- .



– Initially tighten screws -1- and -2- to the end stop tightening torque
⇒ “2.2.2 Summary of components - toothed belt for engine with identification characters CPWA ”, page 109 . To do so, use counterholder - T10172- with adapters -T10172/1- .



– Tighten locking screw -1-. Use counterholder - T10172- with adapters -T10172/1- to do so.



Caution

Risk of destruction of the engine.

- *To complete the work, check that the fixing screw - T10340- and camshaft clamp - T10494- have been removed from the engine.*

Assembling is performed continuing in the reverse order, while paying attention to the following:

– Install the gas pressure regulator
⇒ “4.2 Removing and installing gas pressure regulator”, page 395 .

– Install the bracket for the gas pressure regulator
⇒ “4.1.1 Summary of components - gas pressure regulator”, page 393 .

– Open the valves for tank shut-off -N361- and -N362- again with handwheel - T50026- .

Caution

Carry out a leak tightness test on the liquefied petroleum gas system (LPG)
⇒ “3.2 Inspecting the gas system for leaktightness”, page 17 .

Inspect natural gas system for leak-tightness ⇒ Maintenance ; Booklet Octavia III .

Tightening torques

- V-ribbed belt drive
⇒ “1.1 Assembly overview - poly V-belt drive”, page 51
- Toothed belt guard
⇒ “2.1 Summary of components - toothed belt guard”, page 106
- Toothed belt drive
⇒ “2.2 Assembly overview - toothed belt drive ”, page 107
- Screw plug for bore in the cylinder block ⇒ page 108
- Camshaft housing
⇒ “1.2 Summary of components - camshaft housing”, page 92
- Crankcase ventilation
⇒ “3.1 Summary of components - crankcase ventilation”, page 195
- Coolant pump
⇒ “2.1 Summary of components - coolant pump and coolant thermostat”, page 215
- Exhaust gas turbocharger
⇒ “1.1 Summary of components - exhaust gas turbocharger”, page 362
- Charge-air system
⇒ “2.1 Summary of components - charge air system”, page 370

- Gas pressure regulator
  ⇒ “4.1 Summary of components - gas pressure regulator”, page 393
- Bracket for the gas pressure regulator
  ⇒ “4.1 Summary of components - gas pressure regulator”, page 393 .

3 Valve gear

⇒ “3.1 Assembly overview - valve gear”, page 168

⇒ “3.2 Removing and installing the camshaft adjustment valves”, page 169

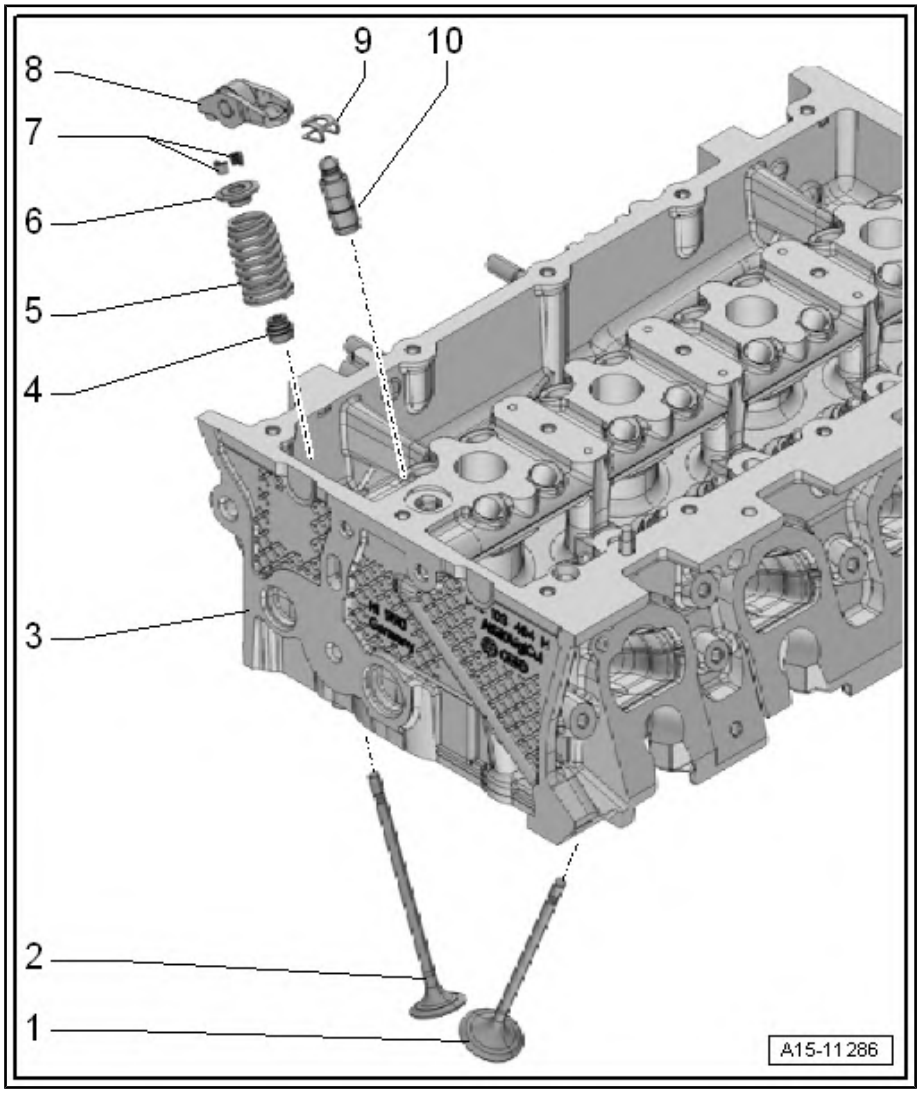
⇒ “3.3 Removing and installing camshaft control”, page 170

⇒ “3.4 Measuring axial play of camshaft”, page 171

⇒ “3.5 Removing and installing gasket ring for camshaft”, page 172

⇒ “3.6 Removing and installing valve stem seal”, page 177

3.1 Assembly overview - valve gear



1 - Inlet valve

- ❑ do not rework, only grinding in is permissible
- ❑ valve dimensions ⇒ “3.6.4 Valve dimensions”, page 183
- ❑ inspecting valve guides ⇒ “3.6.3 Checking valve guides”, page 182

2 - Exhaust valve

- ❑ do not rework, only grinding in is permissible
- ❑ valve dimensions ⇒ “3.6.4 Valve dimensions”, page 183
- ❑ inspecting valve guides ⇒ “3.6.3 Checking valve guides”, page 182

3 - Cylinder head

- ❑ Different versions ⇒ ETKA - Electronic Catalogue of Original Parts
- ❑ Removing and installing ⇒ “1.3 Removing and installing cylinder head”, page 93
- ❑ After replacing, renew all coolant ⇒ “1.2 Draining and filling coolant”, page 209

4 - Valve stem seal

- ❑ Removing and installing ⇒ “3.6 Removing and installing valve stem seal”, page 177

5 - Valve spring

- ❑ Fitting position ⇒ page 169

6 - Valve spring retainer

7 - Valve collets

8 - Roller rocker finger

- ❑ Removing and installing ⇒ “1.4 Removing and installing camshaft housing”, page 97
- ❑ mark the fitting position for re-installation
- ❑ inspect roller bearings for smooth operation
- ❑ oil the contact surfaces before installing

9 - Locking clip

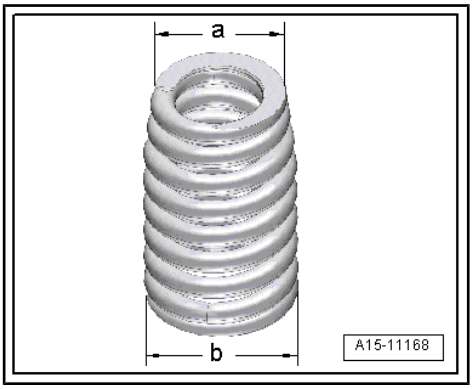
- ❑ for hydraulic balancing element

10 - Hydraulic balancing element

- ❑ Do not interchange
- ❑ Oil contact surface

Fitting position of the valve spring

- The small ∅ -a- points to the valve spring plate.
- The small ∅ -b- points to the cylinder head.



3.2 Removing and installing the camshaft adjustment valves

⇒ “3.2.1 Removing and installing N205 the camshaft adjustment valve 1”, page 169

⇒ “3.2.2 Removing and installing camshaft control valve 1 in the exhaust N318 ”, page 170

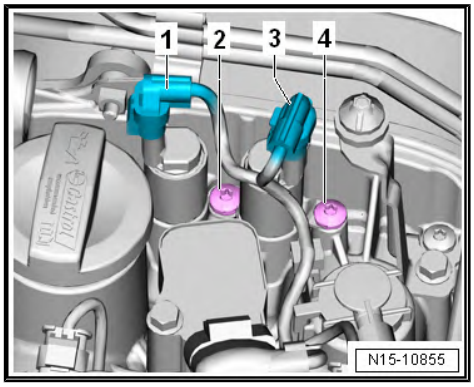
3.2.1 Removing and installing - N205- the camshaft adjustment valve 1

Removing

For vehicles with engine identification characters CHPA

– Disconnect plug connection -1-.

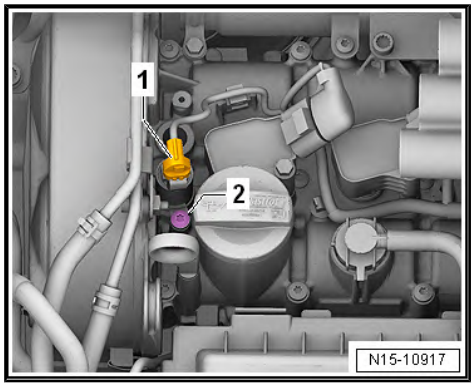
– Unscrew screw -2- and remove camshaft control valve 1 - N205- .



For vehicles with engine identification characters CPWA

– Disconnect plug connection -1-.

– Unscrew screw -2- and remove camshaft control valve 1 - N205- .



Install

Install in the reverse order of removal. When doing this, note the following:

Note

Renew O-ring.

Tightening torques

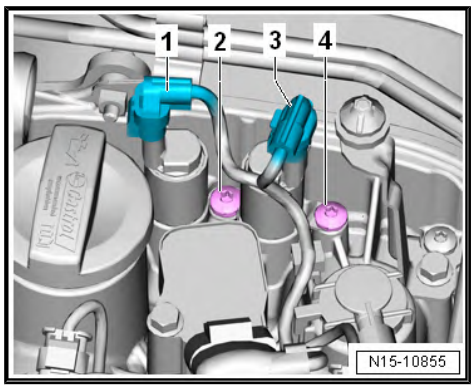
♦ Fixing screw
⇒ “1.2 Summary of components - camshaft housing”, page 92

3.2.2 Removing and installing camshaft control valve 1 in the exhaust - N318-

Removing

– Unplug connector -3-.

– Unscrew screw -4- and remove camshaft control valve 1 in the exhaust - N318- .



Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

Note

Renew O-ring.

Tightening torques

♦ Fixing screw
⇒ “1.2 Summary of components - camshaft housing”, page 92

3.3 Removing and installing camshaft control

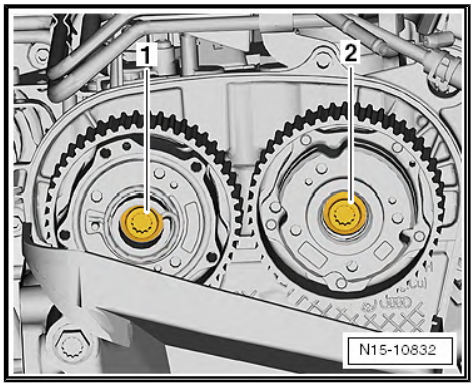
Removing

Camshaft control for exhaust camshaft- for engines with identification characters CHPA

– Remove the toothed belt from the camshafts ⇒ page 114 .

– Remove engine support ⇒ page 59 .

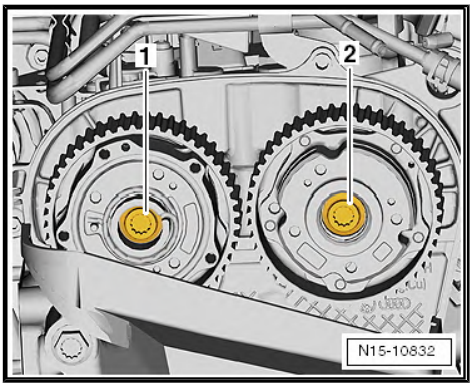
– Unscrew bolt -1- and remove camshaft control.



Camshaft control for inlet camshaft - for engines with identification characters CHPA

– Remove the toothed belt from the camshafts ⇒ page 114 .

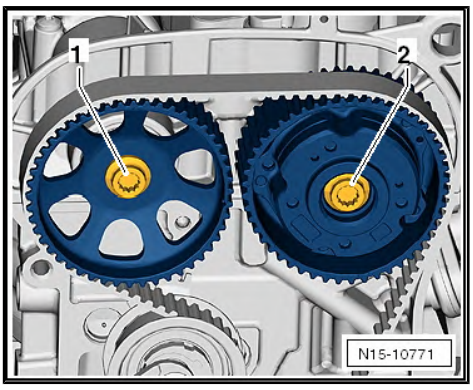
– Unscrew bolt -2- and remove camshaft control.



Camshaft control for exhaust camshaft- for engines with identification characters CPWA

– Remove the toothed belt from the camshafts ⇒ page 126 .

– Unscrew bolt -2- and remove camshaft control.



Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

– Fit the timing belt (set timings) ⇒ page 114 .

– Check assembly bracket setting - for engines with engine identification characters CHPA ⇒ page 47 .

3.4 Measuring axial play of camshaft

Special tools and workshop equipment required

♦ Universal dial gauge holder - MP3-447 (VW 387)-

♦ Dial gauge , e.g. -VAS 6079-

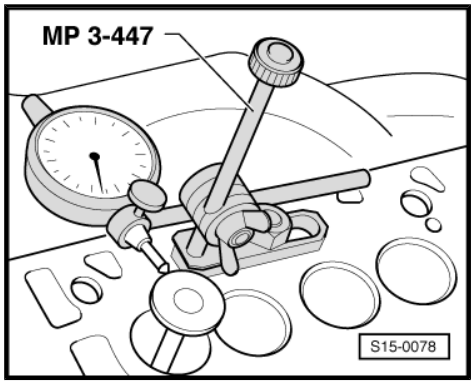
Work procedure

– Remove the camshaft housing
⇒ “1.4 Removing and installing camshaft housing”, page 97 .

– Secure dial gauge with the universal dial gauge bracket to the camshaft housing, as shown in the illustration.
– Press the camshaft by hand against the dial gauge.
– Position dial gauge to “0”.
– Press the camshaft off the dial gauge and read the value:

Axial clearance:

• Wear limit 0.25 mm



3.5 Removing and installing gasket ring for camshaft

⇒ “3.5.1 Removing and installing the inlet camshaft on the belt pulley side”, page 172

⇒ “3.5.2 Removing and installing the exhaust camshaft on the belt pulley side”, page 174

⇒ “3.5.3 Removing and installing the exhaust camshaft on the gearbox side”, page 176

3.5.1 Removing and installing the inlet camshaft on the belt pulley side

Special tools and workshop equipment required

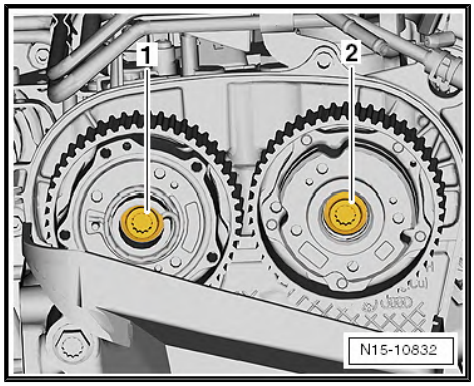
♦ Assembly device - T10478-
♦ Extraction hook - T20143/1-

Removing

– Remove the toothed belt from the camshafts ⇒ “2.4 Remove the toothed belt from the camshaft”, page 114 .

For vehicles with engine identification characters CHPA

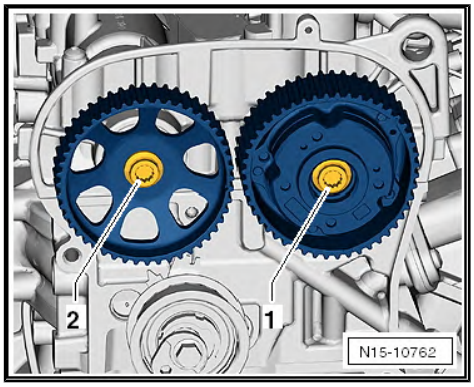
– Unscrew screw -2- and remove camshaft sprocket.



For vehicles with engine identification characters CPWA

– Unscrew screw -1- and remove camshaft sprocket.

Continued for all vehicles

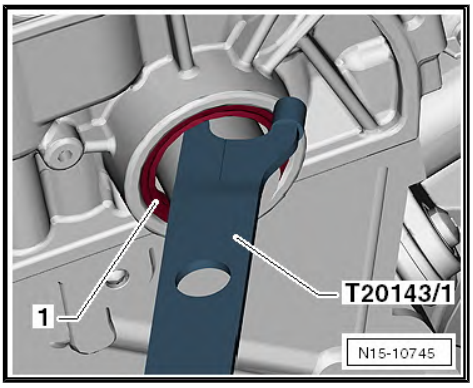


– Remove seal -1- using extractor hook - T20143/1- .

Install

Note

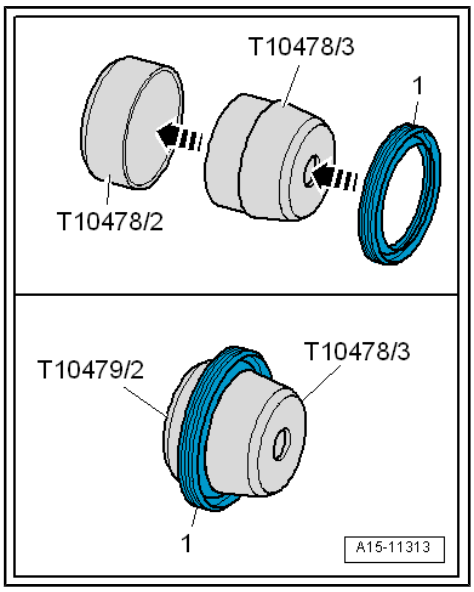
Do not oil new sealing ring.



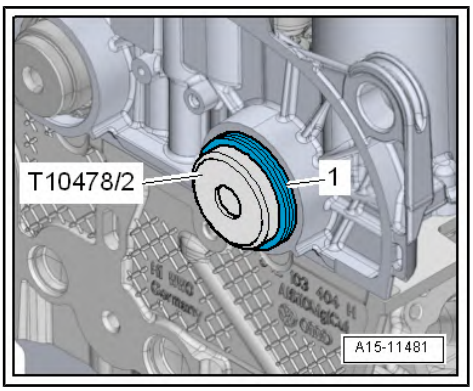
– Push sealing ring -1- over the receiver tube -T10478/3- onto the guide bushing -T10478/2- .

• Fitting position: Closed side of sealing ring points to the receiver tube.

– Disconnect receiver tube and guide bushing.

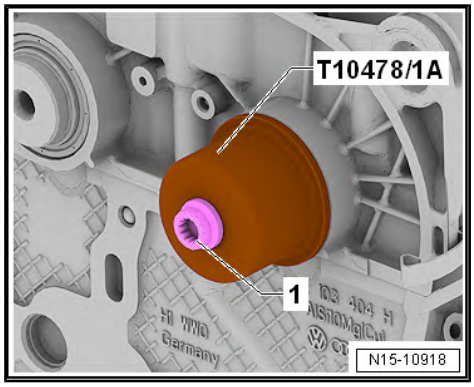


– Position guide bushing -T10478/2- with seal -1- on camshaft.



– Pull sealing ring in to the stop using the thrust piece - T10478/1A- and the camshaft sprocket screw -1-.

– install (set the timing)
⇒ “2.4 Remove the toothed belt from the camshaft”, page 114 .



3.5.2 Removing and installing the exhaust camshaft on the belt pulley side

Special tools and workshop equipment required

- Assembly device - T10478- with screw -T10478/5-
- Extraction hook - T20143/1-

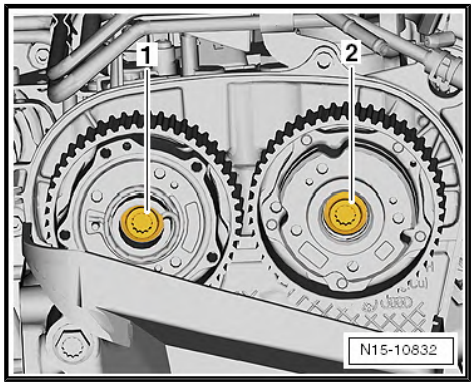
Removing

– Remove the toothed belt from the camshafts
⇒ “2.4 Remove the toothed belt from the camshaft”, page 114 .

For vehicles with engine identification characters CHPA

– Remove engine support
⇒ “1.5 Removing and installing engine support”, page 59 .

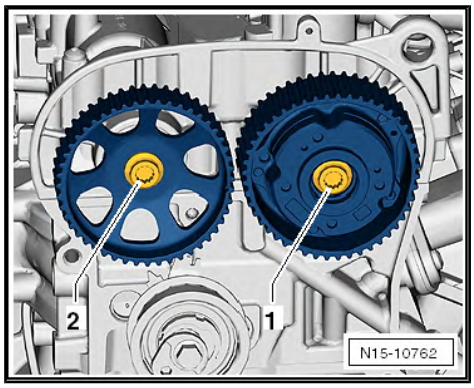
– Unscrew screw -1- and remove camshaft sprocket.



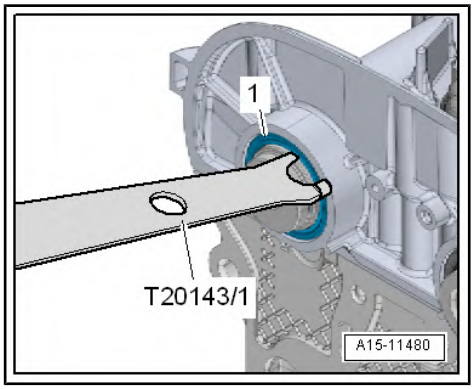
For vehicles with engine identification characters CPWA

– Unscrew screw -2- and remove camshaft sprocket.

Continued for all vehicles



– Remove seal -1- using extractor hook - T20143/1- .



Install

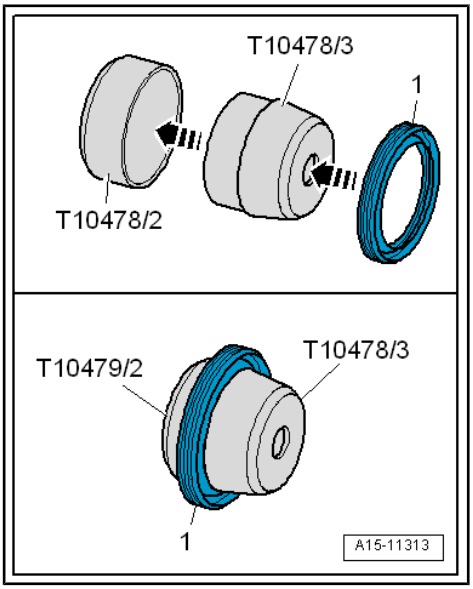
Note

Do not oil new sealing ring.

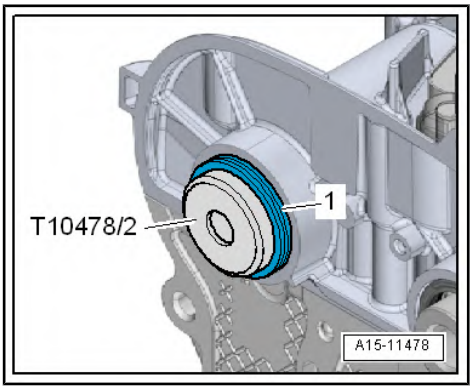
– Push sealing ring -1- over the receiver tube -T10478/3- onto the guide bushing -T10478/2- .

• Fitting position: Closed side of sealing ring points to the receiver tube.

– Disconnect receiver tube and guide bushing.

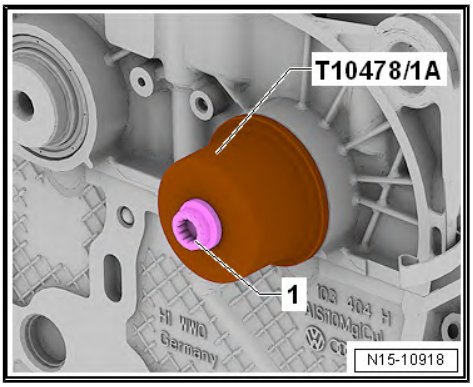


– Position guide bushing -T10478/2- with seal -1- on camshaft.



– Pull in to the stop using screw for camshaft sprocket -1- and thrust piece -T10478/1A- .

– install (set the timing)
⇒ “2.4 Remove the toothed belt from the camshaft”, page 114 .



For vehicles with engine identification characters CHPA

– Install engine support
⇒ “1.5 Removing and installing engine support”, page 59 .

3.5.3 Removing and installing the exhaust camshaft on the gearbox side

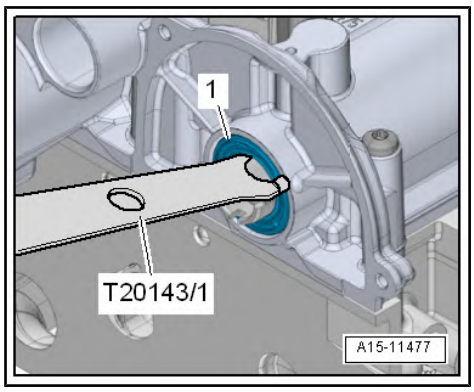
Special tools and workshop equipment required

- Assembly device - T10479-
- Extraction hook - T20143/1-

Removing

– Remove the toothed belt gear for coolant pump drive ⇒ “2.5 Removing and installing toothed belt pulley for coolant pump drive”, page 222 .

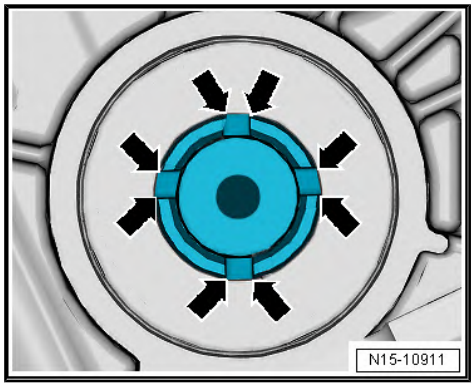
– Carefully fit extractor hook - T20143/1- between camshaft and seal -1-.



– Lever out sealing ring.

Install

– Remove any burrs in the area of the external grooves on the exhaust camshaft -arrows- with sandpaper (220...1000x grain size).



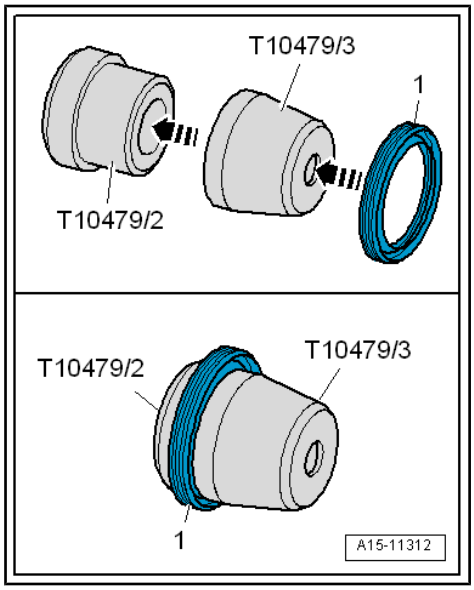
Note

Do not oil new sealing ring.

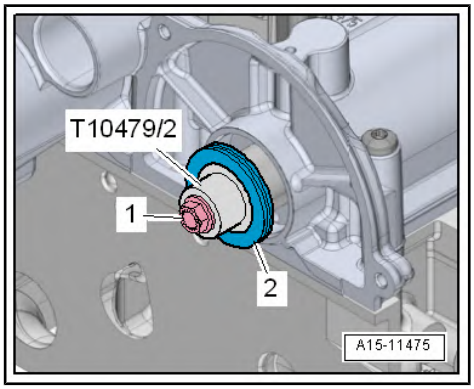
– Push sealing ring -1- over the receiver tube -T10479/3- onto the guide bushing -T10479/2- .

- Fitting position: Closed side of sealing ring points to the receiver tube.

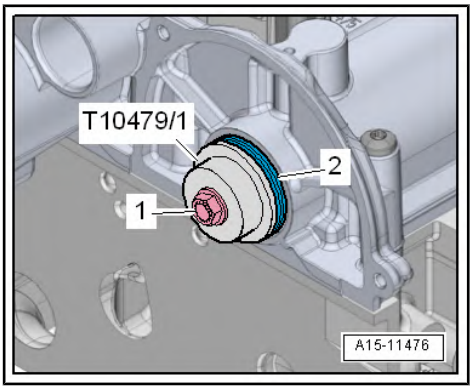
– Disconnect receiver tube and guide bushing.



– Fit guide bushing -T10479/2- with sealing ring -2- centrally onto the camshaft.
– Fix guide bushing with screw -1- for coolant pump driving wheel onto the camshaft.
– Push sealing ring onto camshaft and unscrew guide bushing.



– Pull sealing ring -2- into the stop using the thrust piece -T10479/1- and the screw -1- for coolant pump driving wheel.
– Install the toothed belt gear for coolant pump drive ⇒ “2.5 Removing and installing toothed belt pulley for coolant pump drive”, page 222 .



3.6 Removing and installing valve stem seal

⇒ “3.6.1 Removing and installing valve stem seal with cylinder head installed ”, page 177

⇒ “3.6.2 Removing and installing valve stem seal with cylinder head removed ”, page 180

⇒ “3.6.3 Checking valve guides”, page 182

⇒ “3.6.4 Valve dimensions”, page 183

3.6.1 Removing and installing valve stem seal with cylinder head installed

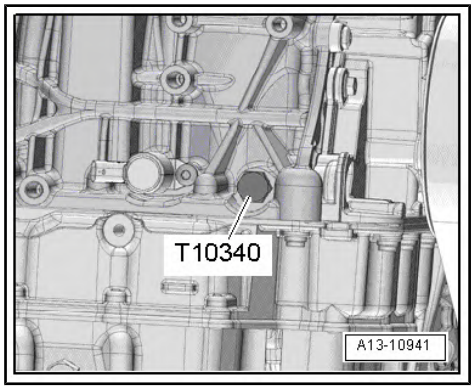
Special tools and workshop equipment required

♦ Spark plug wrench - 3122 B- , e.g. -3122 B-
♦ Disassembly and assembly device for valve collets - VAS 5161- with set - VAS 5161/32-32-
♦ Adapter - T40012-
♦ Valve stem seal insertion tool - MP1-233 (3365)-
♦ Valve shaft pliers , e.g. -VAS 6770-

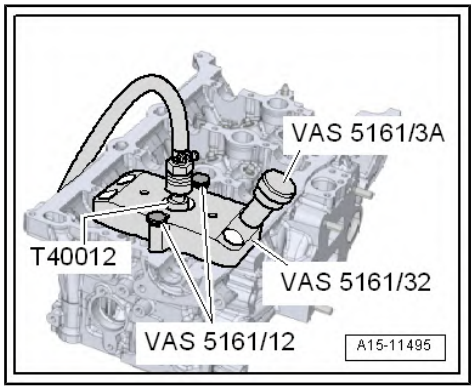
Work procedure

– Remove the camshaft housing ⇒ “1.4 Removing and installing camshaft housing”, page 97 .
– Unscrew the spark plugs with spark plug wrench - 3122 B- .

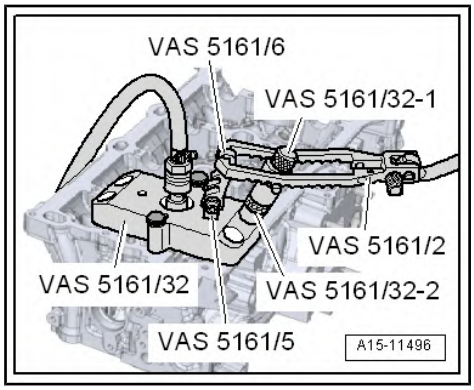
– Unscrew positioning screw - T10340- .
– Position piston of the relevant cylinder in “BDC”.



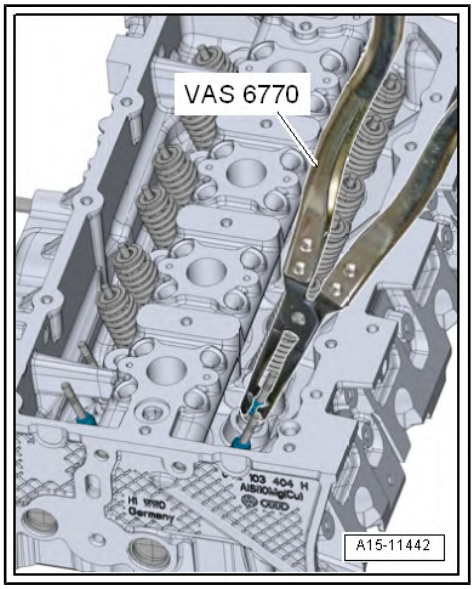
– Place guide plate -VAS 5161/32-1- on the cylinder head and screw on using the knurled screws -VAS 5161/12- .
– Screw in adapter - T40012- with seal ring hand-tight into the corresponding plug connector thread.
– Connect the adapter to the compressed air with a commercially available intermediate piece and apply constant pressure.
• Minimum pressure: 0.6 MPa (6 bar)
– Insert the impact drift -VAS 5161/3A- into the guide plate and knock off the tightly fitted valve collets using a plastic hammer.



– Screw the detent part -VAS 5161/6- with the interlocking fork -VAS 5161/5- into the guide plate.
– Insert assembly cartridge -VAS 5161/32-2- with sleeve mounted -VAS 5161/32-3- into the guide plate.
– Hook the pressure fork -VAS 5161/2- onto the detent part and push the assembly cartridge downwards.
– Turn simultaneously the knurled screw of the assembly cartridge to the right, until the tips click into the valve collets.
– Rotate the knurled screw to the left and to the right, by doing so the valve collets are pressed apart and are installed in the assembly cartridge.
– Release the pressure fork.
– Remove assembly cartridge.
– Unscrew guide plate and turn it to the side.
• The compressed air hose remains connected
– Remove the valve spring with the valve spring retainer.



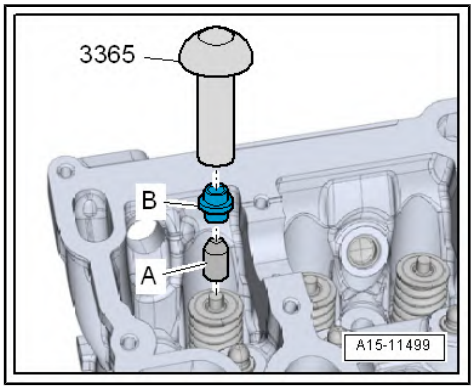
– Use valve shaft pliers - VAS 6770- to pull off valve stem seal.



Caution

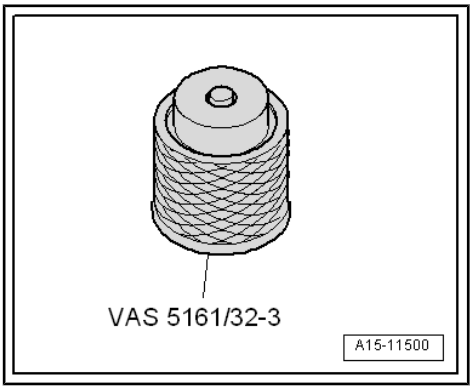
Risk of damage when installing the valve stem seals.

– Fit the plastic bushing -A-, which is attached to the new valve stem seals -B-, onto the valve stem.
– Lightly oil sealing lip of the valve stem seal.
– Slide the valve stem seal onto the plastic bushing.
– Carefully press the valve stem seal with the valve stem seal insertion tool - 3365- onto the valve guide.
– Remove plastic sleeve.

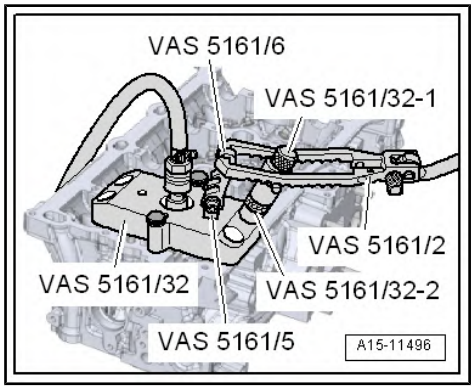


If the valve collets were removed from the assembly cartridge, first of all they must be inserted into the insertion device.

• The large diameter of the valve collets points to the top.
– Press the assembly cartridge from the top onto the insertion device and lift up the valve collets.
– Insert the valve spring and the valve spring retainer, installation position of valve spring ⇒ page 169 .



– Screw the guide plate -VAS 5161/32-1- back onto the cylinder head.
– Insert assembly cartridge -VAS 5161/32-2- with sleeve -VAS 5161/32-3- mounted into the guide plate.
– Press down the pressure fork and turn the knurled screw to the left and to the right while pulling it upwards, by doing so the valve collets are inserted.
– Release the pressure fork on tightened knurled screw.
– Repeat the work procedure for each cylinder.



Assembling

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

– Install spark plugs ⇒ Maintenance ; Booklet Octavia III .
– Install camshaft housing
⇒ “1.4 Removing and installing camshaft housing”, page 97 .

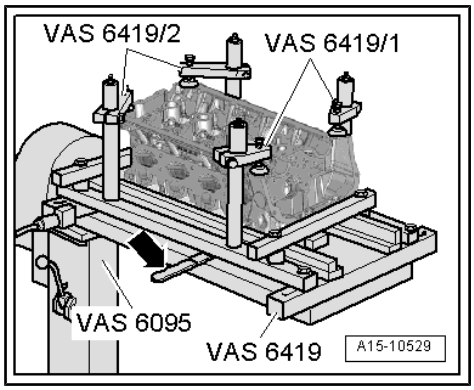
3.6.2 Removing and installing valve stem seal with cylinder head removed

Special tools and workshop equipment required

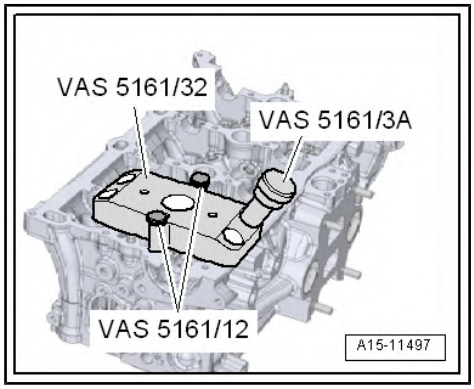
♦ Disassembly and assembly device for valve collets - VAS 5161- with set - VAS 5161/32-32-
♦ Engine and gearbox support - VAS 6095-
♦ Cylinder head tensioning device - VAS 6419-
♦ Valve shaft pliers - VAS 6770-
♦ Valve stem seal insertion tool - 3365-

Work procedure

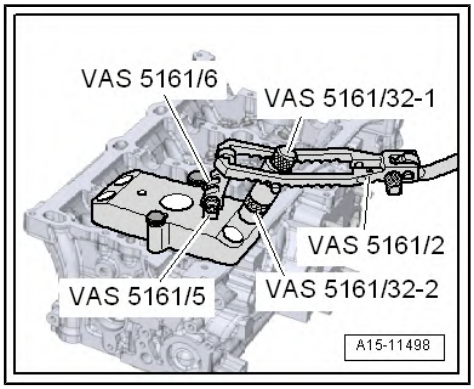
– Remove cylinder head
⇒ “1.3 Removing and installing cylinder head”, page 93 .
– Insert the cylinder head tensioning device - VAS 6419- into the engine and gearbox jack - VAS 6095- .
– Tension the cylinder head in the cylinder head tensioning device, as shown in the illustration.
– Connect cylinder head tensioning device to compressed air.
– Adjust the air bellows with the lever -arrow- below the combustion chamber on which the valve stem seals should be removed.
– Allow just enough air to flow into the air bag so that it applied to the valve disc.



– Place guide plate -VAS 5161/32-1- on the cylinder head and screw on using the knurled screws -VAS 5161/12- .
– Insert the impact drift -VAS 5161/3A- into the guide plate and knock off the tightly fitted valve collets using a plastic hammer.



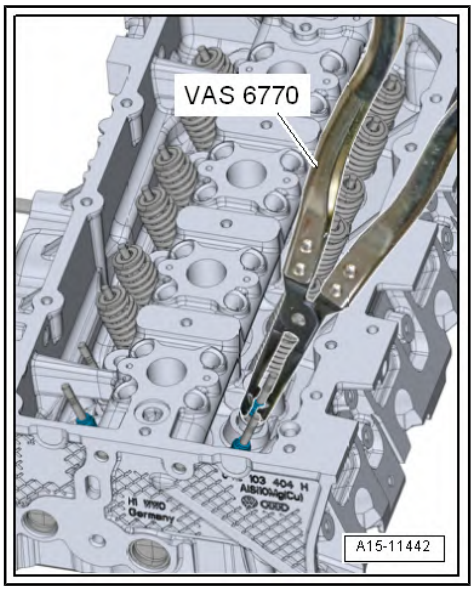
– Screw the detent part -VAS 5161/6- with the interlocking fork -VAS 5161/5- into the guide plate.
– Insert assembly cartridge -VAS 5161/32-2- with sleeve mounted -VAS 5161/32-3- into the guide plate.
– Hook the pressure fork -VAS 5161/2- onto the detent part and push the assembly cartridge downwards.
– Turn simultaneously the knurled screw of the assembly cartridge to the right, until the tips click into the valve collets.
– Rotate the knurled screw to the left and to the right, by doing so the valve collets are pressed apart and are installed in the assembly cartridge.
– Release the pressure fork.
– Remove assembly cartridge.
– Unscrew guide plate and turn it to the side.
– Remove the valve spring with the valve spring retainer.



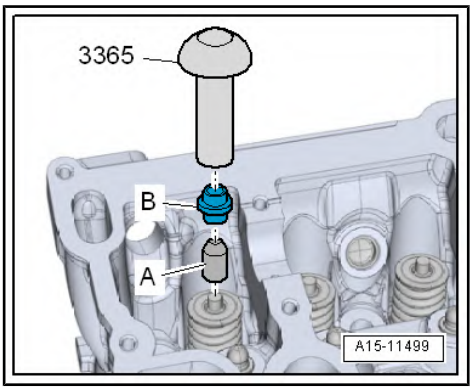
– Use valve shaft pliers - VAS 6770- to pull off valve stem seal.

Caution

Risk of damage when installing the valve stem seals.



– Fit the plastic bushing -A-, which is attached to the new valve stem seals -B-, onto the valve stem.
– Lightly oil sealing lip of the valve stem seal.
– Slide the valve stem seal onto the plastic bushing.
– Carefully press the valve stem seal with the valve stem seal insertion tool - 3365- onto the valve guide.
– Remove plastic sleeve.

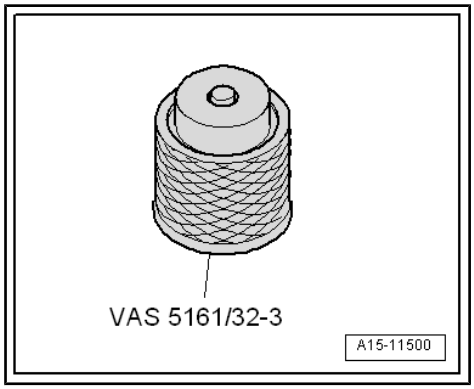


If the valve collets were removed from the assembly cartridge, first of all they must be inserted into the insertion device.

- The large diameter of the valve collets points to the top.

– Press the assembly cartridge from the top onto the insertion device and lift up the valve collets.

– Insert the valve spring and the valve spring retainer, installation position of valve spring ⇒ page 169 .



– Screw the guide plate -VAS 5161/32-1- back onto the cylinder head.

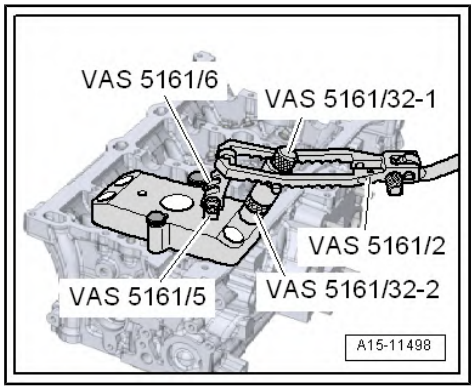
– Insert assembly cartridge -VAS 5161/32-2- with sleeve -VAS 5161/32-3- mounted into the guide plate.

– Press down the pressure fork and turn the knurled screw to the left and to the right while pulling it upwards, by doing so the valve collets are inserted.

– Release the pressure fork on tightened knurled screw.

– Repeat the procedure for each valve.

– Install cylinder head
⇒ “1.3 Removing and installing cylinder head”, page 93 .



3.6.3 Checking valve guides

Special tools and workshop equipment required

- Universal dial gauge holder - MP3-447 (VW 387)-
- Dial gauge , e.g. -VAS 6079-

Test procedure

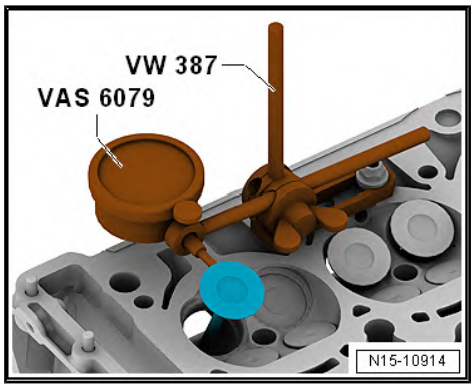
– Insert valve into guide. The end of the valve stem must be flush with the guide. On account of differing stem diameters, only use inlet valve in inlet valve guide and exhaust valve in exhaust valve guide.

– Determine valve rock.

- Wear limit: 0.5 mm

– If the wear limit is exceeded, repeat measurement with new valves.

– If the wear limit is again exceeded, replace cylinder head.



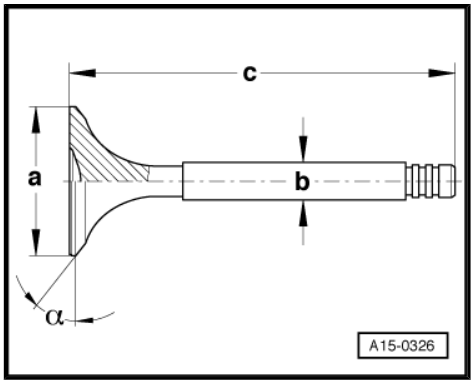
Note

The valve guides cannot be replaced.

3.6.4 Valve dimensions

Note

Inlet and exhaust valves must not be reworked. Only lapping-in is permitted.



Dimension		Inlet valve	Exhaust valve
∅ a	mm	28,5	25,0
∅ b	mm	4,973	4,963
c	mm	110,25	110,09
α	∠°	45	30

17 – Lubrication

1 Oil sump and oil pump

⇒ “1.1 Summary of components - oil sump and oil pump”, page 184

⇒ “1.2 Removing and installing oil level and oil temperature sender G266 ”, page 186

⇒ “1.3 Removing and installing oil sump bottom part”, page 186

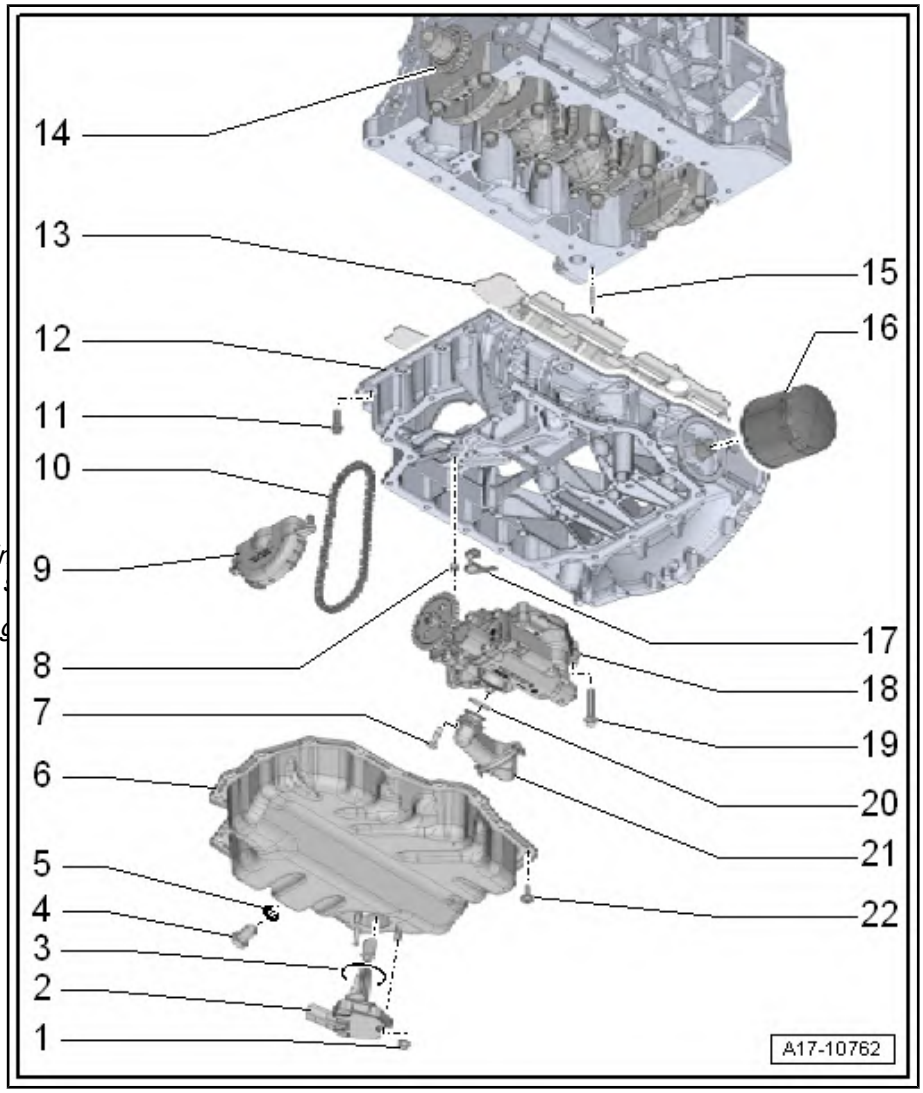
⇒ “1.4 Removing and installing oil pump”, page 188

⇒ “1.5 Removing and installing oil sump top part”, page 190

1.1 Summary of components - oil sump and oil pump

Note

- *If considerable quantities of metal swarf or abrasion are found when carrying out an engine repair, this may indicate damage to the crankshaft and conrod bearings. In order to prevent consequential damage, the following tasks must be performed after the repair: Clean oil channels carefully; change oil injection nozzles, engine oil cooler and oil filter.*
- *Oil spray nozzle and pressure relief valve* *⇒ “4.3 Removing and installing oil injection nozzles”, page 87* *.*



1 - Screw

- ❑ 8 Nm + torque a further 90° (1/4 turn)

2 - Oil level and oil temperature sender - G266-

- ❑ Removing and installing ⇒ “1.2 Removing and installing oil level and oil temperature sender G266 ”, page 186

3 - Sealing ring

- ❑ replace after removal

4 - Oil drain plug

Note

- ♦ *Replace the oil drain it has an integrated*
- ♦ *Always replace the g*

- ❑ 30 Nm

5 - Sealing ring

- ❑ replace after removal

6 - Sump bottom part

- ❑ Removing and installing ⇒ “1.3 Removing and installing oil sump bottom part”, page 186

7 - Screw

- ❑ replace after removal
- ❑ 8 Nm + torque a further 90° (1/4 turn)

8 - Fitting sleeve

- ❑ 2 pieces

9 - Cover

- ❑ for drive chain of the oil pump

10 - Drive chain

- ❑ for oil pump
- ❑ mark the direction of rotation in colour before removing

11 - Screw

- ❑ replace after removal
- ❑ order of tightening ⇒ “1.5 Removing and installing oil sump top part”, page 190
- ❑ 8 Nm + torque a further 90° (1/4 turn)

12 - Sump top part

- ❑ Removing and installing ⇒ “1.5 Removing and installing oil sump top part”, page 190

13 - Baffle

14 - Sprocket

- ❑ for oil pump drive

15 - Fit pin

16 - Oil filter

- ❑ Remove and install with oil filter tool - 3417- .
- ❑ Before installing, lightly coat sealing ring with clean engine oil
- ❑ 20 Nm

17 - Gasket

- ❑ With oil strainer

18 - Oil pump

- ❑ Removing and installing ⇒ “1.4 Removing and installing oil pump”, page 188

19 - Screw

- ❑ 10 Nm

20 - O-ring

- ❑ replace after removal

21 - Oil suction pipe

- ❑ Clean strainer if dirty

22 - Screw

- ❑ replace after removal
- ❑ order of tightening ⇒ page 188
- ❑ 12 Nm

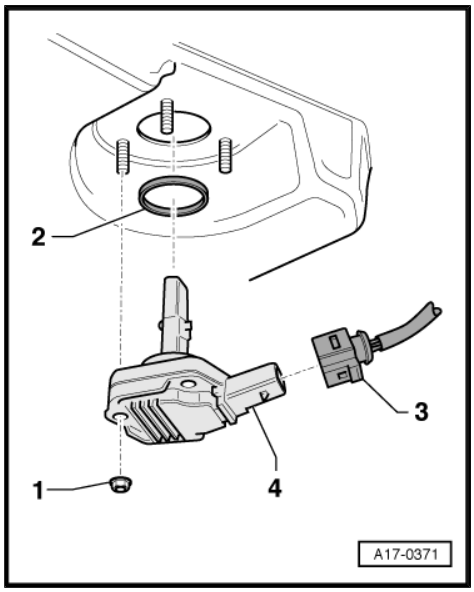
1.2 Removing and installing oil level and oil temperature sender - G266-

Removing

– Drain engine oil ⇒ Maintenance ; Booklet Octavia III .

– Unplug connector -3-.

– Unscrew nuts -1- and remove oil level and oil temperature sender - G266- -4-.



Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

Note

Replace gasket ring -2-.

– Fill with engine oil and check the oil level ⇒ Maintenance ; Booklet Octavia III .

Tightening torques

- ♦ Oil level and oil temperature sender - G266- ⇒ “1.1 Summary of components - oil sump and oil pump”, page 184

1.3 Removing and installing oil sump bottom part

Special tools and workshop equipment required

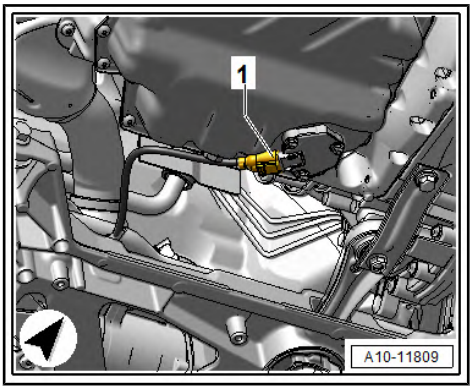
- ♦ Socket insert - T10058-

- Sealant remover gasket stripper (bearing code GST, bearing article no. R 34402), manufacturer Retech s.r.o.
- Silicone sealant ⇒ ETKA - Electronic catalogue of original parts
- Cleaning and degreasing agent , e.g. -D 009 401 04-
- Protective goggles and gloves
- Catch pan , e.g. -VAS 6208-

Removing

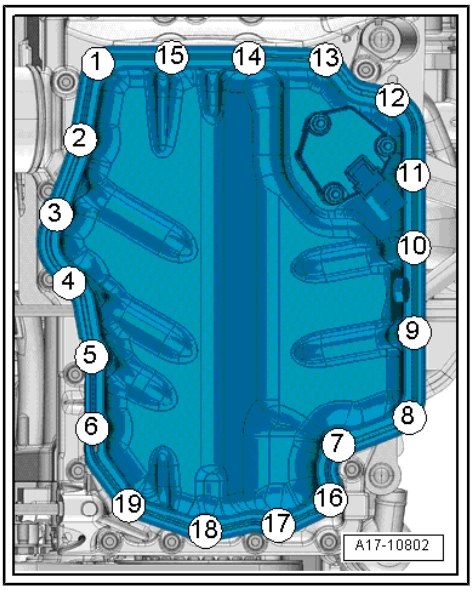
– Drain engine oil ⇒ Maintenance ; Booklet Octavia III .

– Disconnect plug -1- at the oil level and oil temperature sender - G266- .



– Loosen the screws in the sequence -19- to -1- and unscrew them.

– Remove lower part of oil sump. If necessary, undo the oil pan by applying slight blows with a rubber-headed hammer.



Install

Caution

Risk of contamination of the lubrication system.

- *Cover opened engine parts.*

WARNING

Wear protective gloves when working with sealant and grease remover!

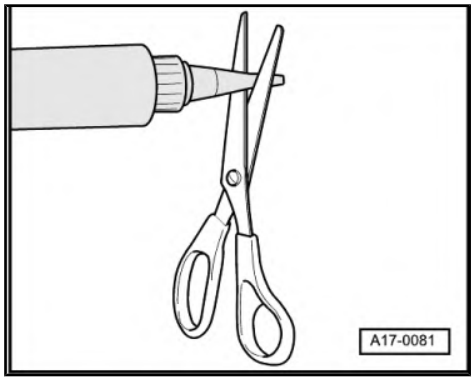
– Remove the remaining sealant on the cylinder block and on the oil pan with chemical sealant remover.

– Degrease the sealing surfaces.

Note

- *Pay attention to the use by date on sealant.*
- *The oil pan must be installed within 5 minutes after applying the sealant.*
- *The oil pan can be better and more securely installed if 2 M6 threaded pins are screwed on the sump top part for the insertion.*

– Cut off nozzle on tube at front marking (∅ of nozzle approx. 2 mm).

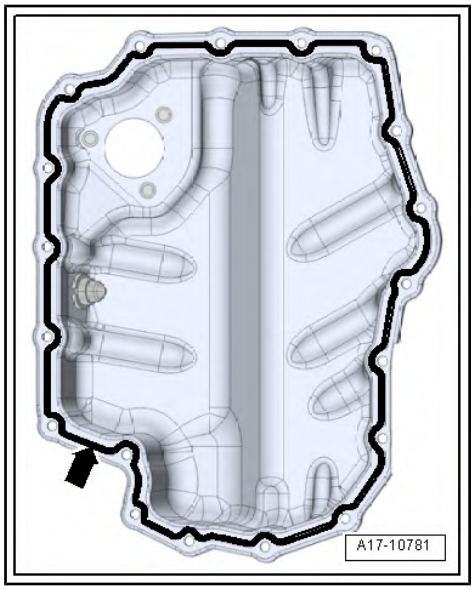


Caution

Risk of blockage of the lubrication system through excess sealant.

- ***Do not apply a thicker sealant bead than indicated.***

– Apply sealant bead -arrow- onto the clean sealing surface of the oil sump bottom part, as shown in the illustration.



The sealant bead must be:

- 2…3 mm thick
- run past the area around the bolt holes on the inside arrow

Note

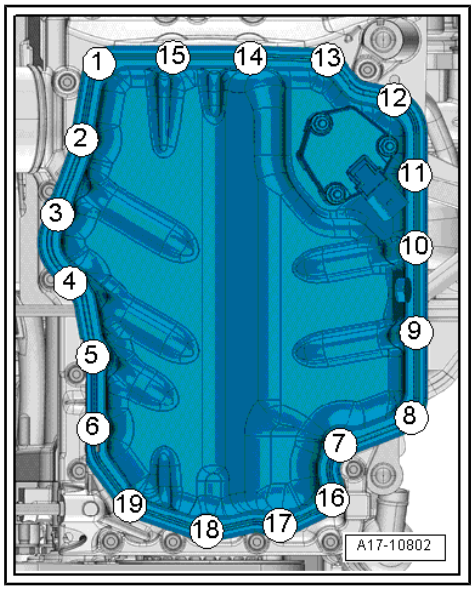
- *Take particular care when applying sealant bead in the area of the sealing flange.*
- *After applying the sealant, the oil sump bottom part must be installed within 5 minutes.*

– Position oil sump bottom part and tighten screws.

Oil sump bottom part - tightening torque and tightening order

– Tighten screws gradually in the given sequence:

Stage	Screws	Tightening torque
1.	-1…19-	by hand as far as the stop
2.	-1…19-	12 Nm



Note

After installing the lower part of the oil pan, allow the sealant to dry for about 30 minutes. Only then fill with engine oil.

– Fill with engine oil and check the oil level ⇒ Maintenance ; Booklet Octavia III .

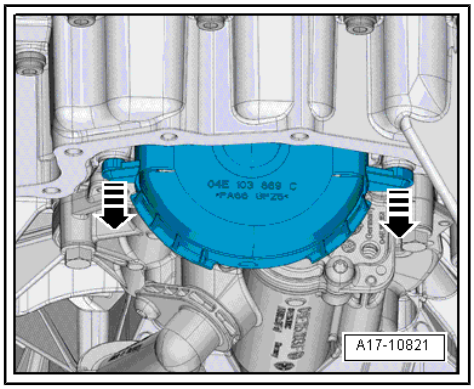
1.4 Removing and installing oil pump

Removing

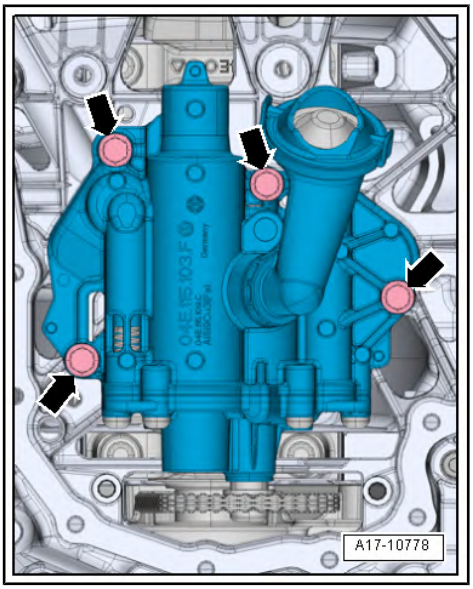
– Remove oil sump bottom part
⇒ “1.3 Removing and installing oil sump bottom part”, page 186 .

Volkswagen Technical Site: http://vwts.ru http://vwts.info
огромный архив документации по автомобилям Volkswagen, Skoda, Seat, Audi

– Unclip cover for oil pump drive chain sprocket -arrows-.

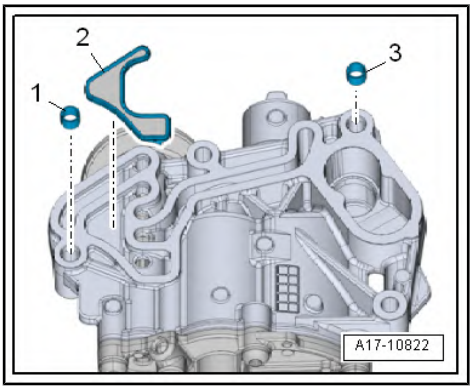


– Remove bolts -arrows-.
– Guide oil pump out with drive chain sprocket below the drive chain.



Install

– Check that the dowel sleeves -1- and -3- are inserted into the oil pump.
– Insert gasket with strainer -2- into the oil pump.



Installation is performed in a similar way in the reverse order. Pay attention to the following points:

– Check smooth operation of drive chain sprocket of the oil pump, to do so turn the toothed belt sprocket with a finger.

Note

A sluggish oil pump must be replaced.

– Insert drive chain sprocket into drive chain and screw tight.
– Install oil sump bottom part
⇒ “1.3 Removing and installing oil sump bottom part”, page 186 .
– Fill with engine oil and check the oil level ⇒ Maintenance ; Booklet Octavia III .

Tightening torques

♦ Oil pump fixing screws
⇒ “1.1 Summary of components - oil sump and oil pump”, page 184

1.5 Removing and installing oil sump top part

Special tools and workshop equipment required

- Cleaning and degreasing agent , e.g. -D 009 401 04-
- Sealant remover gasket stripper (bearing code GST, bearing article no. R 34402), manufacturer Retech s.r.o.
- Silicone sealant ⇒ ETKA - Electronic catalogue of original parts
- Protective goggles and gloves

Removing

For vehicles with air conditioning

Note

- *The refrigerant lines are not opened.*
- *Prevent damage to condenser and refrigerant lines and hoses.*
- *Do NOT stretch, kink or bend lines and hoses.*

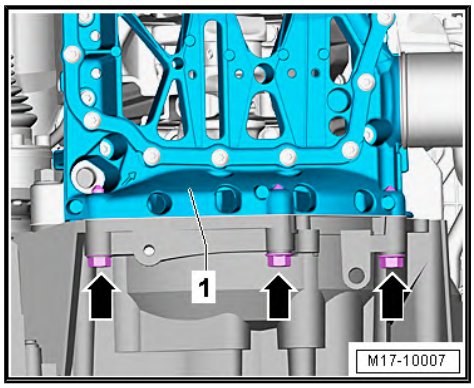
– Remove AC compressor ⇒ Heating, Air Conditioning; Rep. gr. 87 .

– Attach AC compressor to lock carrier.

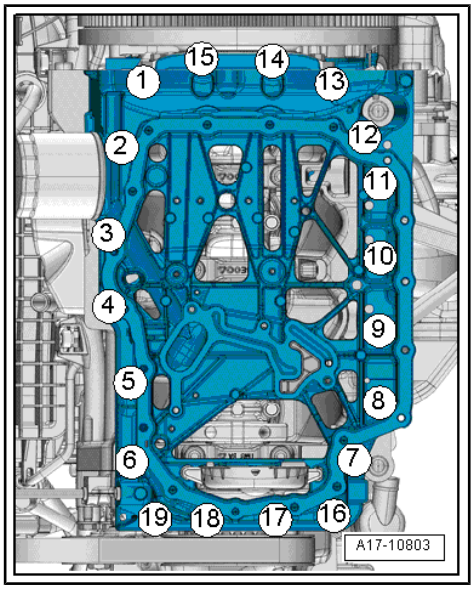
Continued for all vehicles

– Remove oil pump
⇒ “1.4 Removing and installing oil pump”, page 188 .

– Undo fastening screws -arrows- for gearbox/sump top part.



– Loosen the screws in the sequence -19- to -1- and unscrew them.
– Loosing oil sump top part carefully from the bonding.
– Remove baffle.



Install

Note

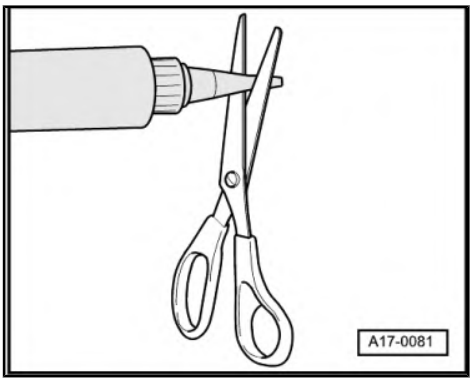
- *Replace screws which have been tightened firmly to a torquing angle.*
- *Replace the gaskets, sealing rings and self-locking nuts.*

– Check oil channels in the oil sump top part and in the cylinder block for contamination.
– Clean oil and grease from sealing surfaces.

Note

Pay attention to the use by date on sealant.

– Cut off nozzle on tube at front marking (∅ of nozzle approx. 2 mm).



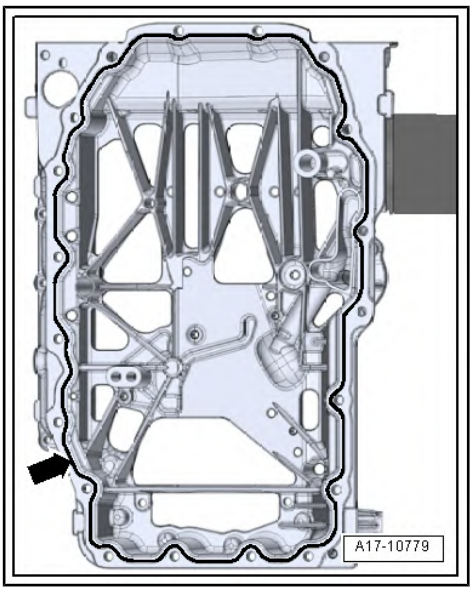
Caution

Risk of blockage of the lubrication system through excess sealant.

- ***Do not apply a thicker sealant bead than indicated.***

– Apply sealant bead -arrow- onto the clean sealing surface of the oil sump top part, as shown in the illustration.

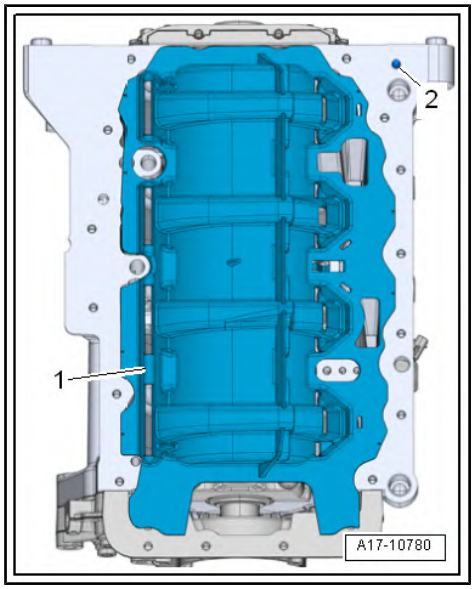
• Thickness of sealant bead: 2 … 3 mm



Note

After applying the sealant, the oil sump top part must be installed within 5 minutes.

– Check firm seating of the fit pin -2- in the cylinder block.
– Position the gasket -1- at the cylinder block.
– Position oil sump top part and tighten screws.



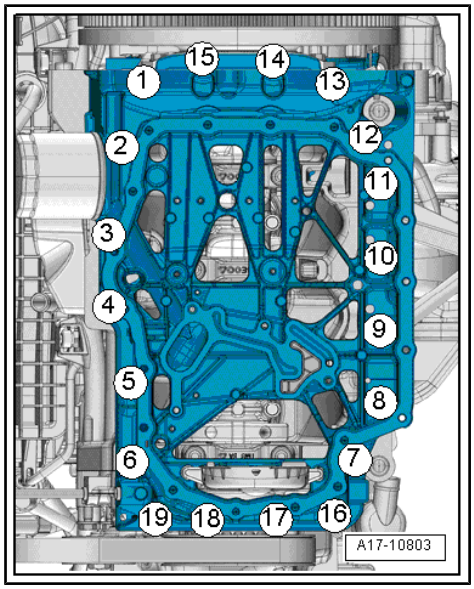
Oil sump top part - tightening torque and tightening order

Note

Replace screws which have been tightened firmly to a torquing angle.

– Tighten screws gradually in the given sequence:

Stage	Screws	Tightening torque/torquing angle
1.	-1...19-	by hand as far as the stop
2.	-1…19-	8 Nm
3.	-1…19-	90° (torque a further 90° ($^1/_4$ turn)



Assembling is performed continuing in the reverse order, while paying attention to the following:

– Install oil pump
⇒ “1.4 Removing and installing oil pump”, page 188 .
– Install AC compressor ⇒ Heating, Air Conditioning; Rep. gr. 87 .
– Fill with engine oil and check the oil level ⇒ Maintenance ; Booklet Octavia III .

2 Engine oil cooler

⇒ “2.1 Summary of components - engine oil cooler”, page 193

⇒ “2.2 Removing and installing engine oil cooler”, page 193

2.1 Summary of components - engine oil cooler

1 - Engine oil cooler

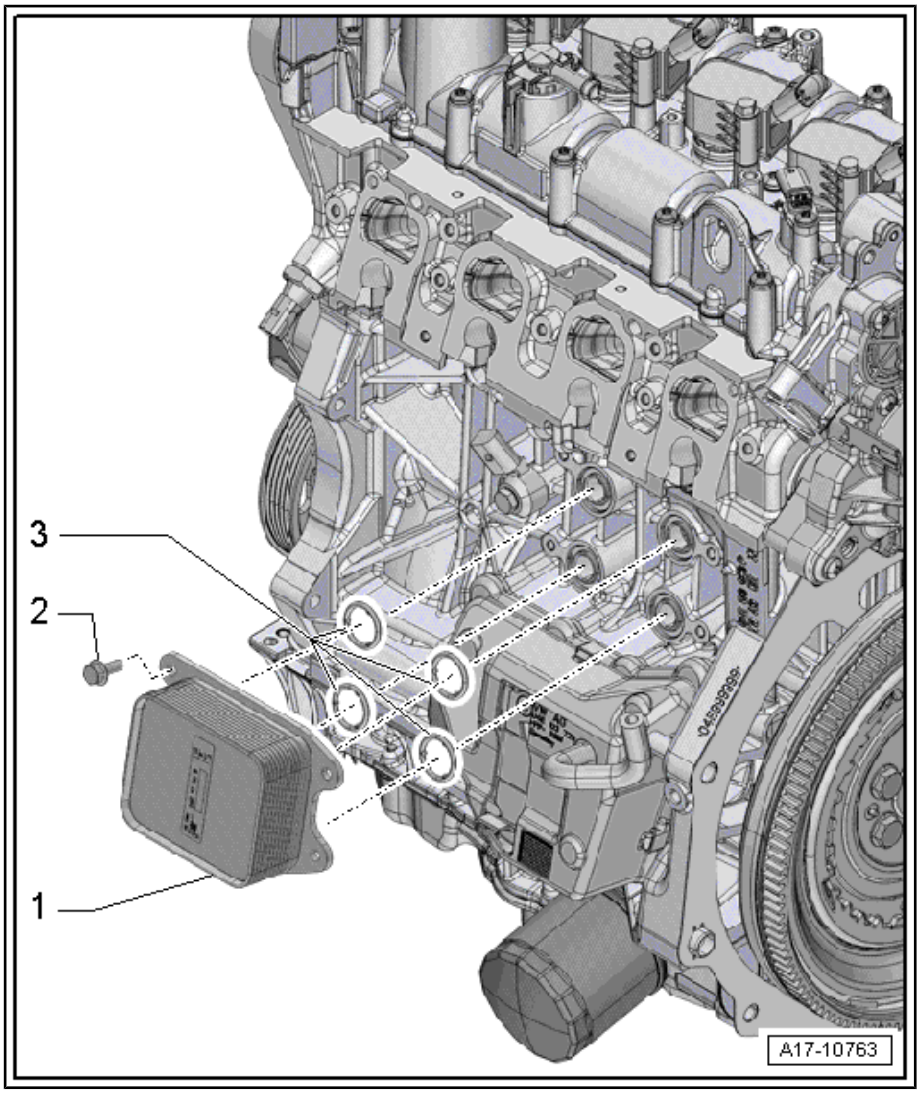
- ❑ pay attention to note ⇒ “1 Oil sump and oil pump”, page 184
- ❑ Removing and installing ⇒ “2.2 Removing and installing engine oil cooler”, page 193
- ❑ After replacing, renew all coolant ⇒ “1.2 Draining and filling coolant”, page 209

2 - Screw

- ❑ replace after removal
- ❑ 8 Nm + torque a further 90° ($^1/_4$ turn)

3 - Gasket rings

- ❑ replace after removal



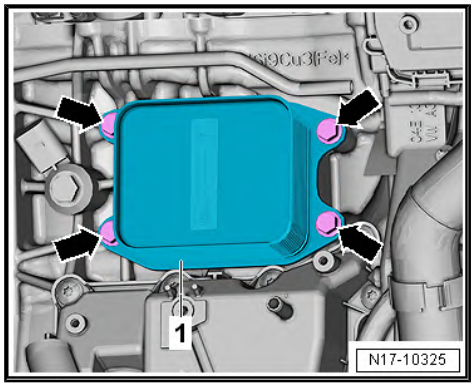
2.2 Removing and installing engine oil cooler

Removing

– Drain coolant ⇒ “1.2 Draining and filling coolant”, page 209 .

– Removing the intake manifold ⇒ “3.2 Removing and installing intake manifold”, page 386 .

– Release screws -arrows- and remove engine oil cooler -1-.



Install

– Insert new O-rings.

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

Caution

Replace all the coolant when installing the new engine oil cooler ⇒ "1.2 Draining and filling coolant", page 209

– Installing the intake manifold
⇒ "3.2 Removing and installing intake manifold", page 386 .

– Replenish coolant
⇒ "1.2 Draining and filling coolant", page 209 .

Tightening torques

- Engine oil cooler
⇒ "2.1 Summary of components - engine oil cooler", page 193
- Ignition system
⇒ "1.1 Assembly overview - ignition system", page 441

3 Crankcase ventilation

⇒ "3.1 Summary of components - crankcase ventilation", page 195

⇒ "3.2 Removing and installing oil separator", page 195

3.1 Summary of components - crankcase ventilation

1 - Hose

- ❑ for crankcase ventilation

2 - Cover

- ❑ For oil separator

3 - Oil separator

- ❑ Removing and installing ⇒ "3.2 Removing and installing oil separator", page 195
- ❑ Replace if damaged

4 - O-ring

- ❑ replace after removal

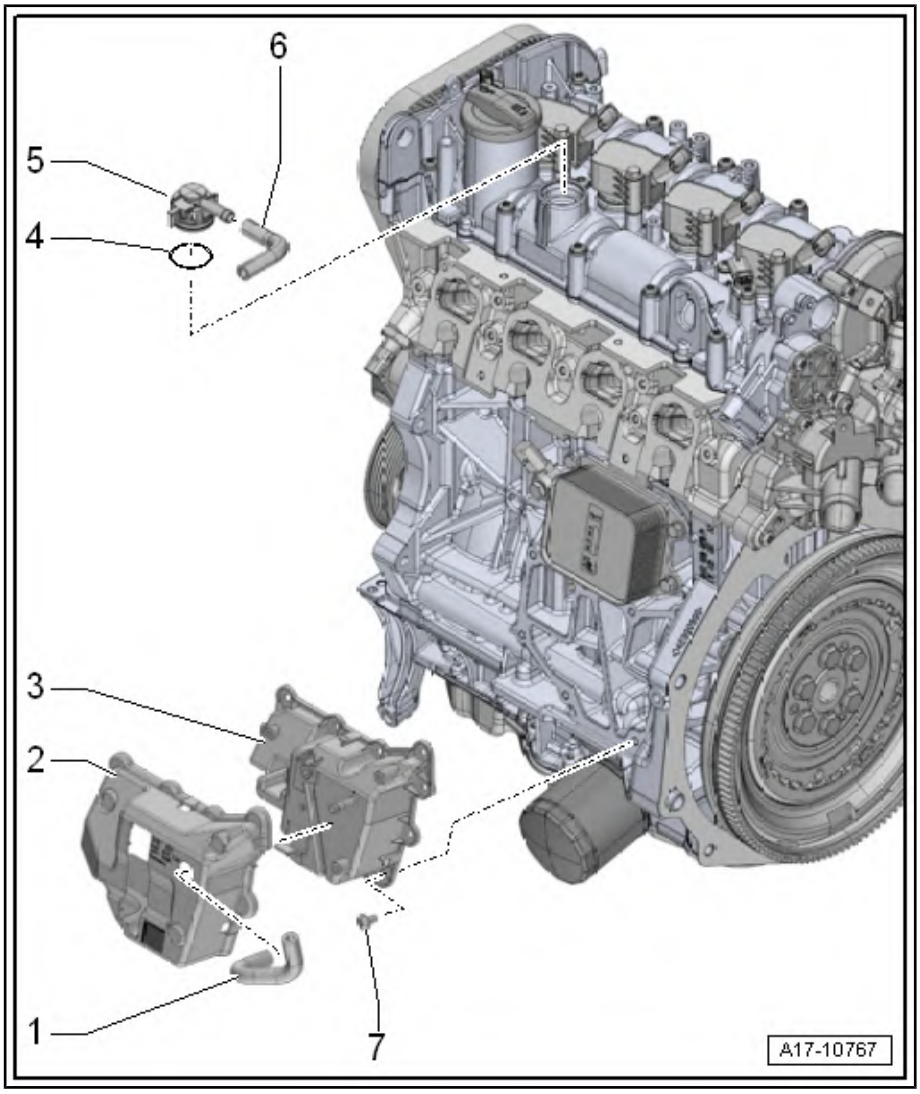
5 - Connection fittings

6 - Hose

- ❑ for crankcase ventilation

7 - Screw

- ❑ replace after removal
- ❑ order of tightening ⇒ page 198
- ❑ 9 Nm



3.2 Removing and installing oil separator

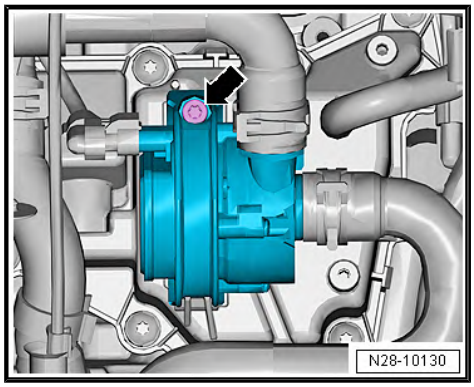
Special tools and workshop equipment required

- ♦ Sealant remover gasket stripper (bearing code GST, bearing article no. R 34402), manufacturer Retech s.r.o.
- ♦ Cleaning and degreasing agent , e.g. -D 009 401 04-
- ♦ Silicone sealant ⇒ ETKA - Electronic catalogue of original parts
- ♦ Protective goggles and gloves
- ♦ 2 M6X20 mm bolts

Removing

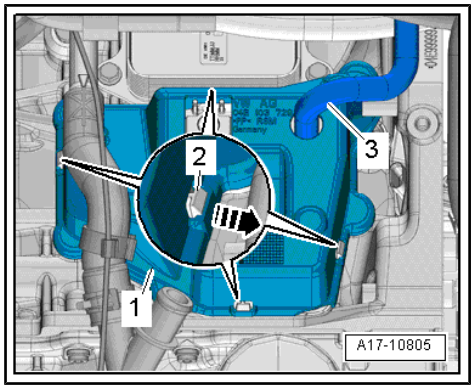
– Remove the sound dampening system ⇒ Body Work; Rep. gr. 66 .

– Unscrew screw -arrow- and push coolant recirculation pump - V188- to the side.



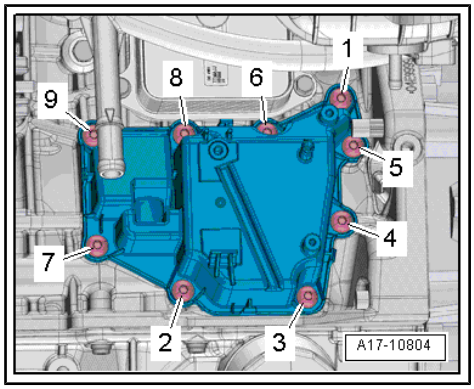
– Pull off hose -3- for crankcase ventilation.

– Unlock -1- oil separator cover at catches -2- -arrow- and remove.



– Loosen the screws in the sequence -9- to -1- and unscrew them.

– Loosen oil separator carefully from the bonding.



Install

Caution

Risk of contamination of the lubrication system.

- *Cover opened engine parts.*

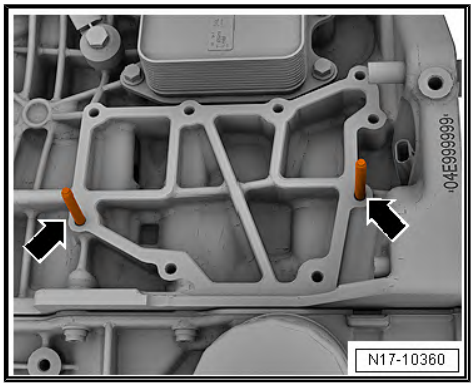
WARNING

Wear protective gloves when working with sealant and grease remover!

– Remove residual sealant on the cylinder head and on the oil trap using a chemical sealant remover.

– Degrease the sealing surfaces.

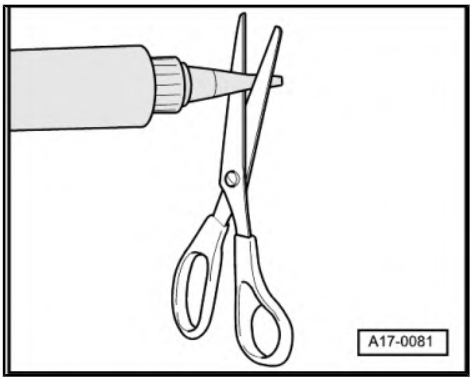
– Insert 2 M6X20 mm bolts a few revolutions into the holes -arrows-.



Note

Pay attention to the use by date on sealant.

– Cut off nozzle on tube at front marking (∅ of nozzle approx. 2 mm).



Caution

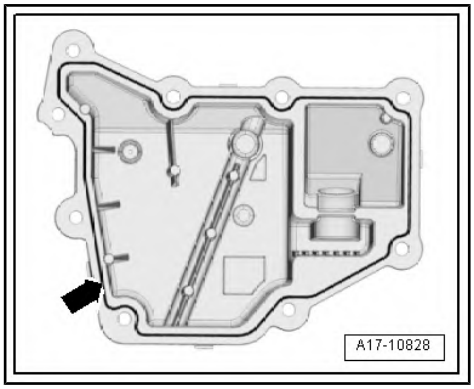
Risk of blockage of the lubrication system through excess sealant.

- ***The sealant bead must not be thicker than specified.***

– Apply sealant bead -arrow- onto the clean sealing surface of the oil separator, as shown in the illustration.

- Thickness of sealant bead: 2 mm

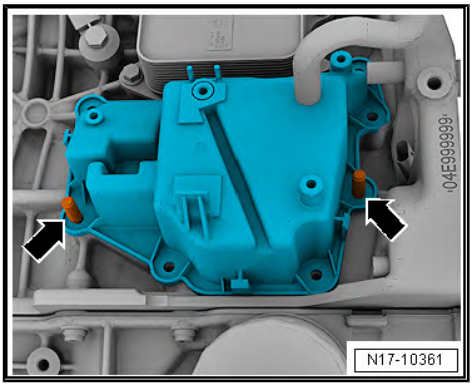
After applying the sealant, the oil separator must be installed within 5 minutes.



– Insert oil trap onto the bolts -arrows- and place onto the crankcase.

– Insert the securing bolts and remove the 2 M6x20 mm bolts.

– Tighten fixing screws.



Oil separator - tightening torque and tightening order

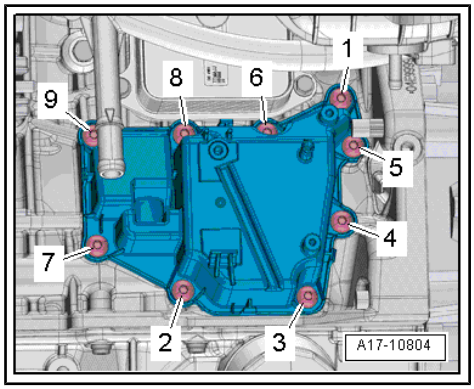
– Tighten the bolts in the sequence -1…9- to 9 Nm.

Assembling is performed continuing in the reverse order, while paying attention to the following:

– Install the noise insulation ⇒ Body Work; Rep. gr. 66 .

Tightening torques

- Electric coolant pump
  ⇒ “2.2 Summary of components - electric coolant pump”, page 218
- Oil separator
  ⇒ “3.1 Summary of components - crankcase ventilation”, page 195



4 Oil filter and oil pressure switch

⇒ “4.1 Summary of components - oil filter and oil pressure switch”, page 199

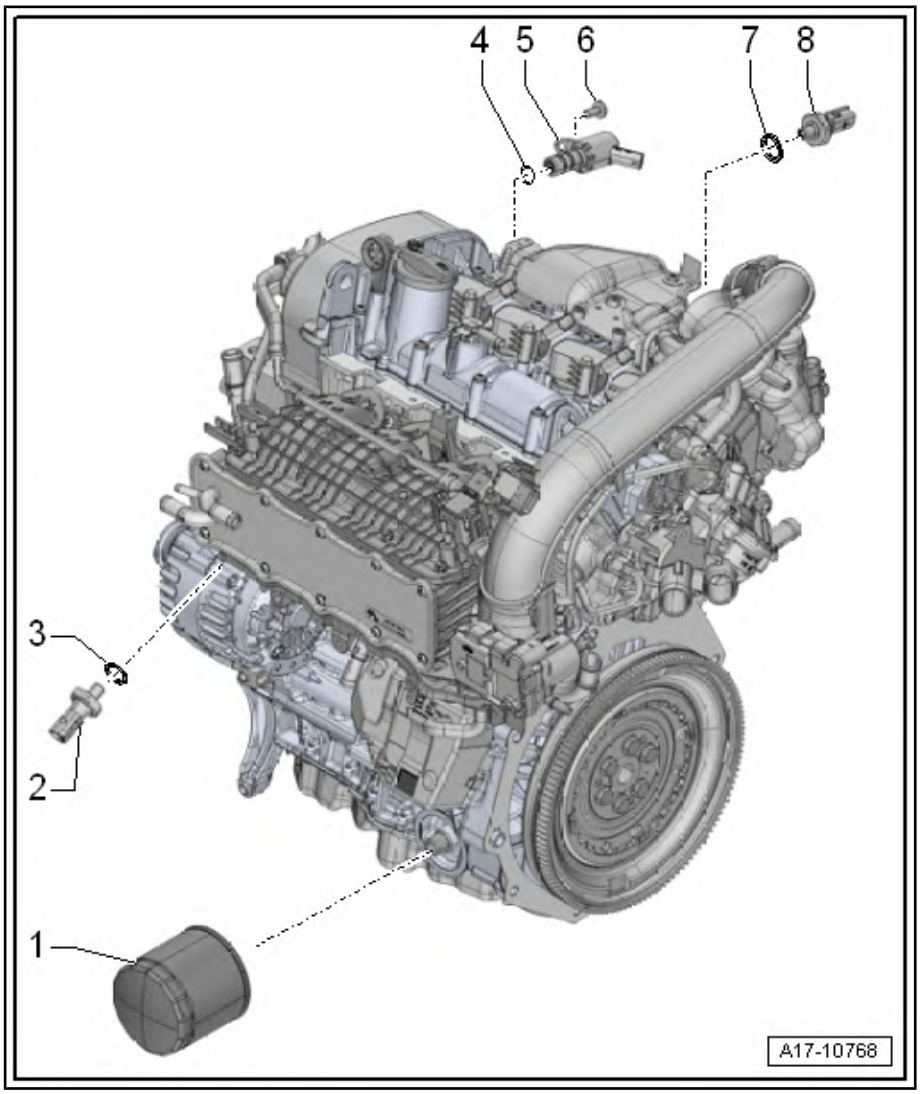
⇒ “4.2 Removing and installing oil pressure switch F1 ”, page 200

⇒ “4.3 Removing and installing oil pressure switch for reduced oil pressure F378 ”, page 201

⇒ “4.4 Removing and installing valve for oil pressure control N428 ”, page 202

⇒ “4.5 Testing oil pressure”, page 203

4.1 Summary of components - oil filter and oil pressure switch



1 - Oil filter

- ❑ Remove and install with oil filter tool - 3417- .
- ❑ Before installing, lightly coat sealing ring with clean engine oil
- ❑ pay attention to the notes ⇒ page 184
- ❑ 20 Nm

2 - Oil pressure switch for reduced oil pressure - F378-

- ❑ green
- ❑ Check switching pressure 0.03 ... 0.06 MPa (0.3 ... 0.6 bar)
- ❑ check ⇒ “4.5 Testing oil pressure”, page 203
- ❑ Removing and installing ⇒ “4.3 Removing and installing oil pressure switch for reduced oil pressure F378 ”, page 201
- ❑ 20 Nm

3 - Sealing ring

- ❑ is a component part of position -2-
- ❑ replace oil pressure switch if leaking

4 - O-ring

- ❑ replace after removal

5 - Oil pressure control valve - N428-

- ❑ Removing and installing ⇒ “4.4 Removing and installing valve for oil pressure control N428 ”, page 202

6 - Screw

- ❑ 8 Nm

7 - Sealing ring

- ❑ is a component part of position -8-

- ❑ replace oil pressure switch if leaking

8 - Oil pressure switch - F1-

- ❑ blue
- ❑ Switching pressure 0.215 ... 0.295 MPa (2.15 ... 2.95 bar)
- ❑ check ⇒ “4.5 Testing oil pressure”, page 203
- ❑ Removing and installing ⇒ “4.2 Removing and installing oil pressure switch F1 ”, page 200
- ❑ 20 Nm

4.2 Removing and installing oil pressure switch - F1-

Special tools and workshop equipment required

- ♦ Flexible-head wrench SW 24 - T40175-

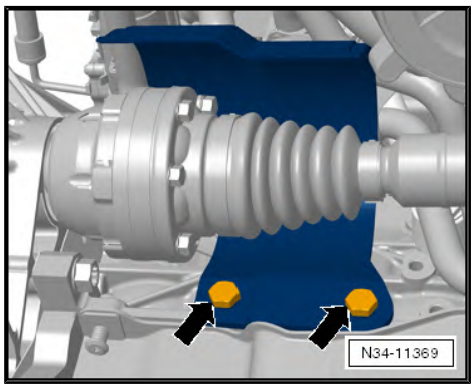
Removing

Note

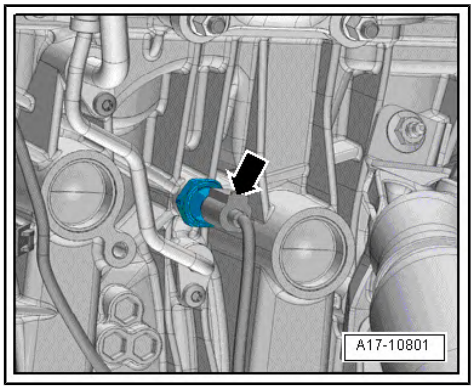
Fit all heat protection sleeves on again in the same place when installing.

