Workshop Manual

Octavia III 2013 ➤
Octavia III 2014 ➤

1.8/132 kW TSI; 2.0/162 kW TSI engines									
Engine ID	CJSA	CJSB	CHHB						

Edition 11.2013

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

Repair Group

00 - Technical data
01 - Self-diagnosis
10 - Removing and installing engine
13 - Crankshaft group
15 - Cylinder head, valve gear
17 - Lubrication
19 - Cooling
20 - Fuel supply system
21 - Turbocharging/supercharging
24 - Mixture preparation - injection
26 - Exhaust system
28 - Ignition system

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.

Contents

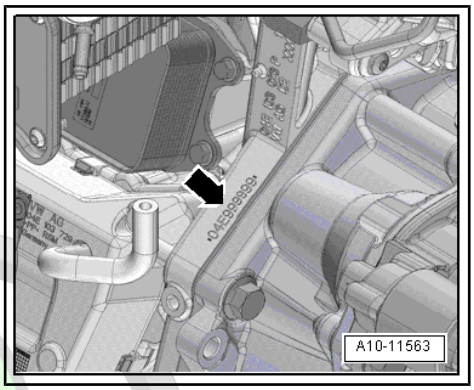
00 – Technical data

1 Technical data

(SRL000638; Edition 11.2013)

1.1 Engine number

The engine number ("engine identification characters" and serial number") is located to the left of the engine/gearbox joint -arrow-.



In addition, a sticker with the “engine identification characters” and “serial number” is affixed to the top cover for the timing chain.

Starting with the letter “C”, new four digit engine codes have been introduced. The first 3 digits of the engine identification characters refer to the displacement and the mechanical construction of the engine. These are type-punched on the cylinder block including the serial number.

4. The 4th digit refers to the output and torque of the engine and depends upon the engine control unit.

The four digit engine code is on the vehicle data sticker ⇒ Maintenance ; Booklet Octavia III and on the engine control unit.

1.2 Engine characteristics

Edition 11.2013; version 4.0

Engine identification characters		CJSA	CJSB	CHHB
Manufactured		11.12 ►	05.13 ►	05.13 ►
Exhaust limit values conforming to		EU2 DDK, EU5, EU6	EU5, EU6	EU6
Capacity	cm^3	1798	1798	1984
Output	kW at rpm	132/5100-6200	132/5100-6200	162/4200-6000
Torque	Nm at rpm	250/1250-5000	280/1350-4500	350/1500-4000
Bore	∅ mm	82.5	82.5	82.5
Stroke	mm	84.2	84.2	92.8
Compression ratio		9.6:1	9.6:1	9.6:1
Cylinder/valves per cylinder		4/4	4/4	4/4
Firing order		1-3-4-2	1-3-4-2	1-3-4-2
RON		95[1)]	95[1)]	95[1)]
Ignition system, fuel injection		FSI	FSI	FSI
		MPI	MPI	MPI
Knock control		yes	yes	yes
Lambda control		yes	yes	yes
Three-way catalytic converter		yes	yes	yes
Exhaust gas recirculation		no	no	no
Exhaust temperature regulation		no	no	no
Intake manifold change-over		yes	yes	yes
Camshaft adjustment		yes	yes	yes
Balancing shafts		yes	yes	yes
Secondary air system		no	no	no
Exhaust gas turbocharger		yes	yes	yes
Charge air cooler		yes	yes	yes

[1)] At least 91 RON in exceptional cases, although engine output is reduced.

01 – Self-diagnosis

1 Self diagnosis, safety measures, cleanliness regulations, directions

1.1 Self-diagnosis

This repair group is deleted.

For this use the “Vehicle self-diagnosis”, “Measuring method” and “Fault finding” ⇒ Vehicle diagnostic tester.

1.2 Safety precautions when working on fuel supply 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. 0.6 MPa = 6 bar).*
- *Before opening the high pressure area, 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 area with a remaining pressure of approx. 0.6 MPa (6 bar) must be reduced* *⇒ page 4* *.*

WARNING

- *The safety measures for the pressure reduction in the high pressure area of the fuel system must be observed* *⇒ page 4* *.*
- *Route lines of any kind so that the original routing can be restored.*
- *The fuel system is under pressure!*
- *Wear safety goggles and fuel-resistant gloves, in order to avoid injuries and skin contact.*
- *Place cleaning cloths around the connection point before detaching cable connections. Reduce pressure by carefully removing the wiring.*

For safety reasons, the power supply to the fuel delivery unit must be disconnected before opening the fuel system. The fuel delivery unit would otherwise be activated when the driver's door is opened. One of the following options must be used to interrupt the current supply:

- *Disconnecting battery*

or

- *Take out fuse for fuel pump control unit - J538-*

or

- *Disconnect the plug on the flange of the fuel pump or on the fuel pump control unit - J538- .*

Pay attention to the following points when removing and installing the sender for fuel gauge display or the fuel pump (fuel delivery unit) on a fuel tank that is filled or partially filled:

- The extraction hose of an exhaust extraction system which is switched on, must be positioned close to the assembly opening of the fuel tank in order to extract the released fuel vapours, even before the work is commenced. If no exhaust extraction system is available, a radial fan (motor not in air flow of fan) with a delivery volume of more than 15 m^3/h must be used.
- Prevent skin contact with fuel!
- Wear fuel-resistant gloves!

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

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

WARNING

Risk of injury from automatic engine start 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).***

1.4 Release pressure in the high pressure area of the fuel system

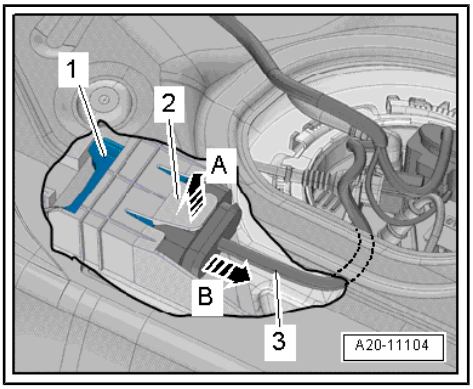
Caution

- ***The injection system consists of a high pressure part (max. pressure of 12 MPa = 120 bar) and a low pressure part (pressure of approx. 0.6 MPa = 6 bar).***
- ***Before opening the high pressure area, 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 area with a remaining pressure of approx. 0.6 MPa (6 bar) must be reduced. The procedure for this is described below.***

– With the⇒ Vehicle diagnostic testerTargeted function, perform a “Remove high fuel pressure”.

– Switch off ignition.

– For safety reasons before opening the fuel system disconnect the plug from the fuel pump control unit -2-.



WARNING

The fuel lines are pressurized! Wear safety goggles and safety clothing, in order to avoid injuries and skin contact with fuel. Before opening the high pressure area, lay a cleaning cloth around the connection point.

– Now lay a clean cleaning cloth around the connection point and carefully open it up, in order to reduce the remaining pressure of approx 0.6 MPa (6 bar). Collect the fuel which flows out.

Note

- *Interrogate the fault memory for the engine control unit at the end of the work and delete all the fault entries.*
- *After deleting the fault memory of the engine control unit the readiness code must be re-generated ⇒ Vehicle diagnostic tester.*

1.5 Rules of cleanliness to observe when working on the fuel supply system

Carefully observe the following five 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. Use only lint-free 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 (e.g. in tool boxes).
- When the system is open: Avoid using compressed air whenever possible. Avoid moving the vehicle.

1.6 Test conditions when working on fuel supply system

- Battery is connected to the battery charger.
- Fuel pump fuse O.K.
- Fuel pump control unit - J538- OK. ⇒ Vehicle diagnostic tester
- Fuel tank at least $^1/_4$ full.
- Fuel filter o.k.
- Fuel lines OK (unplugged, undamaged).
- Ignition switched off.

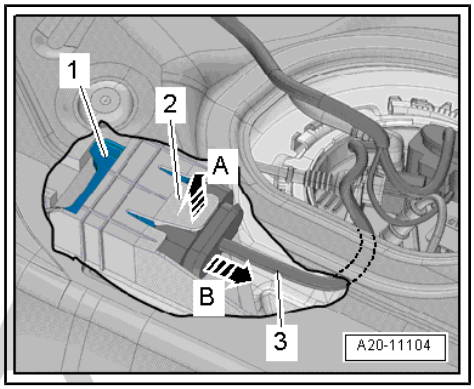
1.7 Safety measures to apply when working on the fuel injection and ignition system

WARNING

- *The safety measures for the pressure reduction in the high pressure area of the fuel system must be observed* *⇒ page 4* *.*
- *The fuel line is under pressure! Wear safety goggles and safety clothing, in order to avoid injuries and skin contact with fuel. Place a clean cleaning cloth around the connection point before detaching wiring. Reduce pressure by carefully removing the wiring.*

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

- Do not touch or remove ignition leads and ignition coils with power output stages with the engine running or at start speed.
- Switch off ignition before connecting or disconnecting injection and ignition system wiring as well as test instrument cables.
- If the engine must be operated at start speed without it starting, as for example, when checking the compression pressure, open lid of fuse carrier in the engine compartment and unplug fuse for Motronic current supply relay - J271- ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- The fuel delivery unit is activated when the ignition is switched on and by the door contact switch of the driver door. Before opening the fuel system and for reasons of safety, if the battery is not disconnected, the plug -3- must be disconnected from the fuel pump control unit.



Caution

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

- *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/wiring, ensure sufficient clearance to all moving or hot components.*

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 from there.
- If the test and measuring devices are operated from the passenger seat, the passenger can be injured by the release of the passenger airbag in the event of an accident.

1.8 General notes on the injection system

- The engine control unit is equipped with self-diagnosis. Before repairs and also for fault finding, first of all interrogate the fault 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 probes.
- If after fault finding, repair or inspection of components the engine starts briefly and then stops, it is possible that the immobiliser blocks the engine control unit. Then if necessary the engine control unit must be adapted ⇒ Vehicle diagnostic tester.
- When opening the driver door the fuel pump is activated for 2 seconds in order to build up the pressure in the fuel system.
- Certain inspections may cause the control unit to detect and store a fault. It is therefore necessary to interrogate the fault memory after having completed all inspections and repairs, and if necessary delete ⇒ Vehicle diagnostic tester.

Safety measures ⇒ page 6 .

1.9 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 is 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 fault memory after having completed all inspections and repairs, and if necessary delete ⇒ Vehicle diagnostic tester.
- If after fault finding, repair or inspection of components the engine starts briefly and then stops, it is possible that the immobiliser blocks the engine control unit. Then if necessary the engine control unit must be adapted ⇒ Vehicle diagnostic tester.

Safety measures ⇒ page 6 .

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

1.10 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 (e.g. 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, e.g. 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. The gasket ring and the sealing surface must be slightly oiled only for push-fit couplings .
- Assembly of hose connections with push-fit couplings ⇒ page 223 .
- 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 screwing down the oil feed line, fill the exhaust turbocharger via the connection fitting with clean engine oil.
- After installing the exhaust turbocharger, run engine at idling speed for about 1 minute to ensure that oil is supplied to the turbocharger bearing.

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

⚠ WARNING

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

ℹ 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 from the bracket ⇒ page 43 .

– Mount the AC compressor in such a way that the refrigerant lines/hoses are not under tension.

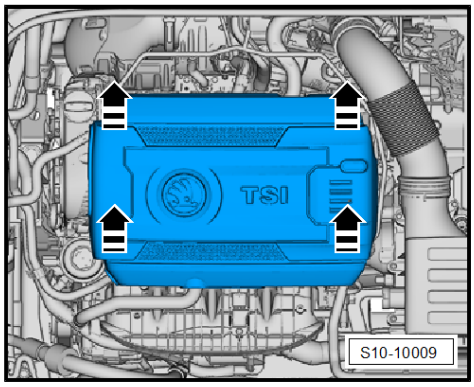
10 – Removing and installing engine

1 Engine trim panel

1.1 Removing and installing engine trim panel

Removing

– Carefully pull the engine cover off the retaining bolts one after another -arrows-. Do not pull engine cover off in jerks or on one side.



Install

– To avoid damage, do not strike the engine cover with the fist or a tool.

– 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

Special tools and workshop equipment required

- Removal tool for inner lining of the door panel - MP8-602/1-
- Supporting device - 10-222A-
- Hook - MP9-200/10-
- Engine and gearbox jack - V.A.G 1383 A-
- Double ladder , e. g. -VAS 5085-
- Catch pan , e.g. -VAS 6208-
- Hose strap pliers , e.g. -VAS 6362-
- Screw plug set for engine , e.g. -VAS 6122-
- Engine bracket - T10359-
- Bolt - T10359/2-
- Adapter - T10359/3-
- Protective goggles
- Protective gloves

Note

- *The engine is removed downwards together with the gearbox.*
- *All cable straps that have been loosened or cut open when the engine was removed must be attached again in the same location when the engine is installed again.*
- *Collect drained coolant in a clean container for reuse or proper disposal.*

Caution

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

- ***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/wiring, ensure sufficient clearance to all moving or hot components.***

Work procedure

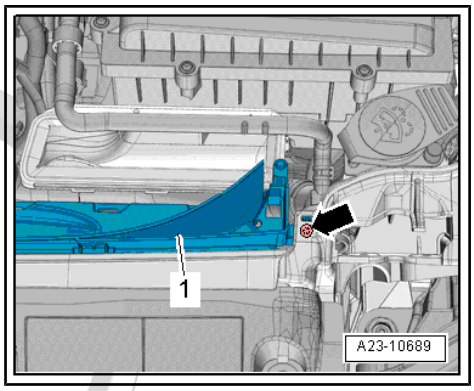
Observe all safety measures and notes for assembly work on the fuel system, on the injection and ignition system and on the charge air system as well as rules for cleanliness ⇒ page 3 .

– Drain coolant ⇒ page 158 .

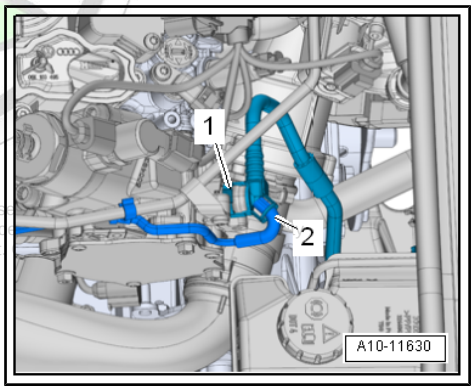
– Remove the assembly carrier ⇒ Chassis; Rep. gr. 40 .

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

– Remove engine cover ⇒ page 10 .
– Remove air guide and air filter housing ⇒ page 258 .
– Undo screws on air guide right and left -arrow-.
– Unclip and remove the air guide pipe bottom - 1 -.
– Remove battery and battery tray ⇒ Electrical System; Rep. gr. 27 .



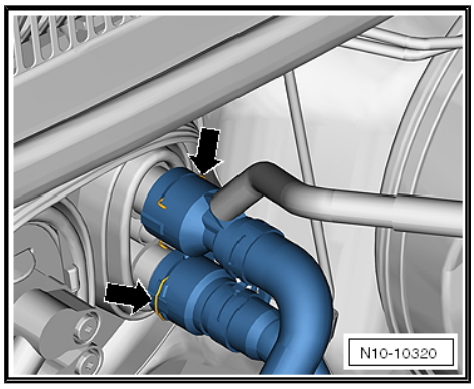
– Disconnect vacuum hose -2-.
– Press the unlocking tool on the vacuum hose -1- and remove the hose from the vacuum pump.



Note

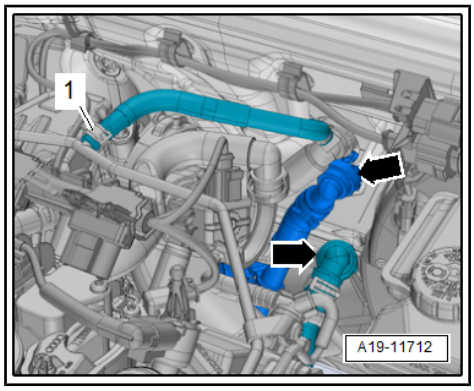
Place a cloth under heating heat exchanger to absorb escaping coolant.

– Raise holding clamps -arrows- and remove coolant hoses from heat exchanger for heating.
– Hold the coolant hoses downwards and allow the coolant to drain.



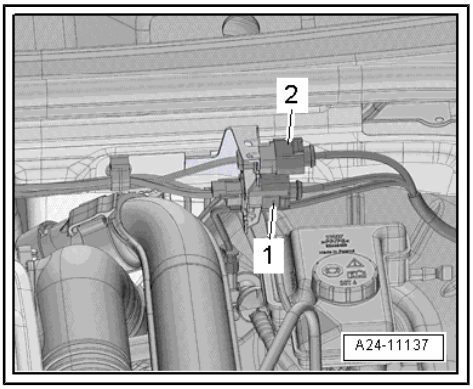
Vehicles with auxiliary heating

– Undo hose clamp -1-, raise holding clamps -arrows- and remove the coolant hoses.



Continued for all vehicles

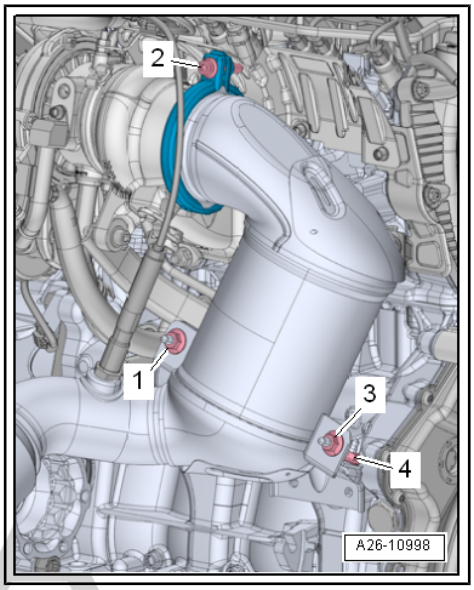
– Take plug connections -1, 2- out of the holder, disconnect and expose electric cable.



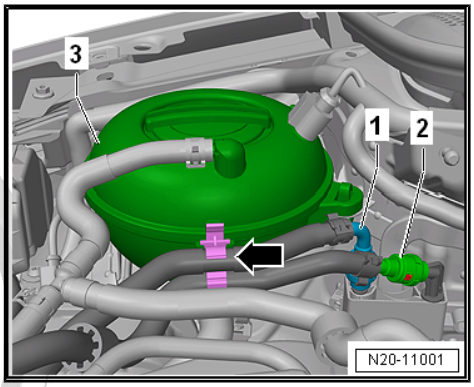
– Unscrew screw -2- and remove screw clamp.
– Remove nuts -1, 3- and strap up catalytic converter to the bodyshell so as not to damage the decoupling element.

Note

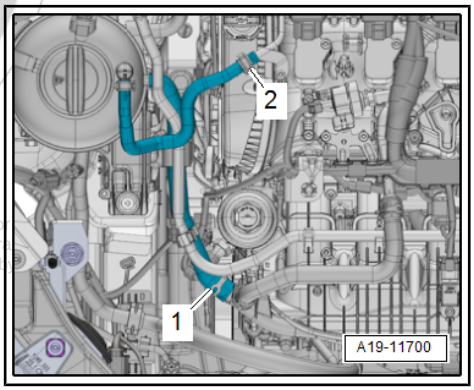
- *do not twist decoupling element in the exhaust pipe more than 10° - risk of damage*
- *Do not pay attention to the position -4-.*



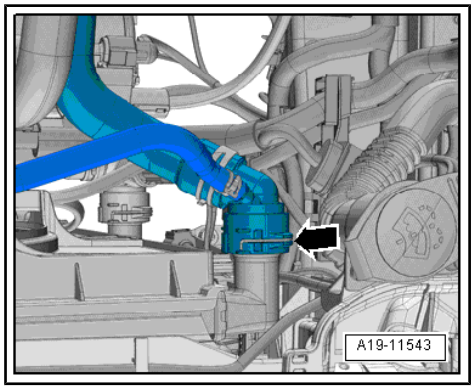
– Disconnect hose couplings -1- and -2- ⇒ page 223 .
– Undo hoses from the coolant expansion tank -3-.



– Undo the hose clamps -1 and 2- and remove the coolant hoses.



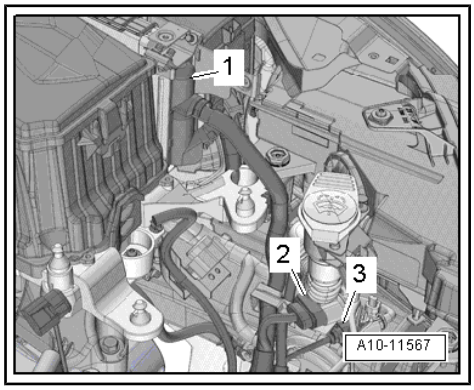
– Raise holding clamp -arrow- and remove top right coolant hose from radiator.



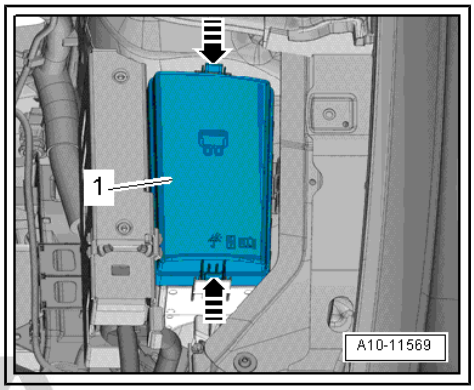
Note

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

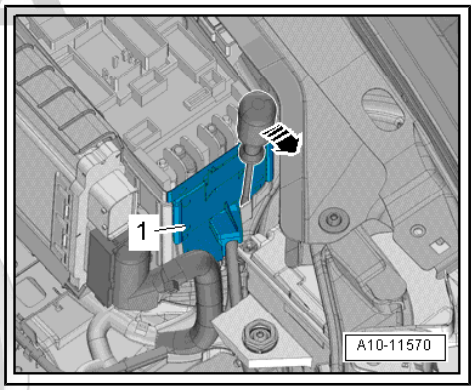
– Remove plug -1- at the engine control unit - J623- ⇒ Electrical System; Rep. gr. 24 .
– Take electrical plug connections -2, 3- out of the holder and disconnect.
– Expose electric cable harness.



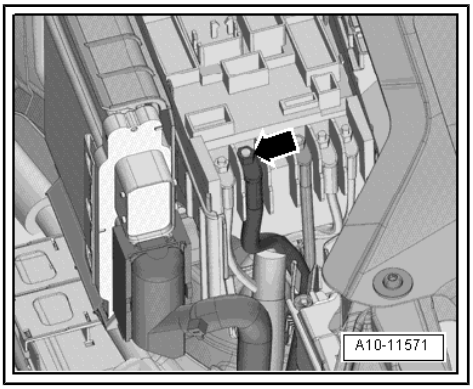
– Unlock catches -arrows- and remove cover -1- for E-box in the engine compartment.



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



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

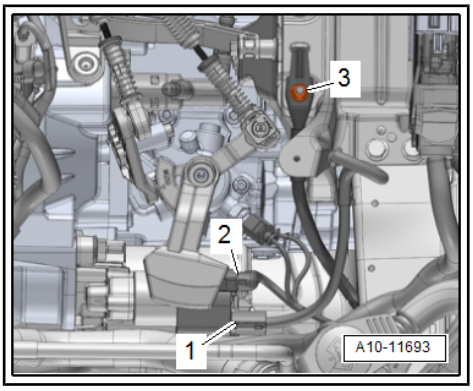


Vehicles fitted with a manual gearbox 02S

– Unplug connector -2-.

– Turn back gear lever boot for B+-pin -1- and unscrew B+-line from magnet switch of the starter.

– Release nuts -3- and remove earth cable.



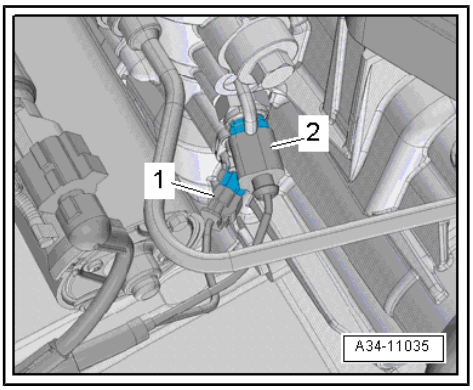
– Remove front left connector from the transmission:

-1- for gearbox neutral position sender - G701- .

-2- for switch for rear lights - F4- .

– Remove the clutch- and guide cable from the transmission and expose ⇒ Gearbox; Rep. gr. 34 .

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



Caution

Risk of damaging the slave cylinder.

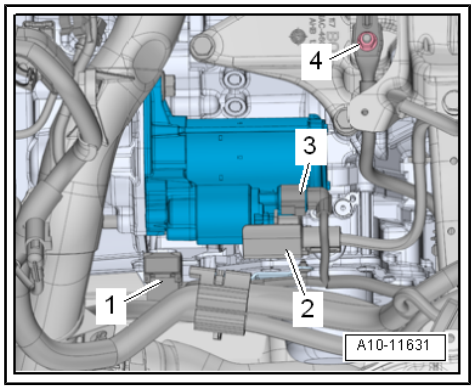
After removing the slave cylinder with connected tube-hose line, no longer press the clutch pedal.

Vehicles with automatic transmission DSG 0CW

– Unplug connector -3-.

– Turn back gear lever boot for B+-pin -2- and unscrew B+-line from magnet switch of the starter.

– Release nuts -4- and remove earth cable.



WARNING

Risk of destruction of the (mechatronics) control unit by electrostatic discharge.

- ***Do not allow the gearbox plug contacts to come into contact with your hands.***

– Touch a conductive component with the hands (without gloves) to discharge static electricity.

– Disconnect the plug -1- from the dual clutch gearbox mechatronics - J743- .

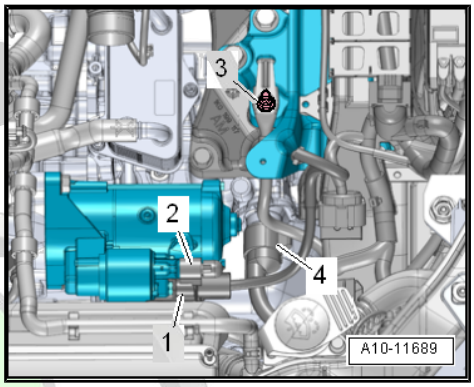
Vehicles with automatic transmission 0D9

– Remove gate selector cable from gearbox and pull it out of the linkage support ⇒ Gearbox; Rep. gr. 34 .

– Unplug connector -2-.

– Turn back gear lever boot for B+-pin -1- and unscrew B+-line from magnet switch of the starter.

– Release nuts -3- and remove earth cable.



Note

The earth cable is secured to the starter bolt, depending on the type.

WARNING

Risk of destruction of the (mechatronics) control unit by electrostatic discharge.

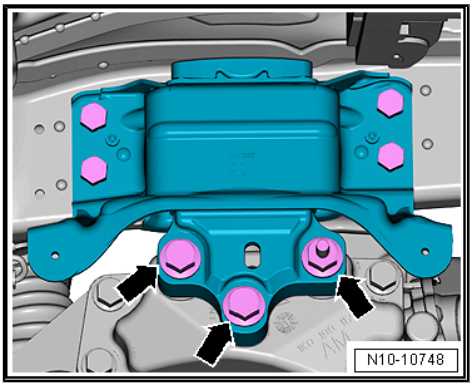
- ***Do not allow the gearbox plug contacts to come into contact with your hands.***

– Touch a conductive component with the hands (without gloves) to discharge static electricity.

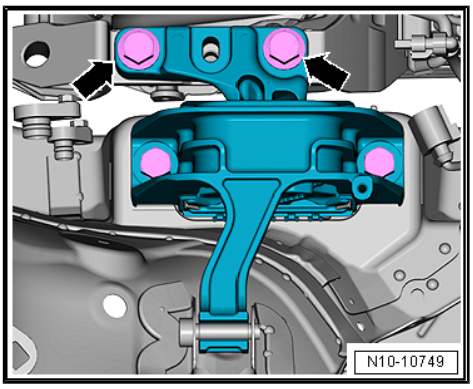
– Turn the rotary lock in an anticlockwise direction and disconnect the plug connection -4- for Mechatronics for double clutch gearbox - J743- .

Continued for all vehicles

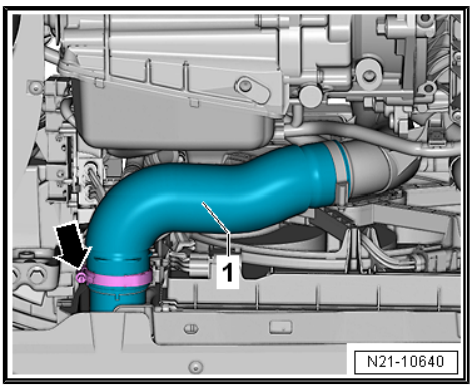
– Screw out screws -arrows- on gearbox mount by approximately 2 turns.



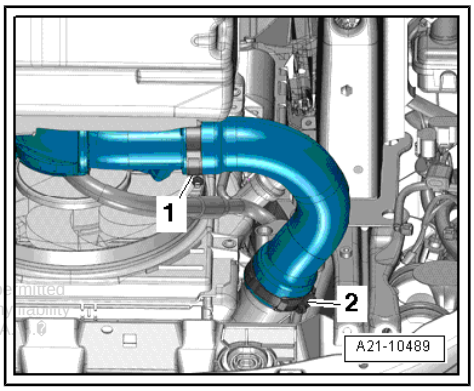
– Screw out screws -arrows- on engine mount by approximately 2 turns.



– Loosen hose clamp -arrow- and remove air guide hose -1- from the charge air cooler left.



– Loosen hose clamp -2- and remove air guide hose from the charge air cooler right.

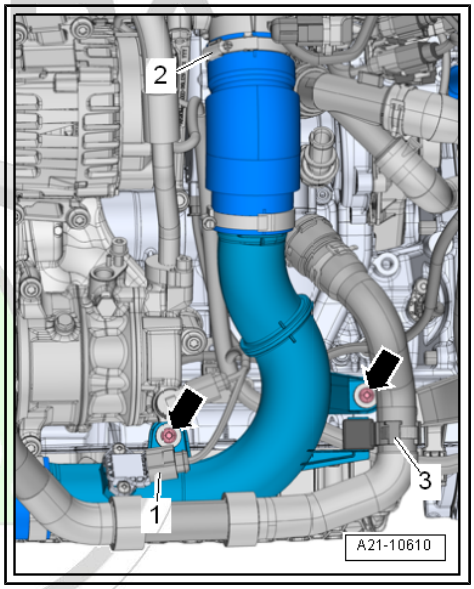


Note

Do not pay attention to the position -1-.

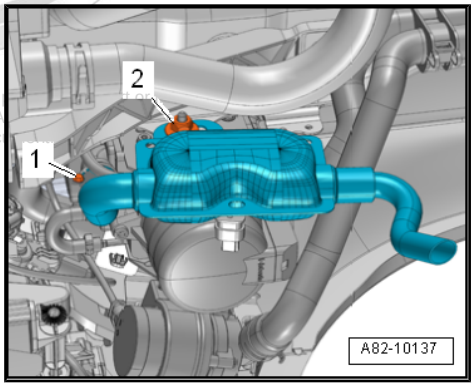
– Close the open lines and connections, immediately with a clean plug, from the plug set for engine , e.g. -VAS 6122-.

– Expose coolant hose -3-.
– Remove bolts -arrows-.
– Loosen hose clamp -2-.
– Disconnect plug -1- from the charge pressure sender - G31- .
– Release right air guide pipe.



Vehicles with auxiliary heating

– Loosen clamp -1-, unscrew nut -2-, and remove silencer for auxiliary heating.



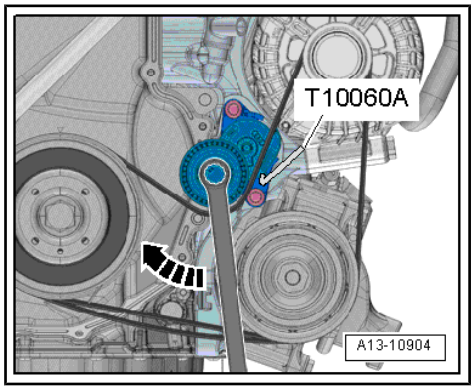
Continued for all vehicles

WARNING

Risk of damage through reversing the rotation direction of an already used V-ribbed belt.

- ***Mark the direction of rotation with chalk or a felt-tip pen before removing the V-ribbed belt so that it can be reinstalled after.***

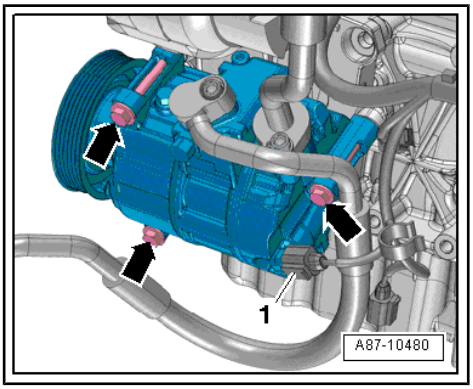
– To release the tension of the V-ribbed belt, turn the tensioning device in the clockwise direction -arrow-.
– Remove the V-ribbed belt from the belt pulley of the AC compressor, and relieve the tensioning device



Note

Ignore locking pin - T10060A- .

– Disconnect the plug -1- at the AC compressor regulating valve - N280- .



WARNING

Risk of damaging AC compressor, refrigerant lines and hoses.

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

– Remove bolts -arrows-.

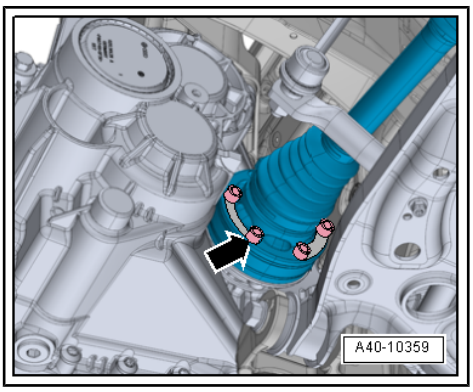
WARNING

Risk of injury through refrigerant.

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

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

– Unscrew the right and left drive shaft -arrow- from the gearbox ⇒ Suspension; Rep. gr. 40 and tie up towards the rear.



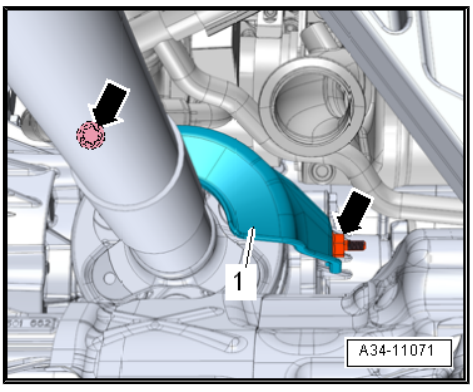
Note

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

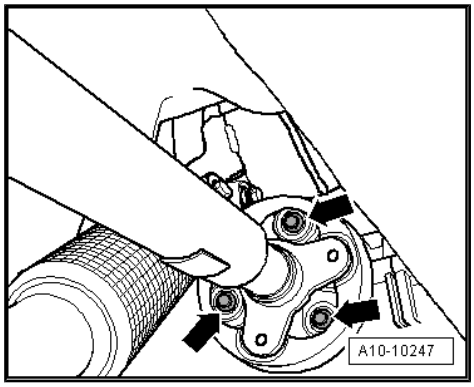
Vehicles with four-wheel drive

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

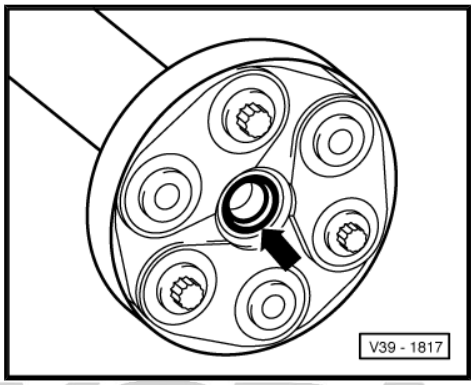
– To reinstall, mark the position of the flexible disk and the angle gearbox flange to each other.



– Unscrew the propshaft from the angle gearbox -arrows-, while counterholding with a lever on the triangular flange.



– Push engine/gearbox assembly slightly forward (in the driving direction) and pull off the propshaft from the angle gearbox.



Caution

Risk of damage to the gasket ring -arrow- on the flange of the propshaft.

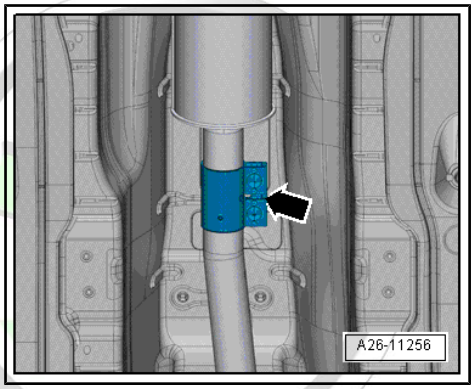
Push propshaft horizontally as far back and towards the left vehicle side as possible.

Note

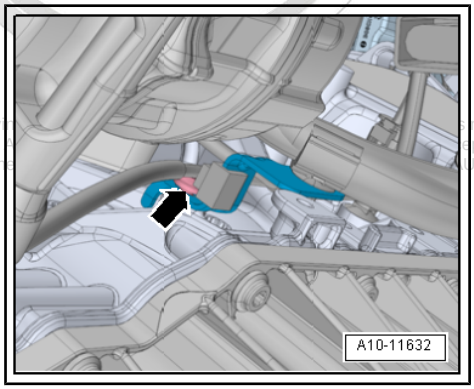
In case of damaged gasket ring the propshaft must be replaced.

Continued for all vehicles

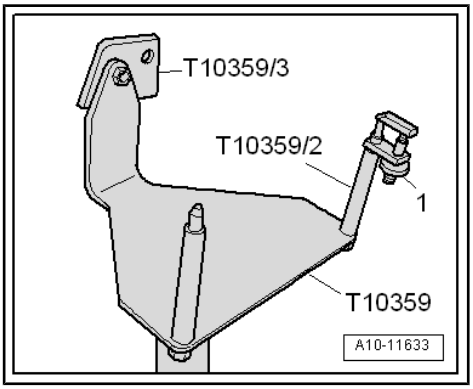
– Loosen the clamping sleeve -arrow- and slide it backwards.
– Remove catalytic converter with exhaust pipe.



– Release screw -arrow- and push the holder with electric wiring harness to one side.



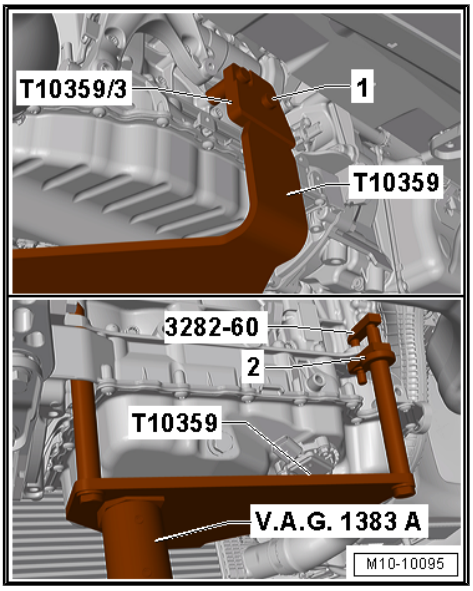
– On the bonnet - T10359- attach the adapter -T10359/3- as shown.
– On the bonnet, screw the bolt -T10359/2- with securing element -1- from the gearbox mount - 3282- .



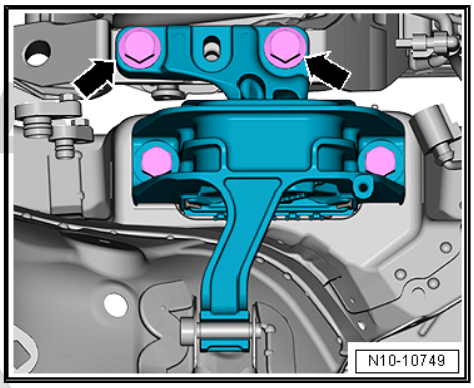
– Screw on the engine mount - T10359- with screw -1- to the cylinder block to 20 Nm, and secure with the securing element -1- from the gearbox mount - 3282- .
– Insert engine and gearbox jack - V.A.G 1383 A- at the engine mount -T10359- and slightly raise engine and gearbox jack.

Note

Use double ladder - VAS 5085- to release the screws for the assembly bracket.



– Screw out engine mount screws -arrows- fully.

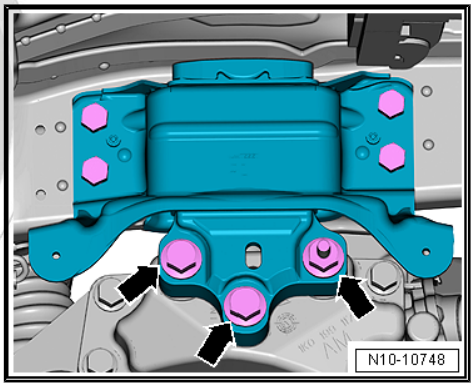


– Screw out gearbox mount screws -arrows- fully.

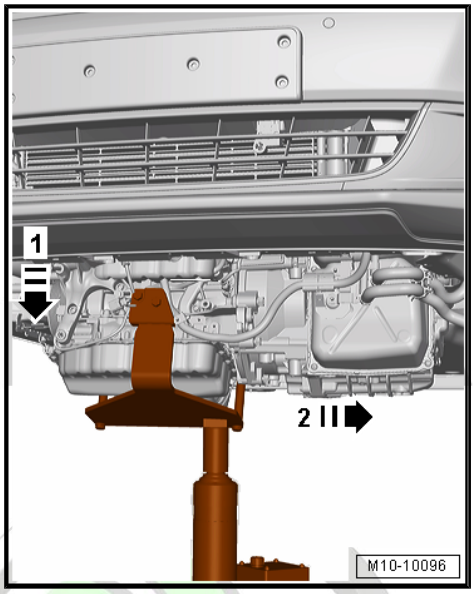
WARNING

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

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



– Lower the engine with gearbox downwards -arrow 1-.



Note

Do not pay attention to the position -2-.

2.2 Separate engine from gearbox

2.2.1 Disconnect the engine from the transmission - vehicles with manual gearbox 02S

Special tools and workshop equipment required

- Lifting device - MP9-201 (2024 A)-
- Supporting device - 10-222 A/2-
- Workshop crane , e.g. -VAS 6100-

Work procedure

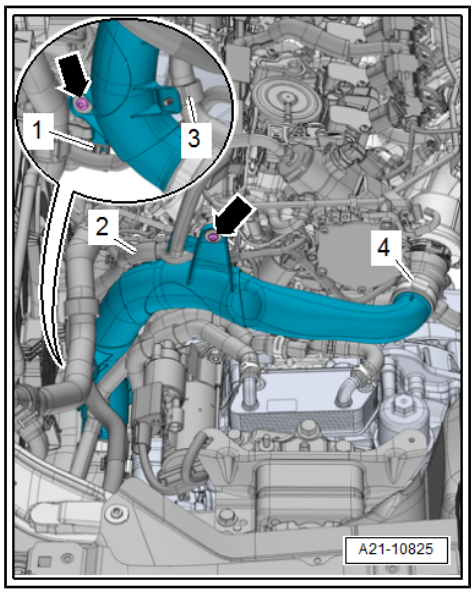
- Engine/gearbox unit removed and attached to engine mount - T10359- .

– Remove starter ⇒ 27; Rep. gr. Elektrische Anlage .

– Expose the electrical wiring harnesses -1 and 2- on the air guide pipe.

– Slacken screw clamp -4-.

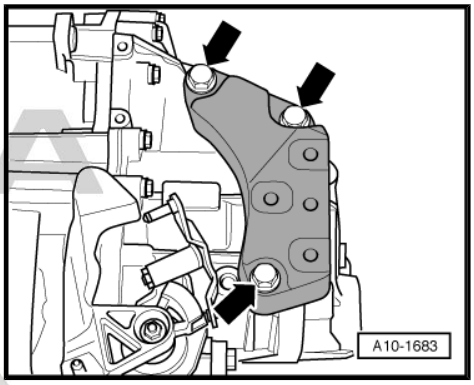
– Unscrew the screws -arrows- and remove the air guide pipe.



Note

Do not pay attention to the position -3-.

– Release screws -arrows- and remove gearbox support bracket.



– Fasten the gearbox to the lifting device - MP9-201 (2024 A)- and to the workshop crane , e.g. -VAS 6100- , as shown in the figure.

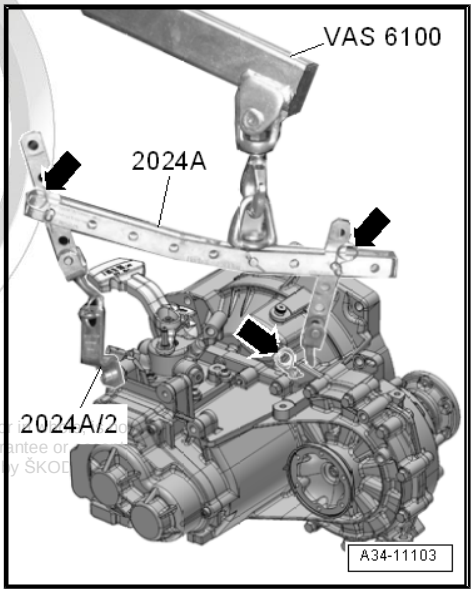
Note

For coordination with the unit centre of gravity position the perforated rails of the suspension hooks 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-.

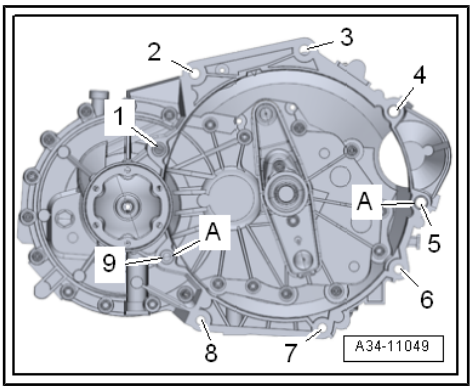


– Undo the connecting screws -1, 2, 3, 6, 7, 8, 9- for gearbox/engine.

Note

Do not pay attention to positions -4, 5 and A-.

– Remove the gearbox from the engine.



2.2.2 Disconnect the engine from the gearbox - vehicles with automatic transmission DSG 0CW

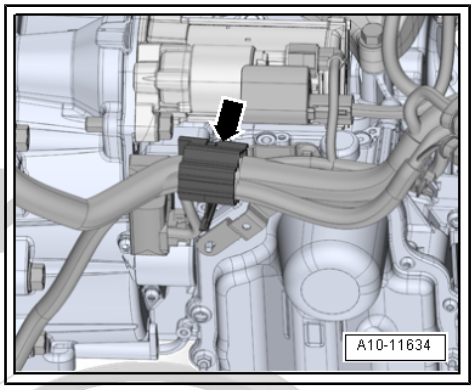
Special tools and workshop equipment required

- Shackle - 10-222 A/12-
- Workshop crane , e.g. -VAS 6100-

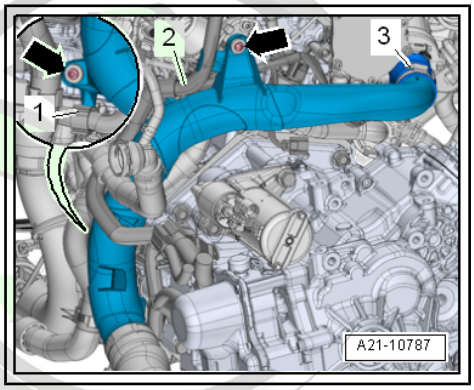
Work procedure

- Engine/gearbox unit removed and attached to engine mount - T10359- .

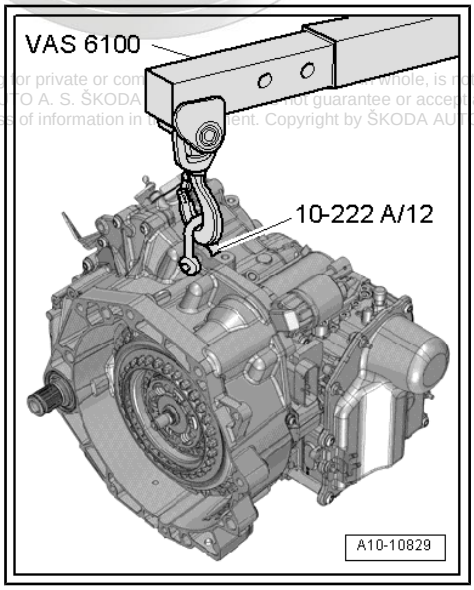
– Expose the electric cables from the holder -arrow-.
– Removing starter ⇒ Electrical System; Rep. gr. 27 .



– Expose the electrical wiring harnesses -1 and 2- on the air guide pipe.
– Slacken screw clamp -3-.
– Unscrew the screws -arrows- and remove the air guide pipe.



– Attach the gearbox with the clevis - 10-222 A/12- to the workshop crane - VAS 6100- .

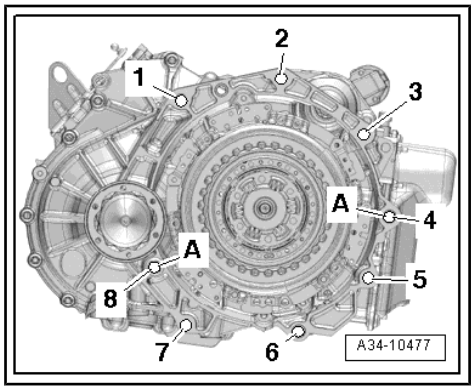


– Undo the connecting screws -1, 3, 4, 5, 6, 7, 8- for gearbox/engine.

Note

Do not pay attention to positions -2 and A-.

– Remove the gearbox from the engine.



2.2.3 Disconnect the engine from the gearbox - vehicles with automatic transmission DSG 0D9

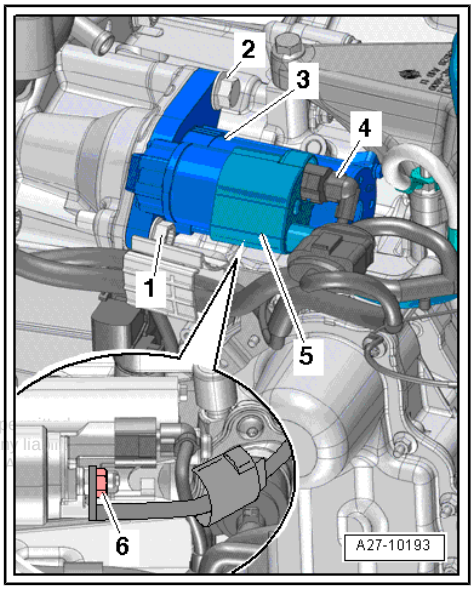
Special tools and workshop equipment required

- Hook - 10-222A/20-
- Lifting device - MP9-201 (2024 A)-
- Workshop crane , e.g. -VAS 6100-
- Screw plug set for engine , e.g. -VAS 6122-
- Hose clamp - MP7-602 (3094)-

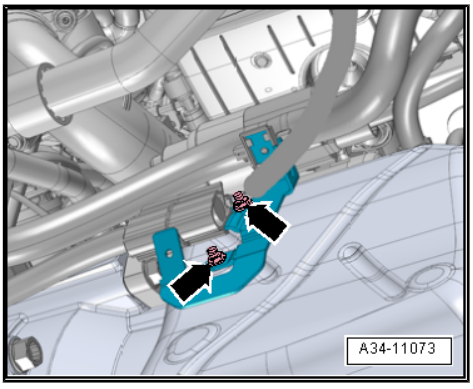
Work procedure

- Engine/gearbox unit removed and attached to engine mount - T10359- .

– Remove starter ⇒ 27; Rep. gr. Elektrische Anlage .



– Remove nuts -arrows- and remove the front bracket from the gearbox oil sump.

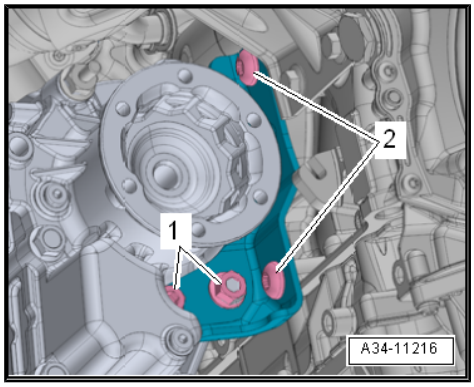


Note

The front threaded bolts at the gearbox are welded onto the oil sump.

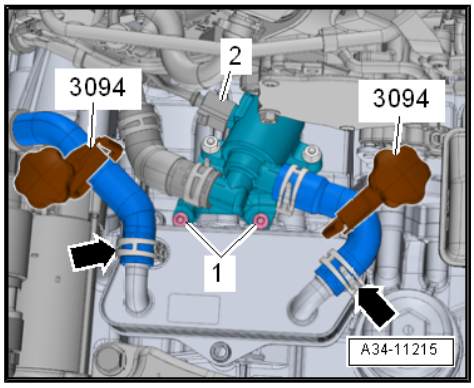
Vehicles with four-wheel drive

– Unscrew screws -1, 2- and remove bracket for angle gearbox.



Continued for all vehicles

– Unplug connector -2-.

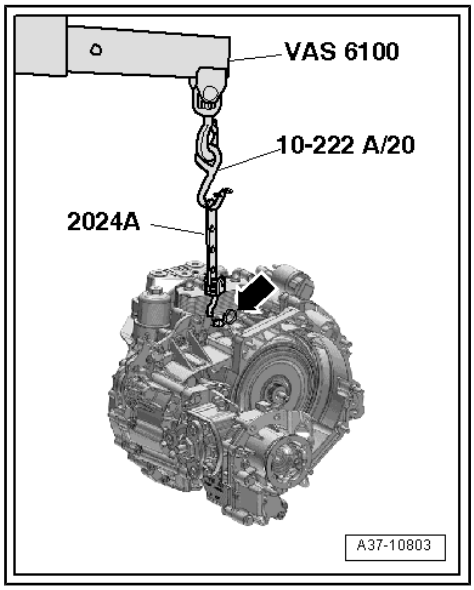


Note

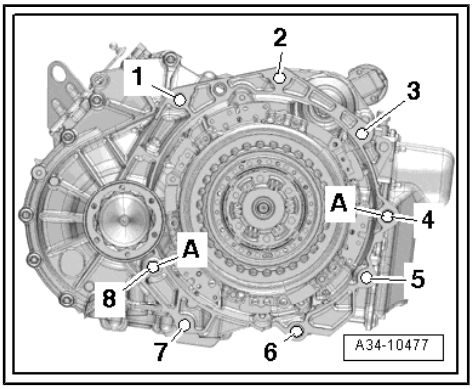
Place a cloth below to absorb leaking coolant.

– Disconnect the coolant hoses with hose clamps - MP7-602 (3094)- to prevent loss of coolant.
– Slacken hose clamps -arrows- and remove coolant hoses from gearbox oil cooler.
– Unscrew screws -1- and put the coolant valve for gearbox - N488- to one side.
– Close the open lines and connections with a clean plug from the screw plug set for engine , e.g. -VAS 6122- .

– Suspend hook of the lifting device - MP9-201 (2024A)- to the lifting eye of the gearbox, and secure with plug-in lock -arrow-.
– Suspend the workshop crane , e. g. -VAS 6100- , with hooks - 10-222A/20- from the lifting device - MP9-201 (2024A)- .



– Unscrew the connecting screws -1...8- of the gearbox connection to the engine.



Note

Ignore the position -A-.

– Remove the gearbox from the engine.

2.3 Securing the engine to the assembly stand

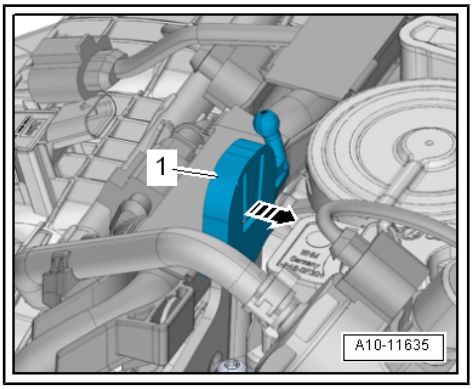
Special tools and workshop equipment required

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

Work procedure

• Separate engine from gearbox ⇒ page 22 .

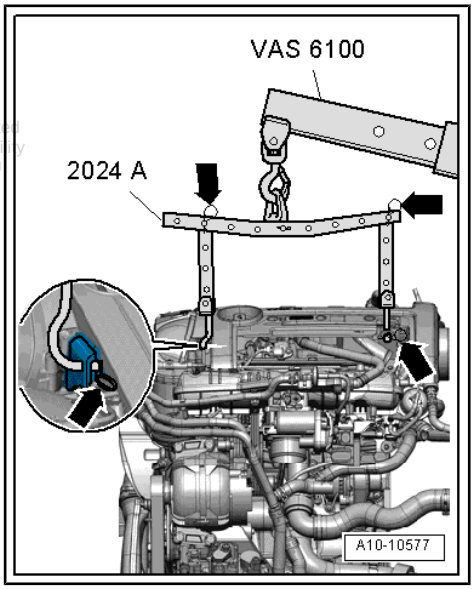
– Release the catch -arrow- and remove the uptake -1- for the engine trim panel.



– Hook on lifting device - MP9-201 (2024 A)- at engine and at workshop crane - VAS 6100- .

Note

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



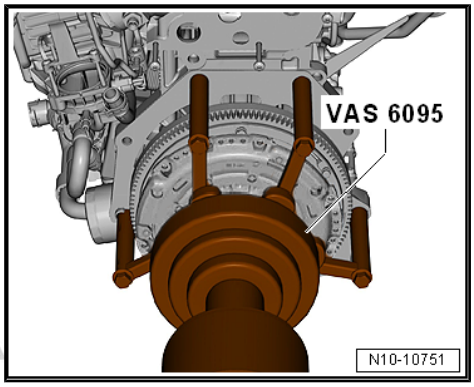
WARNING

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-.***

– Remove the engine with the workshop crane - VAS 6100- from the engine and gearbox jack - V.A.G 1383 A- .

– Screw on engine with the gearbox side to the engine and gearbox jack - VAS 6095- as shown.



2.4 Installing engine

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 or MoS_2 containing graphite.*
- *Do not use degreased parts.*

Component		Nm
Screws and nuts	M6	10
	M7	15
	M8	20
	M10	40
	M12	65

- Assembly bracket ⇒ page 34 .
- Securing gearbox to engine⇒ Gearbox; Rep. gr. 34 .

Work procedure

Note

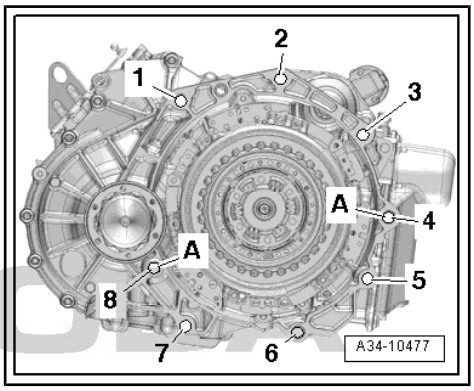
- *Replace screws which have been tightened firmly to a torquing angle.*
- *Replace self-locking nuts and gasket rings, gaskets and O-rings.*
- *Hose connections as well as charge air pipes and -hoses must be free of oil and grease before being installed.*
- *Secure all hose connections with hose clamps which comply with the series design ⇒ ETKA - Electronic Catalogue of Original Parts .*
- *All cable straps should be fitted on again in the same place when installing.*

– Installing intermediate plate ⇒ page 50 .

Note

A vehicle with a dual clutch gearbox is shown as an example.

– If not present in the cylinder block, insert dowel sleeves -A- to centre the engine/gearbox.



Vehicles fitted with a manual gearbox

- If a needle bearing is installed in the crankshaft, the needle bearing must be removed ⇒ page 57 .
- If the clutch release bearing is worn, it will need to be replaced ⇒ 30; Rep. gr. Getriebe .

– Evenly lubricate the teething on the input shaft with grease ⇒ ETKA Electronic Catalogue of Original Parts .

– Check the centering of the driver clutch.

Vehicles with automatic transmission DSG

– If no needle bearing is installed in the crankshaft, install it ⇒ page 57 .

Vehicles with four-wheel drive

– Install the bracket for angle gearbox ⇒ 39; Rep. gr. Getriebe .