– Remove the sound dampening system ⇒ Body Work; Rep. gr. 66 .

– Release screws -arrows- and remove heat shield for right drive shaft, if present.



– Disconnect plug connection -arrow-.



Note

Place a cloth below to absorb leaking engine oil.

– Screw out oil pressure switch - F1- .

Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

Note

- *Sealing ring not replaceable individually.*
- *Replace oil pressure switch if leaking.*
- *To prevent oil loss, immediately insert a new oil pressure switch - F1- into the bore hole.*

– Checking the oil level ⇒ Maintenance ; Booklet Octavia III .

Tightening torques

- Oil pressure switch - F1-
⇒ “4.1 Summary of components - oil filter and oil pressure switch”, page 199

4.3 Removing and installing oil pressure switch for reduced oil pressure - F378-

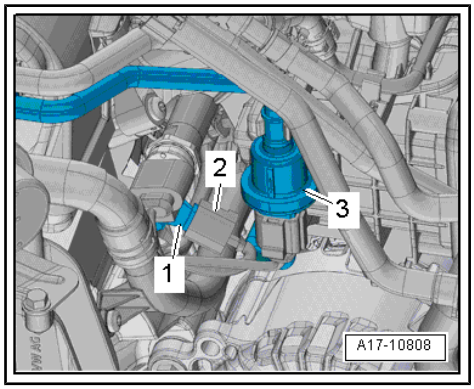
Special tools and workshop equipment required

- Flexible-head wrench SW 24 - T40175-

Removing

– Pull solenoid valve 1 for activated charcoal filter - N80- -3- off the intake manifold and press downwards slightly.

– Unplug connector -2-.



Note

Place a cloth below to absorb leaking engine oil.

– Unscrew the oil pressure switch for reduced oil pressure - F378- -1-.

Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

Note

- *Sealing ring not replaceable individually.*
- *Replace oil pressure switch if leaking.*
- *Insert new oil pressure switch for reduced oil pressure - F378- immediately into the bore in order to avoid loss of oil.*

– Checking the oil level ⇒ Maintenance ; Booklet Octavia III .

Tightening torques

- Oil pressure switch for reduced oil pressure - F378- ⇒ “4.1 Summary of components - oil filter and oil pressure switch”, page 199

4.4 Removing and installing valve for oil pressure control - N428-

Removing

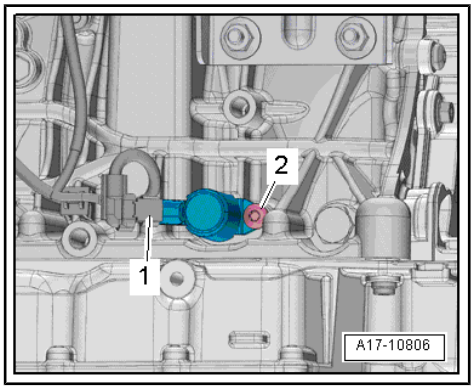
Note

Fit all heat protection sleeves on again in the same place when installing.

– Remove the sound dampening system ⇒ Body Work; Rep. gr. 66 .

– Remove heat protection sleeves.

– Unplug connector -1-.



Note

Place a cloth below to absorb leaking engine oil.

– Remove screw -2- and remove oil pressure control valve - N428- .

Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

Note

Renew O-ring.

– Install the noise insulation ⇒ Body Work; Rep. gr. 66 .

Tightening torque

- Oil pressure control valve - N428-
⇒ “4.1 Summary of components - oil filter and oil pressure switch”, page 199

4.5 Testing oil pressure

Special tools and workshop equipment required

♦ Oil pressure tester - V.A.G 1342-

Work procedure

- Engine oil level o.k., test ⇒ Maintenance ; Booklet Octavia III
- Engine oil temperature at least 80 °C (radiator fan must have run once).

– Remove oil pressure switch for reduced oil pressure - F378-
⇒ “4.2 Removing and installing oil pressure switch F1 ”, page 200 .

– Screw oil pressure switch tester - V.A.G 1342- onto the oil pressure switch bore.

– Screw oil pressure switch for reduced oil pressure - F378- into the oil pressure tester - V.A.G 1342- bore to close it.

– Start engine.

Check oil pressure when idling and at a speed of 2000/min

- Oil pressure in idle: at least 0.06 MPa (0.6 bar)
- Oil pressure at 2000 rpm: at least 0.15 MPa (1.5 bar)

– Switch off engine.

Check oil pressure at a speed of 3800/min

– Disconnect the plug connection for valve for oil pressure control - N428-
⇒ “4.4 Removing and installing valve for oil pressure control N428 ”, page 202 .

– Start engine.

- Oil pressure at 3800 rpm: at least 0.28 MPa (2.8 bar)

If the specification is not attained:

– Connect the plug connection for valve for oil pressure control - N428-
⇒ “4.4 Removing and installing valve for oil pressure control N428 ”, page 202 .

– Querying and erasing event memory of engine control unit ⇒ Vehicle diagnostic tester.

– Check oil pressure control valve - N428- ⇒ Vehicle diagnostic tester.

Note

Mechanical damage such as a worn bearing may also be the cause of oil pressure that is too low.

If no fault is found:

– Replace oil pump
⇒ “1.4 Removing and installing oil pump”, page 188 .

Oil pressure switch for reduced oil pressure - F378- .

– Switch off engine.

– Connect brown wire of tester to earth (-).

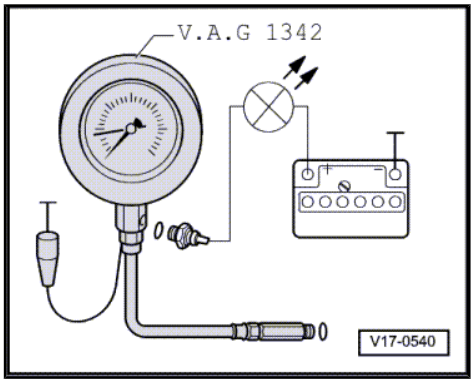
– Connect the voltage tester - V.A.G 1527 B- with adapter cables from measuring tool set - V.A.G 1594 C- to the plus pole on the battery (+) and oil pressure switch for reduced oil pressure - F378- (green).

• The LED must not light up.

– If the LED is illuminated the oil pressure switch for reduced oil pressure - F378- must be replaced.

If the LED does not light up:

– Start the engine: At a pressure of 0.03…0.06 MPa (0.3…0.6 bar) the LED must light up, otherwise replace the oil pressure switch.



Test oil pressure switch - F1-

– Switch off engine.

– Connect voltage tester - V.A.G 1527B- with auxiliary cables from auxiliary measuring set - V.A.G 1594 C- to battery positive (+) and oil pressure switch - F1- (blue).

• The LED must not light up.

– If the LED lights up, replace the oil pressure switch - F1- .

If the LED does not light up:

– Disconnect the plug connection for valve for oil pressure control - N428-
⇒ “4.4 Removing and installing valve for oil pressure control N428 ”, page 202 .

– Start engine and increase engine speed: At a pressure of 0.215…0.295 MPa (2.15…2.95 bar) the LED must light up, otherwise replace the oil pressure switch.

– Connect the plug connection for valve for oil pressure control - N428-
⇒ “4.4 Removing and installing valve for oil pressure control N428 ”, page 202 .

– Install oil pressure switch for reduced oil pressure - F378-
⇒ “4.3 Removing and installing oil pressure switch for reduced oil pressure F378 ”, page 201 .

Tightening torques

• Oil pressure switch - F1-
⇒ “4.1 Summary of components - oil filter and oil pressure switch”, page 199

• Oil pressure switch for reduced oil pressure - F378-
⇒ “4.1 Summary of components - oil filter and oil pressure switch”, page 199

19 – Cooling

1 Cooling system

⇒ “1.1 Coolant hose schematic diagram”, page 206

⇒ “1.2 Draining and filling coolant”, page 209

⇒ “1.3 Checking cooling system for leaks”, page 212

1.1 Coolant hose schematic diagram

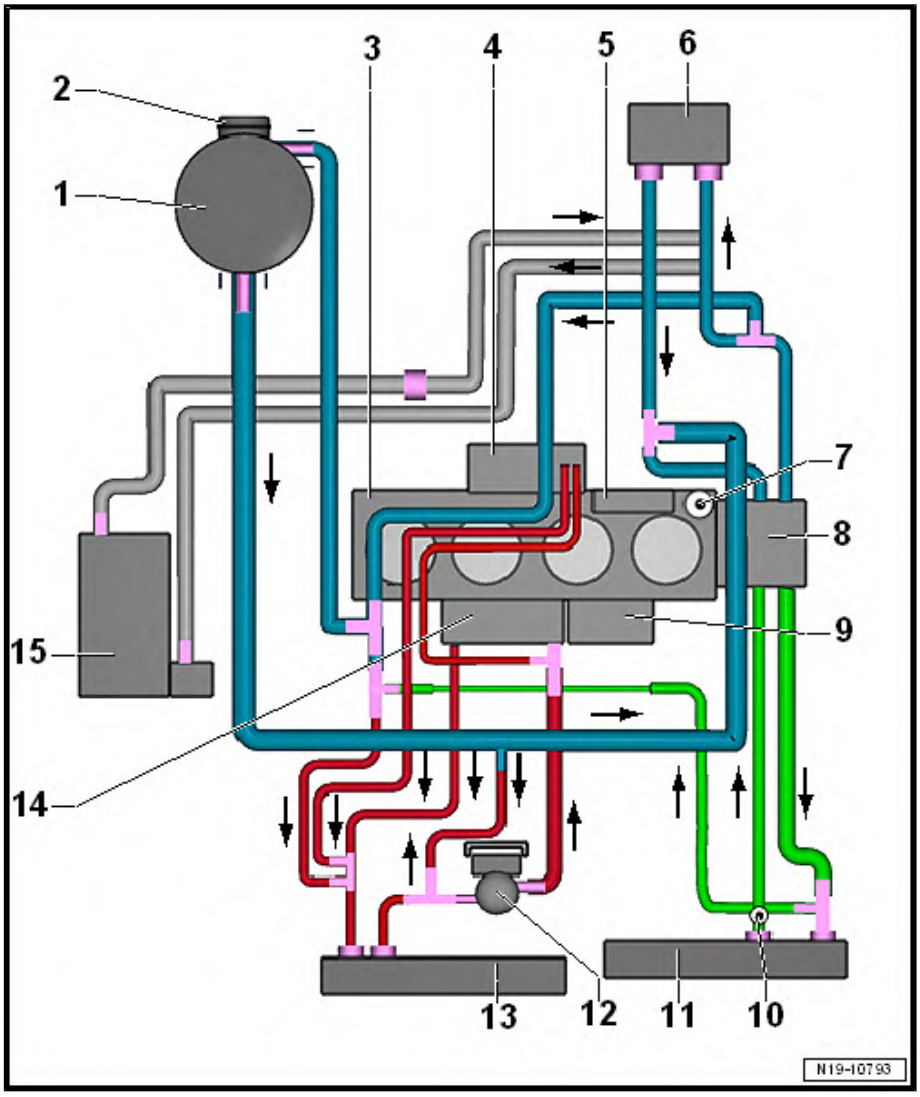
⇒ “1.1.1 Connection diagram - for engines with identification characters CHPA”, page 206

⇒ “1.1.2 Connection diagram - for engines with identification characters CPWA”, page 208

1.1.1 Connection diagram - for engines with identification characters CHPA

Note

- *Blue = small coolant circuit.*
- *Green = large coolant circuit.*
- *Red = charge air coolant circuit.*
- *Grey = auxiliary heating coolant circuit (vehicles with auxiliary heating only)*
- *The arrows point in the coolant flow direction.*
- *The arrows which are on the coolant pipes and the coolant hose ends must stand opposite to each other.*



1 - Coolant expansion tank

2 - Screw cap

- ❑ for coolant expansion tank
- ❑ Check pressure relief valve ⇒ page 214

3 - Cylinder head and cylinder block

- ❑ After replacing, renew all coolant ⇒ “1.2 Draining and filling coolant”, page 209

4 - Exhaust gas turbocharger

5 - Integrated exhaust manifold

6 - Heat exchanger of heating system

- ❑ After replacing, renew all coolant ⇒ “1.2 Draining and filling coolant”, page 209

7 - Coolant temperature sender - G62-

8 - Coolant pump

- ❑ with coolant regulator housing

9 - Engine oil cooler

- ❑ After replacing, renew all coolant ⇒ “1.2 Draining and filling coolant”, page 209

10 - Coolant temperature sender at radiator outlet - G83-

11 - Coolant radiator

- ❑ After replacing, renew all coolant ⇒ “1.2 Draining and filling coolant”, page 209

12 - Coolant recirculation pump - V188-

13 - Cooler for charge air circuit

- ❑ After replacing, renew all coolant ⇒ “1.2 Draining and filling coolant”, page 209

14 - Charge-air cooler in intake manifold

- ❑ After replacing, renew all coolant ⇒ “1.2 Draining and filling coolant”, page 209

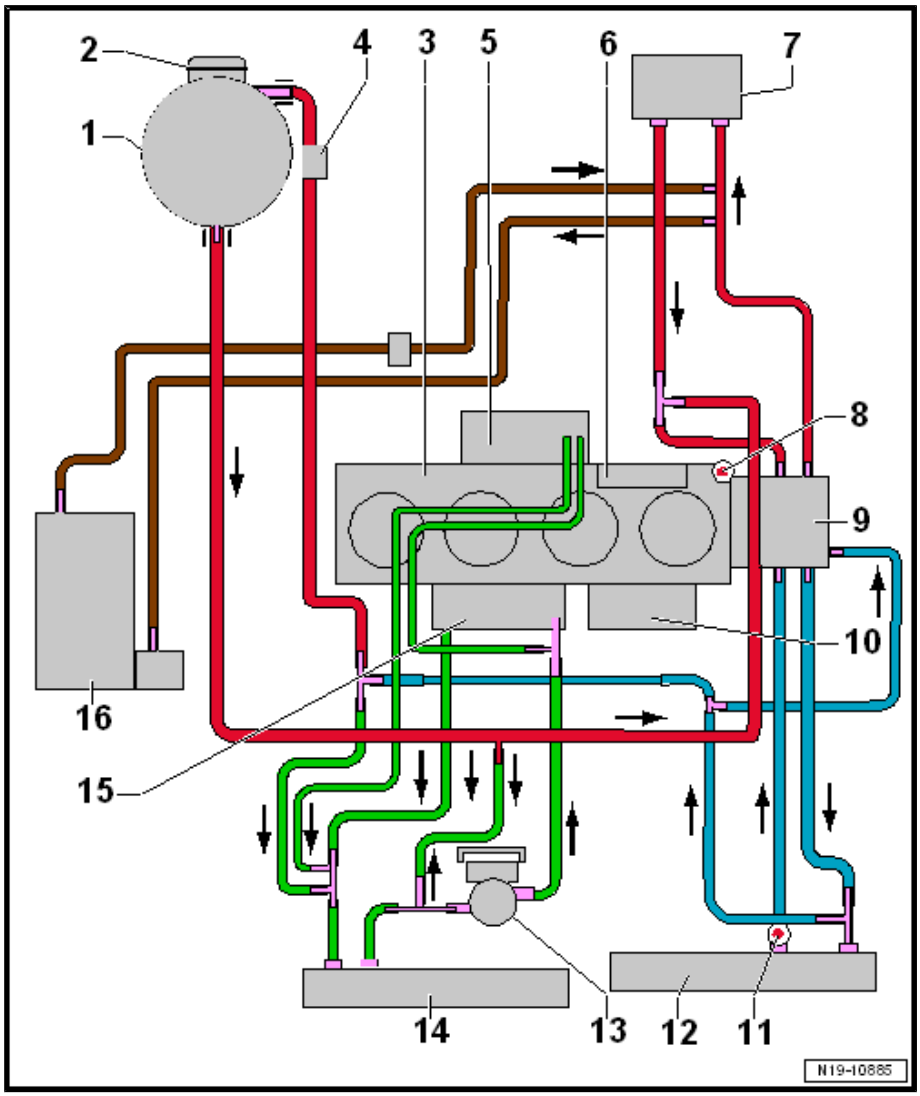
15 - Auxiliary heating

- ❑ Optional equipment

1.1.2 Connection diagram - for engines with identification characters CPWA

Note

- *Red = small coolant circuit.*
- *Blue = large coolant circuit.*
- *Green = charge-air coolant circuit*
- *brown= auxiliary heating coolant circuit (vehicles with auxiliary heating only)*
- *The arrows point in the coolant flow direction.*
- *The arrows which are on the coolant pipes and the coolant hose ends must stand opposite to each other.*



1 - Coolant expansion tank

2 - Screw cap

- ❑ for coolant expansion tank
- ❑ Check pressure relief valve ⇒ page 214

3 - Cylinder head/cylinder block

- ❑ After replacing, renew all coolant ⇒ “1.2 Draining and filling coolant”, page 209

4 - Gas pressure regulator

- ❑ Removing and installing ⇒ “4.2 Removing and installing gas pressure regulator”, page 395

5 - Exhaust gas turbocharger

6 - Integrated exhaust manifold

7 - Heat exchanger of heating system

- ❑ After replacing, renew all coolant ⇒ “1.2 Draining and filling coolant”, page 209

8 - Coolant temperature sender - G62-

9 - Coolant pump

- ❑ with coolant regulator housing

10 - Engine oil cooler

- ❑ After replacing, renew all coolant ⇒ “1.2 Draining and filling coolant”, page 209

11 - Coolant temperature sender at radiator outlet - G83-

12 - Coolant radiator

- ❑ After replacing, renew all coolant ⇒ “1.2 Draining and filling coolant”, page 209

13 - Coolant recirculation pump - V188-

14 - Cooler for charge air circuit

❑ After replacing, renew all coolant ⇒ “1.2 Draining and filling coolant”, page 209

15 - Charge-air cooler in intake manifold

❑ After replacing, renew all coolant ⇒ “1.2 Draining and filling coolant”, page 209

16 - Auxiliary heating

❑ Optional equipment

1.2 Draining and filling coolant

Special tools and workshop equipment required

- Catch pan , e.g. -VAS 6208-
- Pliers for spring strap clamps
- Cooling system charge unit - VAS 6096-
- Adapter for cooling system tester - V.A.G 1274/8-
- Refractometer
- Protective goggles and gloves

Draining

Note

- *Collect drained coolant in a clean container for reuse or proper disposal.*
- *Observe the disposal instructions.*

WARNING

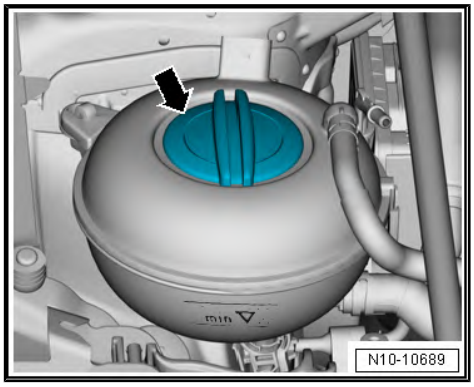
Steam may escape when expansion tank is opened.

- ***When the engine is warm, the cooling system is under overpressure.***
- ***Wear safety goggles and safety clothing, in order to avoid eye injuries and scalding.***
- ***Cover the cap with a cloth and open carefully.***

– Open cap -arrow- for coolant expansion tank.

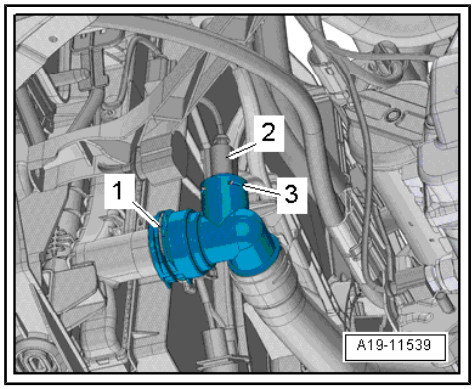
– Remove the sound dampening system ⇒ Body Work; Rep. gr. 66 .

– Position catch pan underneath.



– Remove plug -2- at the coolant temperature sender - G83- -3-.

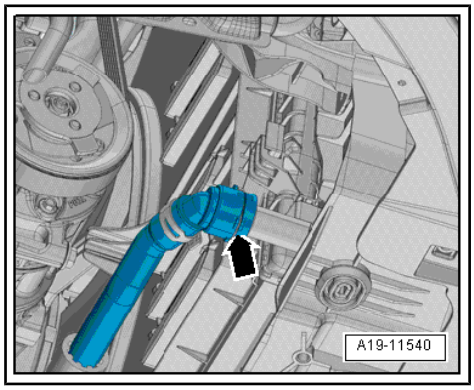
– Raise holding clamp -1-, remove bottom left coolant hose from radiator, allow coolant to drain.



Note

Collect drained coolant in a clean container for proper disposal or reuse.

– Raise holding clamp -arrow-, remove bottom right coolant hose from radiator, allow coolant to drain.



Filling up

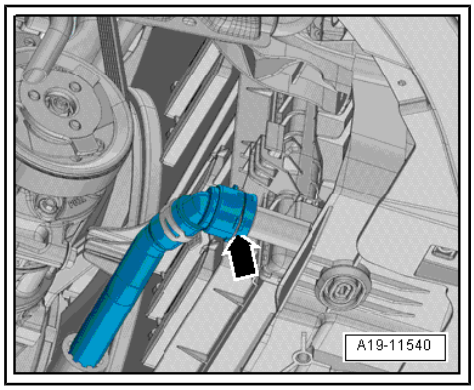
Select the appropriate coolant additive from the ⇒ ETKA - Electronic catalogue of original parts .

– In a clean reservoir mix water and coolant additive in the specified mixing ratio:

♦ ⇒ Maintenance ; Booklet Octavia III .

– Connect coolant hose with quick coupling to radiator bottom left ⇒ page 234 .

– Connect coolant hose bottom right to radiator -arrow-.

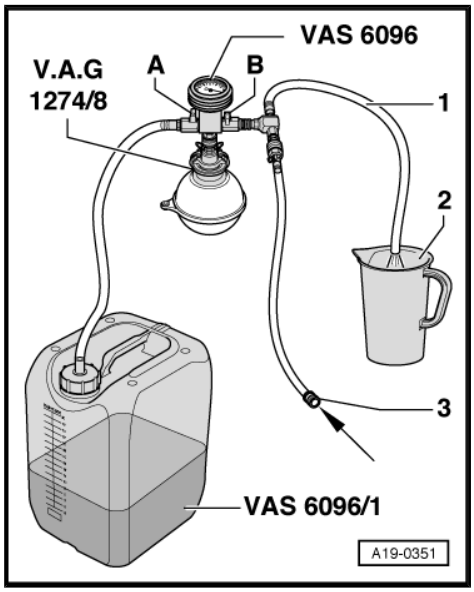


– Fill up the coolant reservoir -VAS 6096- with at least 10 litres of pre-mixed coolant mixed to the correct ratio:

– Screw the adapter for cooling system testing device - V.A.G 1274/8- to the coolant expansion tank.

– Mount cooling system charge unit - VAS 6096- onto the adapter -V.A.G 1274/8- .

– Lead the air hose -1- into a small container -2-.



Note

A small amount of coolant, which is entrained with the exhaust air, must be collected.

– Close the valves -A- and -B-, while doing so turn the lever at right angles to the direction of flow.

– Connect hose -3- to compressed air.

• Pressure: 0.6…1 MPa (6 … 10 bar)

– Open the valve -B-, while doing so turn the lever in the direction of flow.

• A vacuum pump is created in the cooling system by the vacuum pump; the display instrument pointer must move into the green area.

– In addition, briefly open the valve -A- by turning the lever in the direction of flow, so that the hose of the coolant expansion bottle is -VAS 6096- filled with coolant.

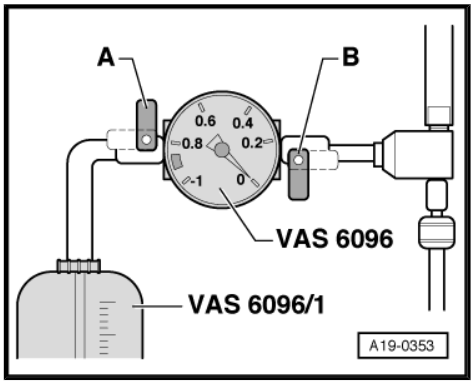
– Close the valve -A- again.

– Leave the valve -B- open a further 2 minutes.

• A vacuum pump is created in the cooling system by the vacuum pump; the display instrument pointer must remain in the green area.

– Close the valve -B-.

• If the display instrument pointer remains in the green area the vacuum in the cooling system is sufficient for subsequent filling.



Note

♦ *If the pointer is below the green area, repeat the process.*

♦ *If the vacuum drops, check the cooling system for leak points.*

– Disconnect pneumatic hose.

– Open valve -A-.

• The vacuum pump in the cooling system draws the coolant out of the coolant reservoir -VAS 6096- and fills the cooling system.

– Remove the cooling system charge unit - VAS 6096- from the coolant expansion tank.

– Fill up coolant up to “Max” marking.

– Install the noise insulation ⇒ Body Work; Rep. gr. 66 .

– For vehicles with auxiliary heating, switch it on for approximately 30 seconds.

– Set temperature to “HI”.

– Switch off AC compressor. Press AC button to do so.

• The LED in the button must not illuminate.

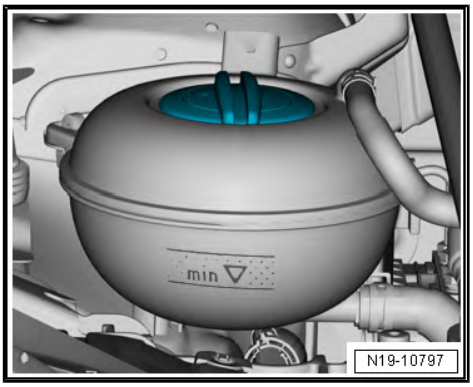
– Start engine and run for not more than 2 minutes at 1500 rpm.

– With the engine running, fill coolant up to the overflow hole on the coolant expansion tank.

– Tighten cap for coolant expansion tank tighten until it clicks into place.

– Run engine at idling speed until the two large coolant hoses at the radiator are hot.

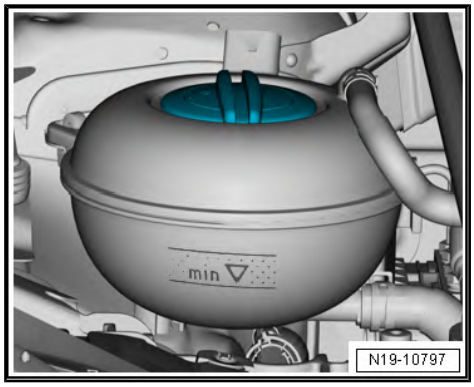
– Switch off engine and allow it to cool down.



– Check coolant level.

- If the engine is cold the coolant level must be between the “Min”- and “Max” marking.
- When the engine is at operating temperature the coolant level may be at the “Max” marking.

– If necessary, top up with coolant.



1.3 Checking cooling system for leaks

⇒ “1.3.1 Checking with the cooling system testing device V.A.G 1274 ”, page 212

⇒ “1.3.2 Checking with the cooling system testing device V.A.G 1274 B ”, page 213

1.3.1 Checking with the cooling system testing device - V.A.G 1274-

Special tools and workshop equipment required

- ♦ Cooling system testing device , e.g. -V.A.G 1274-
- ♦ Adapter for cooling system testing device , e.g. -V.A.G 1274/8-
- ♦ Adapter for cooling system testing device , e.g. -V.A.G 1274/9-

Test prerequisite

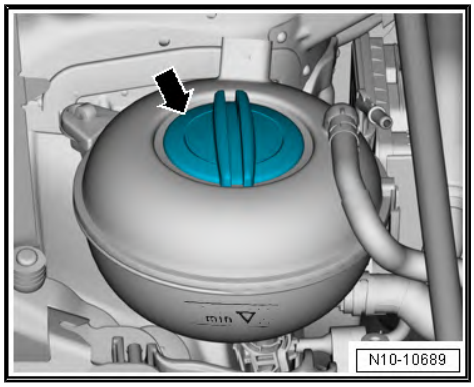
- Engine is at operating temperature.

Test procedure

WARNING

Hot steam may escape when the coolant expansion reservoir is opened. Wear safety goggles and safety clothing, in order to avoid eye injuries and scalding. Cover the cap with a cloth and open carefully.

– Open cap -arrow- for coolant expansion tank.

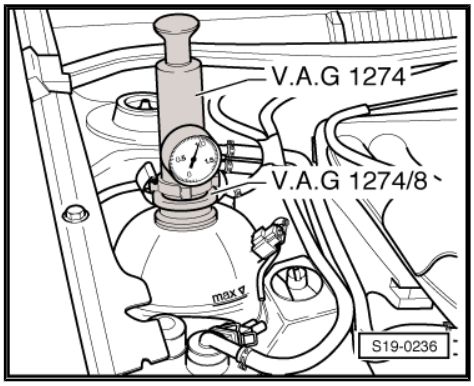


– Position the cooling system testing device - V.A.G 1274- with adapter - V.A.G 1274/8 - on the coolant expansion reservoir.
– Using the hand pump of the testing device generate an overpressure of approx. 0.1 MPa (1.0 bar).

If pressure drops:

– Search position of the leak and repair fault.

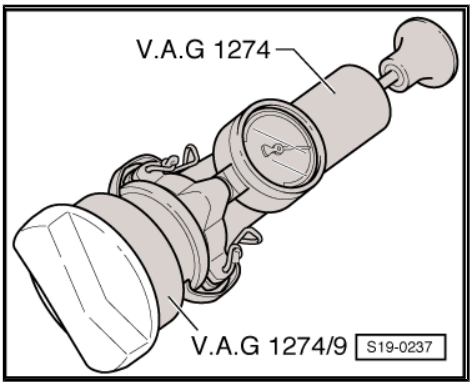
Testing the pressure relief valve in the cap



– Position the cooling system testing device - V.A.G 1274- with adapter - V.A.G 1274/9 - on the cap.
– Operate the handpump.
• The pressure relief valve should open at a pressure of 0.14...0.16 MPa (1.4...1.6 bar).

If the pressure relief valve does not open:

– Renew cap.



1.3.2 Checking with the cooling system testing device - V.A.G 1274 B-

Special tools and workshop equipment required

- Cooling system testing device , e.g. -V.A.G 1274 B-
- Adapter for cooling system testing device , e.g. -V.A.G 1274/8-
- Adapter for cooling system testing device , e.g. -V.A.G 1274/9-

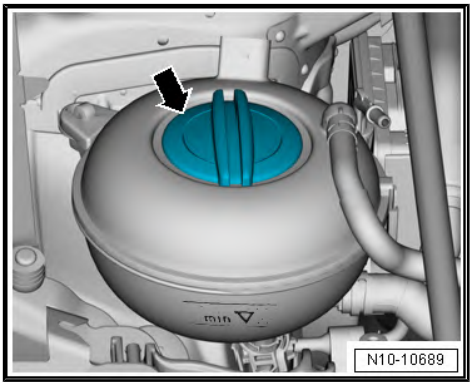
Work procedure

• Engine at operating temperature.
– Open cap -arrow- for coolant expansion tank.

WARNING

Danger of scalding due to hot steam and hot coolant.

- *When the engine is warm, the cooling system is under overpressure.*
- *Reduce excess pressure by covering the cap of the coolant expansion tank with a cloth and opening it carefully.*



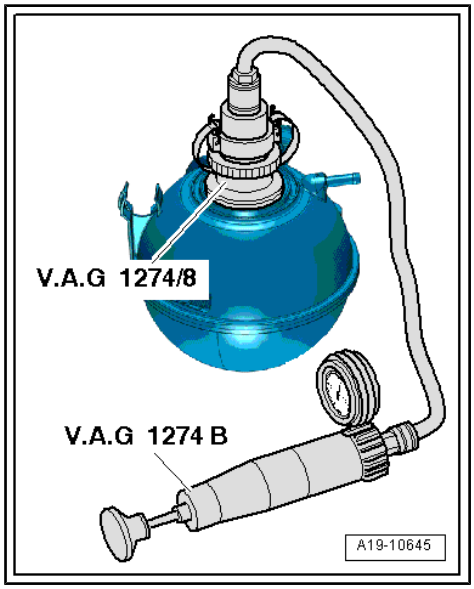
– Fit the cooling system testing device - V.A.G 1274 B- with adapter -V.A.G 1274/8- onto the coolant expansion tank.
– Using the hand pump of the testing device generate an overpressure of approx. 0.1 MPa (1.0 bar).

WARNING

Risk of scalding!

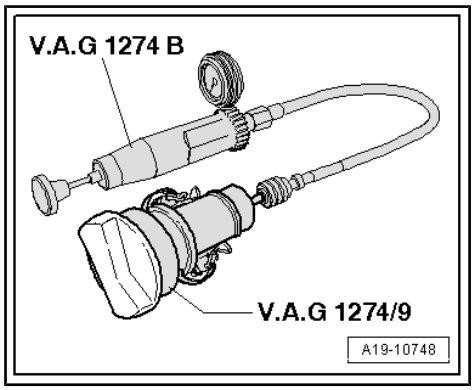
- *Before the cooling system testing device - V.A.G 1274 B- is separated from the connecting hose or the connecting piece - V.A.G 1274 B/1- , the existing pressure must absolutely be released.*
- *For this step, press the pressure relief valve on the cooling system testing device - V.A.G 1274 B- and hold it pressed until the pressure gauge indicates the value »0«.*

– If the pressure drops determine leak positions and repair.



Check pressure relief valve in cap.

– Fit the cooling system testing device - V.A.G 1274 B- with adapter -V.A.G 1274/9- onto the cap.
– Build up overpressure using hand pump on cooling system tester.
- The pressure relief valve should open at a pressure of 0.14...0.16 MPa (1.4...1.6 bar).



2 Coolant pump and map-controlled engine cooling

⇒ “2.1 Summary of components - coolant pump and coolant thermostat”, page 215

⇒ “2.2 Summary of components - electric coolant pump”, page 218

⇒ “2.3 Summary of components - coolant temperature sender”, page 219

⇒ “2.4 Removing and installing coolant pump”, page 219

⇒ “2.5 Removing and installing toothed belt pulley for coolant pump drive”, page 222

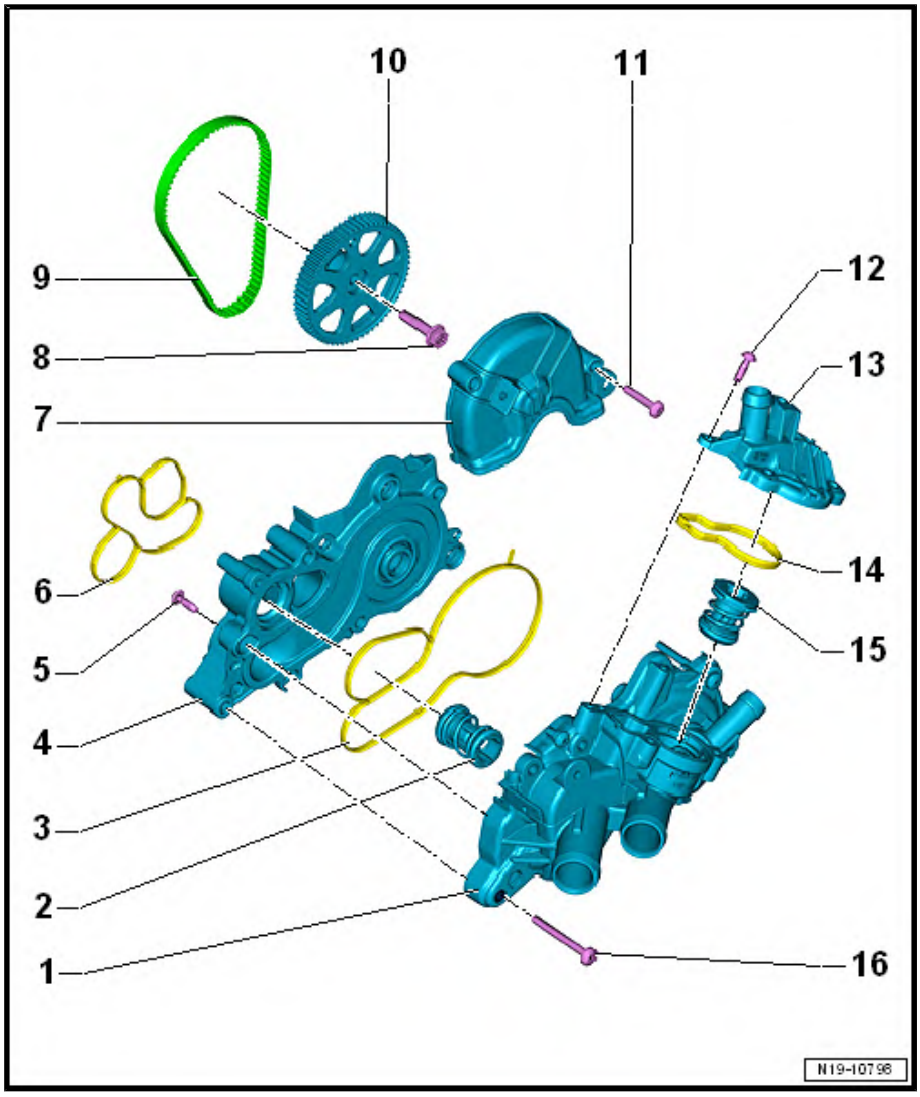
⇒ “2.6 Removing and installing thermostat”, page 223

⇒ “2.7 Removing and installing coolant recirculation pump V188 ”, page 226

⇒ “2.8 Removing and installing coolant temperature sender G62 ”, page 227

⇒ “2.9 Removing and installing coolant temperature sender at radiator outlet G83 ”, page 228

2.1 Summary of components - coolant pump and coolant thermostat



1 - Thermostat housing

- ❑ Removing and installing ⇒ “2.6 Removing and installing thermostat”, page 223

2 - Coolant regulator

- ❑ for large coolant circuits ⇒ ETKA - Electronic Catalogue of Original Parts
- ❑ Start of opening approx. 105 °C
- ❑ Removing and installing ⇒ “2.6 Removing and installing thermostat”, page 223

3 - Gasket

- ❑ replace after removal

4 - Coolant pump

- ❑ Removing and installing ⇒ “2.4 Removing and installing coolant pump”, page 219
- ❑ Also replace toothed belt when changing coolant pump

5 - Screw

- ❑ thread forming
- ❑ position and screw in by to allow the screw to find the old thread, then tighten the screw to the torque
- ❑ Tightening torque and tightening order ⇒ page 226

6 - Gasket

- ❑ replace after removal
- ❑ Observe proper seating of gasket
- ❑ before installing, slightly moisten with coolant

7 - Toothed belt guard

- ❑ For coolant pump toothed belt

8 - Screw

- ❑ replace after removal
- ❑ 20 Nm + torque a further 90° ($^1/_4$ turn)

9 - Toothed belt

- ❑ For coolant pump
- ❑ Also replace toothed belt when changing coolant pump

10 - Toothed belt pulley

- ❑ For coolant pump drive
- ❑ Removing and installing ⇒ “2.5 Removing and installing toothed belt pulley for coolant pump drive”, page 222

11 - Screw

- ❑ 8 Nm

12 - Screw

- ❑ thread forming
- ❑ position and screw in by to allow the screw to find the old thread, then tighten the screw to the torque
- ❑ Tightening torque and tightening order ⇒ page 217

13 - Cover

- ❑ for coolant regulator

14 - Gasket

- ❑ replace after removal

15 - Coolant regulator

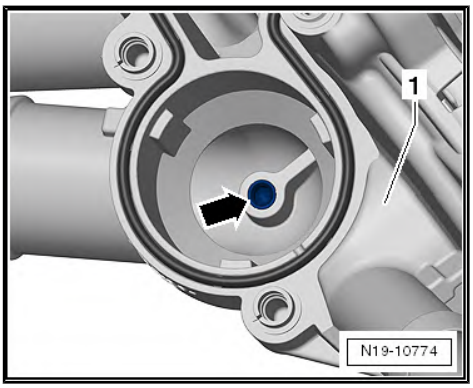
- ❑ for small coolant circuits ⇒ ETKA - Electronic Catalogue of Original Parts
- ❑ Start of opening approx. 87 °C
- ❑ Removing and installing ⇒ “2.6 Removing and installing thermostat”, page 223
- ❑ Fitting position ⇒ page 217

16 - Screw

- ❑ Tightening torque and tightening order ⇒ page 222
- ❑ 12 Nm

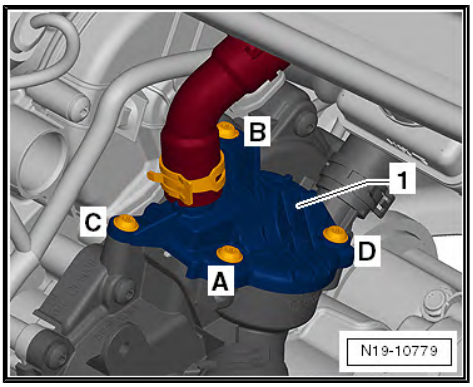
Installation position of thermostat for large coolant circuit

- Must be fitted with the centring pin into guide -arrow- on coolant pump housing.



Cover for coolant thermostat in the coolant thermostat housing - Tightening torque

– Tighten cover screws -1- in the sequence -A-, -B-, -C-, -D- to 8 Nm.



2.2 Summary of components - electric coolant pump

1 - Coolant recirculation pump - V188-

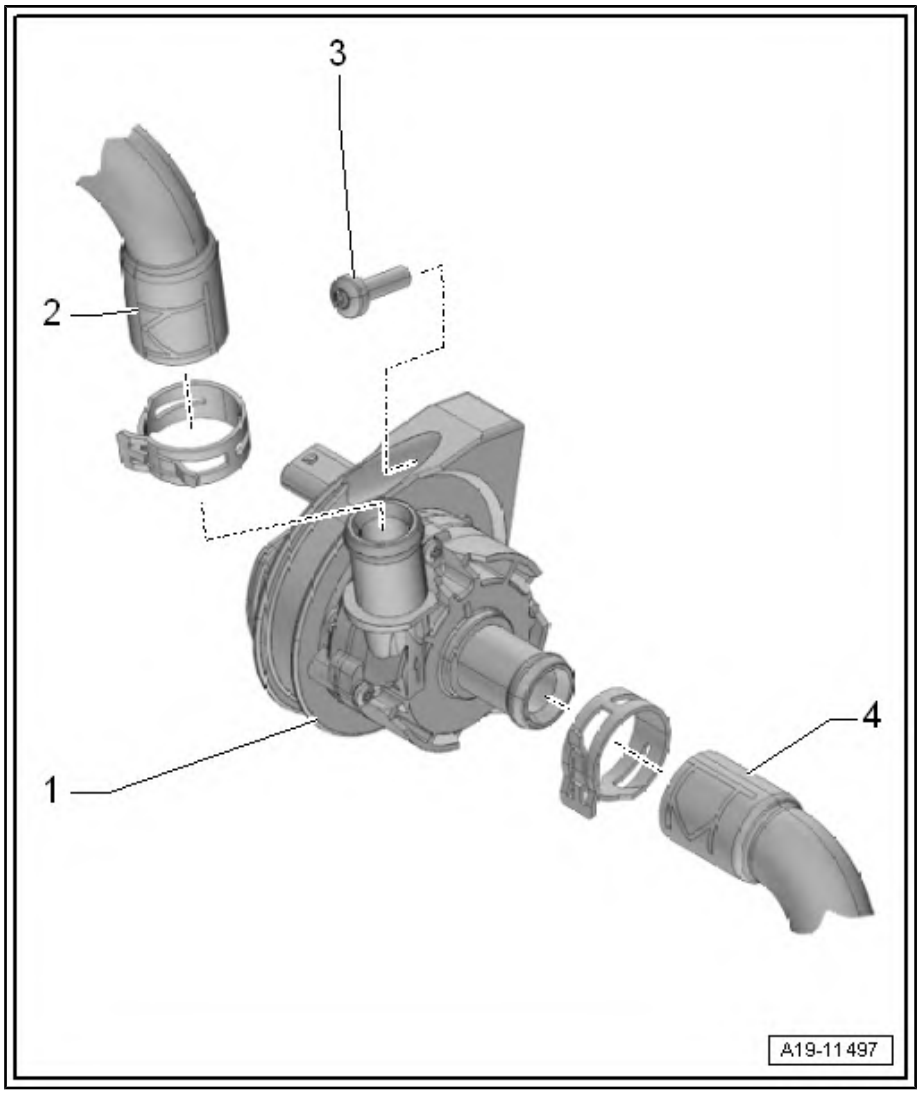
- ❑ With holder
- ❑ Removing and installing ⇒ “2.7 Removing and installing coolant recirculation pump V188 ”, page 226

2 - Coolant hose

3 - Screw

- ❑ 8 Nm

4 - Coolant hose



2.3 Summary of components - coolant temperature sender

1 - O-ring

- ❑ replace after removal

2 - Coolant temperature sender at radiator outlet - G83-

- ❑ Removing and installing ⇒ “2.9 Removing and installing coolant temperature sender at radiator outlet G83 ”, page 228

3 - Support ring

4 - O-ring

- ❑ replace after removal

5 - Coolant temperature sender - G62-

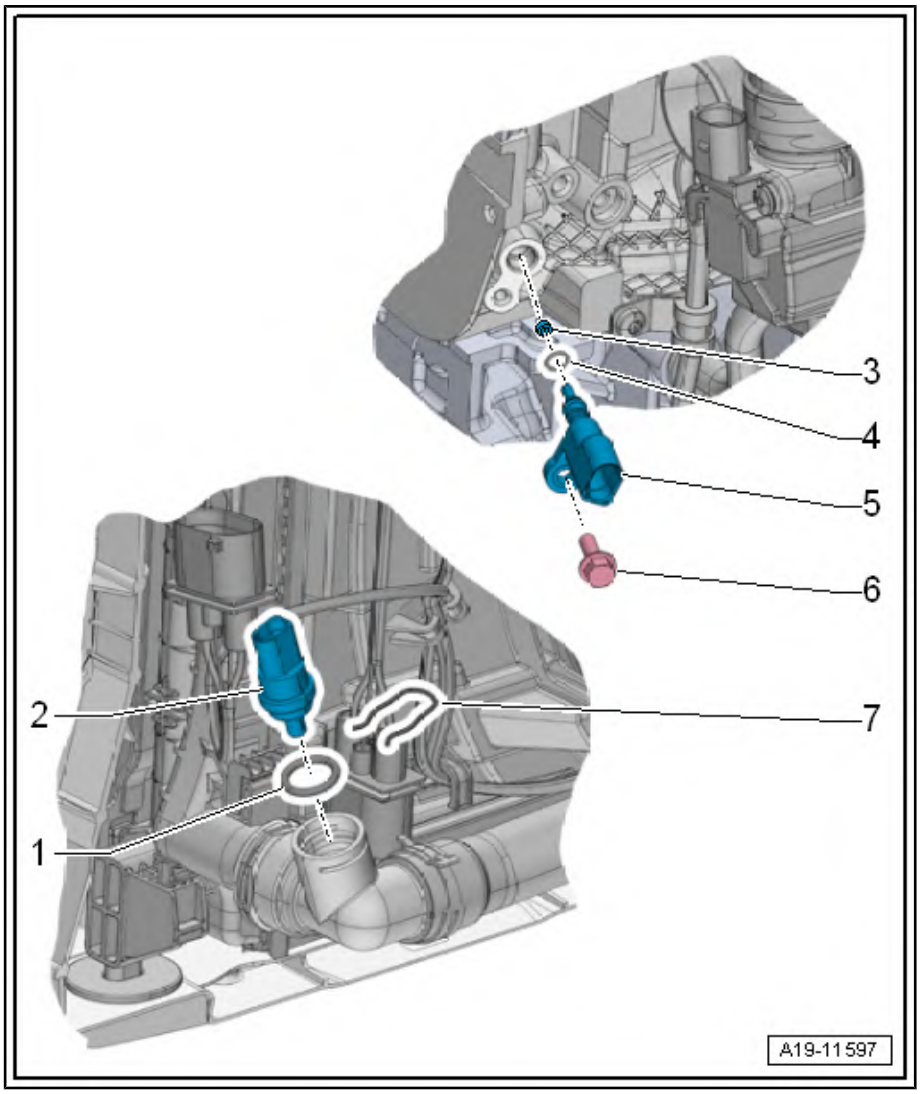
- ❑ Removing and installing ⇒ “2.8 Removing and installing coolant temperature sender G62 ”, page 227

6 - Screw

- ❑ 8 Nm

7 - Retaining clip

- ❑ Check for secure seating



2.4 Removing and installing coolant pump

Special tools and workshop equipment required

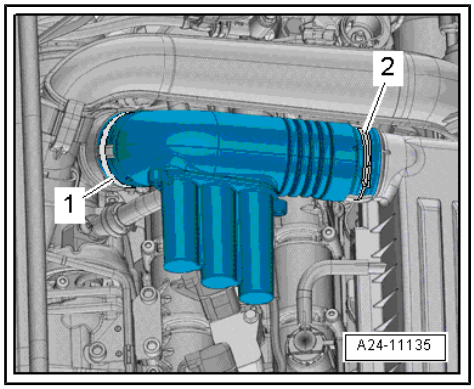
- ♦ Catch pan , e.g. -VAS 6208-
- ♦ Pliers for spring strap clamps
- ♦ Cooling system charge unit - VAS 6096-
- ♦ Adapter for cooling system tester - V.A.G 1274/8-
- ♦ Release tool -T10527-
- ♦ Refractometer

Removing

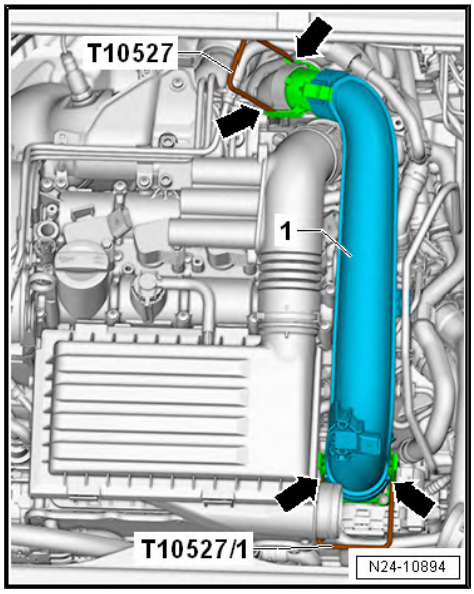
– Drain coolant ⇒ “1.2 Draining and filling coolant”, page 209 .

– Remove battery tray ⇒ Electrical System; Rep. gr. 27 .

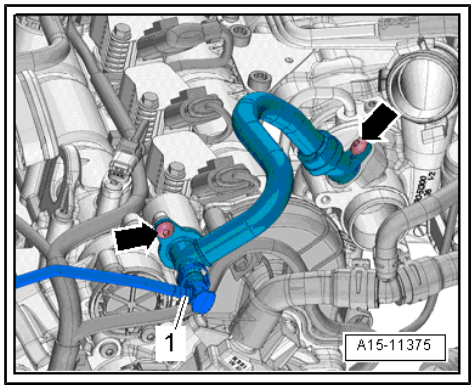
– Loosen hose clamps -1-, -2- and remove air guide pipes.
– Remove plug from charge pressure sender - GX26- .



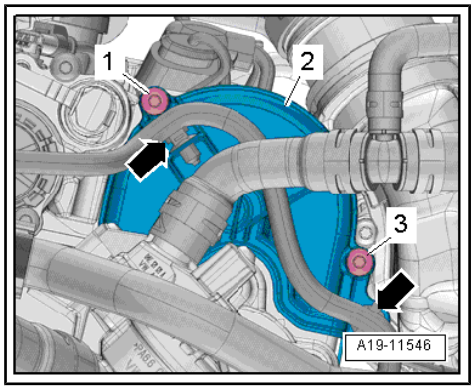
– Release catches -arrows- with release tool -T10527- and remove air guide pipe.



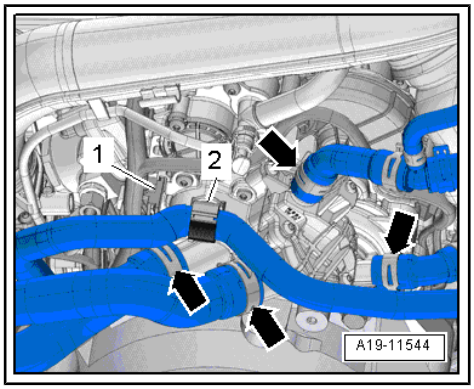
– Press release buttons and remove hose -1- to the activated charcoal filter.
– Unscrew screws -arrows- and remove hose for crankcase ventilation.



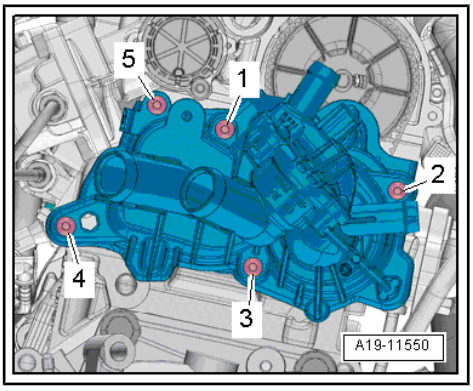
– Expose wiring loom -arrows-.
– Unscrew screws -1-, -3- and remove toothed belt guard -2- for coolant pump toothed belt.



– Expose electric wiring loom -1- and coolant hose -2-.
– Loosen hose clamps -arrows- and remove coolant hoses.



– Loosen the screws in the sequence -5- to -1- and unscrew them.
– Remove coolant pump with toothed belt.
– Remove coolant regulator housing when coolant pump is being replaced
⇒ “2.6 Removing and installing thermostat”, page 223 .

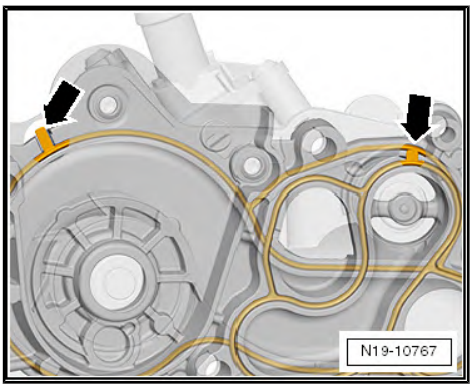


Install

Note

- *Replace seal for coolant regulator housing -arrows-.*
- *Remove toothed belt when coolant pump is being replaced.*
- *Secure hose connection ends with spring-type clips that comply with the series design ⇒ ETKA - Electronic Catalogue of Original Parts .*

– Observe proper seating of gasket -arrows-.
– Moisten gasket for coolant pump with coolant.



Caution

Always adhere to the sequence of work steps given below when installing the coolant pump.

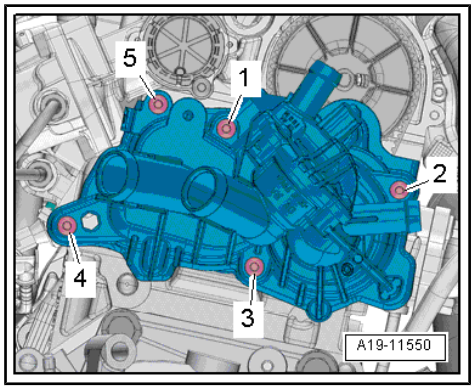
This ensures that the toothed belt is correctly tensioned.

The following work steps must be carried out with the aid of a 2nd mechanic.

– Set cylinder 1 to TDC
⇒ “2.3 Checking valve timing”, page 110 .
– Fit toothed belt centrally and move coolant pump to installation position.
– Mount coolant pump on cylinder head with securing bolts.

– Initially tighten screws in the specified order:

Stage	Screws	Tightening torque
1.	-1…5-	by hand as far as the stop
2.	-1…5-	10 Nm

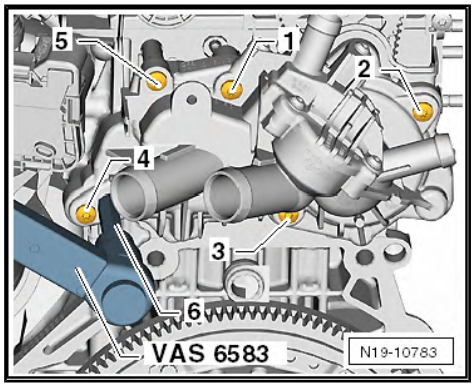


– Loosen all screws by 1 turn.

– Fit torque wrench e. g. -VAS 6583- with hexagon socket SW10 insert Pos. -6- to the coolant pump.

– Preload coolant pump with a 10 mm hexagon socket insert -6- extension and torque wrench to 30 Nm clockwise.

– Position torque wrench vertically for better handling.



Note

- *Do not support torque wrench with the other hand.*
- *Do not exert »excessive pressure« on the torque wrench.*

– Keep coolant pump pretensioned.

– While the coolant pump is kept pre-tensioned, tighten coolant pump screws in the specified sequence:

Stage	Screws	Tightening torque
3.	-2, 1, 5-	10 Nm
4.	-3, 4, 5, 1, 2-	12 Nm

Assembling is performed continuing in the reverse order, while paying attention to the following:

Tightening torques

- Summary of components - Exhaust gas turbocharger
⇒ “1.1 Summary of components - exhaust gas turbocharger”, page 362

2.5 Removing and installing toothed belt pulley for coolant pump drive

Special tools and workshop equipment required

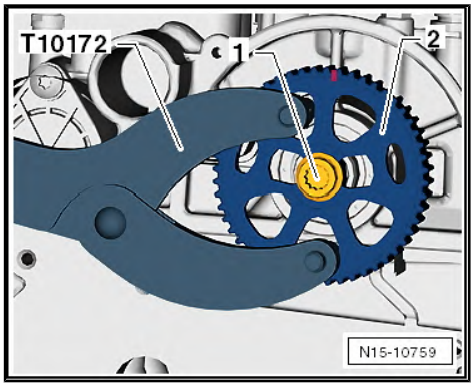
- Counterholder - T10172- with adapters -T10172/2-

Removing

– Remove coolant pump
⇒ “2.4 Removing and installing coolant pump”, page 219 .

– Loosen screw -1-. Use counterholder - T10172- with adapters -T10172/2- to do so.

– Undo screw, remove toothed belt gear for coolant pump drive -2-.

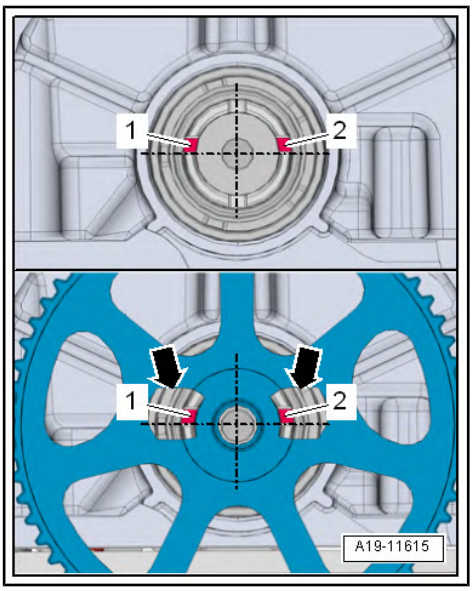


Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

– Install the toothed belt gear for coolant pump drive:

- Grooves -1- and -2- in the camshaft are arranged asymmetrically.
- The recesses -arrows- in the toothed belt pulley are also arranged asymmetrically.



– Place the toothed belt pulley on the camshaft so that the asymmetrical grooves are exactly in the centre of the recesses.

– Install coolant pump
⇒ “2.4 Removing and installing coolant pump”, page 219 .

Tightening torques

♦ Screw for toothed belt gear
⇒ “2.1 Summary of components - coolant pump and coolant thermostat”, page 215

2.6 Removing and installing thermostat

⇒ “2.6.1 Removing and installing thermostat for small coolant circuit”, page 223

⇒ “2.6.2 Removing and installing thermostat for large coolant circuit”, page 225

2.6.1 Removing and installing thermostat for small coolant circuit

Special tools and workshop equipment required

♦ Pliers for spring strap clamps

♦ Key - T10508-

♦ Release tool -T10527-

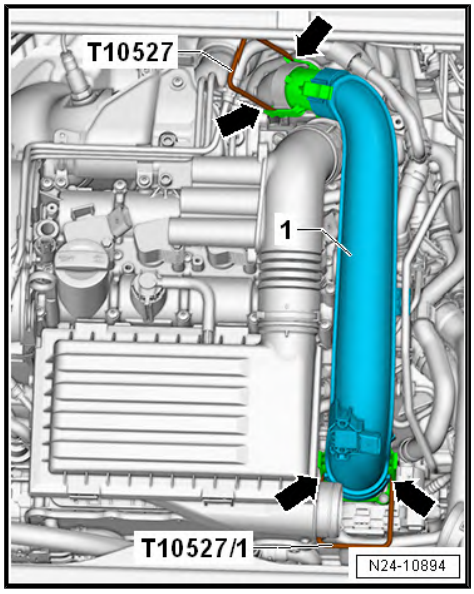
Removing

– Drain coolant ⇒ “1.2 Draining and filling coolant”, page 209 .

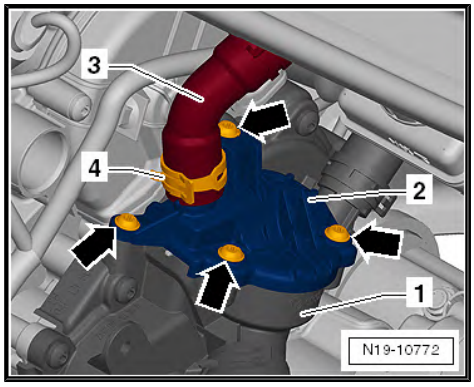
– Expose air guide hoses at the air guide pipe.

– Remove plug from charge pressure sender - GX26- .

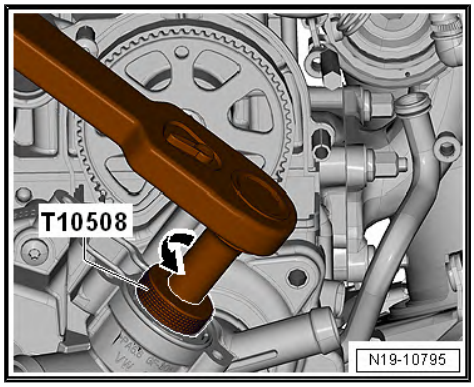
– Release catches -arrows- with release tool -T10527- and remove air guide pipe.



– Loosen hose clamp -4- and remove coolant hose -3-.
– Screw out screws -arrows- and remove cover -2- from thermostat housing.

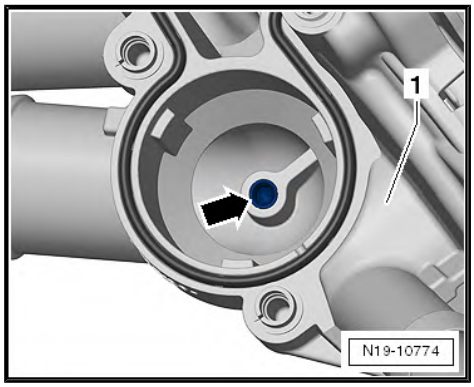


– Remove thermostat with spanner - T10508- .
– Light press the wrench - T10508- down, while doing so, turn in the -direction of the arrow-.



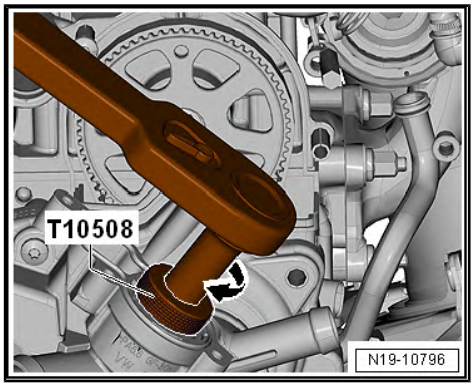
Install

– Insert thermostat. Fit the centring pin in into the guide-arrow-.



– Install thermostat with spanner - T10508- .

– Light press the wrench - T10508- down, while doing so, turn in the -direction of the arrow- as far as it can go.



Installation is performed in a similar way in the reverse order. Pay attention to the following points:

Note

Replace gasket.

– Moisten gasket with coolant.

– Replenish coolant
⇒ “1.2 Draining and filling coolant”, page 209 .

Tightening torques

♦ Cover for thermostat
⇒ “2.1 Summary of components - coolant pump and coolant thermostat”, page 215

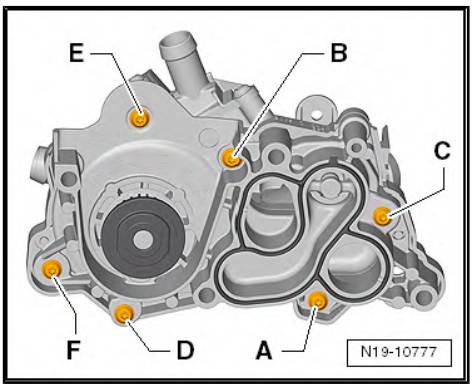
2.6.2 Removing and installing thermostat for large coolant circuit

Removing

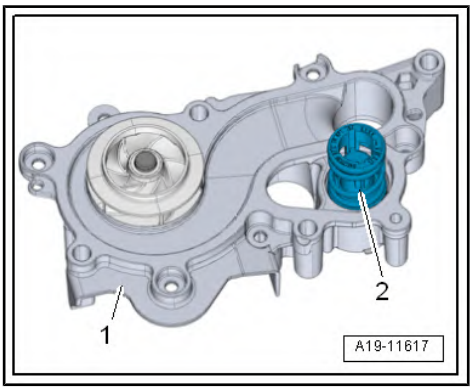
– Remove coolant pump
⇒ “2.4 Removing and installing coolant pump”, page 219 .

– Unscrew and remove the screws in the order -F- to -A-.

– Remove coolant pump from coolant pump housing.



– Remove thermostat -2- from coolant pump -1-.



Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

Note

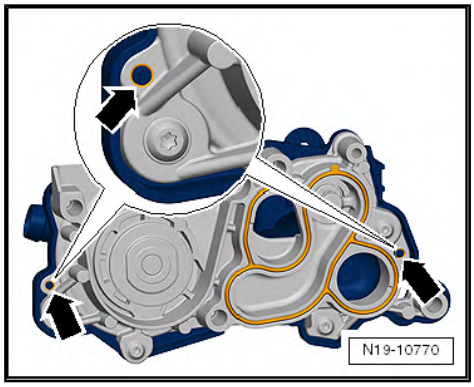
Replace gasket.

– Moisten gasket with coolant.

– Fit thermostat housing to coolant pump.

• The centring bolts on the thermostat must be inserted into the guides -arrows- on the coolant pump.

– Tighten screws for thermostat housing.

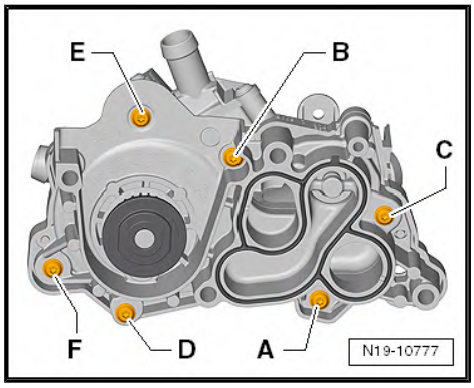


Thermostat housing and coolant pump - tightening torque and tightening order

– Tighten screws in the sequence -A- to -F- to 8 Nm.

– Install coolant pump
⇒ “2.4 Removing and installing coolant pump”, page 219 .

– Replenish coolant
⇒ “1.2 Draining and filling coolant”, page 209 .



2.7 Removing and installing coolant recirculation pump - V188-

Special tools and workshop equipment required

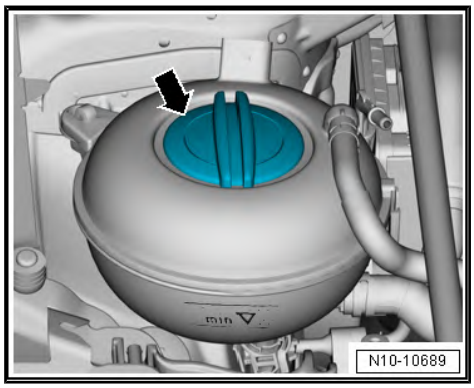
♦ Hose clamps up to 25 mm - MP7-602 (3094)-

♦ Catch pan , e.g. -VAS 6208-

♦ Pliers for spring strap clamps

Removing

– Open cap -arrow- for coolant expansion tank.



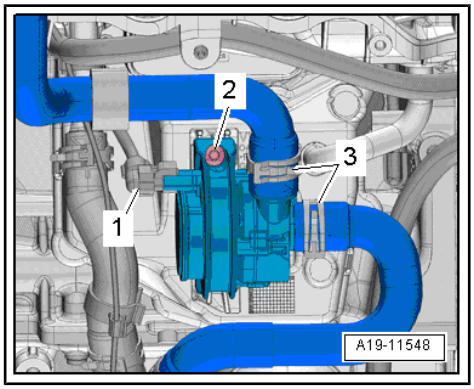
WARNING

Danger of scalding due to hot steam and hot coolant.

- *When the engine is warm, the cooling system is under overpressure.*
- *Reduce the pressure by covering the cap of the coolant expansion tank with a cloth and open it carefully.*

– Remove the sound dampening system ⇒ Body Work; Rep. gr. 66 .

– Unplug connector -1-.
– Place catch pan underneath.
– At the coolant hoses pump - V188- , disconnect coolant hoses with hose clamps -MP7-602 (3094)- .
– Loosen hose clamps -3- and remove coolant hoses.
– Unscrew screw -2- and remove coolant recirculation pump - V188- .



Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

Note

Secure all hose connection ends with spring-type clips that comply with the series design ⇒ ETKA - Electronic Catalogue of Original Parts .

– Install the noise insulation ⇒ Body Work; Rep. gr. 66 .
– Check coolant level ⇒ page 212 .

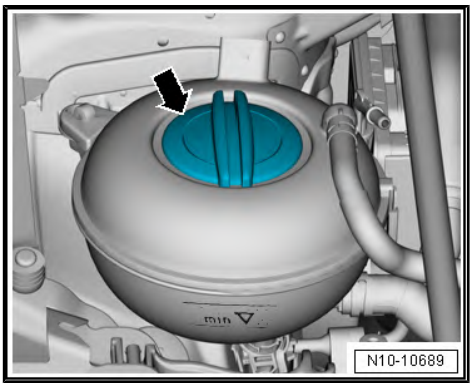
Tightening torques

♦ Coolant recirculation pump - V188-
⇒ “2.2 Summary of components - electric coolant pump”, page 218

2.8 Removing and installing coolant temperature sender - G62-

Removing

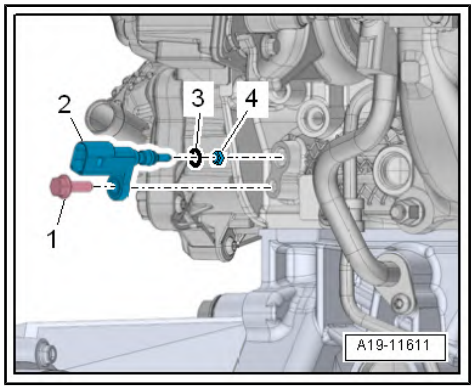
• Engine cold
– Briefly open the cap -arrow- for the coolant expansion reservoir in order to remove the remaining pressure in the coolant system, then close until it clicks into place.
– Disconnect the plug connection.



Note

Place a cloth below to absorb leaking coolant.

– Unscrew screw -1- and pull out coolant temperature sender - G62- -2-.



Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

Note

- *Renew O-ring.*
- *If the O-ring -3- with support ring -4- remains in the cylinder head, lift out the O-ring with support ring using a wire.*
- *Insert new coolant temperature sender - G62- immediately into cylinder head in order to avoid loss of coolant.*

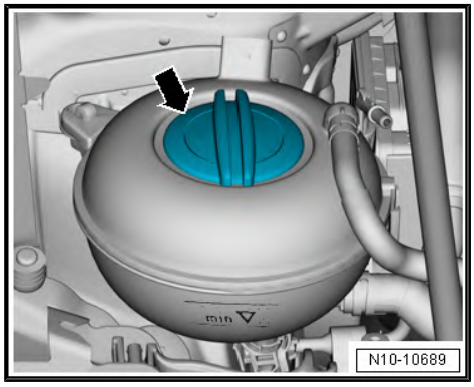
– Check coolant level ⇒ page 212 .

• Tightening torque
⇒ “2.3 Summary of components - coolant temperature sender”, page 219

2.9 Removing and installing coolant temperature sender at radiator outlet - G83-

Removing

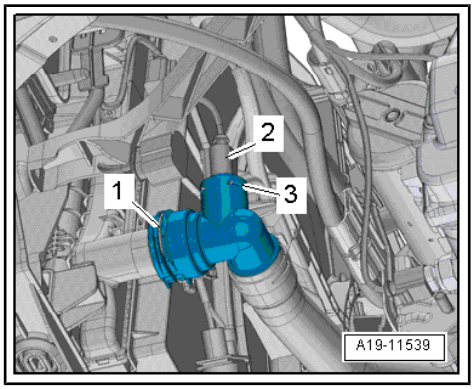
• Engine cold



– Briefly open the cap -arrow- for the coolant expansion reservoir in order to remove the remaining pressure in the coolant system, then close until it clicks into place.

– Remove the sound dampening system ⇒ Body Work; Rep. gr. 66 .

– Unplug connector -2-.



Note

Place a cloth below to absorb leaking coolant.

– Pull out holding clamp -1- and pull coolant temperature sender at radiator outlet - G83- out of the connection piece -3-.

Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

Note

- *Renew O-ring.*
- *Insert new coolant temperature sender - G83- immediately into connection piece in order to avoid loss of coolant.*

– Remove front noise insulation ⇒ Body Work; Rep. gr. 66 .

– Check coolant level ⇒ page 212 .

3 Coolant pipes

⇒ “3.1 Summary of components - coolant pipe”, page 230

⇒ “3.2 Removing and installing coolant pipes”, page 230

3.1 Summary of components - coolant pipe

1 - Coolant hose

2 - Coolant pipe

- ❑ below clipped onto the intake manifold
- ❑ When removing using a screwdriver, carefully lever out of the catch

3 - Screw

- ❑ 8 Nm

4 - Coolant hose

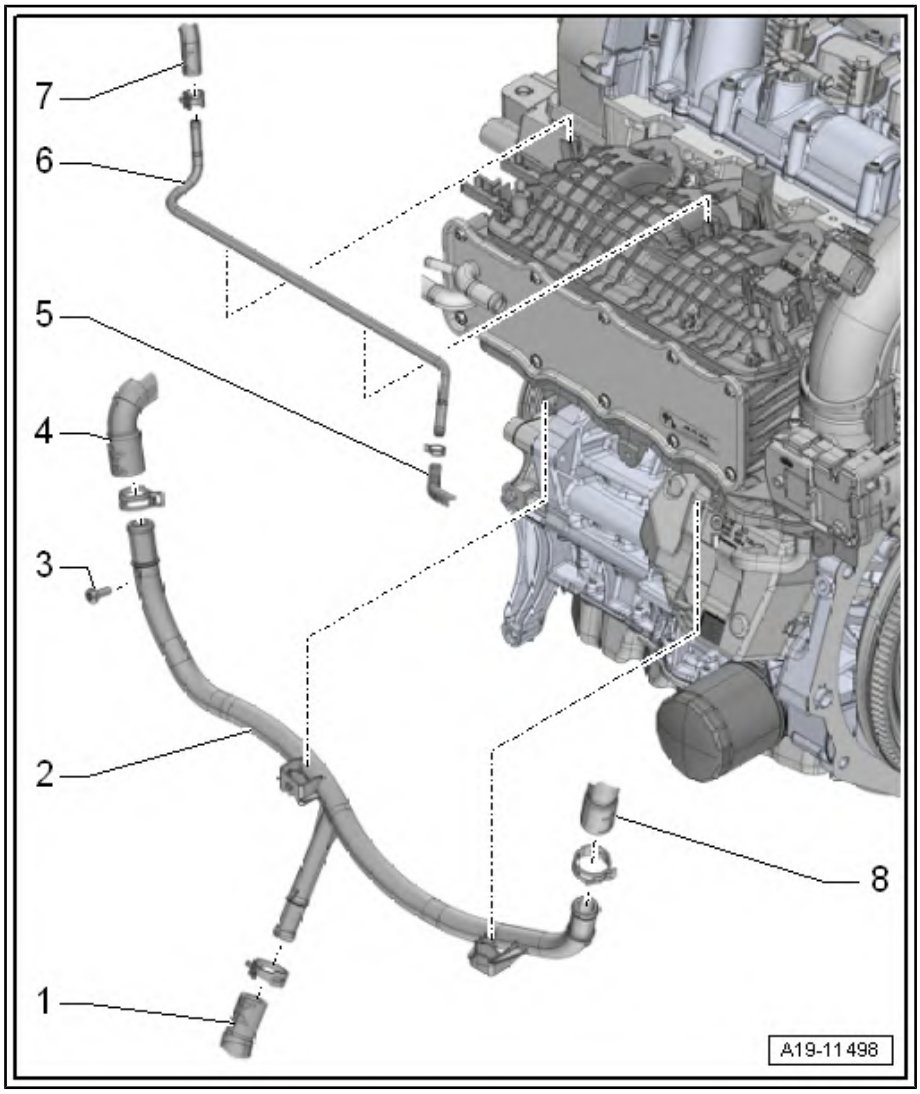
5 - Coolant hose

6 - Coolant line

- ❑ above clipped onto the intake manifold

7 - Coolant hose

8 - Coolant hose



3.2 Removing and installing coolant pipes

Special tools and workshop equipment required

- ♦ Hose clamps up to 25 mm - MP7-602 (3094)-
- ♦ Pliers for spring strap clamps

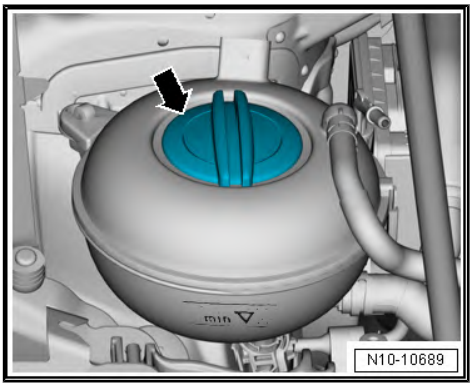
Removing

WARNING

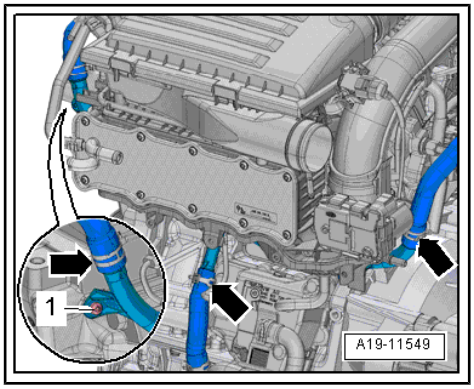
Danger of scalding due to hot steam and hot coolant.

- *When the engine is warm, the cooling system is under overpressure.*
- *Reduce the pressure by covering the cap of the coolant expansion tank with a cloth and open it carefully.*

– Open cap -arrow- for coolant expansion tank.



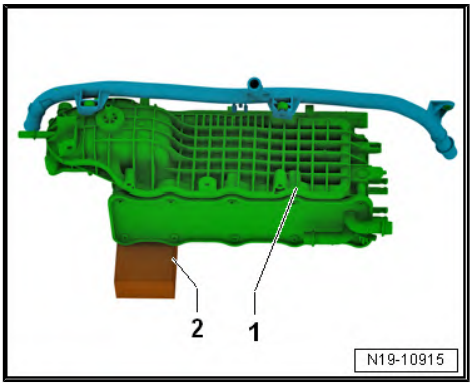
– Disconnect coolant hoses with hose clamps -MP7-602 (3094)- .
– Loosen hose clamps -arrows- and remove coolant hoses.
– Removing the intake manifold
⇒ “3.2 Removing and installing intake manifold”, page 386 .



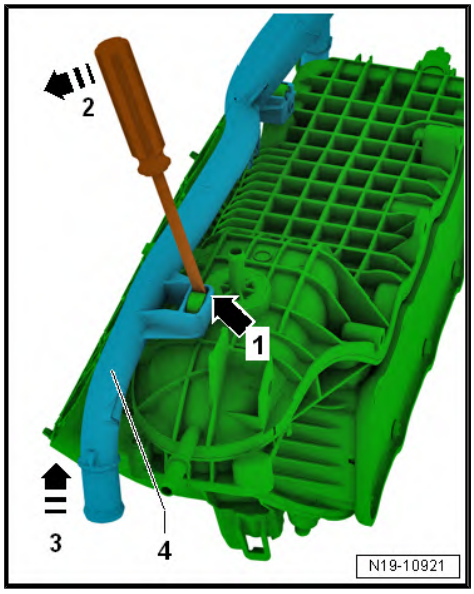
– Place the intake manifold -1- on the work bench as shown.

Note

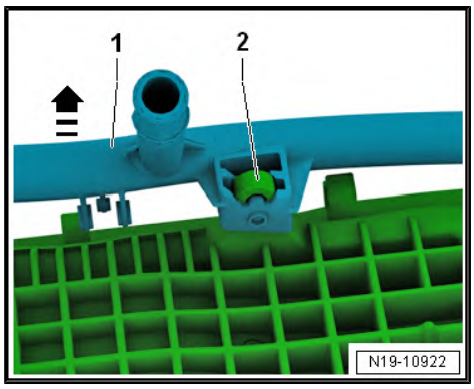
Use a wooden wedge -2- as a support for example.



– Using the screwdriver in the direction of arrow -2- carefully press and at the same time raise the coolant pipe -4- in direction of arrow -3- until it is released from the locking mechanism.



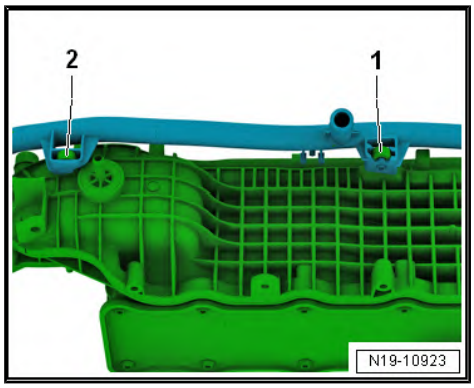
– Remove the coolant pipe -1- in -direction of arrow- upwards, and release it from the locking mechanism -2-.



Install

– Press the coolant pipe onto the bearings -1- and -2- until it latches.

– By pulling in the opposite direction, check that both bearings are locked.



Note

- *Replace gaskets and O-rings.*
- *Secure all hose connection ends with spring-type clips that comply with the series design ⇒ ETKA - Electronic Catalogue of Original Parts .*

Installation is carried out in the reverse order. When installing, note the following:

– Check coolant level ⇒ page 212 .

4 Radiator and radiator fan

⇒ “4.1 Summary of components - coolant radiator”, page 233

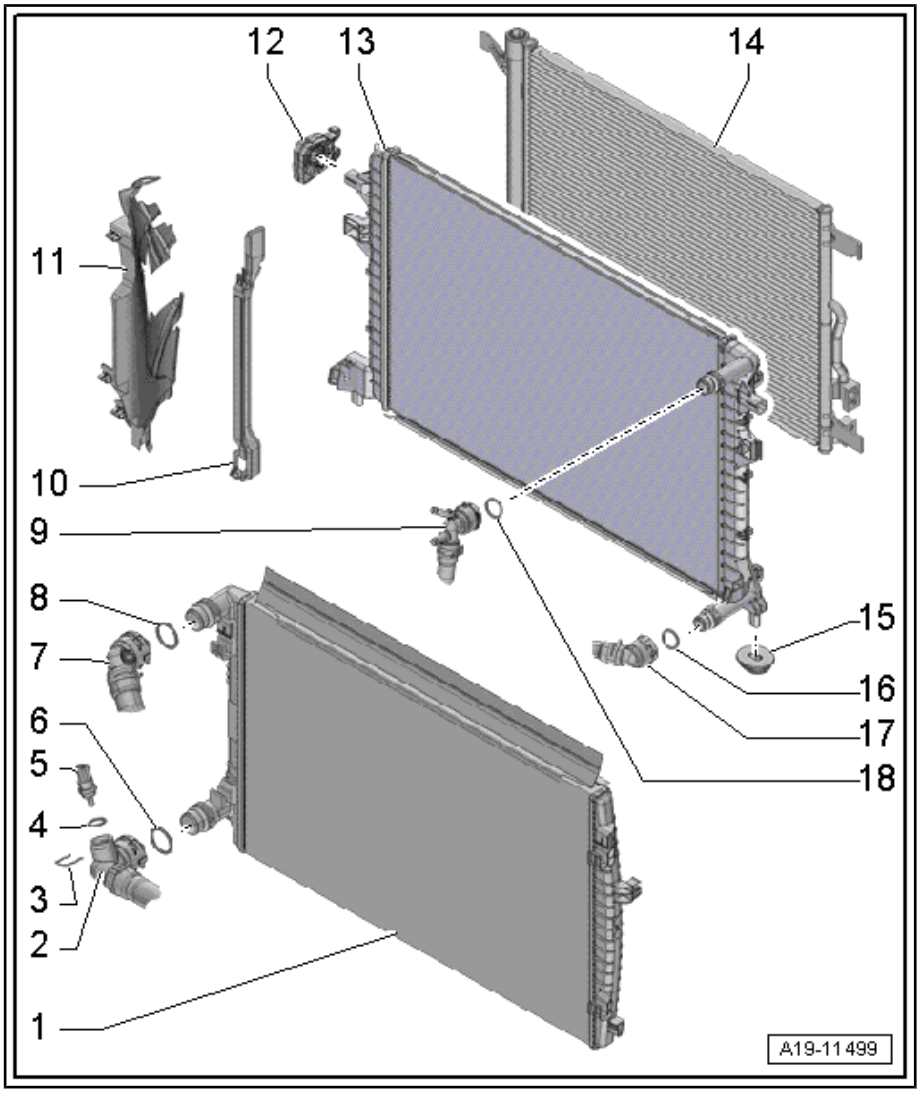
⇒ “4.2 Summary of components - fan shroud and radiator fan”, page 235

⇒ “4.3 Removing and installing radiator fan for coolant”, page 235

⇒ “4.4 Removing and installing fan shroud”, page 238

⇒ “4.5 Removing and installing radiator fan V7 ”, page 239

4.1 Summary of components - coolant radiator



1 - Coolant radiator

- ❑ Removing and installing ⇒ “4.3 Removing and installing radiator fan for coolant”, page 235
- ❑ After replacing, renew all coolant ⇒ “1.2 Draining and filling coolant”, page 209

2 - Coolant hose

- ❑ to remove, raise holding clamps
- ❑ connect ⇒ page 234

3 - Retaining clip

4 - O-ring

- ❑ replace after removal

5 - Coolant temperature sender at radiator outlet - G83-

- ❑ Removing and installing ⇒ “2.9 Removing and installing coolant temperature sender at radiator outlet G83 ”, page 228

6 - O-ring

- ❑ replace after removal

7 - Coolant hose

- ❑ to remove, raise holding clamps
- ❑ connect ⇒ page 234

8 - O-ring

- ❑ replace after removal

9 - Coolant hose

- ❑ to remove, raise holding clamps
- ❑ connect ⇒ page 234

10 - Air deflector

11 - Air deflector

12 - Top radiator bearing

- ❑ If the fuse latches break, you will not need to replace the top radiator bearing. The fuse is replaced by a special screw ⇒ Electronic Catalogue of Original Parts“ETKA” .

- ❑ Screw tightening torque for top radiator bearing, 5 Nm.

13 - Cooler for charge air circuit

- ❑ Removing and installing ⇒ “4.3 Removing and installing radiator fan for coolant”, page 235
- ❑ After replacing, renew all coolant ⇒ “1.2 Draining and filling coolant”, page 209

14 - Condenser

- ❑ removing and installing ⇒ Heating, Air Conditioning; Rep. gr. 87

15 - Bottom radiator bearing

- ❑ for radiator

16 - O-ring

- ❑ replace after removal

17 - Coolant hose

- ❑ to remove, raise holding clamps
- ❑ connect ⇒ page 234

18 - O-ring

- ❑ replace after removal

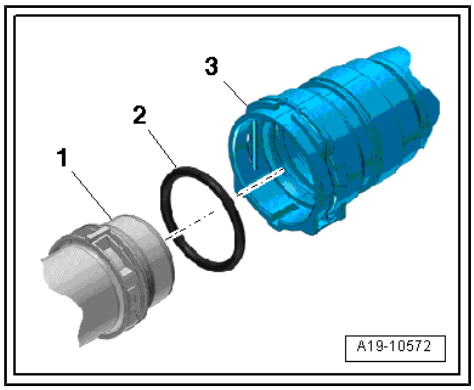
Connect coolant hose with quick coupling

– Remove old O-ring -2- in coolant hose -3-.

– Moisten new O-ring with coolant and insert into coolant hose.

– Press coolant hose onto connection -1- until there is an audible click.

– Press coolant hose down again and check by pulling that the plug-in connector is fully engaged.



4.2 Summary of components - fan shroud and radiator fan

1 - Screw

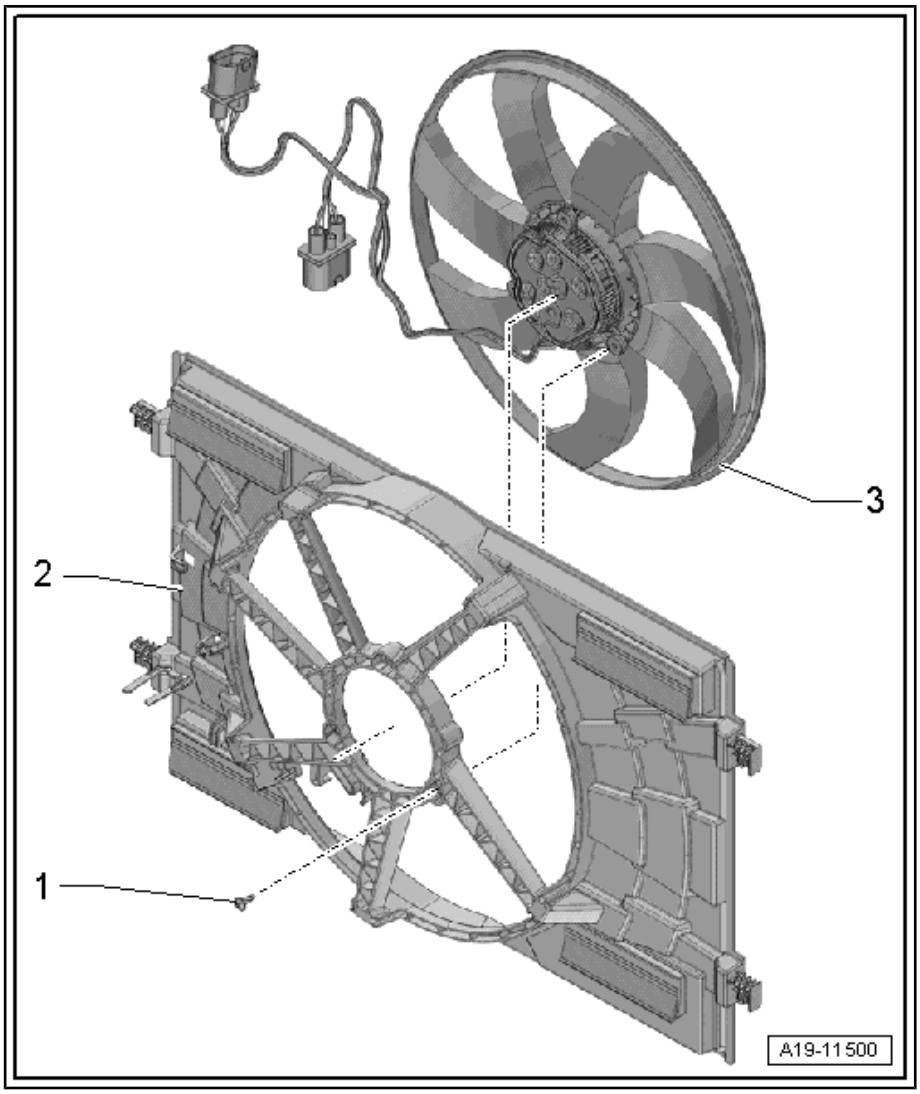
- ❑ 5 Nm

2 - Fan shroud

- ❑ Removing and installing ⇒ “4.4 Removing and installing fan shroud”, page 238

3 - Radiator fan - V7-

- ❑ Removing and installing ⇒ “4.5 Removing and installing radiator fan V7 ”, page 239



4.3 Removing and installing radiator fan for coolant

Special tools and workshop equipment required

- ♦ Catch pan , e.g. -VAS 6208-
- ♦ Pliers for spring strap clamps

WARNING

There is risk of injury from radiator fans starting up automatically.

- ♦ *Before carrying out work in the fan shroud area, disconnect the electrical plug connections.*

Note

Coolant radiator and charge air circulation cooler are removed together.