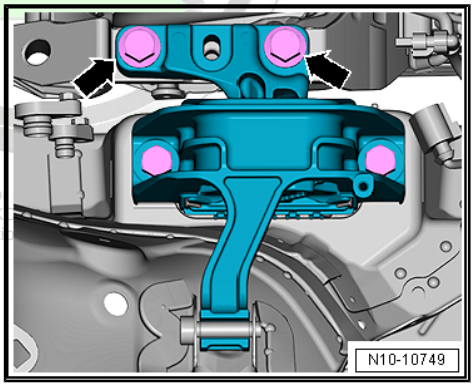
Continued for all vehicles

– Secure gearbox to engine.

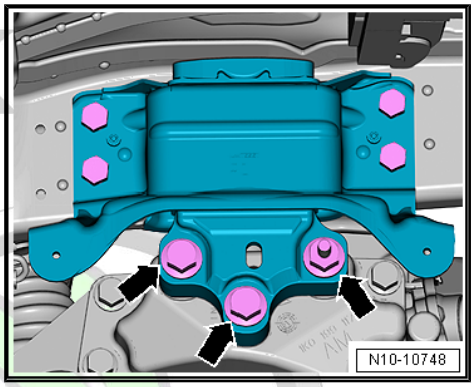
– Install the starter motor ⇒ Electrical System; Rep. gr. 27 .

– 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

Do not tighten the screws fully until the assembly bracket has been adjusted.

– Remove engine mount - T10359- from engine.

– Install drive shafts ⇒ Chassis; Rep. gr. 40 .

Vehicles fitted with a manual gearbox

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

– Install linkages with cable support ⇒ Gearbox; Rep. gr. 34 .

Vehicles with automatic transmission DSG

– Install and adjust the selector lever linkage ⇒ Gearbox; Rep. gr. 34 .

Vehicles with four-wheel drive

– Install propshaft on the angle gearbox ⇒ Rear final drive; Rep. gr. 39 .

Continued for all vehicles

– Install exhaust pipe with catalytic converter ⇒ page 297 .

– Install AC compressor ⇒ Air Conditoining; Rep. gr. 87 .

– Install poly V-belt ⇒ page 44 .

– Adjust the assembly bracket ⇒ page 40 .

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

– Electrical connections and proper routing ⇒ Electrical System; Rep. gr. 97 and ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

– Install air filter housing ⇒ page 258 .

– Install the battery and pay attention to the necessary work after re-connecting the battery ⇒ Electrical System; Rep. gr. 27 .

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

WARNING

Risk of damaging control units as a result of overvoltage.

- ***Do not use charger for jump starting!***

– Connect coolant hoses with quick coupling to the heat exchanger for the heating system ⇒ page 186 .

– Replenish coolant ⇒ page 159 .

Note

- *Only re-use drained coolant if the cylinder head or cylinder block has not been replaced.*
- *Dirty coolant must not be used again.*

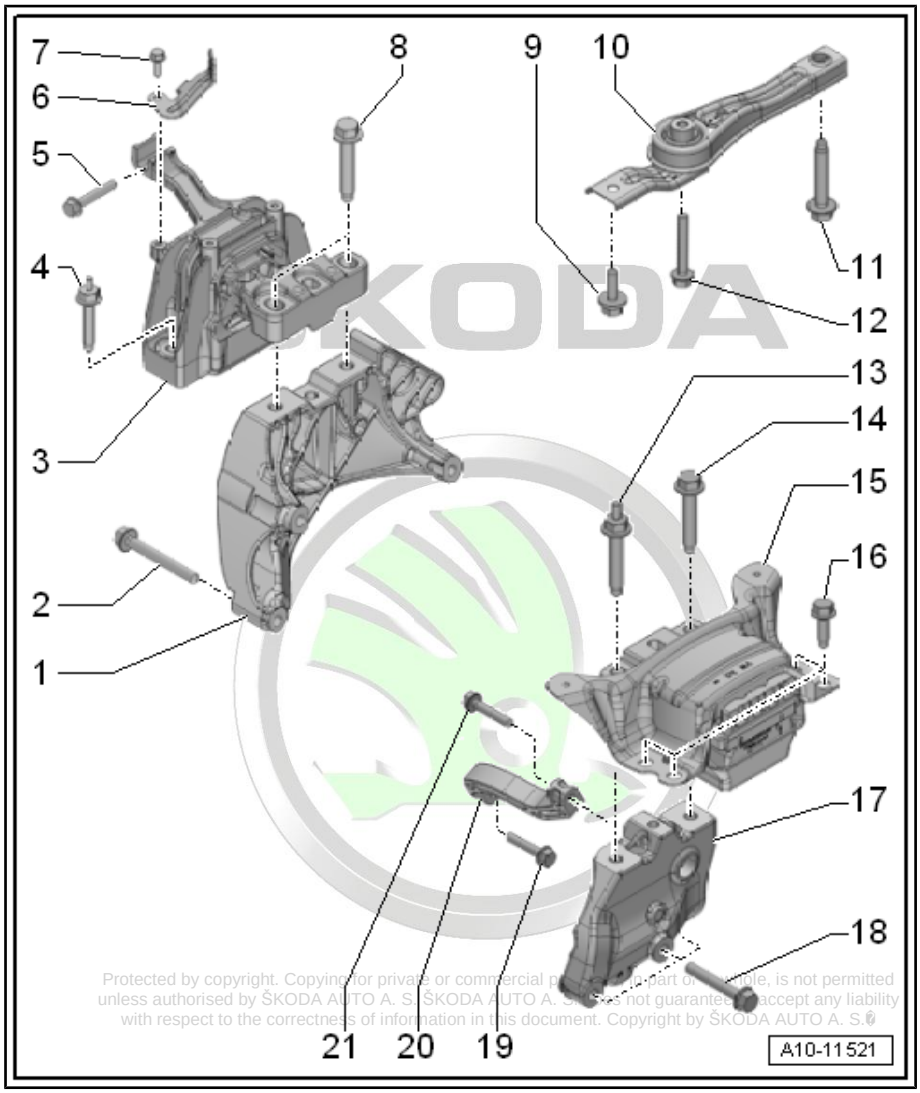
– Install the assembly carrier ⇒ Chassis; Rep. gr. 40 .

– Install front wheelhouse liners ⇒ Body Work; Rep. gr. 66 .
– Install the noise insulation ⇒ Body Work; Rep. gr. 50 .
– Install the engine cover ⇒ page 10 .
– Interrogate all fault memories and delete all fault entries, which are caused by removing and installing the engine ⇒ Vehicle diagnostic tester.

  After deleting the fault memory of the engine control unit the readiness code must be re-generated ⇒ Vehicle diagnostic tester.
– Perform a test drive.
– Then perform a vehicle system test and if necessary eliminate the resulting faults ⇒ Vehicle diagnostic tester.

3 Assembly bracket

3.1 Assembly bracket for vehicles with manual gearbox- Summary of components



1 - Engine support bracket
- ❑ removing and installing ⇒ page 36

2 - Screw
- ❑ replace
- ❑ Tightening torque and tightening order ⇒ page 33

3 - Engine mounting
- ❑ with supporting arm
- ❑ removing and installing ⇒ page 35

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

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

6 - Support
- ❑ for coolant check valve

7 - 8 Nm

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

9 - Screw
- ❑ replace
- ❑ Tightening torque and tightening order ⇒ page 33

10 - Pendulum support
- ❑ removing and installing ⇒ page 39

11 - Screw
- ❑ replace
- ❑ Tightening torque and tightening order ⇒ page 33

12 - Screw
- ❑ replace
- ❑ Tightening torque and tightening order ⇒ page 33

13 - 60 Nm + torque a further 90° (1/4 turn)
- ❑ replace

14 - 60 Nm + torque a further 90° (1/4 turn)
- ❑ replace

15 - Gearbox mount

- ❑ with supporting arm
- ❑ removing and installing ⇒ page 36

16 - 50 Nm + torque a further 90° (1/4 turn)

- ❑ replace

17 - Gearbox support bracket

18 - Screw

- ❑ Tightening torque ⇒ Gearbox; Rep. gr. 34

19 - Screw

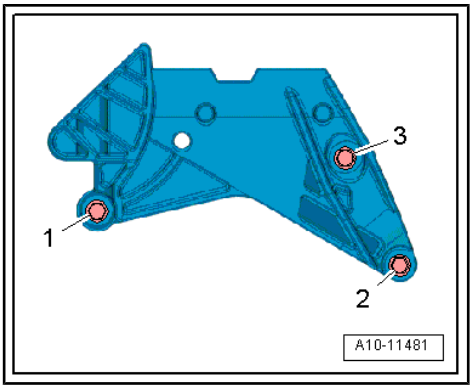
- ❑ Tightening torque ⇒ Gearbox; Rep. gr. 34

20 - Support

21 - Screw

- ❑ Tightening torque ⇒ Gearbox; Rep. gr. 34

Engine support bracket - tightening torque and tightening order



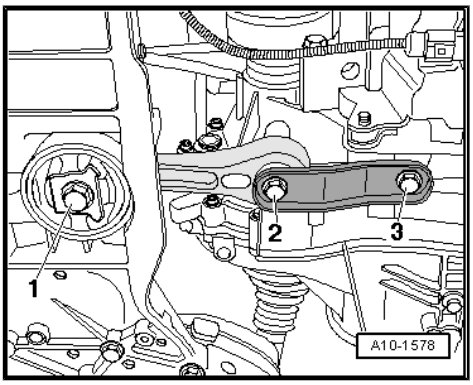
Note

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

– Tighten all bolts step by step 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



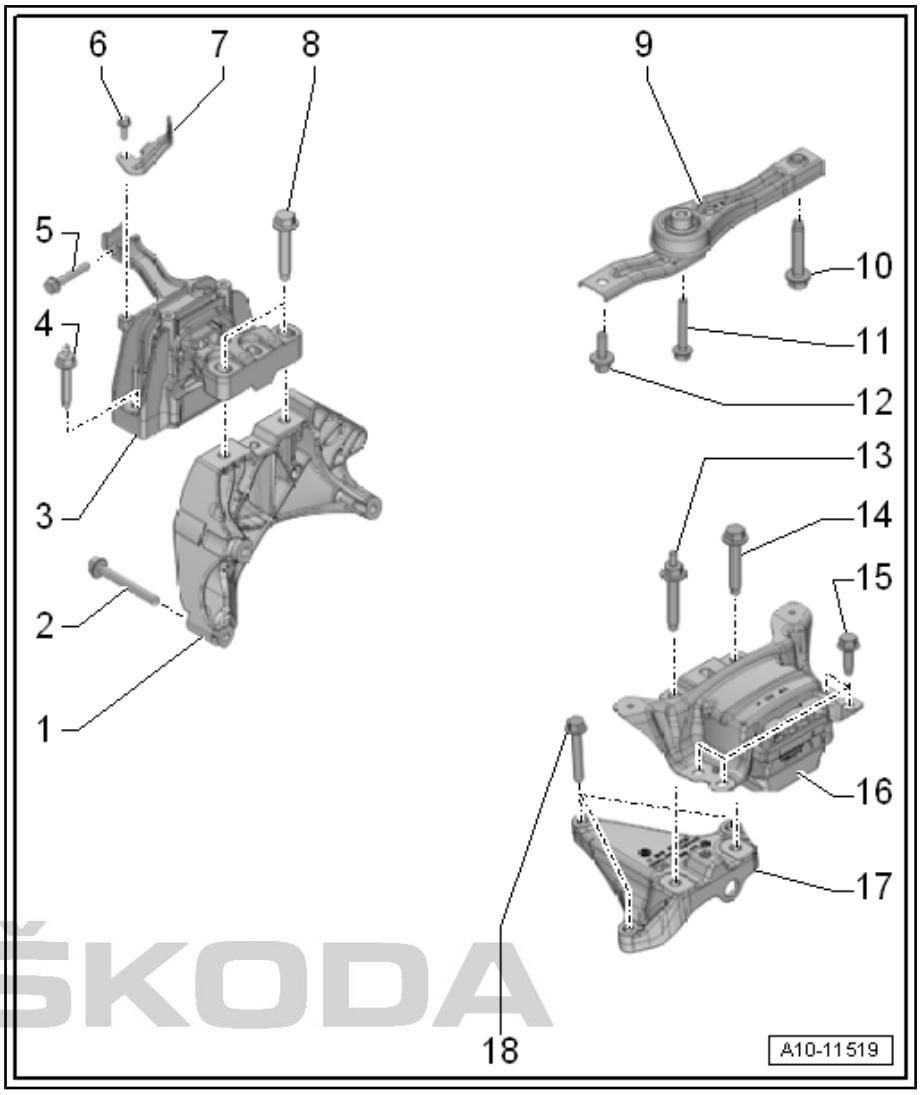
Note

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

– Tighten all bolts step by step 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 Assembly bracket for vehicles with automatic gearbox DSG- Summary of components



1 - Engine support bracket
- ❑ removing and installing ⇒ page 36

2 - Screw
- ❑ replace
- ❑ Tightening torque and tightening order ⇒ page 33

3 - Engine mounting
- ❑ with supporting arm
- ❑ removing and installing ⇒ page 35

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

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

6 - 8 Nm

7 - Support

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

9 - Pendulum support
- ❑ removing and installing ⇒ page 39

10 - Screw
- ❑ replace
- ❑ Tightening torque and tightening order ⇒ page 33

11 - Screw
- ❑ replace
- ❑ Tightening torque and tightening order ⇒ page 33

12 - Screw
- ❑ replace
- ❑ Tightening torque and tightening order ⇒ page 33

13 - 60 Nm + torque a further 90° (1/4 turn)
- ❑ replace

14 - 60 Nm + torque a further 90° (1/4 turn)
- ❑ replace

15 - 50 Nm + torque a further 90° (1/4 turn)
- ❑ replace

16 - Gearbox mount
- ❑ with supporting arm

❑ removing and installing ⇒ page 36

17 - Gearbox support bracket

18 - Screw

❑ Tightening torque ⇒ Gearbox; Rep. gr. 34

3.3 Removing and installing engine mount

Special tools and workshop equipment required

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

Removing

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

– Remove engine cover ⇒ page 10 .

– Unplug connector -2-.

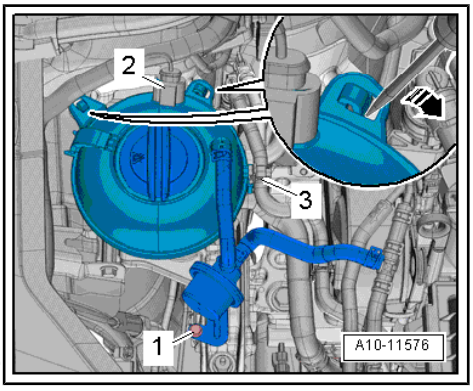
– Unscrew screw -1-.

– Expose hose -3- at the activated charcoal filter.

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

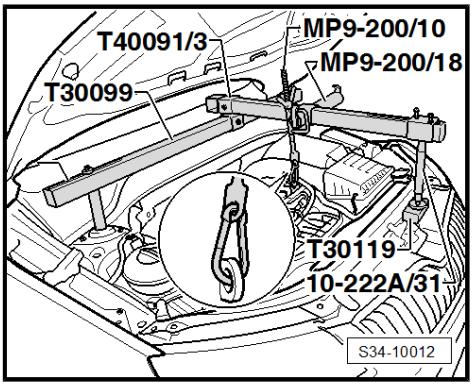
– Remove caps of the screw connections of the front suspension strut dome.

– Install adapters - MP9-200/18 - with the hook - MP9-200/10 - onto the supporting device - T30099- with the support - 10-222A/31- .

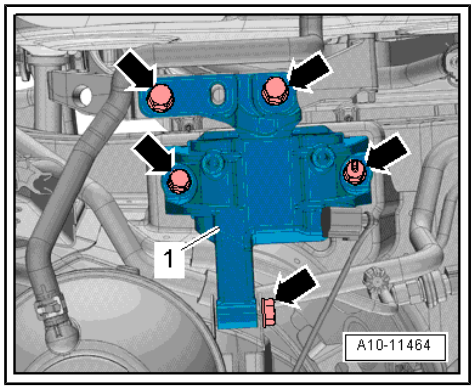


– Position supporting device - T30099- with the support - 10-222A/31- and base - T30119- to the screw fittings of the surface as shown.

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



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



Install

Installation is carried out in the reverse order. However, pay attention to the following:

Tightening torques:

- Assembly mountings for vehicles with manual gearbox ⇒ page 32
- Assembly mountings for vehicles with automatic transmission DSG ⇒ page 34
- ⇒ Electrical system; Rep. gr. 92

– Check assembly bracket setting ⇒ page 40 .

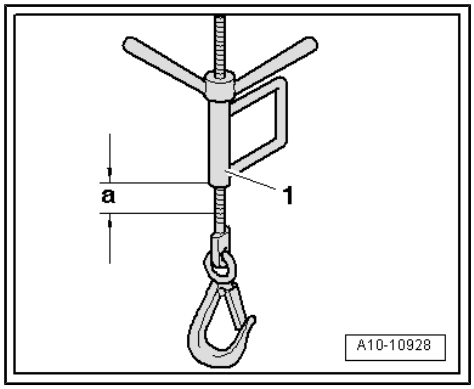
3.4 Removing and installing engine support

Removing

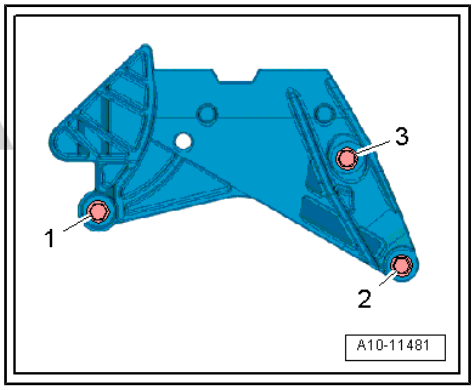
– Remove engine mounts ⇒ page 35 .

– Raise the engine with hook - MP9-200/10- -1- by dimension -a-.

- Dimension -a- = approximately 30 mm.



– Release screws -1, 2, 3- and remove engine support.



Install

Installation is carried out in the reverse order. However, pay attention to the following:

- Tightening torque ⇒ page 33 .

– Install engine mount ⇒ page 35 .

3.5 Removing and installing gearbox mount

Special tools and workshop equipment required

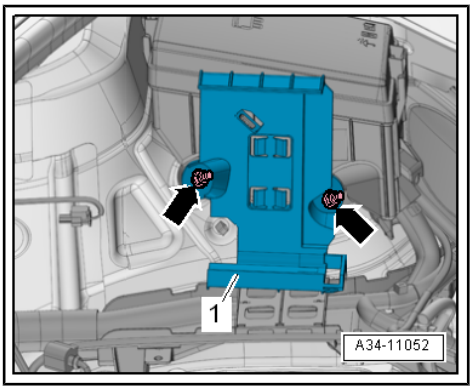
- ♦ Supporting device - T30099-
- ♦ Support - 10-222A/31-
- ♦ Surface - T30119-
- ♦ Adapter - T40091/3-
- ♦ Hook - MP9-200/10-
- ♦ Adapter - MP9-200/18-

Removing

– Remove battery and battery tray -1- ⇒ Electrical System; Rep. gr. 27 .

– Remove engine control unit - J623- from the holder ⇒ page 291 .

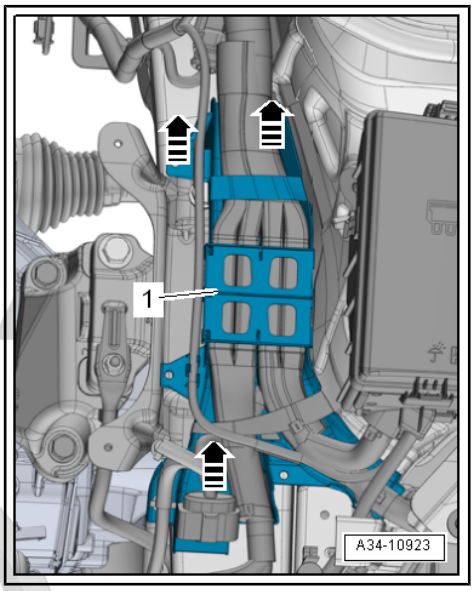
– Unscrew screws -arrows- and remove holder -1-.



Note

Holders are installed differently according to build version.

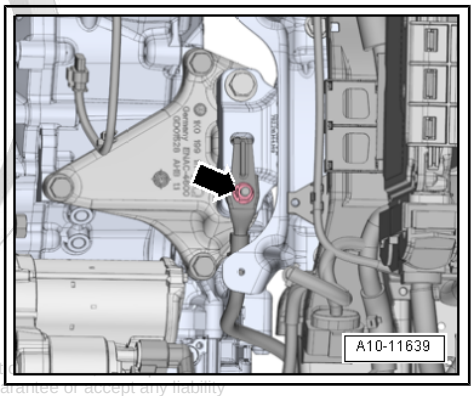
– Unclip the cable guide -1- and push it lightly to the side.



– Unscrew nuts -arrow-, undo earth strap.

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

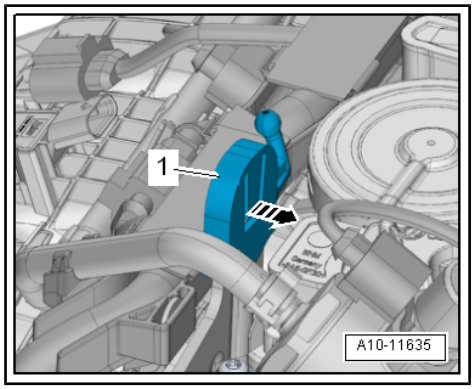
– Remove engine cover ⇒ page 10 .



– Release the catch -arrow-, remove engine trim panel mount -1-.

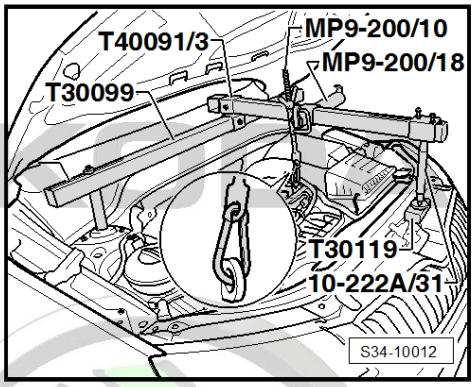
– Remove caps of the screw connections of the front suspension strut dome.

– Install adapters - MP9-200/18 - with the hook - MP9-200/10 - onto the supporting device - T30099- with the support - 10-222A/31- .

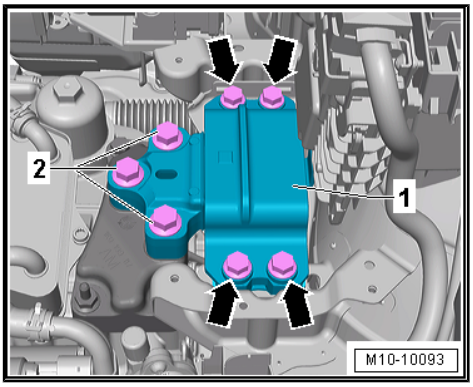


– Position supporting device - T30099- with the support - 10-222A/31- and base - T30119- to the screw fittings of the surface as shown.

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



– Unscrew screws -2-, next remove screws -arrows- and remove the gearbox mount -1-.



Install

Installation is carried out in the reverse order. However, pay attention to the following:

Tightening torques:

- Assembly mountings for vehicles with manual gearbox ⇒ page 32
- Assembly mountings for vehicles with automatic transmission DSG ⇒ page 34
- ⇒ Electrical system; Rep. gr. 27
- ⇒ Electrical system; Rep. gr. 92

Note

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

– Fix the gearbox mount to the longitudinal beam.

Caution

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

- ***Before the screws are turned, the gearbox supports and supporting arm must be absolutely parallel to each other. If necessary, push up gearbox using a hydraulic trolley jack.***
- ***Do not remove support bracket until the bolts securing the assembly mounting have been tightened to specified torque.***

– Evenly 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 ⇒ page 40 .

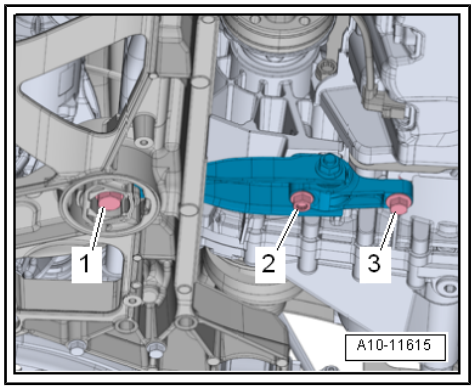
– Disconnect support bracket from engine.

3.6 Removing and installing pendulum support

Removing

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

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



Install

Installation is carried out in the reverse order. However, pay attention to the following:

Tightening torques:

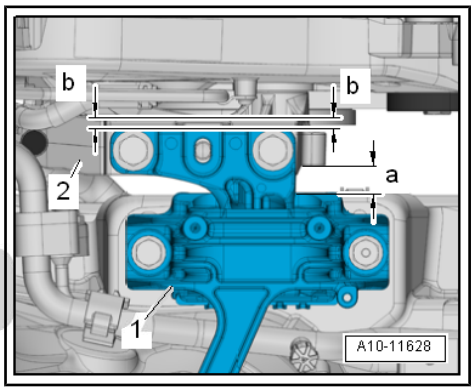
- Engine support bracket - tightening torque and tightening order ⇒ page 33
- ⇒ Body Work; Rep. gr. 66

3.7 Check assembly bracket setting

Work procedure

The following dimensions must be reached:

- A distance of -a- = 10 mm must be present between engine support -1- and engine mount.
- The cast edge on the engine support must be parallel with the engine mount supporting arm.
- Dimension -b- = dimension -b-.



Note

The distance -a- = 10 mm can be checked e.g. with suitable round bars.

– If the distance is too small or too large, adjust the assembly bracket ⇒ page 40 .

3.8 Adjusting the unit mounting

Special tools and workshop equipment required

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

Work procedure

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

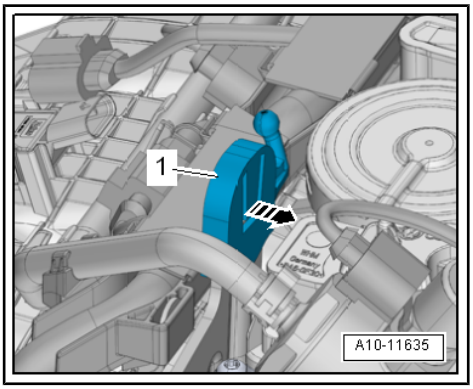
– Remove engine cover ⇒ page 10 .

– Release the catch -arrow-, remove engine trim panel mount -1-.

– Remove battery and battery tray -1- ⇒ Electrical system; Rep. gr. 27 .

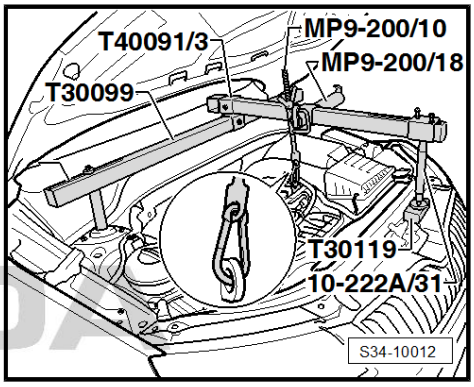
– Remove caps of the screw connections of the front suspension strut dome.

– Install adapters - MP9-200/18 - with the hook - MP9-200/10 - onto the supporting device - T30099- with the support - 10-222A/31- .



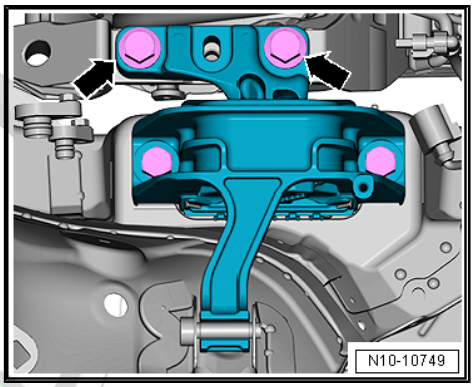
– Position supporting device - T30099- with the support - 10-222A/31- and base - T30119- to the screw fittings of the surface as shown.

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



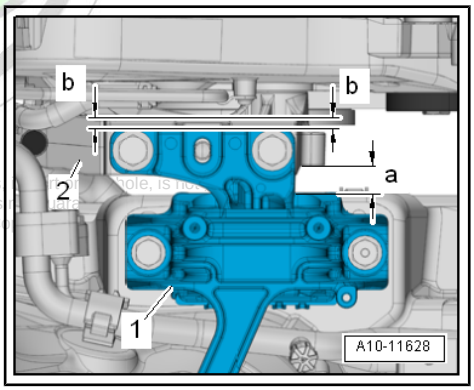
– Unscrew screws -arrows- for engine mount one after another and replace (if not already done during engine installation).

– Firstly, loosely insert the screws.



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

- A distance of -a- = 10 mm must be present between engine support -1- and engine mount.
- The cast edge on the engine support must be parallel with the engine mount supporting arm.
- Dimension -b- = dimension -b-.



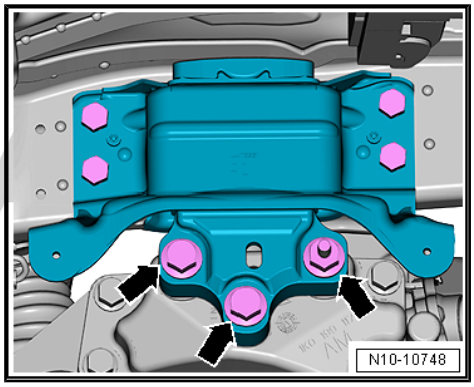
Note

The distance -a- = 10 mm can be checked e.g. with suitable round bars.

– Tighten screws for engine mount.

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

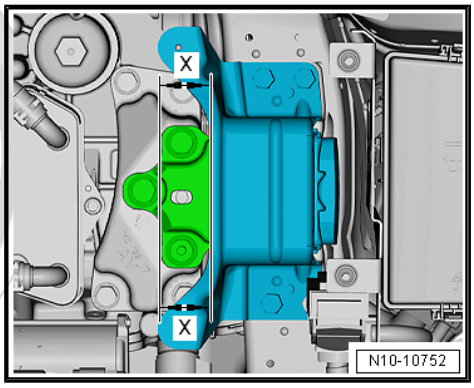
– Firstly, loosely insert the screws.