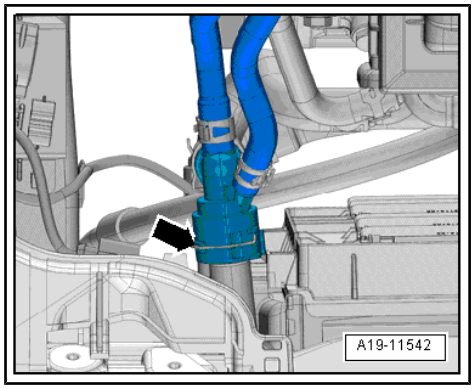
Removing

– Drain coolant ⇒ “1.2 Draining and filling coolant”, page 209 .

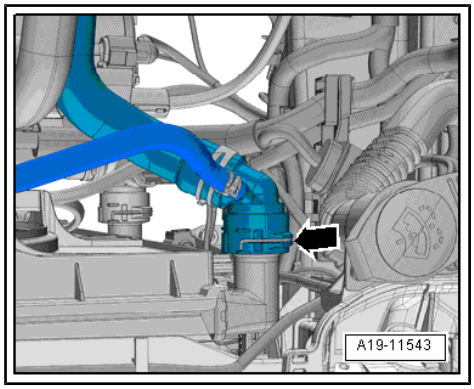
– Removing fan shroud
⇒ “4.4 Removing and installing fan shroud”, page 238 .

– Remove front bumper ⇒ Body Work; Rep. gr. 63 .

– Raise holding clamp -arrow- and disconnect coolant hose right above radiator for charge air circuit.

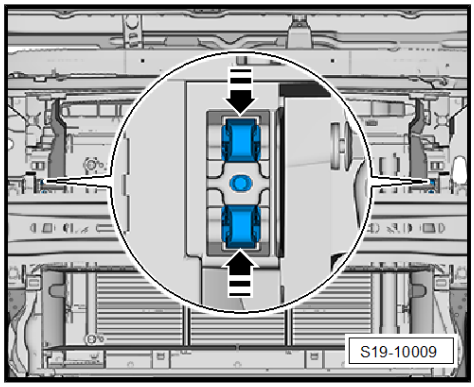


– Raise holding clamp -arrow- and remove top left coolant hose from radiator.



– Press the catches for the top radiator bearing -arrows- at the same time, e.g with screwdrivers, and unclip the bearing on both sides.

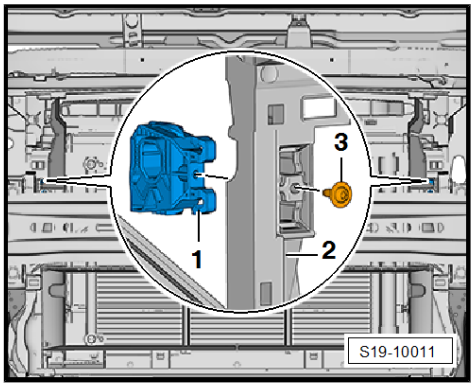
– Partially tilt cooler into the engine compartment.



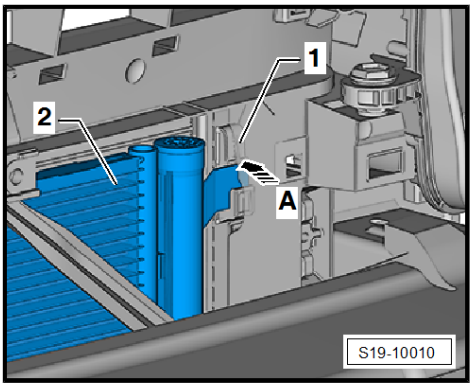
Volkswagen Technical Site: http://vwts.ru http://vwts.info
огромный архив документации по автомобилям Volkswagen, Skoda, Seat, Audi

Note

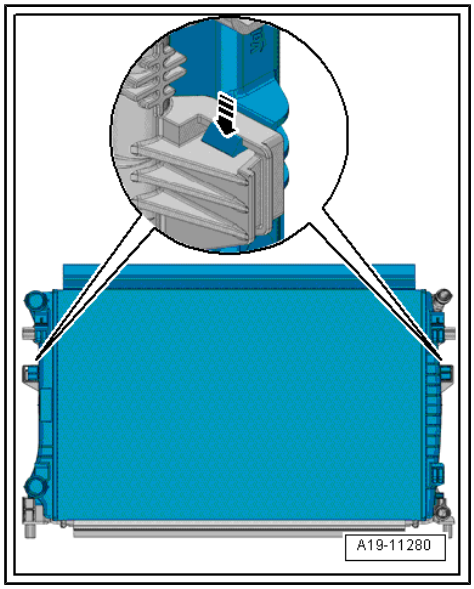
If the fuse latches break, you will not need to replace the top radiator bearing -1- . The fuse is replaced by a special screw -3- ⇒ Electronic Catalogue of Original Parts ETKA .



– Unlock the left and right catches from the cooler -1- arrow -A- and raise the condenser.
– Press the radiator downwards until the radiator bearing deflects at the bottom, to do so, unhook the condenser -2- from the radiator -1-.
– Strap capacitor to the lock support.
– Remove the cooler for the charge air circuit from the vehicle together with the charge air circuit cooler.



– Press left and right radiator locking lugs simultaneously -arrow- and remove coolant radiator from the charge air circuit radiator.



Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

Caution

Replace all the coolant when installing the new cooler ⇒ "1.2 Draining and filling coolant", page 209

Note

- *Do not replace the cooler when there is light pressure on the fins ⇒ "4.5 Assembly of radiators and capacitors", page 21 .*
- *Replace O-rings.*

– Install front bumper ⇒ Body Work; Rep. gr. 63 .

– Install fan shroud
⇒ "4.4 Removing and installing fan shroud", page 238 .

– Connect coolant hoses with quick coupling ⇒ page 234 .

– Replenish coolant
⇒ "1.2 Draining and filling coolant", page 209 .

Note

If the radiator has been replaced, all the coolant must be changed.

Tightening torques

- Screw for top radiator mount
⇒ "4.1 Summary of components - coolant radiator", page 233

4.4 Removing and installing fan shroud

WARNING

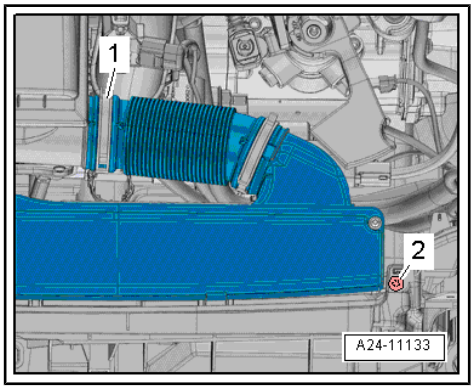
There is risk of injury from radiator fans starting up automatically.

- *Before carrying out work in the fan shroud area, disconnect the electrical plug connections.*

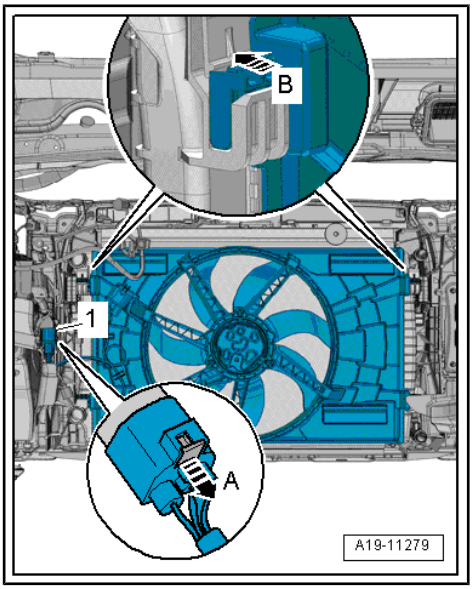
Removing

– Loosen hose clamp -1- and remove air guide hose.

– Release screw left and right arrow -2-.
– Unclip and remove the air guide on the lock carrier.



– Remove plug -1- for radiator fan, for this purpose slide screw clamp backwards arrow -A- and press release button down.
– Press locking lugs for fan shroud left and right simultaneously arrow -B- and remove fan shroud downwards from the radiator.



Install

Install in the reverse order of removal. When doing this, note the following:

– Electrical connections and proper routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

• Tightening torque
⇒ “2.1 Assembly overview - air filter housing”, page 383

4.5 Removing and installing radiator fan -V7-

WARNING

There is risk of injury from radiator fans starting up automatically.

- ***Before carrying out work in the fan shroud area, disconnect the electrical plug connections.***

Removing

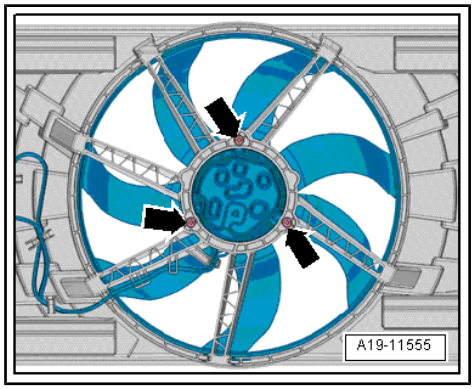
Note

All cable straps should be fastened again in the same place when installing.

– Removing fan shroud
⇒ “4.4 Removing and installing fan shroud”, page 238 .

– Disconnect the plug connection.

– Release screws -arrows- and remove radiator fan - V7- .



Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

– Install fan shroud
⇒ “4.4 Removing and installing fan shroud”, page 238 .

Tightening torques

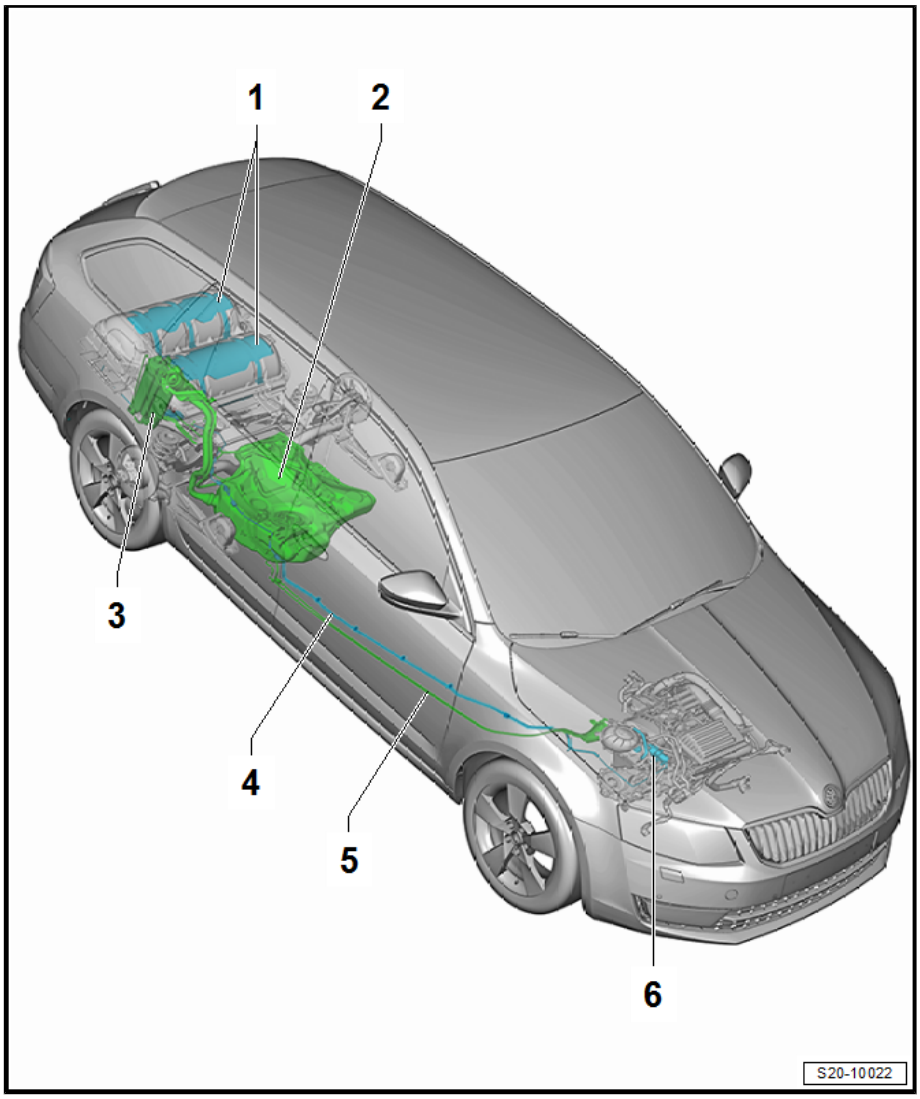
♦ Radiator fan screws
⇒ “4.2 Summary of components - fan shroud and radiator fan”, page 235

20 – Fuel supply system

1 Fuel supply system

⇒ “1.1 Overview of fitting locations - fuel supply”, page 241

1.1 Overview of fitting locations - fuel supply



1 - Natural gas container

- ❑ for natural gas (CNG)
- ❑ Summary of components ⇒ “2.1.2 Summary of components - fuel tank for natural gas vehicles (CNG)”, page 245
- ❑ Removing and installing ⇒ “5.5 Removing and installing natural gas container”, page 323
- ❑ empty ⇒ “5.4 Empty the natural gas container ”, page 316

2 - Fuel tank

- ❑ for petrol
- ❑ Summary of components ⇒ “2.1 Summary of components - fuel tank/natural gas container”, page 243
- ❑ Removing and installing ⇒ “3.2 Removing and installing the fuel tank”, page 267
- ❑ empty ⇒ “3.1 Drain the fuel tank”, page 260

3 - Activated charcoal filter

- ❑ Summary of components ⇒ “7.1 Assembly overview - activated charcoal filter system”, page 358
- ❑ Removing and installing ⇒ “7.2 Removing and installing activated charcoal filter”, page 359
- ❑ check ⇒ “7.3 Checking the fuel tank venting”, page 360

4 - Fuel line

- ❑ for natural gas (CNG)

5 - Fuel line

- ❑ for petrol

6 - Gas pressure regulator

- ❑ with high-pressure valve for gas mode - N372-
- ❑ with tank pressure sensor - G400-
- ❑ Summary of components ⇒ “4.1 Summary of components - gas pressure regulator”, page 393
- ❑ Removing and installing ⇒ “4.2 Removing and installing gas pressure regulator”, page 395

- Removing and installing the tank pressure sensor - G400-
  ⇒ “4.3 Removing and installing the tank pressure sensor G400 ”, page 397

2 Fuel tank/natural gas container

⇒ “2.1 Summary of components - fuel tank/natural gas container”, page 243

2.1 Summary of components - fuel tank/natural gas container

⇒ “2.1.1 Summary of components - fuel tank only for petrol vehicles”, page 243

⇒ “2.1.2 Summary of components - fuel tank for natural gas vehicles (CNG)”, page 245

⇒ “2.1.3 Summary of components - natural gas container (CNG)”, page 248

⇒ “2.1.4 Summary of components - natural gas container 1”, page 251

⇒ “2.1.5 Summary of components - Natural gas container 2”, page 253

⇒ “2.1.6 Summary of components - tensioning strap and spring package”, page 256

2.1.1 Summary of components - fuel tank only for petrol vehicles

1 - Screw cap

- ❑ screw in until there is an audible click
- ❑ with securing suspended to prevent any loss at tank fuel filler flap

2 - Earth connection

- ❑ for fuel filler neck
- ❑ for discharging the electrostatic charge ⇒ page 272

3 - Screw

- ❑ replace after removal
- ❑ 8 Nm + torque a further 90° ($^1/_4$ turn)

4 - Lock ring

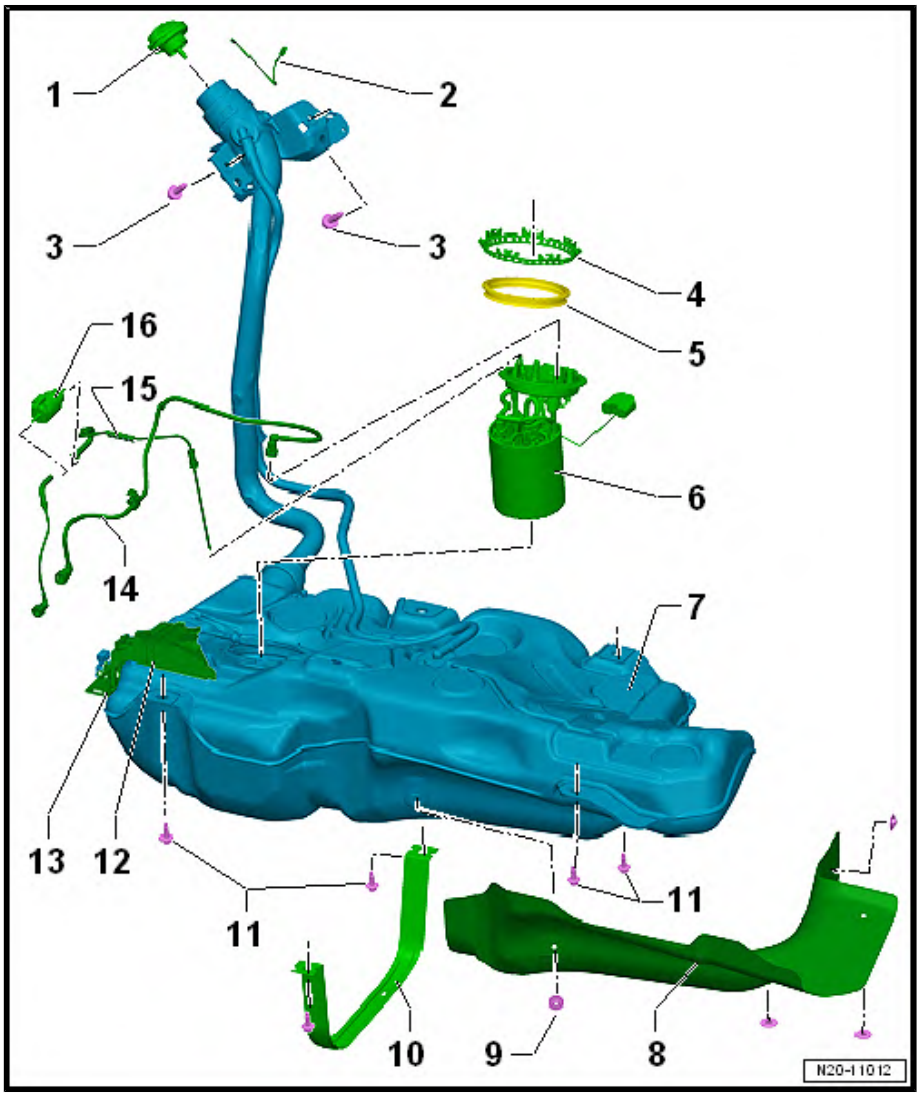
- ❑ loosen and tighten up with spanner -T30101 (3087)-
- ❑ 110 Nm

5 - Sealing ring

- ❑ replace after removal
- ❑ install when dry

6 - Fuel system pressurisation pump - G6-

- ❑ with integrated fuel filter, the fuel filter cannot be replaced individually
- ❑ Checking fuel pump electrics ⇒ Vehicle diagnostic tester



- ❑ Fitting position
  ⇒ page 245
- ❑ Connect fuel lines ⇒ page 245
- ❑ Removing and installing ⇒ “3.4 Fuel delivery unit with sender for fuel gauge display”, page 278
- ❑ Fill the vehicle with at least 5 litres of fuel after installing

7 - Fuel tank

- ❑ Removing and installing
  ⇒ “3.2.1 Removing and installing fuel tanks only for petrol vehicles”, page 267

8 - Heat shield

- ❑ for fuel tank

9 - Shield locking mechanism

- ❑ for heat shield
- ❑ 4 pieces

10 - Tensioning strap

- ❑ Mark installation position before installation
- ❑ pay attention to correct position

11 - Screw

- ❑ replace after removal
- ❑ 20 Nm + torque a further 90° ($^1/_4$ turn)

12 - Bracket

- ❑ For fuel pump control unit -J538-

13 - Bracket

- ❑ for vehicles with auxiliary heating
- ❑ for dosing pump -V54-
- ❑ pay attention to correct fit of the dosing pump in the holder

14 - Fuel line

- ❑ to the engine
- ❑ pushed into the fuel tank
- ❑ do not kink
- ❑ disconnect and connect ⇒ “4 Quick couplings”, page 298

15 - Fuel line

- ❑ for vehicles with auxiliary heating
- ❑ to the dosing pump -V54-
- ❑ do not kink
- ❑ disconnect and connect ⇒ “4 Quick couplings”, page 298

16 - Dosing pump -V54-

- ❑ for vehicles with auxiliary heating

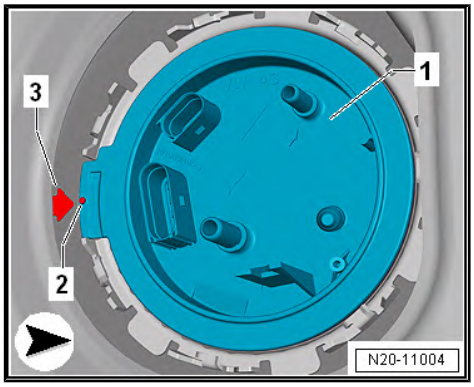
WARNING

Risk of explosion from electrostatic charge.

- *After installing, use an ohmmeter to test the electrical connection of the plate ring on the fuel filler neck at a bare point on the body.*
- *Specified value approximately 0 Ω*

Fitting location of the fuel delivery unit

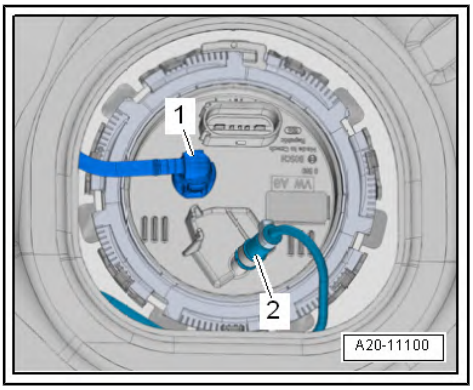
- The marking -2- at the fuel delivery unit closing flange -1- must be located against arrow -3- on the fuel tank.



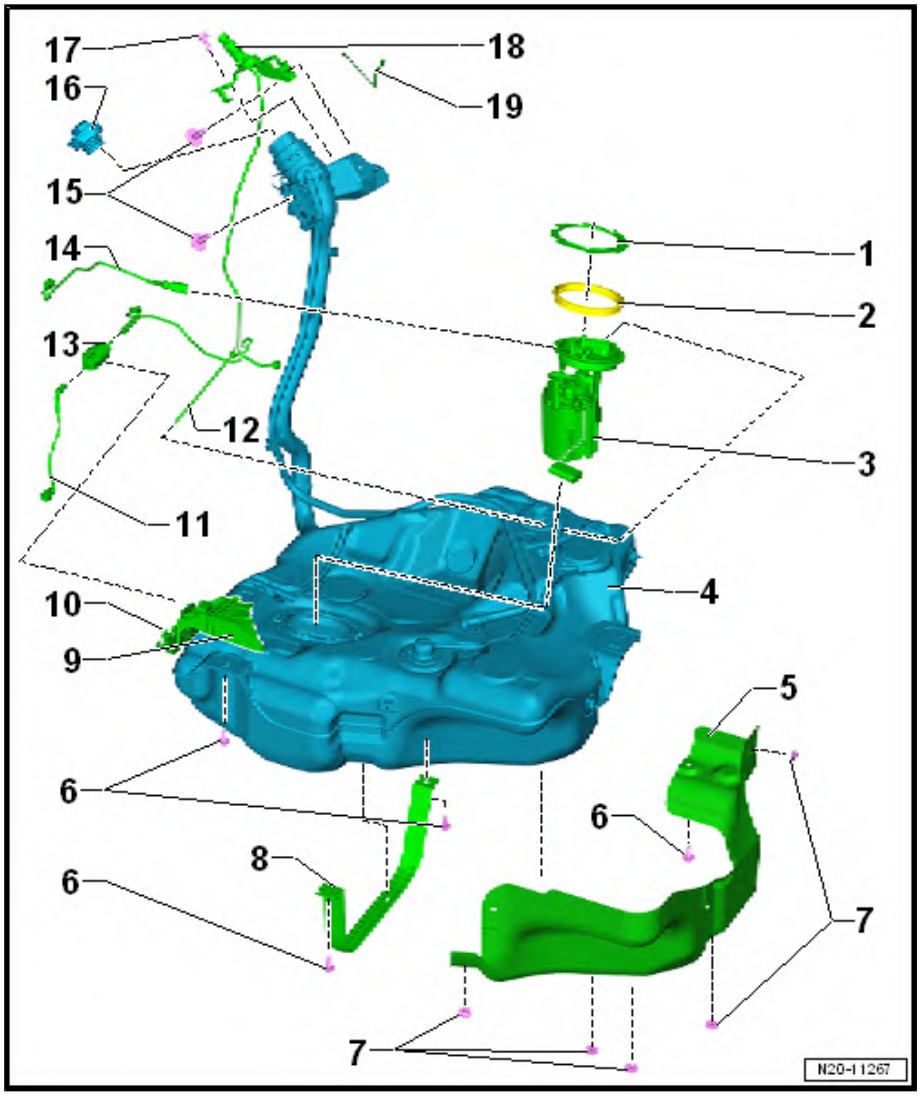
Connect the fuel lines to the fuel delivery unit.

1 - Fuel feed line to the engine

2 - Fuel line to the dosing pump -V54-



2.1.2 Summary of components - fuel tank for natural gas vehicles (CNG)



1 - Lock ring

- ❑ 110 Nm

2 - Sealing ring

- ❑ replace after removal
- ❑ install when dry

3 - Fuel system pressurisation pump - G6-

- ❑ with integrated fuel filter, the fuel filter cannot be replaced individually
- ❑ Checking fuel pump electrics ⇒ Vehicle diagnostic tester
- ❑ Fitting position ⇒ page 248
- ❑ Connect fuel lines ⇒ page 248
- ❑ Removing and installing ⇒ “3.4 Fuel delivery unit with sender for fuel gauge display”, page 278
- ❑ Fill the vehicle with at least 5 litres of fuel after installing

4 - Fuel tank

- ❑ Removing and installing ⇒ “3.2.2 Removing and installing the fuel tank for natural gas vehicles (CNG)”, page 272

5 - Heat shield

- ❑ for fuel tank

6 - Screw

- ❑ replace after removal
- ❑ 5 pieces
- ❑ 20 Nm + torque a further 90° ($^1/_4$ turn)

7 - Shield locking mechanism

- ❑ 4 pieces
- ❑ for heat shield

8 - Tensioning strap

- ❑ Mark installation position before installation
- ❑ pay attention to correct position

9 - Uchwyt

- ❑ For fuel pump control unit -J538-

10 - Uchwyt

- ❑ for vehicles with auxiliary heating
- ❑ for dosing pump - V54-
- ❑ pay attention to correct fit of the dosing pump in the holder

11 - Fuel line

- ❑ for vehicles with auxiliary heating
- ❑ from the dosing pump - V54- for auxiliary heating

- ❑ do not kink
- ❑ disconnect and connect ⇒ “4 Quick couplings”, page 298

12 - Fuel line

- ❑ for vehicles with auxiliary heating
- ❑ to the dosing pump - V54-
- ❑ do not kink
- ❑ disconnect and connect ⇒ “4 Quick couplings”, page 298

13 - Dosing pump - V54-

- ❑ for vehicles with auxiliary heating

14 - Fuel line

- ❑ to the engine
- ❑ pushed into the fuel tank
- ❑ do not kink
- ❑ disconnect and connect ⇒ “4 Quick couplings”, page 298

15 - Screw

- ❑ replace after removal
- ❑ 8 Nm + torque a further 90° ($^1/_4$ turn)

16 - Screw cap

- ❑ screw in until there is an audible click
- ❑ with securing suspended to prevent any loss at tank fuel filler flap

17 - Screw

- ❑ replace after removal
- ❑ 5 Nm

18 - Natural gas filling connection

- ❑ Summary of components ⇒ “5.2 Summary of components - filling connection ”, page 305
- ❑ Removing and installing ⇒ “5.10 Removing and installing filling connection”, page 352
- ❑ Filling connection and fuel line are a joint component and cannot be removed individually

19 - Earth connection

- ❑ for fuel filler neck
- ❑ for discharging the electrostatic charge ⇒ page 277

Earth connection for fuel filler neck

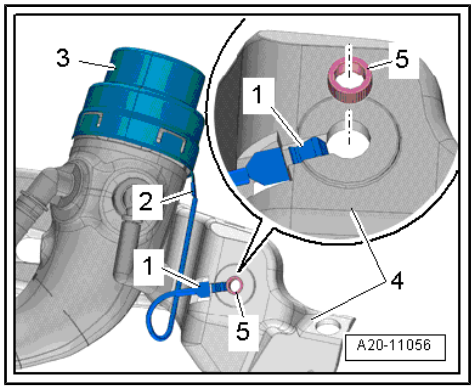
– Install the earth point as shown.

– Ensure the following plug connections fit tightly:

◆ Connector -2- of the earth point at the threaded ring -3- of the fuel filler neck

– Hook the contact tab -1- of the earth point into the mounting bore at the fuel tank -4-.

– Press in spacer bush -5-.



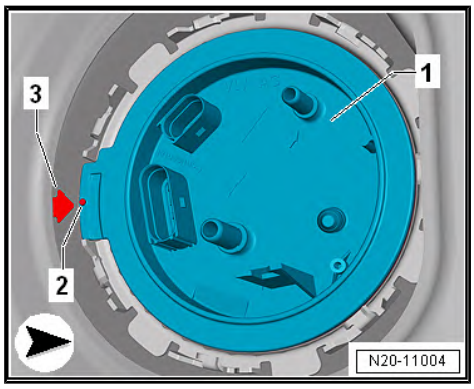
WARNING

There is a risk due to electrostatic charge.

- ◆ *After installation, check electrical connection using an ohmmeter.*
- ◆ *Check the connection of the metal ring on the fuel filler neck with a bare metal part of the body.*
- • *Specified value approx. 0 ohm.*

Fitting location of the fuel delivery unit

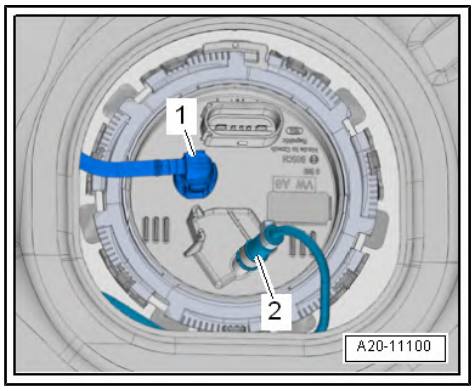
• Arrow -3- at the fuel tank must point to marking -2- on the closing flange -1-.



Fuel lines at the fuel delivery unit

1 - Fuel feed line

2 - Fuel line to the dosing pump - V54-



2.1.3 Summary of components - natural gas container (CNG)

1 - Uchwyt

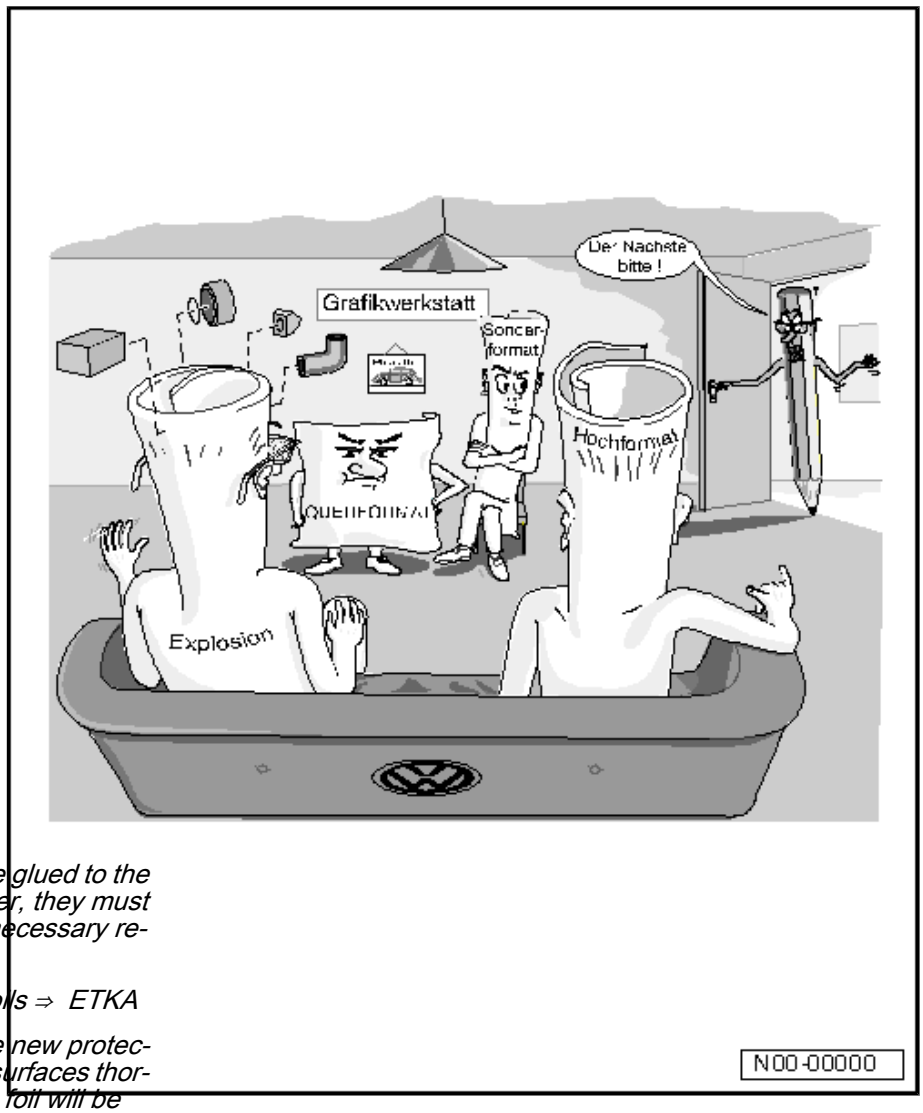
- ❑ for natural gas containers

2 - Screw

- ❑ replace after removal
- ❑ 6 pieces
- ❑ 50 Nm + torque a further 90° ($^1/_4$ turn)

3 - Natural gas containers 2

- ❑ Overview of the installation positions ⇒ “1.1 Overview of fitting locations - fuel supply”, page 241
- ❑ Summary of components ⇒ “2.1.5 Summary of components - Natural gas container 2”, page 253
- ❑ Removing and installing ⇒ “5.5.2 Removing and installing natural gas container 2”, page 332



Note

- *If protective foils are glued to the natural gas container, they must be checked and if necessary replaced.*
- *Assign protective foils ⇒ ETKA*
- *Before installing the new protective foils, clean the surfaces thoroughly to which the foil will be glued.*
- *Glue protective foils to these surfaces.*
- *When installing a new natural gas container, the protective foils must be glued onto these surfaces, as for the old natural gas container.*

4 - Tank shut-off valve 2 - N362-

- ❑ Summary of components ⇒ “5.1 Summary of components - seal fuel tank”, page 302
- ❑ Removing and installing ⇒ “5.7 Removing and installing tank shut-off valve”, page 343

5 - Tank shut-off valve 1 - N361-

- ❑ Summary of components ⇒ “5.1 Summary of components - seal fuel tank”, page 302
- ❑ Removing and installing ⇒ “5.7 Removing and installing tank shut-off valve”, page 343

6 - Bottom cover of the natural gas container

- ❑ Removing and installing ⇒ Body Work; Rep. gr. 66

7 - Natural gas containers 1

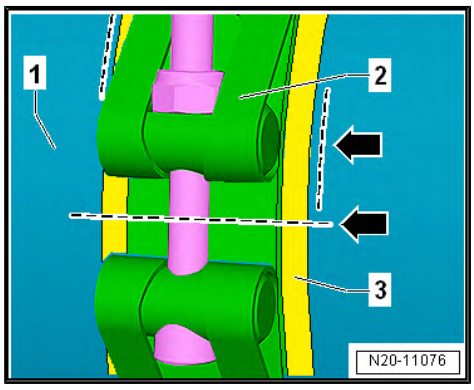
- ❑ Overview of the installation positions ⇒ “1.1 Overview of fitting locations - fuel supply”, page 241
- ❑ Summary of components ⇒ “2.1.4 Summary of components - natural gas container 1”, page 251
- ❑ Removing and installing ⇒ “5.5.1 Removing and installing natural gas container 1”, page 323

Note

- *If protective foils are glued to the natural gas container, they must be checked and if necessary replaced.*
- *Assign protective foils ⇒ ETKA*
- *Before installing the new protective foils, clean the surfaces thoroughly to which the foil will be glued.*
- *Glue protective foils to these surfaces.*
- *When installing a new natural gas container, the protective foils must be glued onto these surfaces, as for the old natural gas container.*

installation position of the protection pads

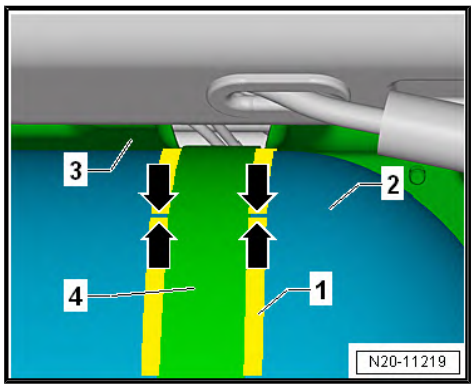
– Mark the position of the protection pads -3- with a felt-tip pen horizontally and vertically on the natural gas container -1- -arrow-.



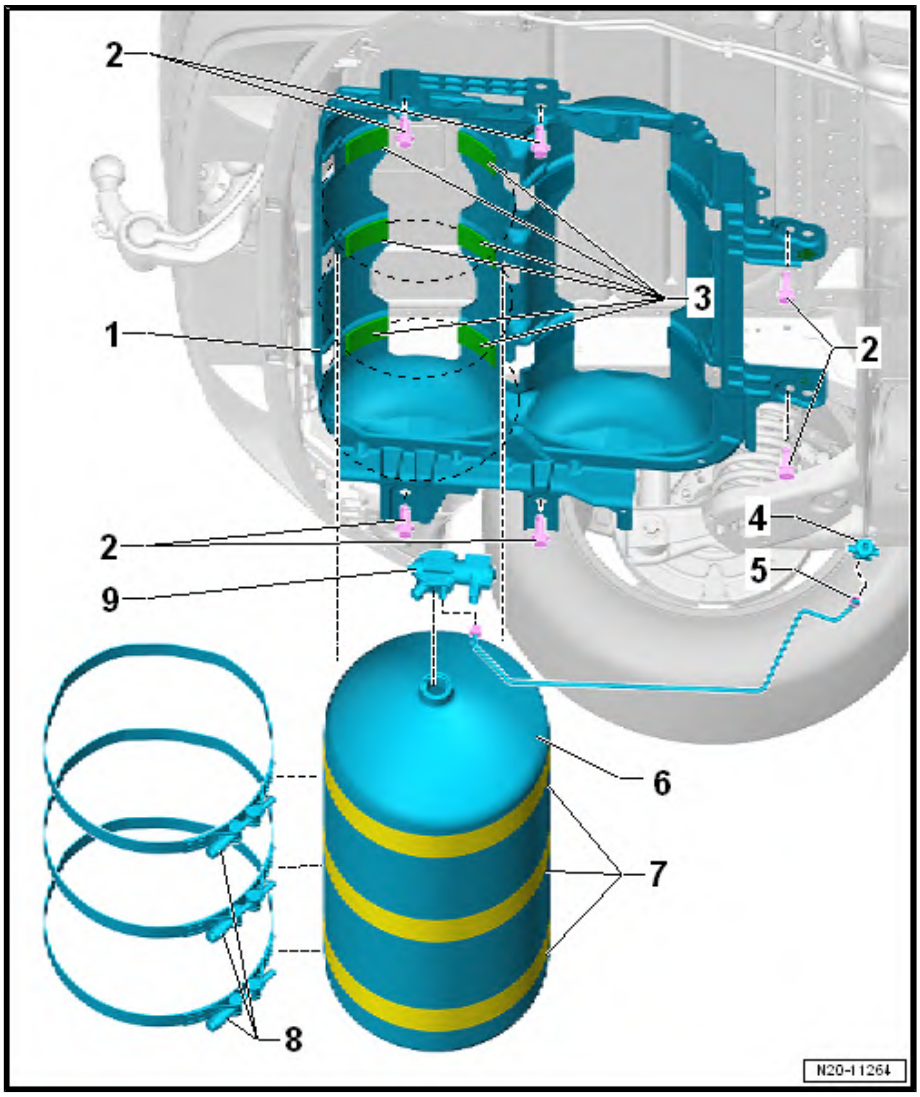
Note

- *The protection pads -3- must fit correctly under the tensioning straps -2- when installing.*
- *To do so, use the previously made markings.*
- *Clean the contact surface between the protection pads and natural gas container thoroughly.*

– Install the protection pads -1- crease-free and assembled as far as possible -arrows-.



2.1.4 Summary of components - natural gas container 1



1 - Uchwyt

- ❑ for natural gas containers

2 - Screw

- ❑ replace after removal
- ❑ 6 pieces
- ❑ 50 Nm + torque a further 90° ($^1/_4$ turn)

3 - Protection pad

- ❑ stuck on
- ❑ 6 pieces on the inside of the support
- ❑ replace if damaged

4 - Branch piece

- ❑ Connection diagram ⇒ page 253

5 - Fuel line

- ❑ When loosening and tightening the connection line, counterhold using an open-end wrench
- ❑ The fuel lines must not be bent or deformed
- ❑ ensure that there is adequate free access to all moving or hot components
- ❑ tighten by hand as far as the stop
- ❑ 17 Nm

6 - Natural gas containers 1

- ❑ Overview of the installation positions ⇒ “1.1 Overview of fitting locations - fuel supply”, page 241
- ❑ Removing and installing ⇒ “5.5.1 Removing and installing natural gas container 1”, page 323
- ❑ Technical data ⇒ page 253
- ❑ Ensure that the surface of the natural gas container is not damaged.

Note

- ♦ *If protective foils are glued to the natural gas container, they must be checked and if necessary replaced.*
- ♦ *Assign protective foils ⇒ ETKA*
- ♦ *Before installing the new protective foils, clean the surfaces thoroughly to which the foil will be glued.*
- ♦ *Glue protective foils to these surfaces.*

- *When installing a new natural gas container, the protective foils must be glued onto these surfaces, as for the old natural gas container.*

7 - Protection pads

- ❑ Fitting position ⇒ page 252
- ❑ 3 pieces
- ❑ Replace if damaged

8 - Tensioning strap

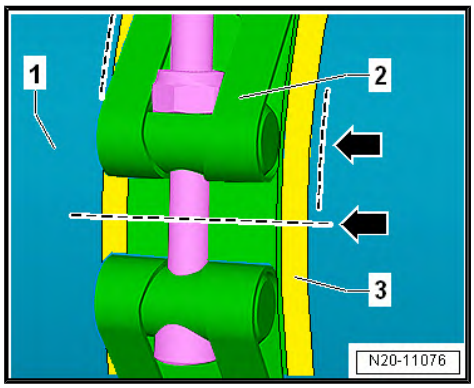
- ❑ Summary of components ⇒ “2.1.6 Summary of components - tensioning strap and spring package”, page 256
- ❑ Fitting position ⇒ page 258
- ❑ 3 pieces

9 - Tank shut-off valve 1 - N361-

- ❑ Summary of components ⇒ “5.7 Removing and installing tank shut-off valve”, page 343
- ❑ Removing and installing ⇒ “5.7 Removing and installing tank shut-off valve”, page 343

installation position of the protection pads

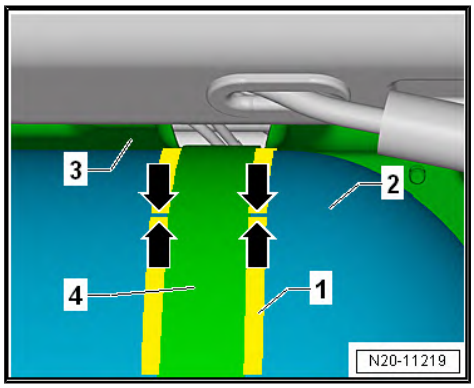
– Mark the position of the protection pads -3- with a felt-tip pen horizontally and vertically on the natural gas container -1- -arrow-.



Note

- *The protection pads -3- must fit correctly under the tensioning straps -2- when installing.*
- *To do so, use the previously made markings.*
- *Clean the contact surface between the protection pads and natural gas container thoroughly.*

– Install the protection pads -1- crease-free and assembled as far as possible -arrows-.



Branch piece - connection diagram

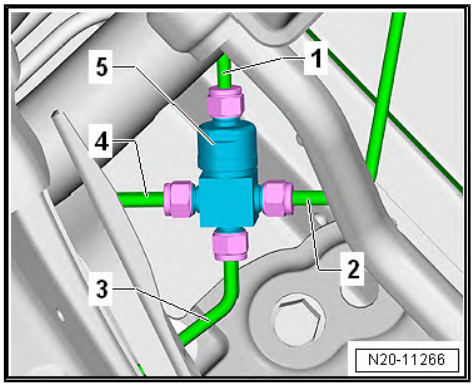
1 - Filling line

2 - Line to the gas pressure regulator

3 - Line to the natural gas container 1

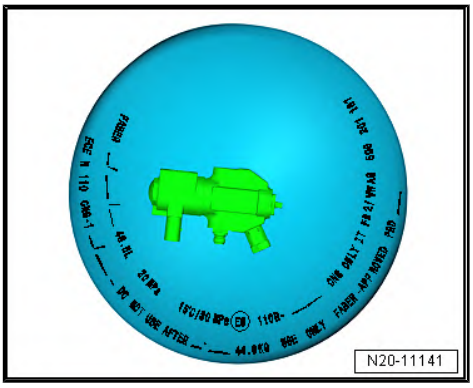
4 - Line to the natural gas container 2

5 - Distributor part



Technical data on the natural gas container

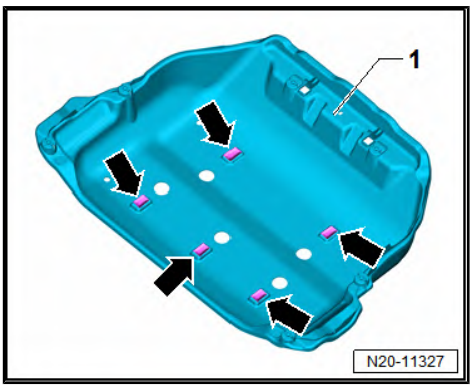
Technical data can be found around the circumference of the natural gas container.



Damping strips on protective cover

– Make sure the protection pads -arrows- are seated correctly.

– Check the protection pads -arrows- for damage and dirt - replace where necessary.



2.1.5 Summary of components - Natural gas container 2

1 - Uchwyt

- ❑ for natural gas containers

2 - Screw

- ❑ replace after removal
- ❑ 6 pieces
- ❑ 50 Nm + torque a further 90° ($^1/_4$ turn)

3 - Protection pad

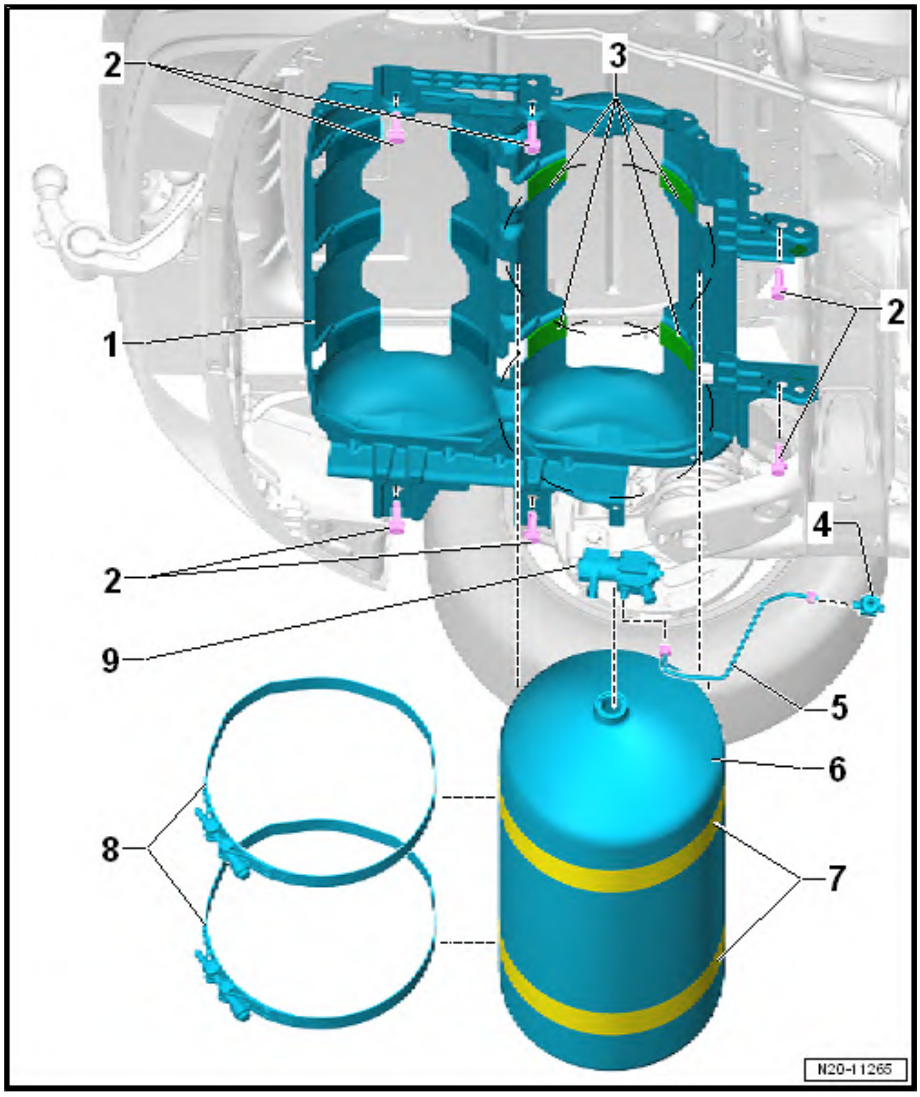
- ❑ stuck on
- ❑ 4 pieces on the inside of the support
- ❑ replace if damaged

4 - Branch piece

- ❑ Connection diagram ⇒ page 255

5 - Fuel line

- ❑ When loosening and tightening the connection line, counterhold using an open-end wrench
- ❑ The fuel lines must not be bent or deformed
- ❑ ensure that there is adequate free access to all moving or hot components
- ❑ tighten by hand as far as the stop
- ❑ 17 Nm



6 - Natural gas containers 2

- ❑ Overview of the installation positions ⇒ “1.1 Overview of fitting locations - fuel supply”, page 241
- ❑ Removing and installing ⇒ “5.5.2 Removing and installing natural gas container 2”, page 332
- ❑ Technical data ⇒ page 256
- ❑ Ensure that the surface of the natural gas container is not damaged.

Note

- *If protective foils are glued to the natural gas container, they must be checked and if necessary replaced.*
- *Assign protective foils ⇒ ETKA*
- *Before installing the new protective foils, clean the surfaces thoroughly to which the foil will be glued.*
- *Glue protective foils to these surfaces.*
- *When installing a new natural gas container, the protective foils must be glued onto these surfaces, as for the old natural gas container.*

7 - Protection pads

- ❑ Fitting position ⇒ page 252
- ❑ 2 pieces
- ❑ Replace if damaged

8 - Tensioning strap

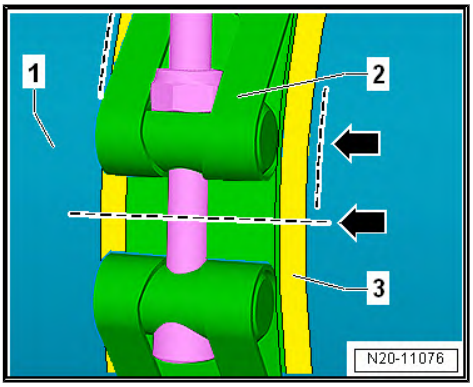
- ❑ Summary of components
  ⇒ “2.1.6 Summary of components - tensioning strap and spring package”, page 256
- ❑ Fitting position ⇒ page 258
- ❑ 2 pieces

9 - Tank shut-off valve 2 - N362-

- ❑ Summary of components ⇒ “5.7 Removing and installing tank shut-off valve”, page 343
- ❑ Removing and installing ⇒ “5.7 Removing and installing tank shut-off valve”, page 343

installation position of the protection pads

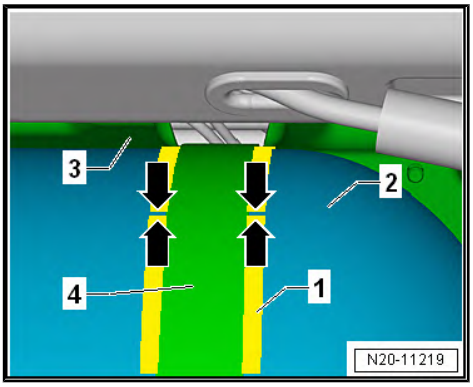
– Mark the position of the protection pads -3- with a felt-tip pen horizontally and vertically on the natural gas container -1- -arrow-.



Note

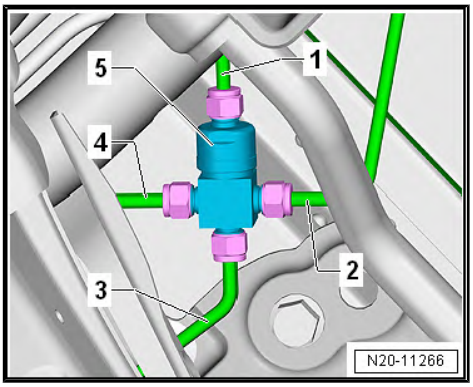
- ♦ *The protection pads -3- must fit correctly under the tensioning straps -2- when installing.*
- ♦ *To do so, use the previously made markings.*
- ♦ *Clean the contact surface between the protection pads and natural gas container thoroughly.*

– Install the protection pads -1- crease-free and assembled as far as possible -arrows-.



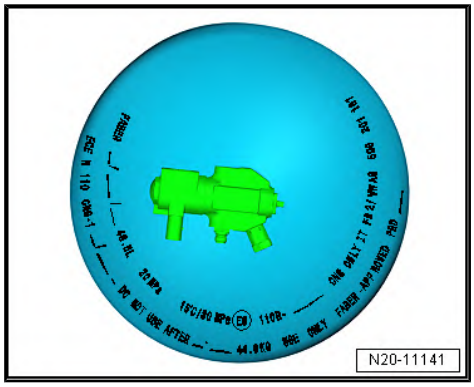
Branch piece - connection diagram

1 - Filling line
2 - Line to the gas pressure regulator
3 - Line to the natural gas container 1
4 - Line to the natural gas container 2
5 - Distributor part



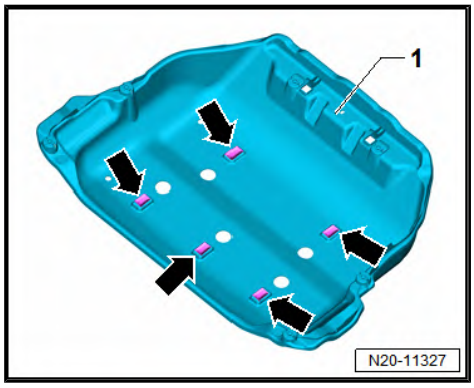
Technical data on the natural gas container

Technical data can be found around the circumference of the natural gas container.



Damping strips on protective cover

- Make sure the protection pads -arrows- are seated correctly.
- Check the protection pads -arrows- for damage and dirt - replace where necessary.



2.1.6 Summary of components - tensioning strap and spring package

1 - Tensioning strap

- ❑ Fitting position
  ⇒ page 258

2 - Screw

- ❑ Tighten tensioning straps when the natural gas container is empty
  ⇒ page 258
- ❑ Tighten tensioning straps when the natural gas container is full
  ⇒ page 259

3 - Disc spring

- ❑ 18 pieces
- ❑ Installation position of the disc springs
  ⇒ page 257

4 - Spacer

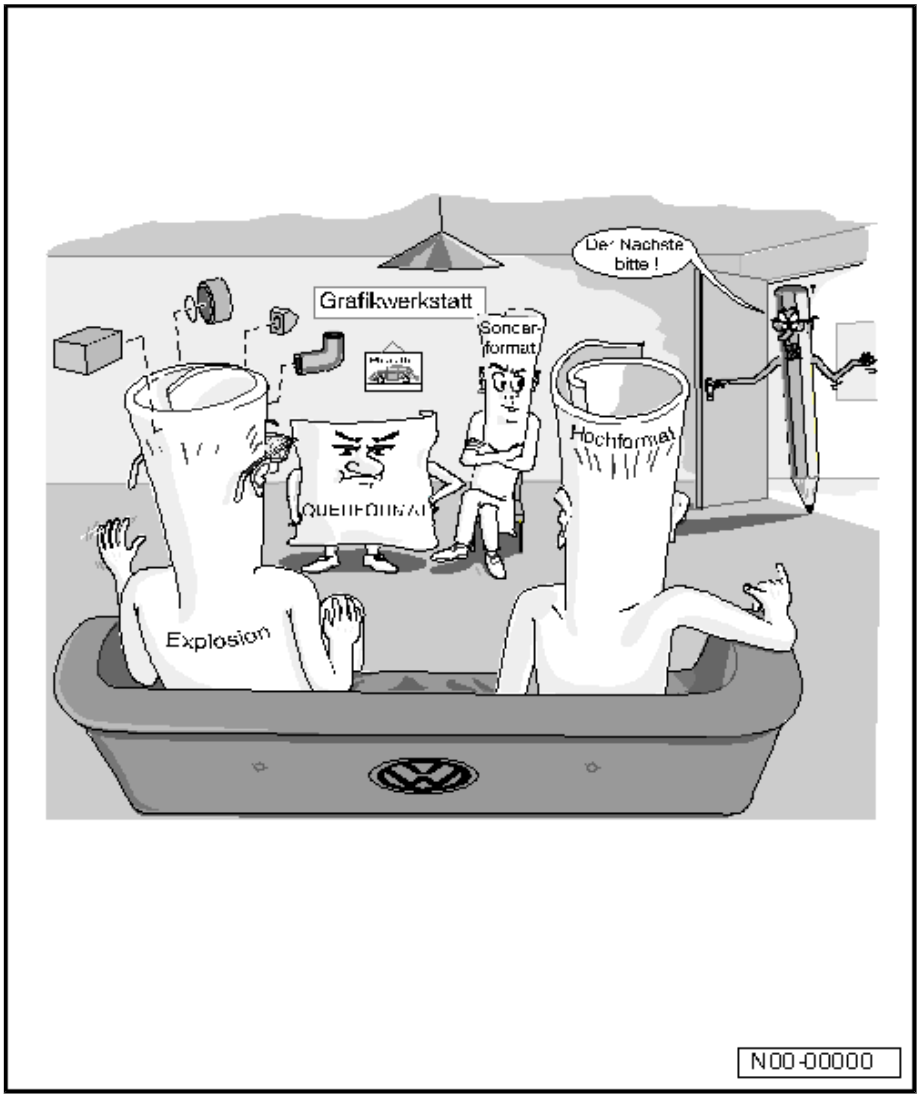
- ❑ Check fitting position

5 - Tensioning bolt

6 - Nut

replace after removal

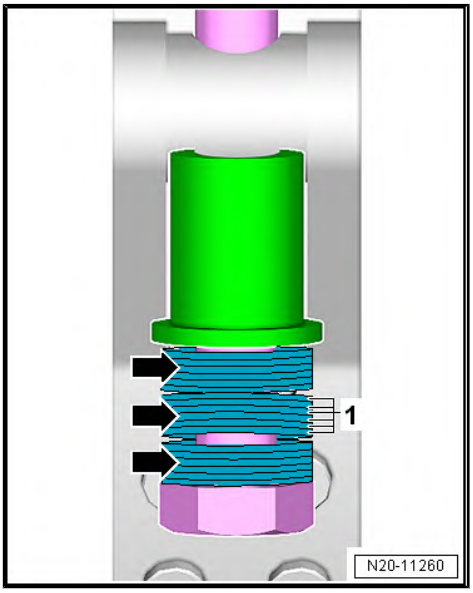
- ❑ Tightening torque
  ⇒ page 258



Fitting position of the disc springs

– Assemble 3 spring packages -arrows- each with 6 disc springs.

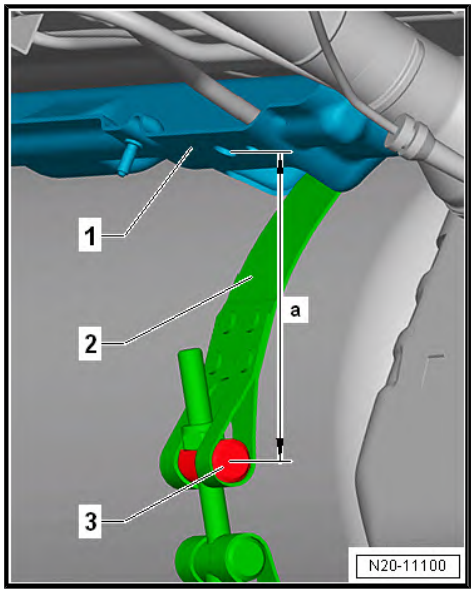
– The spring packages -arrows- must be layered alternately as shown.



Fitting position of the tensioning strap

Before removing, the installation position of the tensioning straps -2- must be determined.

– Measure the dimension -a- between the middle of the tensioning bolt -3-, tensioning strap -2- and mounting bracket -1- using a suitable gauge.

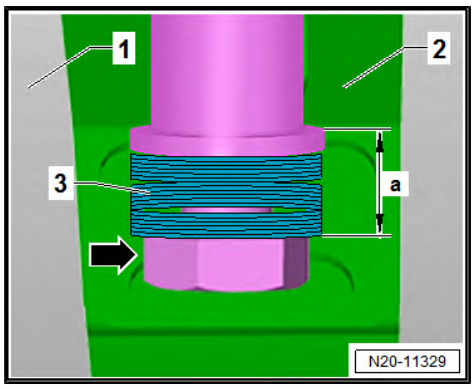


Note

To measure dimension -a-, you may select any point on the bracket for the natural gas container -1-. However, the same point must be kept for measuring when reassembling.

– Align the tensioning strap so that the dimension -a- corresponds with the determined dimension.

Tighten tensioning straps when the natural gas container is empty and the pressure is 0 to 1 MPa (0 to 10 bar)



- The natural gas container must be emptied ⇒ “5.4 Empty the natural gas container ”, page 316 .

– Tighten the tensioning straps -2- at the natural gas container -1-.

– Compress the spring package -3- by tightening the screw -arrow- by 20 Nm.

– Measure the strength of the spring package -3- as shown.

Note

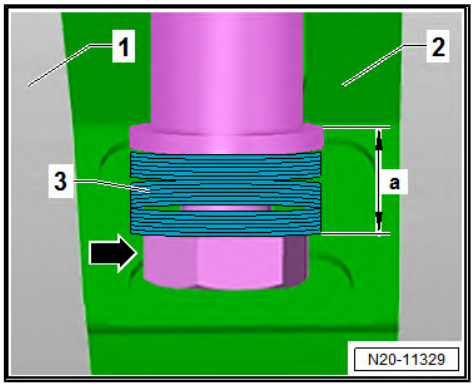
♦ *The spring package is measured together with collar of bushing.*

♦ *To do so, use the caliper gauge, digital, 150 mm - VAS 6335- .*

– Set the dimension -a- by loosening via the screw -arrow-.

- The dimension -a- must be 18.7 mm + 0.1 mm.

Tighten tensioning straps when the natural gas container is full and the pressure is 19 to 20 MPa (190 to 200 bar)



– Tighten the tensioning straps -2- at the natural gas container -1-.

– Compress the spring package -3- by tightening the screw -arrow- by 20 Nm.

– Measure the strength of the spring package -3- as shown.

Note

♦ *The spring package is measured together with collar of bushing.*

♦ *To do so, use the caliper gauge, digital, 150 mm - VAS 6335- .*

– Set the dimension -a- by loosening via the screw -arrow-.

• The dimension -a- must be 18.5 mm + 0.1 mm.

3 Petrol fuel system

⇒ “3.1 Drain the fuel tank”, page 260

⇒ “3.2 Removing and installing the fuel tank”, page 267

⇒ “3.3 Summary of components - fuel delivery unit and sender for fuel gauge display”, page 277

⇒ “3.4 Fuel delivery unit with sender for fuel gauge display”, page 278

⇒ “3.5 Removing and installing the sender for fuel gauge display G ”, page 283

⇒ “3.6 Checking fuel pump”, page 283

⇒ “3.7 Removing and installing fuel pump control unit J538 ”, page 296

3.1 Drain the fuel tank

⇒ “3.1.1 Emptying fuel tank when fuel pump is intact”, page 260

⇒ “3.1.2 Emptying fuel tank if it is more than 3/4 full”, page 263

⇒ “3.1.3 Emptying fuel tank if it is less than 3/4 full”, page 265

3.1.1 Emptying fuel tank when fuel pump is intact

Special tools and workshop equipment required

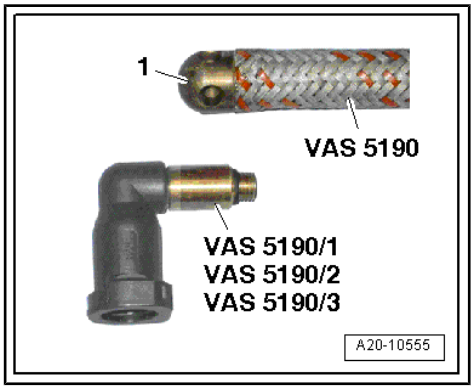
- Fuel extraction device , e. g. -VAS 5190-
- Adapter for fuel extraction - VAS 5190/3-
- Disassembly wedge - 3409-
- Remote control - V.A.G 1348/3A-
- Measuring tool set , e.g. -V.A.G 1594 C-
- Adapter - VAS 5565-

Note

If the fuel extraction device - VAS 5190- is still fitted with an extraction hose with a fixed tip, replace it by the version with a screw-type tip.

– Unscrew tip -1- from extraction hose of fuel extraction unit - VAS 5190- .

– Screw on fuel extraction adapter - VAS 5190/3- to extraction house.



Note

- *Safety precautions when working on the fuel supply system* ⇒ *"2.1 Safety precautions when working on fuel supply system", page 4* .
- *Observe rules for cleanliness* ⇒ *"2.1 Safety precautions when working on fuel supply system", page 4* .

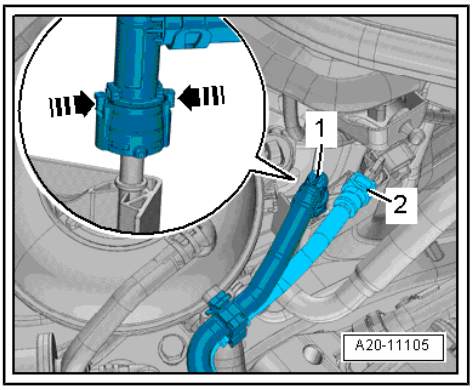
– Switch off the ignition and all electrical components and take out the ignition key.

WARNING

Risk of injury caused by fuel which is under high pressure.

Lay a clean cloth around the connection point and carefully slacken the connection point in order to relieve the pressure in the fuel system.

– Pull out the supply line -1- and catch the fuel that flows out with a cleaning cloth. Unlock the quick coupling and disconnect ⇒ "4 Quick couplings", page 298 .

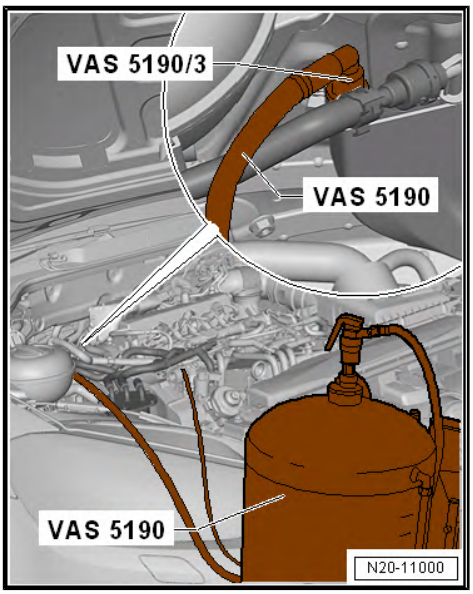


– Connect the fuel extraction device - VAS 5190- with the adapter for the fuel extraction - VAS 5190/3- to the fuel feed line.

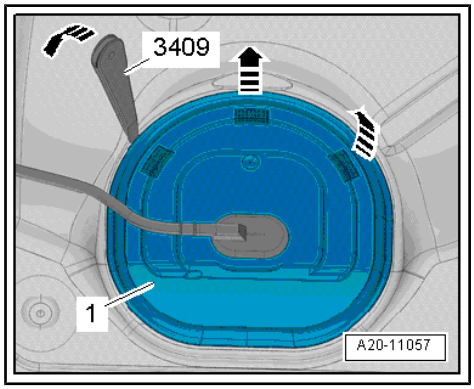
Caution

Secure the earth cable of the fuel extraction device to a bare metal part of the body.

– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

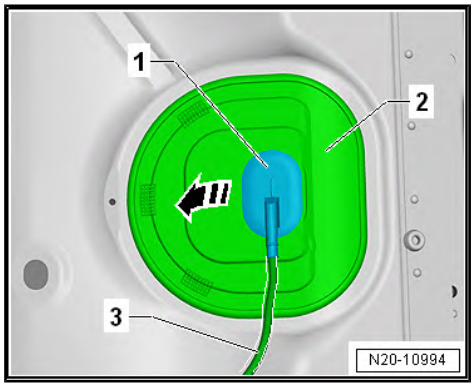


– Unclip cover -1- for closing flange from holder catches -arrows- using the disassembly wedge - 3409- .



– Unclip sealing grommet -1- downwards from the cover -2-.
– Guide the cover -2- backward at the electric wiring loom -3-.

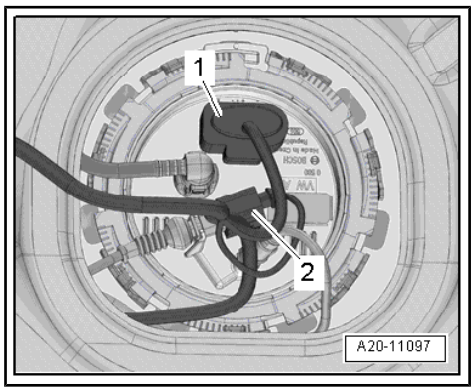
Vehicles with auxiliary heating.



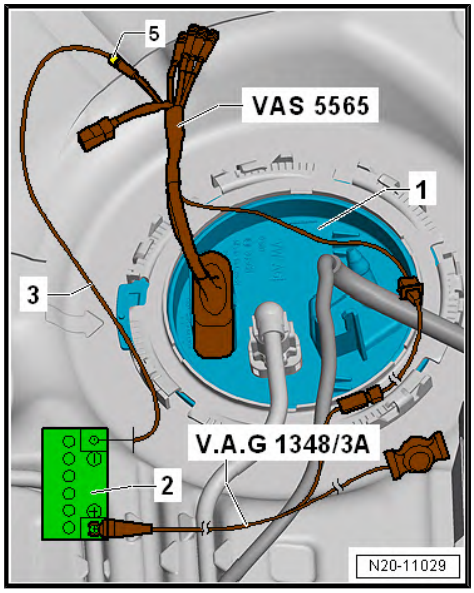
– Disconnect plug connection -2- from auxiliary heating dosing pump - V54- .

Continued for all vehicles

– Disconnect plug connection -1- at fuel pump.



– Connect adapter - VAS 5565- to fuel delivery unit -1-.
– Connect remote control - V.A.G 1348/3A- to adapter - VAS 5565- and to battery positive terminal in engine compartment.
– Connect connection -5- (yellow) from the adapter - VAS 5565- with adapter cables -3- from the adapter set - V.A.G 1594 C- to the minus pole terminal on the battery.

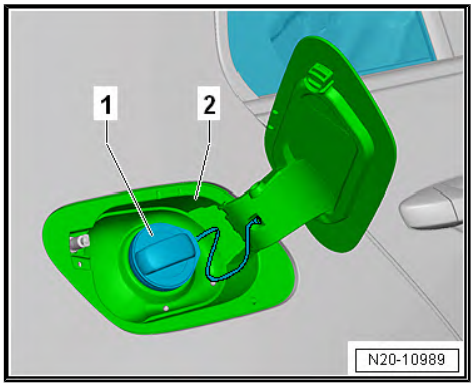


Note

This step is only intended to ensure that the fuel pump runs when the engine is switched off.

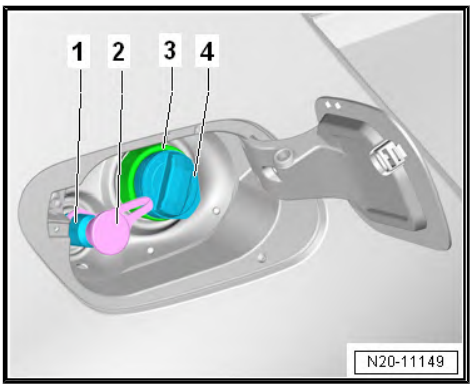
Only for petrol vehicles

– Open the fuel tank cap and clean around the fuel filler neck -2-.
– Unscrew the cap -1- for the fuel filler neck.



For natural gas vehicles (CNG)

– Open the fuel tank cap and clean around the fuel filler neck.
– Unscrew the cap -4- for the fuel filler neck.



Continued for all vehicles

– Operate the remote control - V.A.G 1348/3A- and the shut-off cock on the fuel extraction device - VAS 5190- until the fuel tank is emptied.

Caution

The fuel pump must not run »dry«.

3.1.2 Emptying fuel tank if it is more than 3/4 full

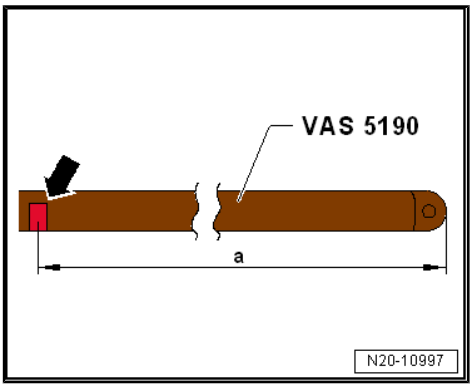
Special tools and workshop equipment required

- Fuel extraction device , e. g. -VAS 5190-

Note

- *Safety precautions when working on the fuel supply system* ⇒ *"2.1 Safety precautions when working on fuel supply system", page 4* .
- *Observe rules for cleanliness* ⇒ *"2.1 Safety precautions when working on fuel supply system", page 4* .

– In distance -a- from the end of the extraction hose make a marking -arrow- on the hose.
– Use insulating tape for this purpose.

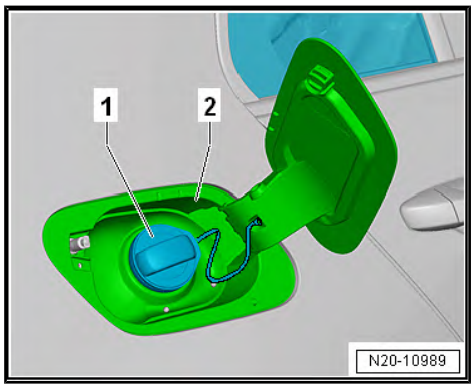


Rear axle	Distance -a- in mm
Vehicles with multi-control arm rear axle	945 mm
Vehicles with torsion beam rear axle	1,010 mm

Only for petrol vehicles

– Open the fuel tank cap and clean around the fuel filler neck -2-.

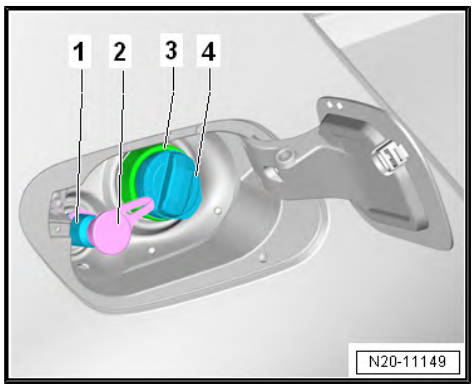
– Unscrew the cap -1- for the fuel filler neck.



For natural gas vehicles (CNG)

– Open the fuel tank cap and clean around the fuel filler neck.

– Unscrew the cap -4- for the fuel filler neck.



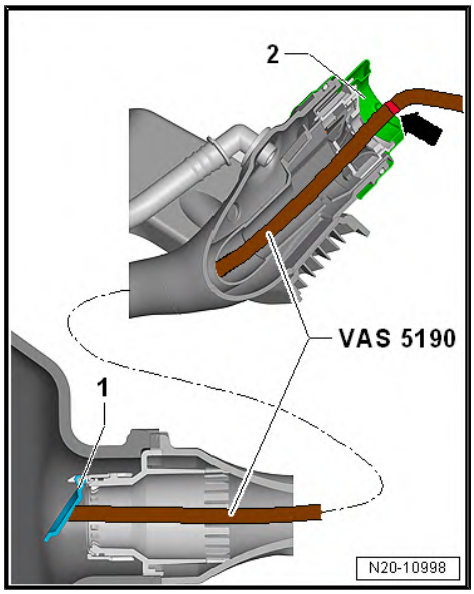
Continued for all vehicles

Caution

Secure the earth cable of the fuel extraction device to a bare metal part of the body.

– Push the extraction hose of the fuel extraction device as far into the fuel tank holder as necessary until the previously applied marking -arrow- terminates with the filler neck -2-.

– Drain the fuel tank through the filler neck as much as possible.



Note

- *In the fuel tank there is a flap -1- on the lower end of the filler neck, which must not be damaged by the extraction hose of the fuel extraction device . Therefore, the hose must only be pushed in up to the previously made marking -arrow-.*
- *If the extraction hose becomes stuck to the check valve while being pulled out, do not pull the extraction hose violently.*
- *If this is the case, remove the fuel delivery unit and hold the check valve open by hand. Make sure that your arm does not come in contact with fuel.*

– Carefully pull out the extraction hose.

Note

- *When no more fuel is extracted, the tank is emptied just enough for the sender flange to be opened without danger.*
- *When working on the fuel delivery unit or on the sender for fuel gauge display , proceed as follows*
  ⇒ "3.4 Fuel delivery unit with sender for fuel gauge display", page 278 .

3.1.3 Emptying fuel tank if it is less than 3/4 full

Special tools and workshop equipment required

- Fuel extraction device , e. g. -VAS 5190-
- Wrench for union nut - T30101 (3087)-
- Disassembly wedge - 3409-

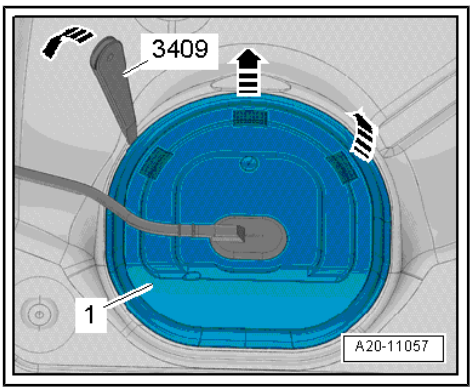
Note

- *Safety precautions when working on the fuel supply system* ⇒ *"2.1 Safety precautions when working on fuel supply system", page 4* .
- *Observe rules for cleanliness* ⇒ *"2.1 Safety precautions when working on fuel supply system", page 4* .

– Switch off ignition and all electrical loads, and pull out ignition key.

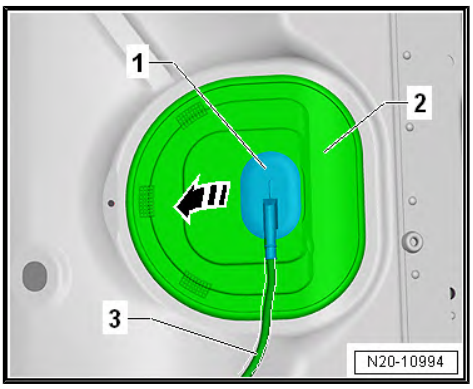
– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

– Unclip the cover -1- using the disassembly wedge - 3409- .

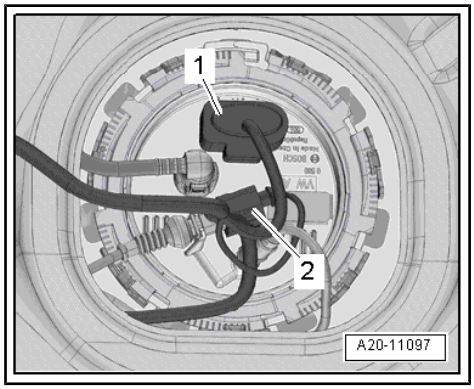


– Unclip sealing grommet -1- downwards from the cover -2-.

– Guide the cover -2- backward at the electric wiring loom -3-.



– Unlock electrical plug connection -1- from closing flange, and remove.



Vehicles with auxiliary heating.

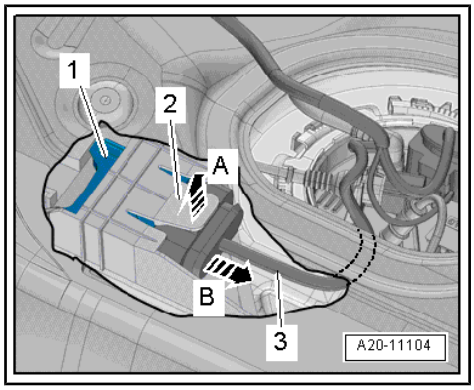
– Unlock plug connection -2- for the dosing pump - V54- and remove it.

Continued for all vehicles

– Push up pick-up coupling -2- -arrow A-. To do so, reach between bottom plate and fuel tank with a finger.

– Simultaneously pull the fuel pump control unit - J538- -1- at the electric wiring loom -3- carefully out of the uptake -arrow B-.

– Take out fuel pump control unit - J538- inwards between fuel tank and bottom plate, and place to one side.

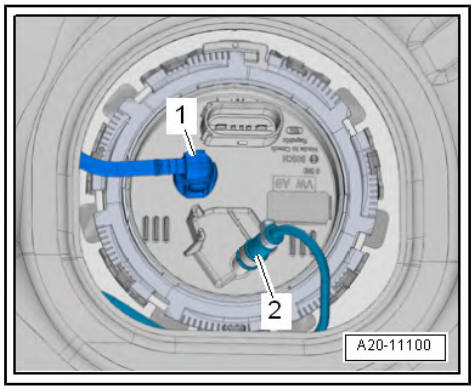


WARNING

Risk of injury caused by fuel which is under high pressure.

Lay a clean cloth around the connection point and carefully slacken the connection point in order to relieve the pressure in the fuel system.

– Remove fuel line -1- from closing flange
⇒ “4 Quick couplings”, page 298 .



Vehicles fitted with auxiliary heating

– Loosen hose clamp, fuel line -2- to the dosing pump for the auxiliary heating from the closing flange.

– To do so, open the bottom clamp.

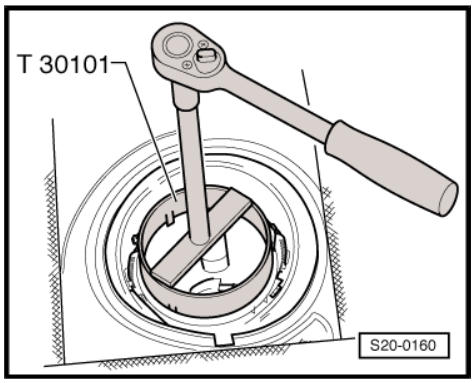
– Carefully pull out fuel line -2-.

Continued for all vehicles

Note

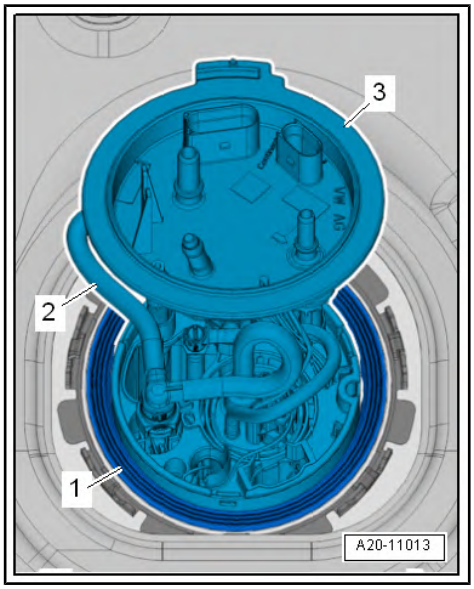
Ensure that the fuel delivery unit is not damaged when loosening the lock ring of the holder on the flange.

– Open lock ring with the wrench - T30101- .



– Carefully lift out fuel delivery unit flange -3-.

– Remove gasket -1- from the opening of the fuel tank opening and raise the fuel delivery unit flange slightly higher.



Caution

Secure the earth cable of the fuel extraction device to a bare metal part of the body.

– Insert suction hose of fuel extractor - VAS 5190- as far as possible into fuel tank.

– Extract fuel using the fuel extraction device - VAS 5190- .

If fuel tank needs only to be emptied, re-install the fuel delivery unit with the sender for fuel gauge display
⇒ “3.4 Fuel delivery unit with sender for fuel gauge display”, page 278 .

Tightening torques

- Summary of components - fuel delivery unit
⇒ “3.3 Summary of components - fuel delivery unit and sender for fuel gauge display”, page 277
- ⇒ Heating, Air conditioning; Rep. gr. 82

3.2 Removing and installing the fuel tank

⇒ “3.2.1 Removing and installing fuel tanks only for petrol vehicles”, page 267

⇒ “3.2.2 Removing and installing the fuel tank for natural gas vehicles (CNG)”, page 272

3.2.1 Removing and installing fuel tanks only for petrol vehicles

Special tools and workshop equipment required

- Engine and gearbox jack , e.g. -V.A.G 1383A-
- Disassembly wedge - 3409-

• The fuel tank must be empty for weight reasons when removing it, if necessary suction the fuel out of the fuel tank
⇒ “3.1 Drain the fuel tank”, page 260 .

Removing

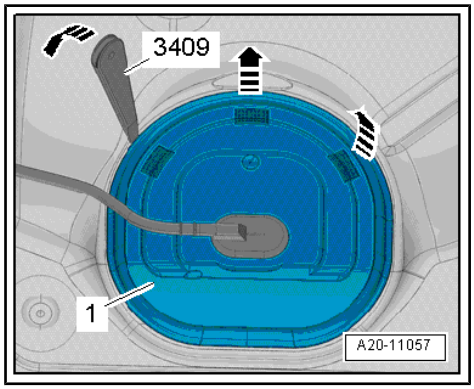
Note

- *Safety precautions when working on the fuel supply system*
⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 .
- *Rules of cleanliness when working on the fuel supply system*
⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 .

– Switch off ignition and all electrical loads, and pull out ignition key.

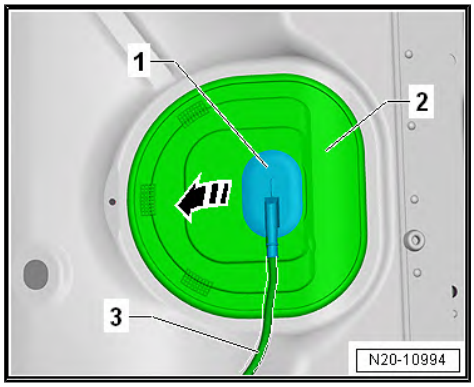
– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

– Unclip cover -1- for closing flange from holder catches -arrows- using the disassembly wedge - 3409- .



– Unclip sealing grommet -1- downwards from the cover -2-.
– Guide the cover -2- backward at the electric wiring loom -3-.

Vehicles with auxiliary heating



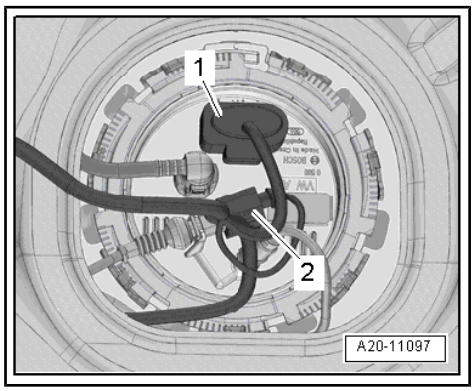
– Disconnect plug connection -2- from auxiliary heating dosing pump.

Vehicles fitted with auxiliary heating

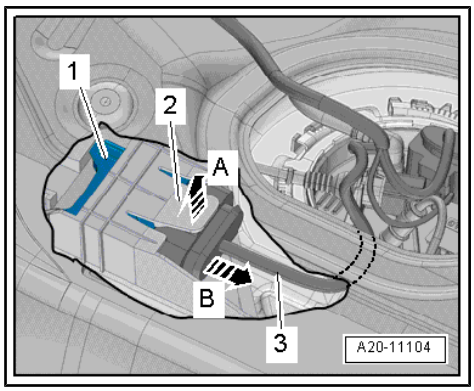
– Unlock the connector -2- for dosing pump - V54- of the auxiliary heating and remove.

Continued for all vehicles

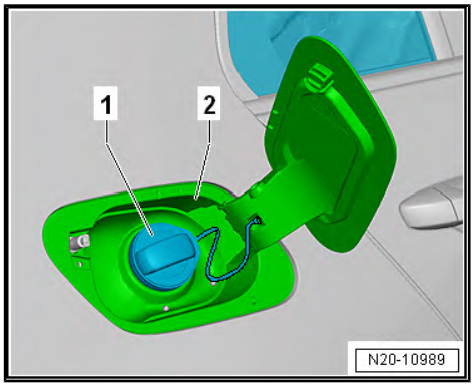
– Push up pick-up coupling -2- -arrow A-. To do so, reach between bottom plate and fuel tank with a finger.
– Simultaneously pull the fuel pump control unit - J538- -1- at the electric wiring loom -3- carefully out of the uptake -arrow B-.



– Take out fuel pump control unit - J538- inwards between fuel tank and bottom plate.



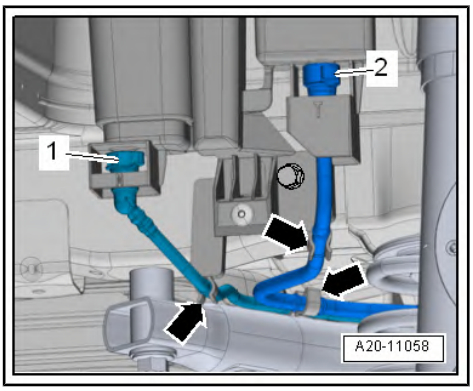
– Open the fuel tank cap and clean around the fuel filler neck -2-.
– Unscrew the cap -1- for the fuel filler neck.



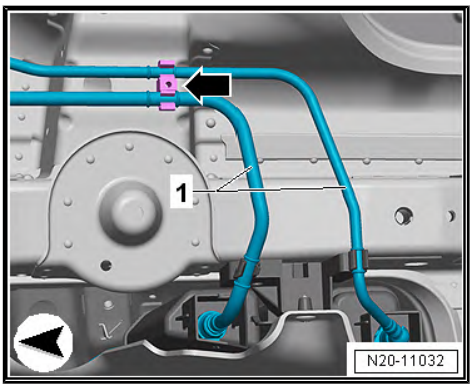
Note

Close the opening of the fuel filler neck with a clean cloth so that no dirt can penetrate.

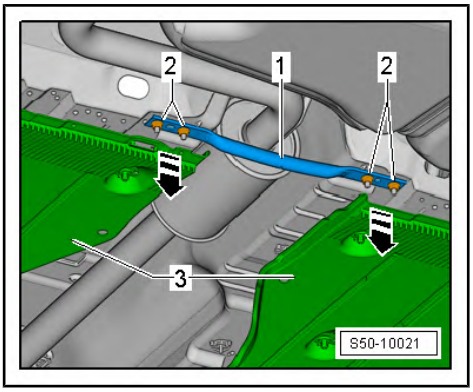
– Remove tank flap unit -2- ⇒ Body Work; Rep. gr. 55 .
– Removing the rear right wheel.
– Remove the rear right wheelhouse liner ⇒ Body Work; Rep. gr. 66 .
– Remove the rear wheel brake calliper and store to on side ⇒ Suspension; Rep. gr. 46 .
– Disconnect the plug connection from the ABS speed sensor, right rear wheel, and undo the line from the mounting brackets at the rear axle ⇒ Suspension; Rep. gr. 45 .
– Remove the vent lines -1- and -2- from the activated charcoal filter, do so by disconnecting the push-fit couplings ⇒ “4 Quick couplings”, page 298 .
– Loosen ventilation lines from fasteners on the holder -arrows-.



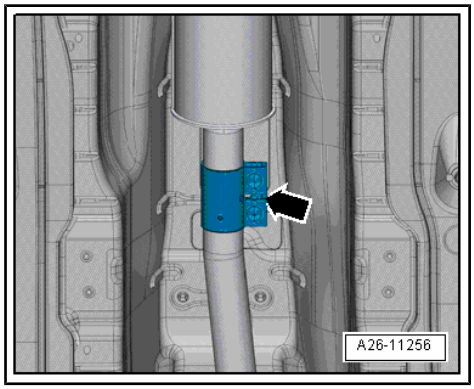
– Loosen ventilation line -1- from fastener on the holder -arrow-.
– Remove cover for rear left underbody and plastic cover behind the rear axle ⇒ Body Work; Rep. gr. 66



– Remove screws -2- and remove tunnel bridge -1- in -direction of arrow-.



– Loosen the clamping sleeve -arrow- and slide it forwards.