– Make sure that on the gearbox side the edges of the supporting arm and gearbox mount are parallel.

• Distance -x- = distance -x-.

– Tighten gearbox mount screws.



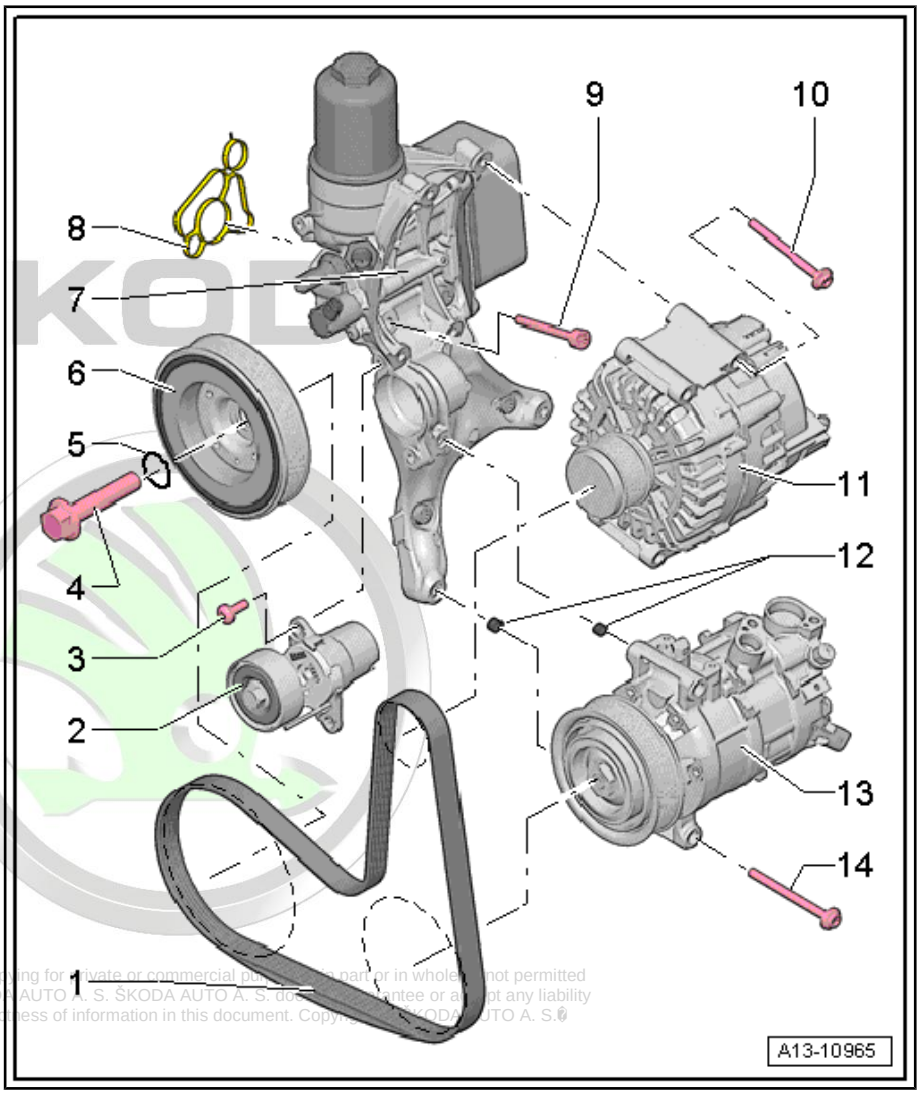
Installation is carried out in the reverse order.

Tightening torques: ⇒ page 34

13 – Crankshaft group

1 Cylinder block - Belt pulley side

1.1 V-ribbed belt drive - Summary of components



1 - V-ribbed belt

- ❑ check for wear
- ❑ before removing, mark out the rotation direction with chalk or felt pen (risk of damage through reversing the rotation direction of an already used belt).
- ❑ do not kink
- ❑ Routing of the ribbed V-belt ⇒ page 45
- ❑ removing and installing ⇒ page 44
- ❑ Pay attention to the correct position of the V-ribbed belt in the belt pulley when installing it

2 - Swivel tensioning pulley for V-ribbed belt

- ❑ swivel tensioning device for V-ribbed belt with open-end wrench to slacken the V-ribbed belt
- ❑ secure with the locking pin - T10060 A-
- ❑ removing and installing ⇒ page 46

3 - 8 Nm + torque a further 45° (1/8 turn)

- ❑ replace

4 - 150 Nm + torque a further 90° (1/4 turn)

- ❑ replace
- ❑ Moisten O-ring with oil.
- ❑ to release and tighten use counterholder - T10355-

WARNING

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

5 - O-ring

- ❑ not available as a spare part, is part of the scope of supply of the screw ⇒ ETKA - Electronic Catalogue of Original Parts

6 - Poly V-belt pulley

- ❑ with vibration damper
- ❑ removing and installing ⇒ page 48

> **WARNING**
> *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.*

7 - Bracket for auxiliary units

- ❑ removing and installing ⇒ page 46

8 - Gasket

- ❑ replace

9 - Screw

- ❑ Tightening torque and tightening order ⇒ page 44

10 - 23 Nm

11 - Alternator

12 - Assembling sleeves

- ❑ for the AC compressor

13 - AC compressor

- ❑ Do not open refrigerant circuit

14 - 25 Nm

Bracket for auxiliary units - tightening torque and tightening order

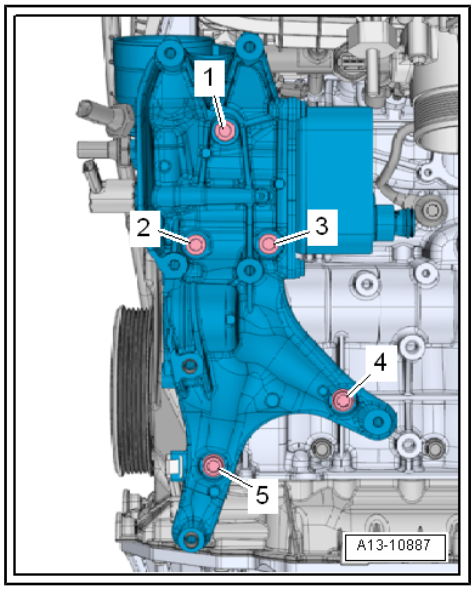
– Insert bracket for auxiliary units and firstly tighten the screw -4- by hand.

Note

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

– Tighten screws in the order -1 ... 5- in 3 stages as follows:

1. Tighten screws until hand-tight.
2. Tighten screws to 20 Nm.
3. 90° (torque a further 90° ($^1/_4$ turn).



1.2 Removing and installing poly V-belt

Special tools and workshop equipment required

- Locking pin - T10060 A-

Removing

– Remove the sound dampening system ⇒ Body Work; Rep. gr. 50 .

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

WARNING

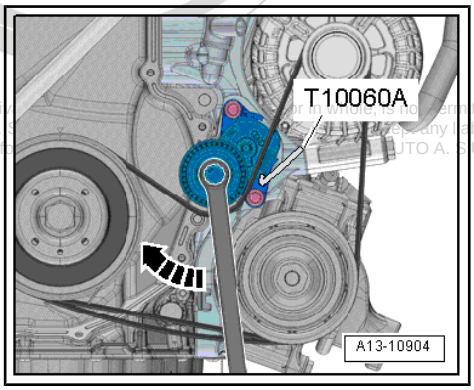
Risk of damage through reversing the rotation direction of an already used V-ribbed belt.

- ***Mark the direction of rotation with chalk or a felt-tip pen before removing the V-ribbed belt so that it can be reinstalled after.***

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

– Secure tensioning device with locking pin - T10060 A- .

– Remove poly V-belt.



Install

Installation is carried out in the reverse order. However, pay attention to the following:

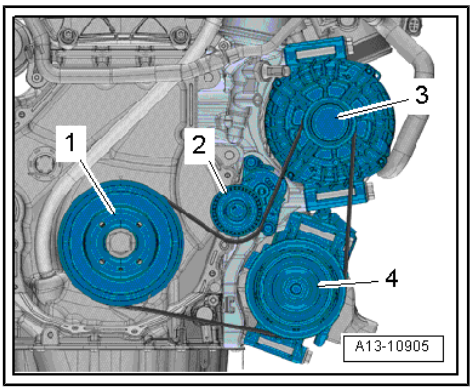
– Lay the poly V-belt as shown:

1 - Poly V-belt pulley

2 - Swivel tensioning pulley for V-ribbed belt

3 - Belt pulley for generator

4 - Belt pulley for AC compressor

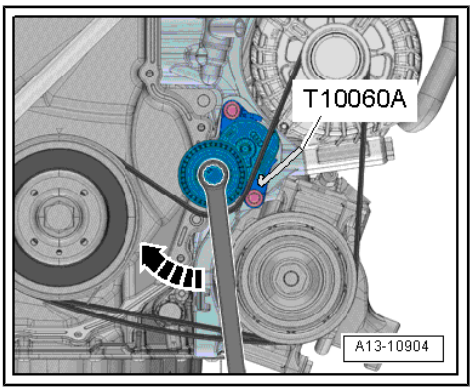


– Turn the tensioning element in the -direction of the arrow- and pull out the locking pin - T10060 A- .

– Release pressure on tensioning device.

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

– Start engine and check the right poly V-belt run.

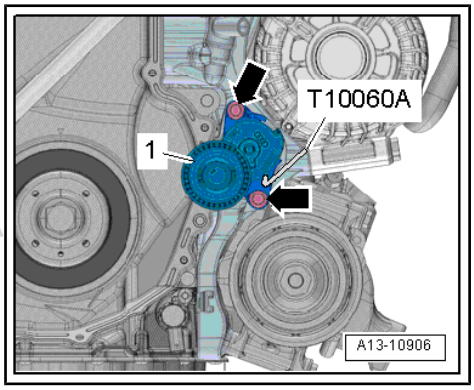


1.3 Removing and installing tensioner pulley for poly V-belt

Removing

– Remove the V-ribbed belt from the tensioning device ⇒ page 44 .

– Release screws -arrows- and pull off tensioning device -1- for poly V-belt from the bracket for the auxiliary units.



Install

Installation is carried out in the reverse order. However, pay attention to the following:

- Tightening torque ⇒ page 43 .

– Install poly V-belt ⇒ page 44 .

1.4 Removing and installing bracket for auxiliary units

Special tools and workshop equipment required

◆ Catch pan , e.g. -VAS 6208-

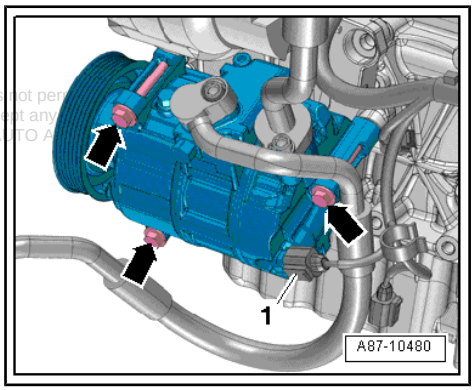
Removing

– Drain coolant ⇒ page 158 .

– Remove V-ribbed belt ⇒ page 44 .

– Remove alternator ⇒ Electrical System; Rep. gr. 27 .

– Disconnect the plug -1- for the magnetic coupling on the AC compressor.



WARNING

Risk of injury through refrigerant.

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

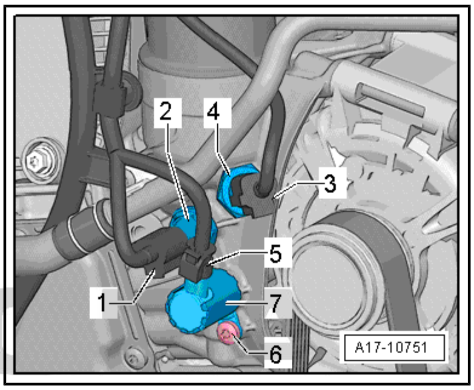
– Release screws -arrows- for AC compressor.

Caution

Risk of damaging refrigerant lines and hoses.

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

– Strap up AC compressor with connected refrigerant hoses to the longitudinal beam.



– Disconnect existing electrical plug connections:

1 - for oil pressure switch - F22- -2-

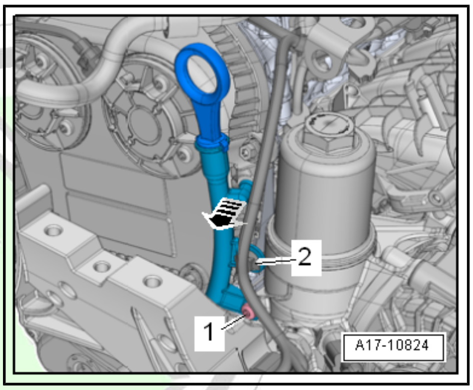
3 - for oil pressure switch for reduced oil pressure - F378- -4-

5 - for control valve for piston cooling nozzles - N522- -7-

Note

Do not pay attention to the position -6-.

– Remove oil filter element ⇒ Maintenance ; Booklet Octavia III .



– Release screw -1- of guide pipe for oil dipstick.

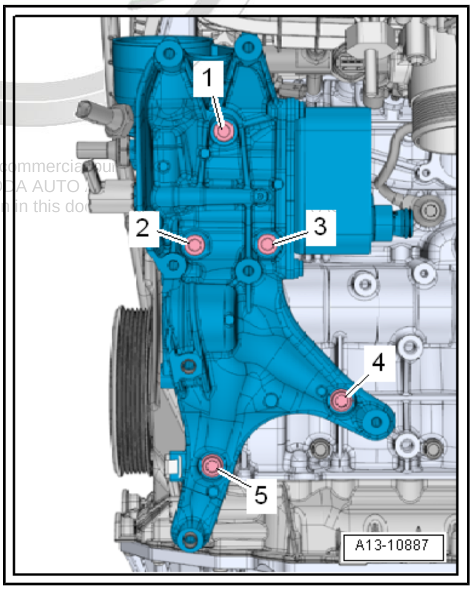
Undo guide pipe from the mount on the top cover for the timing chain -arrow-.

Note

Do not pay attention to the position -2-.

– Expose cable harness.

– Place a catch pan - VAS 6208- under the engine.



– Release screws -1 ... 5- and remove bracket for auxiliary units from the coolant pump housing.

Install

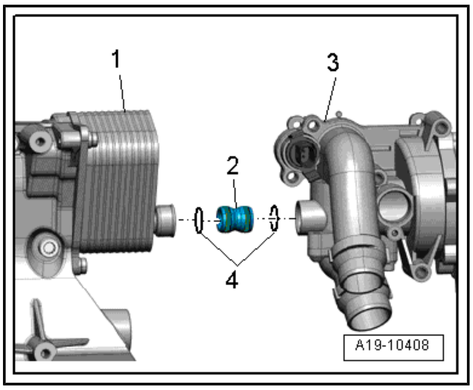
- Tightening torques ⇒ page 43

Installation is carried out in the reverse order. However, pay attention to the following:

Note

♦ *Replace screws which have been tightened to a torquing angle.*

♦ *Replace O-rings and gaskets.*



– Moisten O-rings -4- with coolant.

– Insert connecting studs -2- into the thermostat housing -3-.

– Slide bracket for auxiliary units -1- onto the connecting studs, attach and tighten screws ⇒ page 43 .

– Installing AC compressor.

– Install alternator ⇒ Electrical System; Rep. gr. 27 .

– Install poly V-belt ⇒ page 44 .

– Replenish coolant ⇒ page 158 .

– Fit oil filter and check the oil level ⇒ Maintenance ; Booklet Octavia III .

1.5 Removing and installing ribbed belt pulley

Special tools and workshop equipment required

- Counterholder - T10355-
- Thrust piece - T10368-

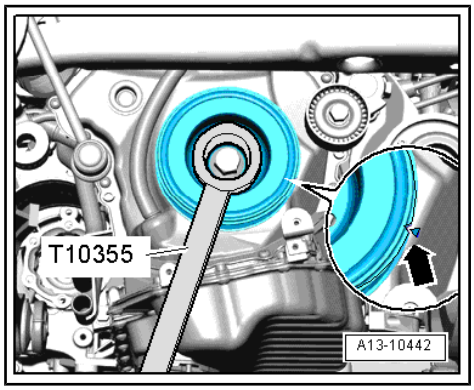
Removing

– Remove V-ribbed belt ⇒ page 44 .

– Turn the V-ribbed belt pulley, crankshaft with the counterholder - T10355- in position “ODT for cylinder 1” -arrow-.

• The notch on the V-ribbed belt pulley must face the arrow marking on the bottom cover for the timing chain.

– Unscrew screw for the V-ribbed belt pulley, using the counterholder - T10355- to do so.



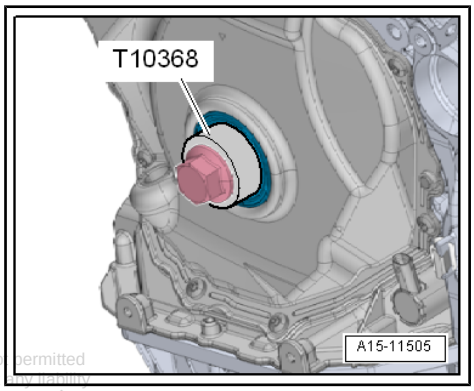
Caution

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 the V-ribbed belt pulley crankshaft.

– Re-install the screw for the belt pulley with the thrust piece - T10368- when the V-ribbed belt pulley is not re-installed immediately.



Note

This step is important as otherwise the chain sprocket may slip off the crankshaft which will mean the whole chain drive will need readjustment.

Install

Installation is carried out in the reverse order. However, pay attention to the following:

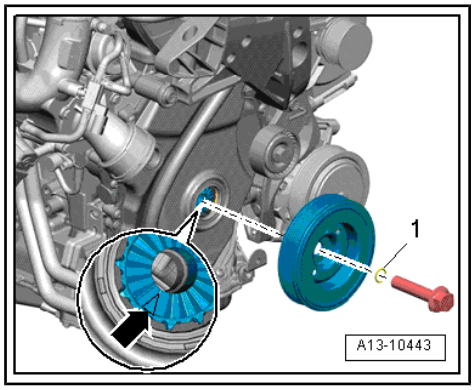
Note

- *Replace the screw for the V-ribbed belt pulley crankshaft.*
- *O-Ring -1- is a part of the scope of supply of the screw, before installtion, wet with engine oil.*

– Remove oil residue on the crankshaft journal with a clean cloth.

– Position V-ribbed belt pulley crankshaft, pay attention to the tooth contour -arrow- and screw while doing so.

Tightening torque: ⇒ page 43

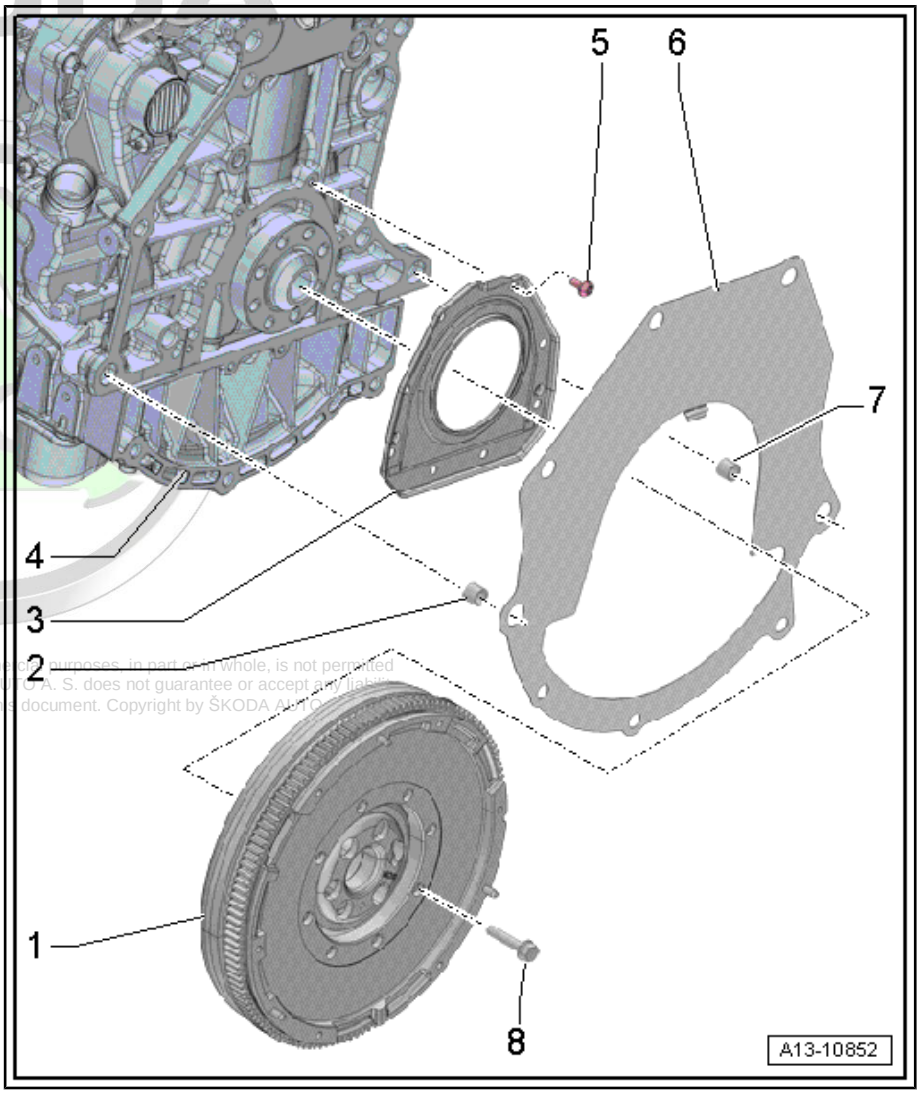


2 Cylinder block - gearbox end

Note

Repairs to the clutch ⇒ Gearbox; Rep. gr. 30 .

2.1 Sealing flange and flywheel - Summary of components



1 - The two-mass flywheel

- ❑ removing and installing the two-mass flywheel ⇒ page 50
- ❑ assembly only possible in one position -holes offset-

2 - Fitting sleeve

3 - Sealing flange on the gearbox side

- ❑ with integrated gasket ring
- ❑ must be replaced completely
- ❑ removing and installing ⇒ page 51
- ❑ Neither grease nor oil sealing lip of gasket ring
- ❑ before installing remove oil residues on crankshaft journal with a clean cloth

4 - Cylinder block

- ❑ removing and installing crankshaft ⇒ page 54
- ❑ Disassembling and assembling pistons and conrods ⇒ page 66

5 - 9 Nm

- ❑ order of tightening ⇒ page 51

6 - Intermediate plate

- ❑ must be positioned on dowel sleeves
- ❑ do not damage or bend during assembly work
- ❑ inserted on sealing flange on gearbox side ⇒ page 50

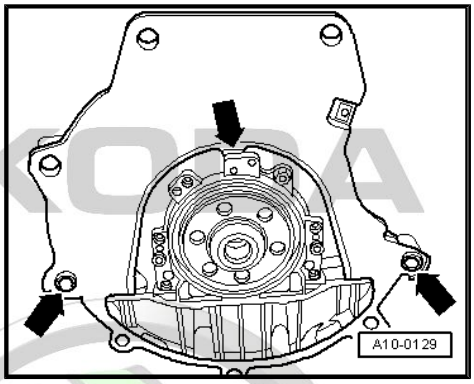
7 - Fitting sleeve

8 - 60 Nm + torque a further 90° (1/4 turn)

- ❑ replace

Installing intermediate plate

– Insert intermediate plate on sealing flange and push onto the dowel sleeves -arrows-.



2.2 Removing and installing the two-mass flywheel

Special tools and workshop equipment required

- Counterholder - MP1-223 (3067)-

or

- Engine bracket - MP1-202 (VW 540)-
- Bushing - T30010 (VW 540/1B)-
- Flywheel lock - MP 1-504-

Removing

- Gearbox removed

– Remove the clutch ⇒ Gearbox; Rep. gr. 30 .

Engine installed

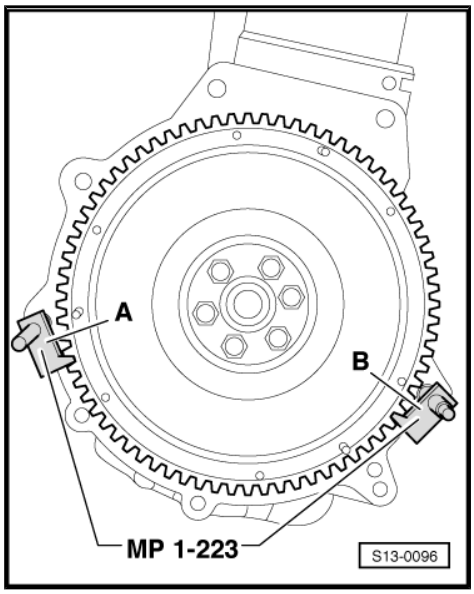
– Insert the counterholder - MP1-223 (3067)- into the bore hole on the cylinder block.

- Fitting position of the counterholder:

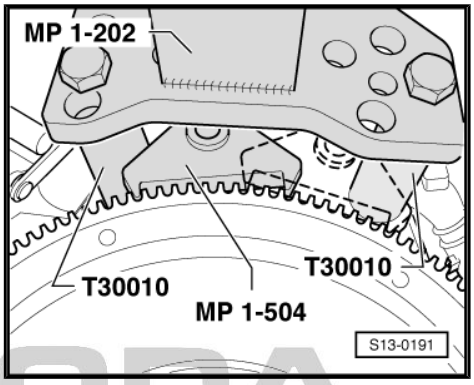
A - for tightening

B - for slackening

Engine removed

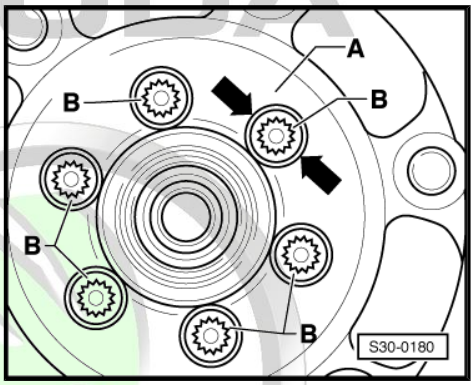


– Position the flywheel lock - MP1-504- on the starter ring gear of the flywheel and turn crankshaft until the lock rests against the sleeve - T30010 - .



Continued for all engines

– 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

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.

- *Do not unscrew screws -B- using a pneumatic power wrench or impact wrench - unscrew by hand.*
- *When unscrewing screws, ensure that no screw head is present on the flywheel.*
- *Rotate flywheel -A- so that the screws -B- are positioned in the centre of the bores -arrows-.*

– Release screws -B- and remove two-mass flywheel.

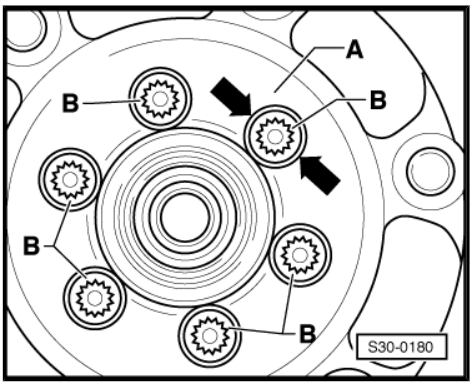
Install

Installation is carried out in the reverse order. However, pay attention to the following:

Note

Use new screws for attaching.

– 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-.



1. Screw in all the screws -B- by hand.
2. First of all tighten all the screws -B- crosswise to 60 Nm.
3. Then torque all the screws -B- 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

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

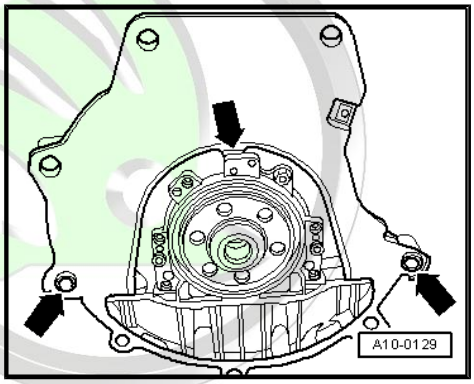
- Sealant remover gasket stripper (bearing code GST, bearing article no. R 34402), manufacturer Retech s.r.o.
- Silicone sealant ⇒ ETKA - Electronic catalogue of original parts
- Guide bushing - T20097-
- Protective goggles
- Protective gloves

Removing

- Gearbox removed

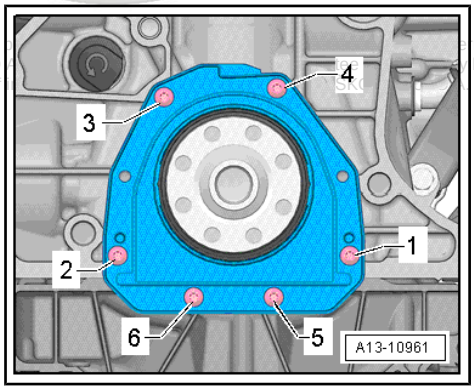
– Remove the two-mass flywheel ⇒ page 50 .

– Unhook intermediate plate at the sealing flange on the gearbox side and dowel sleeves -arrows-.



– Undo screws -1 … 6-.

– Press sealing flange on the gearbox side.



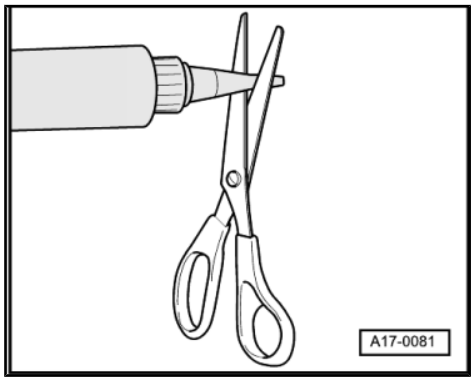
Install

> **WARNING**
>
> ***Wear protective gloves when working with sealant and grease remover!***

– Clean sealing surface on cylinder block and on the upper part of the oil pan and remove sealant residues with chemical sealant remover.

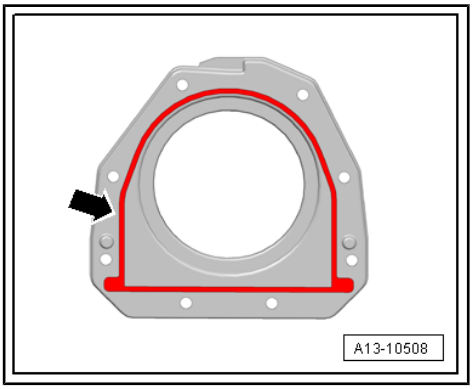
– Degrease the sealing surfaces.

– Cut off nozzle on tube at front marking (∅ of nozzle approx. 2 mm).



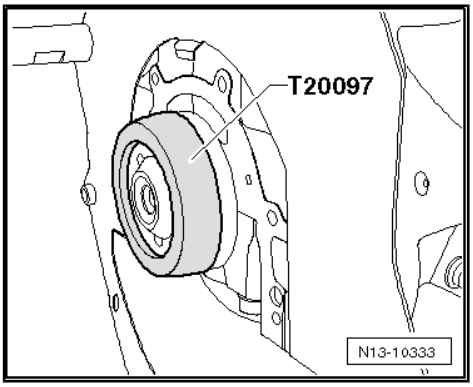
– Apply silicone sealant ⇒ ETKA - Electronic Catalogue of Original Parts -arrow-, as shown in the figure, to the clean sealing surface of the sealing flange on the gearbox side.

♦ Thickness of sealant bead: 2 … 3 mm



– Insert guide bushing - T20097- on the crankshaft journal.

– Slide sealing flange over the guide bushing - T20097- onto the crankshaft stub.



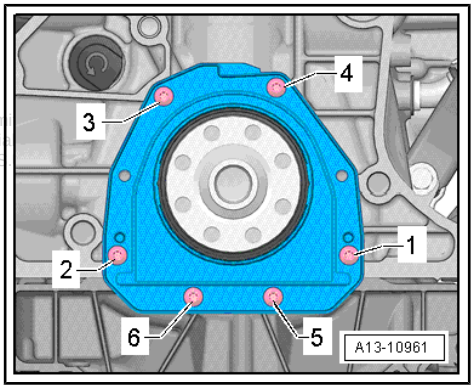
Note

♦ *The sealing flange on the gearbox side must be installed within 5 minutes after applying the silicone sealant.*

♦ *The sealant bead must not be thicker than specified otherwise excess sealant may get into the oil pan and clog the strainer in the oil suction pipe.*

– Immediately place the sealing flange on the gearbox side and tighten the screws in the sequence shown, as follows.

– Tighten screws in 2 steps in the given sequence:



Stage	Screws	Tightening torque
1.	-1…6-	by hand as far as the stop
2.	-1…6-	9 Nm

Note

Only 6 screws are fitted, 2 holes remain free.

Further installation occurs in reverse order.

3 Crankshaft

3.1 Crankshaft - Summary of components

Note

If considerable quantities of metal swarf or abrasion is found when carrying out engine repairs, this can be subject to damage to the crankshaft and conrod bearings. In order to avoid consequential damage, after the repair perform the following tasks:

- Carefully clean the oil galleries.
- Replace oil spray jets.
- Replace engine oil cooler.
- Replace oil filter.

1 - Cylinder block

- ❑ if the cylinder block is replaced, the bearing shells in the cylinder block will need to be re-assigned ⇒ page 56

2 - Bearing shell

- ❑ in cylinder block
- ❑ with lubricating groove
- ❑ do not mix up already used bearing shells (mark)
- ❑ Identification ⇒ page 56
- ❑ moisten with oil

3 - Crankshaft

- ❑ New axial clearance: 0.07 … 0.23 mm

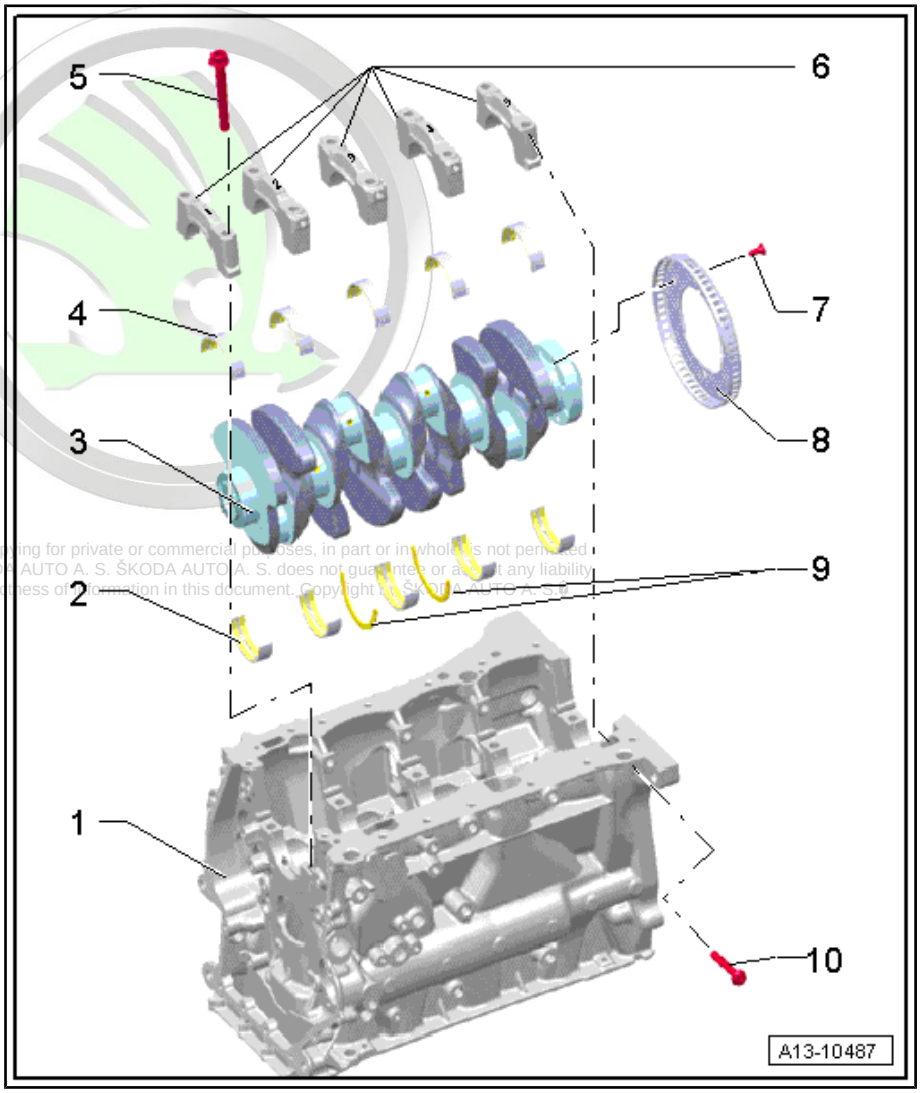
Wear limit: 0.30 mm

- ❑ Crankshaft bearing journals

♦ 1.8 l engines: ∅ 48.00 mm

♦ 2.0 l engines: ∅ 52.00 mm

- ❑ Rod bearing journals: ∅ 47.80 mm
- ❑ install the crankshaft after removal so that the sensor rotor -Pos. 8- dos not rest or is damaged.
- ❑ if the crankshaft is replaced, the bearing shells for the bearing covers will need to be re-assigned ⇒ page 56



- ❑ A needle bearing is installed in vehicles with automatic gearbox DSG
- ❑ Pulling out and driving in the needle bearing for crankshaft ⇒ page 57

4 - Bearing shell

- ❑ in bearing cap
- ❑ without lubricating groove
- ❑ do not mix up already used bearing shells (mark)
- ❑ Identification ⇒ page 56
- ❑ moisten with oil

5 - Screw

- ❑ replace
- ❑ order of tightening ⇒ page 56

6 - Bearing caps

- ❑ Bearing cover 1: Belt pulley side
- ❑ retaining lugs of the bearing shells of the cylinder block/bearing cap must be on top of one another

7 - 10 Nm + torque a further 90° (1/4 turn)

- ❑ replace
- ❑ Replace sensor rotor each time the bolts are slackened

8 - Rotor

- ❑ For engine speed sender - G28- .
- ❑ Replace sensor rotor each time the bolts are slackened
- ❑ assembly only possible in one position -holes offset-
- ❑ removing and installing ⇒ page 55

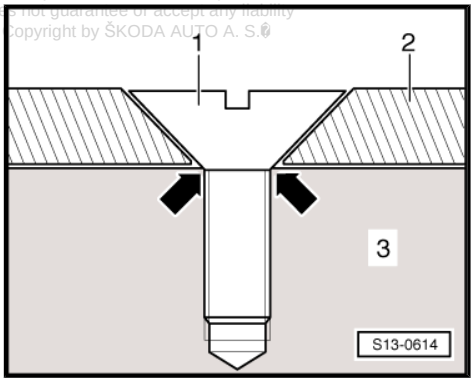
9 - Thrust washers

- ❑ for bearing 3
- ❑ moisten with oil

10 - Screw

- ❑ replace
- ❑ order of tightening ⇒ page 56

Removing and installing sensor rotor



Note

Before removing the crankshaft, ensure a suitable place is available for placing it down so that the sensor rotor does not rest on anything or get damaged.

– Always replace the sensor rotor -2- each time the bolts -1- are slackened.

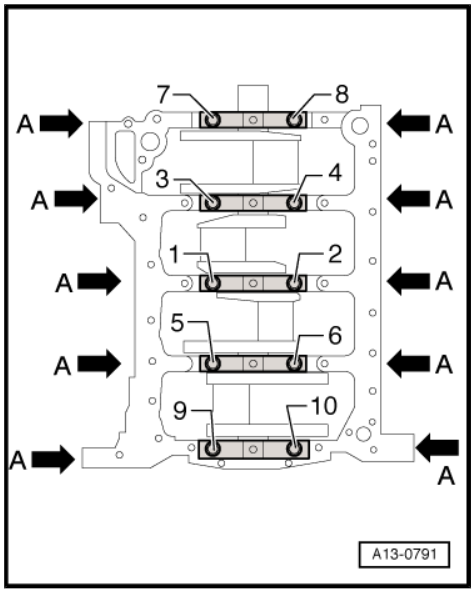
Note

- ♦ *After being attached a second time, the attachment point of the countersunk screws in the sensor rotor is sufficiently misshapen that the bolt heads rest against the crankshaft -3- -arrows-. The sensor rotor is positioned loosely underneath the screws.*
- ♦ *It is only possible to install the sensor rotor in one position, the holes are offset.*

Crankshaft - tightening sequence

– Replace all screws for crankshaft and is in the sequence -1…10- as follows:

1. Tighten the screws -1…10- and -arrows A- hand-tight.
2. Pretension screws -1…10- with 65 Nm.
3. Unscrew screws -1 ... 10Tighten - with the rigid wrench torque by 90° ($^1/_4$ turn).
4. Tighten bolts -arrows A- to 20 Nm.
5. Tighten -arrows A- with the rigid wrench torque by 90° ($^1/_4$turn).



3.2 Assign crankshaft bearing shells to the cylinder block

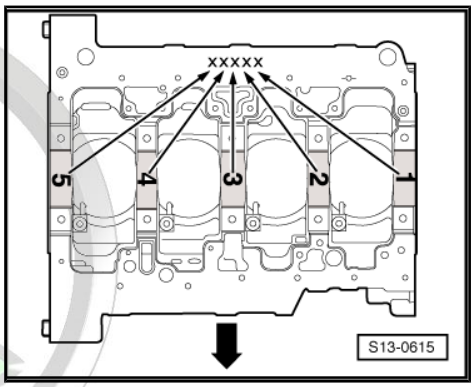
The bearing shells are allocated to the cylinder block with the right thickness at the works. Coloured points on the bearing shell are used to mark the bearing shell thickness.

Which bearing shells (upper bearing shell) must be used in which position is indicated with letters on the lower sealing surface of the cylinder block or on the front face of the cylinder block (gearbox side).

Which bearing shell (lower bearing shell for bearing cover) must be used at which position, is indicated on the crankshaft with letters.

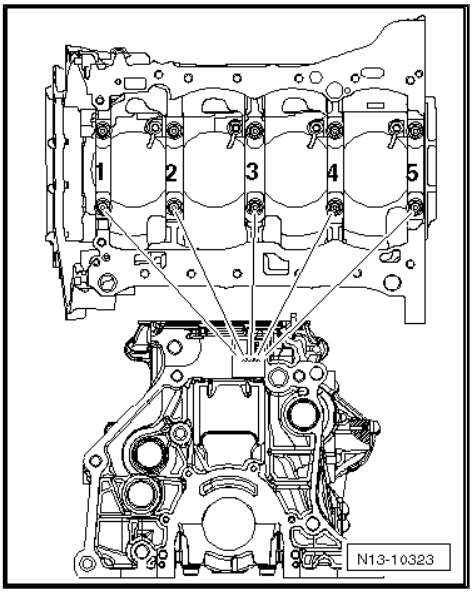
Cylinder block

The indication on the cylinder block can either be attached to the sealing surface of the oil pan (-arrow- shows the direction of travel) or on the front face of the cylinder block (gearbox side).



The indication on the cylinder block applies for the upper bearing shell (bearing shell for cylinder block).

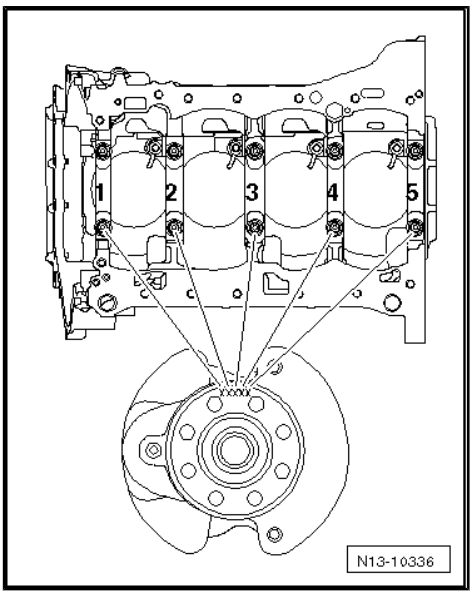
– Note down the letters and look for the colour indication to be installed using the table.



Crankshaft

The indication on the crankshaft applies for the lower bearing shell (bearing shell for bearing cover).

– Note down the letters and look for the colour indication to be installed using the table.



Letter		Bearing colour code
S	=	Black
R	=	red
B	=	Blue
G	=	yellow
W	=	white

3.3 Pulling out and driving in the needle bearing for crankshaft

Special tools and workshop equipment required

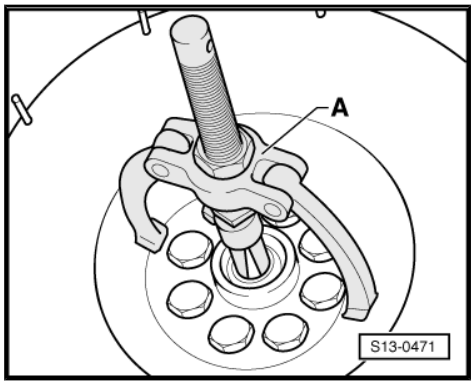
- Centering mandrel - T30029 (3176)-
- Puller - T10055- with adapter -T10055/3-
- Internal extractor Kukko 21/2

Note

Only on vehicles fitted with automatic gearbox DSG.

Removing

– Pull out with interior extractor with countersupport -A-, e.g. Kukko 21/2 with Kukko 22/1.

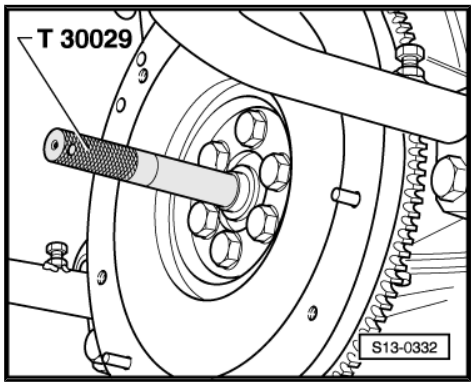


Install

Fitting position of the needle bearing:

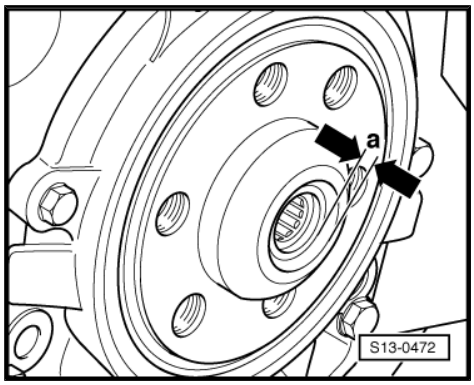
- The marked side of the needle bearing should be visible when in its installed condition.

– Drive in using a centering pin -T30029-



Depth of installation of the needle bearing:

- Dimension a = 2 mm.



4 Balancing shafts

4.1 Balancing shafts - Summary of components

1 - 4 Nm + torque a further 45° (1/8 turn)

- ❑ replace

2 - Balancing shaft

- ❑ Outlet side
- ❑ replace after removal
- ❑ wet bearing with engine oil
- ❑ Renew ⇒ page 63

3 - Needle sleeve

- ❑ Needle sleeves of the same colour can only be used

4 - Pipe for balancing shaft

- ❑ Fitting position ⇒ page 60

5 - Cylinder block

6 - Sealing ring for balancing shaft for inlet camshaft

- ❑ replace ⇒ page 62

7 - Balancing shaft

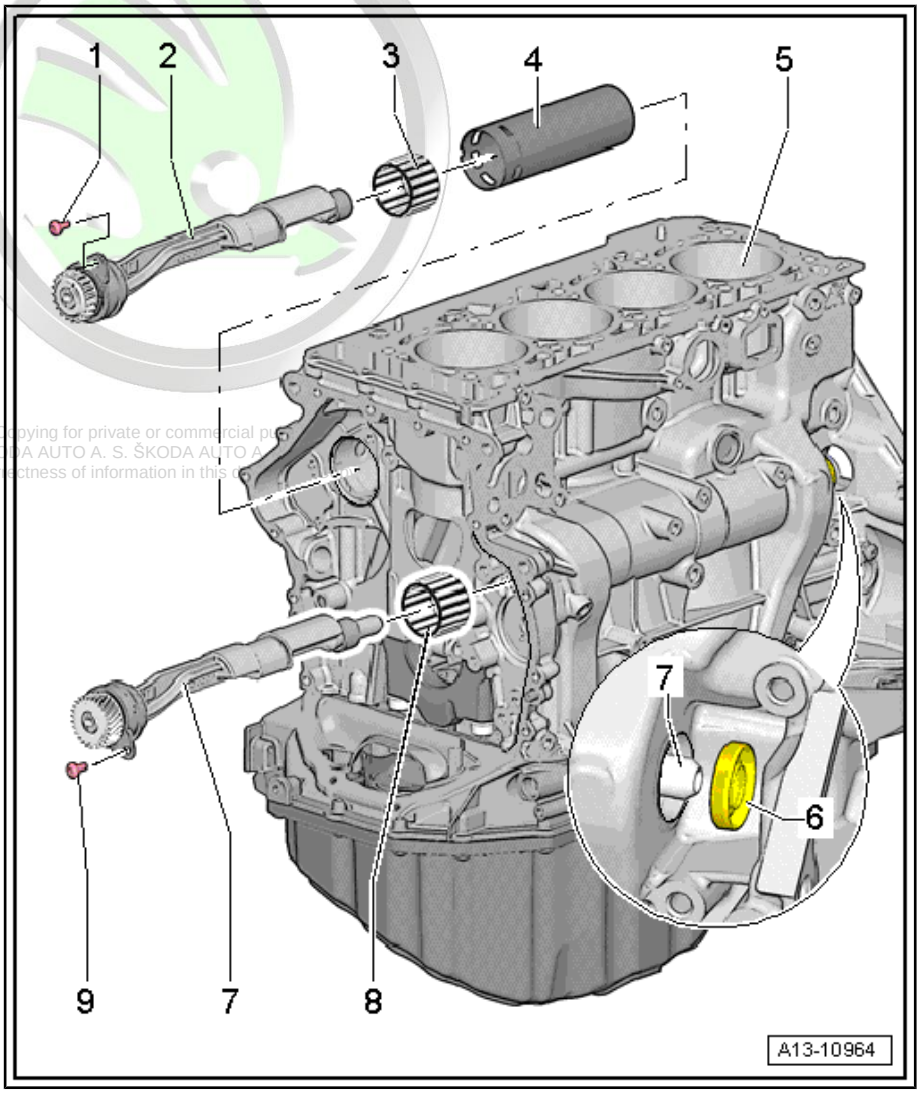
- ❑ Inlet side
- ❑ replace after removal
- ❑ wet bearing with engine oil
- ❑ replace ⇒ page 60

8 - Needle sleeve

- ❑ Needle sleeves of the same colour can only be used

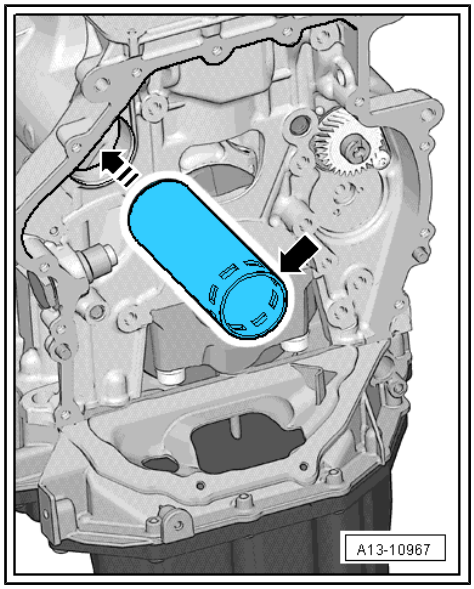
9 - 4 Nm + torque a further 45° (1/8 turn)

- ❑ replace



Inlet camshaft of the pipe for balancing shaft

- The bores -arrows- must face the chain side

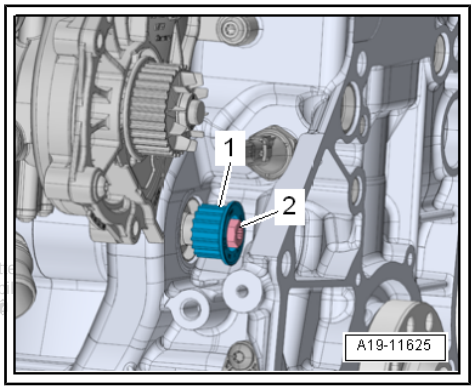


4.2 removing and installing balancing shaft for inlet camshaft

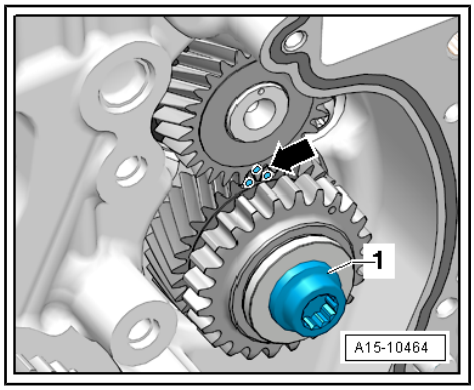
Removing

- Engine is removed

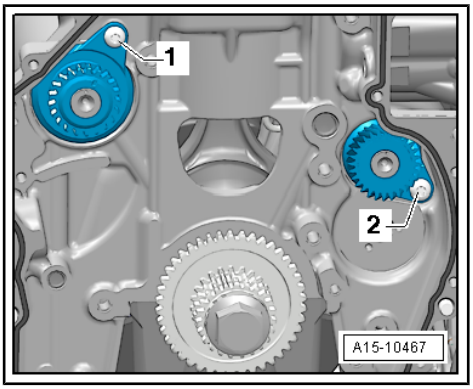
– Remove toothed belt pulley for coolant pump ⇒ page 168 .
– Remove top cover for timing chain ⇒ page 73 .
– Remove below cover for timing chain ⇒ page 75 .
– removing camshaft timing shaft ⇒ page 82 .
– removing balancing shaft timing chain ⇒ page 94 .
– Unscrew screw -2-.
– Remove drive wheel -1- for toothed belt for coolant pump.



– Remove intermediate shaft wheel -1-.

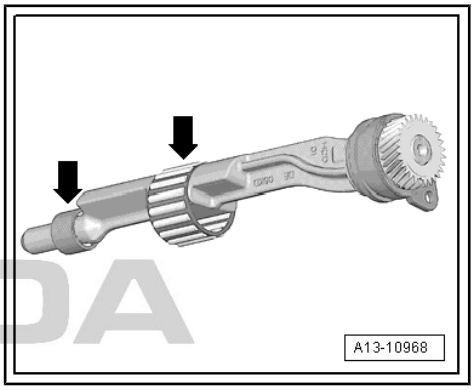


– Remove screw -2- for balancing shaft for inlet camshaft and remove the balancing shaft.

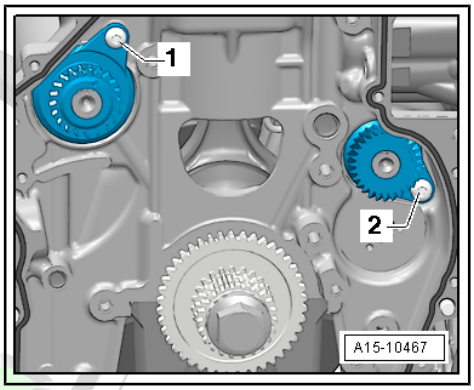


Install

– Wet bearing of the balancing shaft -arrows- with engine oil.

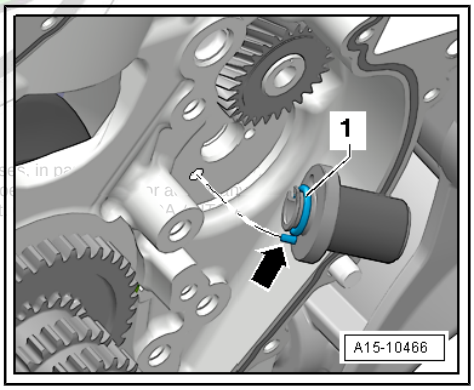


– Install the balancing shaft for inlet camshaft and tighten the screw -2-.



– Replace O-ring -1- and moisten with engine oil.

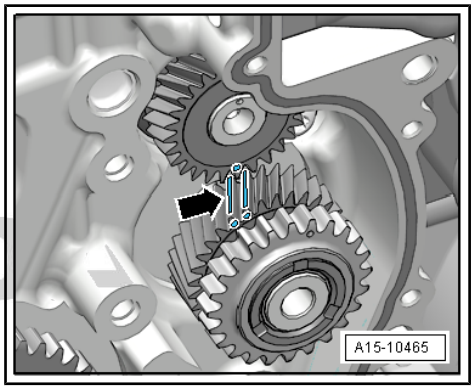
– Wet the bearing bolts with engine oil and enters the cylinder block so that the fit pin -arrow-engages in the bore in the cylinder block.



Caution

- ***The intermediate shaft wheel must be replaced. Otherwise, the backlash cannot be adjusted - engine damage!***
- ***The new intermediate shaft wheel has a smooth paint covering which wears off after a short running time, and thus automatically sets the backlash.***

– Mark the toothed flanks of two adjacent teeth of the intermediate shaft wheel with colour -arrow-.
– Slide in the intermediate shaft wheel, the mark on the balancing shaft must be between the marks on the toothed flanks of the intermediate shaft wheel.
– Fit the new screw -1- for the intermediate shaft wheel and tighten as follows:

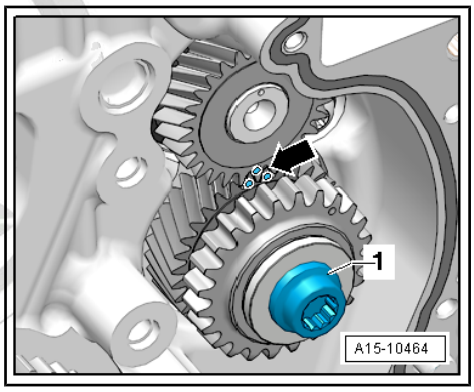


1. Pretighten to 10 Nm.
2. Turn intermediate shaft wheel.

The intermediate shaft wheel must not have any play. Otherwise undo and re-tighten.

3. Tighten to 25 Nm.
4. Using a rigid wrench torque a further 90° ($^1/_4$ turn).

– Check marks on intermediate shaft wheel/balancing shaft -arrow-.



Installation is carried out in the reverse order. However, pay attention to the following:

– installing balancing shaft timing chain ⇒ page 94 .
– installing camshaft timing shaft ⇒ page 82 .
– Install below cover for timing chain ⇒ page 75 .
– Install top cover for timing chain ⇒ page 73 .
– Replace sealing ring for balancing shaft for inlet camshaft ⇒ page 62
– Install toothed belt pulley for coolant pump ⇒ page 168 .
• Tightening torques ⇒ page 59

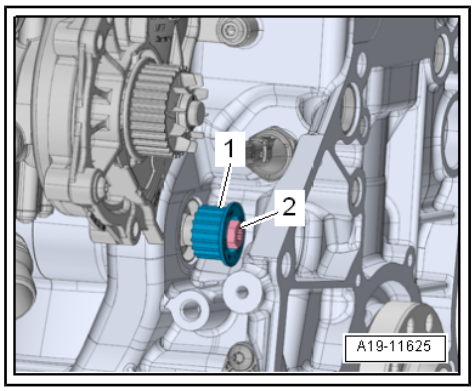
4.3 Replace sealing ring for balancing shaft for inlet camshaft

Special tools and workshop equipment required

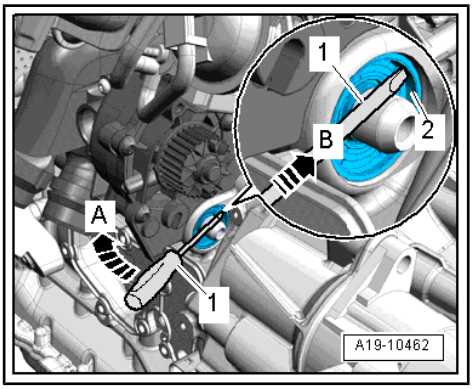
♦ Thrust piece - T10353/1-

Work procedure

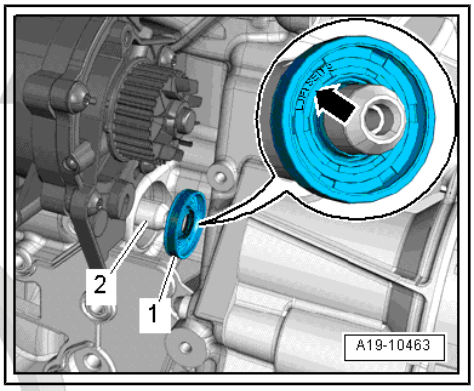
– Remove toothed belt pulley for coolant pump ⇒ page 168 .
– Unscrew screw -2-.
– Remove drive wheel -1- for toothed belt for coolant pump.