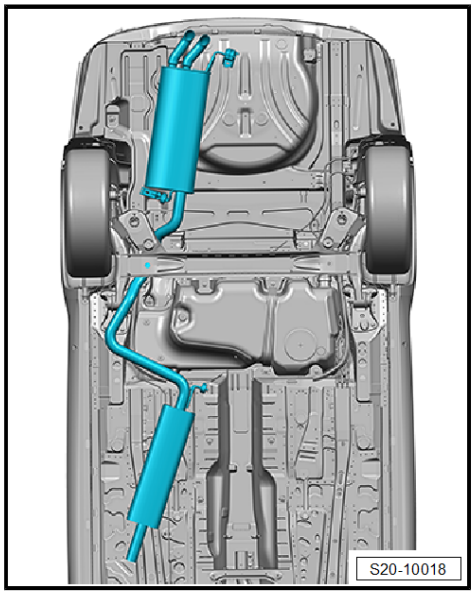


Note

A second person is required for the further work.

– Unscrew screws of the suspension of the centre and rear silencers Positions -2-, -3- and -4-
⇒ “1.4 Replacing middle or rear part of the exhaust system”, page 435

– Unscrew middle silencer outwards and carefully place it on the rear axle as shown in the figure.



Note

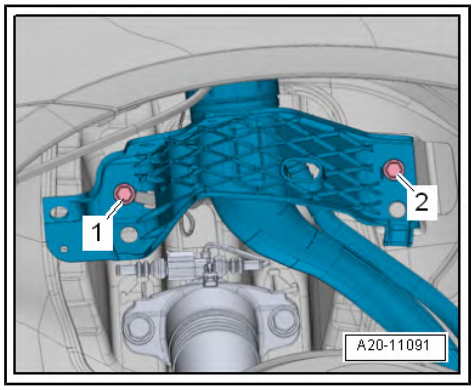
- *Make sure that the rear axle is not damaged.*
- *To protect the rear axle, place a cloth underneath the middle and rear silencer.*

– Unscrew screws -1- -2- for fuel filler neck.

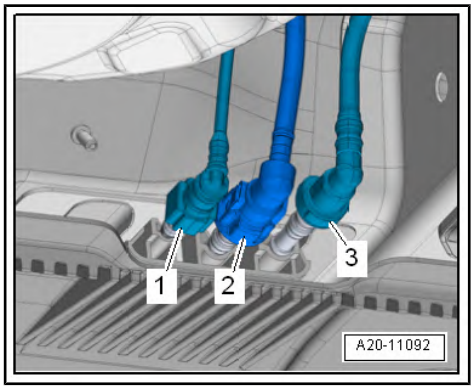
WARNING

Risk of injury caused by fuel which is under high pressure.

Lay a clean cloth around the connection point and carefully slacken the connection point in order to relieve the pressure in the fuel system.



– Disconnect vent line -3- and fuel line -2-
⇒ “4 Quick couplings”, page 298 .



Note

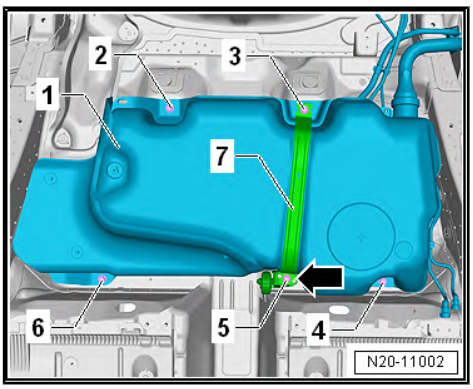
For vehicles with auxiliary heating, the fuel line -1- for the dosing pump - V54- must also be disconnected
⇒ “4 Quick couplings”, page 298 .

WARNING

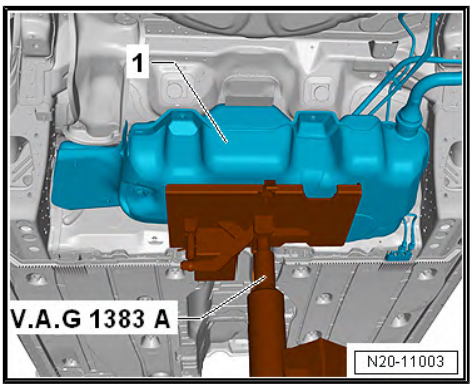
Risk of accident from fuel tank weight.

The fuel tank must be empty for removal.

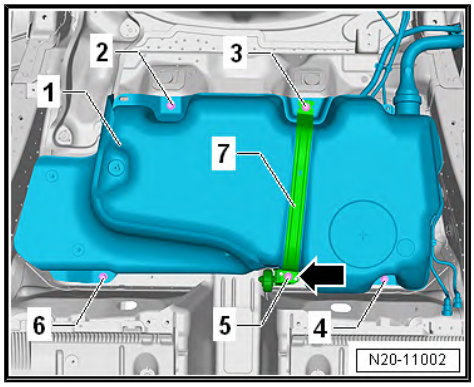
– Unscrew screw -5-.
– Remove holder for exhaust system retaining strap -arrow-.
– Unscrew fixing screws -3- and remove tensioning strap -7-.



– Support the fuel tank using the engine and gearbox jack - V.A.G 1383A- .



– Unscrew fixing screws -2-, -4- and -6-.



Note

The filler neck must be “extracted” between body and rear axle. Lift fuel tank down from the engine and gearbox jack - V.A.G 1383A- with a 2nd mechanic.

– Lower the fuel tank a little and carefully unscrew it outwards and downwards.

Note

Make sure you do not kink the vent and fuel lines.

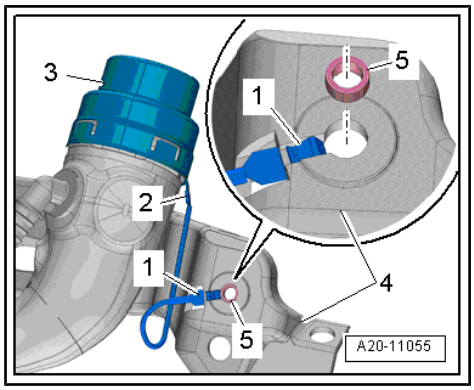
Install

Note

For vehicles with auxiliary heating and additional heating the dosing pump - V54- must also be tested for firm seating on the holder.

– Check both earth connections for corrosion, if necessary remove corrosion.
– Check the fitting position of the earth lead.

Earth connection for fuel filler neck



– Connect earth connection as shown in the illustration.
– Ensure proper seating of plug connection.
♦ Plug -2- of the earth connection on the threaded ring -3- of the fuel filler neck.
– Unhook contact peg -1- of the earth connection in the securing bore on the fuel tank -4- and press in the distance sleeve -5-.
– Guide the filler neck between body and rear axle with the assistance of a 2nd mechanic. Then position the fuel tank onto the engine/gearbox jack - V.A.G 1383A- .

Further installation occurs in reverse order. However, pay attention to the following:

♦ Vent and fuel lines must be laid without any kinks.
♦ Do not mix-up the feed line and the return-flow line (the return-flow line is blue, the feed line is black).
♦ Make sure the line connections fit tightly.
♦ After installing the fuel tank, check whether the lines are also clipped in place on the fuel tank.

3.2.2 Removing and installing the fuel tank for natural gas vehicles (CNG)

Special tools and workshop equipment required

♦ Engine and gearbox jack , e.g. -V.A.G 1383A-
♦ Disassembly wedge - 3409-

- The fuel tank must be empty for weight reasons when removing it, if necessary suction the fuel out of the fuel tank ⇒ “3.1 Drain the fuel tank”, page 260 .

Removing

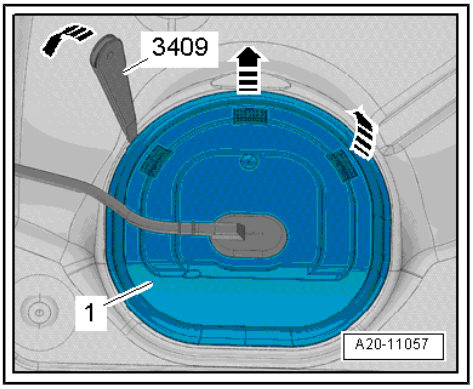
Note

- *Safety precautions when working on the fuel supply system* ⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 .
- *Rules of cleanliness when working on the fuel supply system* ⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 .

– Switch off ignition and all electrical loads, and pull out ignition key.

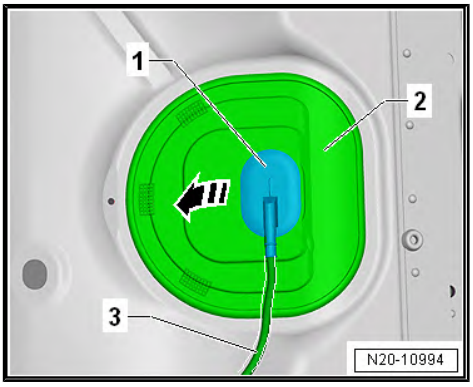
– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

– Unclip cover -1- for closing flange from holder catches -arrows- using the disassembly wedge - 3409- .



– Unclip sealing grommet -1- downwards from the cover -2-.

– Guide the cover -2- backward at the electric wiring loom -3-.



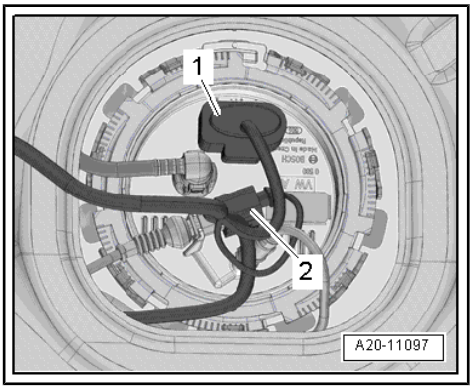
Vehicles fitted with auxiliary heating

– Unlock the connector -2- for dosing pump - V54- of the auxiliary heating and remove.

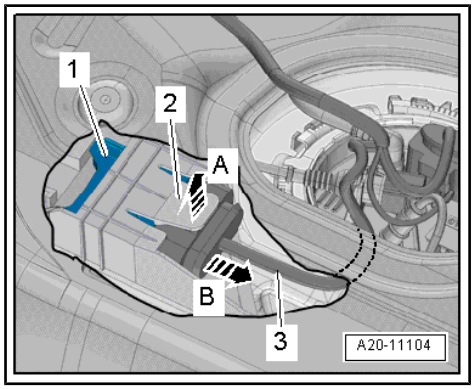
Continued for all vehicles

– Push up pick-up coupling -2- -arrow A-. To do so, reach between bottom plate and fuel tank with a finger.

– Simultaneously pull the fuel pump control unit - J538- -1- at the electric wiring loom -3- carefully out of the uptake -arrow B-.

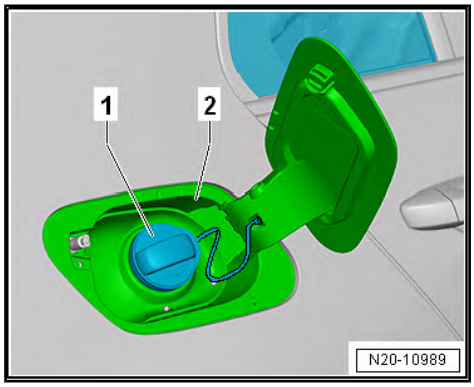


– Take out fuel pump control unit - J538- inwards between fuel tank and bottom plate.



– Open the fuel tank cap and clean around the fuel filler neck -2-.

– Unscrew the cap -1- for the fuel filler neck.



Note

Close the opening of the fuel filler neck with a clean cloth so that no dirt can penetrate.

– Remove tank flap unit -2- ⇒ Body Work; Rep. gr. 55 .

– Removing the rear right wheel.

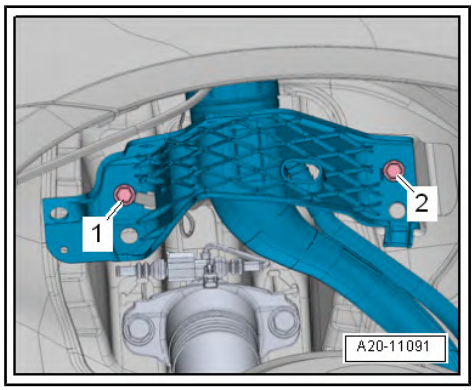
– Remove the rear right wheelhouse liner ⇒ Body Work; Rep. gr. 66 .

– Remove the rear wheel brake calliper and store to on side ⇒ Suspension; Rep. gr. 46 .

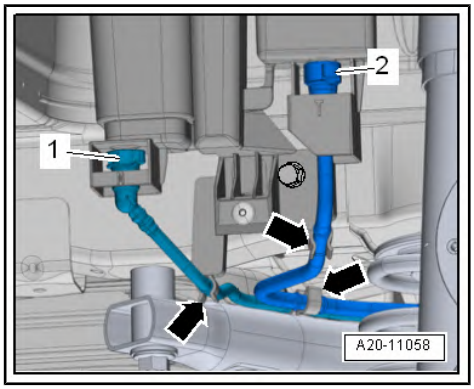
– Disconnect the plug connection from the ABS speed sensor, right rear wheel, and undo the line from the mounting brackets at the rear axle ⇒ Suspension; Rep. gr. 45 .

– Removing the natural gas filling connection ⇒ “5.10 Removing and installing filling connection”, page 352 .

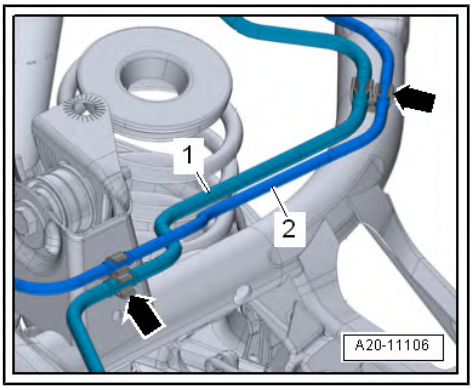
– Unscrew screws -1- -2- for fuel filler neck.



– Remove the vent lines -1- and -2- from the activated charcoal filter, do so by disconnecting the push-fit couplings
⇒ “4 Quick couplings”, page 298 .
– Loosen ventilation lines from fasteners on the holder -arrows-.



– Undo the vent line -1- from the fastening on the mounting bracket -arrows-.
– Remove rear part of exhaust system
⇒ “1.4.2 Replace middle or rear part of the exhaust system on natural gas vehicles”, page 437 .

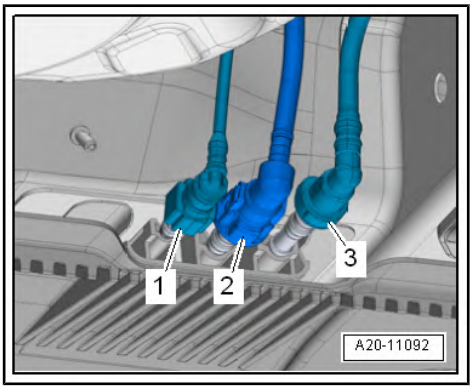


WARNING

Risk of injury caused by fuel which is under high pressure.

Lay a clean cloth around the connection point and carefully slacken the connection point in order to relieve the pressure in the fuel system.

– Disconnect vent line -3- and fuel line -2-
⇒ “4 Quick couplings”, page 298 .



Note

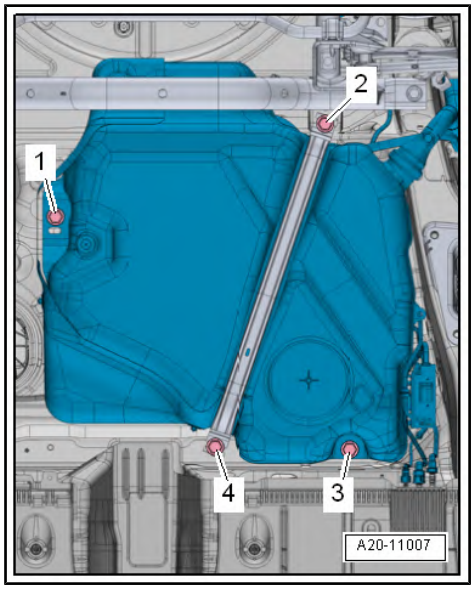
For vehicles with auxiliary heating, the fuel line -1- for the dosing pump - V54- must also be disconnected
⇒ “4 Quick couplings”, page 298 .

WARNING

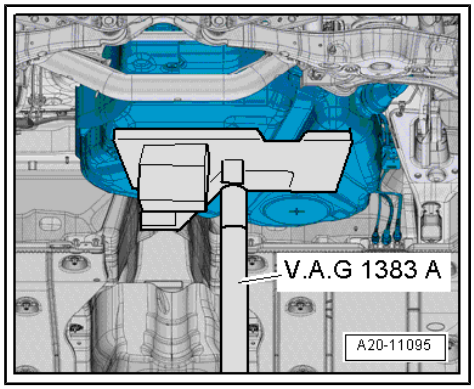
Risk of accident from fuel tank weight.

The fuel tank must be empty for removal
⇒ “3.1 Drain the fuel tank”, page 260 .

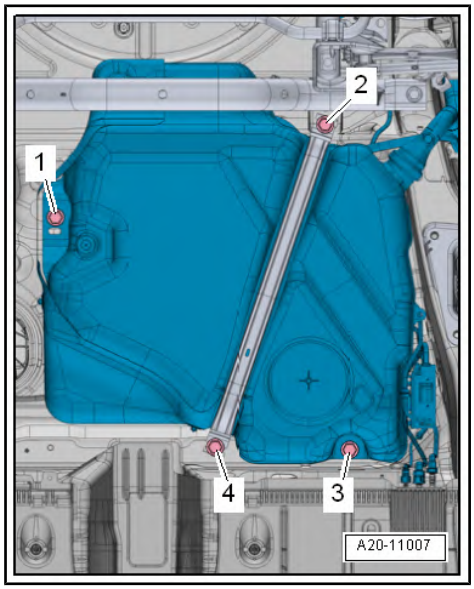
– Release screw -4-.
– Remove holder for exhaust system retaining strap
– Unscrew holding down bolt -2- and remove tensioning strap.



– Support the fuel tank using the engine and gearbox jack - V.A.G 1383A- .



– Release fixing screws -1- and -2-.



Note

The filler neck must be “extracted” between body and rear axle. Lift fuel tank down from the engine and gearbox jack - V.A.G 1383A- with a 2nd mechanic.

– Lower the fuel tank a little and carefully unscrew it outwards and downwards.

Note

Make sure you do not kink the vent and fuel lines.

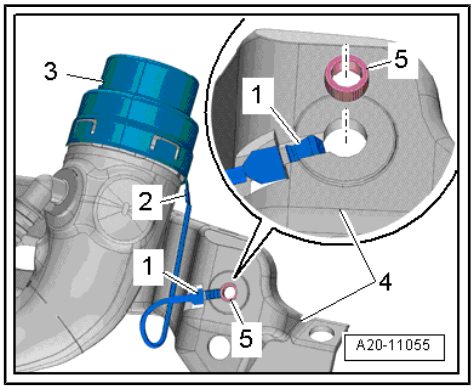
Install

Note

For vehicles with auxiliary heating and additional heating the dosing pump - V54- must also be tested for firm seating on the holder.

– Check both earth connections for corrosion, if necessary remove corrosion.
– Check the fitting position of the earth lead.

Earth connection for fuel filler neck



– Connect earth connection as shown in the illustration.
– Ensure proper seating of plug connection.
♦ Plug -2- of the earth connection on the threaded ring -3- of the fuel filler neck.
– Unhook contact peg -1- of the earth connection in the securing bore on the fuel tank -4- and press in the distance sleeve -5-.
– Guide the filler neck between body and rear axle with the assistance of a 2nd mechanic. Then position the fuel tank onto the engine/gearbox jack - V.A.G 1383A- .

Further installation occurs in reverse order. However, pay attention to the following:

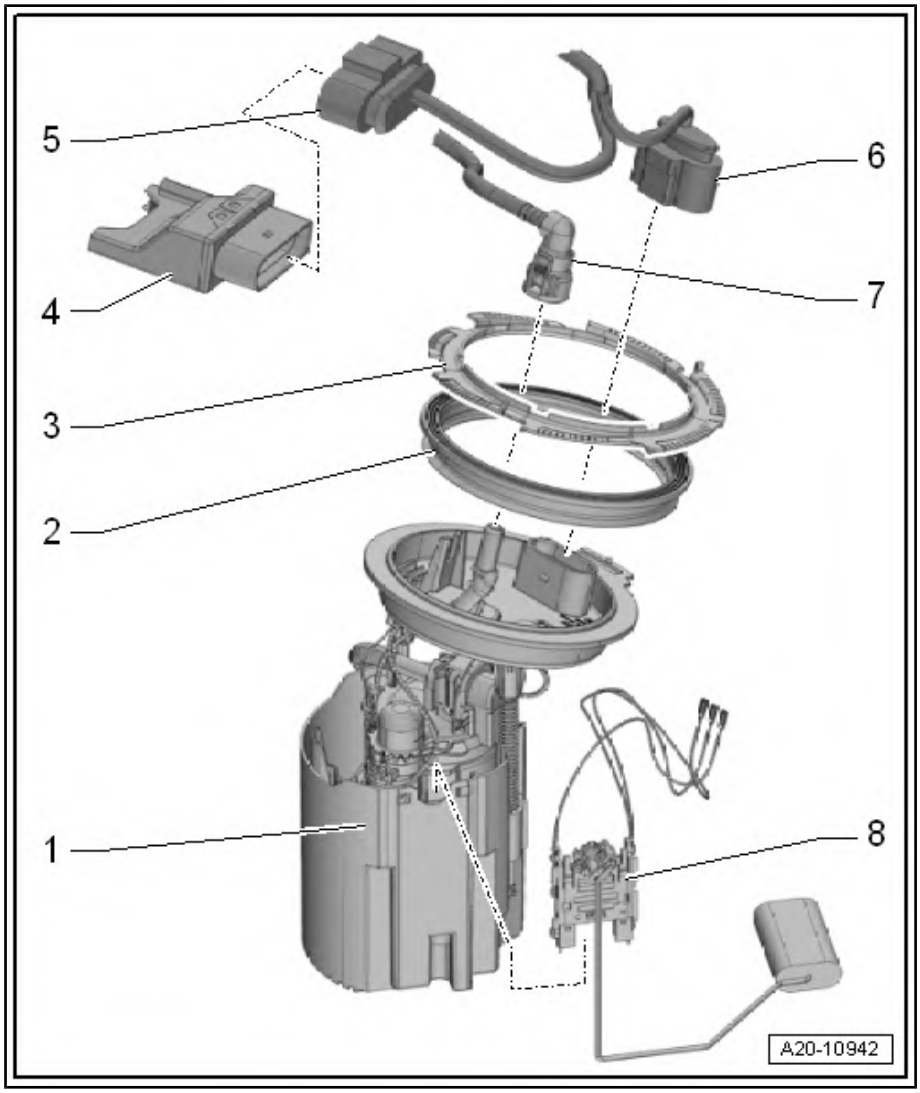
♦ Vent and fuel lines must be laid without any kinks.
♦ Do not mix-up the feed line and the return-flow line (the return-flow line is blue, the feed line is black).
♦ Make sure the line connections fit tightly.
♦ After installing the fuel tank, check whether the lines are also clipped in place on the fuel tank.
– Fill fuel tank with at least 5 litres of fuel.

WARNING

Risk of explosion to the fuel tank!

After installing a new fuel tank or completely emptying the fuel tank, you must replenish with a minimum of 5 litres of fuel right away. The fuel pump must not be allowed to start when the fuel tank is completely empty.

3.3 Summary of components - fuel delivery unit and sender for fuel gauge display



1 - Fuel system pressurisation pump - G6-

- ❑ with integrated fuel filter, the fuel filter cannot be replaced individually
- ❑ Checking fuel pump electrics ⇒ Vehicle diagnostic tester
- ❑ Removing and installing ⇒ “3.4 Fuel delivery unit with sender for fuel gauge display”, page 278
- ❑ Fill the vehicle with at least 5 litres of fuel after installing

2 - Sealing ring

- ❑ replace after removal
- ❑ install when dry

3 - Lock ring

- ❑ loosen and/or tighten using wrench - T30101-
- ❑ 110 Nm

4 - Fuel pump control unit - J538-

- ❑ Removing and installing ⇒ “3.7 Removing and installing fuel pump control unit J538 ”, page 296
- ❑ check ⇒ Vehicle diagnostic tester

5 - Connector

- ❑ For fuel pump control unit - J538-
- ❑ Ensure safe locking by pulling

6 - Connector

- ❑ for Fuel pump for predelivery system - G6- and fuel gauge sender - G-
- ❑ Ensure safe locking by pulling

7 - Fuel feed line

- ❑ to the engine
- ❑ do not kink
- ❑ disconnect and connect ⇒ “4 Quick couplings”, page 298

8 - Fuel gauge sender - G-

- ❑ Removing and installing ⇒ “3.5 Removing and installing the sender for fuel gauge display G ”, page 283
- ❑ Check with the fuel pump control unit - J538- ⇒ Vehicle diagnostic tester

3.4 Fuel delivery unit with sender for fuel gauge display

Special tools and workshop equipment required

- ◆ Disassembly wedge - 3409-

♦ Key - T30101-

Removing

- The fuel tank must not be more than $^{3}/_{4}$ full.

Note

♦ *If necessary, extract fuel from the fuel tank*
⇒ "3.1 Drain the fuel tank", page 260 .

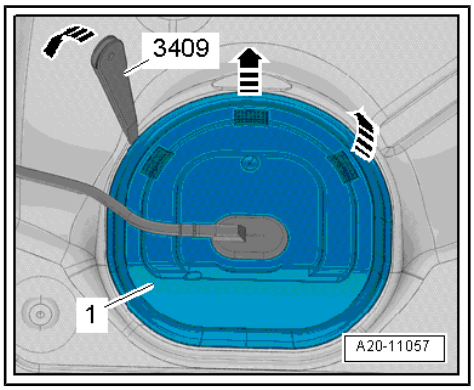
♦ *Observe the safety instructions before starting fitting work*
⇒ "2.1 Safety precautions when working on fuel supply system", page 4 .

♦ *Observe rules for cleanliness*
⇒ "2.1 Safety precautions when working on fuel supply system", page 4 .

– Switch off ignition and all electrical loads, and pull out ignition key.

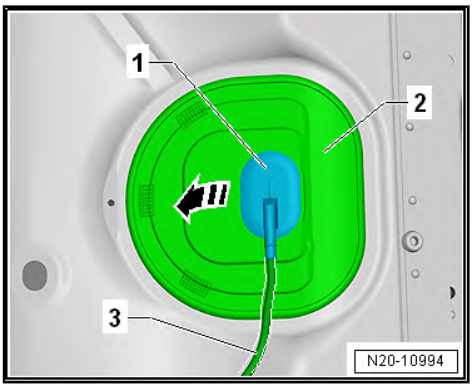
– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

– Unclip cover -1- for closing flange from holder catches -arrows- using the disassembly wedge - 3409- .

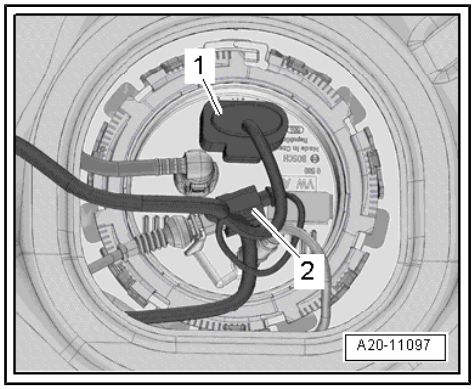


– Unclip sealing grommet -1- downwards from the cover -2-.

– Guide the cover -2- backward at the electric wiring loom -3-.



– Unlock electrical plug connection -1- from closing flange, and remove.



Vehicles with auxiliary heating

– Disconnect plug connection -2- from auxiliary heating dosing pump.

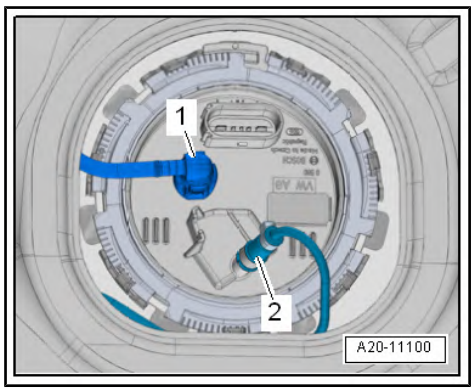
Continued for all vehicles

WARNING

Risk of injury caused by fuel which is under high pressure.

Lay a clean cloth around the connection point and carefully slacken the connection point in order to relieve the pressure in the fuel system.

– Remove fuel line -1- from closing flange
⇒ “4 Quick couplings”, page 298 .

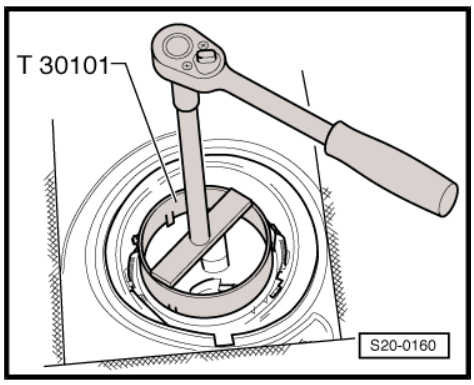


Vehicles with auxiliary heating

– Loosen hose clamp, fuel line -2- to the dosing pump for the auxiliary heating from the closing flange.

Continued for all vehicles

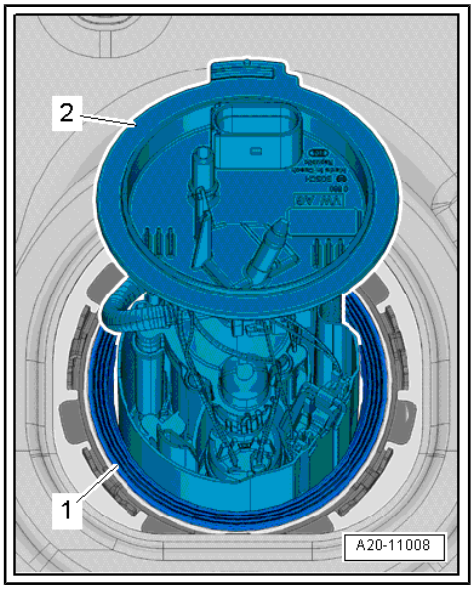
– Open lock ring with the wrench - T30101- .



Volkswagen Technical Site: http://vwts.ru http://vwts.info
огромный архив документации по автомобилям Volkswagen, Skoda, Seat, Audi

– Pull sealing flange -2- carefully out of the fuel tank opening.

– Remove sealing ring -1- from fuel tank opening.



WARNING

Beware of fuel flowing out of the fuel pump that is still full - accident hazard.

Put cleaning cloth underneath to collect fuel.

Note

- *Remove fuel delivery unit from the fuel tank so that the electric lines and fuel hoses are not damaged and the float arm of the sender for fuel gauge display - G- is not bent.*
- *You must empty the old fuel delivery unit before disposing of it if you wish to replace it.*

– Pull the fuel delivery unit out of the opening of the fuel tank.

Install

– Insert the new dry gasket ring into the opening of the fuel tank and moisten only from the inside with fuel for installing the closing flange.

– Insert the fuel delivery unit into the fuel tank in such a way that the float arm of the sender for the fuel gauge display - G- is not bent.

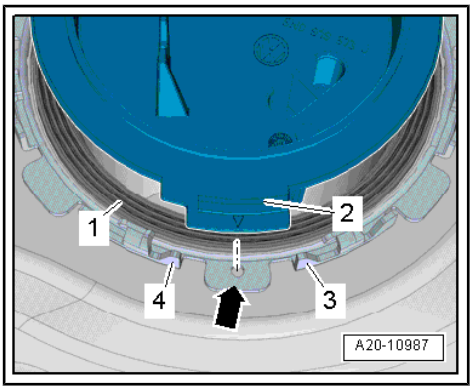
Caution

Risk of leakage.

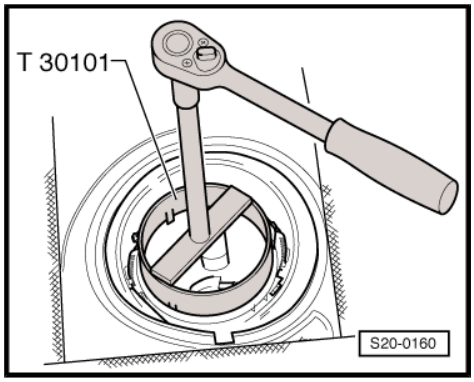
The gasket ring must not get damaged or squashed when inserting the sealing flange.

• Clutch -2- on closing flange must point to opening -arrow- on the lock ring and be located between tabs -3- and -4- on the fuel tank.

– Press down the closing flange against the spring force and bring it into the installation position.

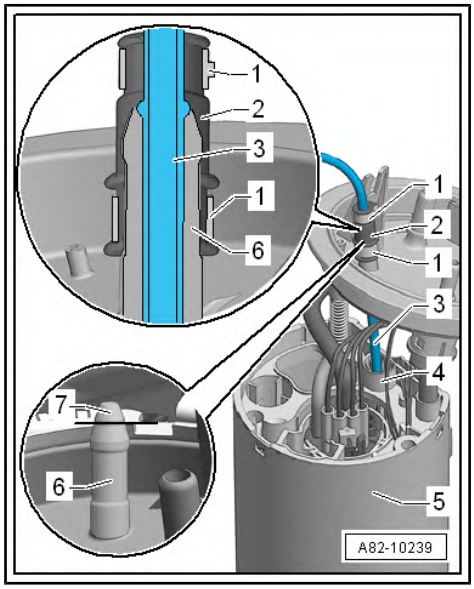


– Insert lock ring and tighten using the wrench - T30101- .
– Connect fuel line ⇒ “4 Quick couplings”, page 298 .



Vehicles with auxiliary heating

– If the fuel delivery unit was replaced, disconnect the cover -7- from the removal connection -6- at the marked separation point and insert the standpipe -3- into the space -4- until the reinforcement rests against the removal connection -6-.
– Push sleeve -2- on and secure with clamps -1-.



Note

Switch on the auxiliary heating and run it for at least 10 minutes at full load to ensure the complete discharge of the fuel line.

Continued for all vehicles

Installation is carried out in the reverse order. Pay attention to the following:

– After installing the fuel delivery unit, refuel with at least 5 litres of fuel.

WARNING

Risk of explosion to the fuel tank!

After installing a new fuel tank or completely emptying the fuel tank, you must replenish with a minimum of 5 litres of fuel right away. The fuel pump must not be allowed to start when the fuel tank is completely empty.

Tightening torques

♦ Lock ring for fuel delivery unit
⇒ “3.3 Summary of components - fuel delivery unit and sender for fuel gauge display”, page 277

3.5 Removing and installing the sender for fuel gauge display - G-

Removing

Note

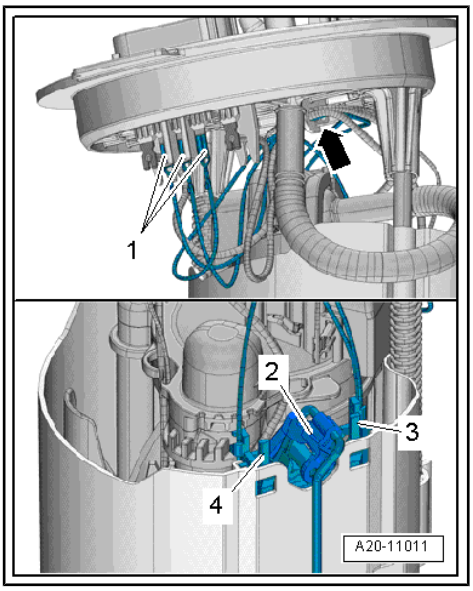
- *Observe safety instructions*
  ⇒ *"2.1 Safety precautions when working on fuel supply system", page 4* .
- *Observe rules for cleanliness*
  ⇒ *"4.1 Cleanliness rules", page 20* .

– Remove fuel delivery unit
⇒ "3.4 Fuel delivery unit with sender for fuel gauge display", page 278 .

– Disconnect electrical plug connection -1- on the closing flange, thereby unlocking the plug lock.

– Unhook the electric cable from the holder -arrow- and expose it.

– Unlock the catch on the uptake clamps -3- and -4-; at the same time, pull the sender for fuel gauge display -G- -2- upwards.



Install

Installation is carried out in the reverse order. Pay attention to the following:

– Insert the sender for fuel gauge display -G- in the guides at the fuel delivery unit and press downwards until it latches into position.

– Connect all electric cables to fuel delivery unit.

– Install fuel delivery unit
⇒ "3.4 Fuel delivery unit with sender for fuel gauge display", page 278 .

3.6 Checking fuel pump

⇒ **"3.6.1 Checking fuel pressure", page 284**

⇒ **"3.6.2 Testing holding pressure", page 287**

⇒ **"3.6.3 Checking fuel delivery rate", page 291**

Special tools and workshop equipment required

- Pressure gauge , e.g. -VAS 6550-
- Pressure control valve - VAS 6550/4-
- Remote control - V.A.G 1348/3A-
- Adapter for measuring method / DSO (5-pin) - VAS 5565-
- Multimeter , e.g. -V.A.G 1715-
- Disassembly wedge - 3409-
- Measuring vessel

3.6.1 Checking fuel pressure

Note

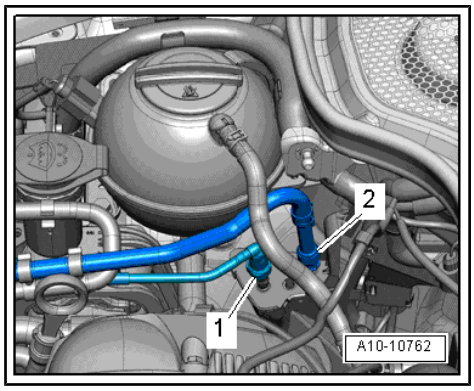
- *Safety precautions when working on the fuel supply system* ⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 .
- *Rules of cleanliness when working on the fuel supply system* ⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 .

– Remove high pressure pipe -2- ⇒ “4 Quick couplings”, page 298 .

– Connect the adapter - VAS 6550/1- to connection -A- of the pressure gauge - VAS 6550- .

– Connect adapter - VAS 6550/1- to the fuel feed line -1- of the fuel pump.

– Connect the adapter - VAS 6550/2- to connection -B- of the pressure gauge - VAS 6550- .

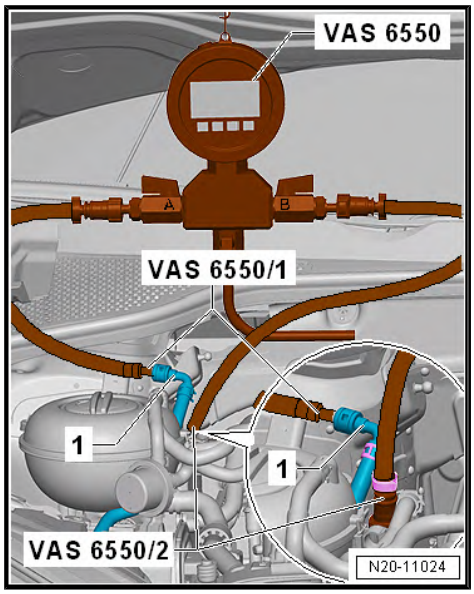


– Connect adapter - VAS 6550/2- to the fuel feed line on the engine.

– Check the quick couplings for firm seating by pulling in the opposite direction!

Caution

Risk of fuel dripping out.

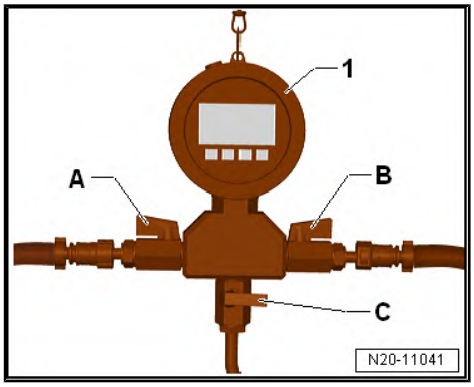


– Open shut-off taps -A- and -B- .

• Shut-off tap -C- is closed.

• Lever points in the direction of flow.

– Connect the diagnostic unit ⇒ Vehicle diagnostic testerand start self-diagnosis with »ODIS«.



Actuate fuel pump with final control diagnosis to build up fuel pressure.

– Switch on ignition.

– On the display, press the buttons in sequence:

♦ `Self-diagnosis`

♦ `Engine electronics`

♦ `Final control diagnosis`

♦ `electric fuel pump`

♦ `Start`

– Read off fuel pressure on pressure gauge.

• Specified value: 0.4…0.7 MPa (4…7 bar)

If the specified value is reached:

– Test holding pressure
⇒ “3.6.2 Testing holding pressure”, page 287 .

If the specified pressure is exceeded:

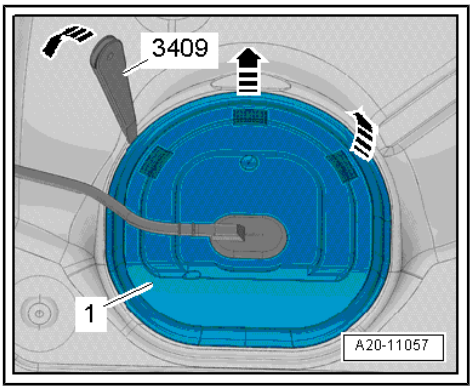
– Replace fuel pump; the pressure limiting valve in the fuel pump is faulty.

If the specified value is not reached:

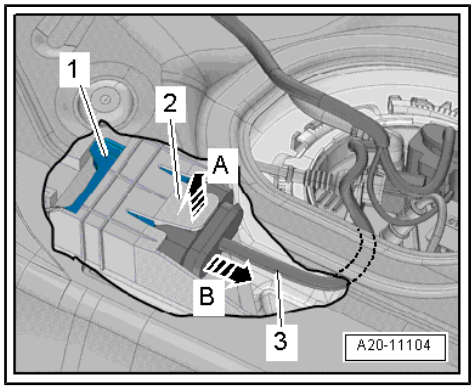
– Proceed as follows to check fuel pressure at fuel delivery unit:

– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

– Loosen catch pegs -arrows- of the cover -1- with disassembly wedge - 3409- and remove the cover.



– Push up pick-up coupling -2- -arrow A-. To do so, reach between bottom plate and fuel tank with a finger.
– Simultaneously pull the fuel pump control unit - J538- -1- at the electric wiring loom -3- carefully out of the uptake -arrow B-.

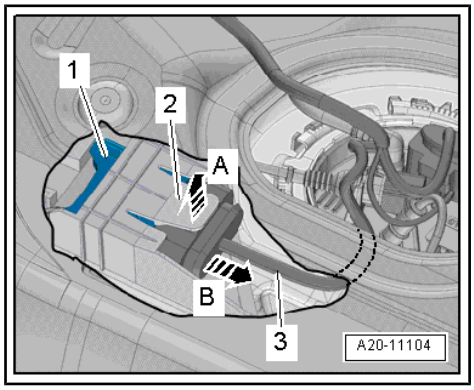


– Place the fuel pump control unit - J538- to one side.

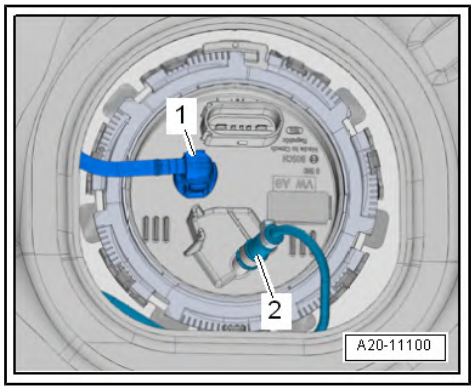
WARNING

Risk of injury caused by fuel which is under high pressure.

Lay a clean cloth around the connection point and carefully slacken the connection point in order to relieve the pressure in the fuel system.



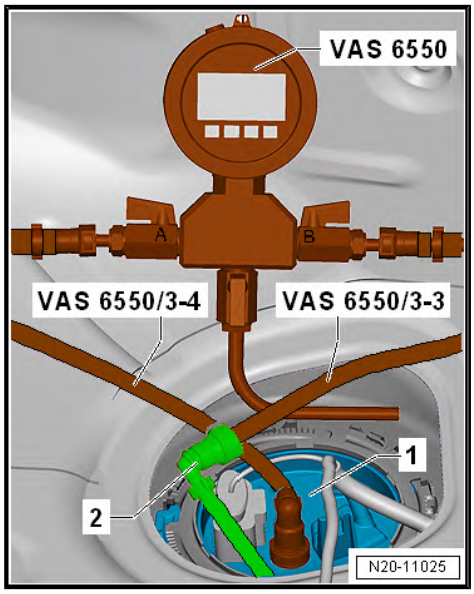
– Remove fuel line -1- from closing flange ⇒ “4 Quick couplings”, page 298 .
– Connect pressure gauge - VAS 6550- with adapter - VAS 6550/3-4- to the fuel delivery unit -1-.



– Connect pressure gauge - VAS 6550- with adapter - VAS 6550/3-3- to the fuel feed line -2-.
– Check the quick couplings for firm seating by pulling in the opposite direction!

Caution

Risk of fuel dripping out.



– Open shut-off taps -A- and -B- .

• Shut-off tap -C- is closed.

• Lever points in the direction of flow.

– Check the fuel pressure again ⇒ page 285

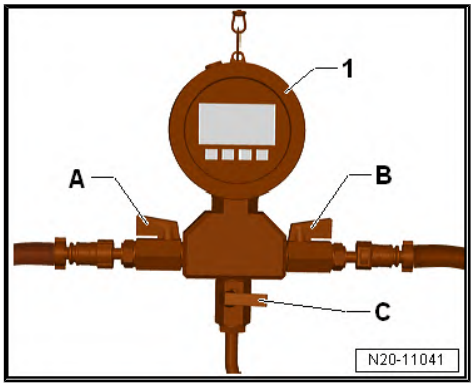
If the specified value is reached:

– Check fuel lines for possible restrictions or blockages.

– Check fuel lines for leaks and possible damage.

If the specified value is not reached:

– Remove fuel pump and check it is clean ⇒ “3.4 Fuel delivery unit with sender for fuel gauge display”, page 278 .

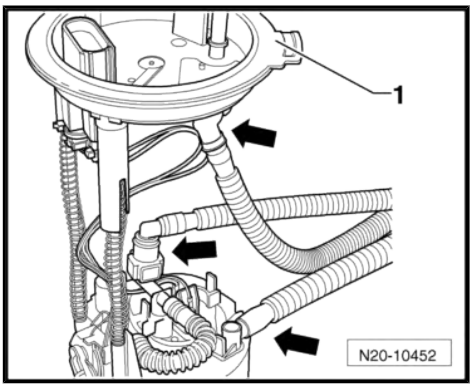


– Check that all hose connections are connected -arrows-.

– Check fuel lines of pump for leaks and possible damage.

If no fault is found:

– Replace fuel pump.



3.6.2 Testing holding pressure

Note

♦ *Safety precautions when working on the fuel supply system* *⇒ “2.1 Safety precautions when working on fuel supply system”, page 4* .

♦ *Rules of cleanliness when working on the fuel supply system* *⇒ “2.1 Safety precautions when working on fuel supply system”, page 4* .

• Fuel pressure OK.

– Connect the adapter - VAS 6550/1- to connection -A- of the pressure gauge - VAS 6550- .

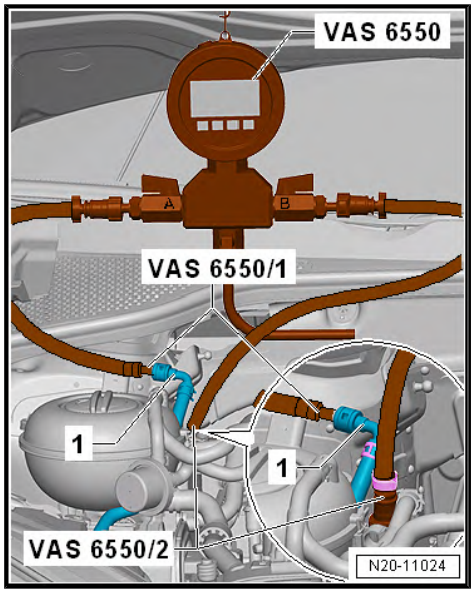
– Connect adapter - VAS 6550/1- to the fuel feed line -1- of the fuel pump.

– Connect the adapter - VAS 6550/2- to connection -B- of the pressure gauge - VAS 6550- .

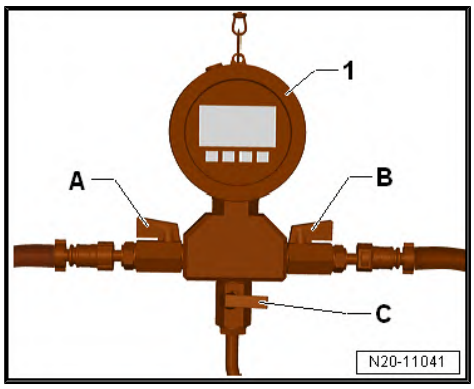
– Connect adapter - VAS 6550/2- to the fuel feed line on the engine.
– Check the quick couplings for firm seating by pulling in the opposite direction!

Caution

Risk of fuel dripping out.



– Open shut-off taps -A- and -B- .
• Shut-off tap -C- is closed.
• Lever points in the direction of flow.
– Check leaktightness and while doing so observe pressure drop at pressure gauge - VAS 6550- .
– Connect the diagnostic unit ⇒ Vehicle diagnostic tester and start self-diagnosis with »ODIS«.



Actuate fuel pump with final control diagnosis to build up fuel pressure.

– Switch on ignition.
– On the display, press the buttons in sequence:
♦ `Self-diagnosis`
♦ `Engine electronics`
♦ `Final control diagnosis`
♦ `electric fuel pump`
♦ `Start`
– Read off fuel pressure on pressure gauge.
• Specified value: ≥ 0.4 MPa (4 bar)
– End the self-diagnosis and switch off the ignition.
– Observe pressure drop at pressure gauge.
• The pressure must not drop below 0.3 MPa (3 bar) after 10 minutes.

If pressure drops:

– Check all fuel lines for leaks and damage.

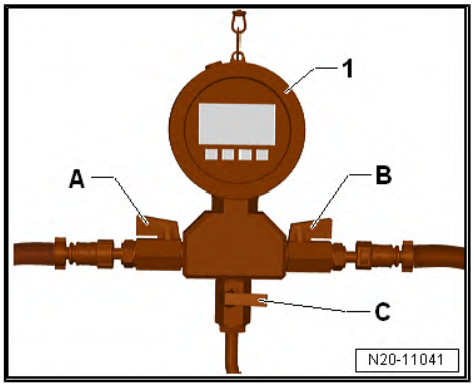
If no fault is found:

- Shut-off tap -C- is closed.
- Lever points in the direction of flow.
- Shut-off taps -A- and -B- are open.

– Actuate control fuel delivery unit ⇒ page 288 .

– Immediately close the shut-off cock -B- of the pressure gauge after the pressure has built up.

– Repeat the holding pressure test.



If the pressure drops (leaking on the fuel tank side):

– Check holding pressure on fuel tank side ⇒ page 289 .

If the pressure does not drop (leaking on engine side):

Note

- *Repeat the holding pressure test. This time, close shut-off tap -A- to check whether leak actually is on engine side.*
- *After closing the tap -A-, the pressure should fall.*

– Check outside of fuel lines and high-pressure pump for leaks ⇒ “8 High pressure pump”, page 417 .

– Check fuel rail with injectors ⇒ “6.1 Assembly overview - fuel rail with injectors”, page 403 .

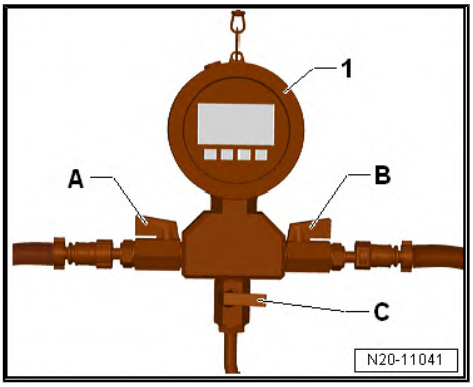
Checking the tightness of the injection valves

– Remove spark plugs ⇒ “1.1 Assembly overview - ignition system”, page 441

- Shut-off tap -C- is closed.
- Lever points in the direction of flow.
- Shut-off taps -A- and -B- are open.

– Actuate control fuel delivery unit ⇒ page 288 .

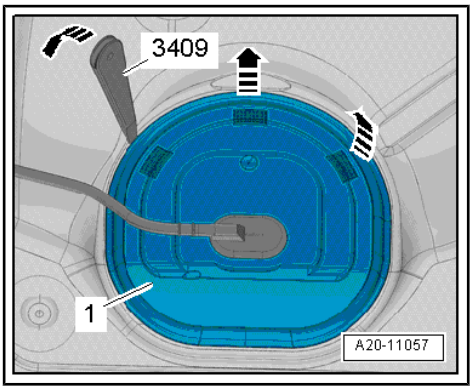
– After removing the spark plugs, check through the hole whether the leaking fuel injector is allowing fuel to escape onto the piston crown.



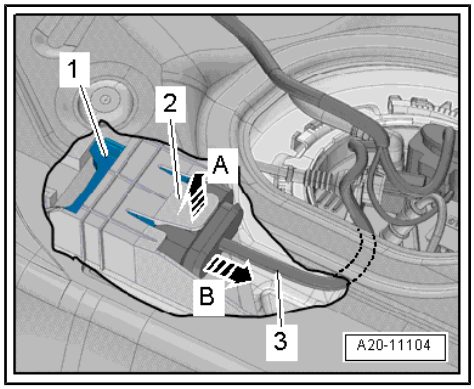
Check holding pressure on fuel tank side

– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

– Loosen catch pegs -arrows- of the cover -1- with disassembly wedge - 3409- and remove the cover.



– Push up pick-up coupling -2- -arrow A-. To do so, reach between bottom plate and fuel tank with a finger.
– Simultaneously pull the fuel pump control unit - J538- -1- at the electric wiring loom -3- carefully out of the uptake -arrow B-.
– Take out fuel pump control unit - J538- inwards between fuel tank and bottom plate, and place to one side.

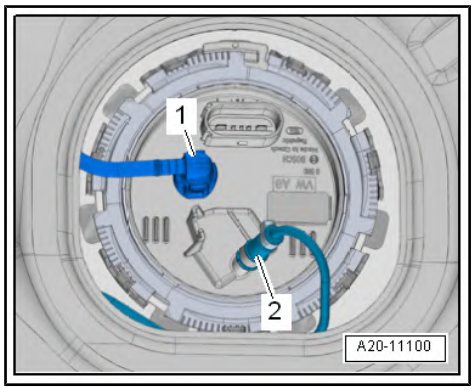


WARNING

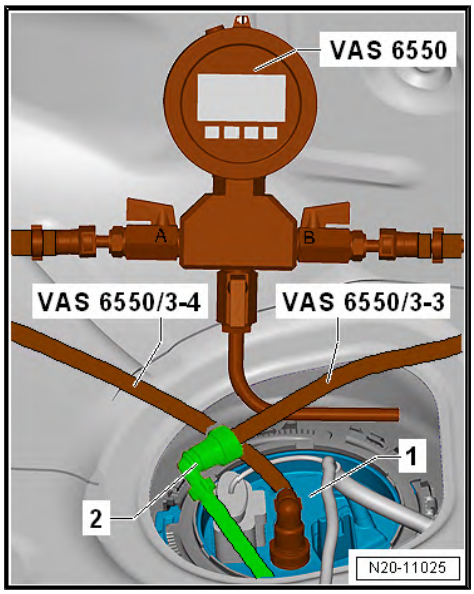
Risk of injury caused by fuel which is under high pressure.

Lay a clean cloth around the connection point and carefully slacken the connection point in order to relieve the pressure in the fuel system.

– Remove fuel line -1- from closing flange ⇒ “4 Quick couplings”, page 298 .



– Connect pressure gauge - VAS 6550- with adapter - VAS 6550/3-4- to the fuel delivery unit -1-.
– Connect pressure gauge - VAS 6550- with adapter - VAS 6550/3-3- to the fuel feed line -2-.
– Check the quick couplings for firm seating by pulling in the opposite direction.



Caution

Risk of fuel dripping out.

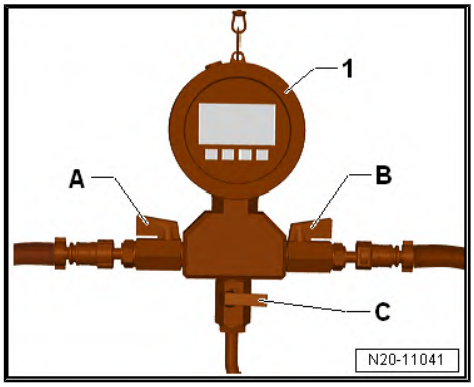
– Open shut-off taps -A- and -B- .

• Shut-off tap -C- is closed.

• Lever points in the direction of flow.

– Actuate control fuel delivery unit ⇒ page 288 .

– Immediately close the shut-off cock -B- of the pressure gauge after the pressure has built up.



Note

Lever points in the direction of flow.

– Repeat the holding pressure test ⇒ page 288 .

If the pressure does not drop:

– Check the fuel lines in the direction of the engine for leaks.

If pressure drops:

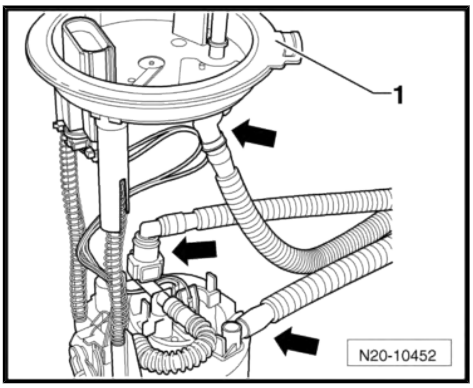
– Remove fuel pump and check it is clean ⇒ “3.4 Fuel delivery unit with sender for fuel gauge display”, page 278 .

– Check that all hose connections are connected -arrows-.

– Check fuel lines of pump for leaks and possible damage.

If no fault is found:

– Replace fuel delivery unit ⇒ “3.4 Fuel delivery unit with sender for fuel gauge display”, page 278 .



3.6.3 Checking fuel delivery rate

Note

♦ *Safety precautions when working on the fuel supply system ⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 .*

♦ *Rules of cleanliness when working on the fuel supply system ⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 .*

♦ *Test conditions when working on the fuel supply system ⇒ “2.4 Safety precautions during road tests in which testing and measuring equipment is used”, page 6 .*

Note

The fuel delivery rate must first be checked in the engine compartment using the targeted function »check fuel flow rate, quick test«. If the minimum fuel delivery volume is not reached, a further test must be carried out at the flange of the fuel delivery unit.

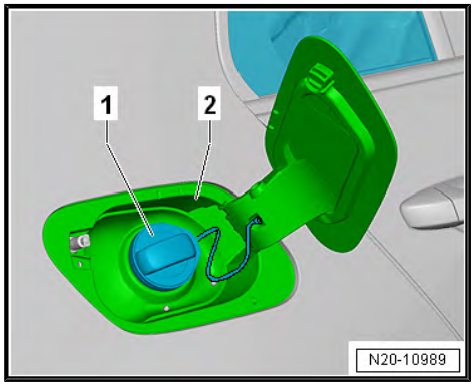
– Connect the diagnostic unit ⇒ Vehicle diagnostic tester and start self-diagnosis with »ODIS«.
– Select the engine identification characters CPWA.
– 01 Self-diagnosable systems
– Engine control unit function
– Check fuel flow rate, quick test
– Connect the diagnostic unit ⇒ Vehicle diagnostic tester and start self-diagnosis with »ODIS«.
– Follow the instructions of the vehicle diagnosis tester .
– Compare the fuel rate with the specified value ⇒ page 296 .

If the specified value is not reached:

– Open the fuel-tank lid unit.

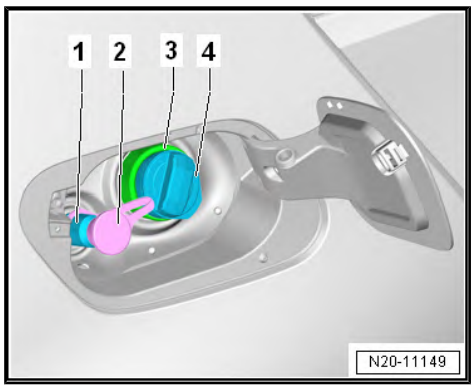
Only for petrol vehicles

– Clean around the fuel filler neck -2-.
– Unscrew the cap -1- for the fuel filler neck.



For natural gas vehicles (CNG)

– Clean around the fuel filler neck.
– Unscrew the cap -4- for the fuel filler neck.
– Repeat the quick test.
– Compare the fuel rate with the specified value ⇒ page 296 .



If the specified value is reached:

– Check the ventilation of the fuel tank ⇒ “7.3 Checking the fuel tank venting”, page 360 .

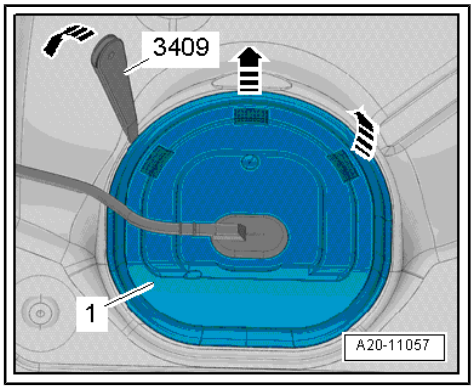
If the specified value is not reached:

– Check fuel lines for possible restrictions or blockages.

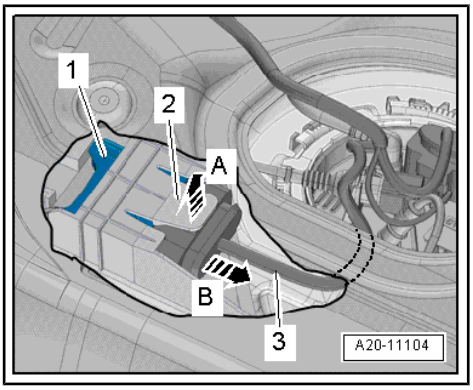
If no fault is found:

– Proceed as follows to check fuel delivery rate at fuel delivery unit:
– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

– Loosen catch pegs -arrows- of the cover -1- with disassembly wedge - 3409- and remove the cover.



– Push up pick-up coupling -2- -arrow A-. To do so, reach between bottom plate and fuel tank with a finger.
– Simultaneously pull the fuel pump control unit - J538- -1- at the electric wiring loom -3- carefully out of the uptake -arrow B-.
– Take out fuel pump control unit - J538- inwards between fuel tank and bottom plate.

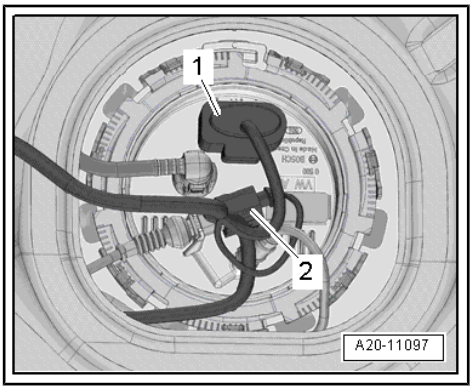


Vehicles with auxiliary heating

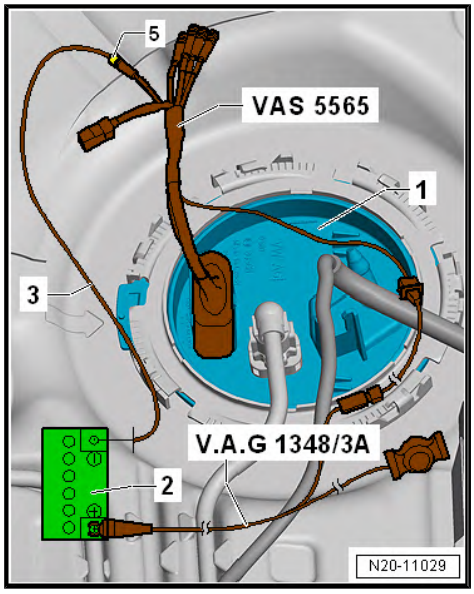
– Disconnect plug connection -2- from auxiliary heating dosing pump - V54- .

Continued for all vehicles

– Disconnect plug connection -1- at fuel pump.



– Connect adapter - VAS 5565- to fuel delivery unit -1-.
– Connect remote control - V.A.G 1348/3A- to adapter - VAS 5565- and to battery positive terminal in engine compartment.
– Connect connection -5- (yellow) from the adapter - VAS 5565- with adapter cables -3- from the adapter set - V.A.G 1594 C- to the minus pole terminal on the battery.



Note

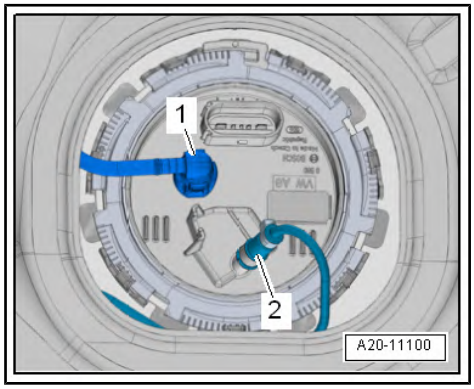
This step is only intended to ensure that the fuel pump runs when the engine is switched off.

WARNING

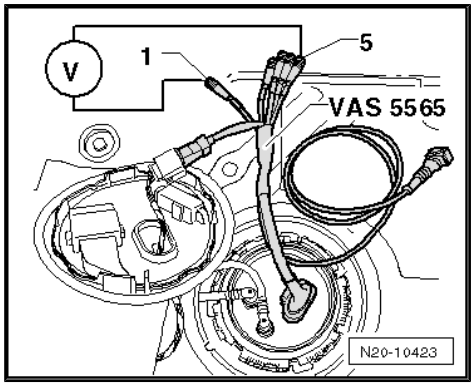
Risk of injury caused by fuel which is under high pressure.

Lay a clean cloth around the connection point and carefully slacken the connection point in order to relieve the pressure in the fuel system.

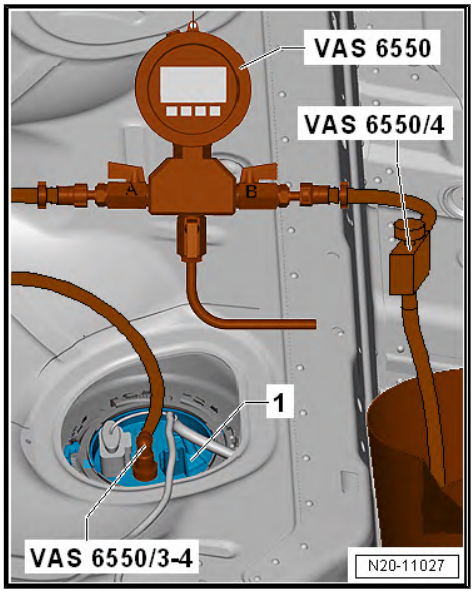
– Remove fuel line -1- from closing flange ⇒ “4 Quick couplings”, page 298 .



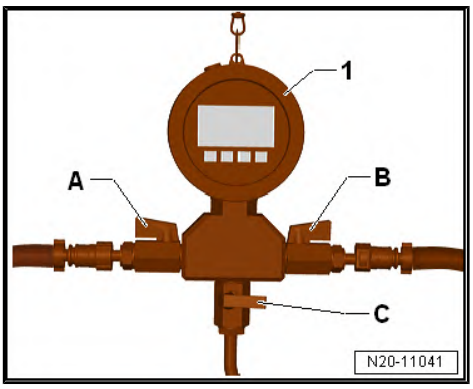
The fuel flow rate of the fuel pump is dependent on the battery voltage. For this reason, additionally connect the multimeter - V.A.G 1715- to the outgoing circuits -1- and -5- of the adapter for measuring method/DSO (5-pin) - VAS 5565- .



– Connect adapter - VAS 6550/3-4- to connection -A- of the pressure gauge - VAS 6550- .
– Connect pressure gauge - VAS 6550- with adapter - VAS 6550/3-4- to the fuel delivery unit -1-.
– Connect pressure valve - VAS 6550/4- to connection -B- of the pressure gauge - VAS 6550- .
– Hold hose on delivery valve - VAS 6550/4- in measuring vessel.



– Open shut-off taps -A- and -B- .
• Shut-off tap -C- is closed.
• Lever points in the direction of flow.

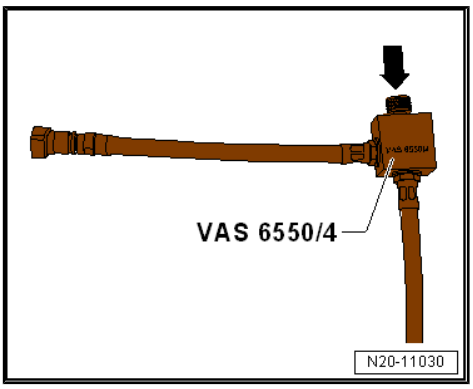


Note

♦ *Counterpressure must be built up against which the fuel pump must work when the fuel delivery flow in the fuel line is being measured.*

♦ *The counterpressure is set by turning the setting wheel -arrow- of the pressure valve - VAS 6550/4- .*

– Operate remote control - V.A.G 1348/3A- . While doing this, slowly close the shut-off control valve -arrow- until the pressure gauge displays 0.4 MPa (4 bar) overpressure.

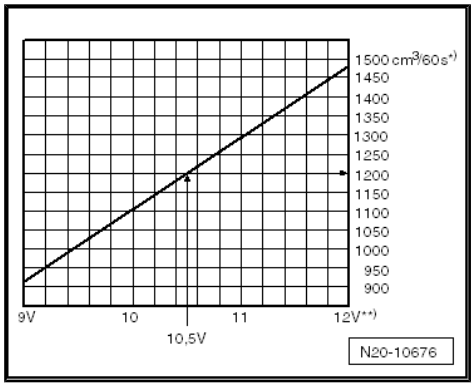


Note

From this point on do not move the position of the control valve.

– Drain measuring container.
– Operate remote control for 60 seconds, whilst measuring voltage at fuel pump.
– Compare the fuel rate with the specified value.

Minimum flow rate cm^3/60 s.



Note

Voltage at the fuel pump when engine is not running and pump is approximately 2 volts less than battery voltage.

If the specified value is reached:

– Check fuel lines for possible restrictions or blockages.

– Check fuel lines for leaks and possible damage.

If the specified value is not reached:

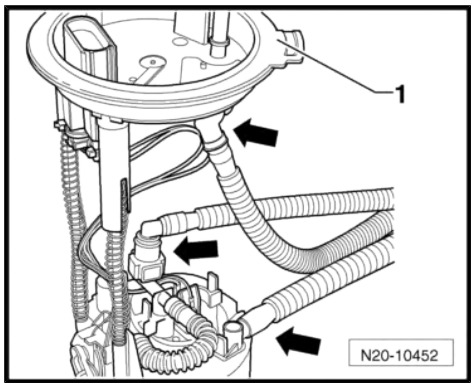
– Remove fuel pump and check it is clean
⇒ “3.4 Fuel delivery unit with sender for fuel gauge display”, page 278 .

– Check that all hose connections are connected -arrows-.

– Check fuel lines of pump for leaks and possible damage.

If no fault is found:

– Replace fuel delivery unit
⇒ “3.4 Fuel delivery unit with sender for fuel gauge display”, page 278 .



3.7 Removing and installing fuel pump control unit -J538-

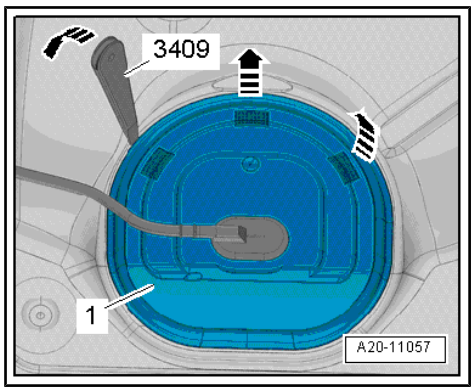
Special tools and workshop equipment required

♦ Disassembly wedge - 3409-

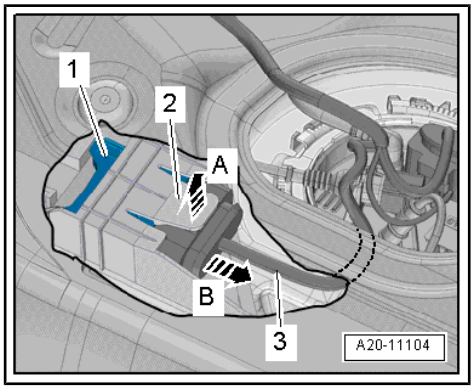
– Switch off ignition and all electrical loads, and pull out ignition key.

– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

– Loosen catch pegs -arrows- of the cover -1- with disassembly wedge - 3409- and remove the cover.



– Push up pick-up coupling -2- -arrow A-. To do so, reach between bottom plate and fuel tank with a finger.
– Simultaneously pull the fuel pump control unit - J538- -1- at the electric wiring loom -3- carefully out of the uptake -arrow B-.
– Take out fuel pump control unit - J538- inwards between fuel tank and bottom plate.
– Disconnect the plug connection.



Install

– Push fuel pump control unit - J538- into the uptake and push in until there is an audible click.

Further installation occurs in reverse order.

4 Quick couplings

⇒ “4.1 Separating push-on couplings”, page 298

4.1 Separating push-on couplings

Special tools and workshop equipment required

- Lever - T10468-

Note

- *The quick couplings of fuel, vacuum and ventilation lines are colour marked. Either the colour point at the quick coupling or the release button has the corresponding colour.*
- *Observe safety measures ⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 .*

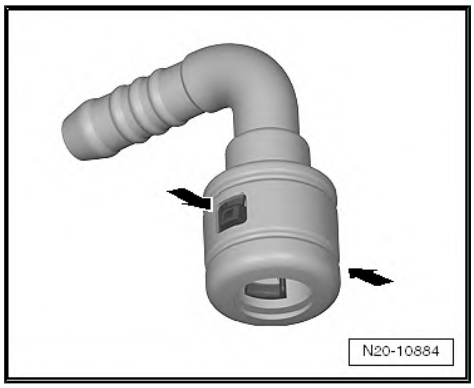
Push-on coupling	Colour code on connector
Fuel feed line	Black
Fuel return-flow line	Blue
Vent line	White, beige
Vacuum line	green

WARNING

Fuel supply line is pressurised! Wear safety goggles and safety clothing, in order to avoid injuries and skin contact with fuel. Place cleaning cloths around the connection point before detaching hose connections. Reduce pressure by carefully removing the hose.

Variant 1

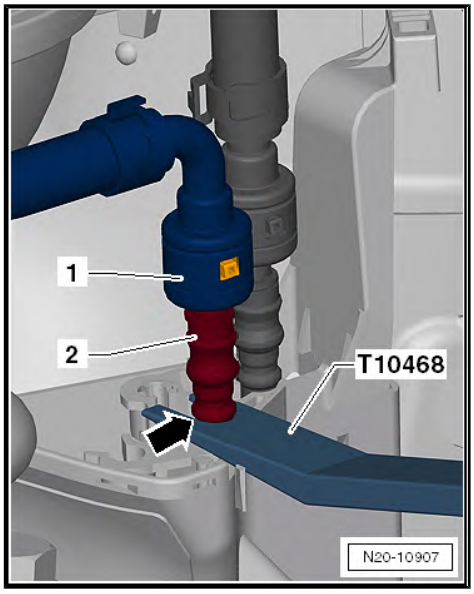
Push-on coupling with release buttons -arrows- on right and left.



The coupling point -1- in the engine compartment must be held.

– Insert the lever - T10468- between the heat shield and the stop -arrow- of the fuel line -2- and hold it.

Continued for all socket boxes

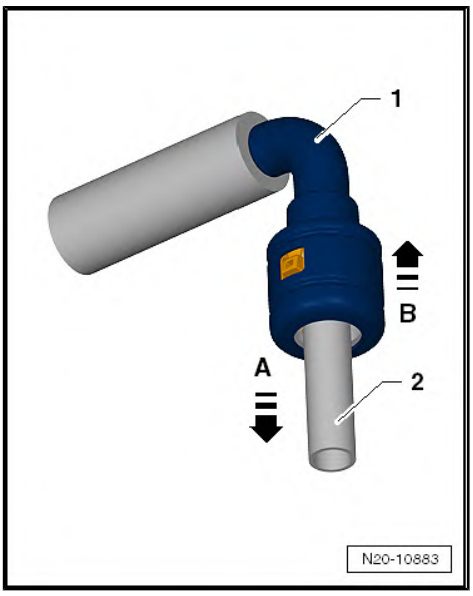


– Push push-on coupling -1- in -direction of arrow A-.

– Press the release buttons and remove the push-fit coupling -1- from the fuel line -2- in direction of the arrow -B-.

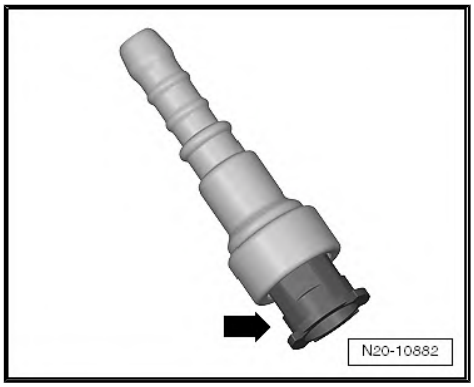
Pay attention to the colour assignment when installing ⇒ page 298 .

– Check the quick coupling for firm seating by pulling in the opposite direction!



Variant 2

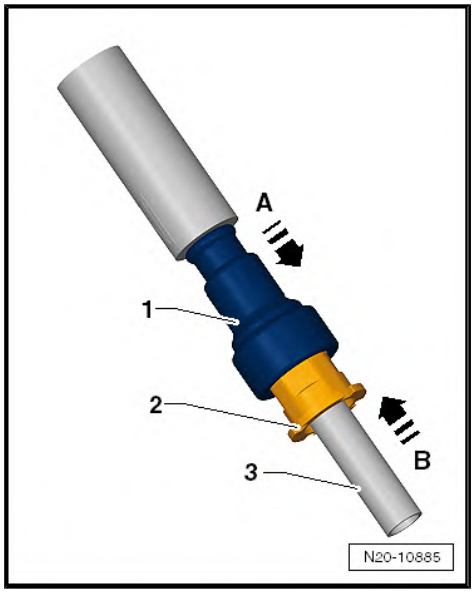
Quick coupling with pull release -arrow-.



– Press the push-fit coupling -1- in direction of arrow -A-.
– Pull pull-release mechanism -2- in direction of arrow -B-.
– Remove the push-fit coupling -1- from the fuel line -3- in direction of the arrow -B-.

Pay attention to the colour assignment when installing ⇒ page 298 .

– Check the quick coupling for firm seating by pulling in the opposite direction!



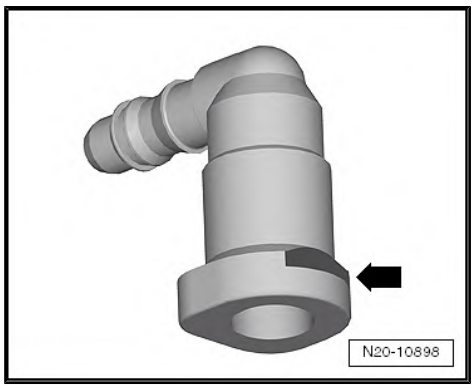
Variant 3

Quick coupling with front release button -arrow-.

– Press the release button -arrow- and detach the quick coupling.

Pay attention to the colour assignment when installing ⇒ page 298 .

– Check the quick coupling for firm seating by pulling in the opposite direction!



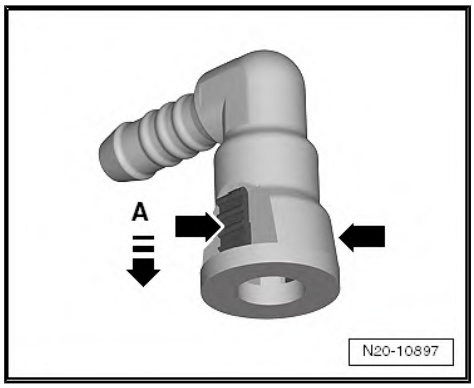
Variant 4

Push-on coupling with release buttons -arrows- on right and left.

– Press the push-fit coupling in direction of arrow -A-.
– Press release buttons -arrows- and pull push-on coupling off.

Pay attention to the colour assignment when installing ⇒ page 298 .

– Check the quick coupling for firm seating by pulling in the opposite direction!



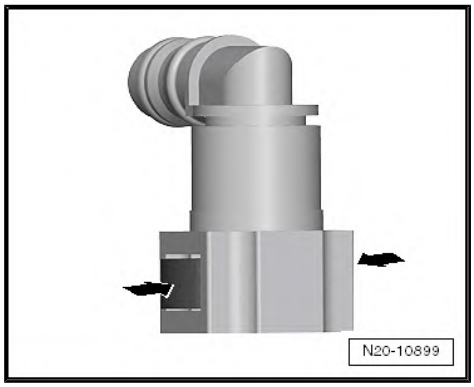
Variant 5

Push-on coupling with release buttons -arrows- on right and left.

– Press release buttons -arrows- and pull push-on coupling off.

Pay attention to the colour assignment when installing ⇒ page 298 .

– Check the quick coupling for firm seating by pulling in the opposite direction!



Variant 6

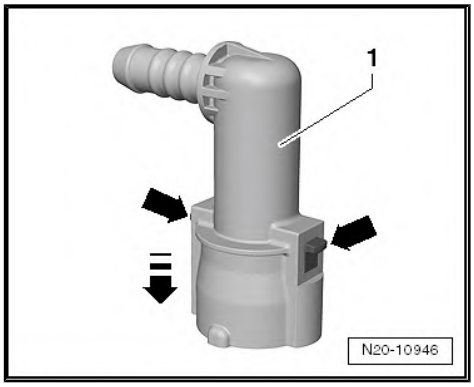
Push-on coupling with release buttons -arrows- on right and left.

– Press push-on coupling -1- in -direction of arrow- and hold pressed.

– Press release buttons -arrows- and pull push-on coupling off.

Pay attention to the colour assignment when installing ⇒ page 298 .

– Check the quick couplings for firm seating by pulling in the opposite direction!



Variant 7

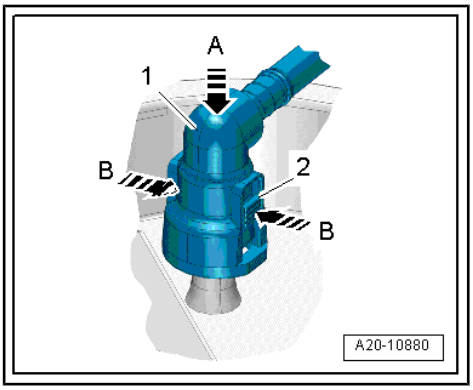
Quick coupling -1- with release buttons -arrows- right and left.

– Press push-on coupling -1- in direction of arrow -A- and hold pressed.

– Press the release buttons -2- in direction of arrow -B- and remove the push-fit coupling -1-.

Pay attention to the colour assignment when installing ⇒ page 298 .

– Check the quick couplings for firm seating by pulling in the opposite direction!



5 Natural gas fuel system (CNG)

⇒ “5.1 Summary of components - seal fuel tank”, page 302

⇒ “5.2 Summary of components - filling connection ”, page 305

⇒ “5.3 Determine the residual pressure in the natural gas container”, page 306

⇒ “5.4 Empty the natural gas container ”, page 316

⇒ “5.5 Removing and installing natural gas container”, page 323

⇒ “5.6 Mechanically close the tank shut-off valves N361 and N362 at the natural gas containers .”, page 341

⇒ “5.7 Removing and installing tank shut-off valve”, page 343

⇒ “5.8 Remove the pressure in the high-pressure line”, page 347

⇒ “5.9 Removing and installing the magnetic coil from the tank shut-off valve N361 and N362 ”, page 349

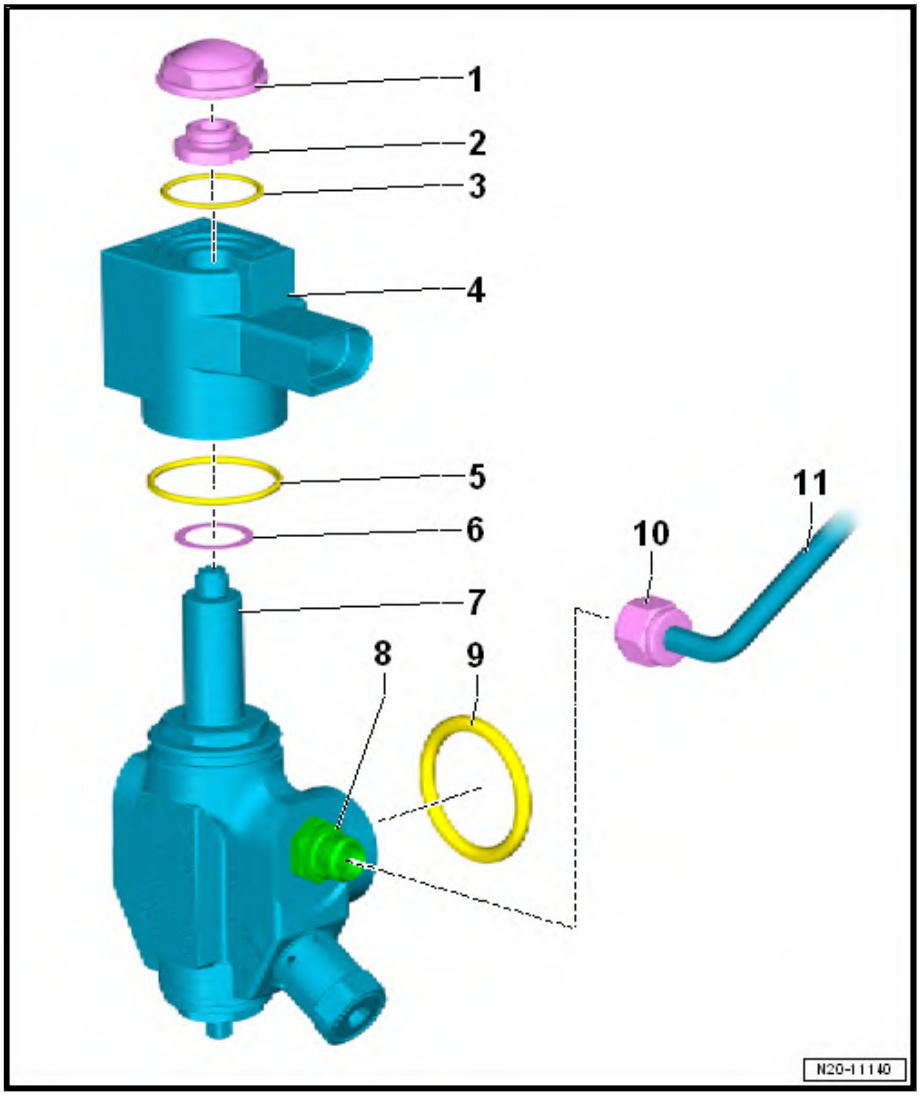
⇒ “5.10 Removing and installing filling connection”, page 352

5.1 Summary of components - seal fuel tank

⇒ “5.1.1 Summary of components - tank shut-off valve 1 N361 ”, page 302

⇒ “5.1.2 Summary of components - tank shut-off valve 2 N362 ”, page 304

5.1.1 Summary of components - tank shut-off valve 1 -N361-



1 - Screw plug

- ❑ with gasket
- ❑ replace if damaged
- ❑ 9 Nm

2 - Securing nut

- ❑ replace after removal
- ❑ 12 Nm

3 - Sealing ring

- ❑ Component part of the locking screw -1-

4 - Solenoid coil

- ❑ Removing and installing ⇒ “5.9 Removing and installing the magnetic coil from the tank shut-off valve N361 and N362 ”, page 349

5 - Sealing ring

- ❑ replace after removal
- ❑ pay attention to correct fit in slot

6 - Spring ring

- ❑ Assignment see ⇒ ET-KA

7 - Tank shut-off valve 1 - N361-

- ❑ Removing and installing ⇒ “5.7 Removing and installing tank shut-off valve”, page 343
- ❑ 130 Nm

8 - Line connection

- ❑ 18 Nm

9 - Sealing ring

- ❑ replace after removal
- ❑ between the tank shut-off valve and the fuel tank
- ❑ before fitting moisten lightly with clean engine oil

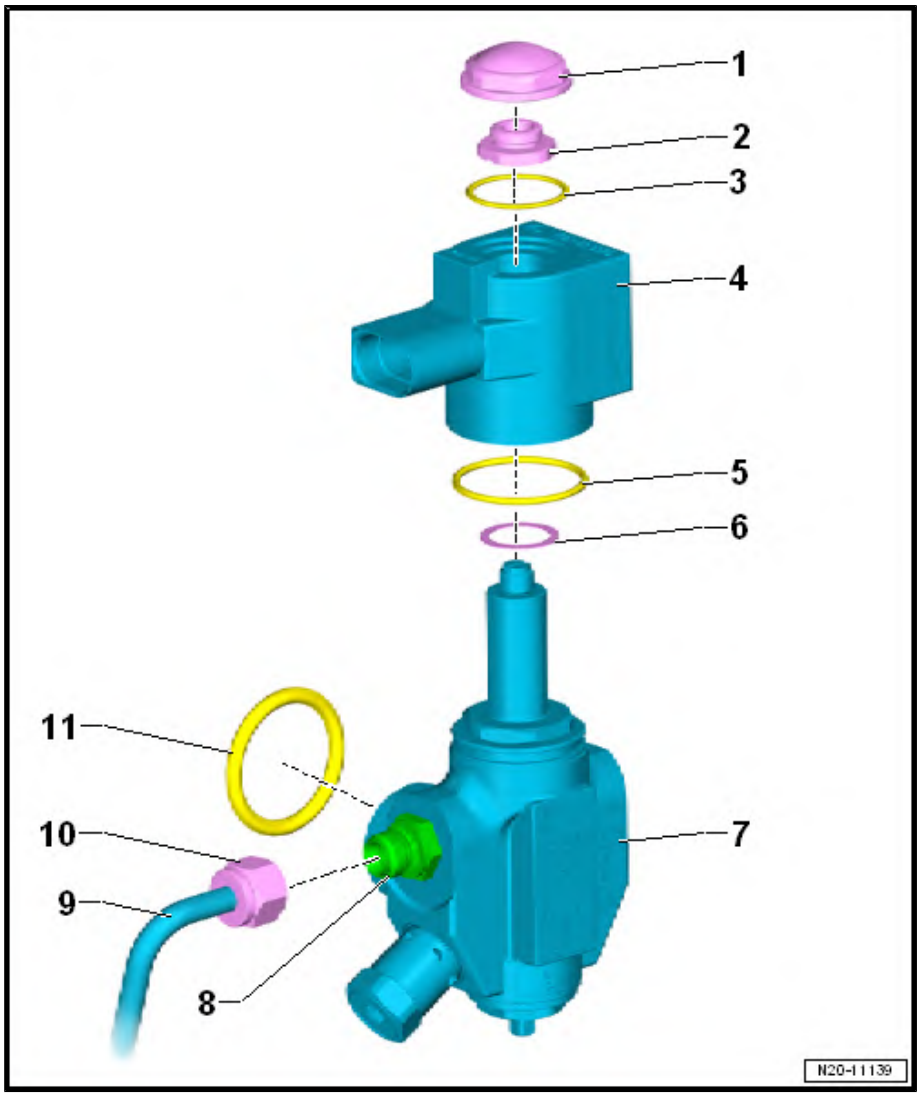
10 - Union nut

- ❑ When loosening and tightening the connection line, counterhold using an open-end wrench -8-
- ❑ tighten by hand as far as the stop
- ❑ 17 Nm

11 - Fuel line

- ❑ When loosening and tightening the connection line, counterhold using an open-end wrench
- ❑ The lines must not be bent or deformed
- ❑ ensure that there is adequate free access to all moving or hot components
- ❑ tighten by hand as far as the stop

5.1.2 Summary of components - tank shut-off valve 2 -N362-



1 - Screw plug
- ❑ with gasket
- ❑ replace if damaged
- ❑ 9 Nm

2 - Securing nut
- ❑ replace after removal
- ❑ 12 Nm

3 - Sealing ring
- ❑ Component part of the locking screw -1-

4 - Solenoid coil
- ❑ Removing and installing ⇒ “5.9 Removing and installing the magnetic coil from the tank shut-off valve N361 and N362 ”, page 349

5 - Sealing ring
- ❑ replace after removal
- ❑ pay attention to correct fit in slot

6 - Spring ring
- ❑ Assignment see ⇒ ET-KA

7 - Tank shut-off valve 2 - N362-
- ❑ Removing and installing ⇒ “5.7 Removing and installing tank shut-off valve”, page 343
- ❑ 130 Nm

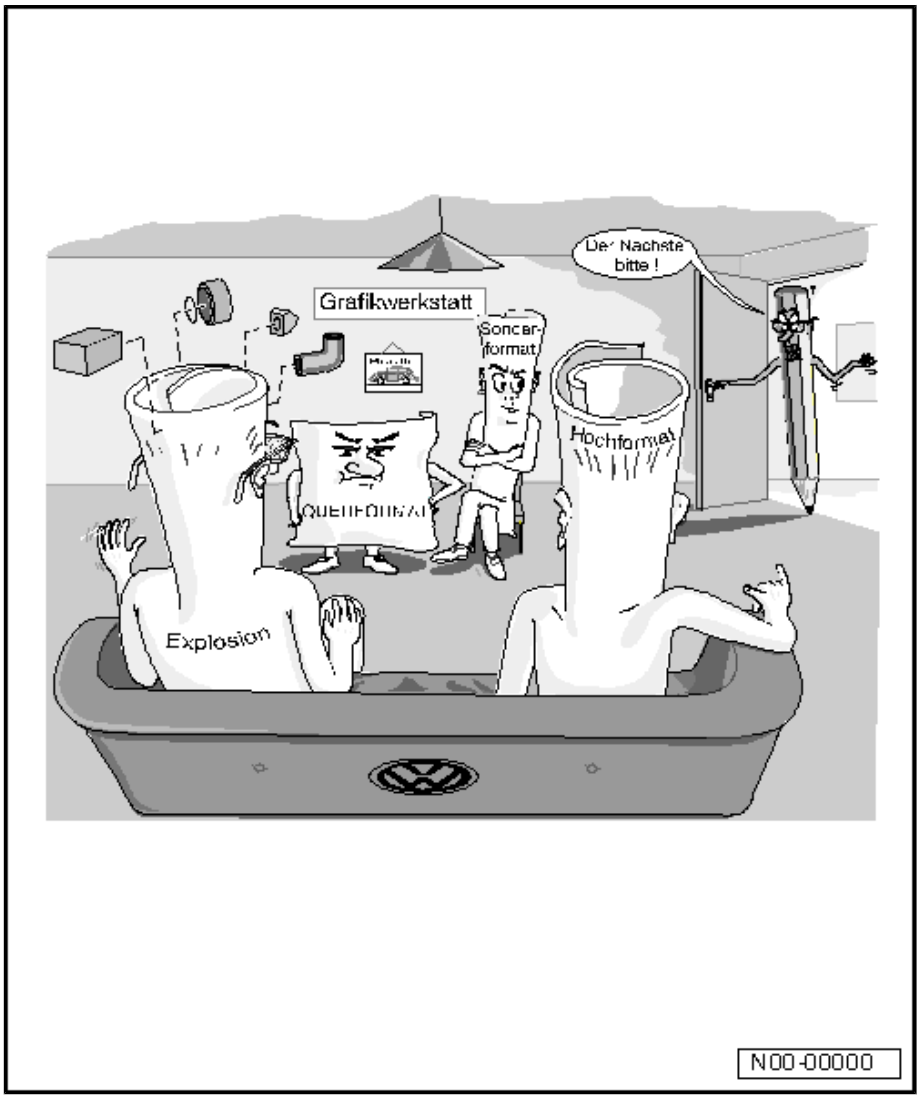
8 - Line connection
- ❑ 18 Nm

9 - Fuel line
- ❑ When loosening and tightening the connection line, counterhold using an open-end wrench
- ❑ The lines must not be bent or deformed
- ❑ ensure that there is adequate free access to all moving or hot components
- ❑ tighten by hand as far as the stop

10 - Union nut
- ❑ When loosening and tightening the connection line, counterhold using an open-end wrench
- ❑ tighten by hand as far as the stop
- ❑ 17 Nm

11 - Sealing ring
- ❑ replace after removal
- ❑ between the tank shut-off valve and the fuel tank
- ❑ before fitting moisten lightly with clean engine oil

5.2 Summary of components - filling connection



1 - Fuel tank lid unit

- ❑ Removing and installing ⇒ Body Work; Rep. gr. 55

2 - Nut

- ❑ Left-hand thread
- ❑ Removing and installing ⇒ “5.10 Removing and installing filling connection”, page 352

> **WARNING**
> *Follow the instructions for tightening* *⇒ page 354*

- ❑ 35 Nm

3 - Surface

4 - Operating button

- ❑ to open the fuel tank lid unit
- ❑ ⇒ Body Work; Rep. gr. 55

5 - Bolts

- ❑ replace after removal
- ❑ 2 pieces
- ❑ 8 Nm + torque a further 90° ($^1/_4$ turn)

6 - Uchwyt

7 - Filling connection

- ❑ for natural gas
- ❑ Filling connection and fuel line are a joint component and cannot be removed individually
- ❑ Connection diagram ⇒ page 306
- ❑ Removing and installing ⇒ “5.10 Removing and installing filling connection”, page 352
- ❑ with gasket

8 - Filler neck

- ❑ For petrol fuel tanks

9 - Screw

- ❑ 5 Nm

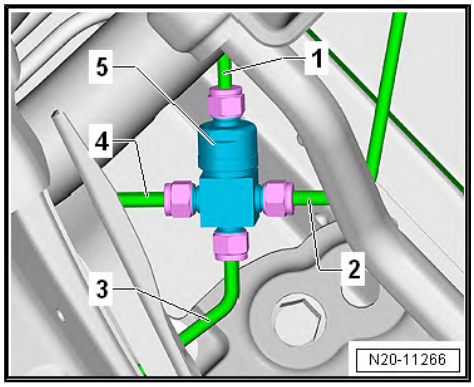
10 - Screw cap

- ❑ For gas filling connection

11 - Screw cap

- ❑ For petrol fuel tanks

Branch piece - connection diagram



1 - Filling line
2 - Line to the gas pressure regulator
3 - Line to the natural gas container 1
4 - Line to the natural gas container 2
5 - Distributor part

5.3 Determine the residual pressure in the natural gas container

⇒ “5.3.1 Check and rework the adapter for the residual pressure test of the natural gas”, page 306

⇒ “5.3.2 Test (self-test) the cooling system tester V.A.G 1274 B and the adapter for the cooling system tester V.A.G 1274 B/12 A ”, page 308

⇒ “5.3.3 Residual pressure test of the natural gas”, page 312

5.3.1 Check and rework the adapter for the residual pressure test of the natural gas

Special tools and workshop equipment required

- Cooling system tester - V.A.G 1274 B-
- Adapter for cooling system tester - V.A.G 1274 B/12 A-

DANGER!

Before using the adapter for the residual pressure test of the natural gas, you must check that the adapter is the latest version.

Older adapters for the residual pressure test of the natural gas must not be used and must be reworked!

Only the adapter -V.A.G 1274 B/12 A- may be used. All other adapters must be reworked.

Distinguishing features of the different designs ⇒ page 307 .

Rework the adapter for the residual pressure test of the natural gas ⇒ page 307 .

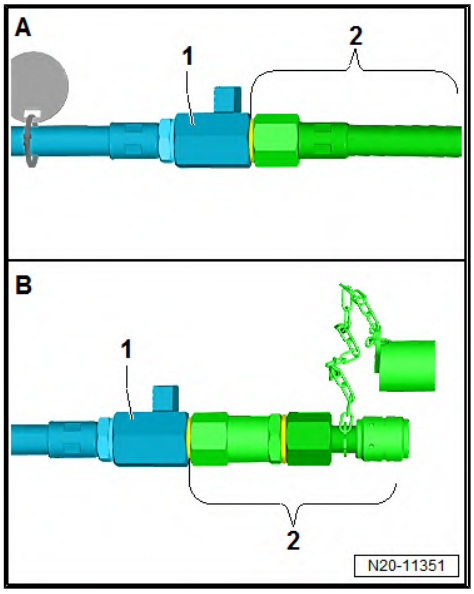
Distinguishing features of the different designs

A - old version without pressure relief valve in the connection -2-

B - new version of the adapter -V.A.G 1274 B/12 A- with pressure relief valve in the connection -2-

The old version -A- does not have a pressure relief valve and must be reworked. A flexible hose is installed after the connection -1-.

Section -2- of the new version -B- is significantly longer. The pressure relief valve is also located in this section.



Adapter -V.A.G 1274 B/12 A-1-

1 - Protective cap

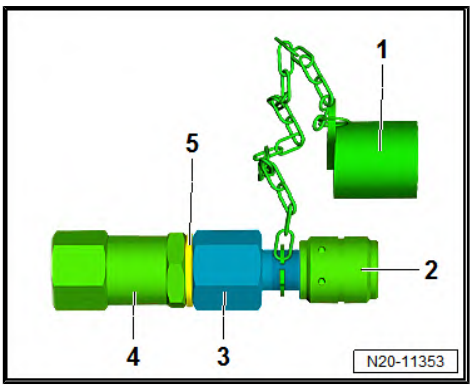
2 - Screw connection for the tank shut-off valve

3 - Connection

4 - Pressure relief valve

5 - Sealing ring

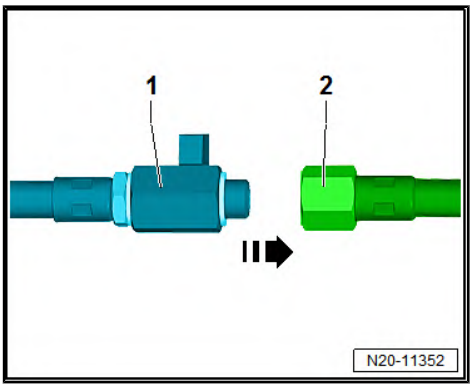
Use the adapter -V.A.G 1274 B/12 A-1- to rework the old version of the adapter ⇒ page 307 .



Rework old version of the adapter with adapter -V.A.G 1274 B/12 A-1-

DANGER!

Follow safety measures and rules of cleanliness when working on the natural gas system and general instructions for operating a natural gas vehicle (CNG) ⇒ "2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)", page 10 .



– Carefully loosen and take off the union nut -2-, while counter-holding the connection -1- with a suitable tool.

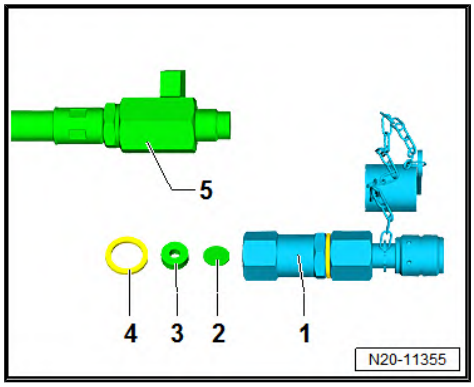
– Remove the spacer ring from the connection -1-.

– Insert the filter sieve -2- and the seal -3- into the adapter -1-.

– Place the space ring -4- onto the threaded part of the adapter -5-.

– Screw the adapter -V.A.G 1274 B/12 A-1- -1- onto the connection -5- and tighten to 20 Nm. At the same time, counterhold the connection -5-with a suitable tool.

– Connect the reworked adapter for the residual pressure test of the natural gas to the tank shut-off valve
⇒ “5.3.2 Test (self-test) the cooling system tester V.A.G 1274 B and the adapter for the cooling system tester V.A.G 1274 B/12 A ”, page 308 .



5.3.2 Test (self-test) the cooling system tester - V.A.G 1274 B- and the adapter for the cooling system tester - V.A.G 1274 B/12 A-

Special tools and workshop equipment required

- Cooling system tester - V.A.G 1274 B-
- Adapter for cooling system tester - V.A.G 1274 B/12 A-
- Handwheel - T50026-
- Screw plug set for engine - VAS 6122-

Caution

Only the adapter -V.A.G 1274 B/12 A- may be used. All other adapters must be reworked.

– Check and if necessary rework the adapter for the residual pressure test of the natural gas
⇒ “5.3.1 Check and rework the adapter for the residual pressure test of the natural gas”, page 306 .

DANGER!

Follow safety measures and rules of cleanliness when working on the natural gas system and general instructions for operating a natural gas vehicle (CNG)
⇒ “2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)”, page 10 .

– Remove natural gas container
⇒ “5.5 Removing and installing natural gas container”, page 323 .

Note

Seal open connections using suitable screw plugs from the screw plug set for engine - VAS 6122- .

– Empty the natural gas container
⇒ “5.4 Empty the natural gas container ”, page 316 .

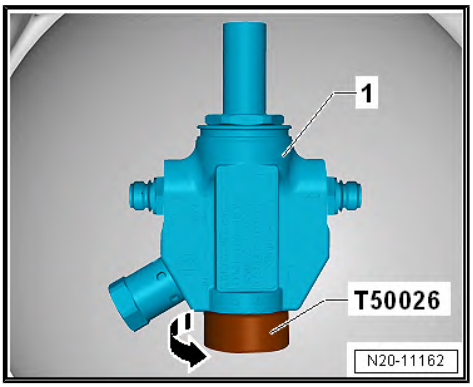
WARNING

Do not leave natural gas containers unattended while the cooling system testing device - V.A.G 1274 B- is connected.

Note

- *Different shut-off valves can be installed on the natural gas container.*
- *Valves for the tank shut-off have connection lines based on model 1 or 2.*
- *With valves for tank shut-off with 2 connections, both connections must be closed with adapter for cooling system testing device - V.A.G 1274 B/12 A- and additional cap.*

– Use the handwheel - T50026- to close the mechanical shut-off valve on the valve for tank shut-off -1-.



Note

The shut-off valve can be closed by turning in a clockwise direction.

WARNING

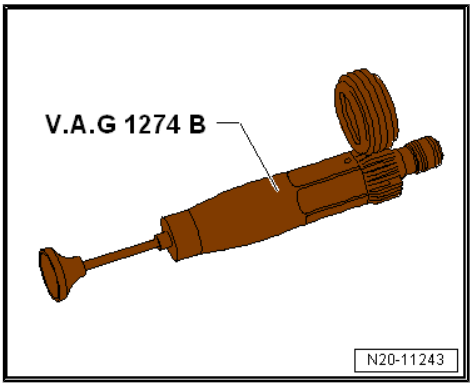
To ensure that the residual pressure test can be carried out correctly, firstly carry out the test (self-test) of the cooling system testing device - V.A.G 1274 B- and the adapter for cooling system testing device - V.A.G 1274 B/12 A- !

If this test is not successful, refrain from continuing to use the tools!

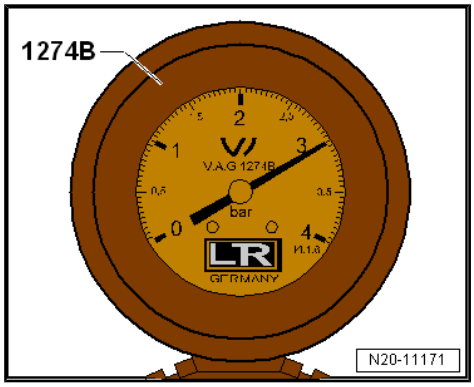
Test (self-test) of the cooling system testing device - V.A.G 1274 B-

Note

Remove any adapter lines from the cooling system testing device - V.A.G 1274 B- .



– Use the cooling system testing device - V.A.G 1274 B- to build up the pressure to 0.3 MPa (3.0 bar).
– Monitor the pressure on the pressure manometer of the cooling system testing device - V.A.G 1274 B- 30 seconds long.



Pressure is not established or the pressure drops:

The cooling system testing device - V.A.G 1274 B- is not OK and cannot be used for the test.

Pressure is built up and does not drop:

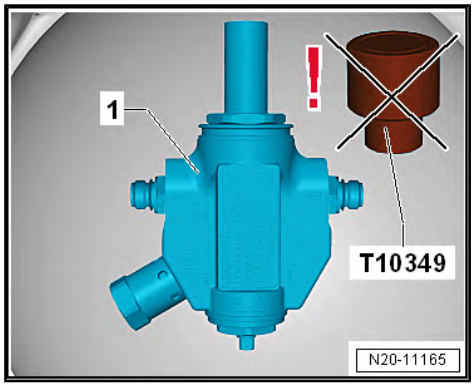
The cooling system testing device - V.A.G 1274 B- is OK and can be used for the test.

Test (self-test) the adapter for the cooling system tester - V.A.G 1274 B/12 A-

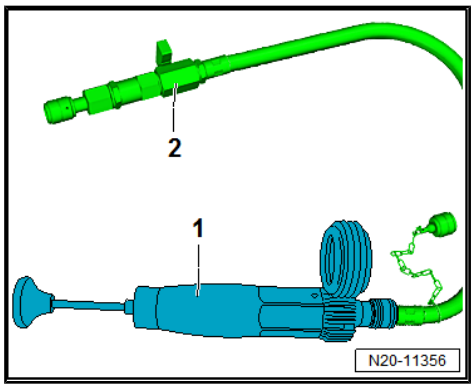
WARNING

Make sure that the magnetic release tool - T10349- is not present on the tank shut-off valve -1-!

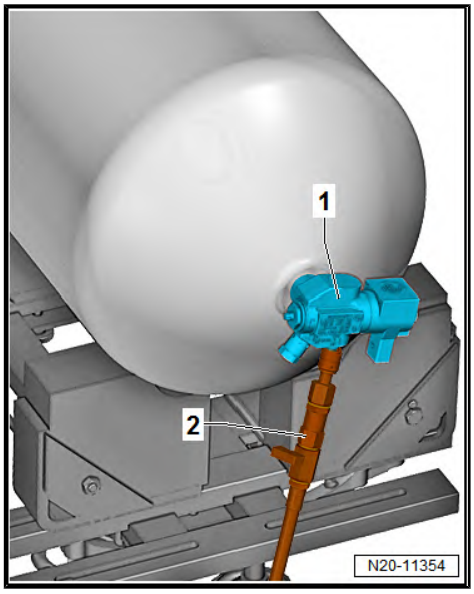
– Check the thread on the valve for tank shut-off and on the adapter for cooling system testing device - V.A.G 1274 B/12 A- for dirt; clean where necessary.



– Connect the adapter for the cooling system tester - V.A.G 1274 B/12 A- -2- to the cooling system tester - V.A.G 1274 B- -1-.

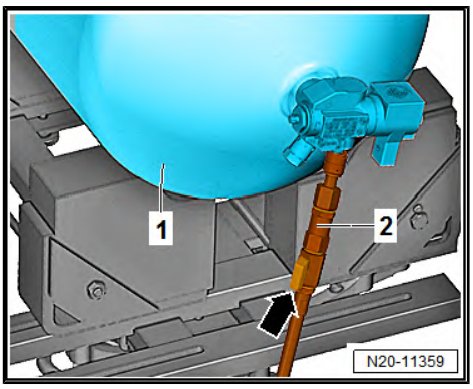


– Connect the adapter for cooling system tester - V.A.G 1274 B/12 A- -2- to the tank shut-off valve -1-.

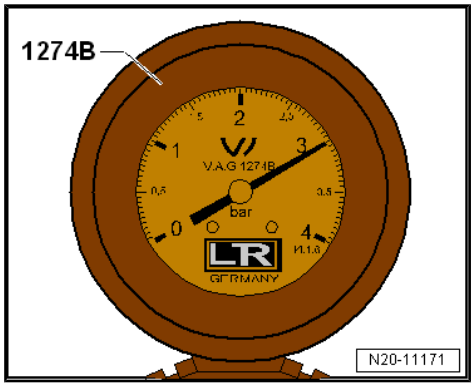


– Open the shut-off valve -arrow- at the adapter for cooling system tester - V.A.G 1274 B/12 A- -2-.

• Lever points in direction of flow.



– Use the cooling system testing device - V.A.G 1274 B- to build up the pressure to 0.3 MPa (3.0 bar).
– Monitor the pressure on the pressure manometer of the cooling system testing device - V.A.G 1274 B- 30 seconds long.



Pressure is not established or drops:

– Check the connection between the valve for tank shut-off and the adapter for cooling system testing device - V.A.G 1274 B/12 A- ; tighten where necessary.
– Repeat the test (self-test) ⇒ page 310 .

Pressure is not established or drops again:

The cooling system testing device - V.A.G 1274 B/12 A- is not OK and cannot be used for the residual pressure test.

Pressure is built up and does not drop:

Cooling system testing device - V.A.G 1274 B- and adapter for cooling system testing device - V.A.G 1274 B/12 A- are OK and can be used.

– Press the button on the cooling system testing device - V.A.G 1274 B- .

Note

As a result, the pressure in the cooling system testing device - V.A.G 1274 B- and adapter for cooling system testing device - V.A.G 1274 B/12 A- breaks down.

5.3.3 Residual pressure test of the natural gas

Special tools and workshop equipment required

- Cooling system tester - V.A.G 1274 B-
- Adapter for cooling system tester - V.A.G 1274 B/12 A-
- Handwheel - T50026-
- Screw plug set for engine - VAS 6122-

• The natural gas container has been emptied
⇒ “5.4 Empty the natural gas container ”, page 316
• Check using cooling system tester - V.A.G 1274 B- and adapter for cooling system tester - V.A.G 1274 B/12 A-
⇒ “5.3.2 Test (self-test) the cooling system tester V.A.G 1274 B and the adapter for the cooling system tester V.A.G 1274 B/12 A ”, page 308

Note

- *The residual pressure test must be carried out after the natural gas container has been emptied.*
- *The residual pressure test determines that the pressure in the natural gas container is less than 0.1 MPa (1.0 bar).*
- *If the residual pressure test was not carried out, do not carry out any work on the natural gas container or valve for tank shut-off.*
- *Seal open connections using suitable screw plugs from the screw plug set for engine - VAS 6122- .*

Caution

Only the adapter -V.A.G 1274 B/12 A- may be used. All other adapters must be reworked.

– Check and if necessary rework the adapter for the residual pressure test of the natural gas
⇒ “5.3.1 Check and rework the adapter for the residual pressure test of the natural gas”, page 306 .

– Check using cooling system tester - V.A.G 1274 B- and adapter for cooling system tester - V.A.G 1274 B/12 A-
⇒ “5.3.2 Test (self-test) the cooling system tester V.A.G 1274 B and the adapter for the cooling system tester V.A.G 1274 B/12 A ”, page 308

DANGER!

Follow safety measures and rules of cleanliness when working on the natural gas system and general instructions for operating a natural gas vehicle (CNG)
⇒ “2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)”, page 10 .

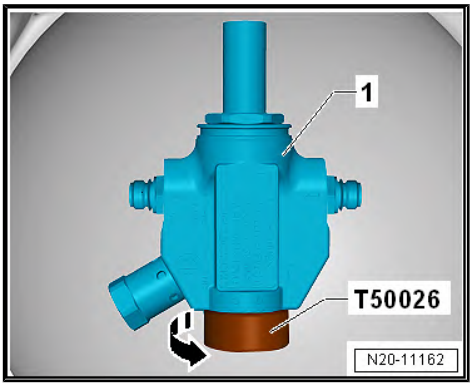
Do not leave natural gas containers unattended while the cooling system testing device - V.A.G 1274 B- is connected.

To ensure that the residual pressure test can be carried out, firstly carry out the self-test of the cooling system tester - V.A.G 1274 B- and the adapter for cooling system tester - V.A.G 1274 B/12 A- . If the test is not successful, these tools must not be used!

Note

- *Different shut-off valves can be installed on the natural gas container.*
- *Valves for the tank shut-off have connection lines based on model 1 or 2.*
- *With valves for tank shut-off with 2 connections, both connections must be closed with adapter for cooling system testing device - V.A.G 1274 B/12 A- and additional cap.*
- *The shut-off valve can be closed by turning in a clockwise direction.*

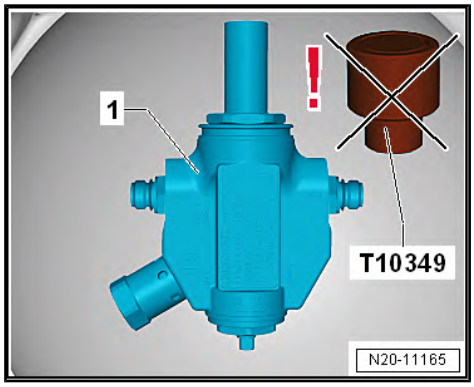
– Use the handwheel - T50026- to close the mechanical shut-off valve on the valve for tank shut-off -1-.



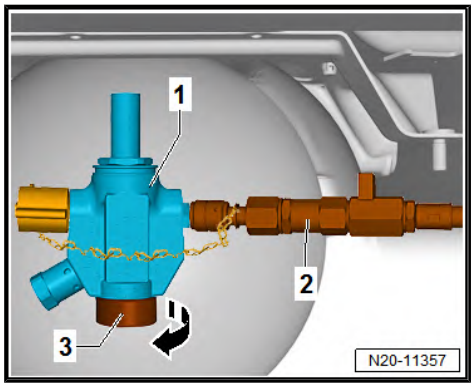
Carry out the residual pressure test

DANGER!

Make sure that the magnetic unlocking tool - T10349- is not present on the valve for tank shut-off!

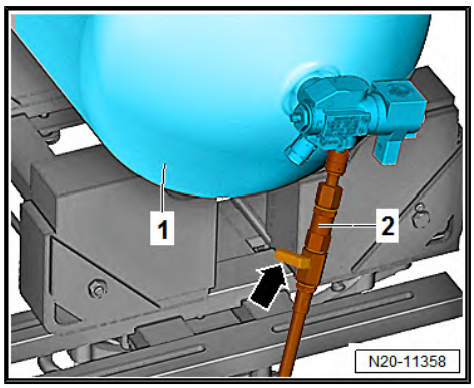


– Use the handwheel - T50026- -3- to carefully open the mechanical shut-off valve -1- in -direction of arrow-.

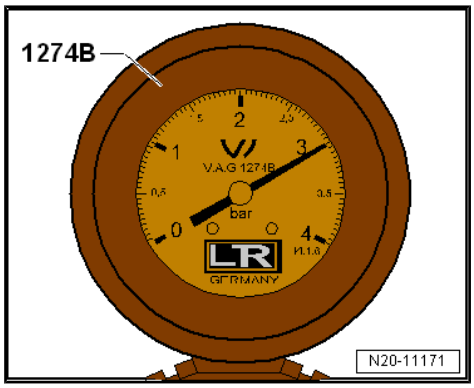


– Close the shut-off cock -arrow- at the adapter for cooling system testing device - V.A.G 1274 B/12 A- .

• Lever points in the direction of flow.



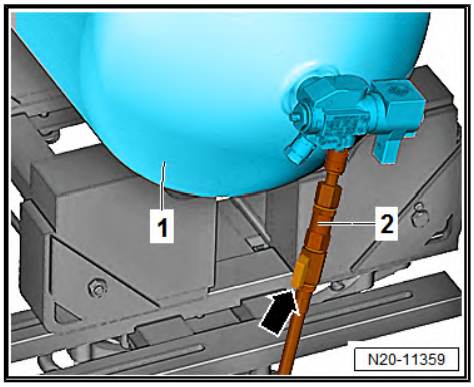
– Use the cooling system testing device - V.A.G 1274 B- to build up the pressure to 0.3 MPa (3.0 bar).



– Open the shut-off cock -arrow- at the adapter for cooling system testing device - V.A.G 1274 B/12 A- .

• Lever points in direction of flow.

– Monitor the pressure on the pressure manometer of the cooling system testing device - V.A.G 1274 B- 30 seconds long.



If the pressure does not fall below 0.1 MPa (1.0 bar) right away:

The pressure in the natural gas container is too high as the natural gas container is not completely empty.

WARNING

If the pressure does not drop as the pressure is too high in the natural gas container, the work cannot be resumed until the natural gas container has been emptied further and a residual pressure test has been carried out again!

– Empty the natural gas container again ⇒ “5.4 Empty the natural gas container ”, page 316 .

– Repeat residual pressure check ⇒ page 313 .

If the pressure again does not fall below 0.1 MPa (1.0 bar):

– Empty the natural gas container again ⇒ “5.4 Empty the natural gas container ”, page 316 .

– Repeat residual pressure check ⇒ page 313 .

If the pressure again does not fall below 0.1 MPa (1.0 bar):

– Do not continue working on the natural gas container.

The pressure falls very slowly:

– Check the connection between the valve for tank shut-off and the adapter for cooling system testing device - V.A.G 1274 B/12 A- ; tighten where necessary.

– With tank shut-off valves with 2 connections, check the connection between the cap on the adapter for cooling system testing device - V.A.G 1274 B/12 A- and the tank shut-off valve; tighten where necessary.

– Repeat the test (self-test) ⇒ page 310 .

– Repeat residual pressure check ⇒ page 313 .

If the pressure falls below 0.1 MPa (1.0 bar) right away:

– Repeat the residual pressure test to verify that it is correct ⇒ page 313 .

Note

- *After the residual pressure test, close the cooling system testing device - V.A.G 1274 B- several times more.*
- *This should not generate any pressure!*
- *Air is audibly pumped into the natural gas container.*
- *Repeat the residual pressure test once the pressure has built up ⇒ page 313 .*

The natural gas container has been emptied sufficiently and depressurised:

WARNING

Further work may only be performed on the natural gas container if the residual pressure test was successful!

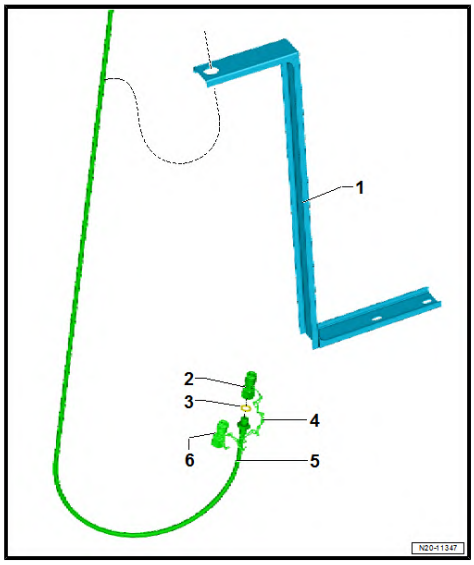
The tank shut-off valve can be removed
⇒ “5.7 Removing and installing tank shut-off valve”, page 343 .

5.4 Empty the natural gas container

Special tools and workshop equipment required

- Magnetic release tool - T10349-
- Handwheel - T50026-
- Gas exhaust , e.g. -VAS 523 001-
- Gas leakage detector for natural gas vehicles - VAS 6227-
- Commercially available leak search spray
- 2 x M8 screws with washers

Summary of components of gas exhaust - VAS 523 001-

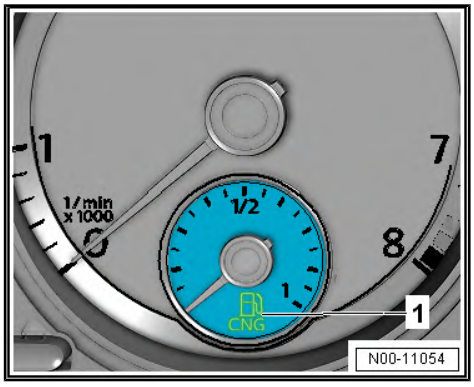


1 - Bracket - VAS 523 001/6
2 - Adapter - VAS 523 001/2
3 - Sealing ring
4 - Retaining chain
5 - Gas vent pipe VAS 523 001/1
6 - Adapter - VAS 523 001/3

Work procedure

DANGER!

Follow safety measures and rules of cleanliness when working on the natural gas system and general instructions for operating a natural gas vehicle (CNG)
⇒ “2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)”, page 10 .



Note

- *The gas tank must be driven completely empty as long as the vehicle is still fully operational and roadworthy in gas mode.*
- *The pointer in the field marked in blue indicates the gas level in the gas reservoirs.*
- *The green indicator light -1- indicates that the vehicle is in natural gas mode (CNG).*
- *When the pointer in the field marked in blue indicates "Natural gas container empty" and the engine control unit has switched to petrol mode (the indicator light-1- is out), a pressure of approx. 1.2 MPa (12 bar) still applies in the fuel tank.*
- *The natural gas remaining in the natural gas container must now be drained from the natural gas containers via the mechanical shut-off in the tank shut-off valve .*

DANGER!

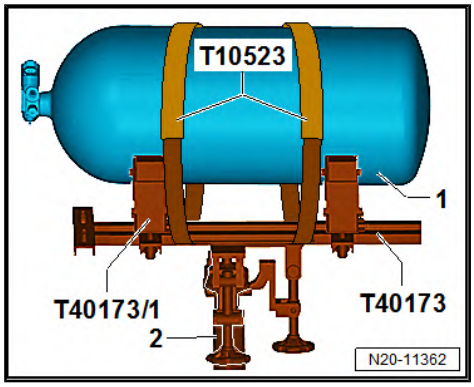
Releasing the pressure must be carried out in the open in a secured area.

Make sure that there are no ignition sources and naked flames in the vicinity of the vehicle and the natural gas container.

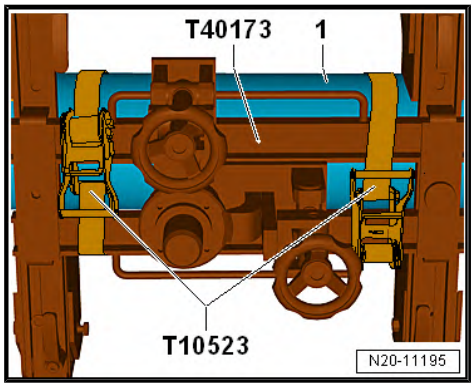
There is a risk of explosion!

Follow safety measures and rules of cleanliness when working on the natural gas system and general instructions for operating a natural gas vehicle (CNG)
⇒ "2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)", page 10 .

– Determine the pressure in the natural gas system
– Switch on ignition.
– Connect the diagnostic unit ⇒ Vehicle diagnostic tester and start self-diagnosis with »ODIS«.
– Select the engine identification characters CPWA.
– 01 Engine electronics
– Tank pressure sensor G400
– Remove the pressure in the high-pressure line
⇒ "5.8 Remove the pressure in the high-pressure line", page 347 .
– Disconnect battery ⇒ Electrical System; Rep. gr. 27 .
– Remove the corresponding natural gas container
⇒ "5.5 Removing and installing natural gas container", page 323 .



- The natural gas container -1- is secured to the Engine and gearbox jack - V.A.G 1383 A- with tensioning strap - T10523- as shown.
- Install the locks on the tensioning strap mutually offset as shown in the figure.

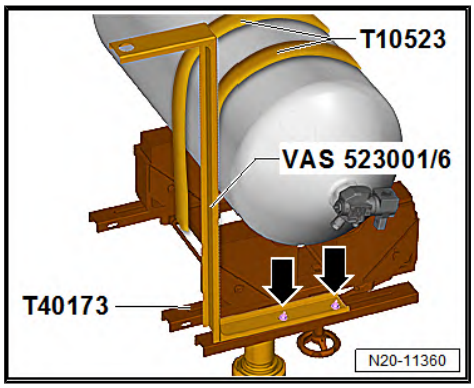


Note

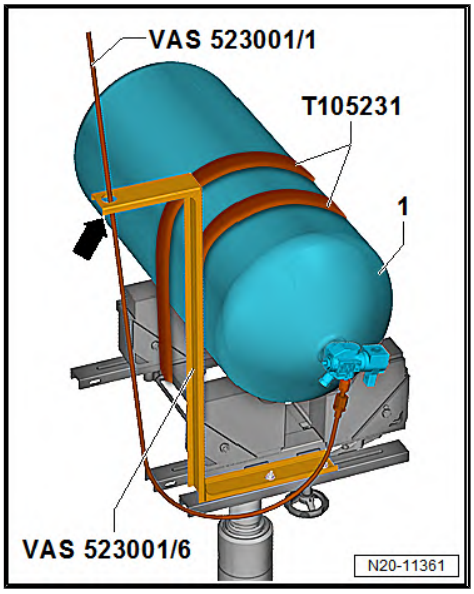
- *Make sure that the painted surface of the natural gas container is not damaged when securing the natural gas container.*
- *Different shut-off valves can be installed on the natural gas container.*
- *Valves for the tank shut-off have connection lines based on model 1 or 2.*

– Turn the natural gas container so that the connection of the fuel line on the tank shut-off valve is pointing vertically downwards.

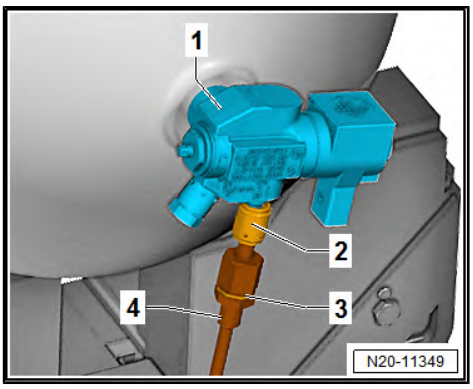
– Attach the bracket - VAS 523 001/6- to bracket - T40173- , as shown. Use two screws for this purpose -arrows-.



– Fit the pipe - VAS 523 001/1- into the guide -arrow- of the bracket - VAS 523 001/6- .



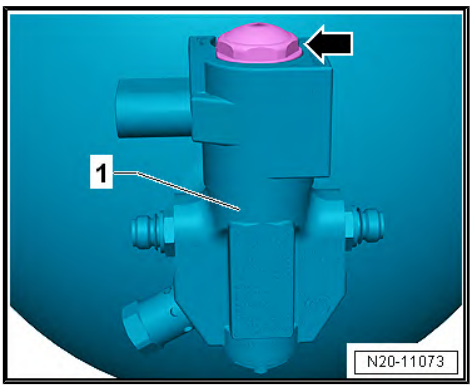
– Screw a suitable adapter - VAS 523 001- onto the pipe - VAS 523 001/1- -4-.
– Ensure that the gasket is seated properly -3-.
– Screw the adapter - VAS 523 001- -2- onto the tank shut-off valve -1-.
– Tighten the adapter - VAS 523 001- -2- hand-tight.



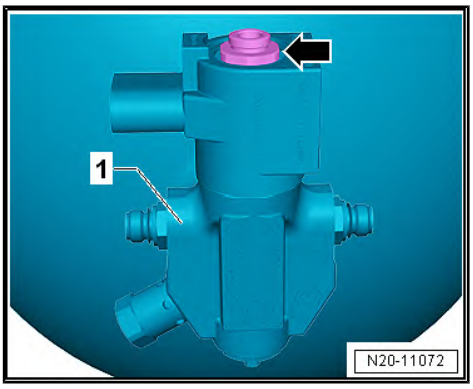
Note

Do not use any aids, such as pliers or other tools, to tighten the adapter - VAS 523 001- .

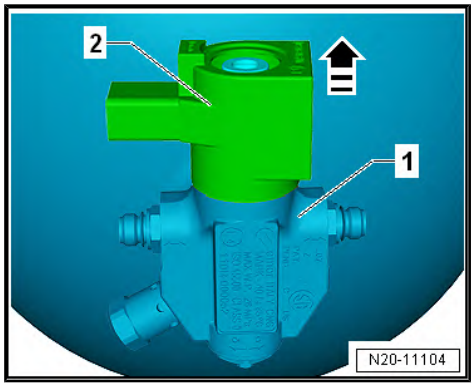
– Unscrew screw plug -arrow- at the tank shut-off valve -1-.



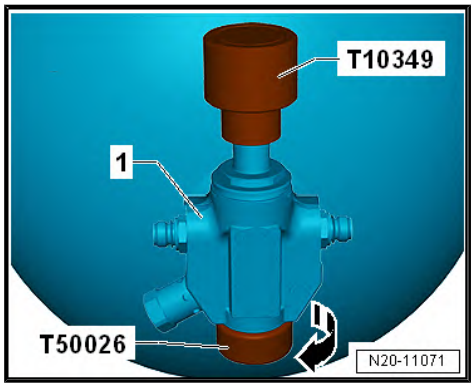
– Unscrew and remove nut -arrow- at the tank shut-off valve -1-.



– Detach the solenoid coil -2- from the tank shut-off valve -1- in -direction of arrow-.



– Position the magnetic release tool - T10349- on the tank shut-off valve -1-.



Note

- *The magnetic release tool - T10349- must remain on the valve during the entire drain operation.*
- *This prevents a valve blocking.*

– Position the handwheel - T50026- on the mechanical shut-off valve -arrow- on the tank shut-off valve .

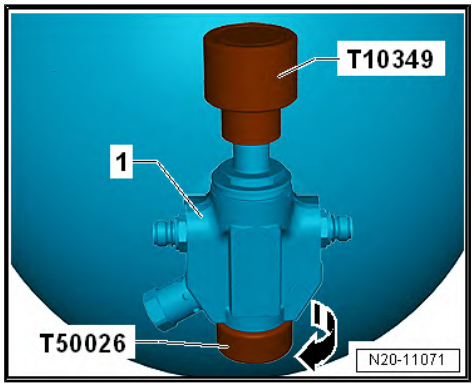
DANGER!

- ***Risk of explosion due to natural gas!***
- ***A safety area in the immediate vicinity of the natural gas container must be established and should not be entered while the container is draining.***
- ***After opening the manual shut-off, you must leave the safety area!***
- ***The inhalation of natural gas can cause poisoning of the respiratory tract.***
- ***If no more natural gas is escaping from the natural gas container, the residual pressure in the natural gas container must be checked***
  ⇒ "5.3 Determine the residual pressure in the natural gas container", page 306 .

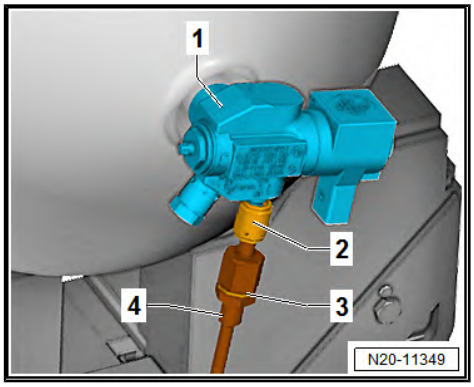
Check connection points for leaks

– Use the handwheel - T50026- to carefully open the mechanical shut-off valve on the tank shut-off valve in -direction of arrow-, until the natural gas begins to escape.

– After 1 to 2 seconds, use the handwheel - T50026- to close the mechanical shut-off valve on the tank shut-off valve again.



– Check the connection points between pipe - VAS 523 001/1- -4- and tank shut-off valve -1- for leaks.



Note

For the leakage test, use the gas leakage detector for natural gas vehicles - VAS 6227- and commercially available leak search spray.

If leaks are found:

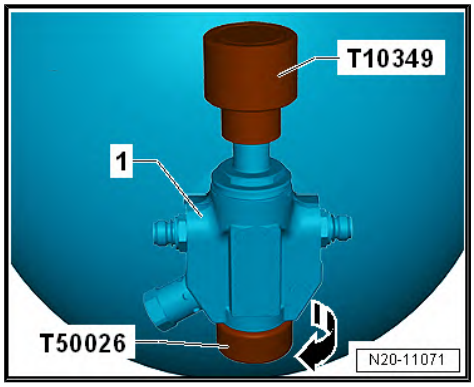
– Check the seal -3- for damage and if necessary replace it.

– Check the connection between pipe - VAS 523 001/1- -4- and tank shut-off valve -1- for soiling and tighten if necessary.

If the leak cannot be eliminated, the gas exhaust - VAS 523 001- cannot be used.

If no leaks are found or they have been eliminated already:

– Use the handwheel - T50026- to carefully open the mechanical shut-off valve on the tank shut-off valve in -direction of arrow-, until the natural gas begins to escape.



Note

- *Open the mechanical shut-off valve on the tank shut-off valve as far as possible without activating the “pipe failure valve”.*
- *How far the shut-off cock on the tank shut-off valve opens depends on the gas pressure in the natural gas container.*
- *The mechanical shut-off valve on the tank shut-off valve must not be opened completely.*
- *Fully opening of the mechanical shut-off valve on the tank shut-off valve will activate the “pipe failure valve”. Only a minimum amount of gas can escape.*
- *Fully opening the mechanical shut-off valve on the tank shut-off valve may cause it to freeze and loss of gas is prevented.*

If the pipe failure valve is activated:

Note

- *To disable the pipe failure valve, pressure must first be equalised by closing the mechanical shut-off valve on the tank shut-off valve .*
- *Close the mechanical shut-off valve on the tank shut-off valve with the handwheel - T50026- .*

– Close the mechanical shut-off valve on the tank shut-off valve .

– Partially opened the mechanical shut-off valve on the tank shut-off valve .

Note

After around 2 minutes, the mechanical shut-off valve on the tank shut-off valve may be opened.

Continued

– If no more natural gas is escaping from the natural gas container, close the mechanical shut-off valve on the tank shut-off valve .

– Check the residual pressure in the natural gas container to determine whether sufficient gas has been discharged
⇒ “5.3 Determine the residual pressure in the natural gas container”, page 306

5.5 Removing and installing natural gas container

⇒ "5.5.1 Removing and installing natural gas container 1", page 323

⇒ "5.5.2 Removing and installing natural gas container 2", page 332

5.5.1 Removing and installing natural gas container 1

Special tools and workshop equipment required

- Engine and gearbox jack - V.A.G 1383 A-
- Tensioning strap , e.g. -T10523-
- Gearbox mount - T40173-
- Gearbox mount - T40173/1-
- Handwheel - T50026-
- Supports - VAS 6131/14-1-
- Caliper gauge, digital, 150 mm - VAS 6335-
- Screw plug set - VAS 6122-

Removing

DANGER!

Follow safety measures and rules of cleanliness when working on the natural gas system and general instructions for operating a natural gas vehicle (CNG) *⇒ "2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)", page 10* *.*

- The vehicle must be at ambient temperature (min. 15 °C).

Warning instructions!

WARNING

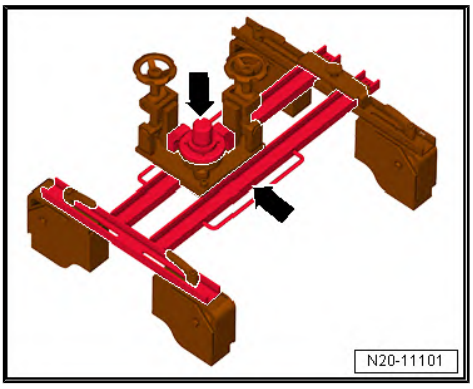
Before using the gearbox mount - T40173- , it is essential to check whether it is the latest version.

If the fitting status of the mounts is older, they must not be used and exchanged against the newest version!

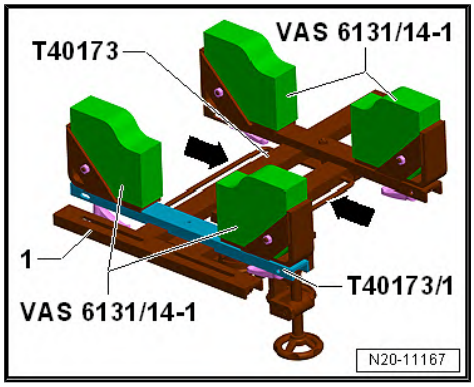
Distinguishing features (latest fitting status):

As of the newest version, the components -arrows- shown in the figure are chrome yellow!

If the gearbox mount does not correspond to the instructions, contact the supplier of the gearbox mount!



– Enlarge the gearbox mount - T40173- by the gearbox mount - T40173/1- .
– Install the gearbox mount - T40173/1- between the rigid carrier -1- and the clamps -arrows-.



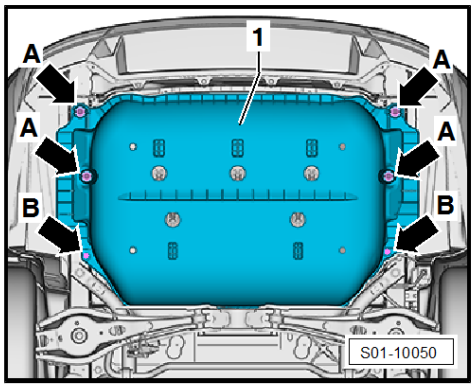
Note

Where necessary, adjust the specifications - VAS 6131/14-1- to the contours of the natural gas container using suitable means in the workshop.

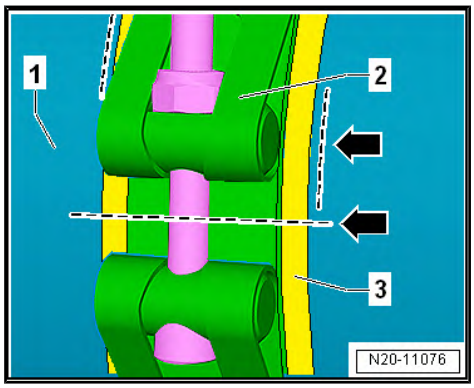
Note

- *Make sure that the painted surface of the natural gas container is not damaged when working on the natural gas container.*
- *Where necessary, protect the painted surface of the natural gas container using suitable means in the workshop.*

– Undo plastic nuts arrows -A- on the cover at the bottom -1-.
– Undo the securing bolts arrows -B- for the bottom -1- and remove the cover.
– Seal the mechanical shut-off valves on the tank shut-off valves - N361- and -N362- on the fuel tanks
⇒ “5.6 Mechanically close the tank shut-off valves N361 and N362 at the natural gas containers .”, page 341 .
– Empty gas line
⇒ “5.8 Remove the pressure in the high-pressure line”, page 347 .
– Disconnect battery ⇒ Electrical System; Rep. gr. 27 .



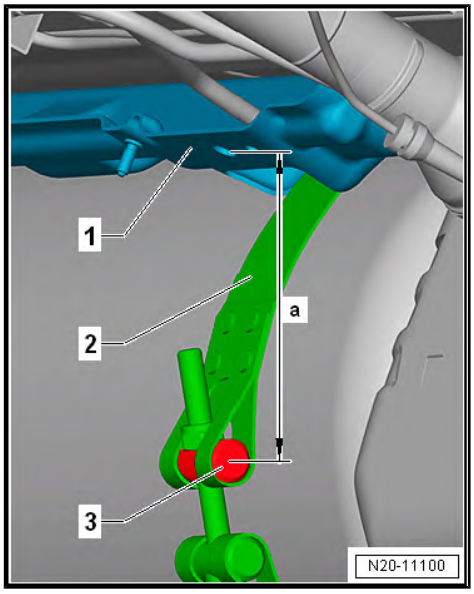
– Mark the fitting position of the protection pads -3- using a felt-tip pen.
– To this end, make horizontal and vertical markings -arrows- on the natural gas container -1- and tensioning straps -2-.



Volkswagen Technical Site: http://vwts.ru http://vwts.info
огромный архив документации по автомобилям Volkswagen, Skoda, Seat, Audi

Before removing, the installation position of the tensioning straps -2- must be determined.

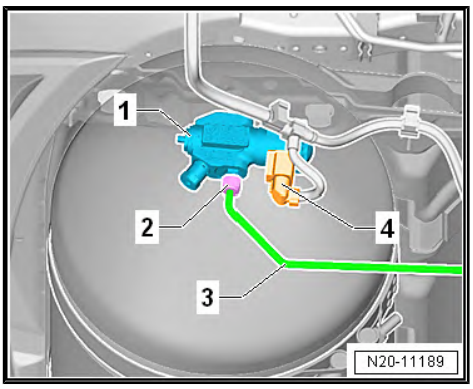
– Measure the dimension -a- between the middle of the tensioning bolt -3-, tensioning strap -2- and mounting bracket -1- using a suitable gauge.



Note

To measure dimension -a-, you may select any point on the bracket for the natural gas container -1-. However, the same point must be kept for measuring when reassembling.

– Disconnect plug connection -4- at tank shut-off valve 1 - N361- -1-.



Note

When undoing the union nuts, counterhold the connection line using an open-end wrench.

– Carefully loosen the union nuts -2- so that any residual gas can escape.

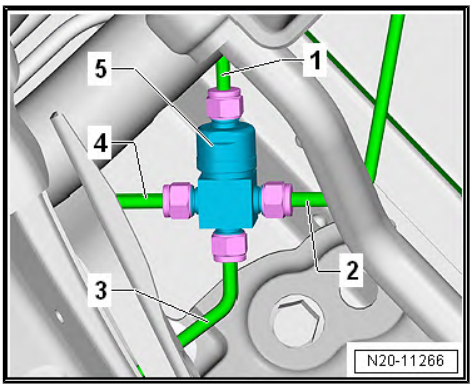
– Unscrew nut -2-.

WARNING

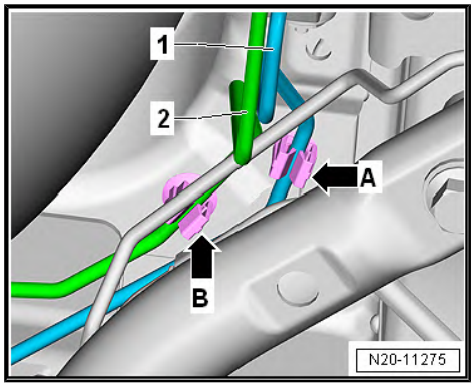
The lines must not be bent or deformed.

– Unscrew the fuel line -3- from the branch piece -5-.

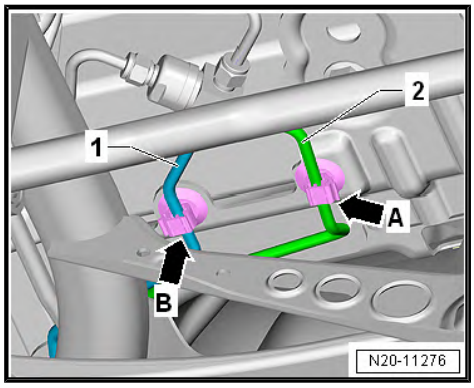
– Seal open connections using suitable screw plugs from the screw plug set - VAS 6122- .



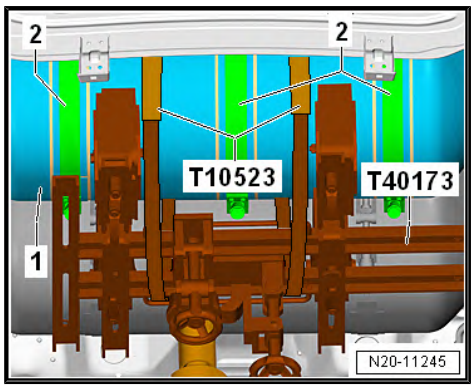
– Remove the high-pressure line -2- from the line holder arrow -B-.



– Unlock the mounting bracket arrow -A-.
– Remove the high-pressure line -2- from the line holder arrow -B-.



– Place the engine and gearbox jack - V.A.G 1383 A- together with the gearbox mount - T40173- underneath the natural gas containers -1-.
– Align the gearbox mount - T40173- to the natural gas container -1- between the tensioning straps.
– Raise the engine and gearbox jack - V.A.G 1383 A- until the gearbox mount - T40173- lies at the natural gas container.

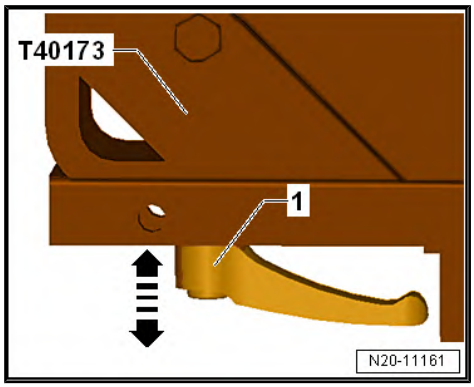


Note

Make sure that the painted surface of the natural gas container is not damaged when securing the natural gas container.

– Align the adjustable mounts of the gearbox mounts - T40173- .

To do so, pull the lever -1- downwards and affix in such a way that it can be tightened correctly.

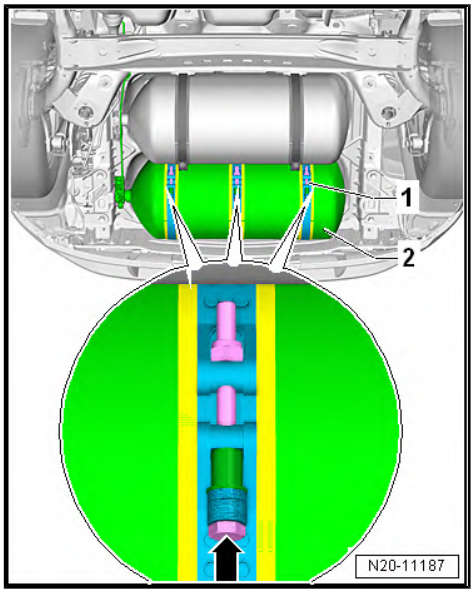


Note

A second mechanic is required for removing the natural gas container.

– Support the natural gas container with the engine/gearbox jack - V.A.G 1383 A- .

– Unscrew bolts -arrow- from the tensioning straps -1-.

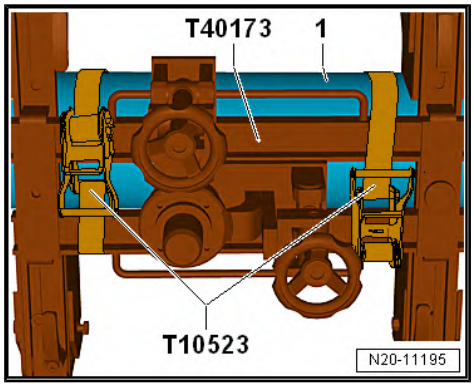


Note

The tensioning straps are slightly tensioned!

– Carefully lower the natural gas container -2- with engine/gearbox jack - V.A.G 1383 A- by 5 cm.

– Secure the natural gas container with the tensioning straps - T10523- to the gearbox mount - T40173- .



Install the locks on the tensioning strap mutually offset as shown in the figure.

Note

Make sure that the painted surface of the natural gas container is not damaged when securing the natural gas container with the tensioning strap - T10523- .

– To avoid damaging the painted surface of the natural gas container, mask off the edges on the ends of the tensioning straps with adhesive tape.

– Slowly lower the natural gas container -1- with the engine and gearbox jack - V.A.G 1383 A- .

Note

When lowering the natural gas container, make sure that the protection pads for the tensioning strap are always present between the tensioning straps and the natural gas container.

– A second mechanic is required for carefully unclipping the natural gas container.

– Slightly pull apart the tensioning straps during this procedure.

Install

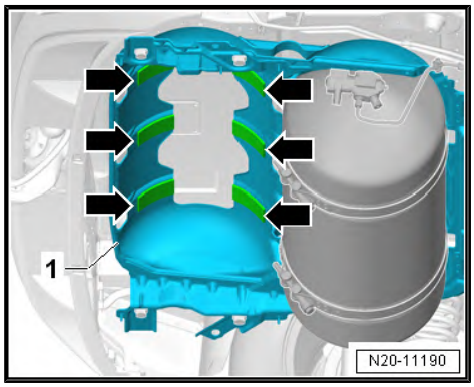
Installation is carried out in the reverse order. Pay attention to the following:

Note

- *A second mechanic is required for refitting the natural gas container.*
- *Clear the natural gas container thoroughly from mechanical impurities.*
- *Make sure that the painted surface of the natural gas container is not damaged when working on the natural gas container.*
- *Where necessary, protect the painted surface of the natural gas container using suitable means in the workshop.*

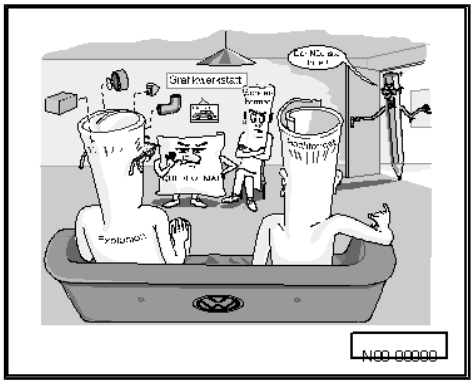
– Make sure the protection pads -arrows- are seated correctly.

– Check the protection pads -arrows- for damage and dirt - replace where necessary.



– Pay attention to the correct fit of the tensioning straps -1- in the mount -2-.

• The tensioning straps -1- must sit in the guide under the protection pad -3-.



Note

♦ *If protective foils are glued to the natural gas container, they must be checked and if necessary replaced.*

♦ *Assign protective foils ⇒ ETKA*

♦ *Before installing the new protective foils, clean the surfaces thoroughly to which the foil will be glued.*

♦ *Glue protective foils to these surfaces.*

♦ *When installing a new natural gas container, the protective foils must be glued onto these surfaces, as for the old natural gas container.*

– Attach the protection pads for tensioning straps at the natural gas container ⇒ page 250 .

– When raising the natural gas container, make sure that the protection pads for the tensioning strap are always present between the tensioning straps and the natural gas container.

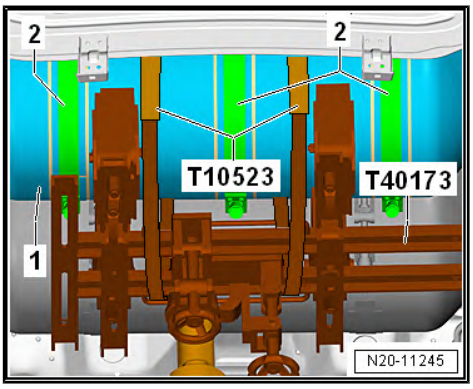
Note

Make sure that the painted surface of the natural gas container is not damaged when raising the natural gas container.

– Raise the natural gas container -1- with the engine and gearbox jack - V.A.G 1383 A- almost to the bracket.

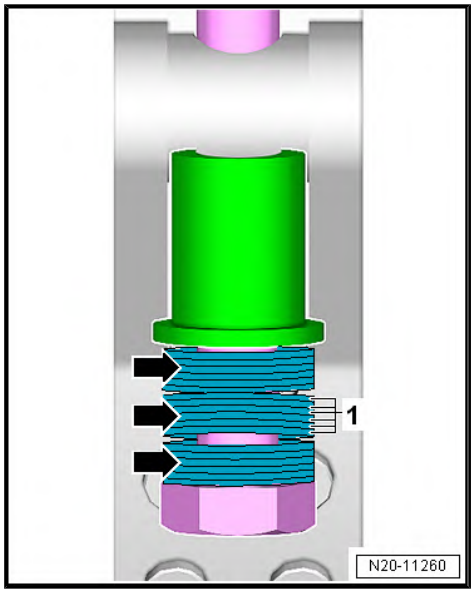
– Remove the tensioning straps - T10523- .

– Raise the natural gas container further to the park position.



– Pay attention to the fitting position of the disc springs.
– Assemble 3 spring packages -arrows- each with 6 disc springs -1-.

The spring packages -arrows- must be layered alternately as shown.

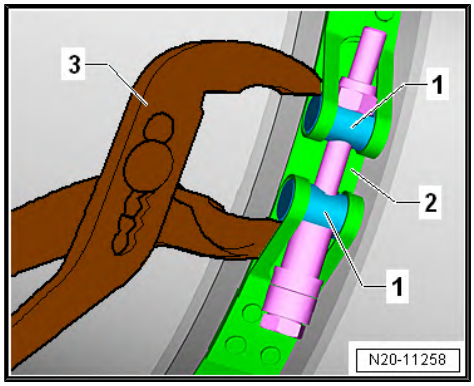


Note

A 2nd mechanic is needed to connect the tensioning straps.

– Fit all components of the tensioning straps ⇒ “2.1.6 Summary of components - tensioning strap and spring package”, page 256 .

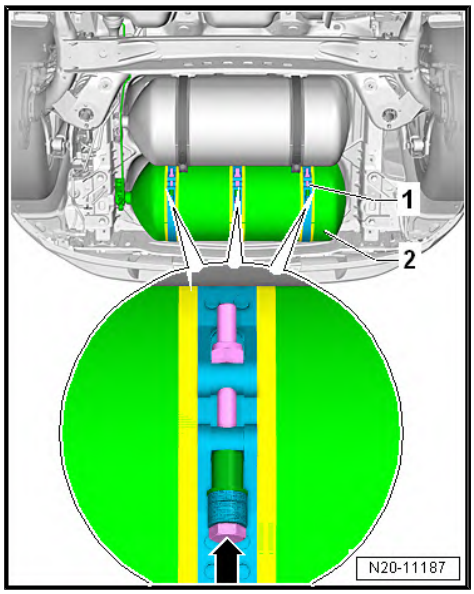
– Manually connect the ends of the tensioning straps -2-.
– To prevent damage to the parts, tape off the SIKO pliers for cutting.
– Mount SIKO pliers -3- on tensioning bolts -1-.
– Bring the end of the tensioning straps -2- as close as possible with SIKO pliers -3-.



– Screw on screws -arrows- to tensioning strap -1-.

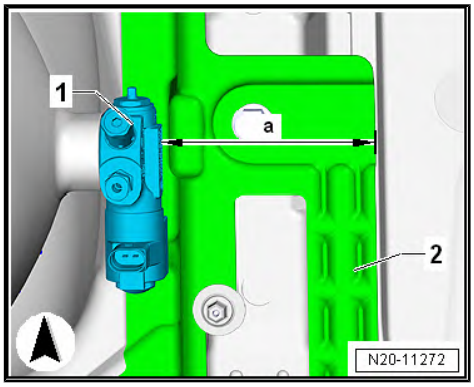
It must still be possible to move the natural gas container -2-.

– Pay attention to the correct fitting position of the tensioning straps and the protection pads ⇒ page 250 .

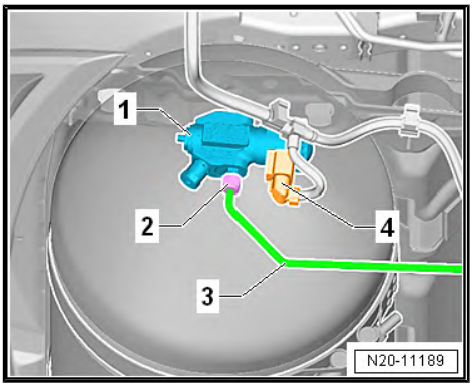


– Align the natural gas container.

• Dimension -a- must by approx. 12.3 cm from the end of the tank shut-off valve -1- to the edge of the bracket -2-.



– Align the natural gas container in such a way that the fuel lines are free of tension and the union nut -2- can be screwed on.



Caution

The fuel line -3- must not be bent or deformed.

The union nut -2- must be screwed in by hand as far as it can go.

The fuel lines -3- must be installed free of tension.

Lay fuel lines in such a way that the original line guide is re-established.

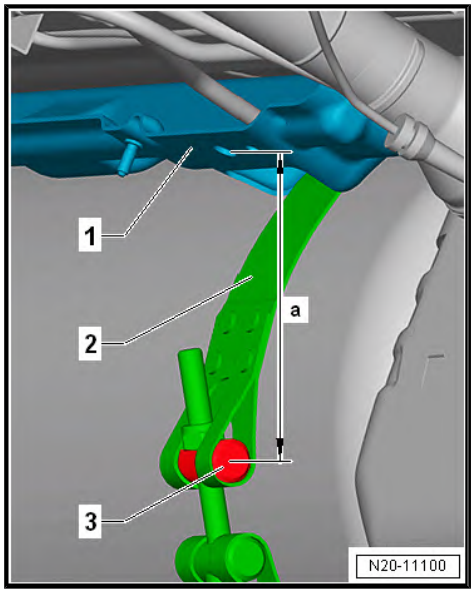
Ensure that there is adequate free access to all moving or hot components.

– Make sure that the fuel lines are correctly seated in the brackets.

– Screw in the union nuts -2-.

– Remove the plug connection -4- from the tank shut-off valve -N361- -1-.

– Align the tensioning strap -2- to the bracket -1-.



Note

- *The dimension -a- must be set from the centre of the tensioning bolt -3- to the bracket for the natural gas container -1-.*
- *To measure dimension -a-, the same point on the bracket for the natural gas tank -1- must be used as for removal.*

– Align the tensioning strap so that the dimension -a- corresponds with the determined dimension.

– Check the fitting position of the protection pads of the tensioning strap ⇒ page 250 .

– Tighten the tensioning strap ⇒ “2.1.6 Summary of components - tensioning strap and spring package”, page 256

Caution

Carry out a leak tightness test on the liquefied petroleum gas system (LPG) ⇒ “3.2 Inspecting the gas system for leaktightness”, page 17 .

Inspect natural gas system for leak-tightness ⇒ Maintenance ; Booklet Octavia III .

Tightening torques

- Union nut for fuel line ⇒ “5.1.1 Summary of components - tank shut-off valve 1 N361 ”, page 302

5.5.2 Removing and installing natural gas container 2

Special tools and workshop equipment required

- Engine and gearbox jack - V.A.G 1383 A-
- Tensioning strap , e.g. -T10523-
- Gearbox mount - T40173-
- Gearbox mount - T40173/1-
- Handwheel - T50026-
- Supports - VAS 6131/14-1-
- Caliper gauge, digital, 150 mm - VAS 6335-
- Screw plug set - VAS 6122-

Removing

- The vehicle must be at ambient temperature (min. 15 °C).

DANGER!

Follow safety measures and rules of cleanliness when working on the natural gas system and general instructions for operating a natural gas vehicle (CNG)
⇒ "2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)", page 10 .

- The vehicle must be at ambient temperature (min. 15 °C).

Warning instructions!

WARNING

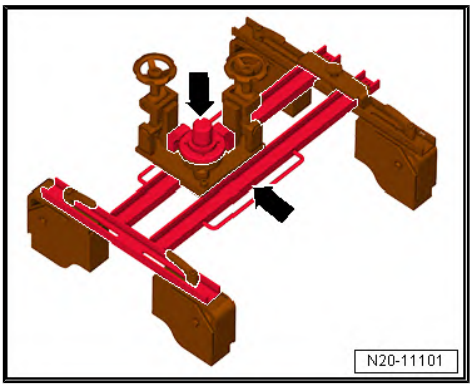
Before using the gearbox mount - T40173- , it is essential to check whether it is the latest version.

If the fitting status of the mounts is older, they must not be used and exchanged against the newest version!

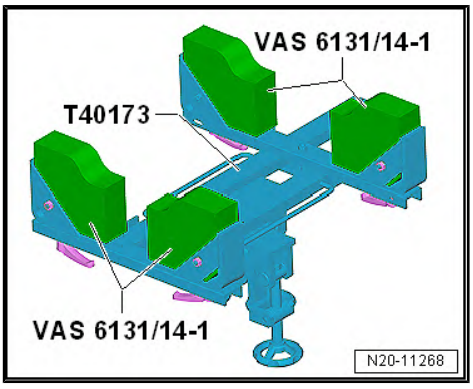
Distinguishing features (latest fitting status):

As of the newest version, the components -arrows- shown in the figure are chrome yellow!

If the gearbox mount does not correspond to the instructions, contact the supplier of the gearbox mount!



– When necessary, fit the mounting bracket for supports - VAS 6131/14-1- to the gearbox mount - T40173- .



Note

Where necessary, adjust the specifications - VAS 6131/14-1- to the contours of the natural gas container using suitable means in the workshop.

Note

- *Make sure that the painted surface of the natural gas container is not damaged when working on the natural gas container.*
- *Where necessary, protect the painted surface of the natural gas container using suitable means in the workshop.*

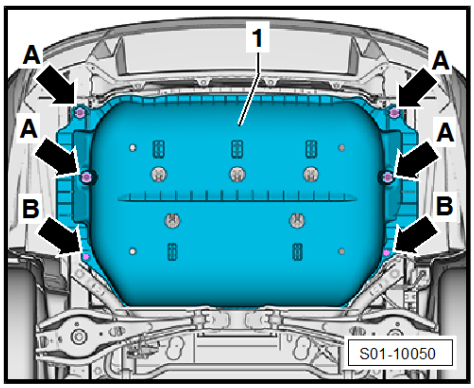
– Undo plastic nuts arrows -A- on the cover at the bottom -1-.

– Undo the securing bolts arrows -B- for the bottom -1- and remove the cover.

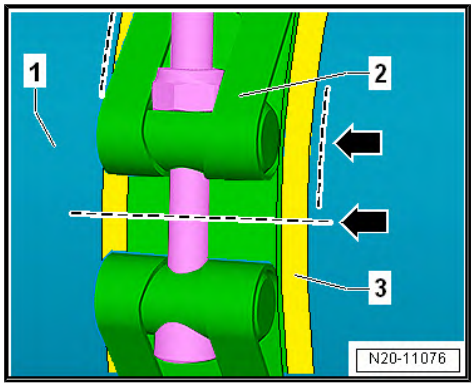
– Seal the mechanical shut-off valves on the tank shut-off valves - N361- and -N362- on the fuel tanks
⇒ "5.6 Mechanically close the tank shut-off valves N361 and N362 at the natural gas containers .", page 341 .

– Empty gas line
⇒ "5.8 Remove the pressure in the high-pressure line", page 347 .

– Disconnect battery ⇒ Electrical System; Rep. gr. 27 .



– Mark the fitting position of the protection pads -3- using a felt-tip pen.
– To this end, make horizontal and vertical markings -arrows- on the natural gas container -1- and tensioning straps -2-.

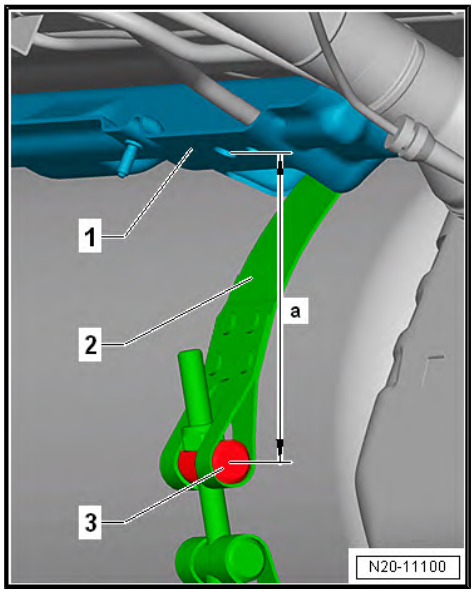


Before removing, the installation position of the tensioning straps -2- must be determined.

– Measure the dimension -a- between the middle of the tensioning bolt -3-, tensioning strap -2- and mounting bracket -1- using a suitable gauge.

Note

To measure dimension -a-, you may select any point on the bracket for the natural gas container -1-. However, the same point must be kept for measuring when reassembling.

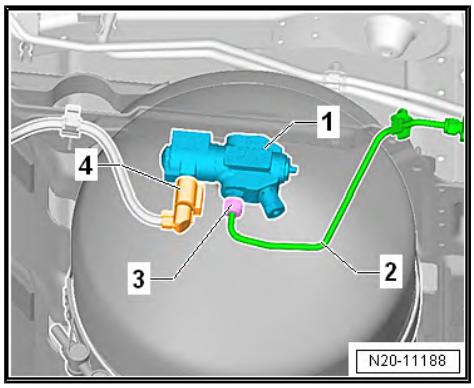


– Remove the plug connection -4- from the tank shut-off valve 2 - N361- -1-.

Note

When undoing the union nuts, counterhold the connection line using an open-end wrench.

– Carefully loosen the union nuts -3- so that any residual gas can escape.
– Unscrew nut -3-.



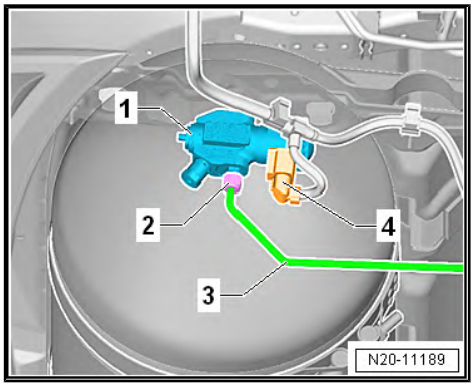
WARNING

The lines must not be bent or deformed.

Note

When undoing the union nuts, counterhold the connection line using an open-end wrench.

– Carefully loosen the union nuts -2- so that any residual gas can escape.
– Unscrew nut -2-.



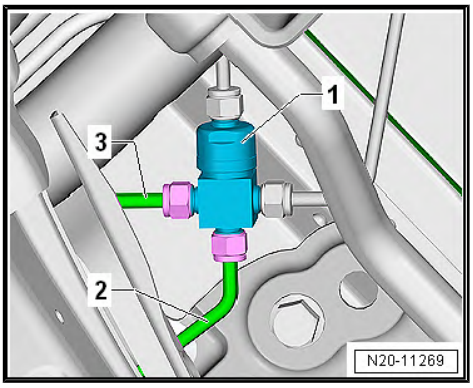
WARNING

The lines must not be bent or deformed.

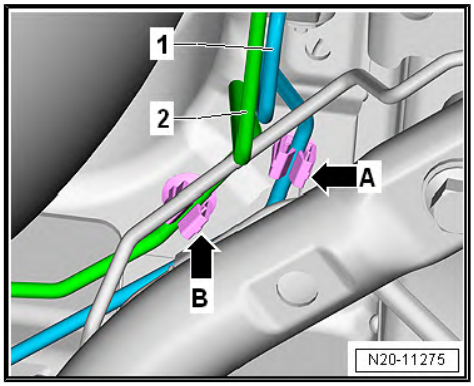
Note

When undoing the union nuts, counterhold the connection line using an open-end wrench.

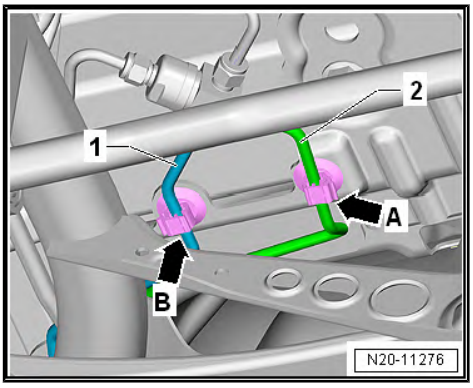
– Unscrew the fuel lines -2- and -3- from the branch piece -1-.
– Seal open connections using suitable screw plugs from the screw plug set - VAS 6122- .



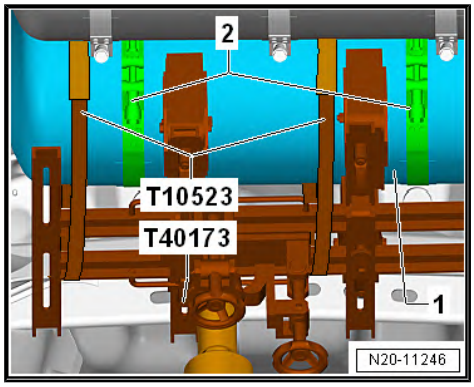
– Remove high-pressure lines -1- and -2- from the line holders arrow -A- and arrow -B-.



– Unlock the mounting brackets arrow -A- and arrow -B-.
– Remove high-pressure lines -1- and -2- from the mounting brackets.



– Place the engine and gearbox jack - V.A.G 1383 A- together with the gearbox mount - T40173- underneath the natural gas containers -1-.
– Align the gearbox mount - T40173- to the natural gas container -1- between the tensioning straps -2- as shown in the figure.
– Raise the engine and gearbox jack - V.A.G 1383 A- until the gearbox mount - T40173- lies at the natural gas container.

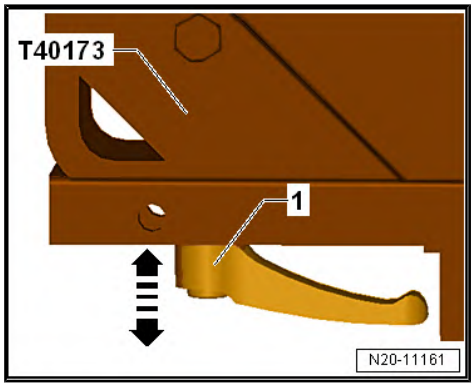


Note

Make sure that the painted surface of the natural gas container is not damaged when securing the natural gas container.

– Align the adjustable mounts of the gearbox mounts - T40173- .

To do so, pull the lever -1- downwards and affix in such a way that it can be tightened correctly.

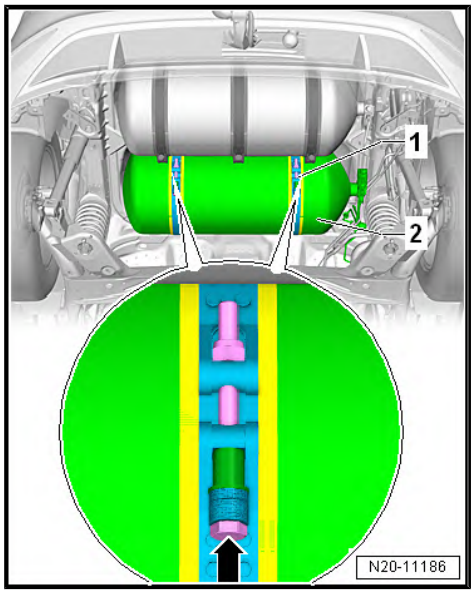


Note

A second mechanic is required for removing the natural gas container.

– Support the natural gas container with the engine/gearbox jack - V.A.G 1383 A- .

– Unscrew bolts -arrow- from the tensioning straps -1-.

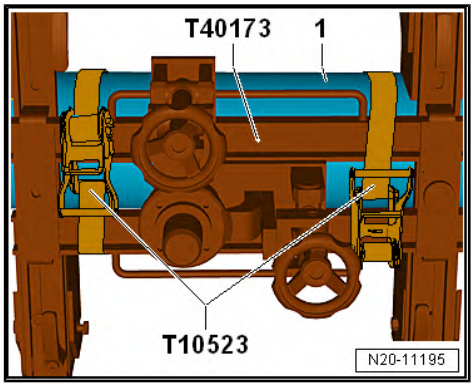


Note

The tensioning straps are slightly tensioned!

– Carefully lower the natural gas container -2- with engine/gearbox jack - V.A.G 1383 A- by 5 cm.

– Secure the natural gas container with the tensioning straps - T10523- to the gearbox mount - T40173- .



Install the locks on the tensioning strap mutually offset as shown in the figure.

Note

Make sure that the painted surface of the natural gas container is not damaged when securing the natural gas container with the tensioning strap - T10523- .

– To avoid damaging the painted surface of the natural gas container, mask off the edges on the ends of the tensioning straps with adhesive tape.

– Slowly lower the natural gas container -1- with the engine and gearbox jack - V.A.G 1383 A- .

Note

When lowering the natural gas container, make sure that the protection pads for the tensioning strap are always present between the tensioning straps and the natural gas container.

– A second mechanic is required for carefully unclipping the natural gas container.

– Slightly pull apart the tensioning straps during this procedure.

Install

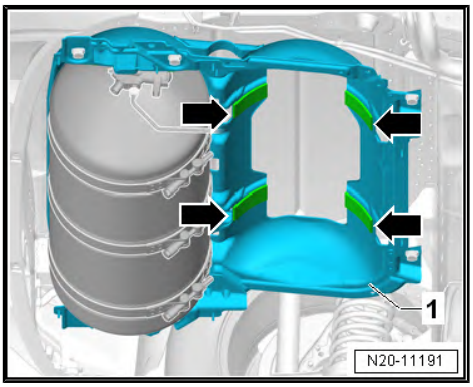
Installation is carried out in the reverse order. Pay attention to the following:

Note

- *A second mechanic is required for refitting the natural gas container.*
- *Clear the natural gas container thoroughly from mechanical impurities.*
- *Make sure that the painted surface of the natural gas container is not damaged when working on the natural gas container.*
- *Where necessary, protect the painted surface of the natural gas container using suitable means in the workshop.*

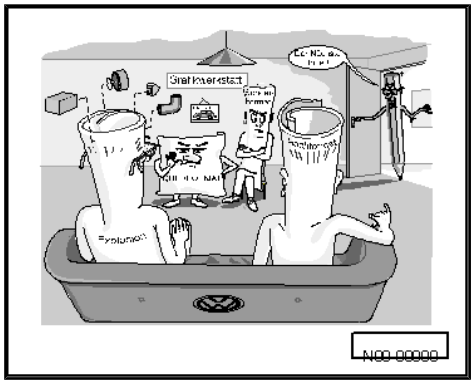
– Make sure the protection pads -arrows- are seated correctly.

– Check the protection pads -arrows- for damage and dirt - replace where necessary.



– Pay attention to the correct fit of the tensioning straps -1- in the mount -2-.

• The tensioning straps -1- must sit in the guide under the protection pad -3-.



Note

♦ *If protective foils are glued to the natural gas container, they must be checked and if necessary replaced.*

♦ *Assign protective foils ⇒ ETKA*

♦ *Before installing the new protective foils, clean the surfaces thoroughly to which the foil will be glued.*

♦ *Glue protective foils to these surfaces.*

♦ *When installing a new natural gas container, the protective foils must be glued onto these surfaces, as for the old natural gas container.*

– Attach the protection pads for tensioning straps at the natural gas container ⇒ page 250 .

– When raising the natural gas container, make sure that the protection pads for the tensioning strap are always present between the tensioning straps and the natural gas container.

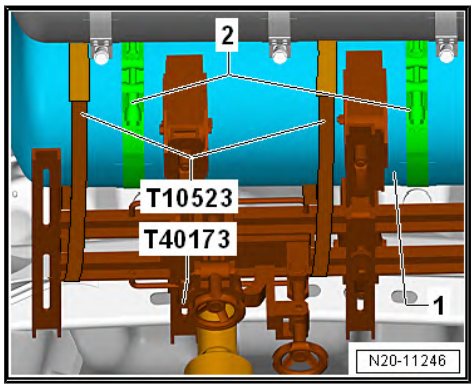
Note

Make sure that the painted surface of the natural gas container is not damaged when raising the natural gas container.

– Raise the natural gas container -1- with the engine and gearbox jack - V.A.G 1383 A- almost to the bracket.

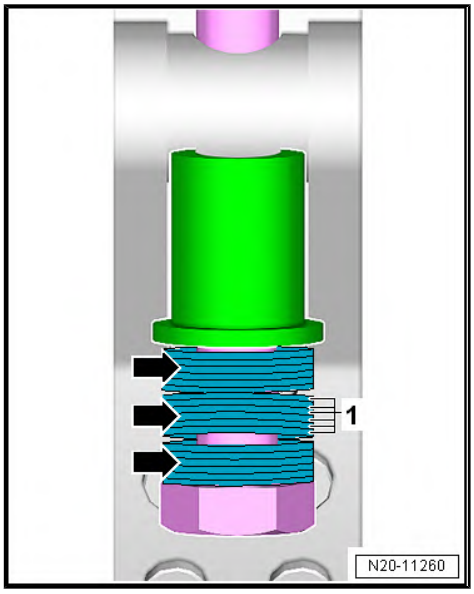
– Remove the tensioning straps - T10523- .

– Raise the natural gas container further to the park position.



– Pay attention to the fitting position of the disc springs.
– Assemble 3 spring packages -arrows- each with 6 disc springs -1-.

The spring packages -arrows- must be layered alternately as shown.

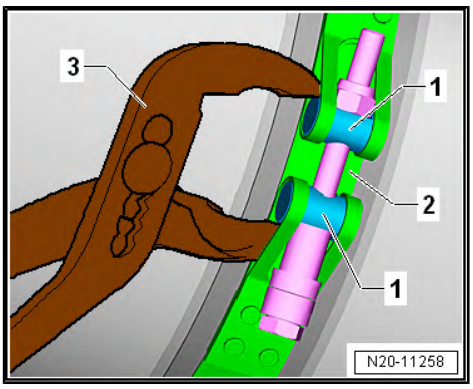


Note

A 2nd mechanic is needed to connect the tensioning straps.

– Fit all components of the tensioning straps ⇒ “2.1.6 Summary of components - tensioning strap and spring package”, page 256 .

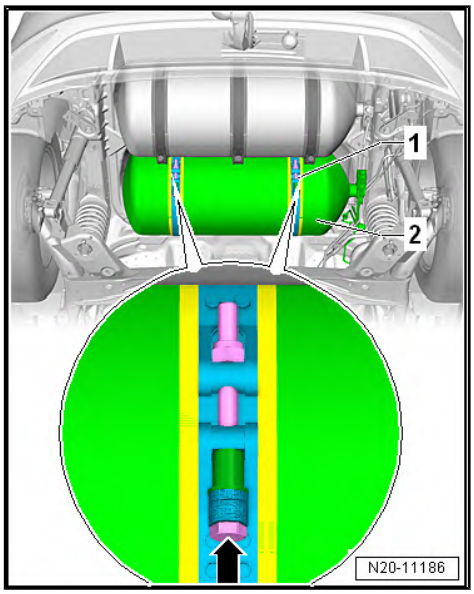
– Manually connect the ends of the tensioning straps -2-.
– To prevent damage to the parts, tape off the SIKO pliers for cutting.
– Mount SIKO pliers -3- on tensioning bolts -1-.
– Bring the end of the tensioning straps -2- as close as possible with SIKO pliers -3-.



– Screw in bolts -arrow- from the tensioning straps -1-.

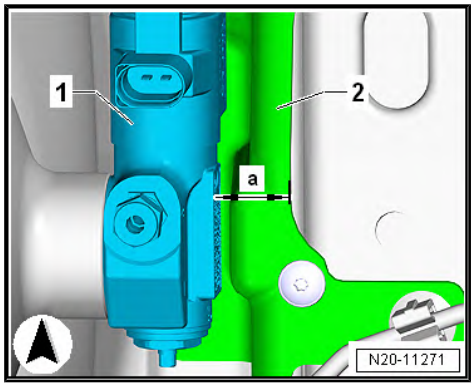
It must still be possible to move the natural gas container -2-.

– Pay attention to the correct fitting position of the tensioning straps and the protection pads ⇒ page 250 .

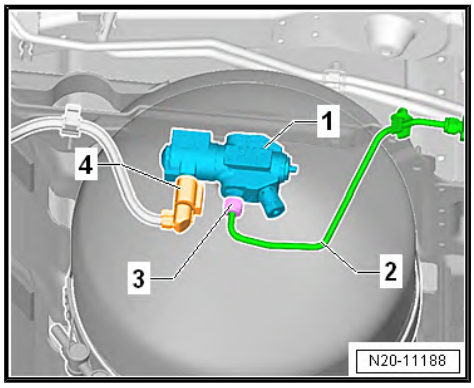


– Align the natural gas container.

• Dimension -a- must by approx. 2.6 cm from the end of the tank shut-off valve -1- to the edge of the bracket -2-.



– Align the natural gas container in such a way that the fuel lines are free of tension and the union nut -3- can be screwed on.



WARNING

The fuel line -2- must not be bent or deformed.

The union nut -3- must be screwed in by hand as far as it can go.

The fuel lines -2- must be installed free of tension.

Lay fuel lines in such a way that the original line guide is re-established.

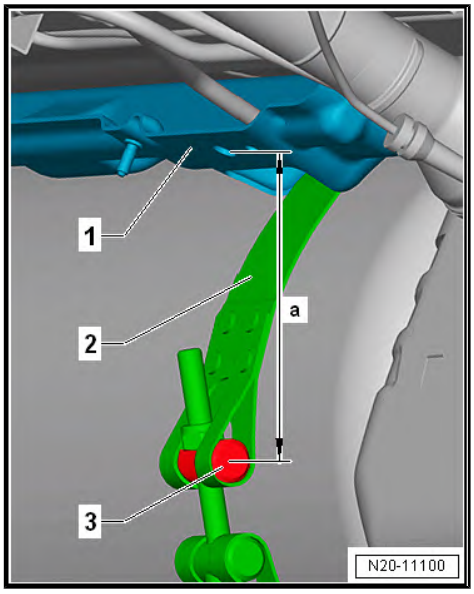
Ensure that there is adequate free access to all moving or hot components.

– Make sure that the fuel lines are correctly seated in the brackets.

– Screw in the union nuts -3-.

– Remove the plug connection -4- from the tank shut-off valve -N361- -1-.

– Align the tensioning strap -2- to the bracket -1-.



Note

- *The dimension -a- must be set from the centre of the tensioning bolt -3- to the bracket for the natural gas container -1-.*
- *To measure dimension -a-, the same point on the bracket for the natural gas tank -1- must be used as for removal.*

– Align the tensioning strap so that the dimension -a- corresponds with the determined dimension.

– Check the fitting position of the protection pads of the tensioning strap ⇒ page 250 .

– Tighten the tensioning strap
⇒ “2.1.6 Summary of components - tensioning strap and spring package”, page 256

Caution

Carry out a leak tightness test on the liquefied petroleum gas system (LPG)
⇒ “3.2 Inspecting the gas system for leaktightness”, page 17 .

Inspect natural gas system for leak-tightness ⇒ Maintenance ; Booklet Octavia III .

Tightening torques

- Union nut for fuel line
⇒ “5.1.2 Summary of components - tank shut-off valve 2 N362 ”, page 304

5.6 Mechanically close the tank shut-off valves -N361- and -N362- at the natural gas containers .

⇒ “5.6.1 Mechanically shut down tank shut-off valve 1 N361 ”, page 341

⇒ “5.6.2 Mechanically shut down tank shut-off valve 2 N362 ”, page 342

5.6.1 Mechanically shut down tank shut-off valve 1 - N361-

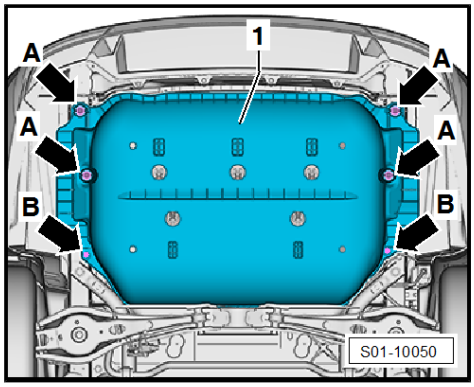
Special tools and workshop equipment required

- Handwheel - T50026-

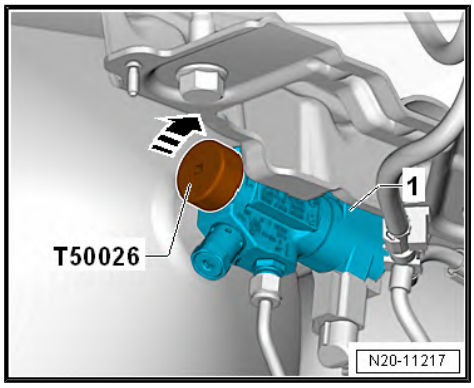
DANGER!

Follow safety measures and rules of cleanliness when working on the natural gas system and general instructions for operating a natural gas vehicle (CNG)
⇒ “2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)”, page 10 .

– Undo plastic nuts arrows -A- on the cover at the bottom -1-.
– Undo the securing bolts arrows -B- for the bottom -1- and remove the cover.



– Place the handwheel - T50026- -arrow- onto the mechanical shut-off valve on tank shut-off valve 1 - N361- -1-.
– Close the mechanical shut-off valve -1- on tank shut-off valve 1 - N361- -1- by turning it in the -direction of arrow- (clockwise).