– Press the screwdriver -1- firmly onto the surface -2- of the sealing ring -arrow B-.
– Lever out seal -arrow A-.
– Clean the friction and sealing surface.



– Wet sealing surface of the balancing shaft -2- with transmission oil.
– Slide the seal -1- onto the balancing shaft.
• The lettering (“Outside”) -arrow- must be legible from the outside.

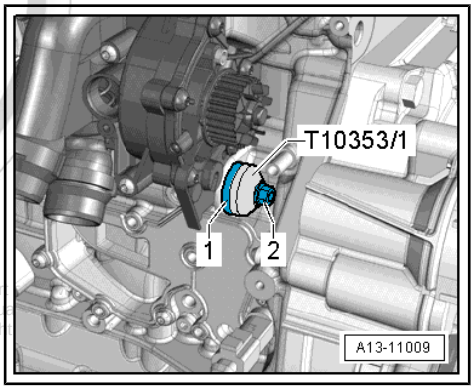


WARNING

Risk of damaging the thread.

- *The screw for the drive wheel has a left-hand thread.*

– Place the thrust piece - T10353/1- on the seal -1- and press into the cylinder block as far as the stop with the screw -2-; do not tilt the seal while doing so.
– Install toothed belt pulley for coolant pump ⇒ page 168 .

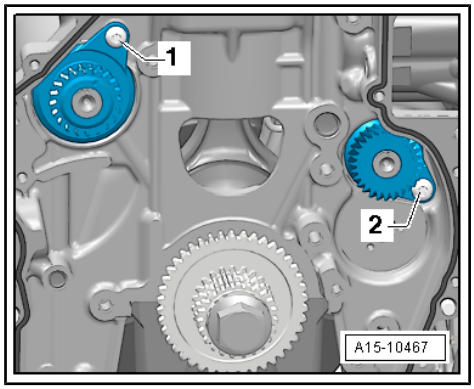


4.4 removing and installing balancing shaft for exhaust camshaft

Removing

• Engine is removed.
– Remove top cover for timing chain ⇒ page 73 .
– Remove below cover for timing chain ⇒ page 75 .
– removing camshaft timing shaft ⇒ page 82 .
– removing balancing shaft timing chain ⇒ page 94 .

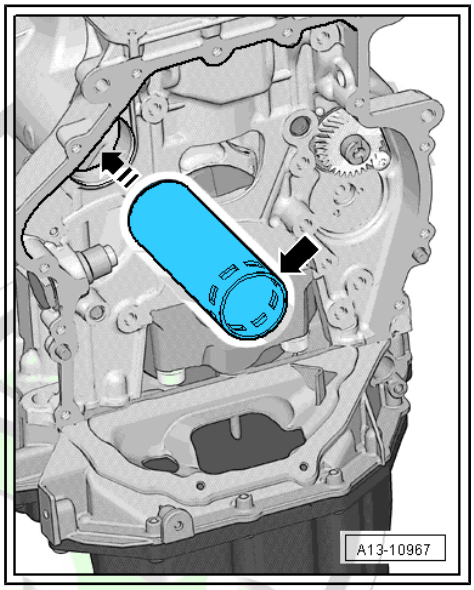
– Remove screw -1- for balancing shaft for inlet camshaft and remove the balancing shaft.



Install

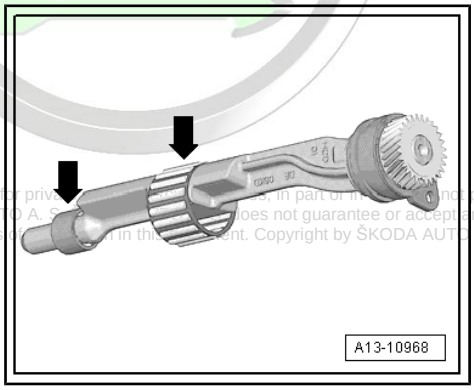
- Tightening torques ⇒ page 59

– Check the installation position of the pipe for the balancing shaft; the bores -arrow- must face the chain side.

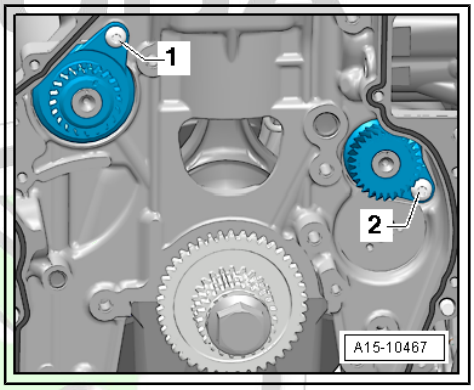


– Wet bearing of the balancing shaft -arrows- with engine oil.

– Install the balancing shaft for the exhaust camshaft.



– Before tightening the screw -1- check whether the balancing shaft rests plane against the crankshaft housing.



Note

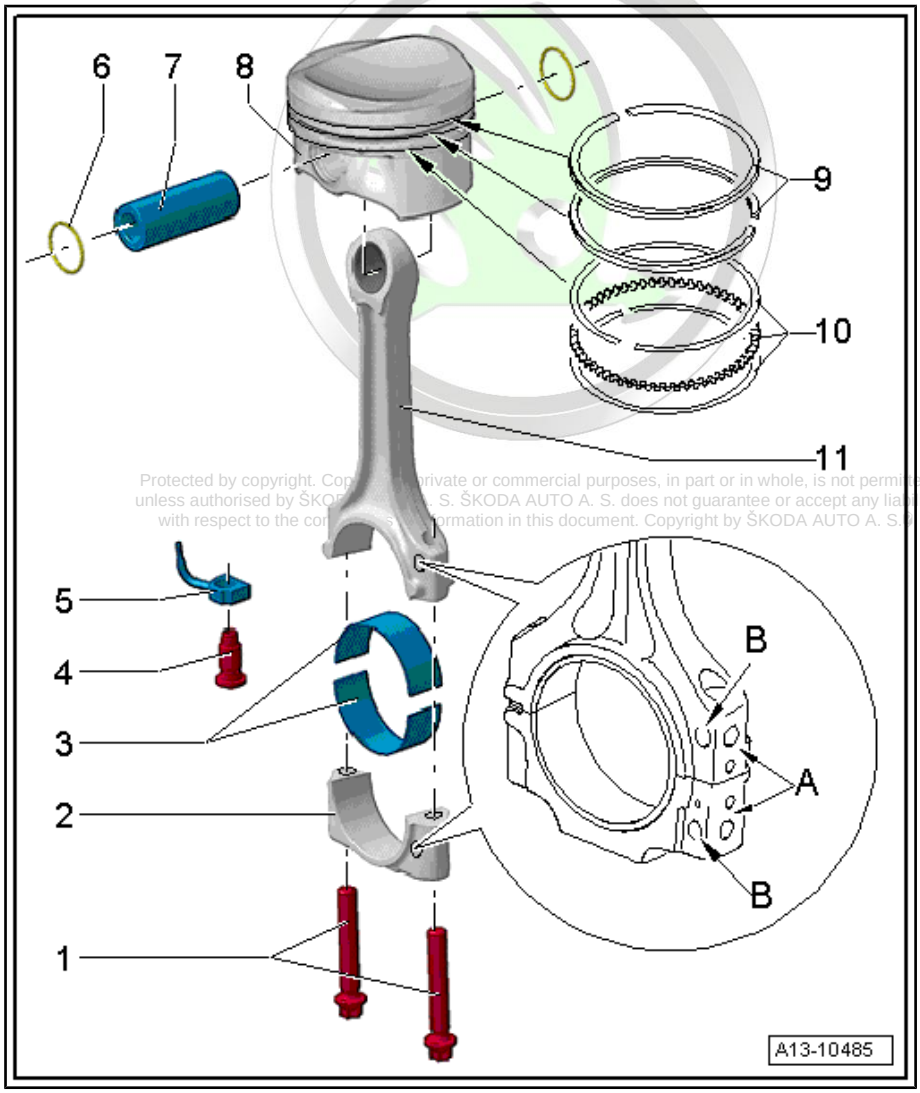
If the balancing shaft does not rest plane, the pipe for the balancing shaft will need to be refitted.

Further installation occurs in reverse order. However, pay attention to the following:

– installing balancing shaft timing chain ⇒ page 94 .
– installing camshaft timing shaft ⇒ page 82 .
– Install below cover for timing chain ⇒ page 75 .
– Install top cover for timing chain ⇒ page 73 .

5 Pistons and conrods

5.1 Piston and conrod - Summary of components



1 - Conrod bolt

- ❑ replace
- ❑ Oil threads and contact surface
- ❑ M9: 45 Nm + torque a further 90° ($^1/_4$ turn)

2 - Conrod bearing cap

- ❑ Check fitting position
- ❑ as a result of the conrods separated in the cracking process, the cover fits only in one position and only to the relevant conrod
- ❑ mark matching cylinder -A-
- ❑ Fitting position: Markings -B- point to belt pulley side

3 - Bearing shells

- ❑ pay attention to correct installation position ⇒ page 67
- ❑ Do not interchange used bearing shells.
- ❑ New axial clearance: 0.10 … 0.35 mm

  Wear limit: 0.4 mm
- ❑ Moisten with oil before installing

4 - Pressure relief valve, 27 Nm

5 - Oil spray jet

- ❑ for piston cooling

6 - Circlip

- ❑ replace

7 - Piston pin

- ❑ If difficult to remove, heat piston to 60 °C.
- ❑ use drift - VW 222 A- for removing and installing
- ❑ Moisten with oil before installing

8 - Piston

- ❑ Mark installation position and cylinder number.
- ❑ arrow on the piston crown faces towards the belt pulley side
- ❑ Install using piston ring clamp.
- ❑ removing and installing ⇒ page 67
- ❑ check ⇒ page 69
- ❑ inspect cylinder bore ⇒ page 70

- ∅ piston: 82.420 mm (nominal dimension)
- ∅ cylinder: 82.51 mm (nominal dimension)

9 - Piston rings

- Offset gaps by 120°
- use piston ring pliers for removing and installing
- Label “TOP” or manufacturer's mark must point upwards towards the piston crown
- Checking ring gap ⇒ page 68 .
- Checking ring-to-groove clearance ⇒ page 69 .

10 - Oil scraper ring

- 2 part
- Install joint, offset to adjacent compression ring by 120°
- Checking ring gap ⇒ page 68 .
- Ring-to-groove clearance not measurable.

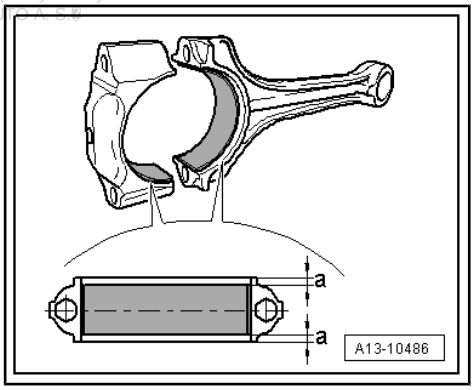
11 - Conrod

- with a split bearing cap
- Renew as set only
- mark matching cylinder -A-
- Fitting position: Markings -B- point to belt pulley side
- separate new conrod ⇒ page 70

Bearing shell installation position

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

The dimension -a- must be the same on the right and left.



5.2 Removing and installing the piston

Special tools and workshop equipment required

- Drift - VW 222 A-
- Piston ring pliers

Removing

– Remove engine ⇒ page 11 .

– Secure engine to the assembly stand ⇒ page 27 .

– Remove cylinder head ⇒ page 101 .

– Remove sump top part ⇒ page 140 .

– Mark installation position and assignment of the piston to the cylinder.

– Mark installation position and assignment of the connecting rod to the cylinder ⇒ page 66 .

– Remove big-end bearing cap and pull out piston with connecting rod upwards.

– Remove compress circlips.

Note

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

– Remove piston pin with mandrel - VW 222 A- .

Install

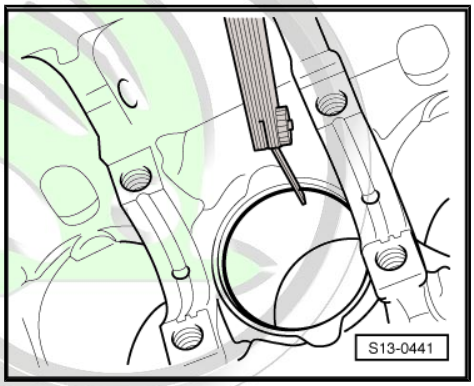
Installation is carried out in the reverse order. However, pay attention to the following:

Note

- *Replace screws which have been tightened firmly to a torquing angle.*
- *Arrow on piston crown faces towards the belt pulley side*
- *Offset piston ring joint by 120°*
- *Lubricate the contact surfaces of the bearing shells.*
- *Tightening torques and information about installation* ⇒ page 66 .

5.3 Inspect piston, piston rings and cylinder bore

Checking piston ring gap



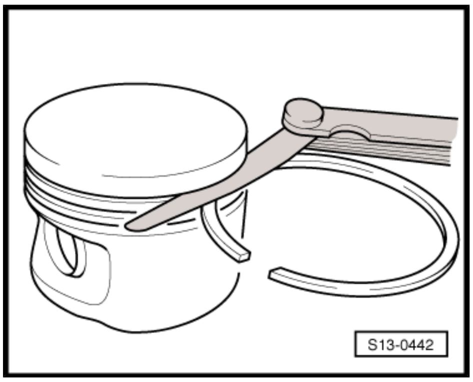
Special tools and workshop equipment required

- Feeler gauges

– Push ring squarely from above down into cylinder bore to approx. 15 mm from bottom end of cylinder.

Piston ring		Gap clearance	
		New	Wear limit
Compression rings	mm	0.20 … 0.40	0.8
Oil scraper ring	mm	0.25 … 0.50	0.8

Checking ring-to-groove clearance



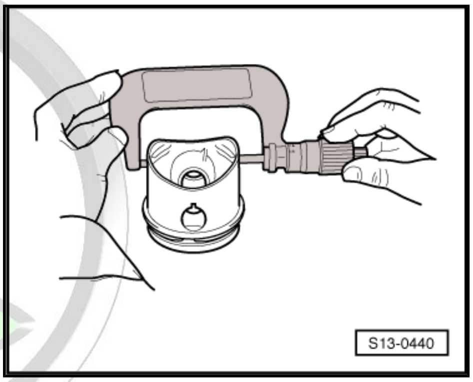
Special tools and workshop equipment required

♦ Feeler gauges

– Clean the annular groove before inspecting.

Piston ring		End clearance	
		New	Wear limit
Compression rings	mm	0.06 … 0.09	0.20
Oil scraper ring	mm	0.03 … 0.06	0.15

Checking piston



Special tools and workshop equipment required

♦ External micrometer 75...100 mm

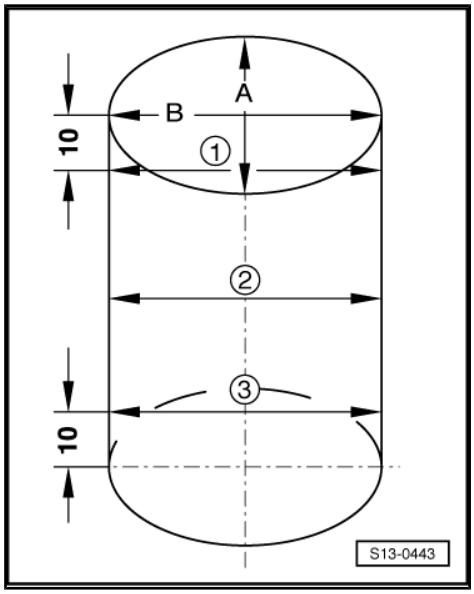
– Measure about 10 mm from the lower edge and offset 90° to piston pin axis.

Deviations from specified dimension: max. 0.04 mm

		∅ piston
Basic dimension	mm	82.420[1)]

[1)] Dimensions with graphite coating (thickness 0.02 mm). The graphite coating wears off.

Checking cylinder bores



Special tools and workshop equipment required

- Internal precision measuring instrument 50...100 mm

– Measure at three points crosswise in a transverse direction -A- and lengthwise -B-.

  Deviations from specified dimension: max. 0.08 mm

		Ø cylinder bore
Basic dimension	mm	82.51

Note

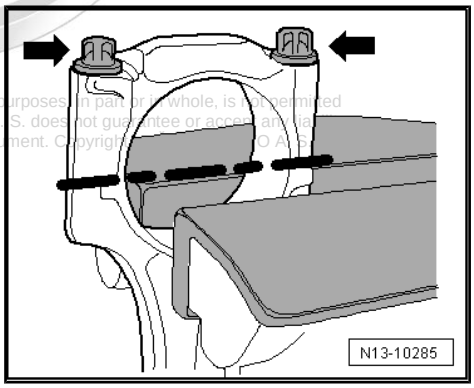
Do not measure the cylinder bore if the cylinder block is fixed to the assembly stand - MP1-202- with the engine mount - MP9-101- , as this may result in incorrect measurements.

5.4 Separating new conrod

It can happen that on new conrods, the provided separation point is not completely cracked. If the conrod bearing cap cannot be removed by hand, then proceed as follows:

– Mark the assignment of the conrod to the cylinder.

– Slightly tension the conrod, as shown in the illustration, in a vice provided with aluminium protective jaws.

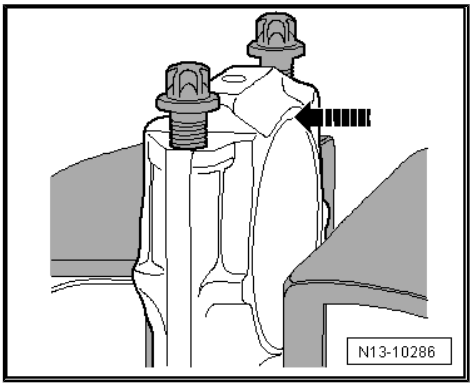


Note

- *Only tension the conrod slightly in order to avoid damage.*
- *The conrod is clamped below the broken line.*

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

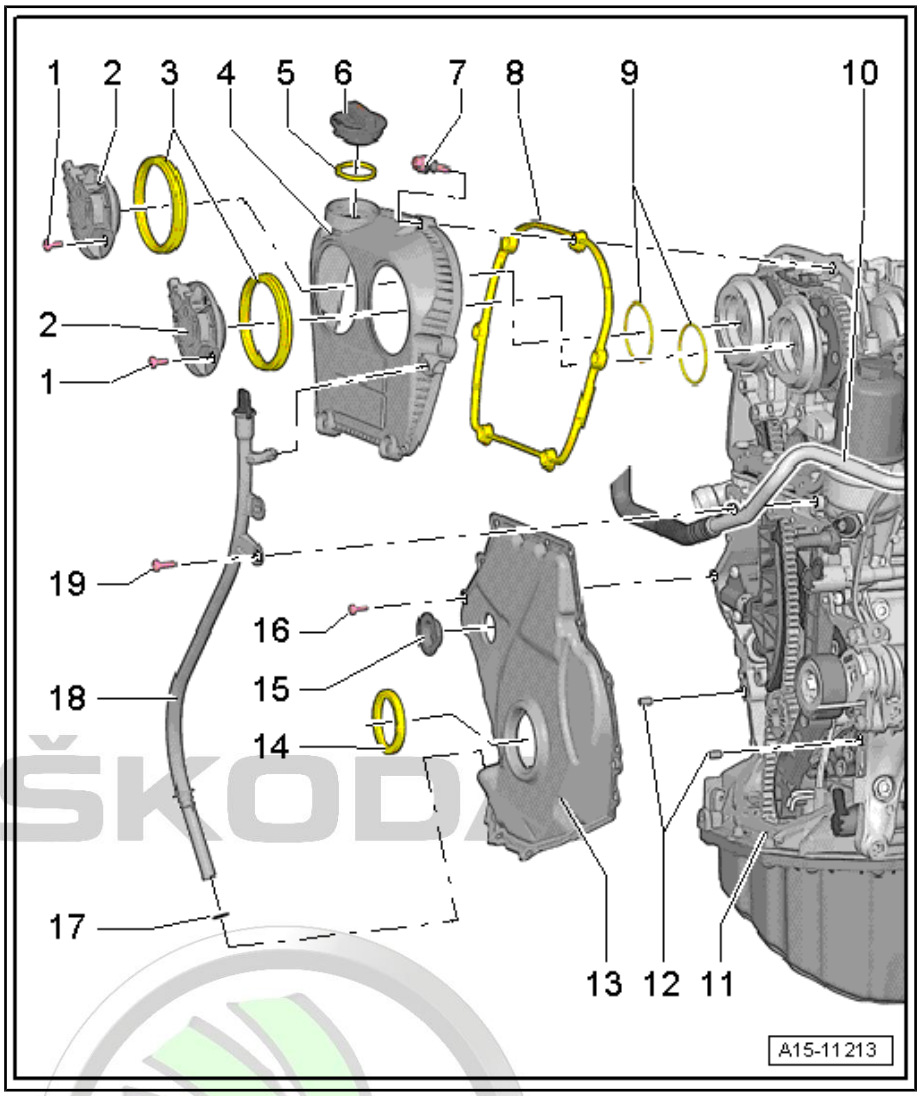
– Using a plastic hammer, carefully knock against conrod bearing cap in -direction of arrow- until it is loose.



15 – Cylinder head, valve gear

1 Covers for timing chains

1.1 Covers for timing chains - Summary of components



1 - 4 Nm + torque a further 45° (1/8 turn)

2 - Camshaft control valve 1 in the exhaust - N318- and valve 1 for camshaft control - N205-

3 - Gasket rings
- ❑ replace

4 - Install top cover for timing chain
- ❑ removing and installing ⇒ page 75

5 - Gasket
- ❑ Renew if damaged

6 - Screw cap

7 - Screw
- ❑ order of tightening ⇒ page 75

8 - Gasket
- ❑ Renew if damaged

9 - O-ring
- ❑ replace
- ❑ Moisten with oil before installing

10 - Front coolant pipe

11 - Engine

12 - Dowel pins
- ❑ for centering the bottom cover for timing chain

13 - Install top cover for timing chain
- ❑ with gasket
- ❑ replace ⇒ page 75

14 - Sealing ring
- ❑ for crankshaft V-ribbed belt pulley
- ❑ replace ⇒ page 79

15 - Plug
- ❑ Replacing

16 - Screw
- ❑ replace
- ❑ order of tightening ⇒ page 75

17 - O-ring

- ❑ replace
- ❑ Moisten with oil before installing

18 - Dipstick discharge

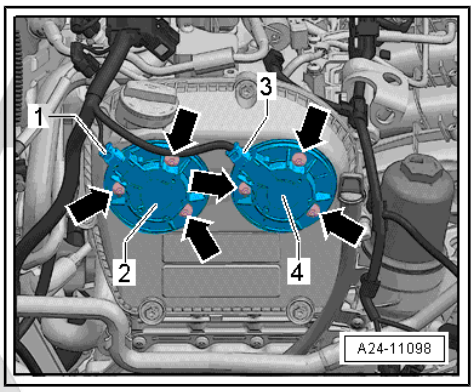
19 - 9 Nm

1.2 Removing and installing -N205- / -N318- the camshaft adjustment valves

Removing

– Remove connector -1- from Camshaft control valve 1 in the exhaust - N318- -2- and connector -3- from Camshaft control valve 1 - N205- -4-.

– Unscrew screws -arrows- and remove Camshaft control valve 1 - N205- and Camshaft control valve 1 in the exhaust - N318- .



Install

Installation is carried out in the reverse order. However, pay attention to the following:

- Tightening torques ⇒ page 72

Note

Replace gasket rings and O-rings.

– Weat surface of seal in the direction of Camshaft control valve 1 - N205- and Camshaft control valve 1 in the exhaust - N318- with engine oil.

1.3 Removing and installing top cover for timing chain

Special tools and workshop equipment required

♦ Hose binding claw - VAS 6362-

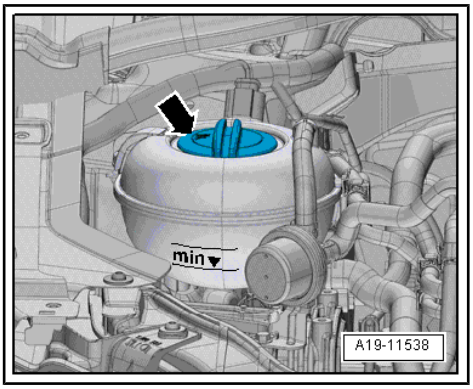
♦ Sealant ⇒ ETKA - Electronic catalogue of original parts

Removing

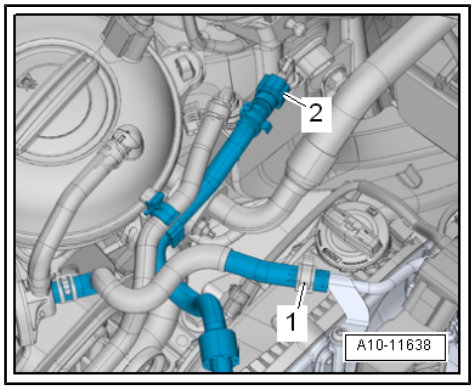
- Engine cold

– Remove residual pressure from the cooling system by briefly opening the cap -arrow- of the coolant expansion tank.

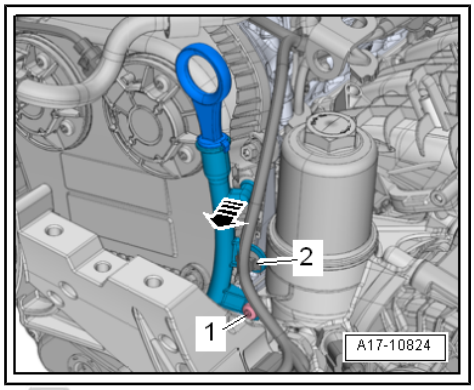
– Remove engine cover ⇒ page 10 .



– Undo hose clamp -1-, remove coolant hose, and push to the right side.
– Press the release buttons on the hose -2- for the activated charcoal filter, remove the hose, and expose.
– Remove camshaft control valve 1 - N205- and camshaft control valve 1 in the exhaust - N318- ⇒ page 73 .



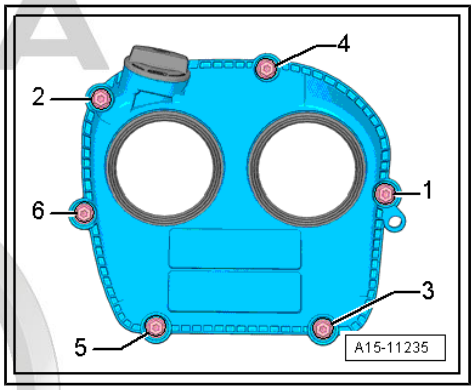
– Unscrew screw -1-.
– Undo guide pipe for dipstick from the mount on the top cover for the timing chain -arrow-.



Note

Do not pay attention to the position -2-.

– Undo screws -1 to 6- and remove the top cover for the timing chain.
– Remove screws -3, 5- as required.



Install

Installation is carried out in the reverse order. However, pay attention to the following:

- Tightening torques ⇒ page 72

Note

Replace gasket rings.

WARNING

Risk of contamination of the lubrication system by sealant residues.

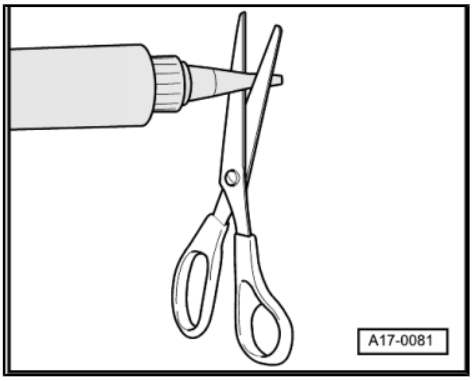
- ***Place clean cloths over the open part of the oil sump.***

– Remove the residual sealant from the bearing cap.
– 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. 1.5 mm).



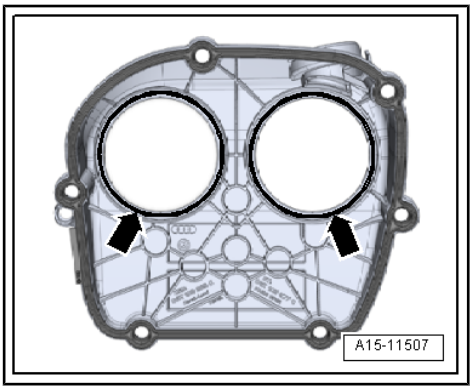
WARNING

Risk of blockage of the lubrication system through excess sealant.

- ***The sealant bead must not be thicker than specified.***

– Apply sealant beads to the clean sealing surfaces as shown -arrows-.

• Thickness of sealant bead: 2 mm



Note

The top cover for the timing chain must be installed within 5 minutes after applying the sealant.

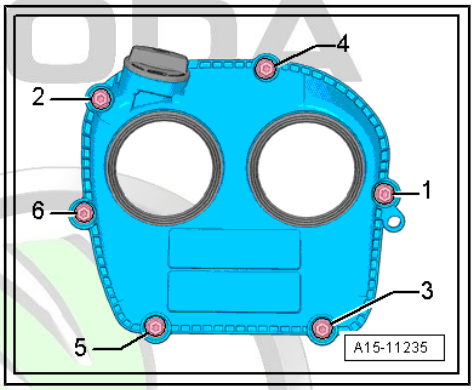
– Install top cover for timing chain.

Tightening sequence for top cover for timing chain

– Tighten screws -1 to 6- in the order shown:

– Tighten screws to 9 Nm.

– Install camshaft control valve 1 - N205- and camshaft control valve 1 in the exhaust - N318- ⇒ page 73 .