Note

- *Only tighten the mechanical shut-off valve hand-tight using the handwheel - T50026- !*
- *The mechanical shut-off valves must not be overturned!*

5.6.2 Mechanically shut down tank shut-off valve 2 - N362-

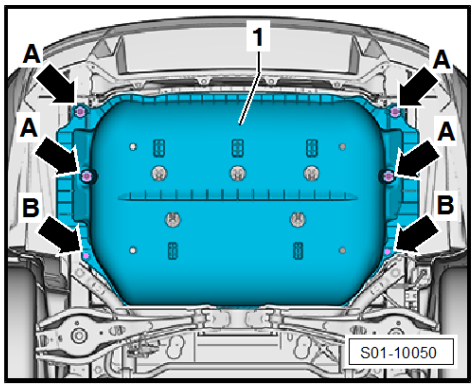
Special tools and workshop equipment required

- Handwheel - T50026-

DANGER!

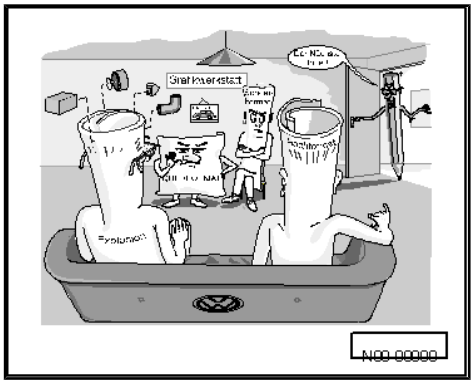
Follow safety measures and rules of cleanliness when working on the natural gas system and general instructions for operating a natural gas vehicle (CNG) ***⇒ "2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)", page 10*** ***.***

– Undo plastic nuts arrows -A- on the cover at the bottom -1-.
– Undo the securing bolts arrows -B- for the bottom -1- and remove the cover.



– Place the handwheel - T50026- -arrow- onto the mechanical shut-off valve on tank shut-off valve 2 - N362- -1-.

– Close the mechanical shut-off valve -1- on tank shut-off valve 2 - N362- -1- by turning it in the -direction of arrow- (clockwise).



Note

- *Only tighten the mechanical valve by hand using a handwheel - T50026- !*
- *The mechanical shut-off valves must not be overturned!*

5.7 Removing and installing tank shut-off valve

Special tools and workshop equipment required

- Engine and gearbox jack - V.A.G 1383 A-
- Tensioning strap , e.g. -T10523-
- Handwheel - T50026-
- Key - T50025-
- Uchwyt - T40173-
- Uchwyt - T40173/1-
- Supports - VAS 6131/14-1-

Removing

- The natural gas container must be at ambient temperature (at least 15 °C).

DANGER!

Follow safety measures and rules of cleanliness when working on the natural gas system and general instructions for operating a natural gas vehicle (CNG) ***⇒ "2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)", page 10*** .

Remove tank shut-off valve 1 - N361-

– Remove natural gas container 1 ⇒ "5.5.1 Removing and installing natural gas container 1", page 323 .

Remove tank shut-off valve 2 - N362-

– Remove natural gas container 2 ⇒ "5.5.2 Removing and installing natural gas container 2", page 332 .

Proceed as follows for both valves

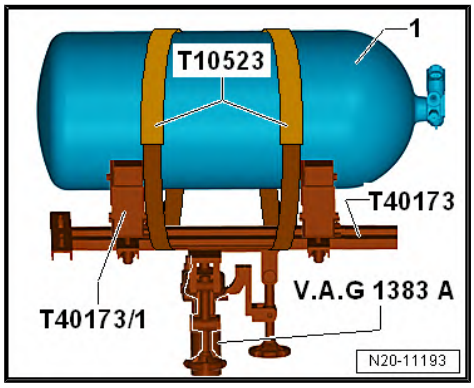
Note

- *Make sure that the painted surface of the natural gas container is not damaged when working on the natural gas container.*
- *Where necessary, protect the painted surface of the natural gas container using suitable means in the workshop.*

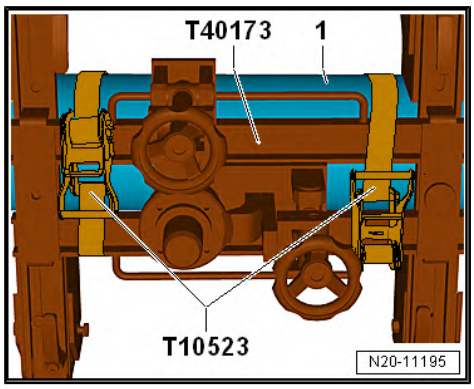
Caution

The natural gas container must be fixed firmly to the Engine and gearbox jack - V.A.G 1383 A- !

No work should be carried out on the natural gas container unless it is fixed correctly.



- The natural gas container -1- is secured to the Engine and gearbox jack - V.A.G 1383 A- with tensioning strap - T10523- as shown.
- Install the locks on the tensioning strap mutually offset as shown in the figure.

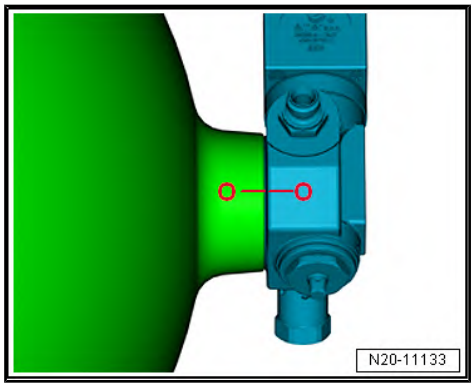


– Thoroughly clean the area around the tank shut-off valve .

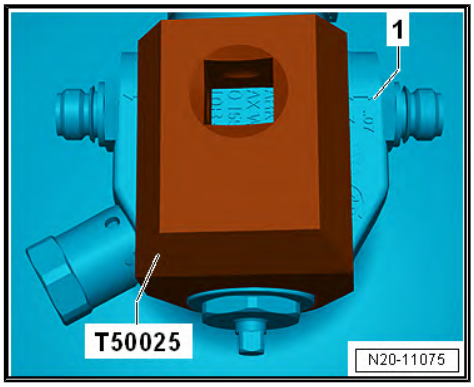
– Empty the natural gas container
⇒ “5.4 Empty the natural gas container ”, page 316 .

– Check the residual pressure in the natural gas container
⇒ “5.3 Determine the residual pressure in the natural gas container”, page 306 .

– Mark the position of the valve opposite the natural gas container.



– Position the wrench - T50025- at the tank shut-off valve -1- as shown.
– Make sure that the guide of the wrench - T50025- is correctly positioned at the mount.
– Detach the tank shut-off valve -1- as follows:



DANGER!

Absolutely observe the following procedure for unscrewing the tank shut-off valve.

Procedure for unscrewing the tank shut-off valve:

Note

- *Any residual gas should escape from the groove when the O-ring has fallen out.*
- *A high build up of noise may arise depending on the residual pressure.*

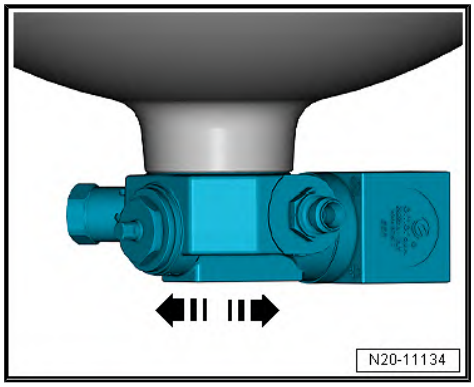
– Carefully undo the tank shut-off valve with key - T50025- by max. 1/2 turn to allow any residual gas to escape.

DANGER!

The shut-off valve must not be undone any further whole the gas discharge can still be heard.

If the gas discharge can no longer be heard:

– Carefully move the tank shut-off valve in both -directions of arrow- back and forth.



Note

- *Do not turn the tank shut-off valve any further!*
- *A slight play must be present.*

– Allow the residual gas to escape.

DANGER!

The shut-off valve must not be undone any further whole the gas discharge can still be heard.

If no more gas escapes:

– Undo the tank shut-off valve in steps of 90°, however by a max. of 2 turns.

DANGER!

If has does not escape after 2 turns and there is no play, do not undo the valve any further.

If there is no escape of residual gas:

– Tighten tank shut-off valve to 130 Nm.

– Do not carry out any more work on the tank shut-off valve or on the natural gas container.

If residual gas escapes and no play is present:

– Unscrew the tank shut-off valve in steps of 90°.

– Completely remove the remainder of the preservative product.

Note

- *There must be no more preservative product on the thread!*
- *No preservative product must get into the cylinder.*

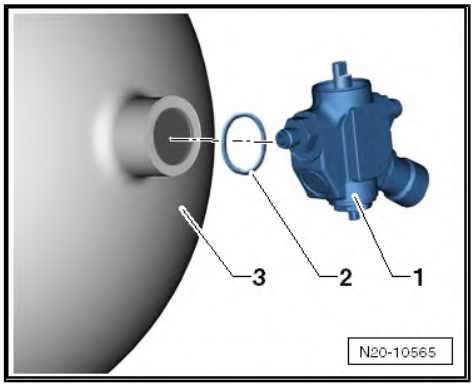
Install

Installation is carried out in the reverse order. Pay attention to the following:

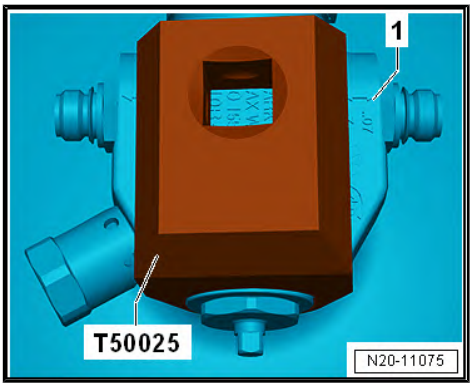
Note

- *There must be no more preservative product on the thread!*
- *No preservative product must get into the cylinder.*
- *Slightly moisten gasket ring with engine oil.*

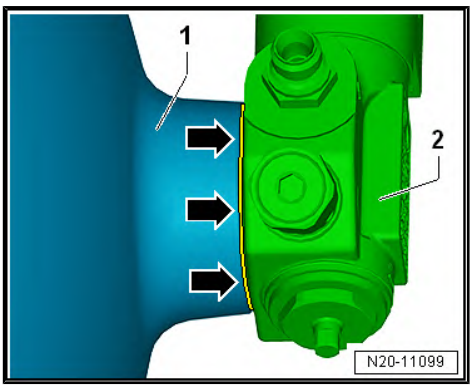
– Insert the new seal -2- onto the tank shut-off valve -1-.
– Screw the tank shut-off valve -1- into the natural gas container -3-.



– Tighten the tank shut-off valve -1- with key - T50025- to the specified tightening torque.



– Coat the connection point between the natural gas container -1- and the tank shut-off valve -2- with preservation product ⇒ ETKA .
– Apply the preservation product all around -arrows-.



Note

No preservation product must get into the gas line!

– Install natural gas container ⇒ “5.5 Removing and installing natural gas container”, page 323 .

Caution

Carry out a leak tightness test on the liquefied petroleum gas system (LPG) ⇒ “3.2 Inspecting the gas system for leaktightness”, page 17 .

Inspect natural gas system for leak-tightness ⇒ Maintenance ; Booklet Octavia III .

Tightening torques

♦ Tank shut-off valve ⇒ “5.1 Summary of components - seal fuel tank”, page 302

5.8 Remove the pressure in the high-pressure line

Special tools and workshop equipment required

♦ Handwheel - T50026-

DANGER!

Follow safety measures and rules of cleanliness when working on the natural gas system and general instructions for operating a natural gas vehicle (CNG) ***⇒ "2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)", page 10*** .

The pressure must always be released in the high pressure line before carrying out installation and repair work on the natural gas system or its components (empty gas line)!

– Use the handwheel - T50026- to close the mechanical cut-off valves -N361/N362- to the natural gas containers ⇒ "5.6 Mechanically close the tank shut-off valves N361 and N362 at the natural gas containers .", page 341 .

– Switch on ignition.

– Connect the diagnostic unit ⇒ Vehicle diagnostic tester and start self-diagnosis with »ODIS«.

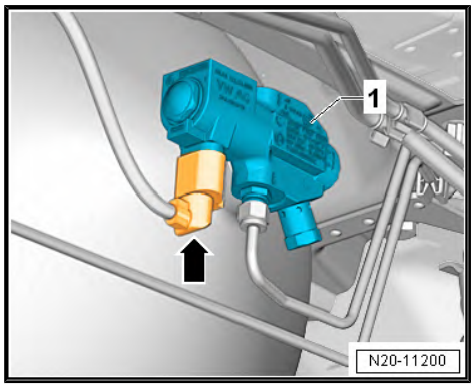
– Select the engine identification characters `CPWA`.

– Select the address word `01 Microelectronics`.

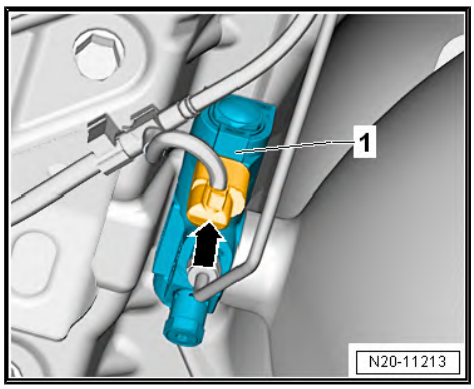
– In the `Targeted functions` select and start the `Remove the pressure in the high-pressure line`.

– Follow the instructions of the vehicle diagnosis tester .

– Remove connector -arrow- from the tank shut-off valve 2 - N362- -1-.



– Remove connector -arrow- from the tank shut-off valve 1 - N361- -1-.



Note

This work step is used to prevent the system from starting up accidentally.

5.9 Removing and installing the magnetic coil from the tank shut-off valve -N361- and -N362-

⇒ "5.9.1 Removing and installing the magnetic coil from the tank shut-off valve 1 N361 ", page 349

⇒ "5.9.2 Removing and installing the magnetic coil from the tank shut-off valve 2 N362 ", page 350

5.9.1 Removing and installing the magnetic coil from the tank shut-off valve 1 -N361-

Removing

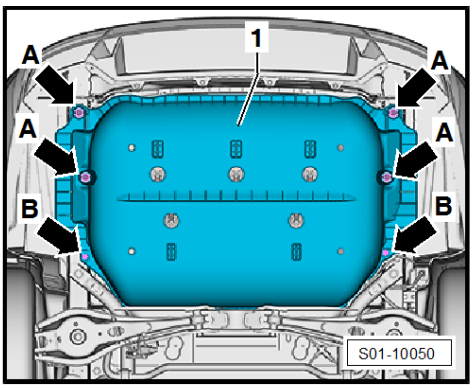
DANGER!

Follow safety measures and rules of cleanliness when working on the natural gas system and general instructions for operating a natural gas vehicle (CNG) *⇒ "2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)", page 10 .*

– Disconnect battery ⇒ Electrical System; Rep. gr. 27 .

– Undo plastic nuts arrows -A- on the cover at the bottom -1-.

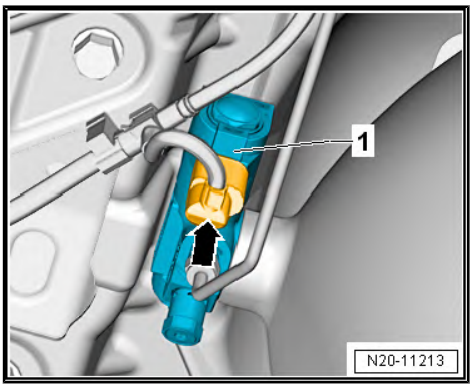
– Undo the securing bolts arrows -B- for the bottom -1- and remove the cover.



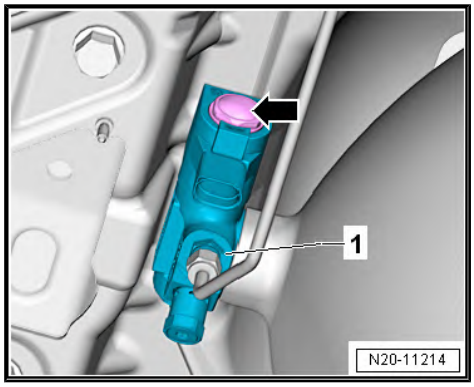
Note

- *Make sure that the painted surface of the natural gas container is not damaged when working on the natural gas container.*
- *Where necessary, protect the painted surface of the natural gas container using suitable means in the workshop.*

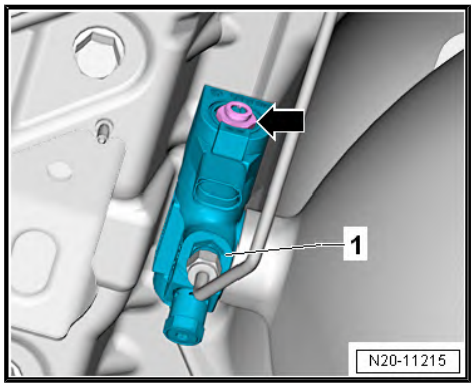
– Remove the connector -arrow- from the magnetic coil of the tank shut-off valve -1-.



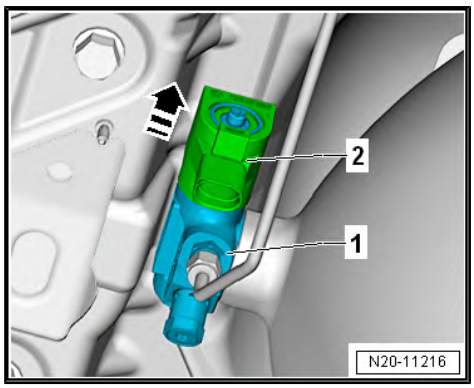
– Unscrew screw plug -arrow- at the tank shut-off valve -1-.



– Unscrew and remove nut -arrow- at the tank shut-off valve -1-.



– Detach the solenoid coil -2- from the tank shut-off valve -1- in -direction of arrow-.



Install

Installation is carried out in the reverse order. Pay attention to the following:

Tightening torques

- Screw plug
  ⇒ “5.1 Summary of components - seal fuel tank”, page 302
- Securing nut
  ⇒ “5.1 Summary of components - seal fuel tank”, page 302

5.9.2 Removing and installing the magnetic coil from the tank shut-off valve 2 -N362-

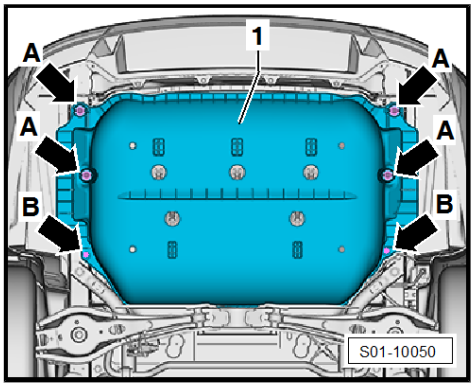
Removing

DANGER!

Follow safety measures and rules of cleanliness when working on the natural gas system and general instructions for operating a natural gas vehicle (CNG) ⇒ “2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)”, page 10 .

– Disconnect battery ⇒ Electrical System; Rep. gr. 27 .

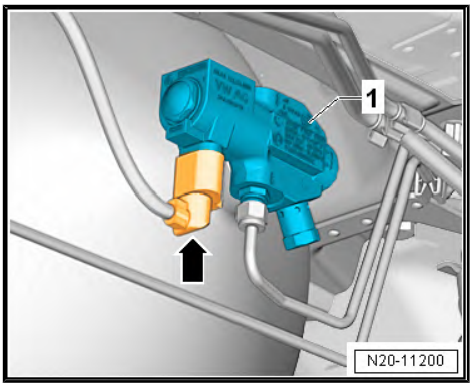
– Undo plastic nuts arrows -A- on the cover at the bottom -1-.
– Undo the securing bolts arrows -B- for the bottom -1- and remove the cover.



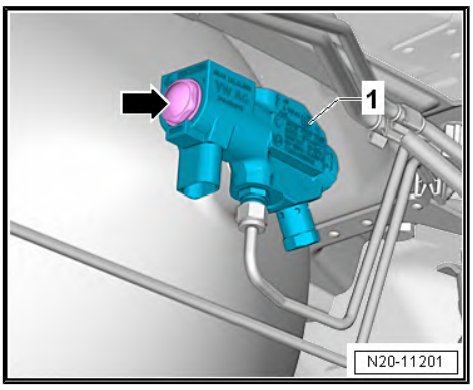
Note

- *Make sure that the painted surface of the natural gas container is not damaged when working on the natural gas container.*
- *Where necessary, protect the painted surface of the natural gas container using suitable means in the workshop.*

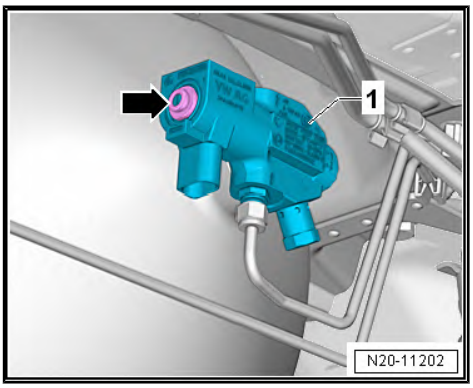
– Remove the connector -arrow- from the magnetic coil of the tank shut-off valve -1-.



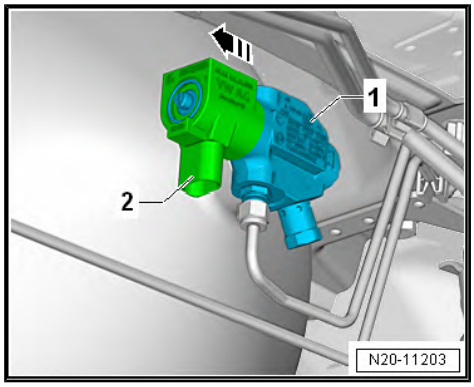
– Unscrew screw plug -arrow- at the tank shut-off valve -1-.



– Unscrew and remove nut -arrow- at the tank shut-off valve -1-.



– Detach the solenoid coil -2- from the tank shut-off valve -1- in -direction of arrow-.



Install

Installation is carried out in the reverse order. Pay attention to the following:

Tightening torques

- Screw plug
  ⇒ “5.1 Summary of components - seal fuel tank”, page 302
- Securing nut
  ⇒ “5.1 Summary of components - seal fuel tank”, page 302

5.10 Removing and installing filling connection

Special tools and workshop equipment required

- Torque wrench -V.A.G 1331-
- Key - 3312-
- Plug set for engine - VAS 6122-

Removing

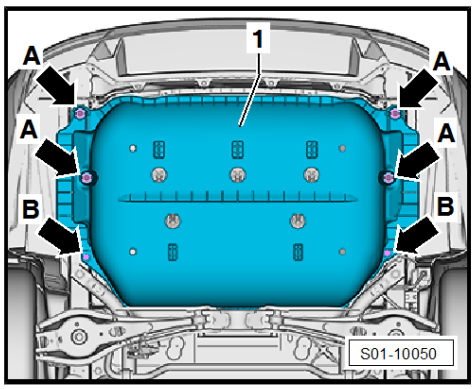
DANGER!

Follow safety measures and rules of cleanliness when working on the natural gas system and general instructions for operating a natural gas vehicle (CNG)
⇒ “2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)”, page 10 .

Note

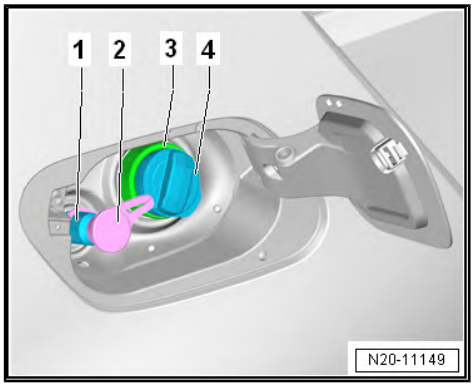
- *The filling connection and fuel line are a joint component and cannot be removed individually*
- *Make sure that the painted surface of the natural gas container is not damaged when working on the natural gas container.*
- *Where necessary, protect the painted surface of the natural gas container using suitable means in the workshop.*

– Undo plastic nuts arrows -A- on the cover at the bottom -1-.

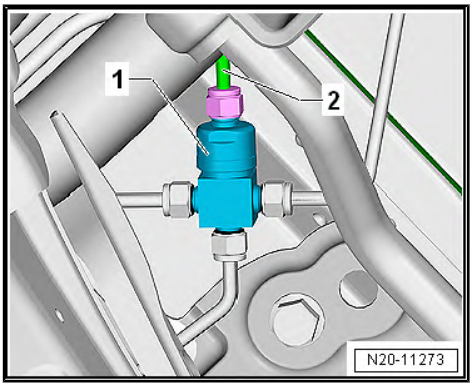


– Undo the securing bolts arrows -B- for the bottom -1- and remove the cover.
– Remove the pressure in the high-pressure line
  ⇒ “5.8 Remove the pressure in the high-pressure line”, page 347 .
– Disconnect battery ⇒ Electrical System; Rep. gr. 27 .

– Open the fuel-tank lid unit.
– Clean the area around the natural gas filling connection -1-.
– Remove the screw cap -2- from the natural gas filling connection.
– Unscrew the cap -4- for the fuel filler neck.
– Remove tank flap unit ⇒ Body Work; Rep. gr. 55 .
– Remove rear wheel on the right ⇒ Axles, steering; Rep. gr. 44 .
– Remove the rear right wheelhouse liner ⇒ Body Work; Rep. gr. 66 .



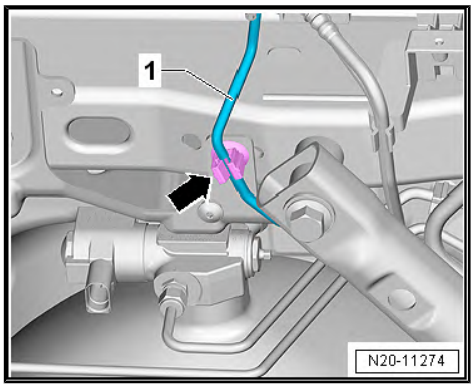
– Carefully undo the union nut of the fuel line -2- at the branch piece -1- to allow the residual gas to escape.



Note

At the same time, counterhold the branch piece -1-with a suitable tool.

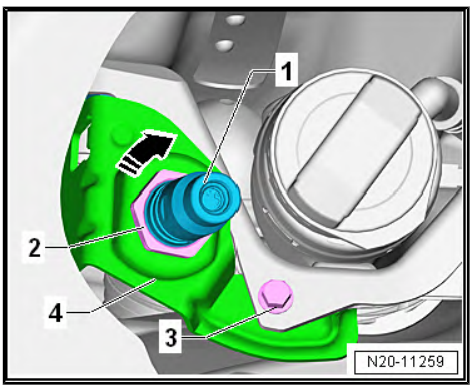
– Unscrew and detach the union nut of fuel line -2- from the branch piece -1-.
– Remove fuel line -2-.
– Seal open connections using suitable screw plugs from the screw plug set - VAS 6122- .
– Unclip fuel line -1- from the holder -arrow-.



– Undo and unscrew the nuts -2- at the filling connection -1- in -direction of arrow-.

Caution

Left-hand thread!



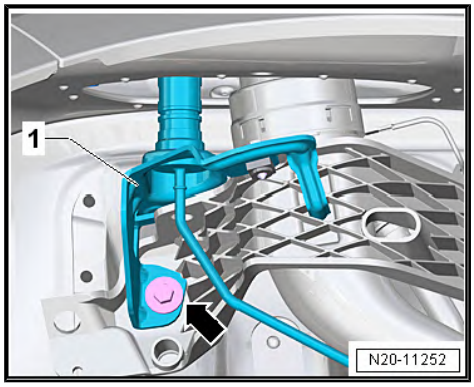
– Unscrew the screw -3- on the filling connection holder -4-.

– Unscrew the screw -arrow- on the filling connection holder -1-.

– Remove filling connection holder -1-

– Carefully remove the filling connection from the filler tube.

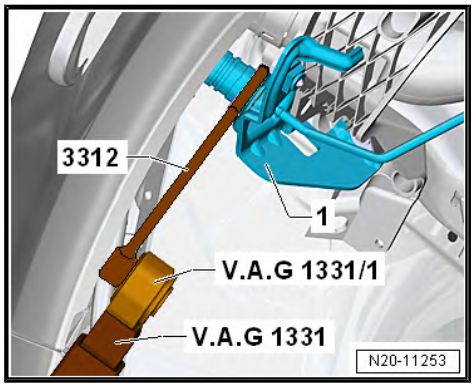
– Detach filling connection from the support on the body.



Install

Installation is carried out in the reverse order. Pay attention to the following:

– Plug the key - 3312- onto the nuts of the filling connection as shown.



Caution

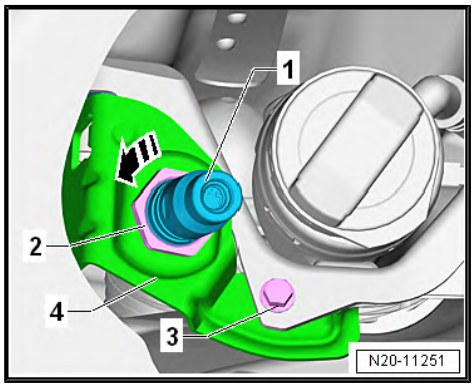
The torque wrench - V.A.G 1331- must be used to tighten. Only use the torque wrench together with key - 3312- !

When setting the tightening torque on the torque wrench - V.A.G 1331- set the reduced tightening torque of 19 Nm!

The required tightening torque of 35 Nm is achieved by extending the torque wrench - V.A.G 1331- around the key - 3312- !

Left-hand thread!

– Tighten the nut -2- to the specified tightening torque.



Caution

Carry out a leak tightness test on the liquefied petroleum gas system (LPG) ⇒ "3.2 Inspecting the gas system for leaktightness", page 17 .

Inspect natural gas system for leak-tightness ⇒ Maintenance ; Booklet Octavia III .

Tightening torques

- Screws of the filling connection bracket ⇒ “5.2 Summary of components - filling connection ”, page 305
- Filling connection nut ⇒ page 354

6 Accelerator pedal

⇒ “6.1 Assembly overview - accelerator module”, page 355

⇒ “6.2 Removing and installing accelerator module”, page 356

6.1 Assembly overview - accelerator module

1 - Screw

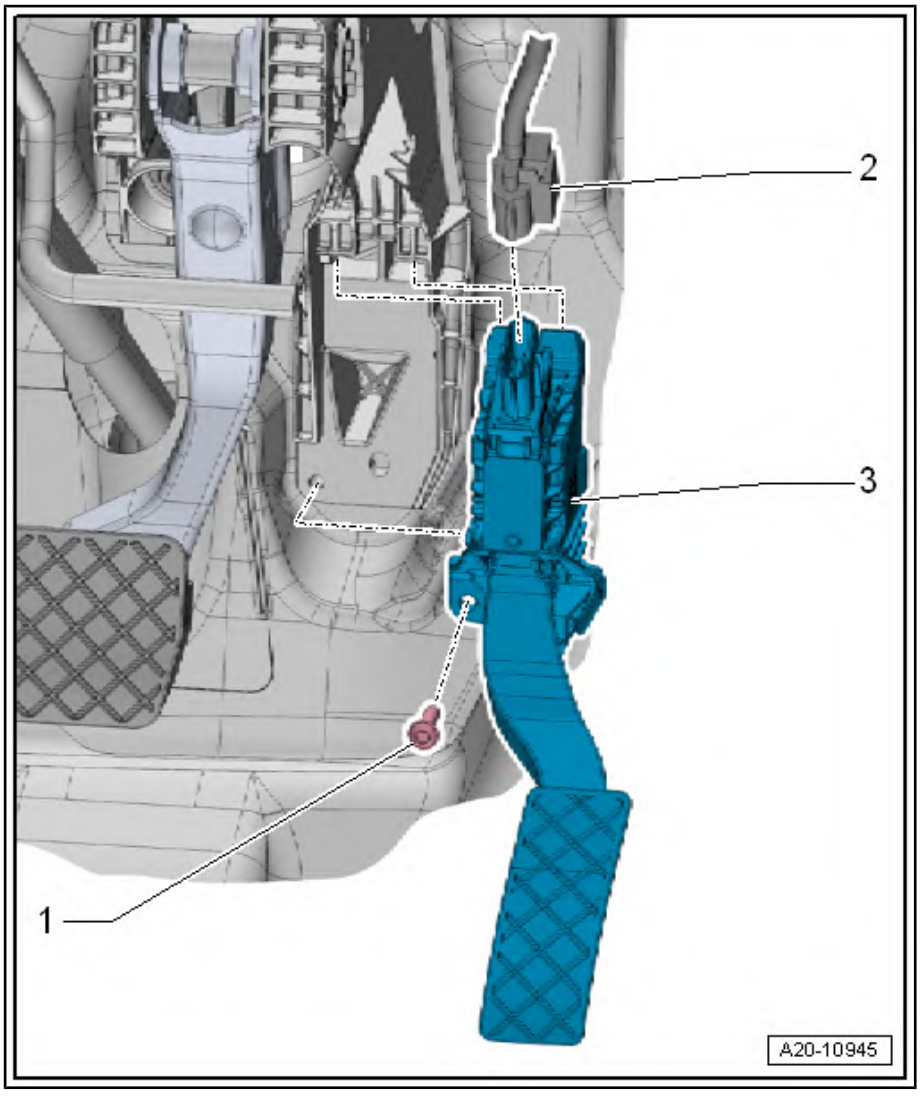
- ❑ 6 Nm

2 - Connector

- ❑ Ensure safe locking by pulling

3 - Accelerator pedal module

- ❑ with accelerator pedal position sender - G79-
- ❑ with accelerator pedal position sender 2 - G185-
- ❑ for vehicles with automatic gearbox DSG with kick-down switch
- ❑ After replacing in vehicles with automatic gearbox DSG, adjust the engine control unit ⇒ Vehicle diagnostic tester



6.2 Removing and installing accelerator module

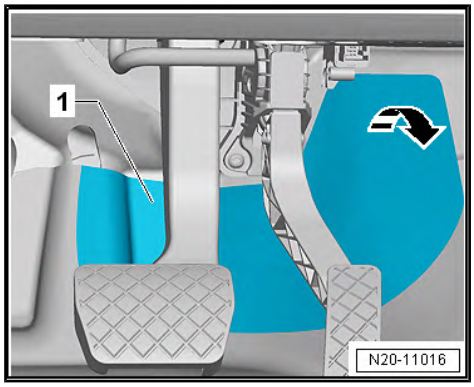
⇒ “6.2.1 Disconnect connector for accelerator pedal module and fit on”, page 356

Removing

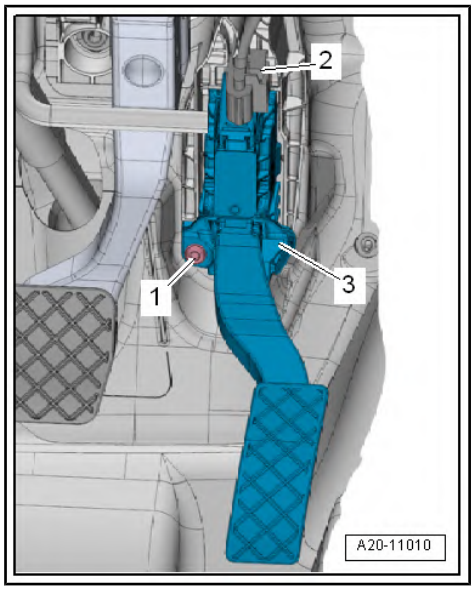
– Tilt the cover for underbody -1- towards the front in -direction of arrow-.

– Disconnect electrical plug connections -2- on the accelerator pedal module, thereby pressing the release upwards.

– Unscrew screw -1-.



– Remove accelerator module -3- from the uptake.



Install

Installation is carried out in the reverse order.

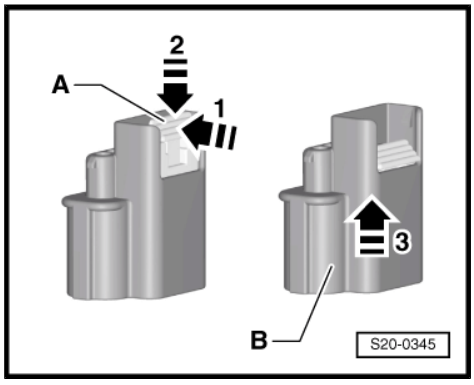
Tightening torques

♦ Screw for accelerator pedal module
⇒ “6.1 Assembly overview - accelerator module”, page 355

6.2.1 Disconnect connector for accelerator pedal module and fit on

Note

The plugs for the accelerator pedal module which are inserted, must be disconnected and fit on in a different manner.



Disconnect connector 1K0 973 706

– Lightly press the piston slide valve -A- (grey) in direction of arrow -1- and slide as far as it can go in the direction of arrow -2-.

– Hold the piston slide valve in this position and disconnect the socket housing -B- towards the top in direction of arrow -3-.

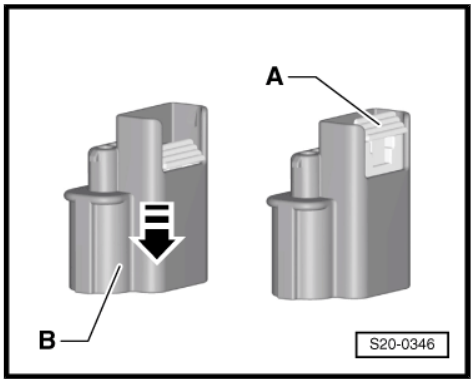
The piston slide valve -A- remains in the bottom position.

Fit on connector 1K0 973 706

– Push the socket housing -B- down in -direction of arrow- until the housing can be heard to lock in place.

  The piston slide valve -A- moves automatically upwards.

– For safety reasons, check the connector for secure catch by tightening it in the opposite direction.

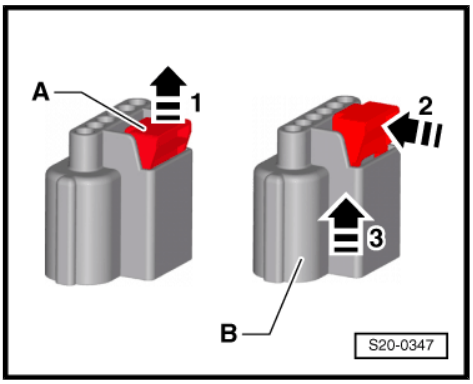


Disconnect connector 8K0 973 706

– Pull the piston slide valve -A- (red) upwards in direction of arrow -1- up to the stop.

– Press the piston slide valve in direction of arrow -2- and disconnect the socket housing -B- in direction of arrow -3-.

  The piston slide valve -A- remains in the top position.



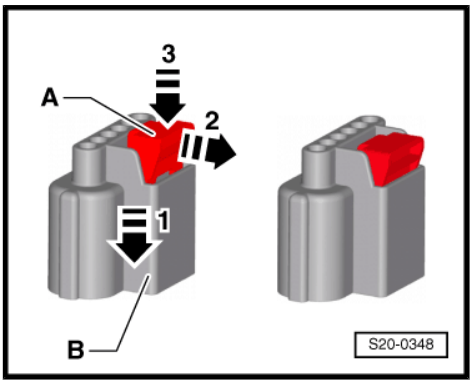
Fit on connector 8K0 973 706

– Push the socket housing -B- downwards up to the stop in direction of arrow -1-.

– Lightly press the piston slide valve in direction of arrow -2- and slide in the direction of arrow -3-.

  The piston slide valve -A- can only be pushed downwards if the socket housing was pushed downwards »up to the stop«.

– For safety reasons, check the connector for secure catch by tightening it in the opposite direction.



7 Activated charcoal filter system

⇒ “7.1 Assembly overview - activated charcoal filter system”, page 358

⇒ “7.2 Removing and installing activated charcoal filter”, page 359

⇒ “7.3 Checking the fuel tank venting”, page 360

7.1 Assembly overview - activated charcoal filter system

1 - Vent line

- ❑ to activated charcoal filter solenoid valve 1 - N80-
- ❑ pushed into the fuel tank
- ❑ Connection diagram ⇒ page 359
- ❑ disconnect and connect ⇒ “4 Quick couplings”, page 298

2 - Screw

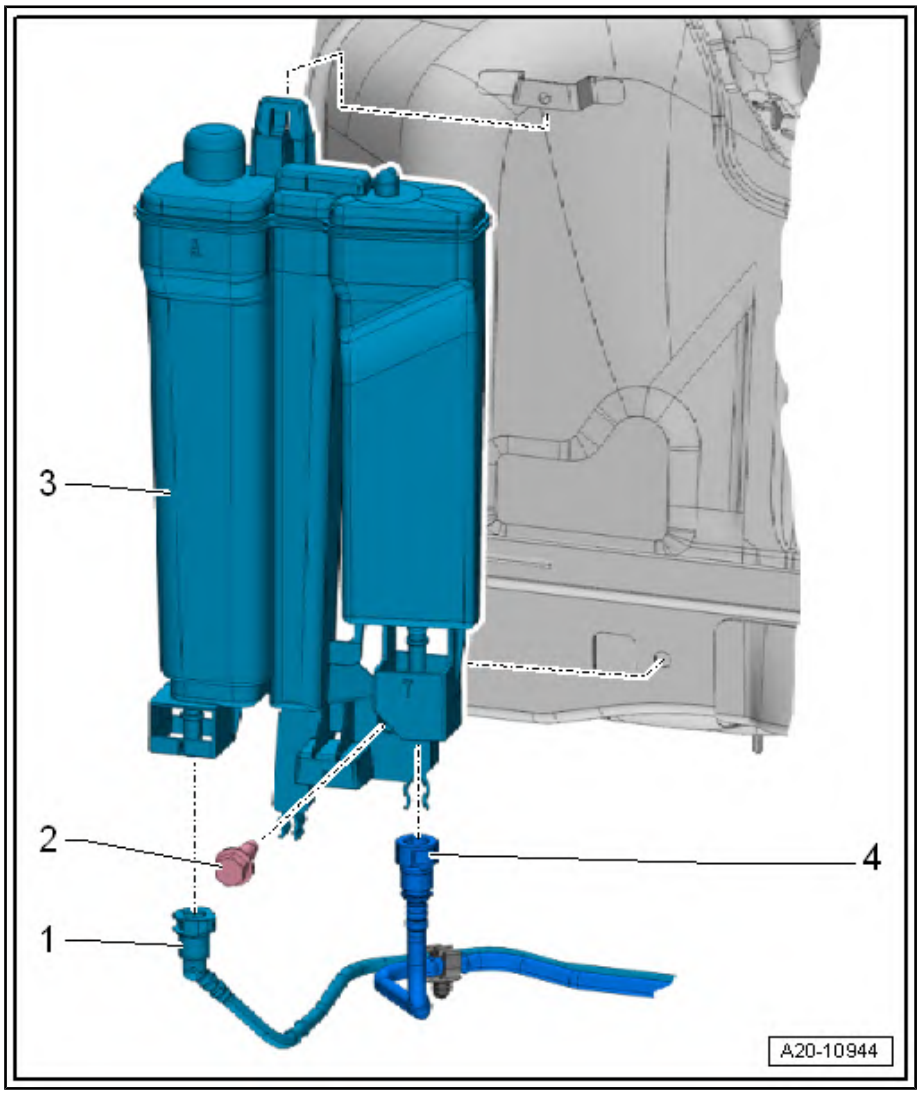
- ❑ 20 Nm

3 - Activated charcoal filter

- ❑ Installation location in wheelhouse under the wheelhouse liner
- ❑ Connection diagram ⇒ page 359
- ❑ Removing and installing ⇒ “7.2 Removing and installing activated charcoal filter”, page 359
- ❑ Checking breather ⇒ “7.3 Checking the fuel tank venting”, page 360

4 - Vent line

- ❑ to fuel tank
- ❑ Connection diagram ⇒ page 359
- ❑ disconnect and connect ⇒ “4 Quick couplings”, page 298



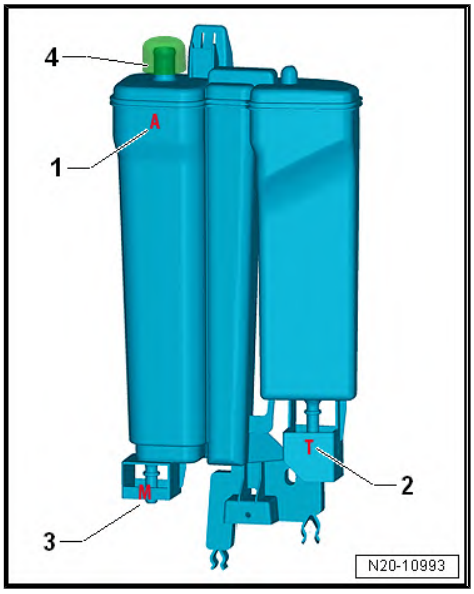
Connection diagram at activated charcoal filter

1 - Vent connection -A-

2 - Connection to the fuel tank -T-

3 - Connection to the Solenoid valve 1 for activated charcoal filter - N80- -M-

4 - Protective cap



7.2 Removing and installing activated charcoal filter

Note

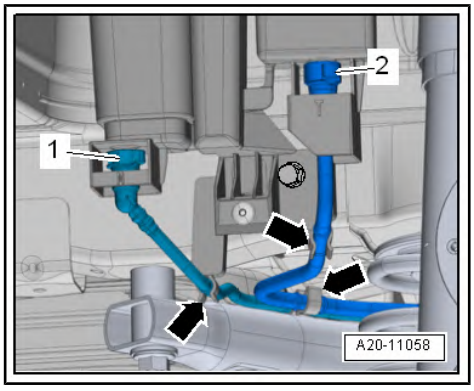
- *Observe safety instructions*
  ⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 .
- *Observe rules for cleanliness*
  ⇒ “2.1 Safety precautions when working on fuel supply system”, page 4 .

– Remove right rear wheel ⇒ Chassis; Rep. gr. 44 .

– Remove the rear right wheelhouse liner ⇒ Body Work; Rep. gr. 66 .

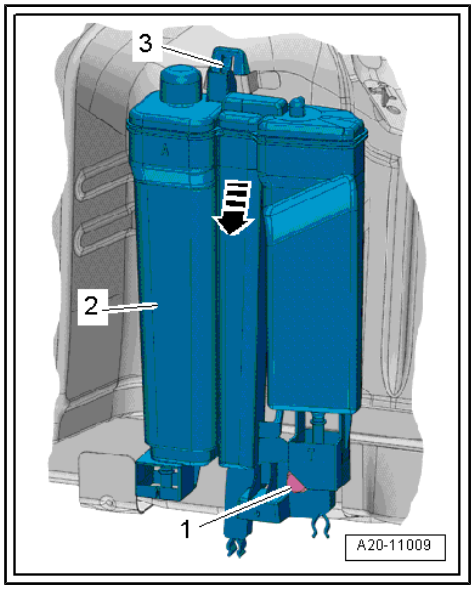
– Disconnect the vent lines -1- and -2- on the activated charcoal filter ⇒ “4 Quick couplings”, page 298 .

– Loosen ventilation lines from fasteners on the holder -arrows-.



– Unscrew screw -1-.

– Pull out catch -3- using a screwdriver and pull the activated charcoal filter -2- down out of the lock -arrow-.



Install

Installation is carried out in the reverse order.

Tightening torques

- Screw for activated charcoal filter system
  ⇒ “7.1 Assembly overview - activated charcoal filter system”, page 358

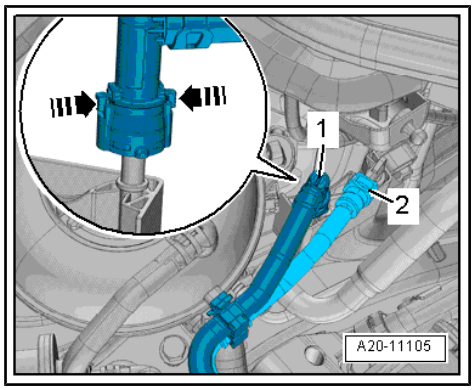
7.3 Checking the fuel tank venting

Special tools and workshop equipment required

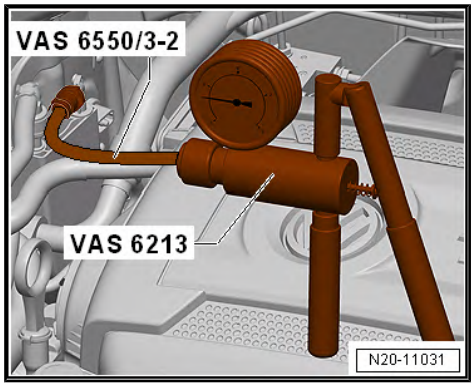
- Hand vacuum pump , e.g. -V.A.S 6213-
- Pressure gauge - VAS 6550 -
- Adapter - VAS 6550/3-1 -
- Screw plug set for engine , e.g. -VAS 6122-

Test sequence

– Remove the ventilation line -2- from the activated charcoal filter to the activated charcoal filter system solenoid valve 1 - N80- . Unlock the quick coupling and disconnect
⇒ “4 Quick couplings”, page 298 .



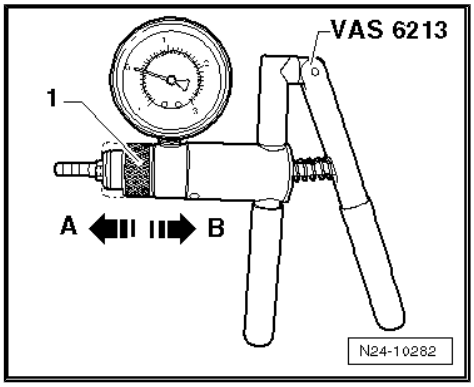
– Connect the hand vacuum pump -V.A.S 6213- with adapter - VAS 6550/3-2 - to the vent line as shown.



– Put the change-over ring -1- of the hand vacuum pump -V.A.S 6213- in position -A- for vacuum
– Operate the hand vacuum pump several times.

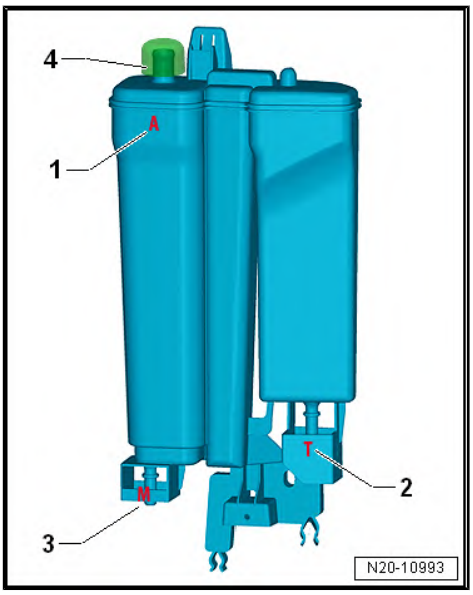
No vacuum should build up.

If a vacuum builds up.



– Check the ventilation opening -4- on the activated charcoal filter -1- for dirt and clean as required.
– Check vent line from activated charcoal filter to engine for clearance.

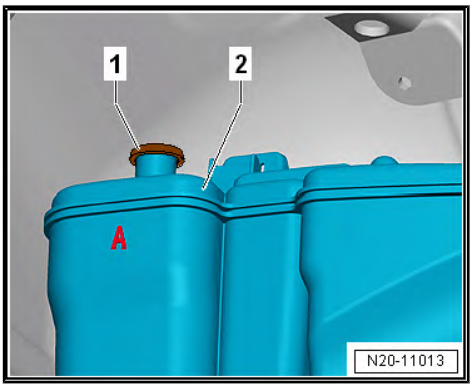
If no vacuum builds up:



– Seal connection of the activated charcoal filter -2- with a suitable plug -1- from screw plug set for engine , e. g. -VAS 6122- .
– Operate the hand vacuum pump several times. A vacuum should build up.

If no vacuum builds up:

– Renew activated charcoal filter
⇒ “7.2 Removing and installing activated charcoal filter”, page 359 .



21 – Turbocharging/supercharging

1 Exhaust gas turbocharger

⇒ “1.1 Summary of components - exhaust gas turbocharger”, page 362

⇒ “1.2 Removing and installing exhaust gas turbocharger”, page 364

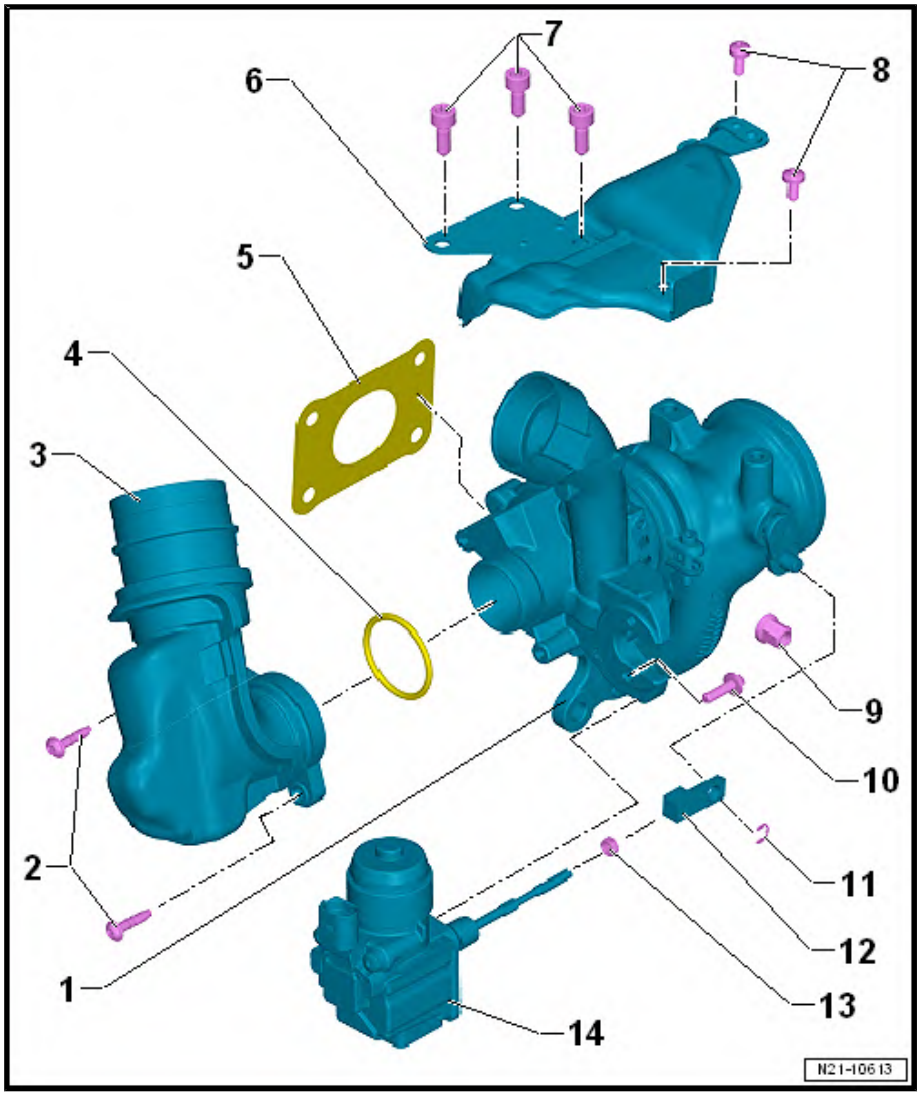
⇒ “1.1 Summary of components - exhaust gas turbocharger”, page 362

1.1 Summary of components - exhaust gas turbocharger

⇒ “1.1.1 Part I ”, page 362

⇒ “1.1.2 Part II ”, page 363

1.1.1 Part I



1 - Exhaust gas turbocharger
- ❑ Removing and installing ⇒ “1.2 Removing and installing exhaust gas turbocharger”, page 364

2 - Screw
- ❑ 8 Nm

3 - Supports

4 - O-ring
- ❑ replace after removal

5 - Gasket
- ❑ replace after removal

6 - Heat shield

7 - Screw
- ❑ 25 Nm

8 - Screw
- ❑ 8 Nm

9 - Nut
- ❑ Replace after removing ⇒ ETKA - Electronic Catalogue of Original Parts
- ❑ 14 Nm

10 - Screw
- ❑ replace after removal
- ❑ 9 Nm

11 - Locking clip

12 - Release handle

13 - Locknut
- ❑ Secure with sealant
- ❑ 6 Nm

14 - Charge pressure regulator - V465-

Note

- *Always observe when installing!*
- *Different variants of the charge pressure regulator can be installed.*

❑ Removing and installing ⇒ “1.3 Removing and installing charge pressure regulator V465 ”, page 369

1.1.2 Part II

1 - Oil return-flow line

2 - O-ring
❑ replace after removal

3 - Screw
❑ 9 Nm

4 - O-ring
❑ replace after removal

5 - Screw
❑ 9 Nm

6 - Oil feed line

7 - O-ring
❑ replace after removal

8 - Screw
❑ 9 Nm

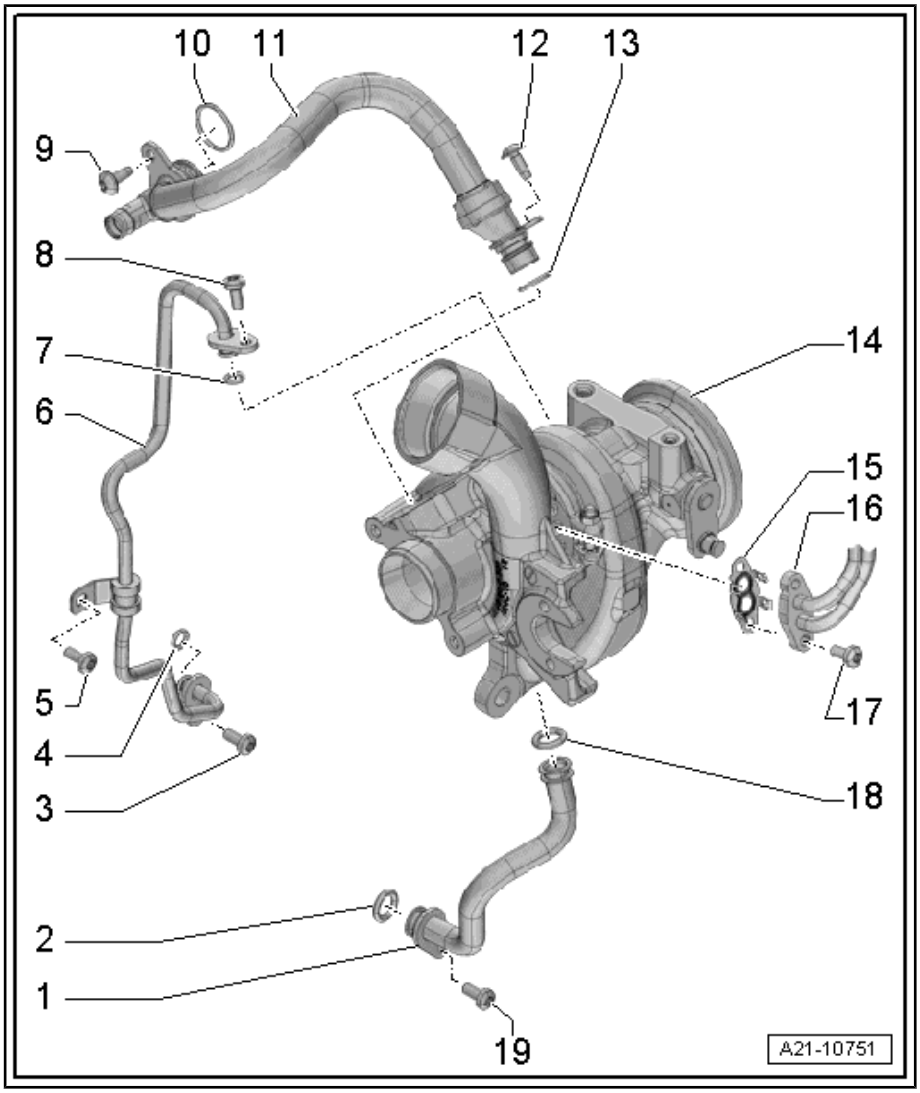
9 - Screw
❑ 8 Nm

10 - O-ring
❑ Replace crankcase ventilation hose (Pos. -11-) if it is damaged

11 - Hose
❑ for crankcase ventilation

12 - Screw
❑ 8 Nm

13 - O-ring
❑ Replace crankcase ventilation hose (Pos. -11-) if it is damaged



14 - Exhaust gas turbocharger
❑ Removing and installing ⇒ “1.2 Removing and installing exhaust gas turbocharger”, page 364

15 - Gasket
❑ replace after removal

16 - Coolant line
❑ Forward and reverse

17 - Screw

- ❑ 8 Nm

18 - O-ring

- ❑ replace after removal

19 - Screw

- ❑ 9 Nm

1.2 Removing and installing exhaust gas turbocharger

Special tools and workshop equipment required

- ♦ Screw plug set for engine , e.g. -VAS 6122-
- ♦ Hose clamps up to 25 mm - MP7-602 (3094)-
- ♦ Pliers for spring strap clamps -VAS 6362-

Removing

Note

- ♦ *Observe rules for cleanliness*
  ⇒ "2.1 Safety precautions when working on fuel supply system", page 4 .
- ♦ *Fit all heat protection sleeves on again in the same place when installing.*

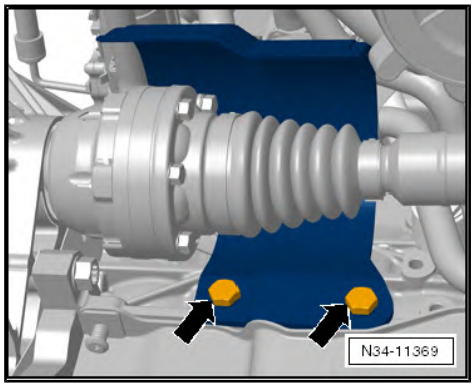
Caution

In case a mechanical damage to the exhaust gas turbocharger is found, (e.g. damage to the compressor wheel), it is not sufficient to only replace the turbocharger. In order to avoid consequential damage, the following tasks must be performed:

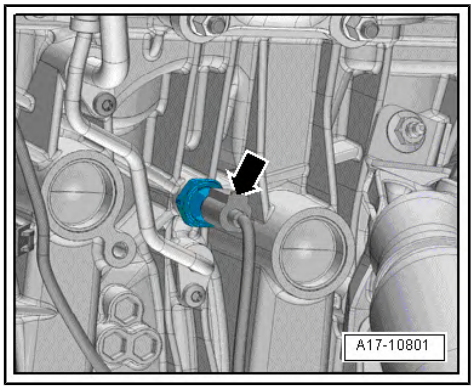
- ♦ ***Inspect the air filter housing, the air filter element and air guide hoses for contamination.***
- ♦ ***Inspect the whole charge-air routing and the charge air cooler for foreign bodies.***
- ♦ ***If foreign bodies are found in the charge air system, clean the charge air duct and replace the charge air cooler if necessary.***

– Remove the sound dampening system ⇒ Body Work; Rep. gr. 66 .

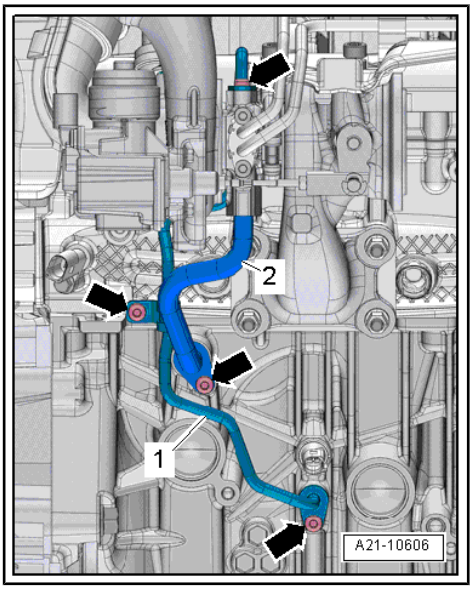
– Release screws -arrows- and remove heat shield for right drive shaft, if present.



– Remove plug -arrow- at the oil pressure switch for reduced oil pressure - F378- .

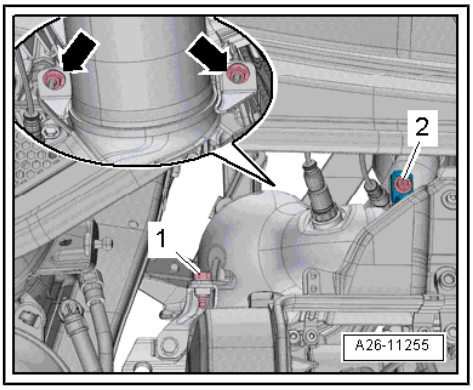


– Screw out the screws -arrows-, remove oil feed line -1- and oil return flow-line -2-.



– Unscrew screw -2- and remove screw clamp.

– Remove screw -1-, remove nuts -arrows- and strap up catalytic converter to the bodyshell so as not to damage the decoupling element.

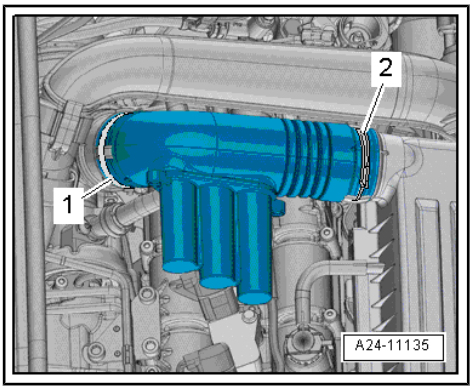


Note

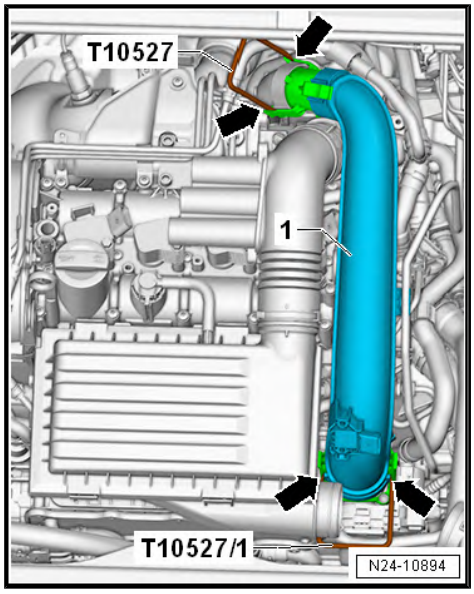
do not twist decoupling element in the exhaust pipe more than 10° - risk of damage

– Loosen hose clamps -1-, -2- and remove air guide pipes.

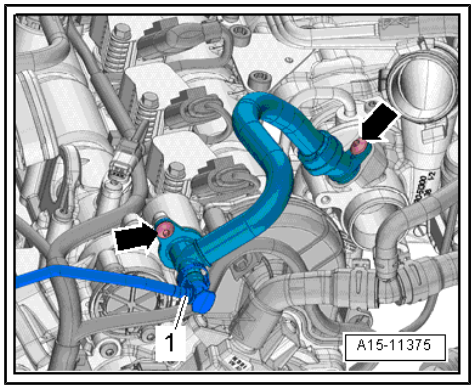
– Remove plug from charge pressure sender - GX26- .



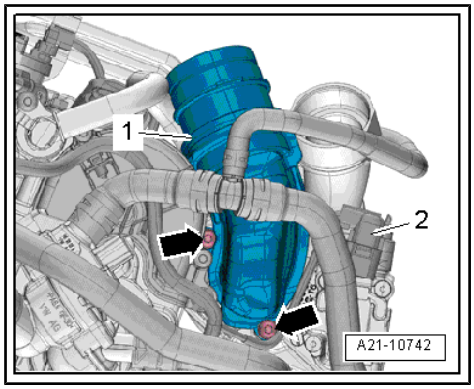
– Release catches -arrows- with release tool -T10527- and remove air guide pipe.



– Press release buttons and remove hose -1- to the activated charcoal filter.
– Unscrew screws -arrows- and remove hose for crankcase ventilation.



– Unplug connector -2-.
– Release screws -arrows- and remove connection piece -1-.

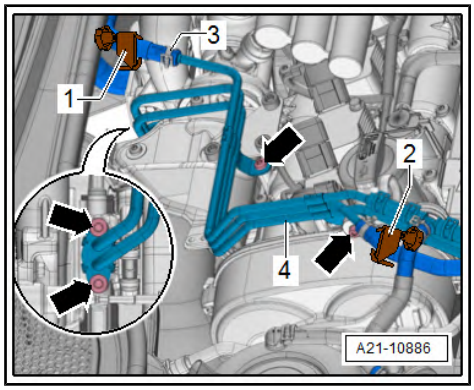


– Disconnect coolant hoses with hose clamps up to 25 mm - MP7-602 (3094)- -1- and -2-.

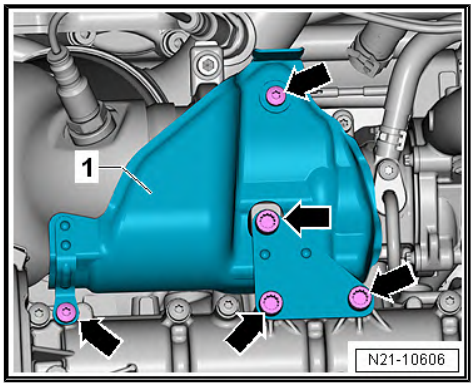
Note

Place a cloth below to absorb leaking coolant.

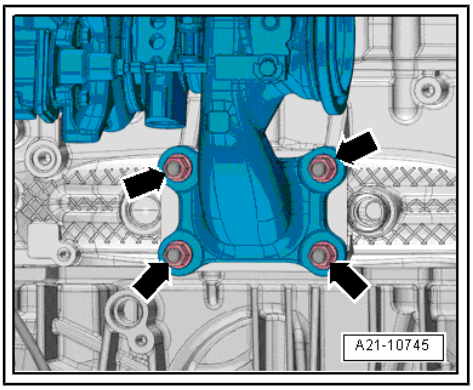
– Loosen hose clamp -3- and remove coolant hose.
– Unscrew -arrows- screws and swivel coolant lines -4- to the right side.



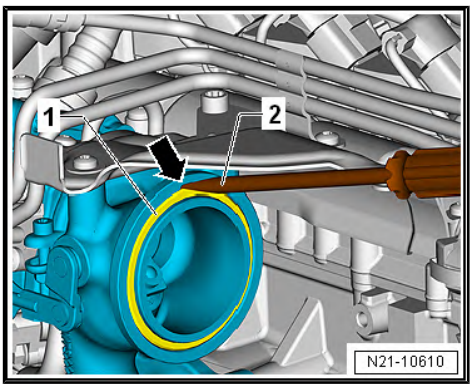
– Release screws -arrows- and remove heat shield -1-.



– Unscrew nuts -arrows- and remove cylinder head cover.



– Push screwdriver -2- into the recess -arrow- of the exhaust gas turbocharger and lever out the sealing ring -1-.



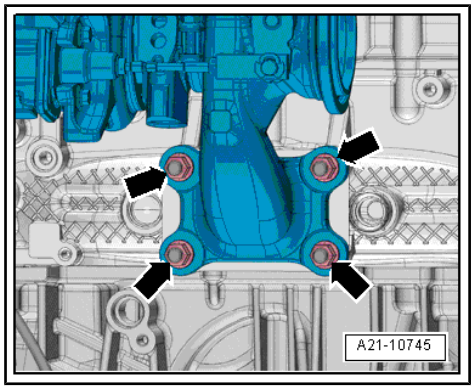
Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

Torquing procedure of nuts for exhaust gas turbocharger

Tighten nuts -arrows- in succession in the clockwise direction in several stages:

Stage	Nut	Tightening torque
1.	-1…4-	tighten to 7 Nm
2.	-1…4-	tighten to 10 Nm
3.	-1…4-	tighten again to 10 Nm
4.	-1...4-	tighten to 14 Nm



Note

- *Replace gaskets and O-rings.*
- *Fill the exhaust turbocharger with engine oil at the connection fitting for the oil feed line.*
- *Secure all hose connection ends with spring-type clips that comply with the series design ⇒ ETKA - Electronic Catalogue of Original Parts .*
- *To ensure the oil supply to the exhaust gas turbocharger, leave the engine running for about 1 minute after installing the exhaust gas turbocharger; do not rev up immediately.*

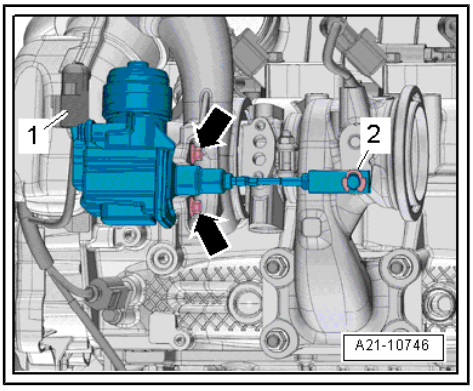
– Electrical connections and proper routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

Tightening torques

- Exhaust gas turbocharger
  ⇒ “1.1 Summary of components - exhaust gas turbocharger”, page 362
- Air guide ⇒ page 372
- Catalytic converter ⇒ page 433
- ⇒ Chassis; Rep. gr. 40

1.3 Removing and installing charge pressure regulator - V465-

Removing



– Switch off ignition.
– Unplug connector -1-.
– Remove lock washer -2-.
– Release screws -arrows- and remove charge pressure regulator - V465- .

Install

Installation is performed in the reverse order, pay attention to the following points:

Note

Different variants of the charge pressure regulator can be installed.

Charge pressure regulator without adjustable linkage

– Adapting the engine control unit - J623- to the charge pressure regulator - V465- ⇒ Vehicle diagnostic tester.

Charge pressure regulator with adjustable linkage

– Screw threads of charge pressure regulator - V465- into the driver at the centre position.

Set charge pressure regulator - V465- as follows:

– Switch on the ignition and choose ⇒ Vehicle diagnostic tester.
– On the display press consecutively the following buttons:

♦ `01 - Engine electronics`
♦ `01 - Targeted functions`
♦ `01 - Basic setting`
♦ `01 - Charge pressure regulator - V465 - setting`

– Set specified value by adjusting the operating rod; specified value ⇒ Vehicle diagnostic tester.
– Tighten counter nut to 6 Nm an secure using sealant.

Tightening torques

♦ Screws for charge pressure regulator - V465-
⇒ “1.1 Summary of components - exhaust gas turbocharger”, page 362

2 Charge-air system

⇒ “2.1 Summary of components - charge air system”, page 370

⇒ “2.2 Removing and installing charge pressure sender GX26 ”, page 372

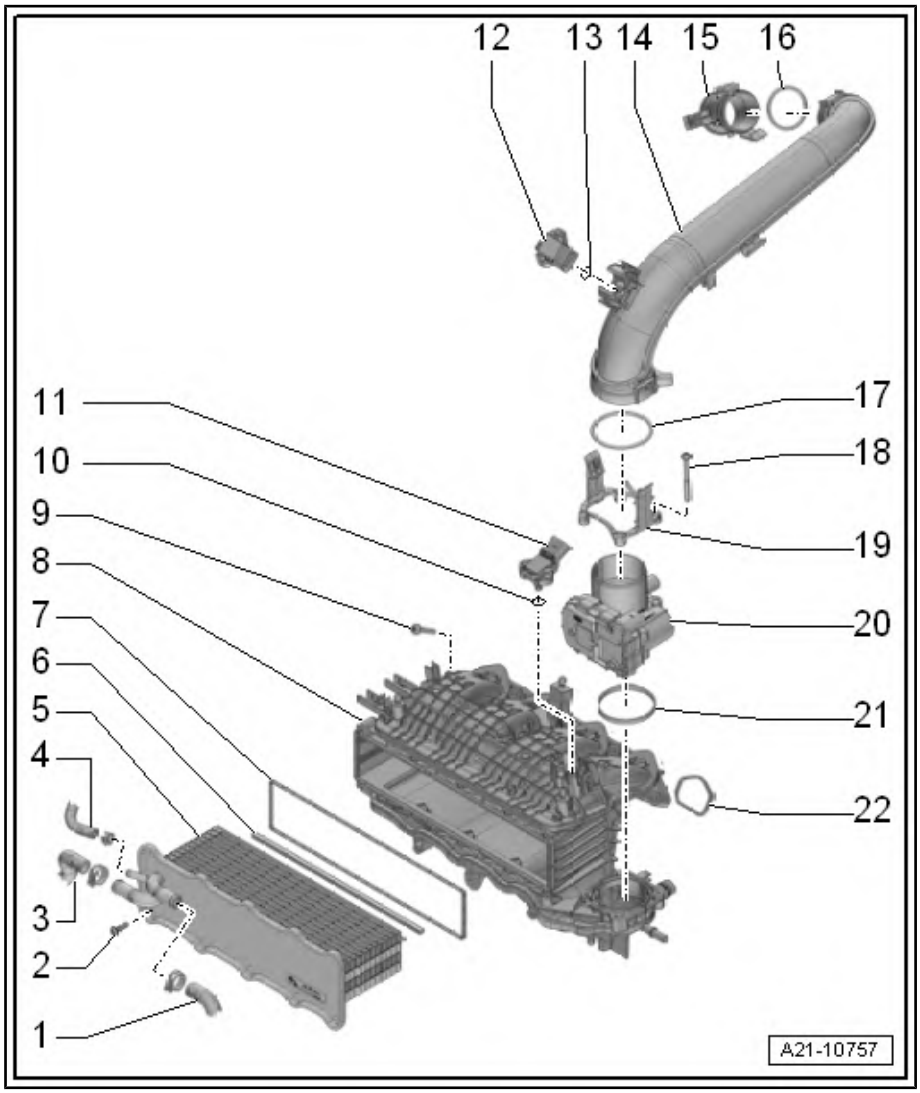
⇒ “2.3 Removing and installing charge air cooler”, page 372

⇒ “2.4 Checking the charge-air system for leaktightness”, page 374

2.1 Summary of components - charge air system

Note

- *Before a test or repair, check all charge air pipes, charge air hoses and vacuum lines for tight connection and leaktightness.*
- *Observe rules for cleanliness ⇒ “4.1 Cleanliness rules”, page 20 .*



1 - Coolant hose

2 - Screw

- ❑ thread forming
- ❑ position and screw in by to allow the screw to find the old thread, then tighten the screw to the torque
- ❑ 15 Nm

3 - Coolant hose

4 - Coolant hose

5 - Charge air cooler

- ❑ Removing and installing ⇒ “2.3 Removing and installing charge air cooler”, page 372
- ❑ After replacing, renew all coolant ⇒ “1.2 Draining and filling coolant”, page 209

6 - Sealing section

7 - Gasket

- ❑ replace after removal

8 - Intake manifold

Removing and installing ⇒ “3.2 Removing and installing intake manifold”, page 386

9 - Screw

- ❑ Tightening torque and tightening order ⇒ page 390
- ❑ 8 Nm

10 - O-ring

- ❑ replace after removal

11 - Intake manifold pressure sender - GX9-

- ❑ comprises:

- ♦ Intake air temperature sender 2 - G299-
- ♦ Intake manifold pressure sender - G71-

- ❑ Removing and installing
  ⇒ “7.1 Removing and installing intake manifold pressure sender GX9 ”, page 413

12 - Charge pressure sender - GX26-

- ❑ comprises:

- ♦ Charge pressure sender - G31-
- ♦ Intake air temperature transmitter - G42-

- ❑ Removing and installing ⇒ “2.2 Removing and installing charge pressure sender GX26 ”, page 372

13 - O-ring

- ❑ replace after removal

14 - Air guide pipe

- ❑ Remove with release tool -T10527-

15 - Connection fittings

16 - O-ring

- ❑ replace after removal

17 - O-ring

- ❑ replace after removal

18 - Screw

- ❑ thread forming
- ❑ position and screw in by to allow the screw to find the old thread, then tighten the screw to the torque
- ❑ 7 Nm

19 - Retaining clip

- ❑ For air guide pipe

20 - Throttle valve control unit - GX3-

- ❑ comprises:

- ♦ Throttle valve control unit - J338-
- ♦ Throttle valve drive - G186-
- ♦ Throttle valve drive angle sender 1 - G187-
- ♦ Throttle valve drive angle sender 2 - G188-

- ❑ Removing and installing ⇒ “3.3 Removing and installing the throttle valve control unit GX3 ”, page 390

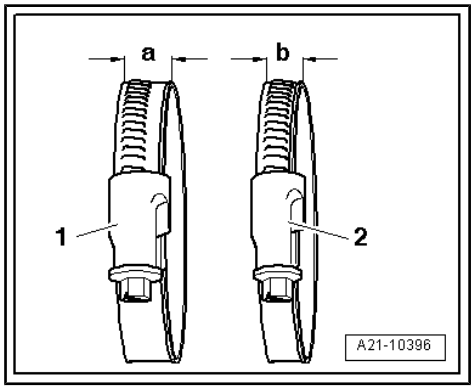
21 - Sealing ring

- ❑ replace after removal

22 - Gasket

- ❑ 4 pieces
- ❑ replace after removal

Install air guide pipes with screw clamps



Note

- *Hose connections and air guide pipes and hoses must be free of oil and grease before being installed.*
- *Secure all hose connection ends with spring-type clips that comply with the series design ⇒ ETKA - Electronic Catalogue of Original Parts .*
- *In order to secure the air guide hoses securely on their connection fittings, the screw threads must be sprayed with rust solvent before installing if the screw clamps have been used beforehand.*

Tightening torque for

1 - Hose clamp -a- = 13 mm wide: 5.5 Nm

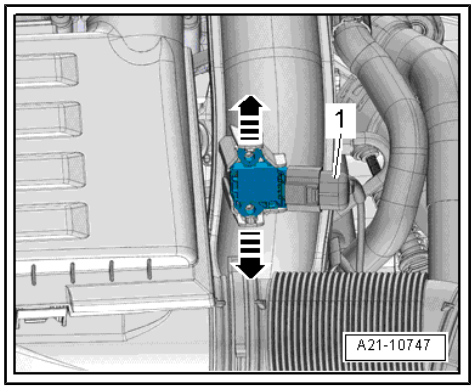
2 - Screw clamp -b- = 9 mm wide: 3 Nm

2.2 Removing and installing charge pressure sender - GX26-

The charge pressure sender - GX26- consists:

- Charge pressure sender - G31-
- Intake air temperature transmitter - G42-

Removing



– Separate plug connection -1-.

– Release catches -arrows- and remove the charge pressure sender - GX26- .

Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

Note

- *Renew O-ring.*
- *If the locking lugs brake, the sender can be secured with two screws (3 Nm) ⇒ ETKA - Electronic Catalogue of Original Parts .*

2.3 Removing and installing charge air cooler

Special tools and workshop equipment required

- Hose clamps up to 25 mm - MP7-602 (3094)-
- Catch pan , e.g. -VAS 6208-
- Pliers for spring strap clamps

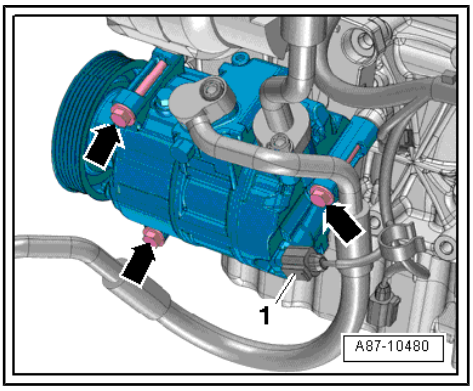
Removing

– Removing fan shroud
⇒ “4.4 Removing and installing fan shroud”, page 238 .

For vehicles with air conditioning

– Separate plug connection -1-.

– Remove AC compressor from holder -arrows- and strap up to body ⇒ Heating, Air Conditioning; Rep. gr. 87 .

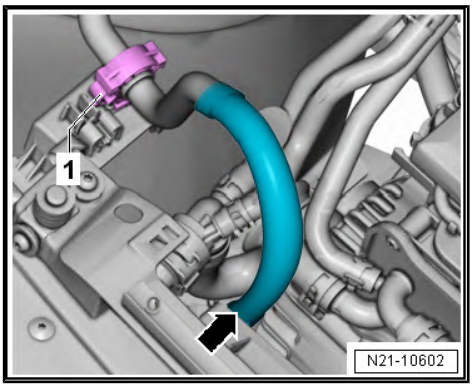


Continued for all vehicles

– Place catch pan - VAS 6208- underneath.

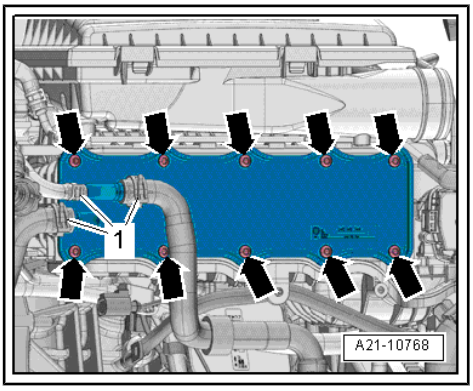
– Disconnect coolant hoses at coolant pipe with hose clamps - MP7-602 (3094)- .

– Open the clamp -1- and push hose -arrow- to the side.

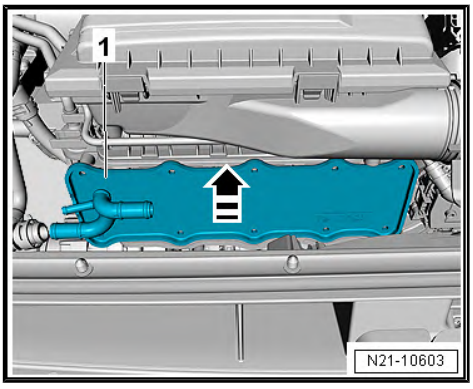


– Loosen hose clamps -1- and remove coolant hoses.

– Remove bolts -arrows-.



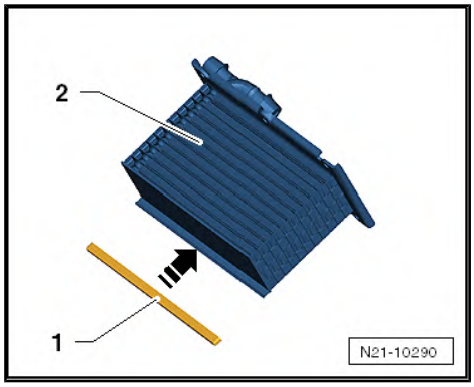
– Pull charge air cooler -1- backwards and forwards simultaneously in -direction of the arrow- out of the intake manifold.



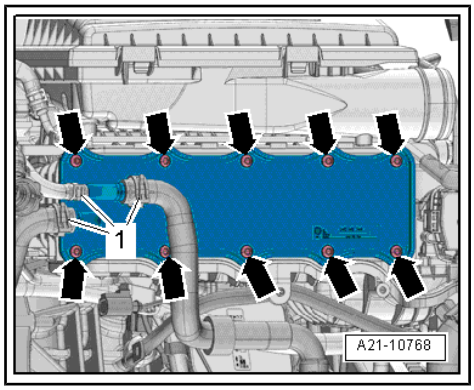
Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

– Fit sealing strip -1- in -direction of the arrow- to the charge air cooler -2-.
– Insert new gasket into the groove at the intake manifold.



– Tighten screws -arrows- from centre to outside crosswise.
– Attach hose clamps -1-.



Note

If the fins have only minor indentations this does not indicate damage and the radiator, capacitor and charge air cooler must not be replaced.

– Install fan shroud
⇒ “4.4 Removing and installing fan shroud”, page 238 .
– Check coolant level ⇒ page 212 .

Tightening torques

♦ Screws for charge air cooler
⇒ “2.1 Summary of components - charge air system”, page 370

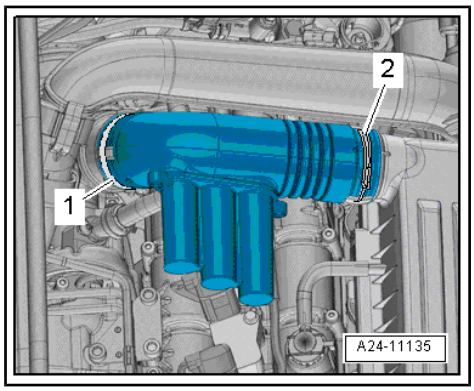
2.4 Checking the charge-air system for leaktightness

Special tools and workshop equipment required

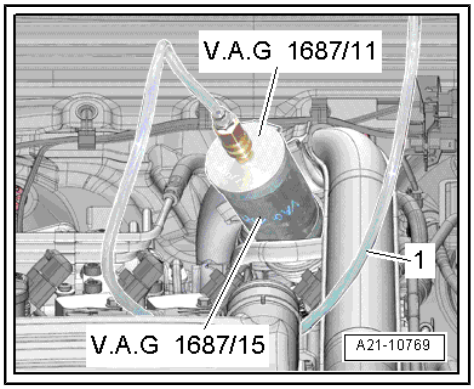
♦ Tester for charge air systems - V.A.G 1687-

Work procedure

– Loosen hose clamps -1-, -2- and remove air guide pipes.



– Connect adapter - V.A.G 1687/15- with -V.A.G 1687/11- to the exhaust gas turbocharger.
– Connect hose -1- of charge air system tester -V.A.G 1687- to adapter.

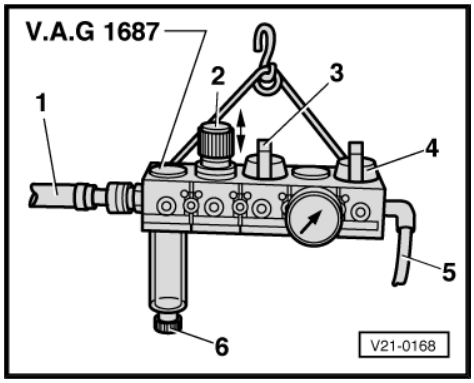


Prepare tester for charge air system - V.A.G 1687- as follows:

– Unscrew pressure control valve -2- fully and close the valves -3- and -4-.

• The rotary switch must be pulled to the top in order to rotate the pressure control valve -2-.

– Connect tester for charge air systems - V.A.G 1687- to compressed air using a commercially available intermediate piece -1-.



Note

If there is water in the inspection glass, drain water via the drain plug -6-.

– Open valve -3-.

Caution

Risk of damage owing to pressure being set too high.

♦ ***The pressure must not be greater than 0.05 MPa (0.5 bar)!***

– Set the pressure to 0.05 MPa (0.5 bar) with the pressure control valve -2-.

– Open valve -4- and wait until the test circuit is filled up. If necessary readjust pressure to 0.05 MPa (0.5 bar).

– Listen to, touch or use commercially available leak search spray or the ultrasonic measuring device - V.A.G 1842- to check the charge-air system for leak points.

Note

♦ *A small amount of air escapes via the valves into the engine. For this reason no holding pressure test is possible.*

♦ *Use of ultrasonic measuring device -V.A.G 1842- ⇒ Operating instructions .*

♦ *Before removing the adapter, depressurize the test circuit by detaching the hose coupling.*

Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

• Install air guide ⇒ page 372

Note

Replace gaskets and O-rings.

24 – Mixture preparation - injection

1 Injection system

⇒ “1.1 Installation overview - injection system”, page 377

1.1 Installation overview - injection system

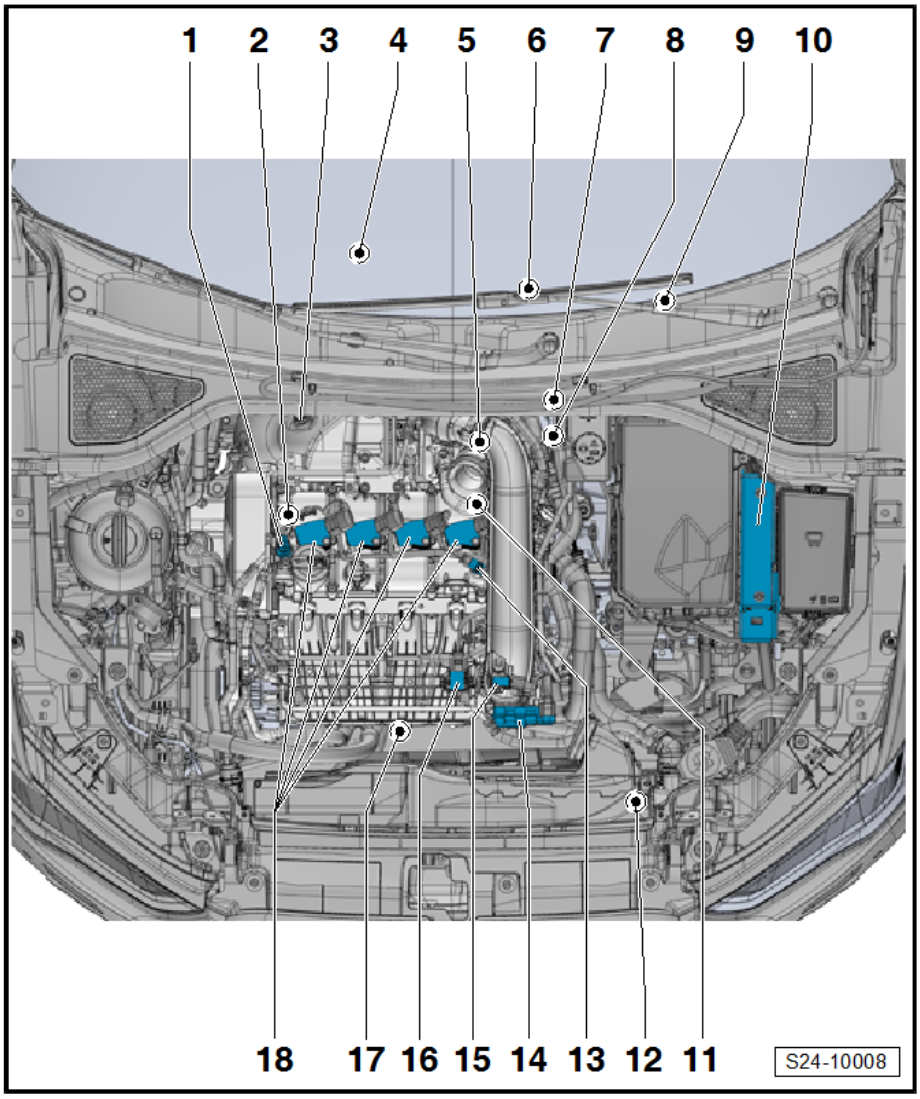
⇒ “1.1.1 Engine room for engine with identification characters CHPA - Overview of fitting locations”, page 377

⇒ “1.1.2 Engine room for engine with identification characters CPWA - Overview of fitting locations”, page 379

⇒ “1.1.3 Installation overview - engine from front ”, page 381

⇒ “1.1.4 Installation overview - engine from rear”, page 382

1.1.1 Engine room for engine with identification characters CHPA - Overview of fitting locations



1 - Inlet camshaft control valve 1 - N205-

- ❑ Removing and installing ⇒ “3.2 Removing and installing the camshaft adjustment valves”, page 169
- ❑ as of 05.2013 with integrated oil strainer

2 - Camshaft control valve 1 in the exhaust - N318-

- ❑ Removing and installing ⇒ “3.2 Removing and installing the camshaft adjustment valves”, page 169
- ❑ as of 05.2013 with integrated oil strainer

3 - Lambda probe 1 in front of the catalytic converter - GX10-

- ❑ comprises:

- ♦ Lambda probe - G39-
- ♦ Heating for lambda probe - Z19-
  - ❑ Removing and installing ⇒ “9.2 Removing and installing Lambda probe 1 in front of catalytic converter GX10 and Lambda probe 1 after catalytic converter GX7 ”, page 422

4 - Lambda probe 1 after catalytic converter - GX7-

- ❑ comprises:

- ♦ Lambda probe after catalytic converter - G130-
- ♦ Lambda probe 1 heater after catalytic converter - Z29-

❑ Removing and installing
⇒ “9.2 Removing and installing Lambda probe 1 in front of catalytic converter GX10 and Lambda probe 1 after catalytic converter GX7 ”, page 422

5 - Charge pressure regulator - V465-

❑ Removing and installing ⇒ “1.3 Removing and installing charge pressure regulator V465 ”, page 369

6 - Accelerator pedal position sender - G79- with accelerator pedal position sender 2 - G185-

❑ Removing and installing ⇒ “6.2 Removing and installing accelerator module”, page 356

7 - Pressure sensor for the brake servo unit - G608-

8 - Brake light switch - F- with Brake pedal switch - F63-

9 - Clutch position sender - G476-

❑ for vehicles with manual gearbox

10 - Engine control unit - J623-

❑ Removing and installing ⇒ “10 Engine control unit”, page 424

11 - Hall sender 3 - G300-

❑ Removing and installing ⇒ “1.5 Removing and installing hall sender 3 G300 ”, page 444

12 - Coolant temperature sender at radiator outlet - G83-

❑ Removing and installing
⇒ “2.9 Removing and installing coolant temperature sender at radiator outlet G83 ”, page 228

13 - Hall sender - G40-

❑ Removing and installing ⇒ “1.4 Removing and installing Hall sender G40 ”, page 444

14 - Throttle valve control unit - GX3-

❑ comprises:

- Throttle valve control unit - J338-
- Throttle valve drive - G186-
- Throttle valve drive angle sender 1 - G187-
- Throttle valve drive angle sender 2 - G188-

❑ Removing and installing ⇒ “3.3 Removing and installing the throttle valve control unit GX3 ”, page 390

15 - Charge pressure sender - GX26-

❑ comprises:

- Charge pressure sender - G31-
- Intake air temperature transmitter - G42-

❑ Removing and installing ⇒ “2.2 Removing and installing charge pressure sender GX26 ”, page 372

16 - Intake manifold pressure sender - GX9-

❑ comprises:

- Intake air temperature sender 2 - G299-
- Intake manifold pressure sender - G71-

❑ Removing and installing
⇒ “7.1 Removing and installing intake manifold pressure sender GX9 ”, page 413

17 - Coolant recirculation pump - V188-

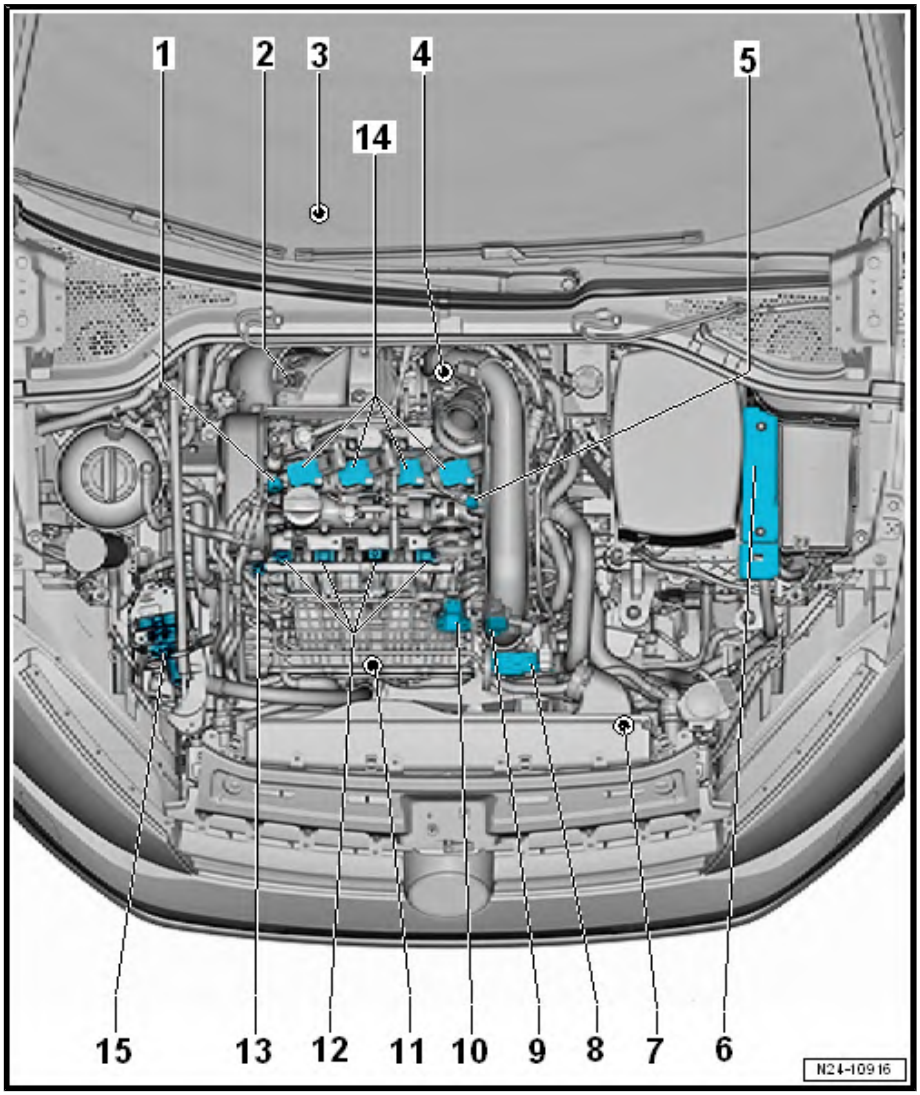
❑ Removing and installing ⇒ “2.7 Removing and installing coolant recirculation pump V188 ”, page 226

18 - Ignition coils with a power output stage

- Ignition coil 1 with output stage - N70-
- Ignition coil 2 with output stage - N127-
- Ignition coil 3 with output stage - N291-
- Ignition coil 4 with output stage - N292-

- ❑ Removing and installing ⇒ “1.2 Removing and installing ignition coils with output stage”, page 442
- ❑ When installing new spark plugs, grease the ignition coils with power output stage with lubricating paste G 052 565 A1.

1.1.2 Engine room for engine with identification characters CPWA - Overview of fitting locations



1 - Inlet camshaft control valve 1 - N205-

- ❑ Removing and installing ⇒ “3.2 Removing and installing the camshaft adjustment valves”, page 169
- ❑ as of 05.2013 with integrated oil strainer

2 - Lambda probe 1 in front of the catalytic converter - GX10-

- ❑ comprises:
- ♦ Lambda probe - G39-
- ♦ Heating for lambda probe - Z19-
- ❑ Removing and installing ⇒ “9.2 Removing and installing Lambda probe 1 in front of catalytic converter GX10 and Lambda probe 1 after catalytic converter GX7 ”, page 422

3 - Lambda probe 1 after catalytic converter - GX7-

- ❑ comprises:
- ♦ Lambda probe after catalytic converter - G130-
- ♦ Lambda probe 1 heater after catalytic converter - Z29-
- ❑ Removing and installing ⇒ “9.2 Removing and installing Lambda probe 1 in front of catalytic converter GX10 and Lambda probe 1 after catalytic converter GX7 ”, page 422

4 - Charge pressure regulator - V465-

- ❑ Removing and installing ⇒ “1.3 Removing and installing charge pressure regulator V465 ”, page 369

5 - Hall sender - G40-

- ❑ Removing and installing ⇒ “1.4 Removing and installing Hall sender G40 ”, page 444

6 - Engine control unit - J623-

- ❑ Removing and installing ⇒ “10 Engine control unit”, page 424

7 - Coolant temperature sender at radiator outlet - G83-

- ❑ Removing and installing ⇒ “2.9 Removing and installing coolant temperature sender at radiator outlet G83 ”, page 228

8 - Throttle valve control unit - GX3-

- ❑ comprises:

- Throttle valve control unit - J338-
- Throttle valve drive - G186-
- Throttle valve drive angle sender 1 - G187-
- Throttle valve drive angle sender 2 - G188-
  - Removing and installing ⇒ “3.3 Removing and installing the throttle valve control unit GX3 ”, page 390

9 - Charge pressure sender - GX26-

- comprises:
- Charge pressure sender - G31-
- Intake air temperature transmitter - G42-
  - Removing and installing ⇒ “2.2 Removing and installing charge pressure sender GX26 ”, page 372

10 - Intake manifold pressure sender - GX9-

- comprises:
- Intake air temperature sender 2 - G299-
- Intake manifold pressure sender - G71-
  - Removing and installing ⇒ “7.1 Removing and installing intake manifold pressure sender GX9 ”, page 413

11 - Coolant recirculation pump - V188-

- Removing and installing ⇒ “2.7 Removing and installing coolant recirculation pump V188 ”, page 226

12 - Gas inlet valves

- Gas inlet valve 1 - N366-
- Gas inlet valve 2 - N367-
- Gas inlet valve 3 - N368-
- Gas inlet valve 3 - N369-
- Removing and installing ⇒ “5.2 Removing and installing gas distribution line with gas inlet valves N366 , N367 , N368 and N369 ”, page 400

13 - Temperature and pressure sensor for gas distribution line - GX21-

- comprises:
- Gas distribution line sensor - G401-
- Temperature sensor for alternatives fuel system - G876-
  - Removing and installing ⇒ “5.3 Removing and installing the temperature and pressure sensor for gas distribution line GX21 ”, page 401

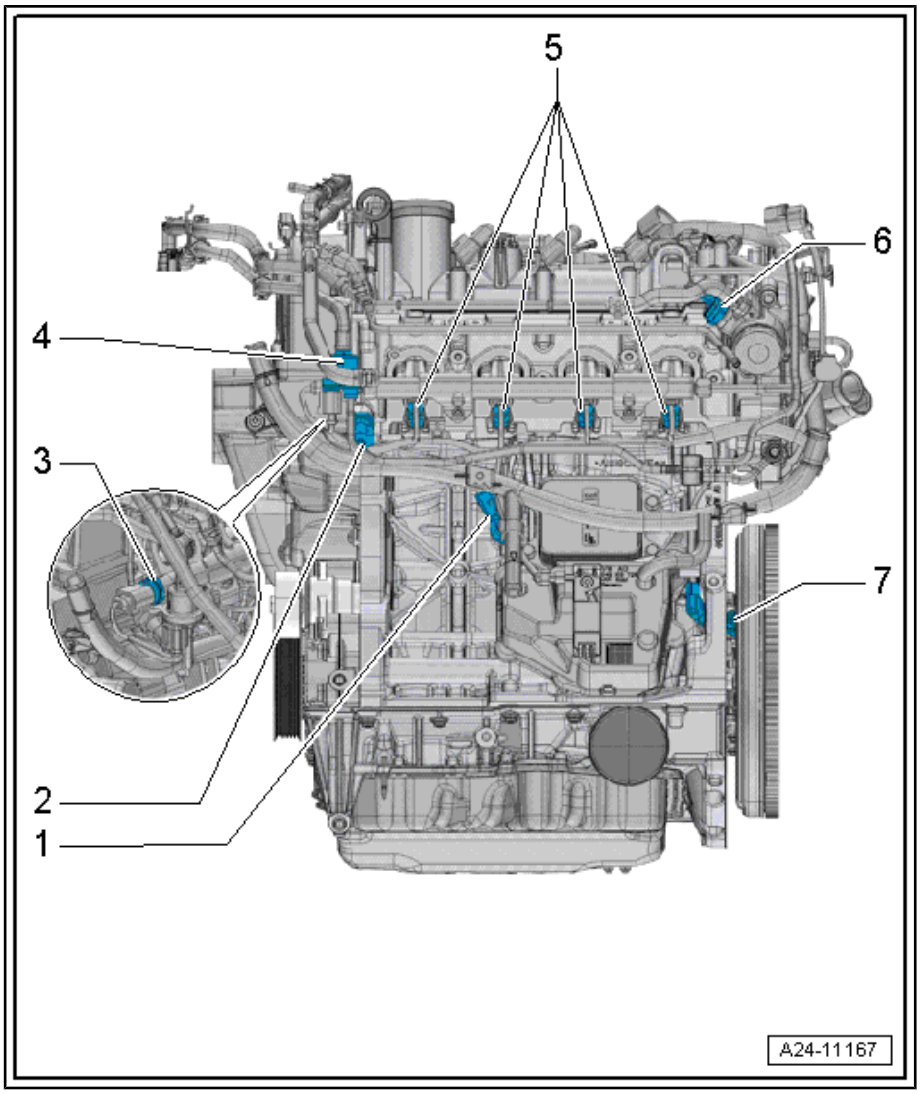
14 - Ignition coils with a power output stage

- Ignition coil 1 with output stage - N70-
- Ignition coil 2 with output stage - N127-
- Ignition coil 3 with output stage - N291-
- Ignition coil 4 with output stage - N292-
  - Removing and installing ⇒ “1.2 Removing and installing ignition coils with output stage”, page 442
  - When installing new spark plugs, grease the ignition coils with power output stage with lubricating paste G 052 565 A1.

15 - Tank pressure sensor - G400-

- Removing and installing ⇒ “4.3 Removing and installing the tank pressure sensor G400 ”, page 397

1.1.3 Installation overview - engine from front



1 - Knock sensor 1 - G61-

- ❑ Summary of components ⇒ “1.1 Assembly overview - ignition system”, page 441

2 - Oil pressure switch for reduced oil pressure - F378-

- ❑ Summary of components ⇒ “4.3 Removing and installing oil pressure switch for reduced oil pressure F378 ”, page 201

3 - Fuel pressure sender - G247-

- ❑ Summary of components ⇒ “6.1 Assembly overview - fuel rail with injectors”, page 403

4 - Activated charcoal filter solenoid valve 1 - N80-

5 - Injectors

- ♦ Injector, cylinder 1 - N30-
- ♦ Injector, cylinder 2 - N31-
- ♦ Injector, cylinder 3 - N32-
- ♦ Injector, cylinder 4 - N33-
- ❑ Summary of components ⇒ “6.1 Assembly overview - fuel rail with injectors”, page 403

6 - Control valve for fuel pressure - N276-

- ❑ on the high pressure pump
- ❑ Summary of components ⇒ “8.1 Summary of components - high pressure pump”, page 417

7 - Engine speed sender - G28-

- ❑ Summary of components ⇒ “1.1 Assembly overview - ignition system”, page 441

1.1.4 Installation overview - engine from rear

1 - Oil level and oil temperature sender - G266-

- ❑ Removing and installing ⇒ “1.2 Removing and installing oil level and oil temperature sender G266 ”, page 186

2 - Coolant temperature sender - G62-

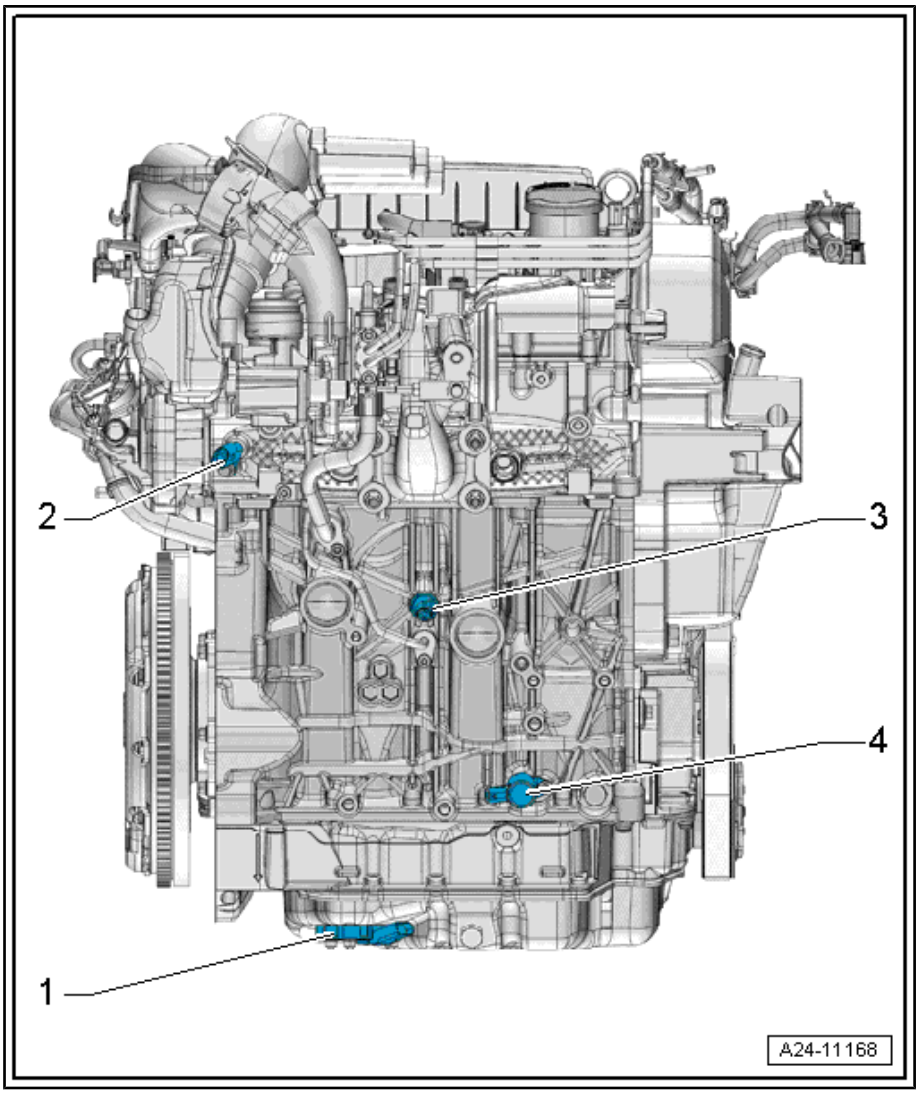
- ❑ Removing and installing ⇒ “2.8 Removing and installing coolant temperature sender G62 ”, page 227

3 - Oil pressure switch - F1-

- ❑ Removing and installing ⇒ “4.2 Removing and installing oil pressure switch F1 ”, page 200

4 - Oil pressure control valve - N428-

- ❑ Removing and installing ⇒ “4.4 Removing and installing valve for oil pressure control N428 ”, page 202



2 Air filter

⇒ “2.1 Assembly overview - air filter housing”, page 383

⇒ “2.2 Removing and installing air filter housing”, page 384

2.1 Assembly overview - air filter housing

1 - Air guide lower part
- ❑ on the lock support

2 - air guide pipe top
- ❑ on the lock support

3 - Cover
- ❑ for air guide

4 - Screw
- ❑ 2 Nm

5 - Air filter lower part
- ❑ remove mechanical foreign particles

6 - Air filter element
- ❑ Change intervals ⇒ Maintenance ; Booklet Octavia III

7 - Air filter upper part

8 - Hose
- ❑ for crankcase ventilation

9 - Air guide hose

10 - Rubber bush

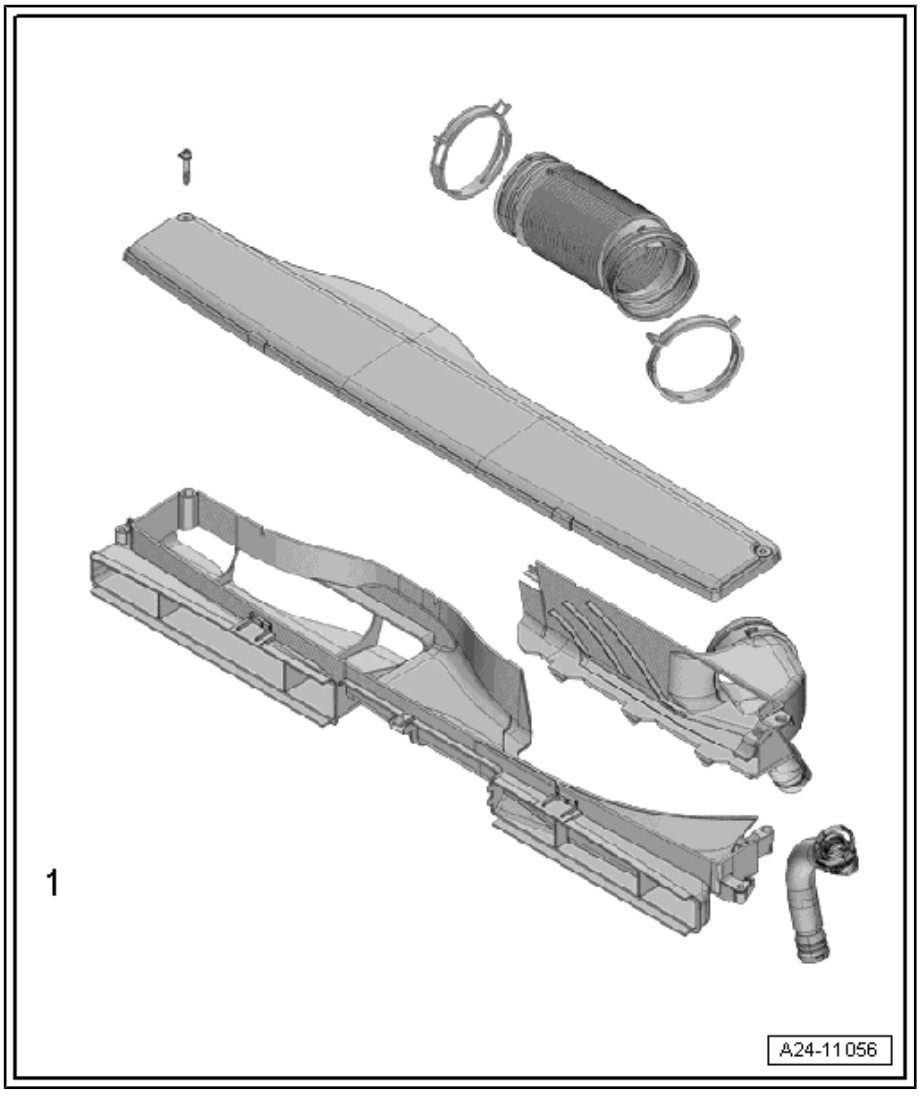
11 - Screw
- ❑ 2 Nm

12 - Air guide hose

13 - O-ring
- ❑ replace if damaged

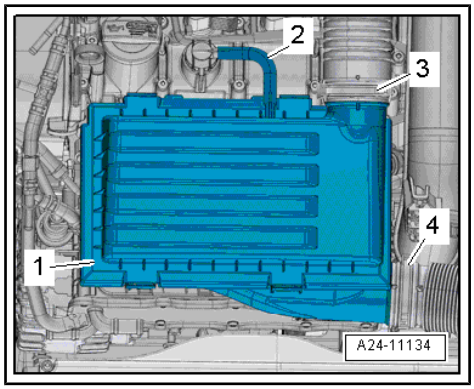
14 - Water drain hose
- ❑ clean

15 - Screw
- ❑ 2 Nm



2.2 Removing and installing air filter housing

Removing



– Pull off air guide hose -2-.

– Pull off -1- air filter housing upwards from the ball pin.

– Loosen hose clamps -3- and -4- and remove air guides.

Install

Note

- *If the air filter is heavily soiled or wet, dirt particles or moisture can enter components and distort the measured values. This leads to loss of power as a smaller injection quantity is calculated.*
- *It is imperative for the air filter housing to be clean.*
- *Hose connections and air guide pipes and hoses must be free of oil and grease before being installed.*
- *Use a silicone-free lubricant to assemble the air guide hoses.*
- *Secure all hose connection ends with spring-type clips that comply with the series design ⇒ ETKA - Electronic Catalogue of Original Parts .*
- *When blowing out the air filter housing using compressed air, cover critical air-carrying components such as air ducts etc, with a clean cloth. This will prevent any malfunctions.*
- *Observe the disposal instructions!*

– Remove mechanical foreign particles from the top and bottom parts of the air filter housing.

– Clean the water drain with compressed air.

• Tightening torque
⇒ “2.1 Assembly overview - air filter housing”, page 383

3 Intake manifold

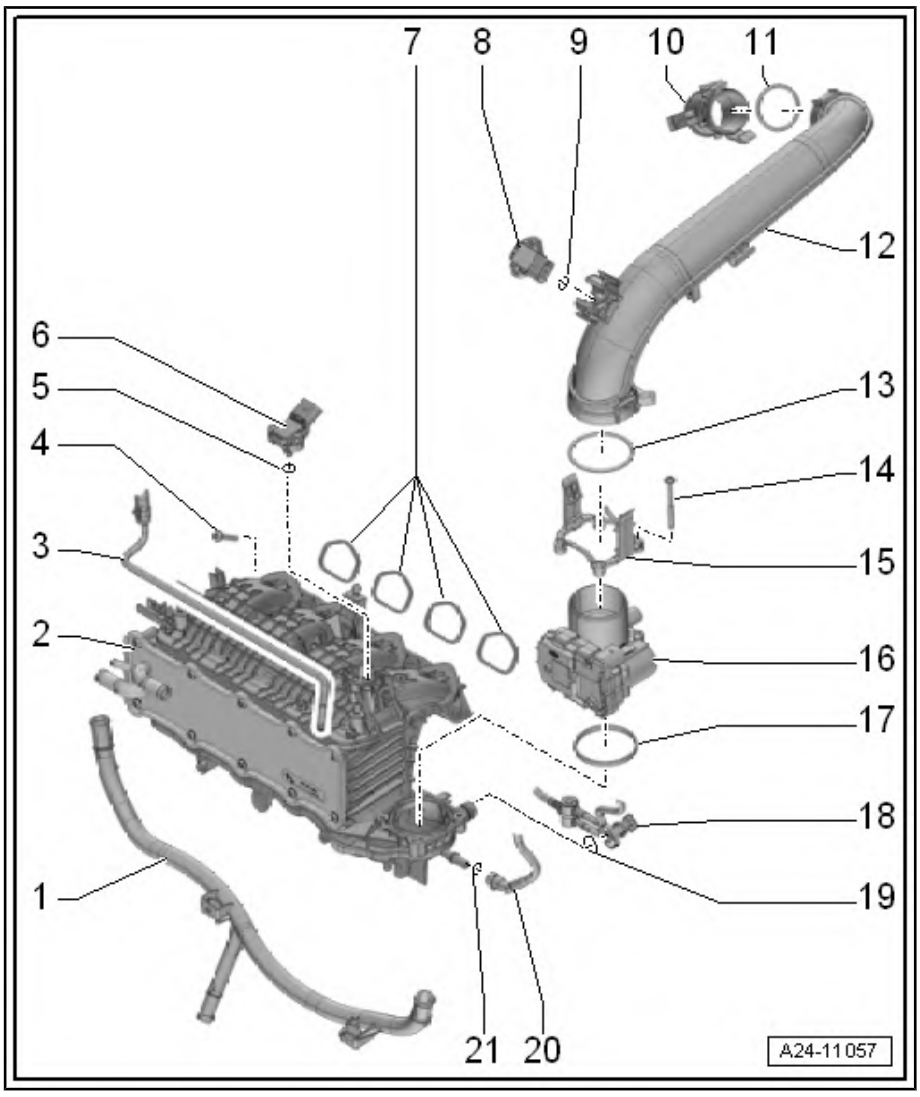
⇒ “3.1 Assembly overview - intake manifold”, page 385

⇒ “3.2 Removing and installing intake manifold”, page 386

⇒ “3.3 Removing and installing the throttle valve control unit GX3 ”, page 390

⇒ “3.4 Clean throttle valve control unit GX3 ”, page 392

3.1 Assembly overview - intake manifold



1 - Coolant pipe

- ❑ clipped onto the intake manifold
- ❑ Removing and installing ⇒ “3.2 Removing and installing coolant pipes”, page 230

2 - Intake manifold

- ❑ Building unit with charge air cooler
- ❑ Removing and installing ⇒ “3.2 Removing and installing intake manifold”, page 386

3 - Coolant pipe

- ❑ clipped onto the intake manifold

4 - Screw

- ❑ Tightening torque and tightening order ⇒ page 390
- ❑ 8 Nm

5 - O-ring

- ❑ replace after removal

6 - Intake manifold pressure sender - GX9-

- ❑ comprises:

- ♦ Intake air temperature sender 2 - G299-
- ♦ Intake manifold pressure sender - G71-

- ❑ Removing and installing ⇒ “7.1 Removing and installing intake manifold pressure sender GX9 ”, page 413

7 - Gasket

- ❑ replace after removal

8 - Charge pressure sender - GX26-

- ❑ comprises:

- ♦ Charge pressure sender - G31-
- ♦ Intake air temperature transmitter - G42-

- ❑ Removing and installing ⇒ “2.2 Removing and installing charge pressure sender GX26 ”, page 372

9 - O-ring

- ❑ replace after removal

10 - Connection fittings

11 - O-ring

- ❑ replace after removal

12 - Air guide pipe

- ❑ Remove with release tool -T10527-

13 - O-ring

- ❑ replace after removal

14 - Screw

- ❑ thread forming
- ❑ position and screw in by to allow the screw to find the old thread, then tighten the screw to the torque
- ❑ 7 Nm

15 - Retaining clip

- ❑ For air guide pipe

16 - Throttle valve control unit - GX3-

- ❑ comprises:

- ♦ Throttle valve control unit - J338-
- ♦ Throttle valve drive - G186-
- ♦ Throttle valve drive angle sender 1 - G187-
- ♦ Throttle valve drive angle sender 2 - G188-

- ❑ Removing and installing ⇒ “3.3 Removing and installing the throttle valve control unit GX3 ”, page 390
- ❑ cleaning ⇒ “3.4 Clean throttle valve control unit GX3 ”, page 392
- ❑ After replacing the throttle valve control unit - GX3- this must be readjusted to the engine control unit - J623- ⇒ Vehicle diagnostic tester

17 - Sealing ring

- ❑ replace after removal

18 - Vacuum line

19 - O-ring

- ❑ replace after removal

20 - Vacuum line

21 - O-ring

- ❑ replace after removal

3.2 Removing and installing intake manifold

Removing

Special tools and workshop equipment required

- ♦ Hose clamps up to 25 mm - MP7-602 (3094)-
- ♦ Pliers for spring strap clamps -VAS 6362-
- ♦ Release tool -T10527-

For natural gas vehicles (CNG)

DANGER!

Follow safety measures and rules of cleanliness when working on the natural gas system and general instructions for operating a natural gas vehicle (CNG)
⇒ "2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)", page 10 .

– Empty gas line
⇒ "5.8 Remove the pressure in the high-pressure line", page 347 .

Continued for all vehicles

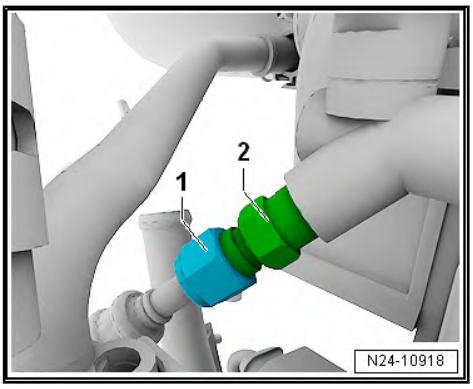
– Remove air filter housing
⇒ "2.2 Removing and installing air filter housing", page 384 .
– Remove the sound dampening system ⇒ Body Work; Rep. gr. 66 .
– Drain coolant ⇒ "1.2 Draining and filling coolant", page 209 .

For natural gas vehicles (CNG)

Note

When undoing the union nuts, counterhold the connection line using an open-end wrench.

– Carefully loosen the union nuts -1- so that any residual gas can escape.
– Unscrew nut -1-.
– Remove the gas distribution line with gas inlet valves
⇒ "5.2 Removing and installing gas distribution line with gas inlet valves N366 , N367 , N368 and N369 ", page 400 .



Continued for all vehicles

WARNING

Risk of injury from fuel.

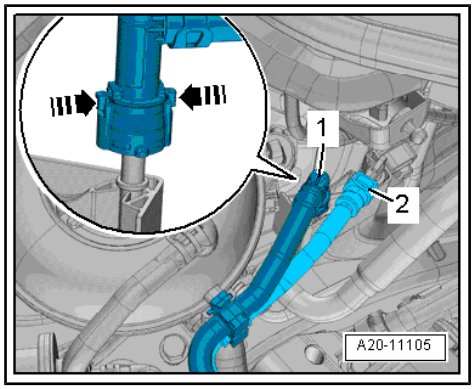
- *To relieve the fuel pressure, place a clean cloth around the connection point and loosen the connection point carefully before opening the fuel system.*

Caution

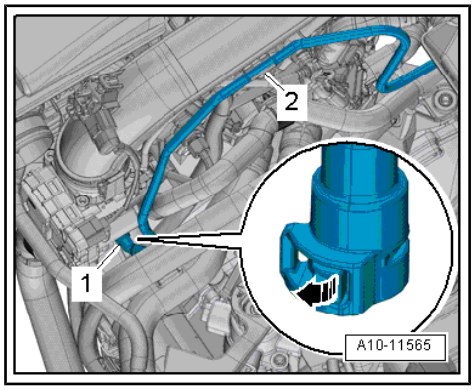
Risk of malfunctions caused by soiling.

- *Safety precautions when working on the fuel supply system*
⇒ "2.1 Safety precautions when working on fuel supply system", page 4

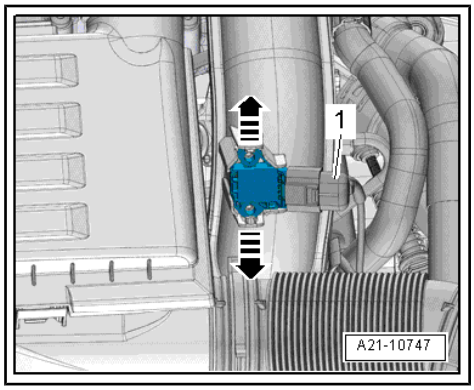
– Remove the fuel feed line -1- and the cable to the activated charcoal filter -2- ⇒ “4 Quick couplings”, page 298 .



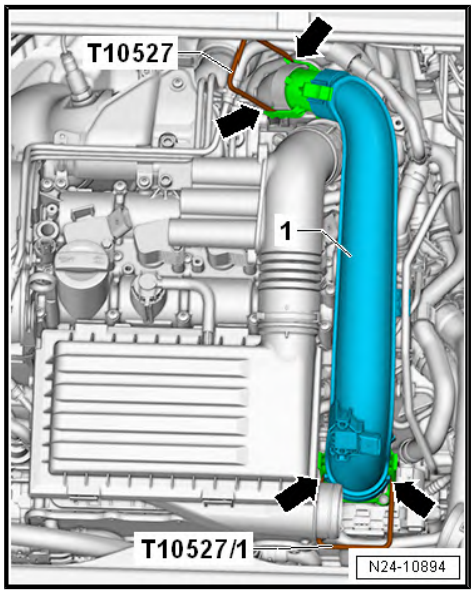
– Unlock catch -arrow- and remove vacuum hose -1-.
– Expose vacuum hose on the air guide pipe -2-.
– Expose air guide hoses at the charge air pipe.



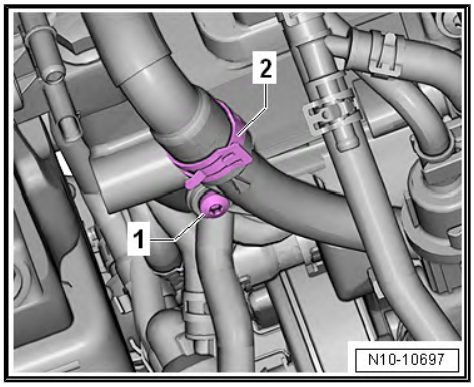
– Unplug connector -1-.



– Release catches -arrows- with release tool -T10527- and remove air guide pipe.



– Release screw -1- and remove gasket -2-.
– Disconnect coolant hose.
– Also remove both the other coolant hoses from the coolant pipe.



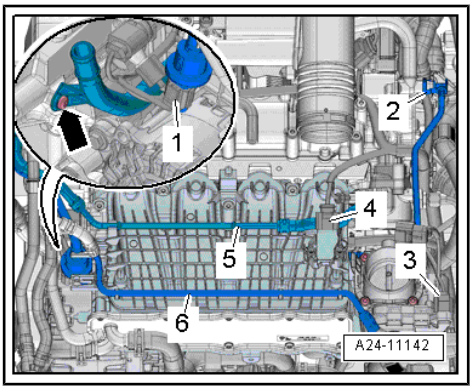
– Disconnect the plug connections:

1 - For solenoid valve 1 for activated charcoal filter - N80-

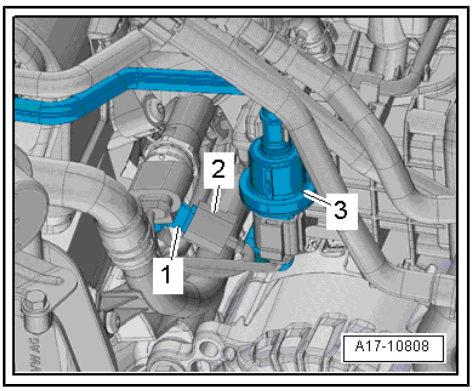
3 - for throttle valve control unit - GX3-

4 - For intake manifold pressure sender - GX9-

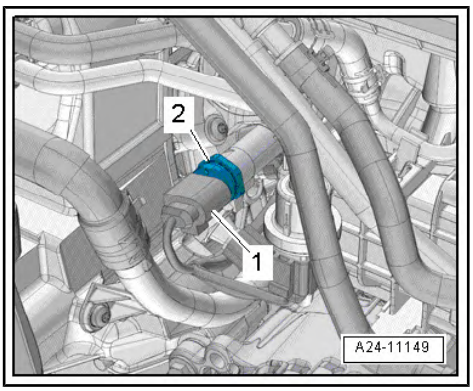
– Unscrew plug -arrow-.
– Press release buttons and remove hose -2- for activated charcoal filter.
– Unclip fuel feed line -5- and coolant line -6- at the intake manifold and push to the side.



– Remove connector -2- from the oil pressure switch for reduced oil pressure - F378- -1-.



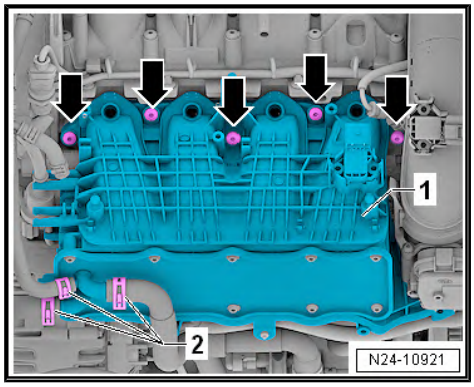
– Remove connector -1- from fuel pressure sender - G247- -2-.



– Loosen hose clamps -2- and remove coolant hoses.

– Release screws -arrows-.

– Remove intake manifold -1-.



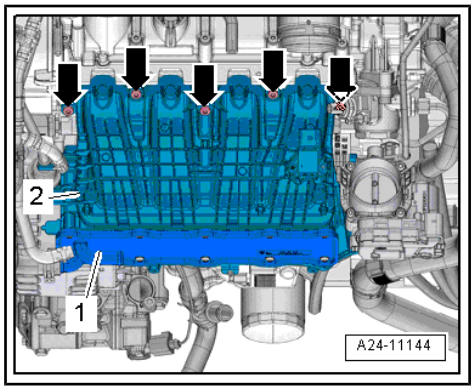
Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

Intake manifold - tightening torque and tightening order

– Tighten screws gradually as follows:

Stage	Screws	Tightening torque
1.	-Arrows-	Insert in the centre, starting alternately, by hand as far as the stop
2.	-Arrows-	In the centre, starting alternately, 8 Nm



Note

Replace gaskets and O-rings.

– Install the noise insulation ⇒ Body Work; Rep. gr. 66 .

– Install air filter housing
⇒ “2.2 Removing and installing air filter housing”, page 384 .

For natural gas vehicles (CNG)

– Open the valves for tank shut-off -N361- and -N362- again with handwheel - T50026- .

Caution

Carry out a leak tightness test on the liquefied petroleum gas system (LPG)
⇒ “3.2 Inspecting the gas system for leaktightness”, page 17 .

Inspect natural gas system for leak-tightness ⇒ Maintenance ; Booklet Octavia III .

3.3 Removing and installing the throttle valve control unit - GX3-

Throttle flap control unit - GX3- comprises:

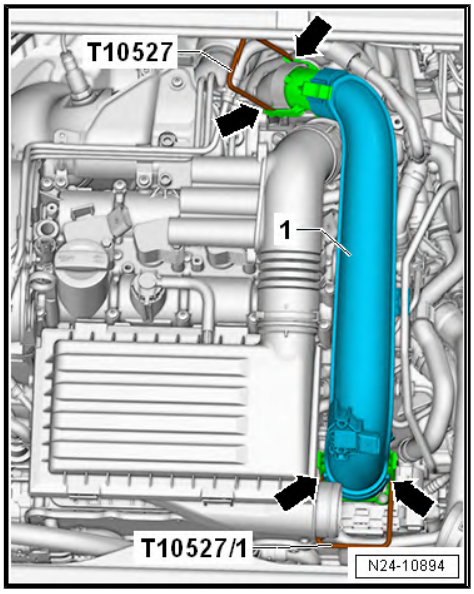
- Throttle valve control unit - J338-
- Throttle valve drive - G186-
- Throttle valve drive angle sender 1 - G187-
- Throttle valve drive angle sender 2 - G188-

Removing

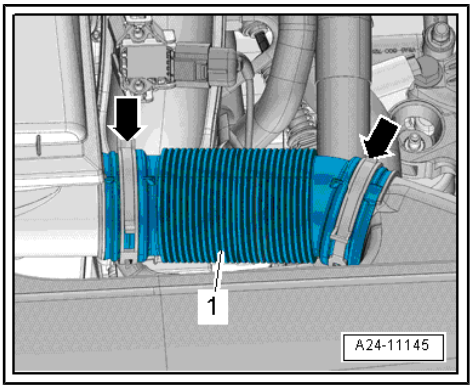
– Expose air guide hoses at the charge air pipe.

– Remove plug from charge pressure sender - GX26- .

– Release catches -arrows- with release tool -T10527- and remove air guide pipe.

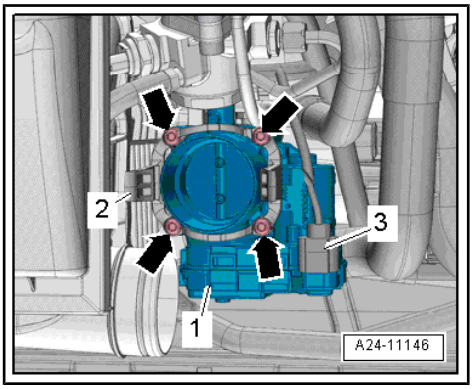


– Loosen hose clamps -arrows- and remove air guide -1-.



– Unplug connector -3-.

– Unscrew the screws -arrows- and remove throttle valve control unit - GX3- -1- with adapter -2-.



Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

– Clean the original throttle valve control unit - GX3- before re-installation
⇒ “3.4 Clean throttle valve control unit GX3 ”, page 392 .

– After replacing the throttle valve control unit - GX3- this must be readjusted to the engine control unit - J623- ⇒ Vehicle diagnostic tester

Tightening torques

♦ Screws for throttle valve control unit - GX3-
⇒ “3.1 Assembly overview - intake manifold”, page 385

3.4 Clean throttle valve control unit - GX3-

Note

- *If a new engine control unit - J623- is installed the throttle valve module must be adjusted.*
- *Soiling and carbonisation in the limit stop can lead to incorrect adjustment values.*
- *When cleaning the throttle valve housing it must not be scratched.*

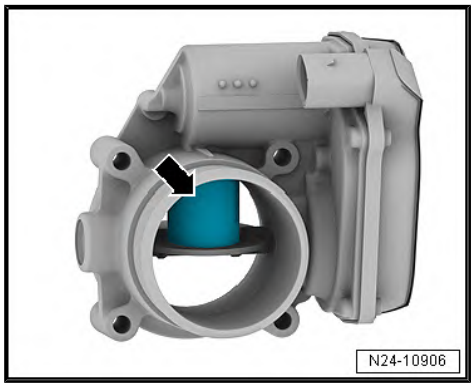
Special tools and workshop equipment required

- Commercially available Acetone
- Paint brush

Work procedure

– Remove throttle valve module - GX3-
⇒ “3.3 Removing and installing the throttle valve control unit GX3 ”, page 390 .

– Open throttle valve by hand and lock in open position using wood or a plastic wedge -arrow-.

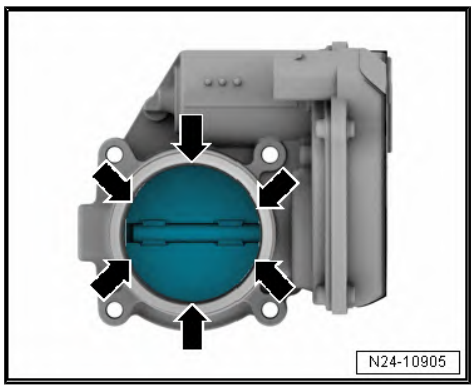


WARNING

Acetone is highly inflammable.

- *Accident prevention regulations and the safety instructions must be observed when handling easily inflammable fluids.*
- *Do not use compressed air when cleaning throttle valve.*
- *To avoid injury from metal shavings and to avoid skin contact, wear eye protection and protective clothing.*

– Thoroughly clean the throttle valve housing using commercially available Acetone and a paint brush, particularly in the area -arrows- of the closed throttle valve.



– Wipe out throttle valve housing with a lint-free cloth.

– Allow Acetone to dry off completely.

– Install throttle valve control unit - GX3-
⇒ “3.3 Removing and installing the throttle valve control unit GX3 ”, page 390 .

– Erase initialisation values and adapt the engine control unit - J623- to the throttle valve control unit - GX3- ⇒ Vehicle diagnostic tester.

4 Gas pressure regulator

⇒ “4.1 Summary of components - gas pressure regulator”, page 393

⇒ “4.2 Removing and installing gas pressure regulator”, page 395

⇒ “4.3 Removing and installing the tank pressure sensor G400 ”, page 397

4.1 Summary of components - gas pressure regulator

⇒ “4.1.1 Summary of components - gas pressure regulator”, page 393

⇒ “4.1.2 Summary of components - gas pressure regulator with attached parts”, page 394

4.1.1 Summary of components - gas pressure regulator

1 - Screw

- ❑ 8 Nm

2 - Nut

- ❑ 2 pieces
- ❑ 8 Nm

3 - Gas pressure regulator

- ❑ Summary of components with attached parts ⇒ “4.1.2 Summary of components - gas pressure regulator with attached parts”, page 394
- ❑ with high-pressure valve for gas mode - N372-
- ❑ Removing and installing ⇒ “4.2 Removing and installing gas pressure regulator”, page 395

4 - Screw

- ❑ 8 Nm

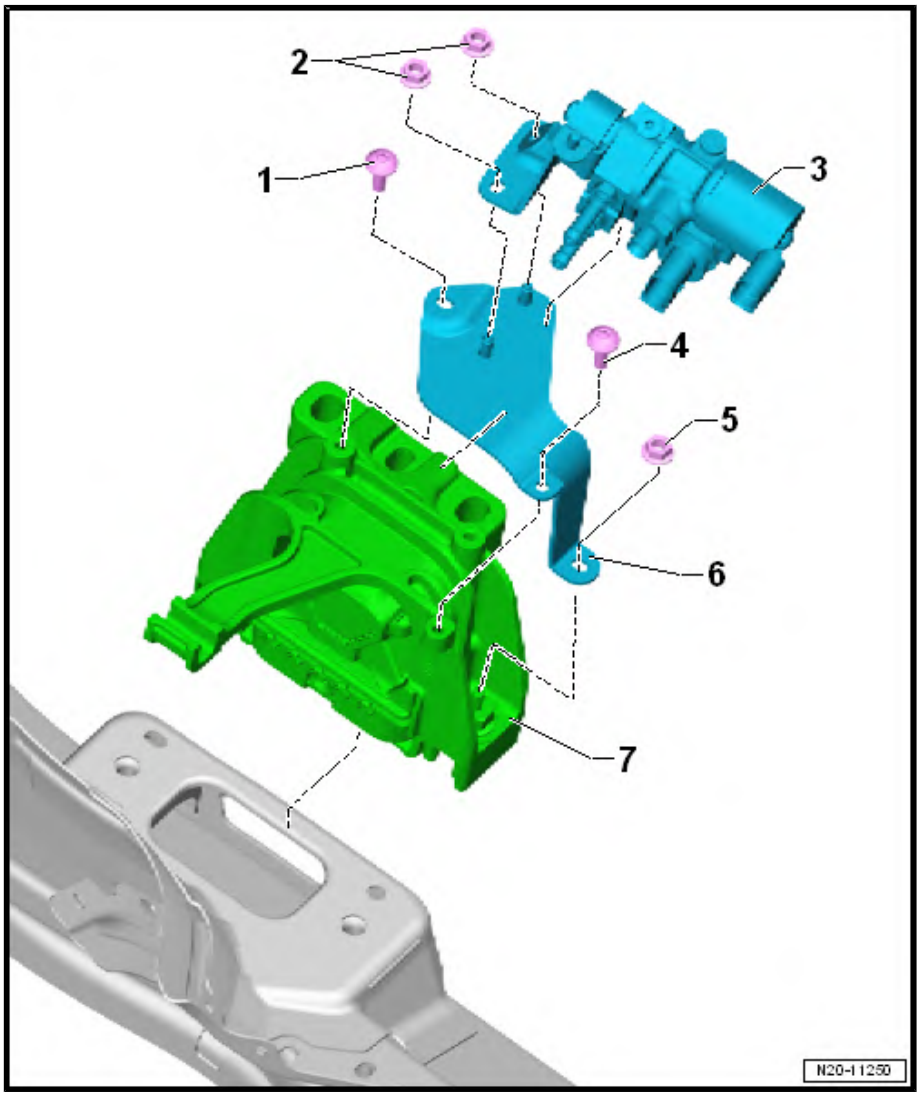
5 - Nut

- ❑ 8 Nm

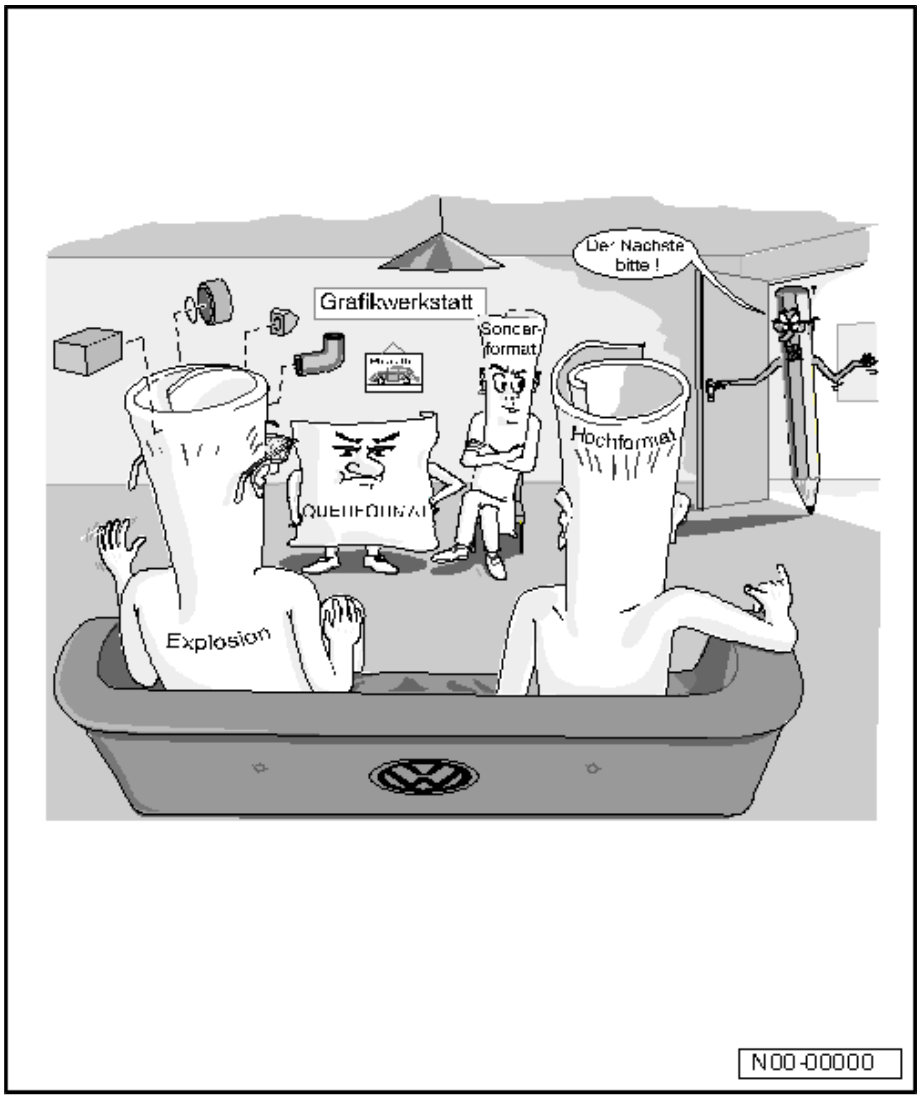
6 - Uchwyt

7 - Engine mounting

- ❑ Summary of components ⇒ “3.1 Assembly overview - assembly mountings”, page 41



4.1.2 Summary of components - gas pressure regulator with attached parts



1 - Gas pressure regulator

- ❑ with high-pressure valve for gas mode - N372-
- ❑ Removing and installing ⇒ “4.2 Removing and installing gas pressure regulator”, page 395

2 - Connection for pipeline

- ❑ Counterhold when the loosening and tightening the fuel line
- ❑ 18 Nm

3 - High pressure line

- ❑ Screw in the union nut by hand as far as the stop
- ❑ 17 Nm

4 - Tank pressure sensor - G400-

- ❑ Removing and installing ⇒ “4.3 Removing and installing the tank pressure sensor G400 ”, page 397
- ❑ 20 Nm

5 - Connector

- ❑ Tank pressure sensor - G400-
- ❑ High-pressure valve for gas mode - N372-

6 - Connection for pipeline

- ❑ Counterhold when the loosening and tightening the fuel line
- ❑ 18 Nm

7 - Low-pressure line

- ❑ 5 Nm + torque a further 135°

8 - Screw/threaded bolt

9 - Nut

- ❑ 8 Nm

10 - Coolant hoses

- ❑ Removing and installing spring-type clips with hose binding claw - VAS 6340-

11 - Nut

- ❑ 8 Nm

12 - Screw

- ❑ 8 Nm

13 - Uchwyt

14 - Bearings

❑ Screw in by hand

4.2 Removing and installing gas pressure regulator

Special tools and workshop equipment required

- ♦ Hose clamps up to 25 mm - 3094-
- ♦ Plug set for engine - VAS 6122-

Removing

DANGER!

Follow safety measures and rules of cleanliness when working on the natural gas system and general instructions for operating a natural gas vehicle (CNG) ⇒ "2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)", page 10 .

– Empty gas line
⇒ "5.8 Remove the pressure in the high-pressure line", page 347 .

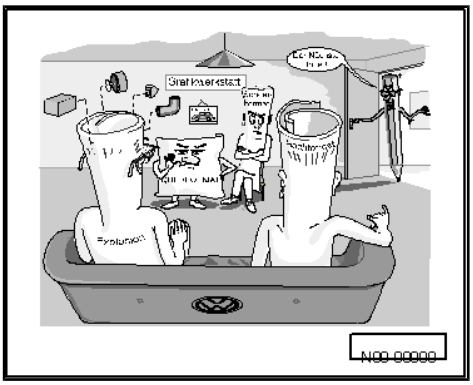
– Disconnect battery ⇒ Electrical System; Rep. gr. 27 .

Note

When undoing the union nuts, counterhold the connection line using an open-end wrench.

– Carefully loosen the union nuts -3- so that any residual gas can escape.

– Unscrew the nuts of the low-pressure line -3- from the gas pressure regulator -2-.



WARNING

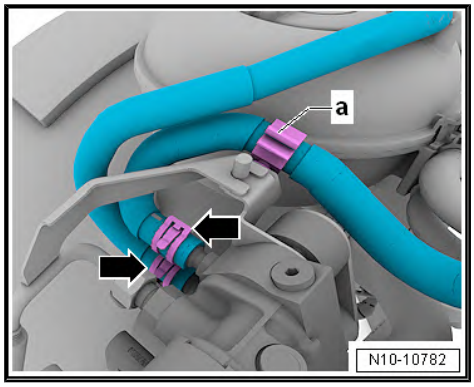
A residual amount of gas may still escape!

– Unscrew the nuts -arrow- and remove the low-pressure line -1- from the mounting bracket.

– Immediately seal open connections using suitable screw plugs from the screw plug set - VAS 6122- .

– Disconnect the terminal -a- from the mounting bracket and remove the coolant hose.

– Pinch off coolant hoses -1- with the hose clamps up to 25 mm - 3094- .



WARNING

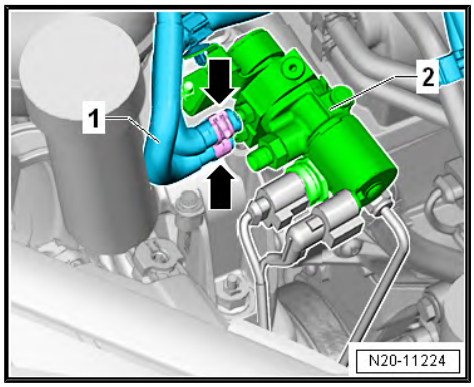
The cooling system remains pressurised while the engine is warm!

Danger of scalding due to hot steam and hot coolant.

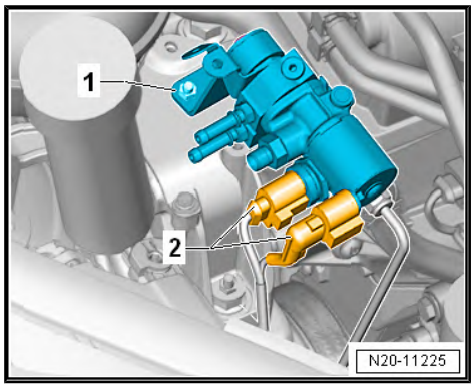
– Reduce excess pressure by covering the cap of the coolant expansion tank with a cloth and opening it carefully.

– Open clamps -arrows-.

– Remove the coolant hoses -1- from the gas pressure regulator -2-.



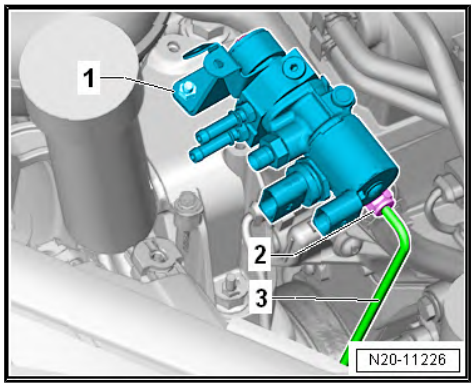
– Release and pull off connector -2-.



Note

When undoing the union nuts, counterhold the connection line using an open-end wrench.

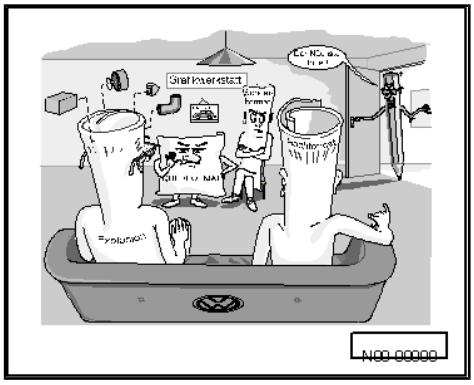
– Unscrew the union nut -2- of the high-pressure line -3- at the gas pressure regulator -1-.



WARNING

A residual amount of gas may still escape!

– Immediately seal open connections using suitable screw plugs from the screw plug set - VAS 6122- .



– Unscrew nuts -3-.
– Remove gas pressure regulator -2- from the mounting bracket -1-.

Install

Installation is carried out in the reverse order. Pay attention to the following:

– Check the level of coolant and top up if necessary ⇒ “1.2 Draining and filling coolant”, page 209 .
– Open the valves for tank shut-off -N361- and -N362- again with handwheel - T50026- .

Caution

Carry out a leak tightness test on the liquefied petroleum gas system (LPG) ⇒ “3.2 Inspecting the gas system for leaktightness”, page 17 .

Inspect natural gas system for leak-tightness ⇒ Maintenance ; Booklet Octavia III .

4.3 Removing and installing the tank pressure sensor - G400-

Removing

Special tools and workshop equipment required

♦ Extension piece No. 27 - T40218-

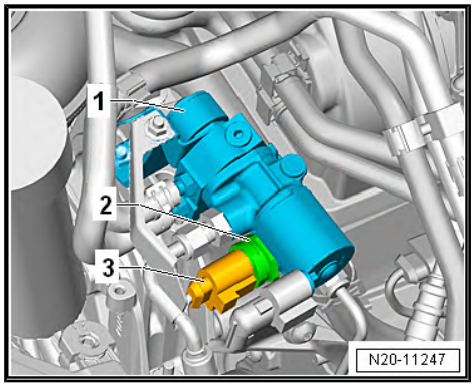
DANGER!

Follow safety measures and rules of cleanliness when working on the natural gas system and general instructions for operating a natural gas vehicle (CNG) ⇒ “2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)”, page 10 .

– Empty gas line ⇒ “5.8 Remove the pressure in the high-pressure line”, page 347 .
– Disconnect battery ⇒ Electrical System; Rep. gr. 27 .

– Release connector -3- and pull off.

– Unscrew sensor for tank pressure - G400- -2- from the gas pressure regulator -1-.



Install

Installation is carried out in the reverse order. Pay attention to the following:

– Open the valves for tank shut-off -N361- and -N362- again with handwheel - T50026- .

Caution

Carry out a leak tightness test on the liquefied petroleum gas system (LPG)
⇒ "3.2 Inspecting the gas system for leaktightness", page 17 .

Inspect natural gas system for leak-tightness ⇒ Maintenance ; Booklet Octavia III .

Tightening torques

◆ Tank pressure sensor - G400-
⇒ "4.1.2 Summary of components - gas pressure regulator with attached parts", page 394 .

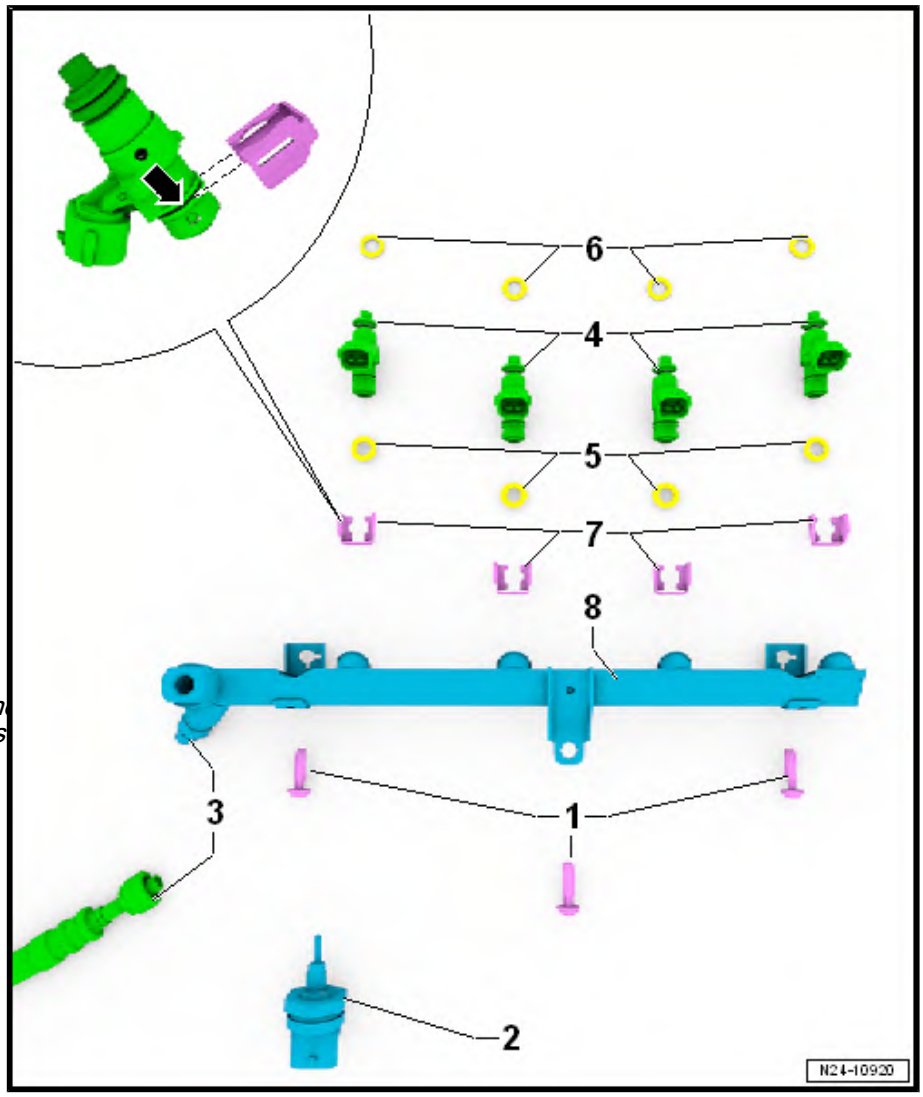
5 Gas inlet valves

⇒ “5.1 Summary of components - gas distribution line with gas inlet valves”, page 399

⇒ “5.2 Removing and installing gas distribution line with gas inlet valves N366 , N367 , N368 and N369 ”, page 400

⇒ “5.3 Removing and installing the temperature and pressure sensor for gas distribution line GX21 ”, page 401

5.1 Summary of components - gas distribution line with gas inlet valves



1 - Screw

- ❑ 7 Nm

2 - Temperature and pressure sensor for gas distribution line - GX21-

- ❑ comprises:

- ♦ Gas distribution line sensor - G401-
- ♦ Temperature sensor for alternatives fuel system - G876-

- ❑ Removing and installing ⇒ “5.3 Removing and installing the temperature and pressure sensor for gas distribution line GX21 ”, page 401

Tightening procedure:

Note

When the loosening an counterhold the gas dis with a lateral wrench.

– Tighten to 27 Nm.

– Turn back by 60°.

– Tighten to 34 Nm.

3 - Feed line

- ❑ Loosen the union nut by hand as far as the stop
- ❑ 5 Nm +70° (the torquing angle can be performed in two stages)

4 - Gas inlet valve

- ❑ Gas inlet valve 1 - N366-
- ❑ Gas inlet valve 2 - N367-
- ❑ Gas inlet valve 3 - N368-
- ❑ Gas inlet valve 4 - N369-
- ❑ Removing and installing ⇒ “5.2 Removing and installing gas distribution line with gas inlet valves N366 , N367 , N368 and N369 ”, page 400

5 - O-ring

- ❑ replace after removal
- ❑ insert dry

6 - O-ring

- ❑ replace after removal
- ❑ insert dry

7 - Retaining clip

- ❑ check tightness on the injection valve and fuel distributor
- ❑ replace after removal

8 - Gas distribution line with gas inlet valves

- ❑ Removing and installing
  ⇒ “5.2 Removing and installing gas distribution line with gas inlet valves N366 , N367 , N368 and N369 ”, page 400

5.2 Removing and installing gas distribution line with gas inlet valves - N366- , -N367- , -N368- and -N369-

Removing

DANGER!

Follow safety measures and rules of cleanliness when working on the natural gas system and general instructions for operating a natural gas vehicle (CNG)
⇒ “2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)”, page 10 .

– Remove air filter housing
⇒ “2.2 Removing and installing air filter housing”, page 384 .

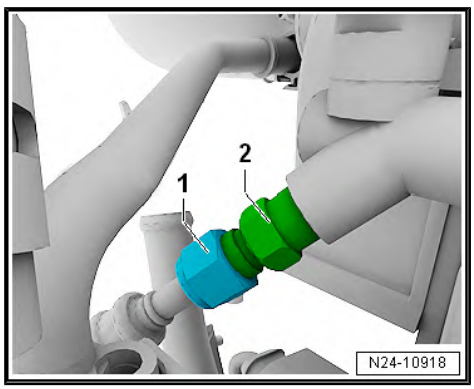
– Empty gas line
⇒ “5.8 Remove the pressure in the high-pressure line”, page 347 .

Note

When undoing the union nuts, counterhold the connection line using an open-end wrench.

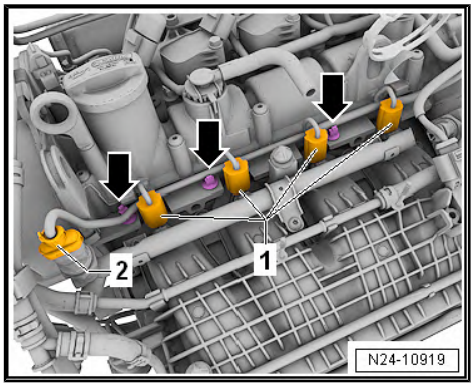
– Carefully loosen the union nuts -1- so that any residual gas can escape.

– Unscrew nut -1-.



Caution

Make sure that the low-pressure line is not kinked.



– Remove holding clamps of wire harness -arrows-.
– Remove connector -1- from the gas inlet valves and the temperature and pressure sensor for gas distribution line - GX21--2-.
– Unscrew securing bolts on gas distribution line from intake manifold.
– Remove gas distribution line from the intake manifold together with the gas distribution line.

If the gas inlet valves or their gaskets must be replaced.

– Carefully remove retaining clip -7- of the gas inlet valve to be removed
⇒ “5.1 Summary of components - gas distribution line with gas inlet valves”, page 399 .
– Pull the gas inlet valve out of the gas distribution line.

Install

Installation is carried out in the reverse order. Pay attention to the following:

– Replace gasket rings Pos. -5- and -6-
⇒ “5.1 Summary of components - gas distribution line with gas inlet valves”, page 399 .
– Ensure proper seating of gasket rings.
– Note the fitting position of the holding clamps on the gas inlet valves.
– Pay attention to the correct seating of the injection valves in the seat of the gas inlet valves.
– Open the valves for tank shut-off -N361- and -N362- again with handwheel - T50026- .

Caution

Carry out a leak tightness test on the liquefied petroleum gas system (LPG)
⇒ “3.2 Inspecting the gas system for leaktightness”, page 17 .

Inspect natural gas system for leak-tightness ⇒ Maintenance ; Booklet Octavia III .

Tightening torques

♦ Screws for fuel rail to intake manifold
⇒ “5.1 Summary of components - gas distribution line with gas inlet valves”, page 399

5.3 Removing and installing the temperature and pressure sensor for gas distribution line - GX21-

The temperature and pressure sensor for gas distribution line - GX21- consists of the following:

♦ Gas distribution line sensor - G401-
♦ Temperature sensor for alternatives fuel system - G876-

Removing

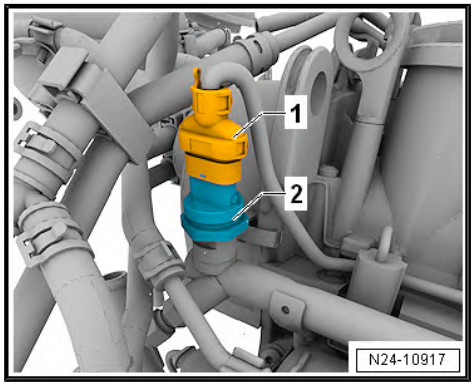
DANGER!

Follow safety measures and rules of cleanliness when working on the natural gas system and general instructions for operating a natural gas vehicle (CNG)
⇒ "2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)", page 10 .

– Empty gas line
⇒ "5.8 Remove the pressure in the high-pressure line", page 347 .

– Unplug connector -1-.

– Unscrew and remove the temperature and pressure sensor for gas distribution line - GX21- -2- while counterholding the gas distribution line with a lateral wrench.



Install

Installation is carried out in the reverse order. Pay attention to the following:

Caution

Carry out a leak tightness test on the liquefied petroleum gas system (LPG)
⇒ "3.2 Inspecting the gas system for leaktightness", page 17 .

Inspect natural gas system for leak-tightness ⇒ Maintenance ; Booklet Octavia III .

Tightening torques

◆ Temperature and pressure sensor for gas distribution line - GX21-
⇒ "5.1 Summary of components - gas distribution line with gas inlet valves", page 399

6 Injectors

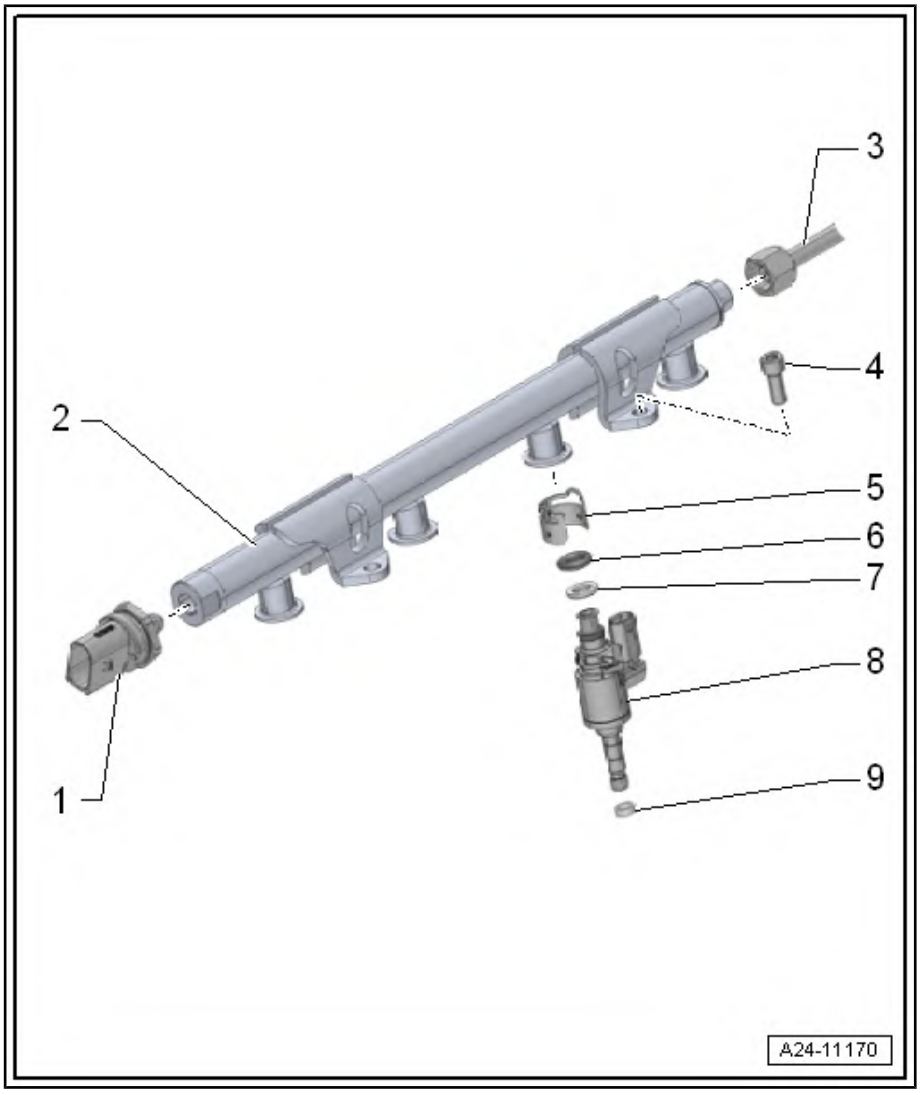
⇒ “6.1 Assembly overview - fuel rail with injectors”, page 403

⇒ “6.2 Removing and installing the fuel distributor”, page 404

⇒ “6.3 Removing and installing injectors”, page 405

⇒ “6.4 Clean injection valves”, page 411

6.1 Assembly overview - fuel rail with injectors



1 - Fuel pressure sender - G247-

- ❑ check ⇒ “7.3 Check fuel pressure sender G247 ”, page 414
- ❑ Removing and installing ⇒ “7.2 Removing and installing fuel pressure sender G247 ”, page 413
- ❑ Moisten the cone with clean engine oil; the thread must not be oiled
- ❑ 22 Nm

2 - Fuel distributor

- ❑ Removing and installing ⇒ “6.2 Removing and installing the fuel distributor”, page 404

3 - High pressure tube

WARNING

Fuel under very high pressure creates a risk of injury.
Before opening the injection system high-pressure system, the fuel pressure must be reduced to residual pressure
⇒ “2.2 Reduce pressure in the high-pressure system”, page 5 .

- ❑ Connections must not be damaged
- ❑ do not change bending form
- ❑ Removing and installing ⇒ “8.3 Removing and installing high pressure pipe”, page 419
- ❑ 10 Nm + torque a further 90° ($^1/_4$ turn)

4 - Screw

- ❑ Removing and installing ⇒ “6.2 Removing and installing the fuel distributor”, page 404
- ❑ 9 Nm

5 - Support ring

- ❑ replace after removal
- ❑ the fuel distributor exerts force via the support ring that holds the injector in the cylinder head

- ❑ connected with valve Pos. -8-

6 - O-ring

- ❑ replace after removal
- ❑ Moisten with engine oil

7 - Distance ring

- ❑ replace if damaged

8 - Injector

- ❑ Removing and installing ⇒ “6.3 Removing and installing injectors”, page 405

9 - Combustion chamber sealing ring

- ❑ Do not grease or treat using any other lubricant
- ❑ Renew ⇒ “6.3 Removing and installing injectors”, page 405 .

6.2 Removing and installing the fuel distributor

Removing

For natural gas vehicles (CNG)

DANGER!

Follow safety measures and rules of cleanliness when working on the natural gas system and general instructions for operating a natural gas vehicle (CNG)
⇒ “2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)”, page 10 .

– Remove the gas distribution line with gas inlet valves
⇒ “5.2 Removing and installing gas distribution line with gas inlet valves N366 , N367 , N368 and N369 ”, page 400 .

Continued for all vehicles

WARNING

Fuel under very high pressure creates a risk of injury.

- *Before opening the injection system high-pressure system, the fuel pressure must be reduced to residual pressure*
⇒ “2.2 Reduce pressure in the high-pressure system”, page 5 .

Caution

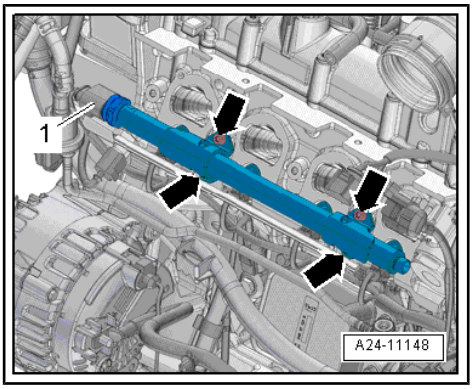
Risk of malfunctions caused by soiling.

- *Self diagnosis, safety measures, cleanliness regulations, directions*
⇒ “2.1 Safety precautions when working on fuel supply system”, page 4

– Removing the intake manifold
⇒ “3.2 Removing and installing intake manifold”, page 386 .

– Remove high pressure pipe
⇒ “8.3 Removing and installing high pressure pipe”, page 419 .

– Unplug connector -1-.



Note

Place a cloth below to absorb leaking fuel.

– Release the screws -arrows-, disconnect fuel distributor from the injection valves.

Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

Note

Renew O-ring.

– Position fuel distributor on the injectors.
– Press fuel distributor first to the right, then to the left onto the injectors up to the stop.
– Press fuel distributor down firmly in the holder area and tighten screws by two turns.
– Tighten screws crosswise uniformly.
– Install the gas distribution line with gas inlet valves
⇒ “5.2 Removing and installing gas distribution line with gas inlet valves N366 , N367 , N368 and N369 ”, page 400 .
– Install high pressure pipe
⇒ “8.3 Removing and installing high pressure pipe”, page 419 .
– Installing the intake manifold
⇒ “3.2 Removing and installing intake manifold”, page 386 .

For natural gas vehicles (CNG)

– Open the valves for tank shut-off -N361- and -N362- again with handwheel - T50026- .

Caution

Carry out a leak tightness test on the liquefied petroleum gas system (LPG)
⇒ “3.2 Inspecting the gas system for leaktightness”, page 17 .

Inspect natural gas system for leak-tightness ⇒ Maintenance ; Booklet Octavia III .

Continued for all vehicles

Tightening torques

◆ Screws for fuel distributor
⇒ “6.1 Assembly overview - fuel rail with injectors”, page 403

6.3 Removing and installing injectors

Special tools and workshop equipment required

- Pulling device - T10133- with removal tool - T10133/16A- and extractor - T10133/19-

Removing

For natural gas vehicles (CNG)

DANGER!

Follow safety measures and rules of cleanliness when working on the natural gas system and general instructions for operating a natural gas vehicle (CNG)
⇒ "2.12 Safety measures and occupational safety when working on vehicles with the gas system (CNG)", page 10 .

– Remove the gas distribution line with gas inlet valves
⇒ "5.2 Removing and installing gas distribution line with gas inlet valves N366 , N367 , N368 and N369 ", page 400 .

Continued for all vehicles

Caution

Risk of malfunctions caused by soiling.

- *Self diagnosis, safety measures, cleanliness regulations, directions*
⇒ "2.1 Safety precautions when working on fuel supply system", page 4

Note

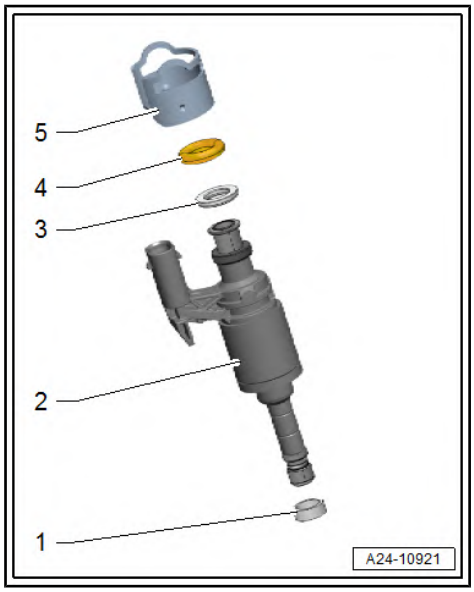
Injectors must not be removed while the engine is cold.

– Removing the intake manifold
⇒ "3.2 Removing and installing intake manifold", page 386 .

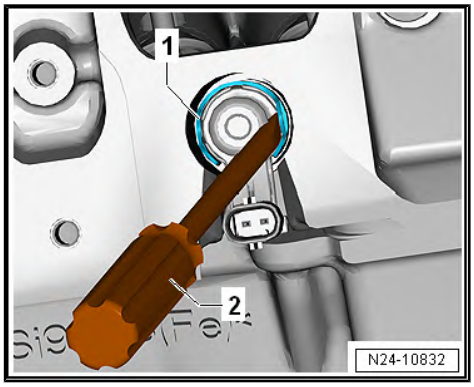
– Remove fuel distributor
⇒ "6.2 Removing and installing the fuel distributor", page 404 .

– Remove O-ring -4- from injector -2-.

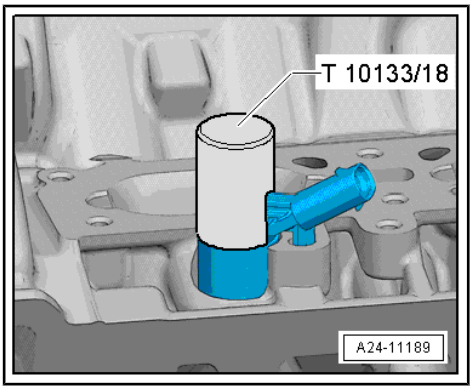
– Disconnect the plug connections from affected injector.



– Lever off caps -1- from injector using a screwdriver -2-.



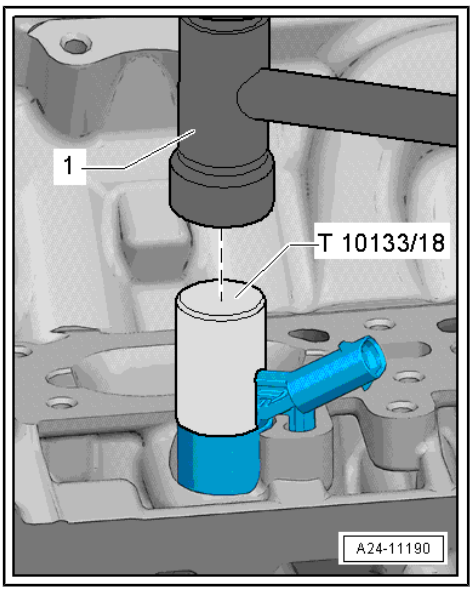
– Push impact sleeve -T10133/18- over the injector.



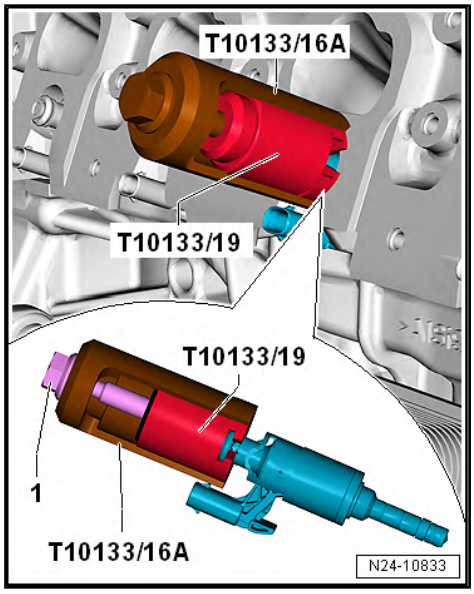
– Gently apply a few knocks to the impact sleeve to loosen the injector.

Note

- *Use a torque wrench to pull out the injector.*
- *Set 5 Nm on the torque wrench.*



– Insert extractor -T10133/19- into the groove at the injector.
– Position removal tool -T10133/16 A- on extractor.
– Pull the injector out by screwing in the screw -1-.
– If the limit torque of 5 Nm is reached without the injector loosening, remove the extractor and begin to loosen the injector again using the impact sleeve.
– Repeat the procedure for each injector.



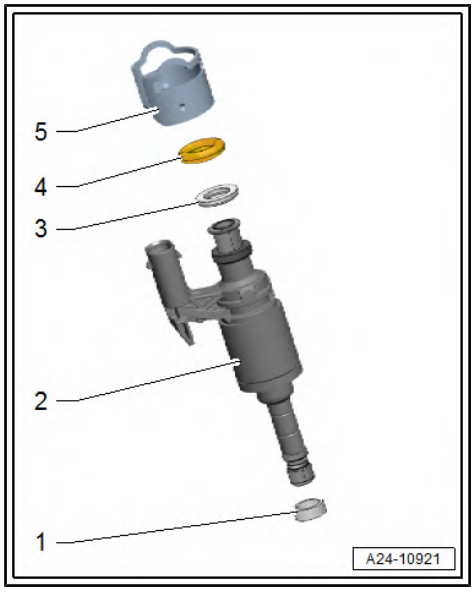
Note

- *Failure to observe the torque threatens the destruction of the injector.*
- *The combustion chamber sealing ring must always be replaced before the injection valve is pre-installed.*

– Remove gasket for intake manifold.

Disassemble injector:

– Pull support ring -5- and distance ring -3- off the injector -2-.
– Carefully remove old combustion chamber sealing ring -1-. To do so, cut off the ring using a knife or enlarge the ring using a small screwdriver and pull it off forwards.

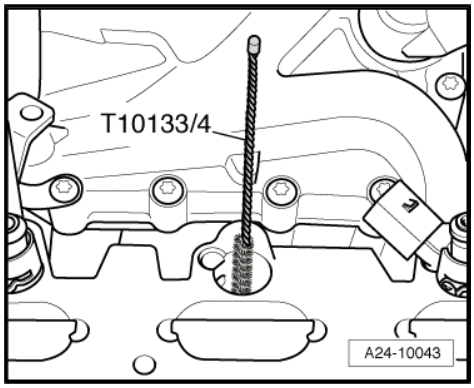


Note

Ensure that the injector groove is not damaged. If the groove is damaged the injector must be replaced.

Install

– Clean hole in the cylinder head using a nylon cylinder brush -T10133/4- .

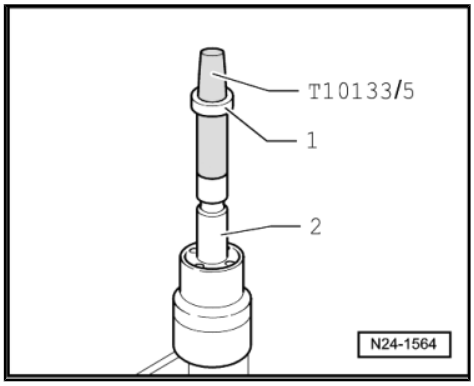


Note

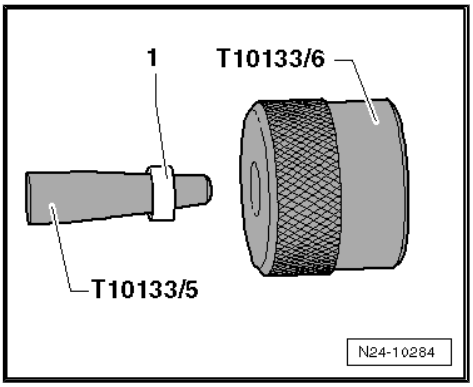
- *Replace combustion chamber sealing ring and O-ring.*
- *Replace distance ring if it is damaged.*

– When reinstalling an injector, clean combustion residues from the groove for the combustion chamber sealing ring and injector shaft using a clean cloth clean.

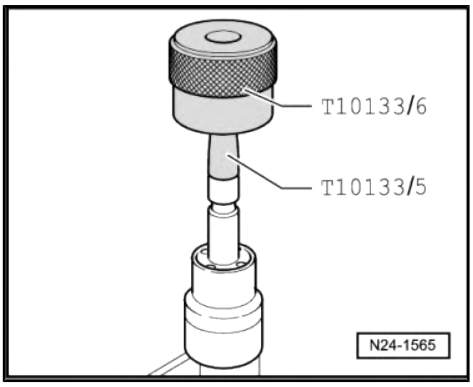
– Fit assembly cone -T10133/5- with the new combustion chamber sealing ring -1- onto the injector -2-.



– Push combustion chamber sealing ring with assembly sleeve -T10133/6- as far as possible onto the assembly cone -T10133/5- .



– Turn assembly sleeve -T10133/6- , push combustion chamber sealing ring into the sealing ring groove.

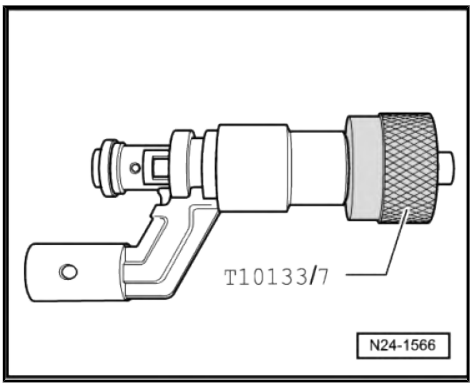


Note

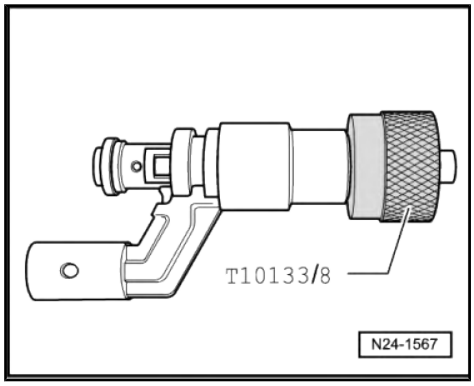
When sliding on the injector the combustion chamber sealing ring is widened. It must therefore be reduced in width again in two steps, as described below.