1.4 Removing and installing bottom cover for timing chain

Special tools and workshop equipment required

- Thrust piece - T10368-
- Protective goggles
- Protective gloves
- 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.
- Sealant ⇒ ETKA - Electronic catalogue of original parts

Removing

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

– Remove engine support ⇒ page 36 .

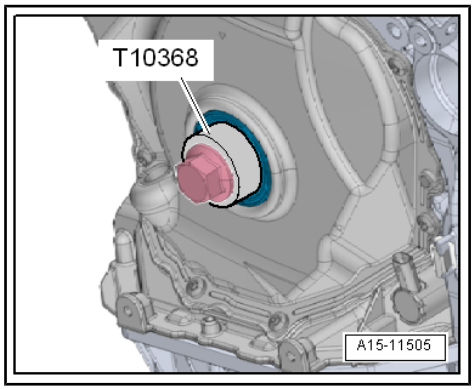
– Remove tensioning pulley for V-ribbed belt ⇒ page 46 .

– Remove poly V-belt pulley from crankshaft ⇒ page 48 .

Caution

To prevent damage to the teething, only use a thrust piece - T10368- to turn the screw for the crankshaft V-ribbed belt pulley.

– Turn the screw for the crankshaft V-ribbed belt pulley with thrust piece - T10368- further.



WARNING

Risk of destruction of the engine.

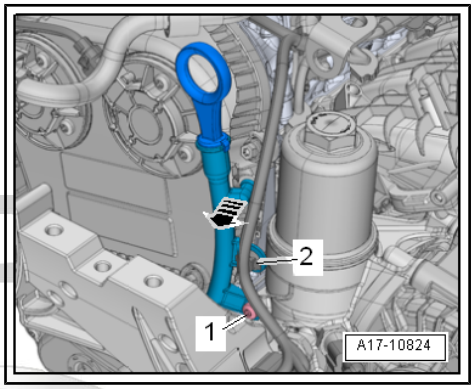
- *So as not to adjust the timing the crankshaft must not be turned out of the "TDC" position while the ribbed belt pulley is removed.*

– Undo the retaining clip -arrow- on the electric wire harness.

– Unscrew screw -1-.

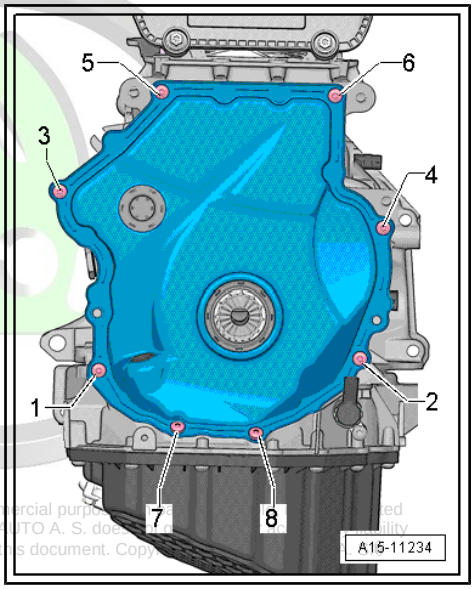
– Undo guide pipe for dipstick from the mount on the top cover for the timing chain -arrow-.

– Remove the guide pipe for dipstick from the cover for the timing chain.



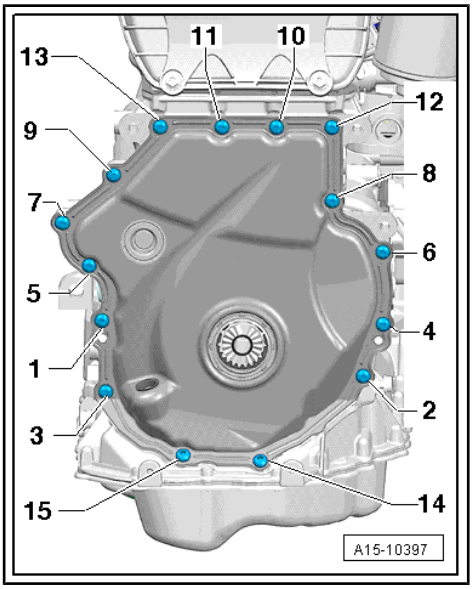
Cover with 8 screws

– Undo screws -1 … 8-.



Cover with 15 screws

– Undo screws -1 … 15-.



For all versions

– Cut through the sealant with a sharp flat spatula at the accessible places all the way around the bottom cover for the timing chain.

– Carefully, and in stages, pry open the bottom cover for timing chain with a spatula to prevent it from being deformed.

Install

Note

- *Silicone sealant: ⇒ ETKA - Electronic Catalogue of Original Parts. .*
- *Pay attention to the use by date on silicone sealant.*
- *The bottom cover for the timing chain must be installed within 5 minutes after applying the sealant.*
- *Replace screws which have been tightened to a torquing angle.*
- *Replace the gaskets, sealing rings and self-locking nuts.*

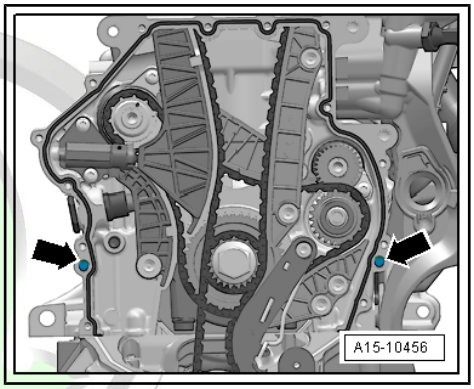
WARNING

Wear protective gloves when working with sealant and grease remover!

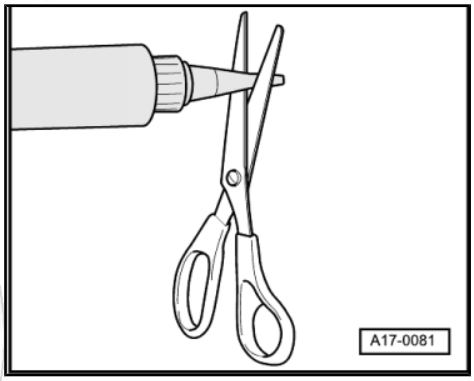
– Remove residual sealant from the sealing surfaces on the cylinder block, upper part of the oil pan, and on the bottom cover with chemical sealant remover.

– Degrease the sealing surfaces.

– Check whether both fitted pins -arrows- are present for centering the bottom cover for timing chain.

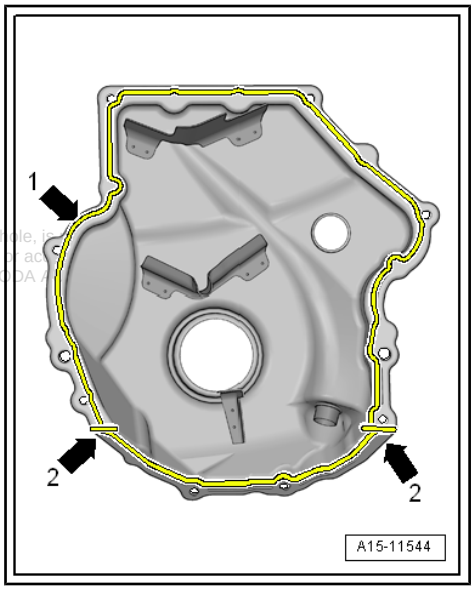


– Cut off nozzle on tube at front marking (∅ of nozzle approx. 3 mm).
– Apply the silicone sealant to the clean sealing surface of the bottom cover for timing chain -arrow 1- and to the surfaces -arrows 2- as shown in the figure.



Cover with 8 screws

Thickness of sealant bead: 2 … 3 mm

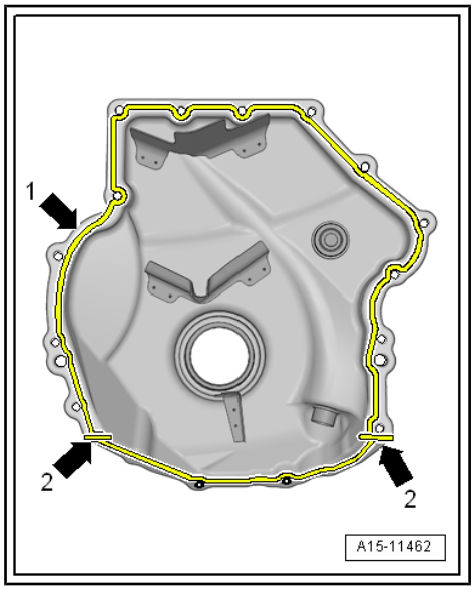


Cover with 15 screws

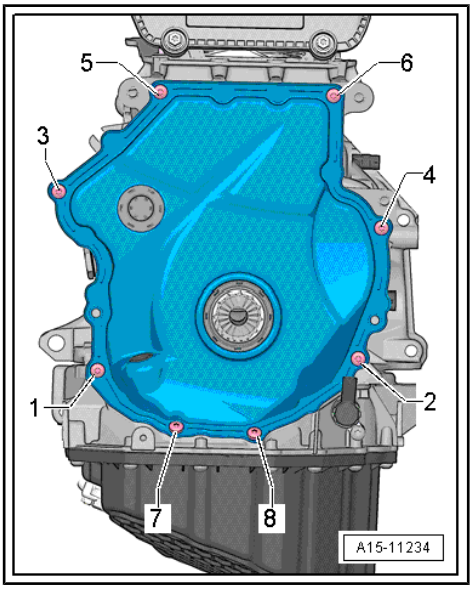
- Thickness of sealant bead: 2 … 3 mm

Note

- *The bottom cover for the timing chain must be installed within 5 minutes after applying the sealant.*
- *The sealant bead must not be thicker than specified otherwise excess sealant may get into the oil pan and clog the strainer in the oil suction pipe.*

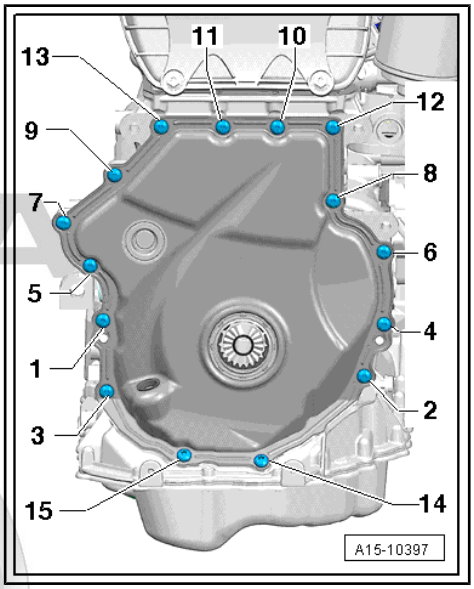


Tightening sequence for bottom cover for timing chain with 8 screws



– Tighten screws -1 to 8- in 2 stages in the order shown:
– 1. Tighten screws to 8 Nm.
– 2. 45° (torque a further 90° ($^1/_8$ turn).

Tightening sequence for bottom cover for timing chain with 15 screws



– Tighten screws -1 to 15- in 2 stages in the order shown:
– 1. Tighten screws to 8 Nm.
– 2. 45° (torque a further 90° ($^1/_8$ turn).

Note

Let sealing compound dry for approx. 30 minutes after installing cover. Only then fill with engine oil.

Further installation occurs in reverse order. However, pay attention to the following:

– Install tensioner pulley for V-ribbed belt ⇒ page 46 .
– Adjust the assembly bracket ⇒ page 40 .
– Fill engine oil ⇒ Maintenance ; Booklet Octavia III .

1.5 Replace seal for the V-ribbed belt pulley crankshaft.

Special tools and workshop equipment required

♦ Thrust piece - T10354-
♦ Thrust piece - T10368-
♦ Puller hooks - T40274-
♦ Cleaning and degreasing agent , e.g. -D 009 401 04-

Removing

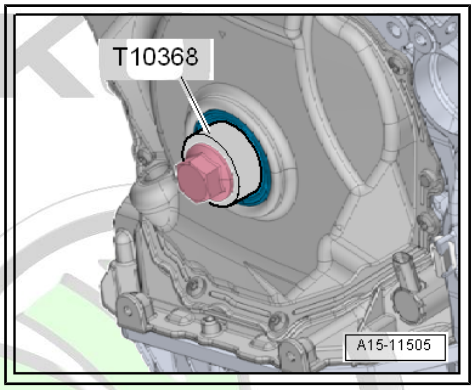
– Remove poly V-belt pulley from crankshaft ⇒ page 48 .

– Turn the screw for the crankshaft V-ribbed belt pulley with thrust piece - T10368- further.

WARNING

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.*

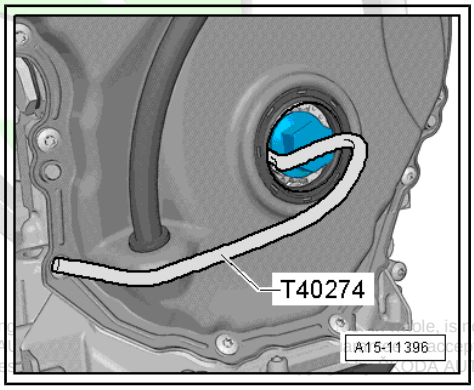


– Remove seal -1- with extractor hook - T40274- .

Install

WARNING

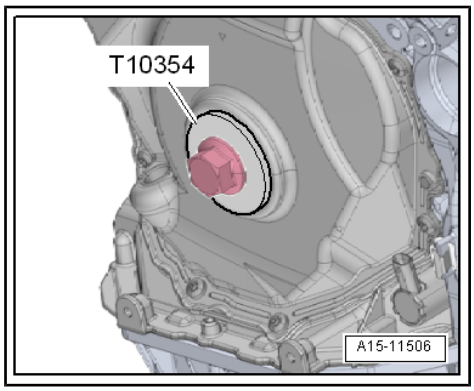
Wear protective gloves when working with sealant and grease remover!



– Clean the bottom cover for the timing chain in the area of the seal fitting. it must be free of oil and grease.

– Remove thrust piece - T10368- .

– Insert thrust piece -arrow- with thrust piece - T10354- and screw for the V-ribbed belt pulley crankshaft up to the stop.



Note

Replace the screw for the V-ribbed belt pulley crankshaft with O-ring.

Further installation occurs in reverse order. However, pay attention to the following:

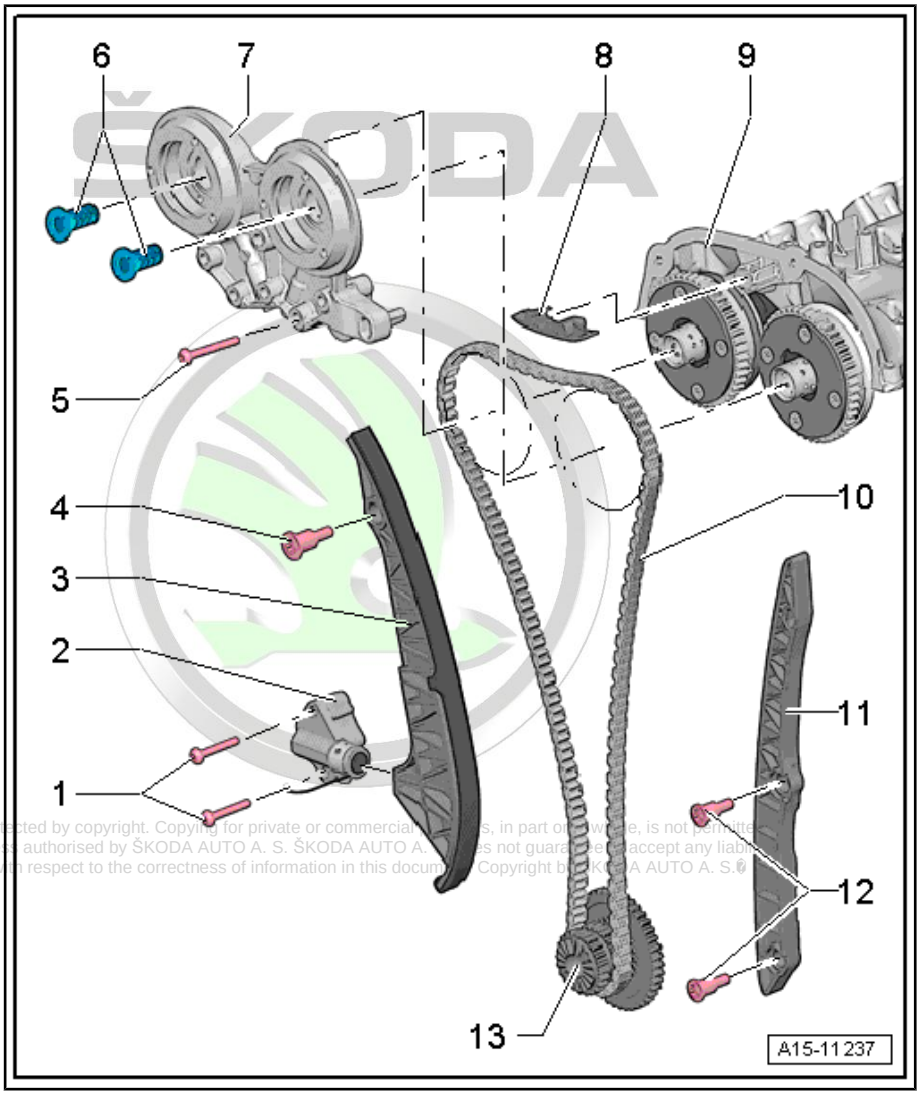
– Installing the V-ribbed belt pulley crankshaft ⇒ page 48 .

2 Chain drive

2.1 Camshaft timing shaft - Summary of components

Note

After working on the chain drive, carry out the adjustment of the timing belt length ⇒ Vehicle diagnostic tester.



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

2 - Chain tensioner
- ❑ is under spring tension
- ❑ before moving it, pin it with a rig pin - T40267-

3 - Tensioning rail for timing chain

4 - Guide bolt
- ❑ 20 Nm

5 - 4 Nm + torque a further 180° (1/2 turn)
- ❑ replace

6 - Control valves, 35 Nm
- ❑ Left-hand thread
- ❑ Remove with assembly tool -T10352/2-

7 - Bearing caps

8 - Sliding rail
- ❑ for camshaft timing shaft

9 - Camshaft housing

10 - Camshaft timing shaft
- ❑ mark direction of rotation in colour before removing

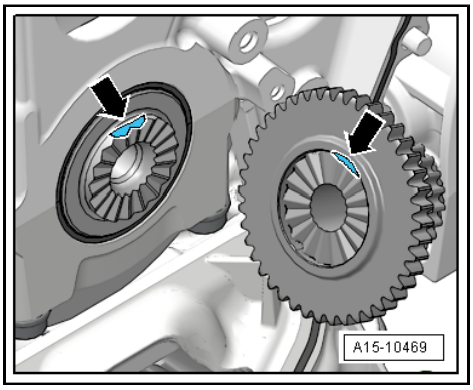
11 - Sliding rail
- ❑ for camshaft timing shaft

12 - Guide bolt, 20 Nm

13 - Three-stage chain sprocket
- ❑ at the crankshaft
- ❑ Fitting position ⇒ page 82

Chain sprocket to crankshaft - fitting position

- The two areas -arrows- must face each other.



2.2 Removing and installing the camshaft timing shaft

Special tools and workshop equipment required

- ♦
- ♦ Assembly device - T10352/2-
- ♦ Rig pin - T40011-
- ♦ Rig tool - T40267-
- ♦ Counterholder - T10355-
- ♦ Camshaft clamp - T40271-
- ♦ Lever - T40243-
- ♦ Thrust piece - T10368-
- ♦ Assembly device - T40266-

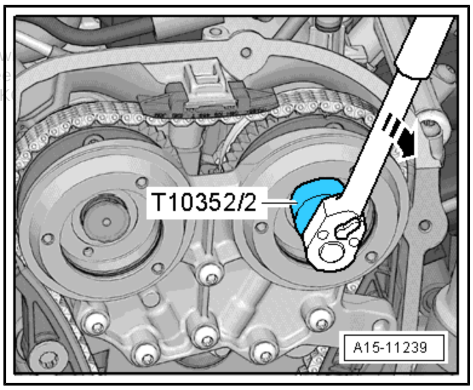
Removing

– Remove top cover for timing chain ⇒ page 73 .

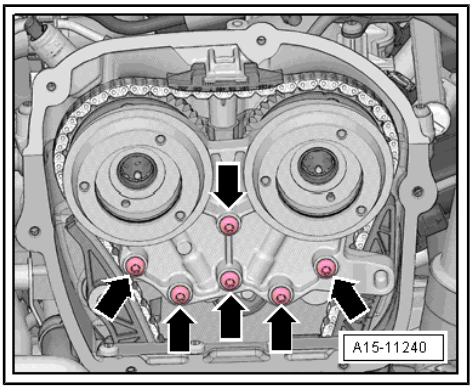
– Remove the sound dampening system ⇒ Body Work; Rep. gr. 66 .

> ⚠ Caution
>
> *The control valves have a left-hand thread.*

– Use the assembly device - T10352/2- to remove the left and right control valve in -direction of arrow-.



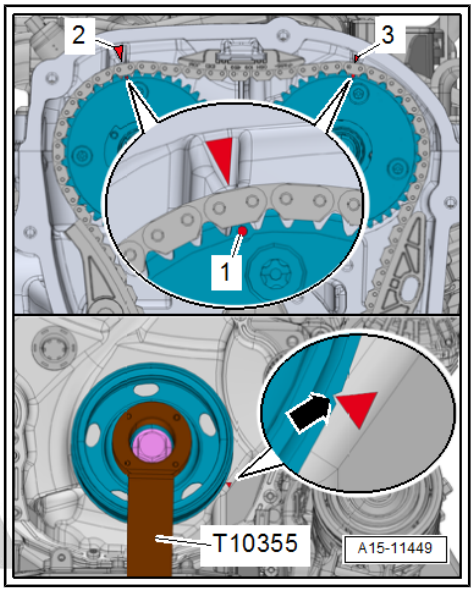
– Screw out screws -arrows- and screws arrows and remove engine cap.



– Rotate the V-ribbed belt pulley with counterholder - T10355- into the “TDC” position.

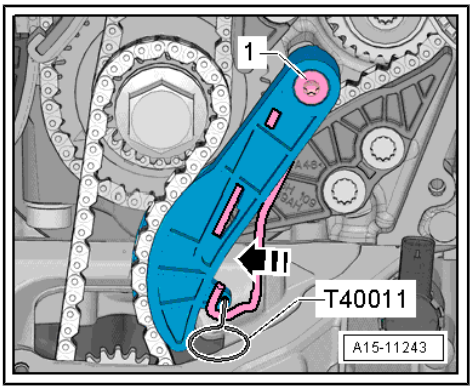
- The notch on the V-ribbed belt pulley and the marking on the cover for the bottom cover for timing chain must face each other -arrow.-
- Markings -1- of the camshaft chain sprocket must lie opposite to markings -2 and 3- on the cylinder head

– Remove below cover for timing chain ⇒ page 75 .

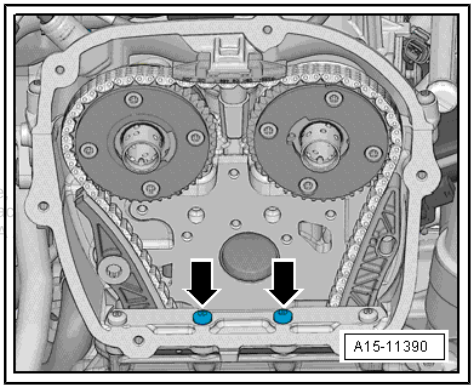


– Press the chain tensioner of the oil pump in -direction of arrow- and lock it with the locking device - T40011- .

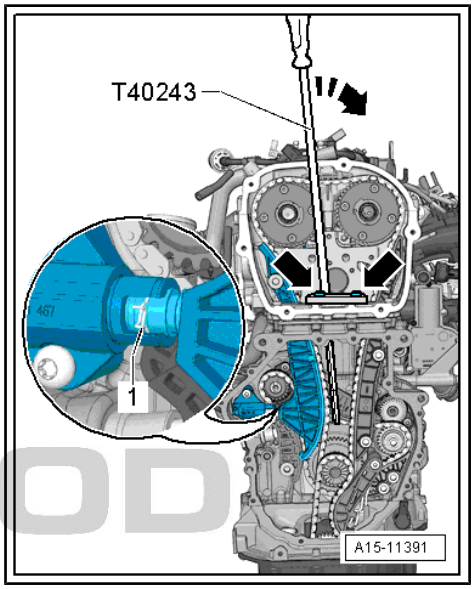
– Remove the chain tensioner of the oil pump -1-.



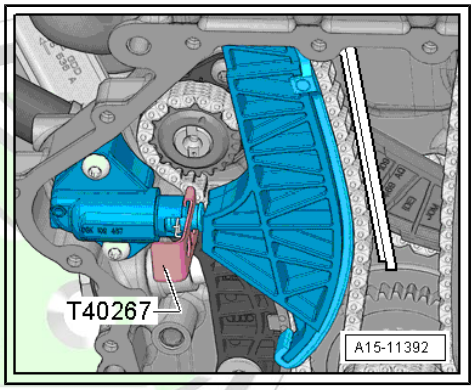
– Remove bolts -arrows-.



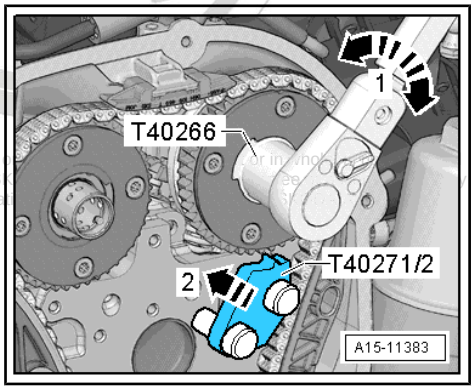
– Screw in lever - T40243- -arrows-.
– Press compress circlip -1- of the chain tensioner together, and hold in place.
– Slowly press the tensioning rail with the lever - T40243- in -direction of arrow-.



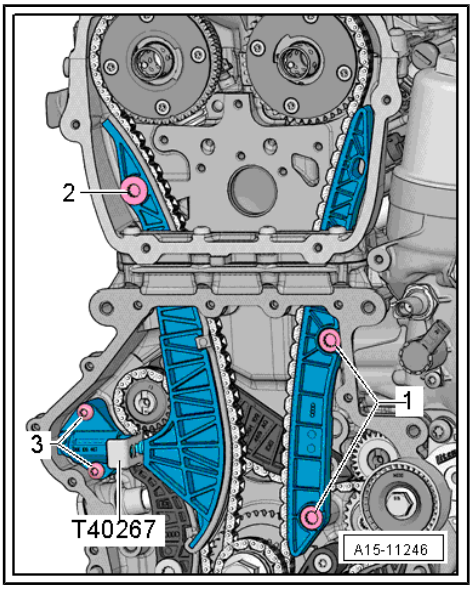
– Secure the chain tensioner using the extractor - T40267- .
– Remove lever - T40243- .



– Attach camshaft clamp - T40271/2- at the cylinder head and slide into the teething of the chain sprocket in -direction of arrow 2-; turn inlet camshaft with an assembly device - T40266- in -direction of arrow 1- where required.



– Remove tensioning rail for camshaft timing shaft -2-.

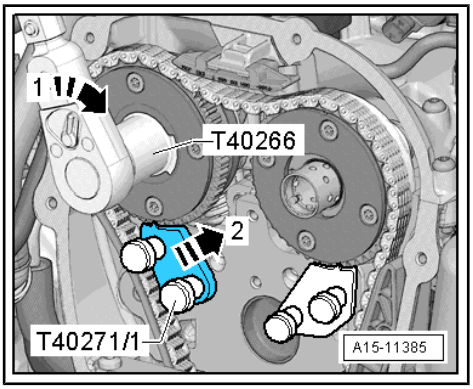


Note

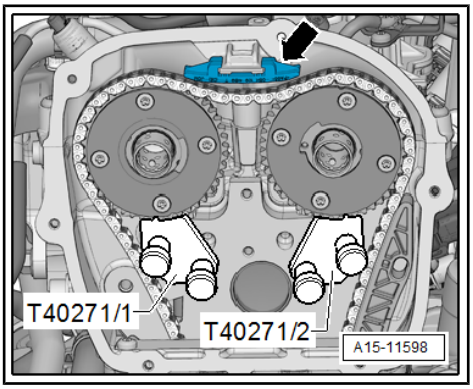
Ignore the positions -1, 3- and -T40267- .

– Screw camshaft clamp - T40271/1- onto cylinder head.

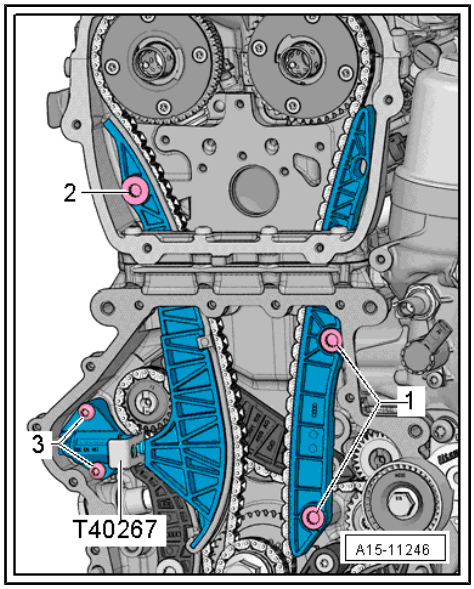
– Turn exhaust camshaft with assembly tool - T40266- in -direction of arrow 1- and move camshaft clamp - T40271/1- into the teething of the chain sprocket in -direction of arrow 2-.



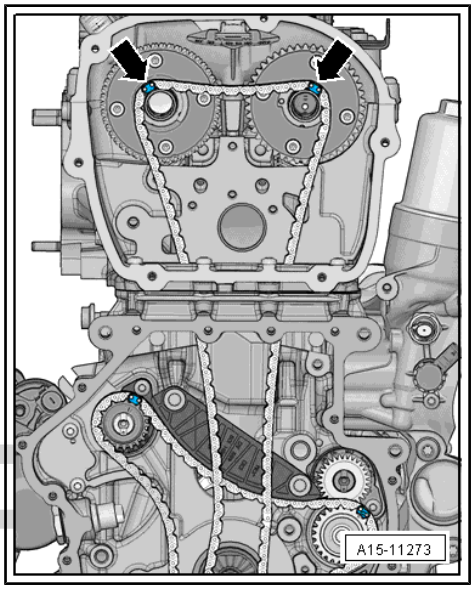
– Remove top guide rail -1-, unlock the locking mechanism with a screwdriver, and push the guide rail forwards.