– Press calibrating sleeve -T10133/7- with a gentle rotary movement (approximately 180°) up to the stop on the injector.

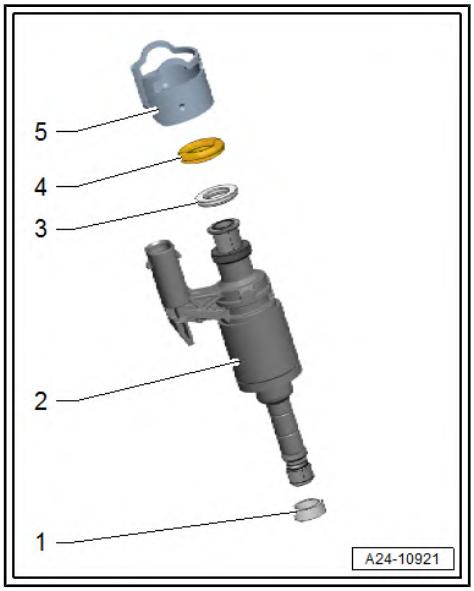
– Turn calibrating sleeve -T10133/7- off again in the opposite direction.



– Press calibrating sleeve -T10133/8- with a gentle rotary movement (approximately 180°) up to the stop on the injector.
– Turn calibrating sleeve -T10133/8- off again in the opposite direction.
– Pull support ring -5- and distance ring -3- onto the injector -2-.



– Before installing injector -2-, moisten new O-ring -4- with clean engine oil.



Note

The combustion chamber sealing ring -1- must not be oiled.

– Press the injectors into the cylinder head bore (free of oil and grease) by hand up to the stop. Pay attention to the correct position of the injection valves in the cylinder head.

Note

- ♦ *The injectors must fit easily. If necessary, wait until the width of the combustion chamber sealing ring has reduced sufficiently.*
- ♦ *Pay attention to the correct seating and fitting position of the injection valves in the cylinder head.*

- The electrical connection of the injector must reach into the recess provided in the cylinder head.

– Install the gas distribution line with gas inlet valves ⇒ “5.2 Removing and installing gas distribution line with gas inlet valves N366 , N367 , N368 and N369 ”, page 400 .

– Install fuel distributor ⇒ “6.2 Removing and installing the fuel distributor”, page 404 .

– Installing the intake manifold ⇒ “3.2 Removing and installing intake manifold”, page 386 .

For natural gas vehicles (CNG)

– Open the valves for tank shut-off -N361- and -N362- again with handwheel - T50026- .

Caution

Carry out a leak tightness test on the liquefied petroleum gas system (LPG) ⇒ “3.2 Inspecting the gas system for leaktightness”, page 17 .

Inspect natural gas system for leak-tightness ⇒ Maintenance ; Booklet Octavia III .

Continued for all vehicles

– Connect ⇒ Vehicle diagnostic tester and perform targeted function “delete adaption values”.

– Switch off ignition.

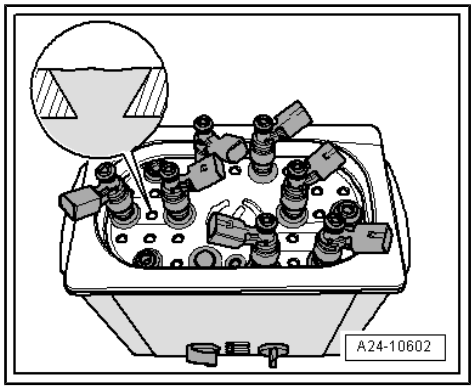
6.4 Clean injection valves

Special tools and workshop equipment required

- ♦ Ultrasonic cleaning device - VAS 6418-
- ♦ Feeder plate for injection units - VAS 6418/1-
- ♦ Cleaning fluid ⇒ ETKA - Electronic Catalogue of Original Parts

Note

- *The ultrasound device must be filled with cleaning agent up to the top of the holes (see inset).*
- *Observe the safety and operating instructions of the ultrasound device.*



Clean

– Remove injection valves
⇒ “6.3 Removing and installing injectors”, page 405 .

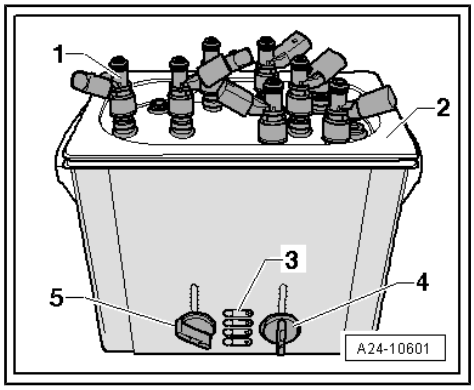
– Push injectors -1- into the feeder plate for injection units - VAS 6418/1- -2-.

– Immerse injectors with the feeder plate for injection units - VAS 6418/1- into the cleaning fluid - VAS 6418/2- .

– On the rotating head -4-, set a temperature of 50 °C.

– On the rotating head -5-, set a cleaning time of 30 minutes.

– Switch on ultrasound device using the button -3-.



Note

Once the cleaning temperature has reached 50 °C the set time begins to elapse.

– Replace the combustion chamber sealing ring at each injector after cleaning
⇒ “6.3 Removing and installing injectors”, page 405 .

7 Senders and sensors

⇒ “7.1 Removing and installing intake manifold pressure sender GX9 ”, page 413

⇒ “7.2 Removing and installing fuel pressure sender G247 ”, page 413

⇒ “7.3 Check fuel pressure sender G247 ”, page 414

7.1 Removing and installing intake manifold pressure sender - GX9-

The intake manifold pressure sender - GX9- comprises:

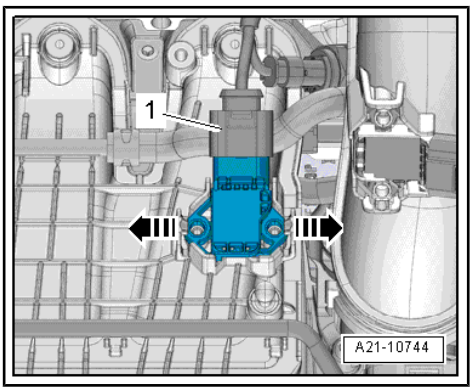
- Intake air temperature sender 2 - G299-
- For intake manifold pressure sender - G71-

Removing

– Remove air filter housing
⇒ “2.2 Removing and installing air filter housing”, page 384 .

– Unplug connector -1-.

– Release catches -arrows- and remove the charge pressure sender - GX26- .



Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

Note

Renew O-ring.

– Install air filter housing
⇒ “2.2 Removing and installing air filter housing”, page 384 .

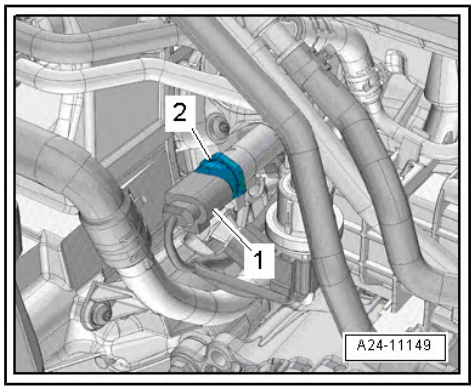
7.2 Removing and installing fuel pressure sender - G247-

Special tools and workshop equipment required

- Assembly tool - T10118-
- Socket insert SW 27 - T40218- or commercially available socket insert

Removing

– Unplug connector -1-.



Note

Place a cloth below to absorb leaking fuel.

– Unscrew the fuel pressure sender - G247- -2- with the socket insert SW 27 - T40218- .

Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

Note

The thread of the fuel pressure sender must not be moistened.

- Tightening torque
⇒ “6.1 Assembly overview - fuel rail with injectors”, page 403

7.3 Check fuel pressure sender - G247-

Special tools and workshop equipment required

- Adapter for measuring method / DSO (3-pin) - VAS 5570-
- Tester for pressure sensor - VAS 6394-
- Socket insert, elongated, SW 27 mm, commercially available

Work procedure

WARNING

Fuel under very high pressure creates a risk of injury.

- ***Before opening the injection system high-pressure system, the fuel pressure must be reduced to residual pressure***
⇒ “2.2 Reduce pressure in the high-pressure system”, page 5 .

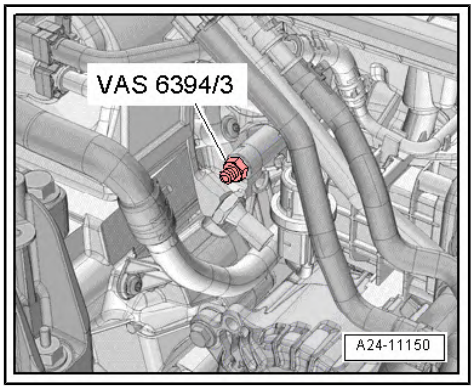
Caution

Risk of malfunctions caused by soiling.

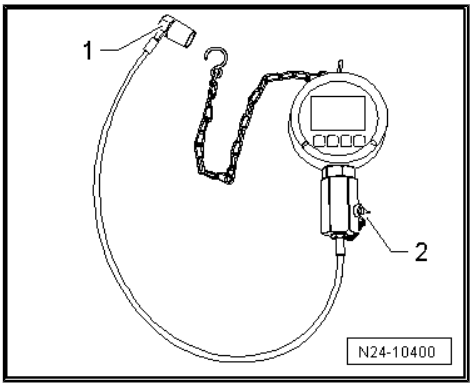
- ***Self diagnosis, safety measures, cleanliness regulations, directions***
⇒ “2.1 Safety precautions when working on fuel supply system”, page 4

– Remove fuel pressure sender - G247-
⇒ “7.2 Removing and installing fuel pressure sender G247 ”, page 413 .

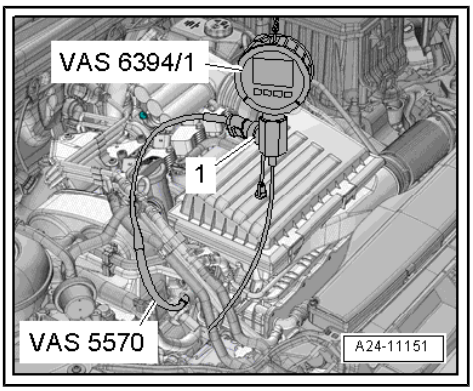
– Moisten the sealing cone of the adapter -VAS 6394/3- with clean engine oil and screw it into the fuel distributor with 22 Nm.



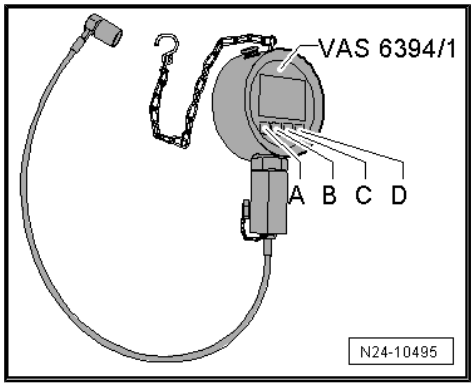
– Release the screw plug -2- and screw the fuel pressure sender - G247- into the tester -VAS 6394/1- .
– Connect the pressure line -1- of the tester onto the adapter - VAS 6394/3- .



– Use the adapter for measuring method/DSO (3-pin) - VAS 5570- to produce the electrical connection between vehicle and fuel pressure sender - G247- .



– Switch on the tester -VAS 6394/1- , for this step, briefly press the button -A-.



Note

- *If the button -A- is pressed for 2 seconds, the illumination is switched on for 20 seconds.*
- *If the tester -VAS 6394/1- is not displaying 0 bar, perform zero point adjustment ⇒ Operating Manual .*

– Connect ⇒ Vehicle diagnostic tester.

– Start engine and run at idling speed.

– Select the “Engine electronics” in the self-diagnosis.

– Then select “measured values”.

– Select “fuel pressure” in the selection list.

– Compare the displayed tester fuel pressure tester -VAS 6394/1- with the actual value displayed at the vehicle diagnosis tester .

– Read fuel pressure on vehicle diagnosis tester .

• The pressures may deviate maximum 0.5 MPa (5 bar) from one another.

– If the deviation is greater than 0.5 MPa (5 bar), replace the fuel pressure sender - G247- .

– Repeat the test with the new fuel pressure sender - G247- and compare both measured values.

– If the measurements now match, install new fuel pressure sender - G247- .

Tightening torque
⇒ “6.1 Assembly overview - fuel rail with injectors”, page 403

– If the measured values still do not match, test electrical line connection between fuel pressure sender - G247- and engine control unit - J623- ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

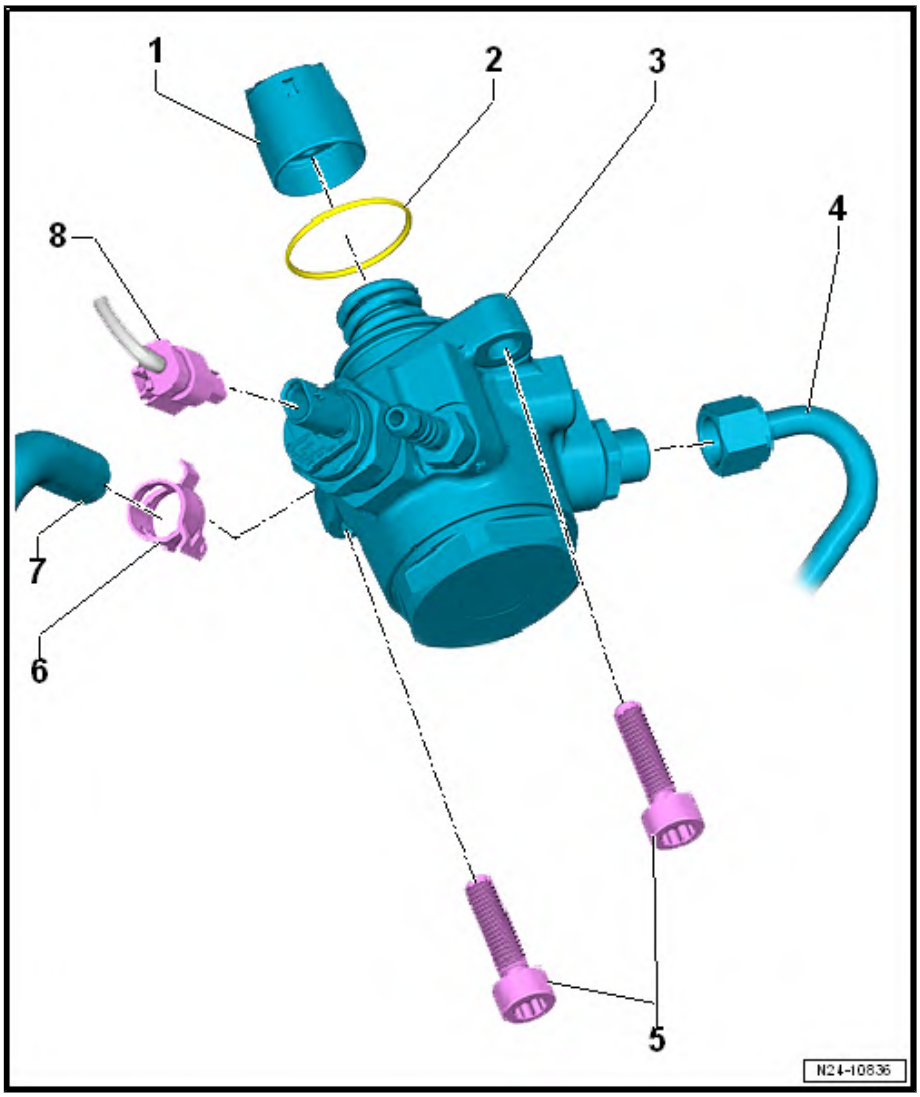
8 High pressure pump

⇒ “8.1 Summary of components - high pressure pump”, page 417

⇒ “8.2 Removing and installing the high pressure pump”, page 418

⇒ “8.3 Removing and installing high pressure pipe”, page 419

8.1 Summary of components - high pressure pump



1 - Roller tappet

- ❑ Moisten with engine oil during installation

2 - O-ring

- ❑ replace after removal
- ❑ Moisten with engine oil during installation

3 - High pressure pump

- ❑ with fuel dosage valve - N290-
- ❑ do not disassemble
- ❑ Removing and installing ⇒ “8.2 Removing and installing the high pressure pump”, page 418

4 - High pressure tube

WARNING

Risk of injury caused by fuel which is under high pressure.
Before opening the injection system high-pressure system, the fuel pressure must be reduced to residual pressure
⇒ “2.2 Reduce pressure in the high-pressure system”, page 5 .

- ❑ Removing and installing ⇒ “8.3 Removing and installing high pressure pipe”, page 419
- ❑ Check for damage before reinstalling
- ❑ do not change bending form
- ❑ Connections must not be damaged
- ❑ Moisten thread of the union nuts with clean engine oil
- ❑ 10 Nm + torque a further 90° ($^1/_4$ turn)

5 - Screw

- ❑ replace after removal
- ❑ Tightening torque and tightening order ⇒ page 419
- ❑ 20 Nm + torque a further 90° ($^1/_4$ turn)

6 - Hose clamp

7 - Fuel line

❑ Feed line from the fuel system pressurisation pump - G6-

8 - Connector

8.2 Removing and installing the high pressure pump

Removing

- Engine is cold

WARNING

Fuel under very high pressure creates a risk of injury.

- *Before opening the injection system high-pressure system, the fuel pressure must be reduced to residual pressure*
  ⇒ "2.2 Reduce pressure in the high-pressure system", page 5 .

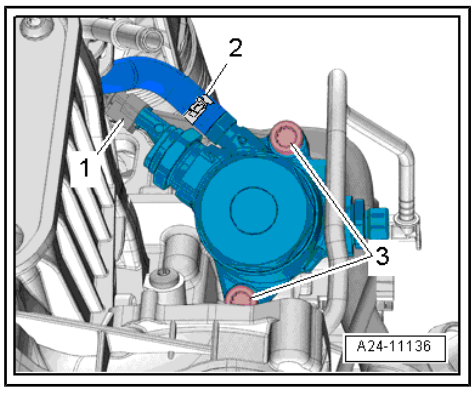
Caution

Risk of malfunctions caused by soiling.

- *Safety measures*
  ⇒ "2.1 Safety precautions when working on fuel supply system", page 4

– Remove high pressure pipe
⇒ "8.3 Removing and installing high pressure pipe", page 419 .

– Unplug connector -1-.



Note

Place a cloth below to absorb leaking fuel.

– Loosen hose clamp -2- and remove fuel intake hose.

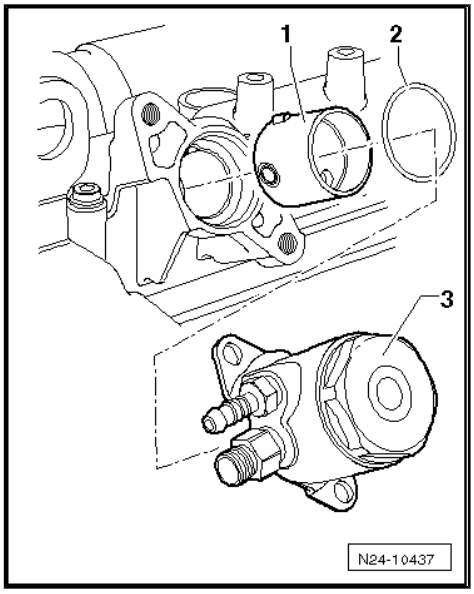
– Unscrew screws -3- and remove high pressure pump with roller tappet.

Install

– Inspect roller tappet for damage, if necessary replace.

– Moisten roller tappet -1- with clean engine oil.

– Insert the oiled roller tappet -1- into the camshaft housing.



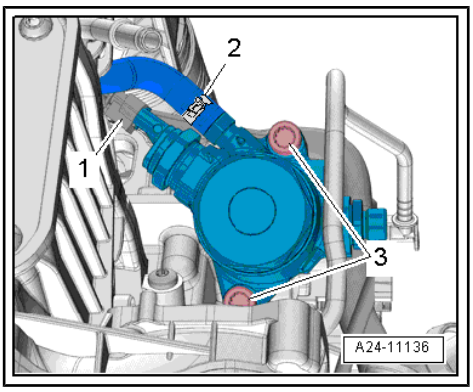
Note

Renew O-ring.

– Turn crankshaft in direction of engine rotation until the roller tappet is at the lowest point.
– Insert a new, oiled O-ring -2- into the slot of the high pressure pump -3-.
– Tighten screws until hand-tight.

High pressure pump - tightening torque and tightening order

To prevent the flange of the high pressure pump from becoming deformed during installation, attach high pressure pump as follows:



– Tighten screws gradually as follows:

Stage	Screws	Tightening torque/torquing angle
1.	-3-	by hand as far as the stop
2.	-3-	Tighten by 1 turn alternately until the flange of the high pressure pump is at the camshaft housing
3.	-3-	20 Nm
4.	-3-	90° (torque a further 90° ($^1/_4$ turn)

– Check the fuel system for tightness.

8.3 Removing and installing high pressure pipe

Removing

– Remove throttle valve module - GX3-
⇒ “3.3 Removing and installing the throttle valve control unit GX3 ”, page 390 .

WARNING

Fuel under very high pressure creates a risk of injury.

- ***Before opening the injection system high-pressure system, the fuel pressure must be reduced to residual pressure***
⇒ “2.2 Reduce pressure in the high-pressure system”, page 5 .

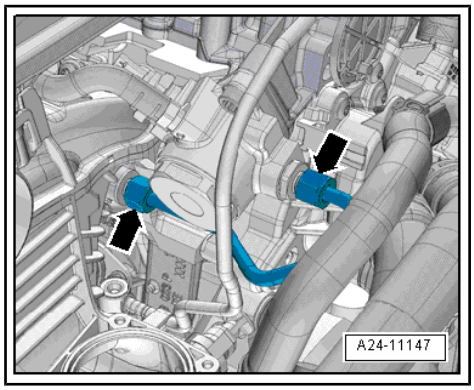
Caution

Risk of malfunctions caused by soiling.

- ***Safety measures***
  ⇒ "2.1 Safety precautions when working on fuel supply system", page 4

Note

Place a cloth below to absorb leaking fuel.



– Unscrew union nuts -arrows- and remove high pressure line.

Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

– Moisten thread of union nuts with clean engine oil.

– Hand-tighten union nuts for high pressure pipe, ensure that the fit is tension-free.

– Tighten union nuts.

– Install throttle valve control unit - GX3-
⇒ "3.3 Removing and installing the throttle valve control unit GX3 ", page 390 .

Tightening torques

- Union nuts
⇒ "8.1 Summary of components - high pressure pump", page 417

9 Lambda probes

⇒ “9.1 Summary of components - lambda probes”, page 421

⇒ “9.2 Removing and installing Lambda probe 1 in front of catalytic converter GX10 and Lambda probe 1 after catalytic converter GX7 ”, page 422

9.1 Summary of components - lambda probes

Note

- *New lambda probes are coated with assembly paste. This paste must not come into contact with the slots of the lambda probe body.*
- *For a re-used lambda probe, only coat the thread with hot bolt paste. This paste must not come into contact with the slots of the lambda probe body. Hot bolt paste ⇒ ETKA - Electronic Catalogue of Original Parts .*
- *The electrical cable wire connection of the lambda probe must be secured again at the same points during installation. Contact between the electrical cable connection and the exhaust pipe must be prevented.*

1 - Lambda probe 1 after catalytic converter - GX7-

- ❑ comprises:

- ♦ Lambda probe after catalytic converter - G130-
- ♦ Lambda probe 1 heater after catalytic converter - Z29-
  - ❑ Removing and installing ⇒ “9.2 Removing and installing Lambda probe 1 in front of catalytic converter GX10 and Lambda probe 1 after catalytic converter GX7 ”, page 422
  - ❑ 55 Nm

2 - Connector

- ❑ for lambda probe 1 downstream of catalytic converter - GX7-

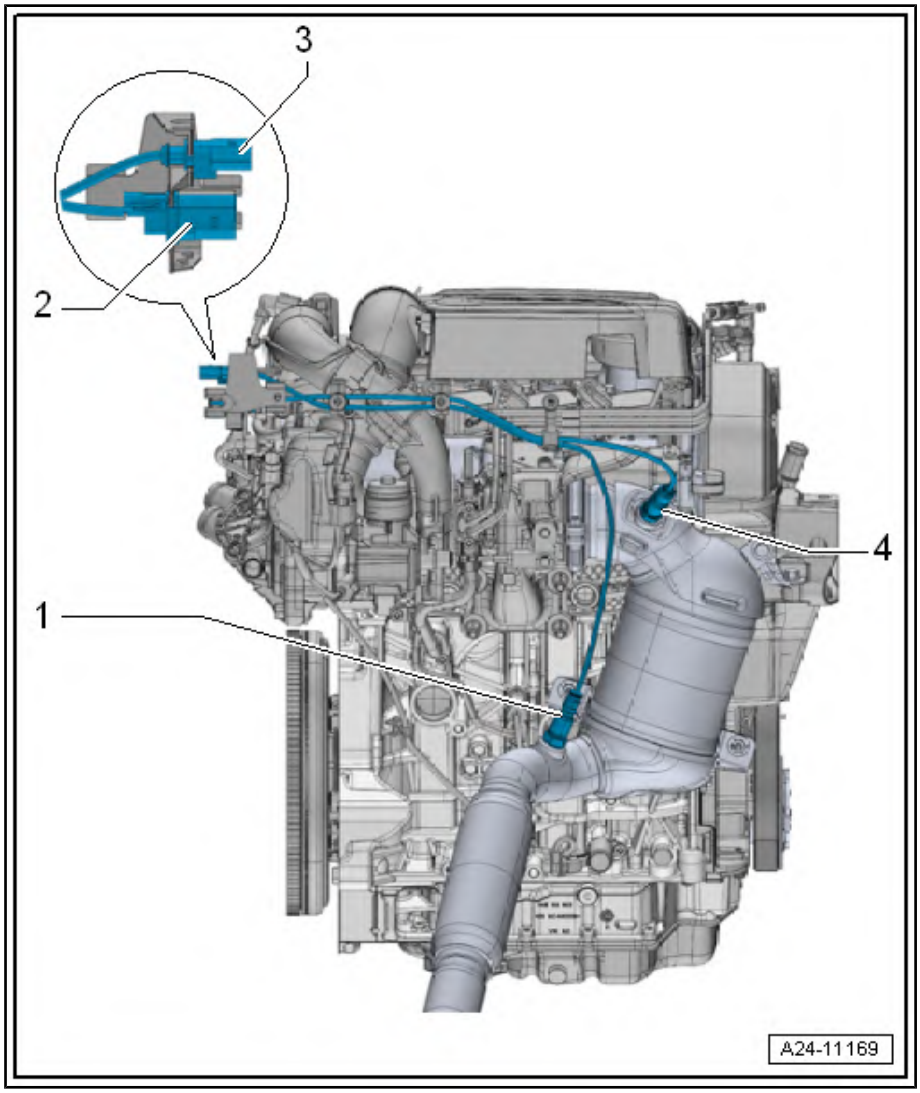
3 - Connector

- ❑ for lambda probe 1 upstream of catalytic converter - GX10-

4 - Lambda probe 1 in front of the catalytic converter - GX10-

- ❑ comprises:

- ♦ Lambda probe - G39-
- ♦ Heating for lambda probe - Z19-
  - ❑ Removing and installing ⇒ “9.2 Removing and installing Lambda probe 1 in front of catalytic converter GX10 and Lambda probe 1 after catalytic converter GX7 ”, page 422
  - ❑ 55 Nm



9.2 Removing and installing Lambda probe 1 in front of catalytic converter - GX10- and Lambda probe 1 after catalytic converter - GX7-

Lambda probe 1 in front of catalytic converter - GX10- comprises:

- ♦ Lambda probe - G39-
- ♦ Heating for lambda probe - Z19-

Lambda probe 1 after catalytic converter - GX7- comprises:

- ♦ Lambda probe after catalytic converter - G130-
- ♦ Lambda probe 1 heater after catalytic converter - Z29-

Special tools and workshop equipment required

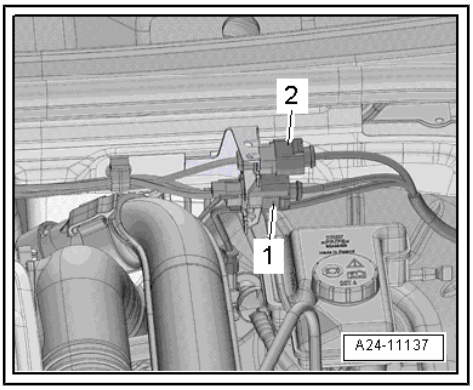
- ♦ Ring spanner set for lambda probe - 3337-

Removing

– Disconnect electrical plug connections:

1 - for lambda probe 1 upstream of catalytic converter - GX10-

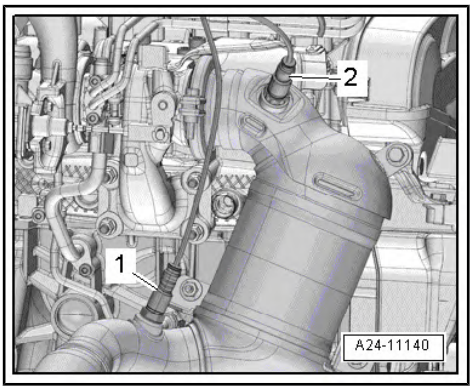
2 - for lambda probe 1 downstream of catalytic converter - GX7-



– Unscrew respective lambda probe using a spanner from the lambda probe ring spanner set - 3337- .

1 - Lambda probe 1 after catalytic converter - GX7-

2 - Lambda probe 1 in front of the catalytic converter - GX10-



Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

Note

- *New lambda probes are coated with assembly paste. This paste must not come into contact with the slots of the lambda probe body.*
- *For a re-used lambda probe, only coat the thread with hot bolt paste. This paste must not come into contact with the slots of the lambda probe body. Hot bolt paste ⇒ ETKA - Electronic Catalogue of Original Parts*
- *The electrical cable wire connection of the lambda probe must be secured again at the same points during installation. Contact between the electrical cable connection and the exhaust pipe must be prevented.*

- Tightening torque
⇒ “9.1 Summary of components - lambda probes”, page 421

10 Engine control unit

⇒ “10.1 Removing and installing engine control unit J623 (without protective housing)”, page 424

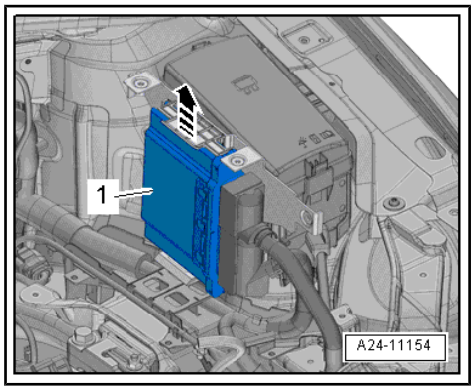
⇒ “10.2 Removing and installing engine control unit J623 (with protective housing)”, page 424

10.1 Removing and installing engine control unit - J623- (without protective housing)

Removing

Note

If the engine control unit is replaced, vehicle diagnosis tester ⇒ Vehicle diagnostic testermust be connected and the function “replace engine control unit” must be carried out.



– Unlock catch in -direction of the arrow- and remove the engine control unit -1-.
– Unlock plug connections for engine control unit - J623- and pull off.

Install

Installation is carried out in the reverse order.

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

– Connect vehicle diagnosis tester ⇒ Vehicle diagnostic tester.
– Activate the engine control unit in operating mode “Software version management” or “Targeted functions” under `Replace engine control unit`.

10.2 Removing and installing engine control unit - J623- (with protective housing)

Removing

Special tools and workshop equipment required

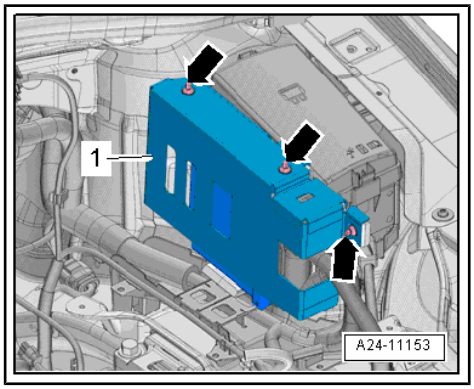
- Hot air blowers - VAS 1978/14A- with push-on nozzle from the wiring harness repair set - VAS 1978 B-
- commercially available miniature grinder

Removing

Note

If the engine control unit is replaced, vehicle diagnosis tester ⇒ Vehicle diagnostic testermust be connected and the function “replace engine control unit” must be carried out.

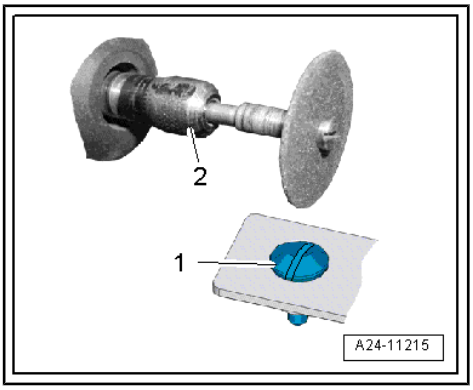
Unscrew shear bolts -arrows- to remove the protective housing -1- as follows:



– In the shear bolt head -1-, using a miniature grinder -2-, make a slot for a screwdriver.

Note

- *The threads of the pull-off screws are equipped with safety agent. Warming the pull-off screw when grinding a slot for a screwdriver makes it easier to undo it afterwards.*
- *If the pull-off screws still cannot be undone, warm the, up with a hot air blower.*



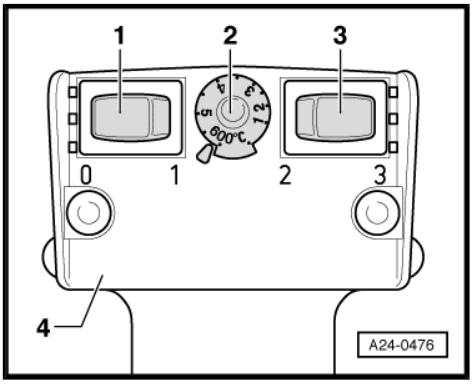
Undoing pull-off screws with a hot air blower:

– Set the temperature adjustment potentiometer -2- to maximum heating performance and set the air flow two stage switch -3- to position 3.

WARNING

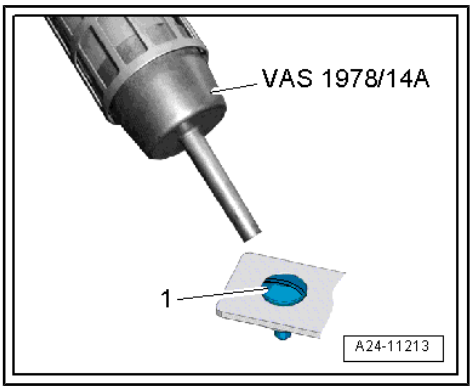
Risk of burns from hot air blower.

- *Only warm up the pull-off screws with a hot air blower.*
- *By warming the pull-off screws, the cover plate and parts in its vicinity are heated up strongly too. Where necessary, protect these parts by a piece of sheet covering.*

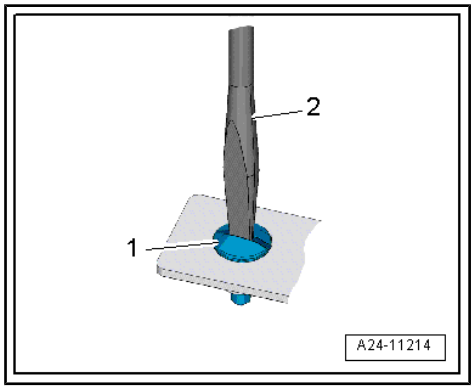


– Heat the shear bolt head -1- for approximately 20 to 30 seconds.

Continued for slackened screws:



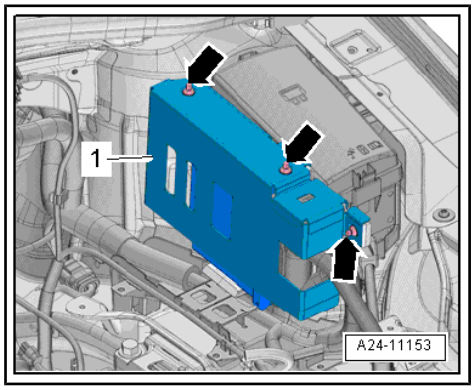
– Release shear bolt -1- using the screwdriver -2-.



– Remove protective housing -1-.

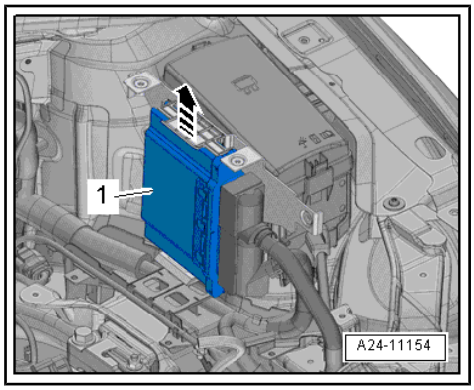
WARNING

If the engine control unit touches the plus pole of the battery, this will destroy it.



– Unlock catch in -direction of the arrow- and remove the engine control unit -1-.

– Unlock plug connections for engine control unit - J623- and pull off.



Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

– It is imperative for the protective housing to be put back in place on the engine control unit - J623- .

– Clean the threaded holes for the shear bolts to remove safety agent residues. Cleaning can be done using a tapper.

– Use new shear bolts.

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

– Connect vehicle diagnosis tester ⇒ Vehicle diagnostic tester.

– Activate the engine control unit in operating mode “Software version management” or “Targeted functions” under `Replace engine control unit`.

26 – Exhaust system

1 Removing and installing parts of the exhaust system

⇒ “1.1 Summary of components - Pre-exhaust pipe with catalytic converter”, page 427

⇒ “1.2 Removing and installing pre-exhaust pipe with catalytic converter ”, page 430

⇒ “1.3 Summary of components - Middle and rear part of the exhaust system”, page 433

⇒ “1.4 Replacing middle or rear part of the exhaust system”, page 435

⇒ “1.5 Aligning exhaust system free of stress”, page 438

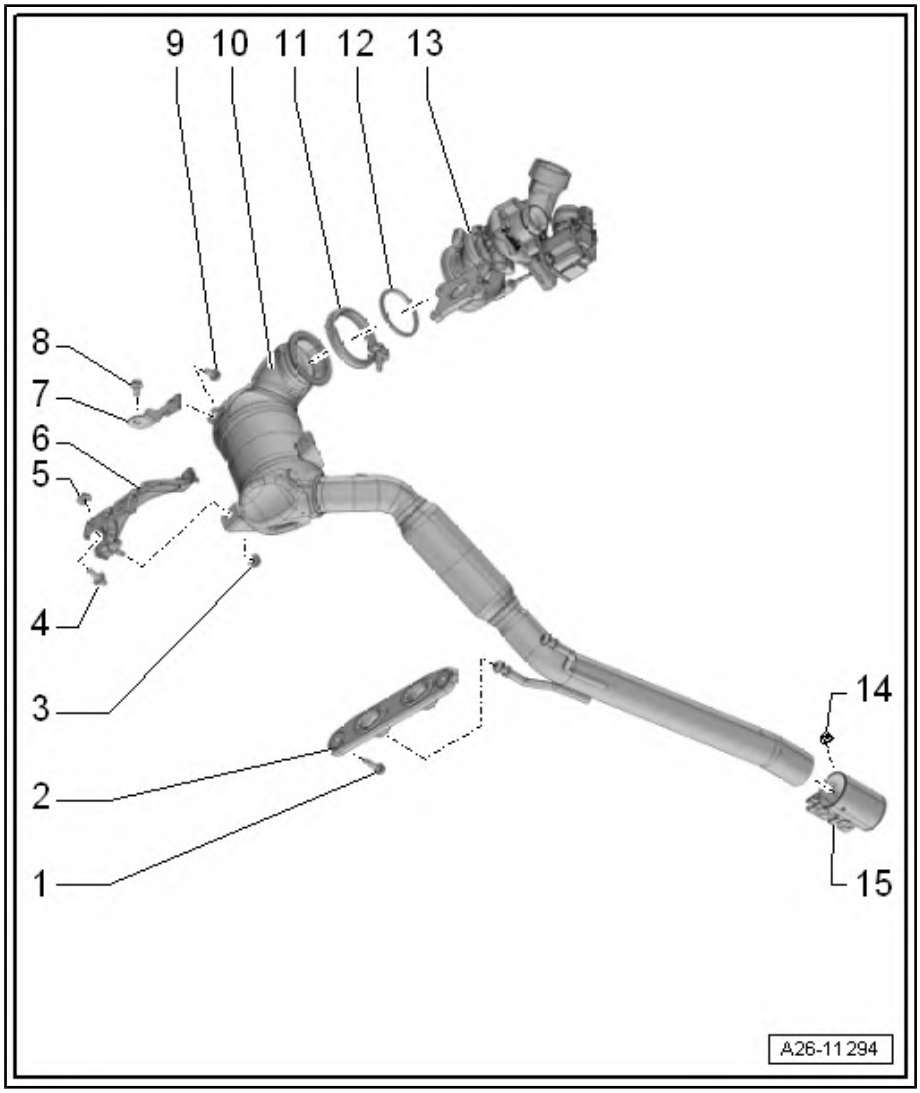
⇒ “1.6 Inspecting the exhaust system for leaktightness”, page 440

1.1 Summary of components - Pre-exhaust pipe with catalytic converter

⇒ “1.1.1 Summary of components - Engine with identification characters CHPA”, page 427

⇒ “1.1.2 Summary of components - Engine with identification characters CPWA”, page 429

1.1.1 Summary of components - Engine with identification characters CHPA



1 - Screw
- ❑ 20 Nm

2 - Uchwyt
- ❑ replace if damaged

3 - Nut
- ❑ Tightening torque and tightening order ⇒ page 433 .
- ❑ 20 Nm

4 - Screw
- ❑ 20 Nm

5 - Nut
- ❑ Tightening torque and tightening order ⇒ page 433 .
- ❑ 20 Nm

6 - Uchwyt

7 - Uchwyt

8 - Screw
- ❑ Tightening torque and tightening order ⇒ page 433 .
- ❑ 20 Nm

9 - Screw
- ❑ Tightening torque and tightening order ⇒ page 433 .
- ❑ 20 Nm

10 - Exhaust pipe with catalytic converter
- ❑ do not twist decoupling element more than 10° - risk of damage
- ❑ Do not load decoupler with tensile stress
- ❑ Do not damage wire mesh on decoupling element
- ❑ protect catalytic converter against shocks and blows
- ❑ Removing and installing ⇒ “1.2 Removing and installing pre-exhaust pipe with catalytic converter ”, page 430
- ❑ Remove the protection for the decoupling element -T10403- on the spare part as late as possible
- ❑ fitting on the exhaust system free of stress ⇒ “1.5 Aligning exhaust system free of stress”, page 438

11 - Screw clamp
- ❑ Tightening torque and tightening order ⇒ page 433
- ❑ 15 Nm

12 - Gasket
- ❑ replace after removal

13 - Exhaust gas turbocharger

14 - Nut
- ❑ 30 Nm

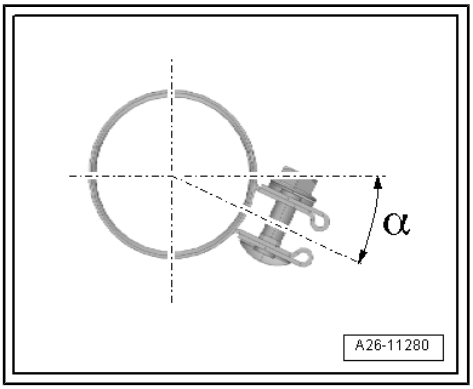
15 - Clamp
- ❑ before tightening, align exhaust system free of stress ⇒ “1.5 Aligning exhaust system free of stress”, page 438
- ❑ Tighten bolted connections evenly

❑ Fitting position ⇒ page 429

Installation position of front clamp

– Install clamping sleeve in the position shown.

- Angle -α- = approximately 20°
- Bolted connection to the right
- Nuts upwards



1.1.2 Summary of components - Engine with identification characters CPWA

1 - Screw

❑ 20 Nm

2 - Uchwyt

❑ replace if damaged

3 - Nut

❑ Tightening torque and tightening order ⇒ page 433 .

❑ 20 Nm

4 - Screw

❑ 20 Nm

5 - Nut

❑ Tightening torque and tightening order ⇒ page 433 .

❑ 20 Nm

6 - Uchwyt

7 - Uchwyt

8 - Screw

❑ Tightening torque and tightening order ⇒ page 433 .

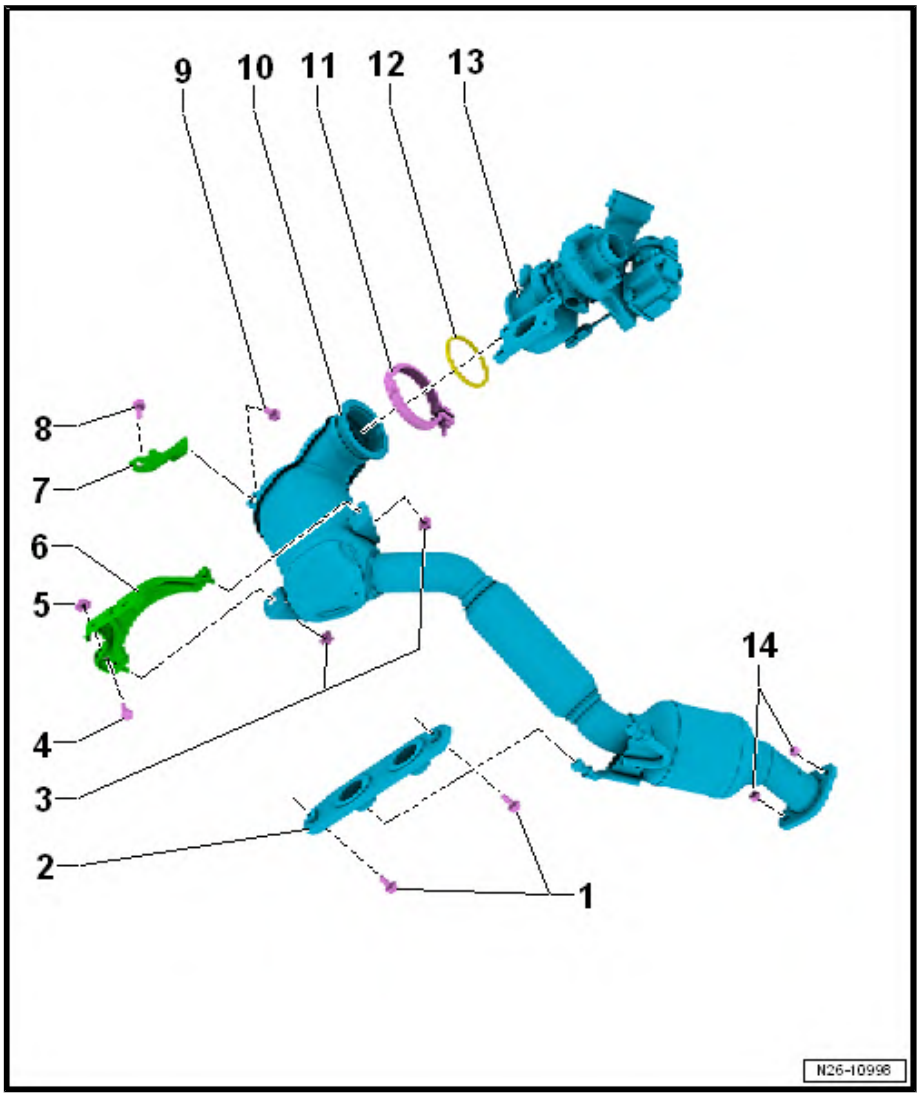
❑ 20 Nm

9 - Screw

❑ Tightening torque and tightening order ⇒ page 433 .

❑ 20 Nm

10 - Exhaust pipe with catalytic converter



❑ do not twist decoupling element more than 10° - risk of damage

❑ Do not load decoupler with tensile stress

❑ Do not damage wire mesh on decoupling element

❑ protect catalytic converter against shocks and blows

- ❑ Removing and installing
  ⇒ “1.2 Removing and installing pre-exhaust pipe with catalytic converter ”, page 430
- ❑ Remove the protection for the decoupling element -T10403- on the spare part as late as possible
- ❑ fitting on the exhaust system free of stress ⇒ “1.5 Aligning exhaust system free of stress”, page 438

11 - Screw clamp

- ❑ Tightening torque and tightening order ⇒ page 433
- ❑ 15 Nm

12 - Gasket

- ❑ replace after removal

13 - Exhaust gas turbocharger

14 - Nuts

- ❑ replace after removal
- ❑ 20 Nm

1.2 Removing and installing pre-exhaust pipe with catalytic converter

Note

The catalytic converter is remove with the pre-exhaust pipe.

Special tools and workshop equipment required

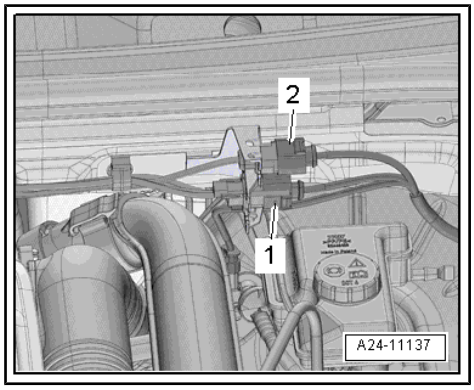
- ♦ Hot bolt paste ⇒ ETKA - Electronic Catalogue of Original Parts

Removing

Note

All cable straps should be fastened again in the same place when installing.

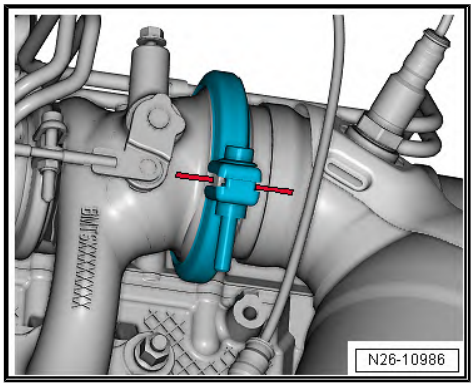
– Take plug connections -1- and -2- out of the holder, disconnect and expose electric cables.



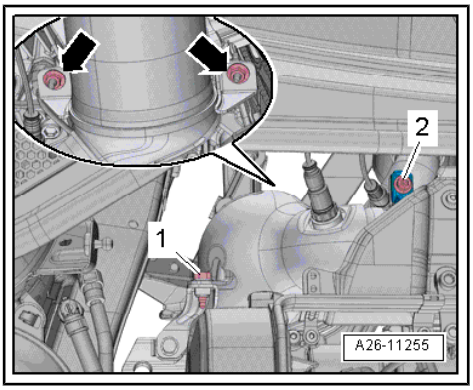
Note

- ♦ *Before undoing the coupling point between catalytic converter and turbocharger, make the position of the clamp ⇒ page 431 !*
- ♦ *Mark the part opposite the part to be replaced.*
- ♦ *Re-establish the position of the clamp when assembling.*

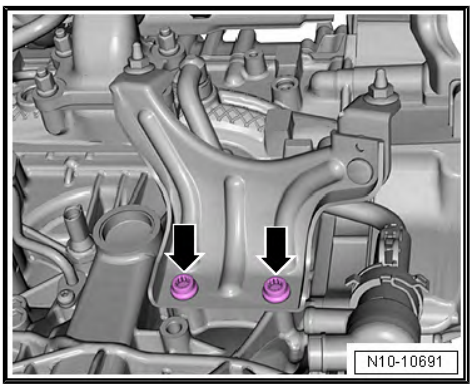
Position of the clamp



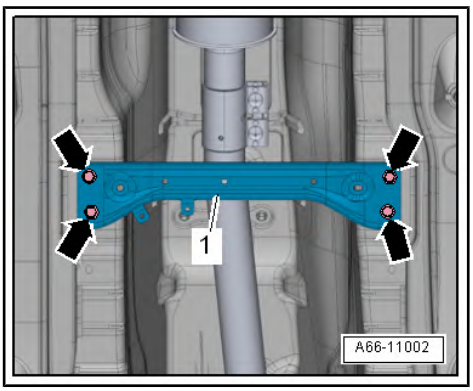
– Unscrew screw -2- and remove screw clamp.
– Unscrew screws -1- and nuts -arrows-.



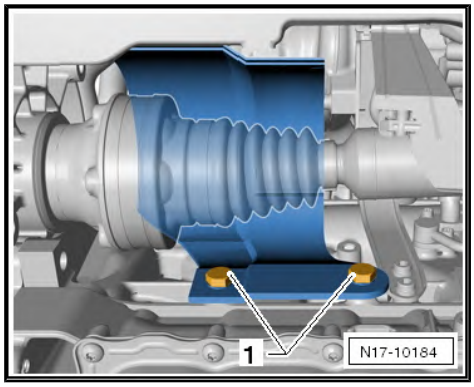
– Release screws -arrows- of the holder.



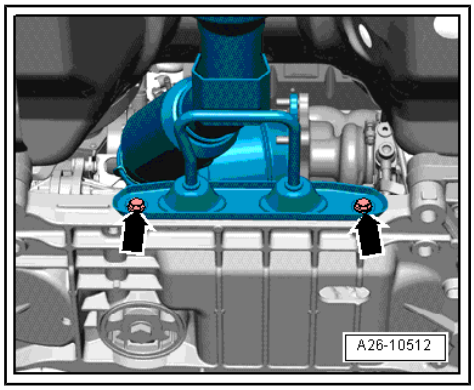
– Remove tunnel bridge -1-.



– Release screws -1- and remove heat shield for right drive shaft, if present.



– Remove bolts -arrows-.
– Remove plug connection from holder, disconnect and expose lambda probe electric cable.
– Remove plastic cover for floor tunnel ⇒ Body Work; Rep. gr. 66 .



Only for petrol vehicles

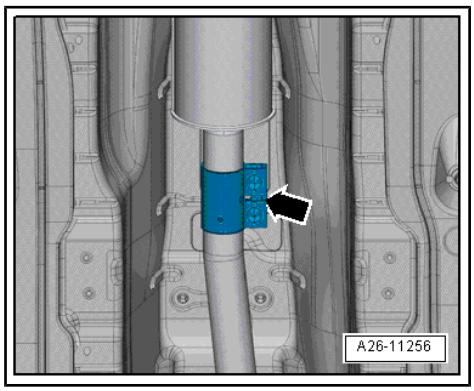
– Loosen the clamping sleeve -arrow- and slide it backwards.

For natural gas vehicles (CNG)

– Unscrew securing nuts for muffler Pos. -14- ⇒ “1.1.2 Summary of components - Engine with identification characters CPWA”, page 429 from catalytic converter and press the muffler towards the rear.

Continued for all vehicles

– Remove catalytic converter backwards.



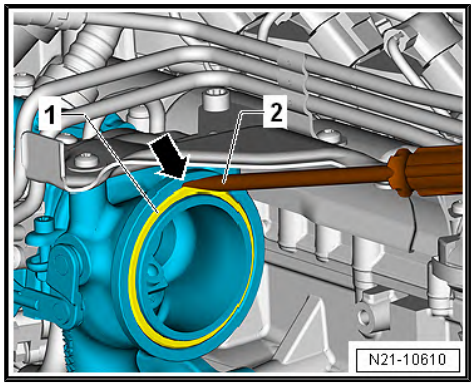
Note

- *When re-fitting the exhaust pipe, note the following:*
- *do not twist decoupling element in the exhaust pipe more than 10° - risk of damage*
- *Do not damage the wire mesh of the decoupling element.*

– Push screwdriver -2- into the recess -arrow- of the exhaust gas turbocharger and lever out the sealing ring -1-.

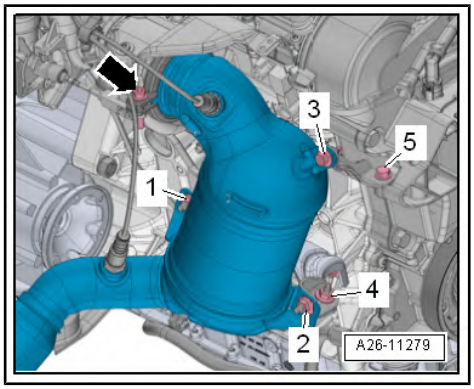
Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:



Installing catalytic converter - tightening torque and tightening order

1.	– Position catalytic converter on exhaust gas turbocharger, loosely tighten clamp -arrow-	
2.	– Loosely insert screws -3, 5- and nuts -1, 2, 4- by hand.	• It must still be possible to move the catalytic converter and the bracket
3.	– Tighten screw clamp -arrow-.	15 Nm
4.	– Tighten screws and nuts in the order -1...5-.	20 Nm



Note

- *Replace the gasket and the self-locking nuts.*
- *Coat bolts and screws of the catalytic converter with hot bolt paste, hot bolt paste ⇒ ETKA - Electronic Catalogue of Original Parts .*

– Align exhaust system free of stress
⇒ “1.5 Aligning exhaust system free of stress”, page 438 .

1.3 Summary of components - Middle and rear part of the exhaust system

⇒ “1.3.1 Replace middle or rear part of the exhaust system on petrol vehicles only ”, page 433

⇒ “1.3.2 Summary of components - Middle or rear part of the exhaust system on natural gas vehicles CNG”, page 435

1.3.1 Replace middle or rear part of the exhaust system on petrol vehicles only

1 - Middle and rear part of the exhaust system

- ❑ for first version a building unit, replace individually when carrying out repairs
  ⇒ “1.4 Replacing middle or rear part of the exhaust system”, page 435
- ❑ fitting on the exhaust system free of stress
  ⇒ “1.5 Aligning exhaust system free of stress”, page 438

2 - 20 Nm

3 - Bracket

- ❑ Observe part number ⇒ ETKA - Electronic Catalogue of Original Parts

4 - Retaining strap

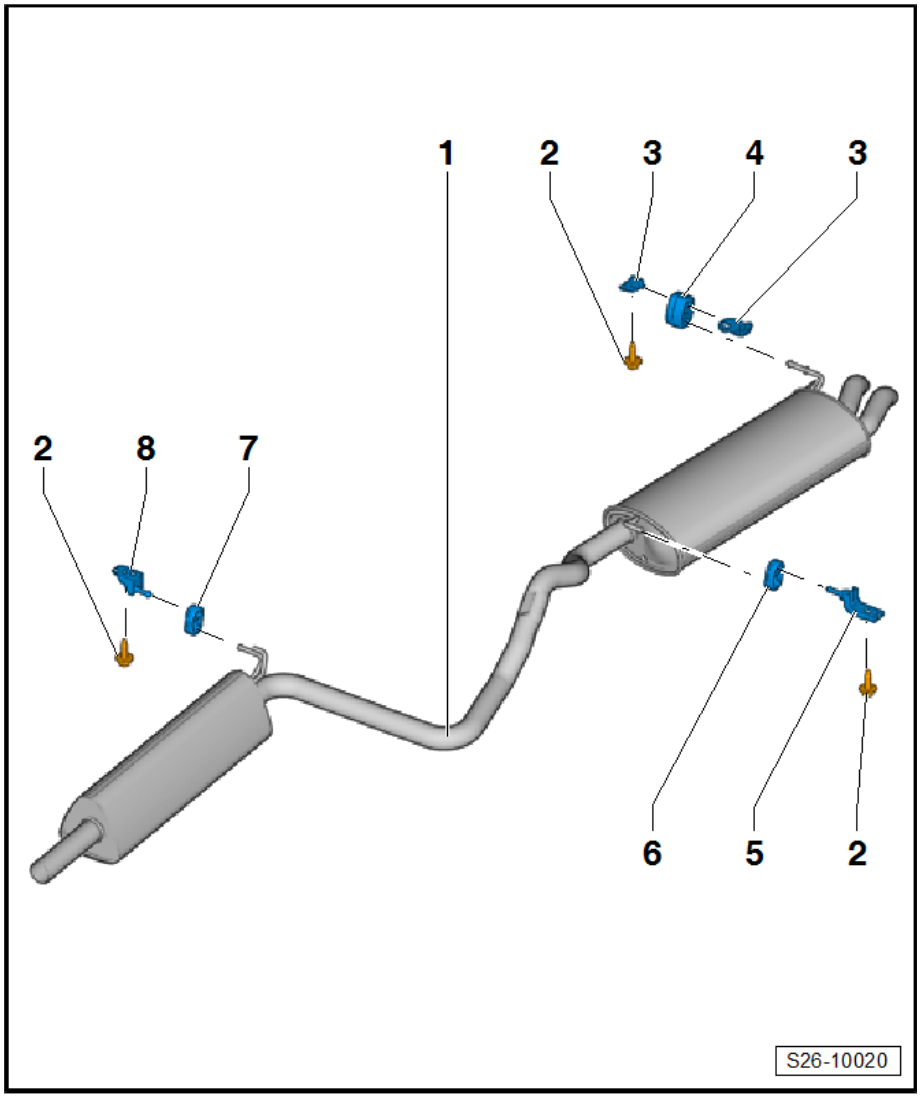
- ❑ Replace if damaged
- ❑ Observe part number ⇒ ETKA - Electronic Catalogue of Original Parts

5 - Bracket

- ❑ Observe part number ⇒ ETKA - Electronic Catalogue of Original Parts

6 - Retaining strap

- ❑ Replace if damaged
- ❑ Observe part number ⇒ ETKA - Electronic Catalogue of Original Parts



7 - Retaining strap

- ❑ Replace if damaged
- ❑ Observe part number ⇒ ETKA - Electronic Catalogue of Original Parts

8 - Bracket

- ❑ Observe part number ⇒ ETKA - Electronic Catalogue of Original Parts

1.3.2 Summary of components - Middle or rear part of the exhaust system on natural gas vehicles CNG

1 - Nut
- ❑ replace after removal
- ❑ 20 Nm

2 - Gasket
- ❑ replace after removal

3 - Silencer

4 - Retaining strap
- ❑ Replace if damaged
- ❑ Observe part number ⇒ ETKA - Electronic Catalogue of Original Parts

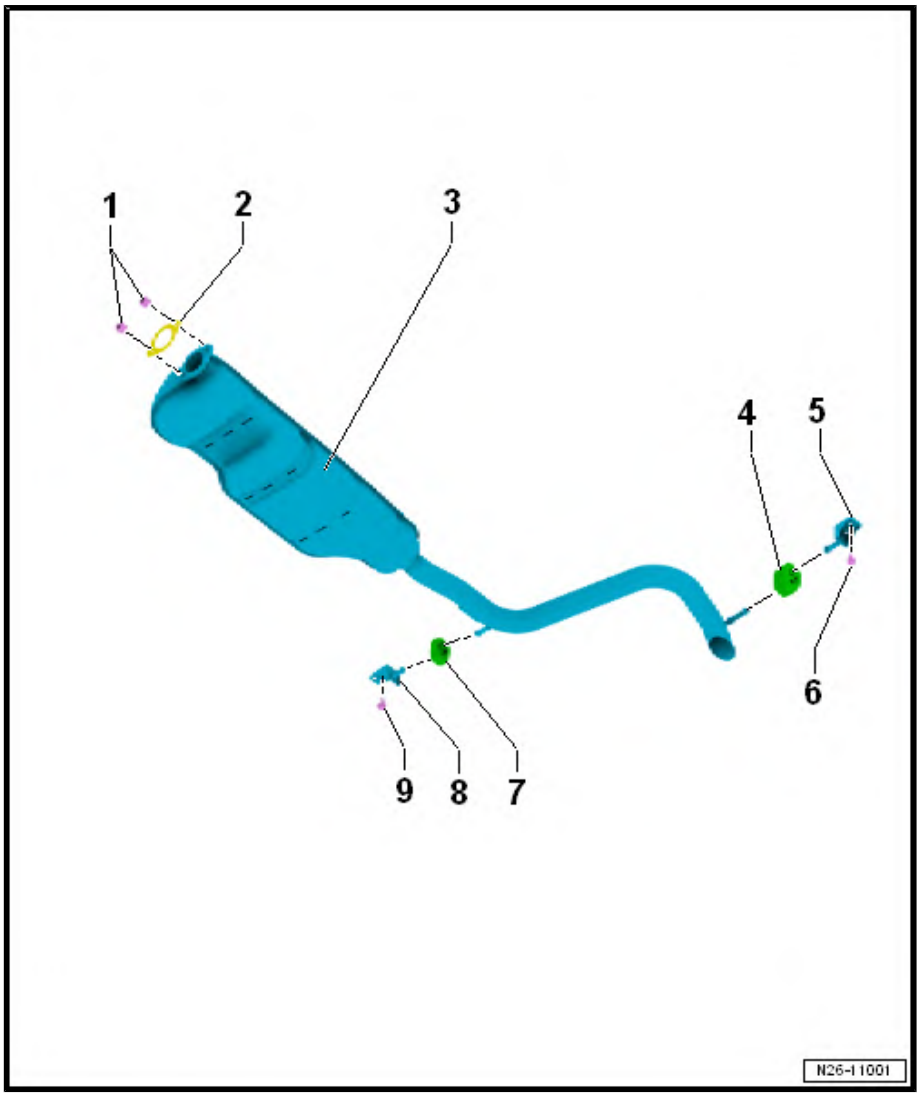
5 - Bracket
- ❑ Observe part number ⇒ ETKA - Electronic Catalogue of Original Parts

6 - Screw
- ❑ 20 Nm

7 - Retaining strap
- ❑ Replace if damaged
- ❑ Observe part number ⇒ ETKA - Electronic Catalogue of Original Parts

8 - Bracket
- ❑ Observe part number ⇒ ETKA - Electronic Catalogue of Original Parts

9 - Screw
- ❑ 20 Nm



1.4 Replacing middle or rear part of the exhaust system

⇒ "1.4.1 Replace middle or rear part of the exhaust system on petrol vehicles", page 435

⇒ "1.4.2 Replace middle or rear part of the exhaust system on natural gas vehicles", page 437

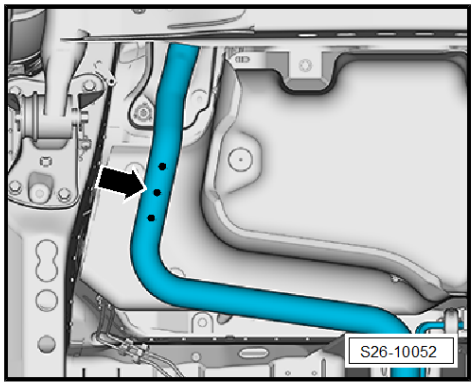
1.4.1 Replace middle or rear part of the exhaust system on petrol vehicles

Special tools and workshop equipment required

♦ Body saw e.g. -V.A.G 1523/A-

Vehicles with middle and rear part of the exhaust system as a building unit

– Use body saw e.g. -V.A.G 1523/A- to separate exhaust pipe at right angles at the separation point -arrow-.

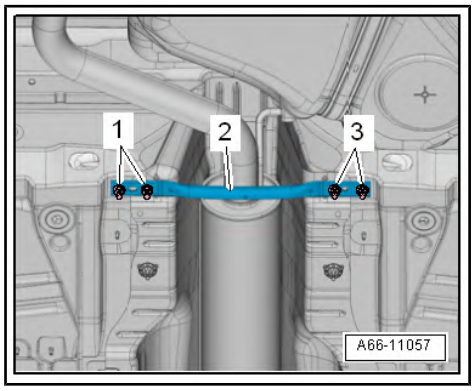


Vehicles with separable middle or rear part of the exhaust system

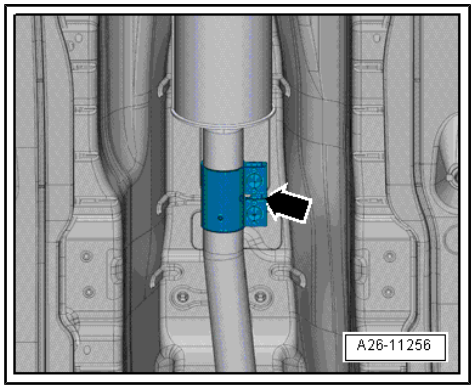
– Loosen the clamping sleeve and slide it backwards.

Replace middle part of exhaust system

– Unscrew nuts -1- and -3- and remove the rear tunnel bridge -2-.

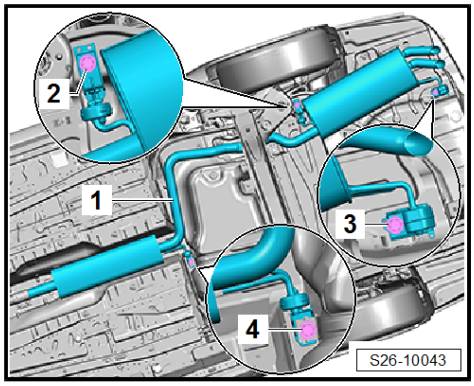


– Loosen the clamping sleeve -arrow- and slide it forwards.

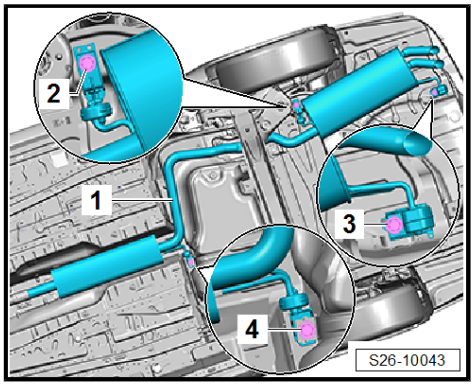


– Unscrew retaining strap screw -4- and remove middle part of the exhaust system.

Replace rear part of the exhaust system



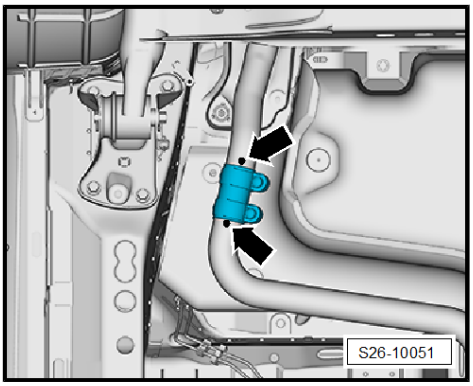
– Unscrew retaining strap rear screws -2- and -3- and remove rear part of the exhaust system.



Install

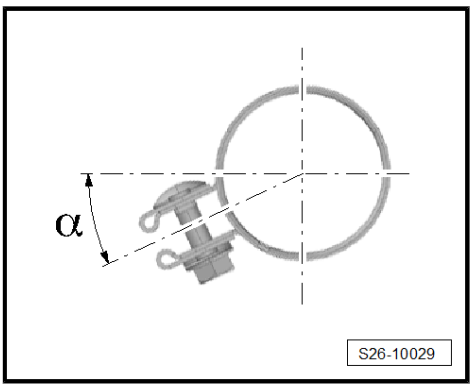
Installation is performed in the reverse order, pay attention to the following points:

– Position rear clamping sleeve when installing, between the side markings -arrows-.



– Install rear clamping sleeve in the position shown.

- Angle -α- = approximately 30°
- The threaded connections point to the fuel tank.
- Nuts downwards



– Tighten bolted connections of clamping sleeve evenly to 30 Nm.

– Align exhaust system free of stress
⇒ “1.5 Aligning exhaust system free of stress”, page 438 .

Tightening torques

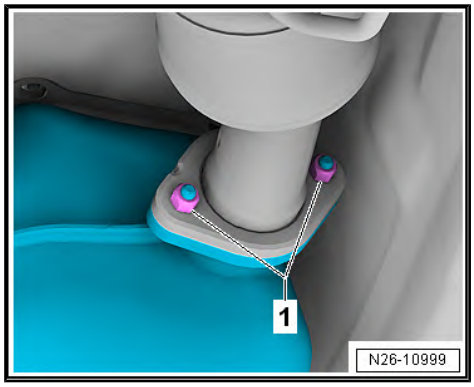
♦ Middle and rear part of the exhaust system
⇒ “1.3 Summary of components - Middle and rear part of the exhaust system”, page 433

1.4.2 Replace middle or rear part of the exhaust system on natural gas vehicles

Removing

– Remove the front and rear tunnel bridge ⇒ Body Work; Rep. gr. 66 .

– Unscrew nuts -1- for middle and rear part of the exhaust system of the catalytic converter.



Note

Before unhooking the mounting bracket of the middle and rear part of the exhaust system, prevent it from falling with the help of a second mechanic,!

– Unhook the mounting bracket and remove the middle and rear part of the exhaust system downwards.

Install

Installation is performed in the reverse order, pay attention to the following points:

Note

- *Replace nuts on the catalytic converter and seals.*
- *Check the retaining straps and mounting brackets and replace if necessary.*

– Align exhaust system free of stress
⇒ “1.5 Aligning exhaust system free of stress”, page 438 .

Tightening torques

- Silencer
⇒ “1.3 Summary of components - Middle and rear part of the exhaust system”, page 433
- Tunnel bridge ⇒ Body work; Rep. gr. 66 .

1.5 Aligning exhaust system free of stress

⇒ “1.5.1 Align exhaust system free of stress on petrol vehicles”, page 438

⇒ “1.5.2 Align exhaust system free of stress on natural gas vehicles”, page 439

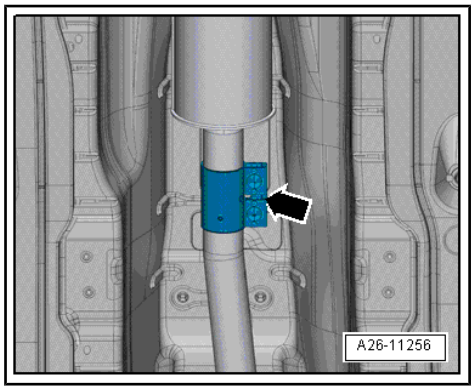
⇒ “1.5.3 Align exhaust tailpipe on petrol engines”, page 439

1.5.1 Align exhaust system free of stress on petrol vehicles

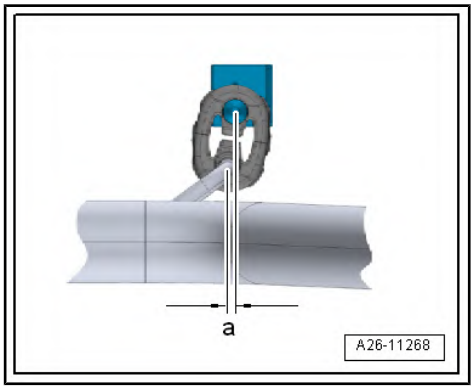
Work procedure

- The exhaust system is aligned when cold.

– Loosen bolted connections on clamping sleeve -arrow-.



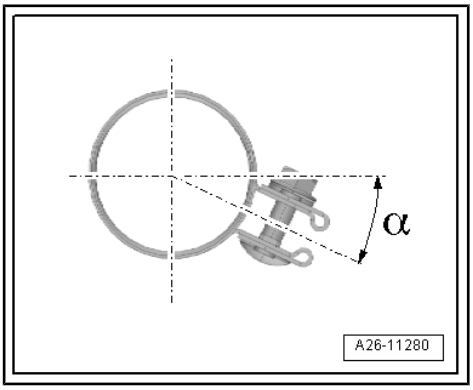
– Push the rear silencer so far forward in the driving direction until the pre-tensioning on the retaining strap on the exhaust pipe is -a- = 5 mm.



– Re-install clamping sleeve in the position shown.

• Angle -α- = approximately 20°
• Bolted connection to the right
• Nuts upwards

– Tighten bolted connections of clamping sleeve evenly.



Tightening torques

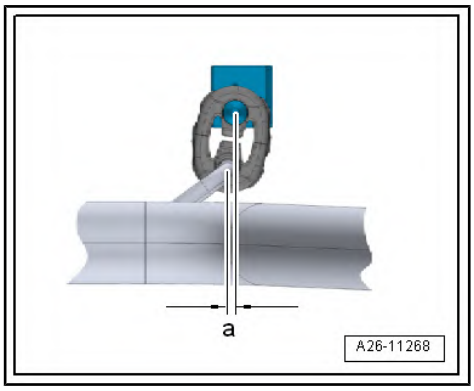
◆ Clamping sleeve
⇒ “1.1 Summary of components - Pre-exhaust pipe with catalytic converter”, page 427

1.5.2 Align exhaust system free of stress on natural gas vehicles

Work procedure

• The exhaust system is aligned when cold.

– Push the rear silencer so far forward in the driving direction until the pre-tensioning on the retaining strap on the exhaust pipe is -a- = 5 mm.



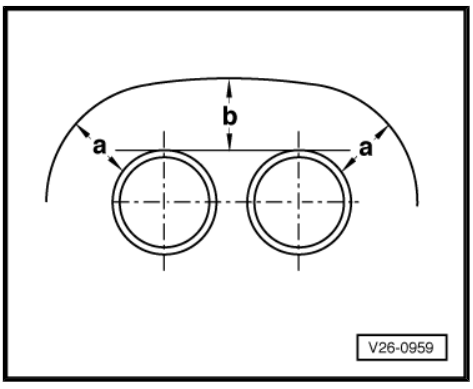
Tightening torques

◆ Clamping sleeve
⇒ “1.1 Summary of components - Pre-exhaust pipe with catalytic converter”, page 427

1.5.3 Align exhaust tailpipe on petrol engines

Work procedure

– Align rear silencer in such a way that there is an equal distance -a- and -b- between bumper opening and exhaust tailpipes.



Note

For centering the exhaust tailpipes, if necessary loosen the suspension of the rear silencer.

1.6 Inspecting the exhaust system for leaktightness

Work procedure

- Start engine and run at idling speed.
- Close off exhaust tailpipes for the duration of the leak test, for example using cloths or plugs.
- Check connection points for leaktightness by listening: exhaust manifold at cylinder head, exhaust gas turbocharger at pre-exhaust pipe, etc.
- Eliminate any leak found.

28 – Ignition system

1 Ignition system

⇒ “1.1 Assembly overview - ignition system”, page 441

⇒ “1.2 Removing and installing ignition coils with output stage”, page 442

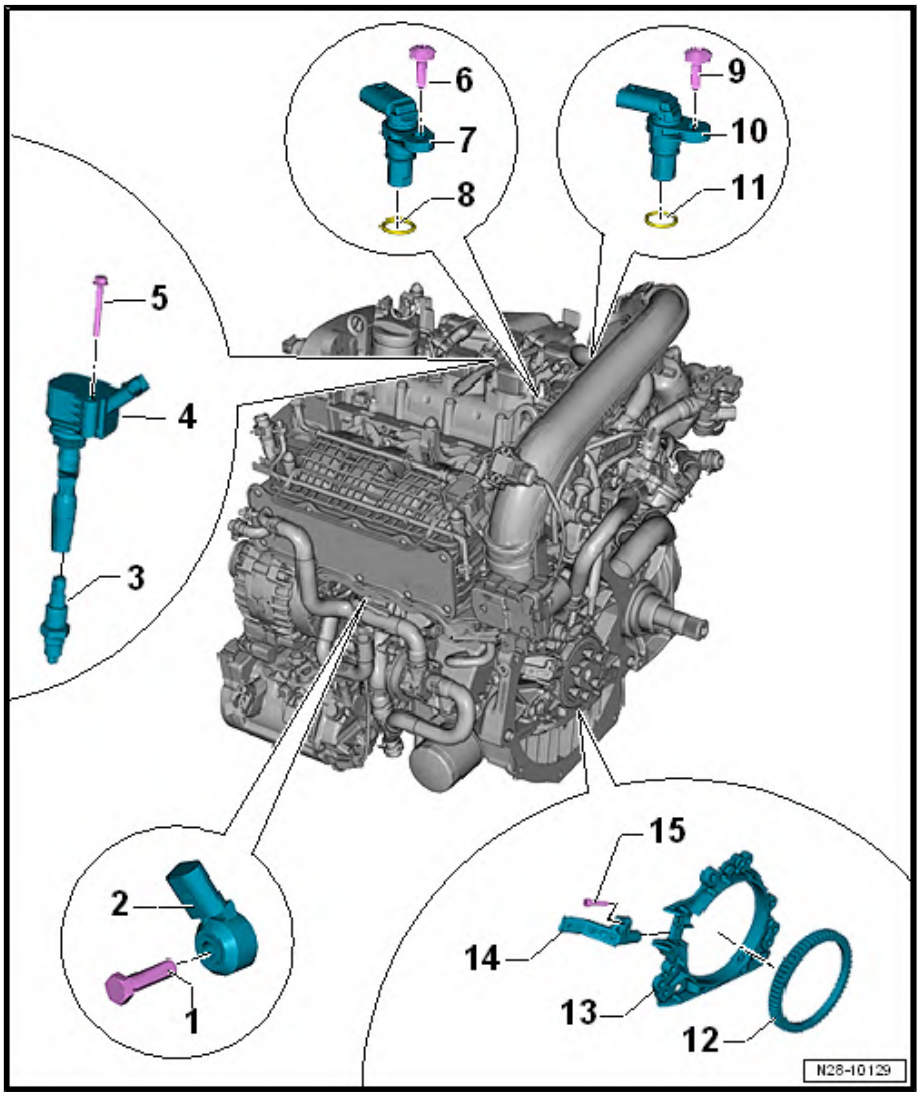
⇒ “1.3 Removing and installing knock sensor 1 G61 ”, page 443

⇒ “1.4 Removing and installing Hall sender G40 ”, page 444

⇒ “1.5 Removing and installing hall sender 3 G300 ”, page 444

⇒ “1.6 Removing and installing engine speed sender G28 ”, page 445

1.1 Assembly overview - ignition system



1 - Screw

- ❑ the tightening torque influences the knock sensor function
- ❑ 20 Nm

2 - Knock sensor 1 - G61-

- ❑ Removing and installing ⇒ “1.3 Removing and installing knock sensor 1 G61 ”, page 443

3 - Spark plug

- ❑ use spark plug wrench e.g. - 3122 B- for removing and installing
- ❑ When installing new spark plugs, grease the ignition coils with power output stage Pos. -4- with lubricating paste G 052 565 A1.
- ❑ Change interval, type and electrode spacing ⇒ Maintenance ; Booklet Octavia III
- ❑ Observe part number ⇒ ETKA - Electronic Catalogue of Original Parts
- ❑ 22 Nm

4 - Ignition coil with a power output stage

- ♦ Ignition coil 1 with output stage - N70-
- ♦ Ignition coil 2 with output stage - N127-
- ♦ Ignition coil 3 with output stage - N291-
- ♦ Ignition coil 4 with output stage - N292-
  - ❑ Removing and installing ⇒ “1.2 Removing and installing ignition coils with output stage”, page 442

- ❑ When installing new spark plugs, grease the ignition coils with power output stage with lubricating paste G 052 565 A1.

5 - Screw

- ❑ 8 Nm

6 - Screw

- ❑ 8 Nm

7 - Hall sender - G40-

- ❑ Removing and installing ⇒ “1.5 Removing and installing hall sender 3 G300 ”, page 444

8 - O-ring

9 - Screw

- ❑ For engines with identification characters CHPA
- ❑ 8 Nm

10 - Hall sender 3 - G300-

- ❑ Removing and installing ⇒ “1.4 Removing and installing Hall sender G40 ”, page 444
- ❑ For engines with identification characters CHPA

11 - O-ring

- ❑ replace if damaged
- ❑ For engines with identification characters CHPA

12 - Rotor

- ❑ for engine speed sender - G28-
- ❑ Removing and installing
  ⇒ “2.3 Removing and installing the sealing flange on the gearbox side”, page 72

13 - Sealing flange on the gearbox side

- ❑ Removing and installing
  ⇒ “2.3 Removing and installing the sealing flange on the gearbox side”, page 72

14 - Engine speed sender - G28-

- ❑ Removing and installing ⇒ “1.6 Removing and installing engine speed sender G28 ”, page 445

15 - Screw

- ❑ 5 Nm

1.2 Removing and installing ignition coils with output stage

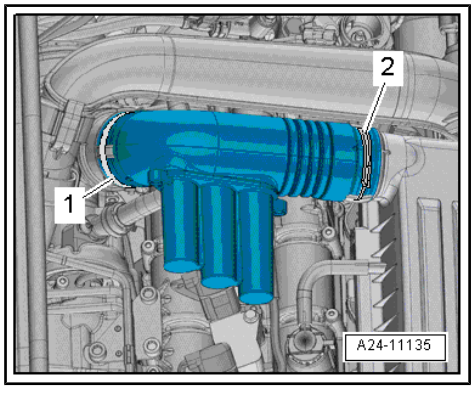
Special tools and workshop equipment required

- ♦ Extractor -T10530-

Removing

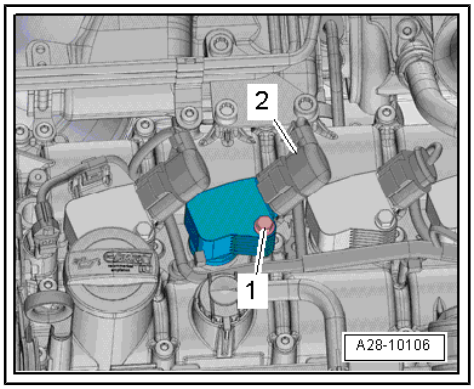
Ignition coils for “cylinders 2, 3 and 4”

– Loosen hose clamps -1-, -2- and remove air guide pipes.

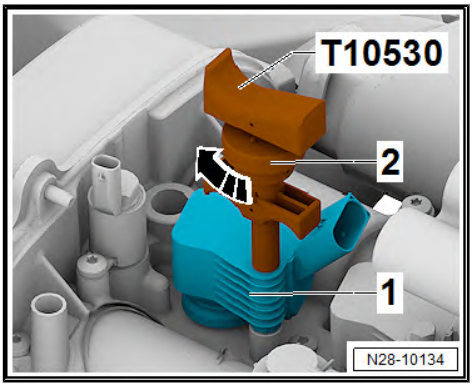


Continued for all ignition coils

– Unplug connector -2-.
– Unscrew screw -1-.



– Press extractor -T10530- into the bore of the ignition coil -1- as far as the stop.
– Tighten nuts -2- in -direction of arrow-.



– Remove ignition coil with extractor -T10530- in -direction of arrow- out of the camshaft housing.

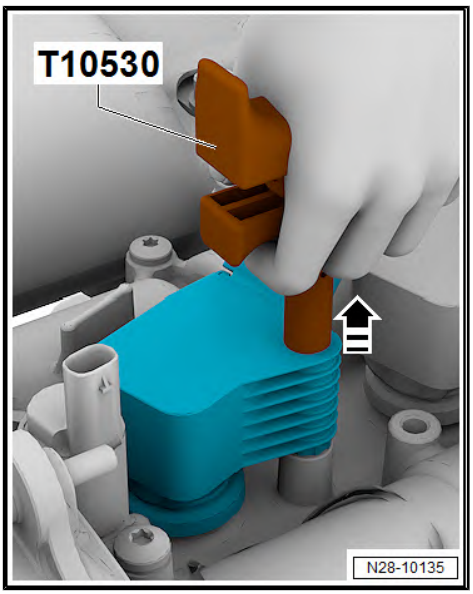
Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

– Place all ignition coils loosely into the spark plug shaft.
– Align ignition coils to the connectors and simultaneously attach all connections to the ignition coils.
– Press ignition coils onto the spark plugs evenly by hand (do not use an impact tool).

Tightening torques

♦ Screw for ignition coil with power output stage
⇒ “1.1 Assembly overview - ignition system”, page 441



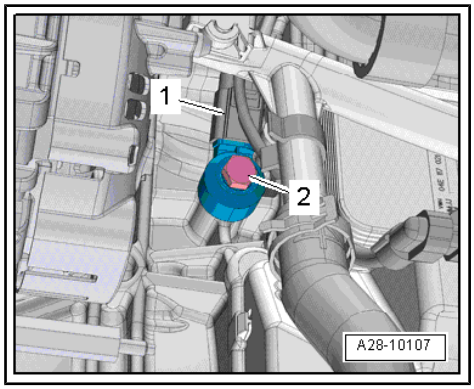
1.3 Removing and installing knock sensor 1 - G61-

Removing

– Remove AC compressor from holder and strap up ⇒ Heating, Air Conditioning; Rep. gr. 87 .

– Unplug connector -1-.

– Release screw -2- and remove knock sensor 1 - G61- .



Install

Installation is performed in a similar way in the reverse order. Pay attention to the following points:

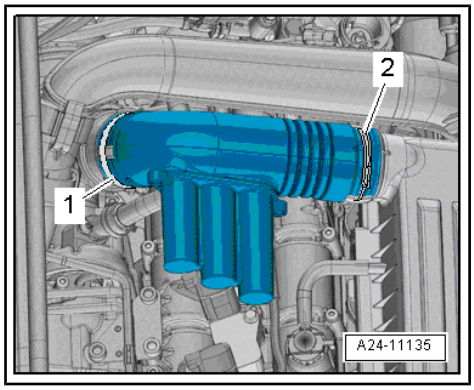
– Install AC compressor ⇒ Heating, Air Conditioning; Rep. gr. 87 .

• Tightening torque
⇒ “1.1 Assembly overview - ignition system”, page 441

1.4 Removing and installing Hall sender - G40-

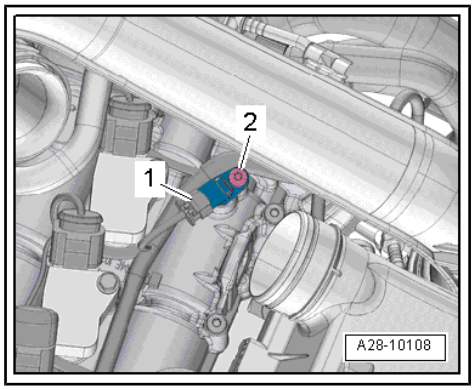
Removing

– Loosen hose clamps -1-, -2- and remove air guide pipes.



– Unplug connector -1-.

– Unscrew screw -2- and remove Hall sender - G40- .



Install

– Installation is carried out in the reverse order.

• Tightening torque
⇒ “1.1 Assembly overview - ignition system”, page 441

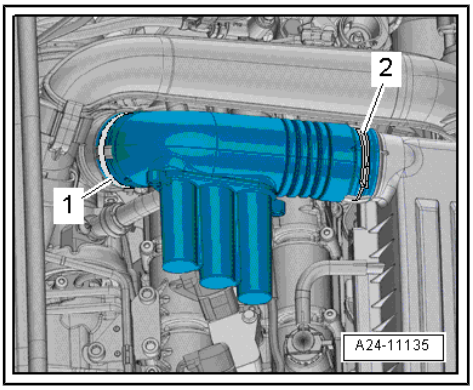
1.5 Removing and installing hall sender 3 - G300-

Note

Only for engines with identification characters CHPA

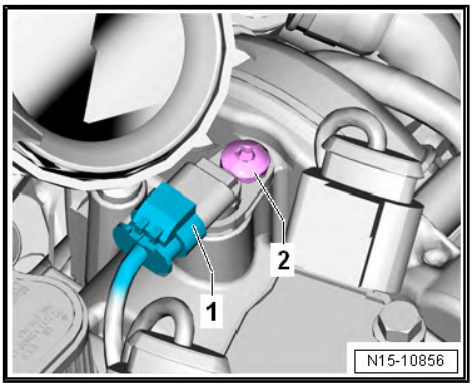
Removing

– Loosen hose clamps -1-, -2- and remove air guide pipes.



– Unplug connector -1-.

– Release screw -2- and remove Hall sender 3 - G300- .



Install

– Installation is carried out in the reverse order.

• Tightening torque
⇒ “1.1 Assembly overview - ignition system”, page 441

1.6 Removing and installing engine speed sender - G28-

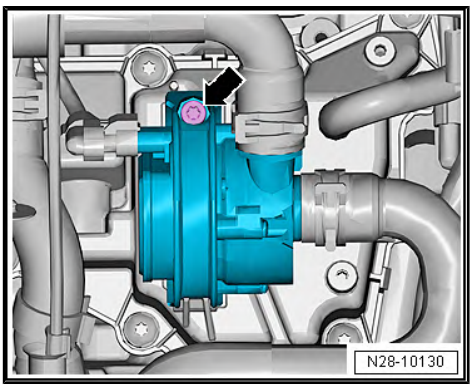
Special tools and workshop equipment required

♦ Socket insert 4 mm - T10370-

Removing

– Remove the sound dampening system ⇒ Body Work; Rep. gr. 66 .

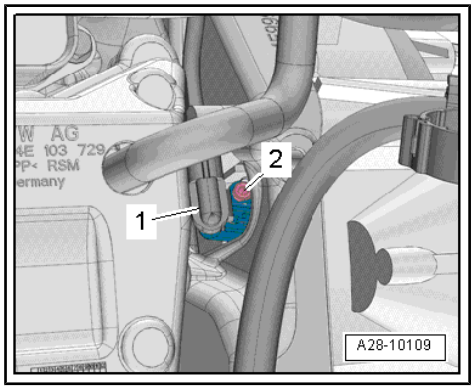
– Unscrew screw -arrow- and push coolant recirculation pump - V188- to the side.



Volkswagen Technical Site: http://vwts.ru http://vwts.info
огромный архив документации по автомобилям Volkswagen, Skoda, Seat, Audi

– Unplug connector -1-.

– Unscrew screw -2- and pull out engine speed sender - G28 - .



Install

> **Caution**
>
> *Carefully insert engine speed sender - G28- into the bore.*
>
> *This prevents the engine speed sensor - G28- from falling between the engine and gearbox.*

– Installation is carried out in the reverse order.

– Install the noise insulation ⇒ Body Work; Rep. gr. 66 .

Tightening torques

- Ignition system
  ⇒ “1.1 Assembly overview - ignition system”, page 441
- Electric coolant pump
  ⇒ “2.2 Summary of components - electric coolant pump”, page 218