– Remove guide rail for camshaft timing shaft -1-.



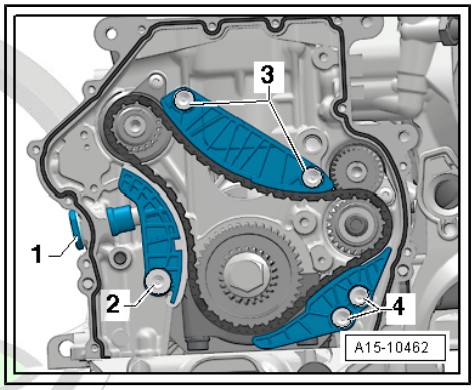
– Remove camshaft timing shaft from the camshaft sprockets and hook onto the camshaft sprockets -arrows-.



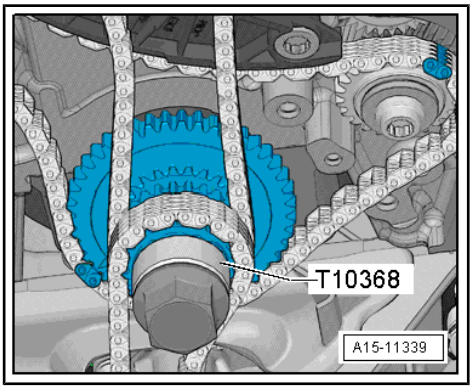
– Remove chain tensioner for balancing shaft timing chain -1-.
– Remove tensioning rail - 2 -.
– Remove guide rail - 4 -.

Note

Do not pay attention to the position -3-.

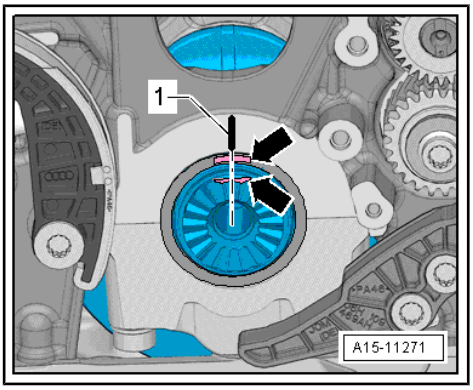


– Remove the screw for the V-ribbed belt pulley crankshaft.
– Remove three-stage chain sprocket; remove the drive chain for oil pump.
– Remove the camshaft timing shaft.

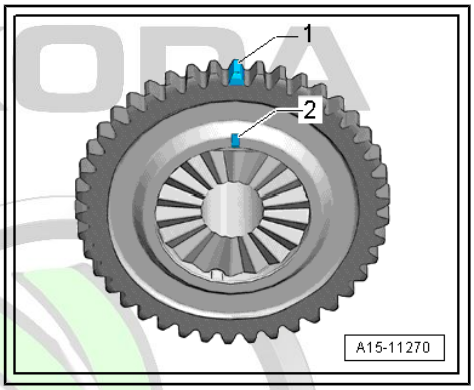


Install

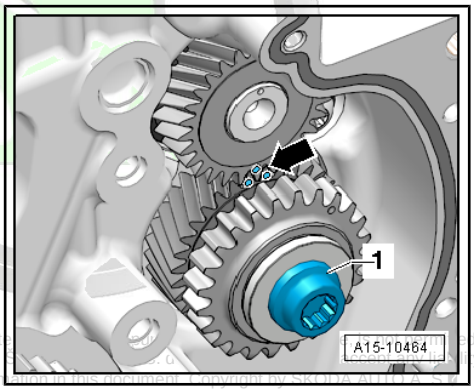
– Check the TCD position of the crankshaft; the marks -arrow- must face each other.
– Attach one mark to the cylinder block -1- with waterproof felt-tip pen.



– Mark the tooth -1- of the three-stage chain sprocket at mark -2- with waterproof felt-tip pen.



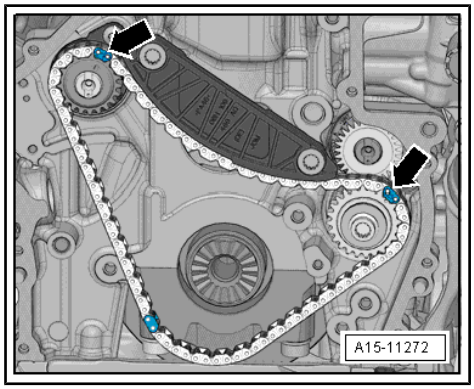
– Turn the intermediate shaft wheel and balancing shaft to the marks -arrow-; do not undo the screw -1-.



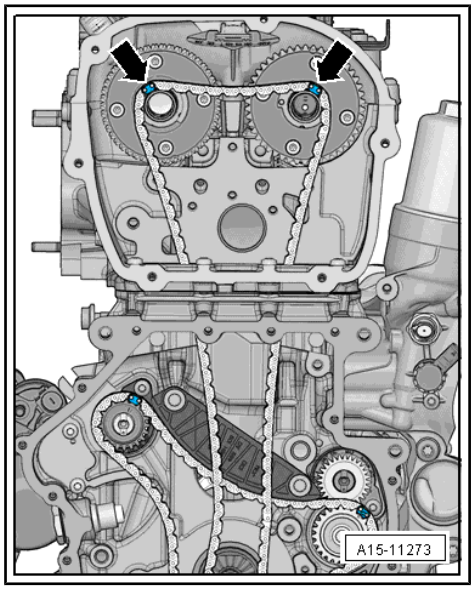
Note

The coloured chain links of the balancing shaft timing chain must be in the area of markings on the chain sprockets.

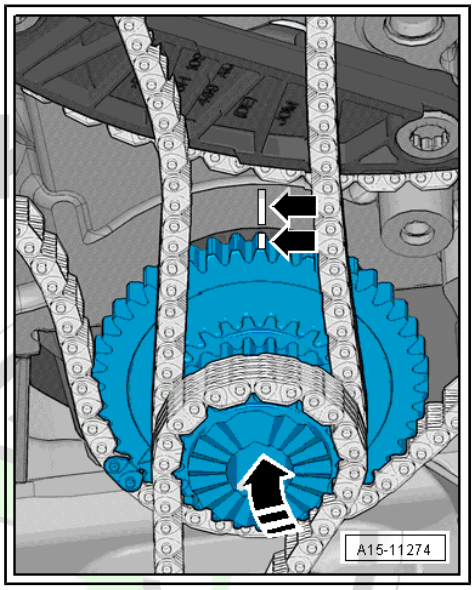
– Place on the balancing shaft timing chain; the coloured chain links -arrows- must be in the area of markings on the chain sprockets.



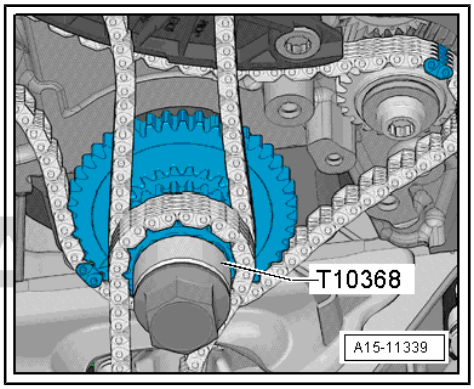
– Attach the camshaft timing shaft with the marks -arrows- to the camshaft journal.



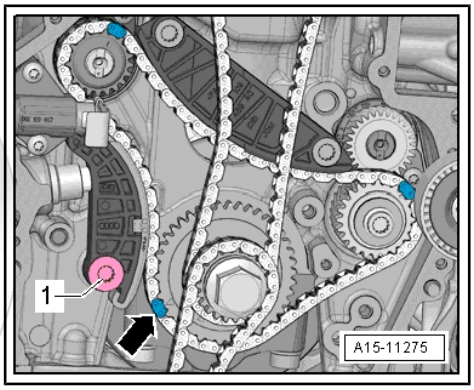
– Place on the final drive chain for the oil pump onto the three-stage sprocket.
– Turn the three-stage sprocket in -direction of arrow- to the engine and secure to the crankshaft. The marks -arrows- must face each other.



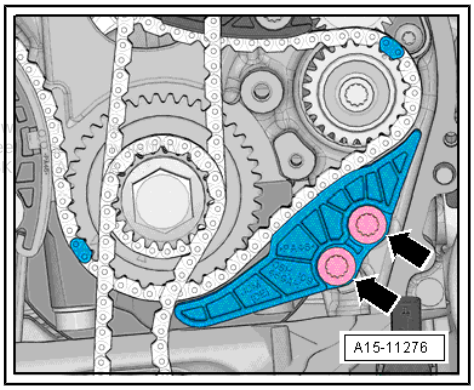
– Screw on thrust piece - T10368- with bolt -arrow- for the V-ribbed belt pulley.



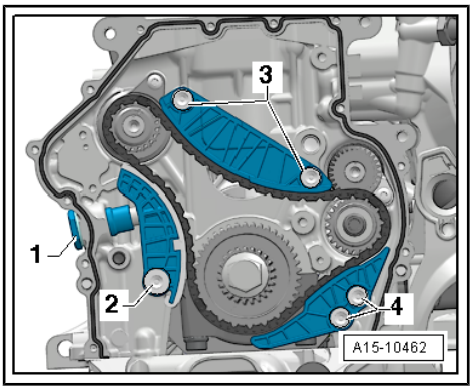
– Position the coloured chain link of the balancing shaft timing chain -arrow- on the mark of the three-stage sprocket; install the tensioning rail for the timing chain and tighten the screw -1-.



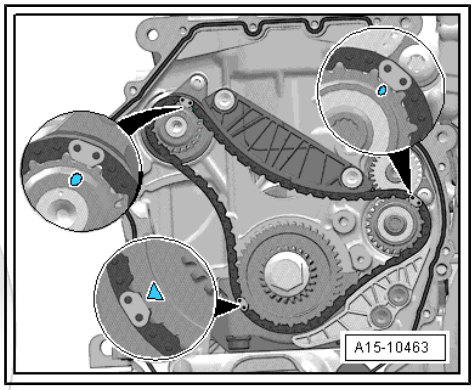
– Install the guide rail for the balancing shaft timing chain and tighten the screws -arrows-.



– Install the chain tensioner for timing chain -1-.



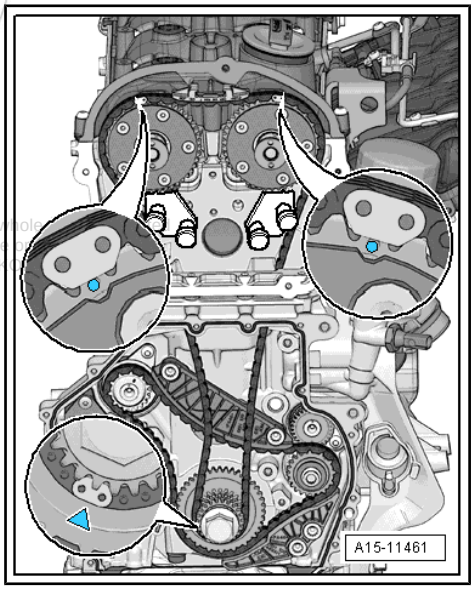
– Check the setting again: the coloured chain links should be located on the markings of the sprockets.



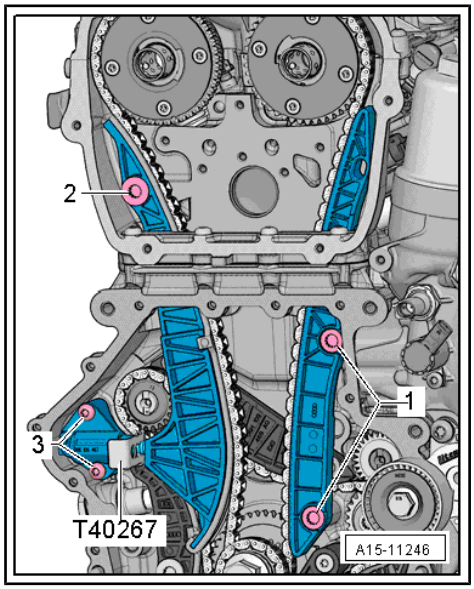
Note

The coloured chain links of the timing chain must be in the area of markings on the chain sprockets.

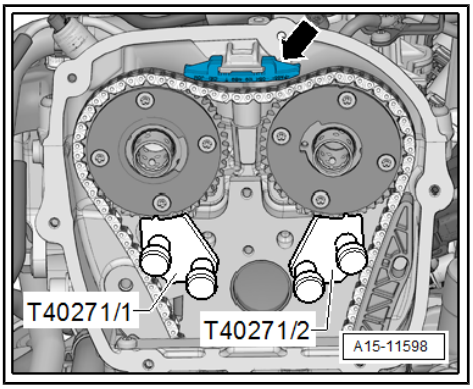
– Place the timing chain on the inlet camshaft.
– Place the timing chain on the exhaust camshaft.
– Place the timing chain on the crankshaft and hold in place.



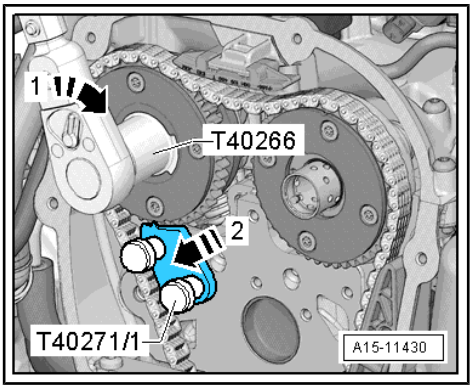
– Install the tensioning rail for timing chain and tighten the screw -2-.
– Install the guide rail for the camshaft timing shaft and tighten the screws -1-.



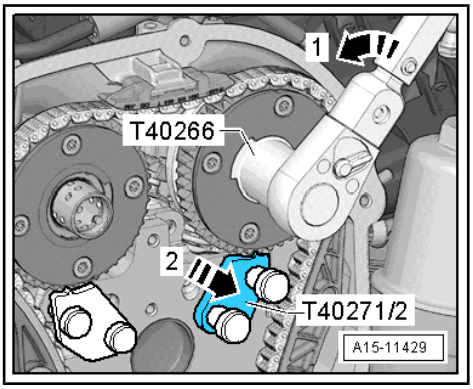
– Install top guide rail -arrow- .



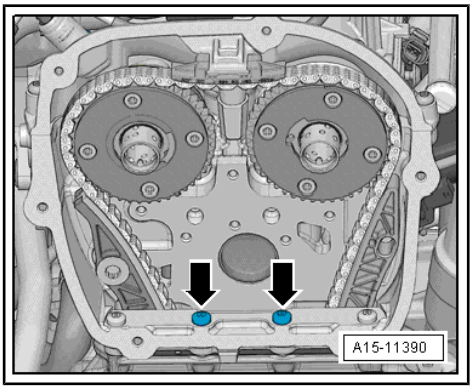
– Turn exhaust camshaft with assembly tool - T40266- in -direction of arrow 1- and move camshaft clamp - T40271/1- out of the teething of the chain sprocket in -direction of arrow 2- and release the camshaft.
– Remove the camshaft fixer/locator - T40271/1- .

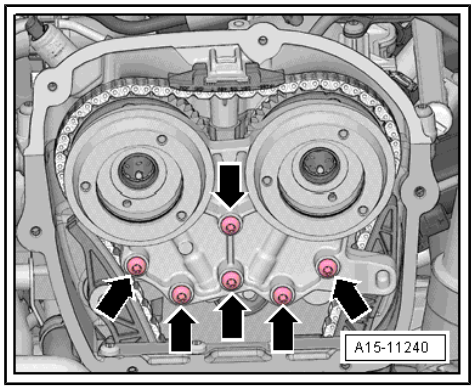


– Turn inlet camshaft with assembly tool - T40266- in -direction of arrow 1- and move camshaft clamp - T40271/2- out of the teething of the chain sprocket in -direction of arrow 2- and release the camshaft.
– Remove the camshaft fixer/locator - T40271/2- .



– Screw in and tighten the screws -arrows-.





– Slide in the bearing cap and tighten the screws -arrows- until hand-tight.
– Remove the extractor - T40267- .
– Tighten the screws -arrows- for the bearing cap ⇒ page 81 .
– Install the control valves -Pos. 6- ⇒ page 81 .

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

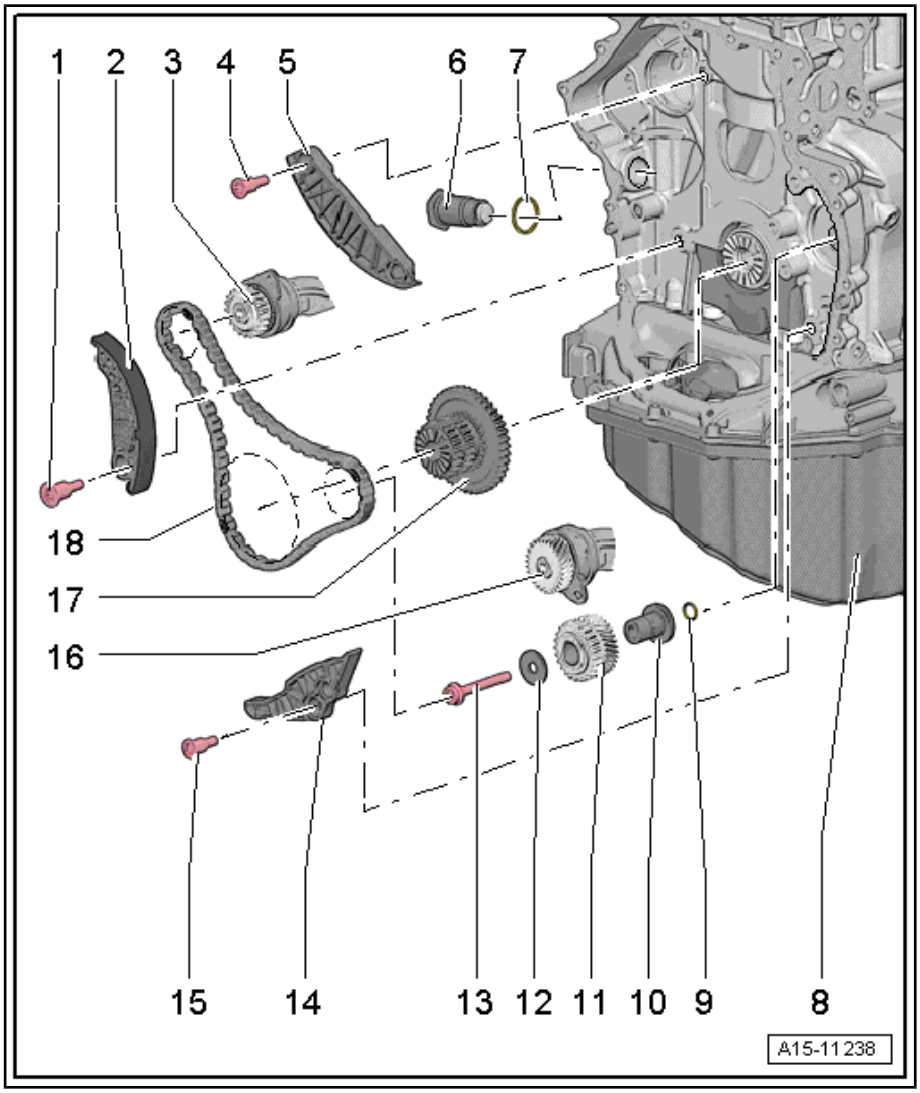
♦ Tightening torques: ⇒ page 81
– Install below cover for timing chain ⇒ page 75 .
– Install top cover for timing chain ⇒ page 73 .

Carry out an adjustment of the timing chain length 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 - Adaption after work on chain drive`

2.3 Balancing shaft timing chain- Summary of components



1 - Guide bolt, 20 Nm

2 - Tensioning rail

- ❑ for timing chain

3 - Balancing shaft

- ❑ Outlet side
- ❑ replace after removal ⇒ page 63
- ❑ wet bearing with engine oil

4 - Guide bolt, 20 Nm

5 - Sliding rail

- ❑ for balancing shaft timing chain

6 - Chain tensioner, 85 Nm

- ❑ install with sealant ⇒ ETKA - Electronic Catalogue of Original Parts

7 - Sealing ring

8 - Cylinder block

9 - O-ring

- ❑ wet with engine oil

10 - Bearing bolt

- ❑ for intermediate shaft wheel
- ❑ wet with engine oil
- ❑ Fitting position ⇒ page 94

11 - Intermediate shaft wheel for balancing shaft

- ❑ after undoing the screw -Pos. 13- the intermediate shaft wheel must be replaced

12 - Washer

13 - Screw

- ❑ replace
- ❑ after undoing the screw, the intermediate shaft wheel -Pos. 11- must be replaced
- ❑ order of tightening ⇒ page 94

14 - Sliding rail

- ❑ for balancing shaft timing chain

15 - Guide bolt, 20 Nm

16 - Balancing shaft

- ❑ Inlet side
- ❑ replace after removal ⇒ page 60
- ❑ wet bearing with engine oil

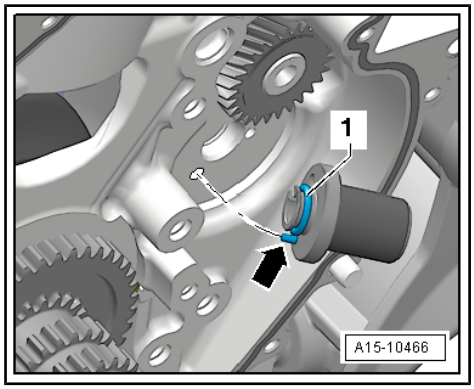
17 - Three-stage chain sprocket

- ❑ at the crankshaft
- ❑ Fitting position ⇒ page 82

18 - Balancing shaft timing chain

- ❑ removing ⇒ page 94

Bearing bolts - installation position

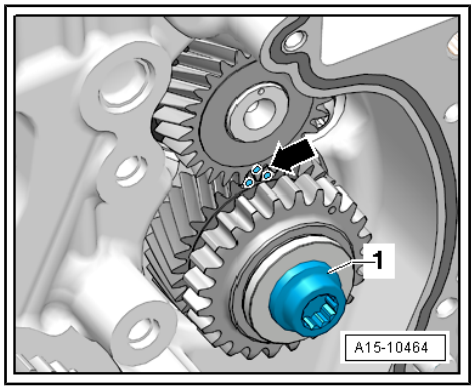


– Replace and oil the O-ring -1-.

• The fitted pin -arrow- for bearing bolts must latch into the bore of the cylinder block.

– Oil the bearing bolts.

Intermediate shaft wheel for balancing shaft - tightening sequence



Caution

- *The intermediate shaft wheel must be replaced. Otherwise, the backlash cannot be adjusted - engine damage!*
- *The new intermediate shaft wheel has a smooth paint covering which wears off after a short running time, and thus automatically sets the backlash.*

– Tighten the new screw as follows.

1. Pretighten to 10 Nm.
2. Turn intermediate shaft wheel.

The intermediate shaft wheel must not have any play. Otherwise undo and re-tighten.

3. Tighten to 25 Nm.
4. Using a rigid wrench torque a further 90° ($^1/_4$ turn).

– Check marks on intermediate shaft wheel/balancing shaft -arrow-.

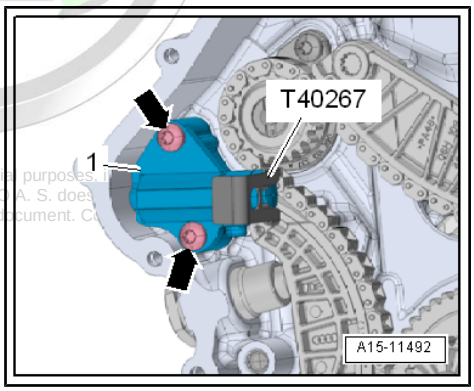
2.4 Removing and installing the balancing shaft timing chain

Removing

– removing camshaft timing shaft ⇒ page 82 .

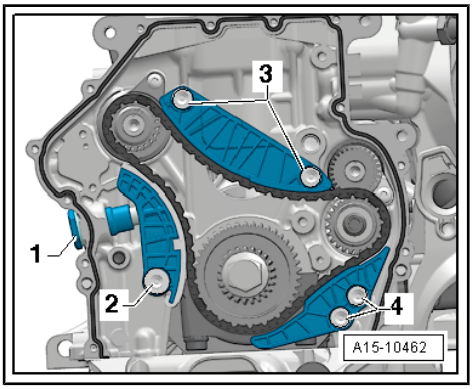
– Remove bolts -arrows-.

– Remove chain tensioner for balancing shaft timing chain -1-.



– Remove guide rail - 3 -.
– Remove the balancing shaft timing chain.

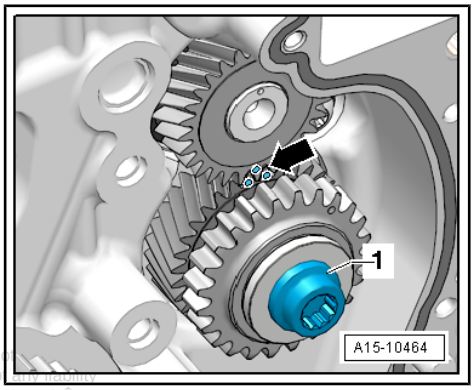
Install



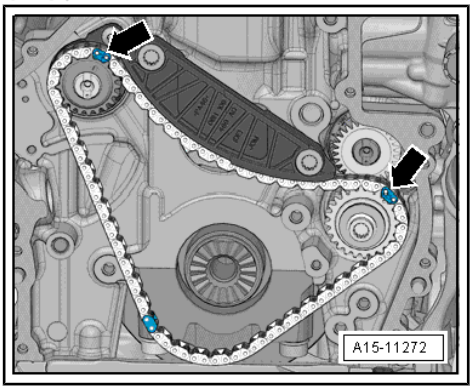
– Turn the intermediate shaft wheel and balancing shaft to the marks -arrow-; do not undo the screw -1-.

Note

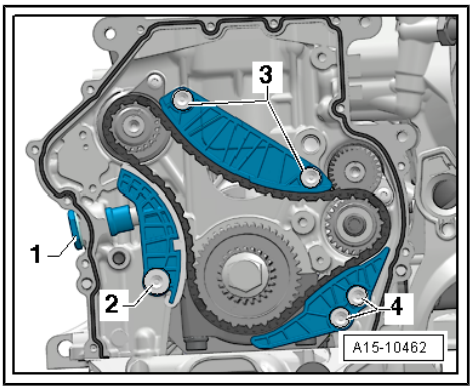
Depending on the transmission ratio, the marks only cover every 7th turn.



– Place on the balancing shaft timing chain; the coloured chain links -arrows- must be in the area of markings on the chain sprockets.

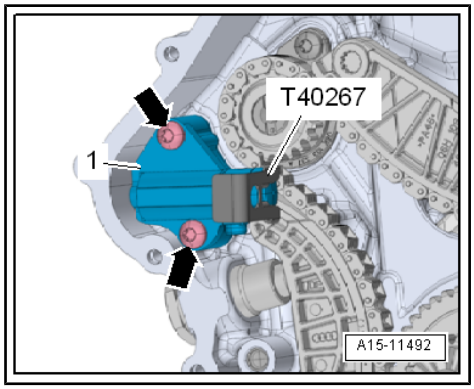


– Install the guide rail for timing chain and tighten the screws -3-.



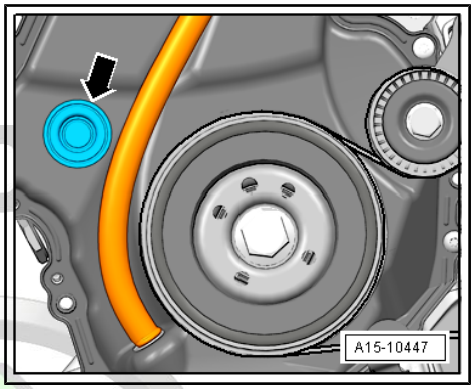
– Install chain tensioner for balancing shaft timing chain -1-.
– installing camshaft timing shaft ⇒ page 82 .

Tightening torques ⇒ page 92

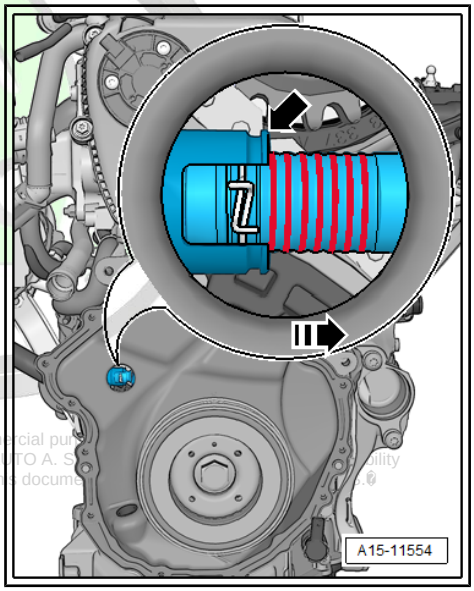


2.5 Check timing chain length

– Remove screw plug -arrow-.



– Turn the belt pulley in the running direction of the engine until the piston of the chain tensioner in the -direction of the arrow- extends to the maximum extent .
– Count visible piston teeth.



Note

- *Visible piston teeth are all the teeth to the right of the chain tensioner protection -arrow-.*
- *If 7 or more teeth are visible: Replace camshaft timing shaft ⇒ page 82 .*

Note

If 6 or fewer teeth are visible, the timing belt may not be replaced.

– Replace screw plugs.

2.6 Checking valve timing

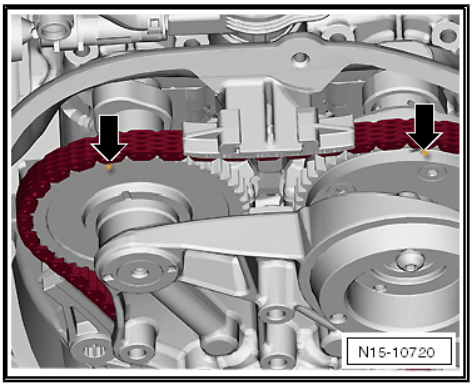
Special tools and workshop equipment required

- Adapter for dial gauge - T10170- or -T10170A-
- Dial gauge
- Caliper gauge

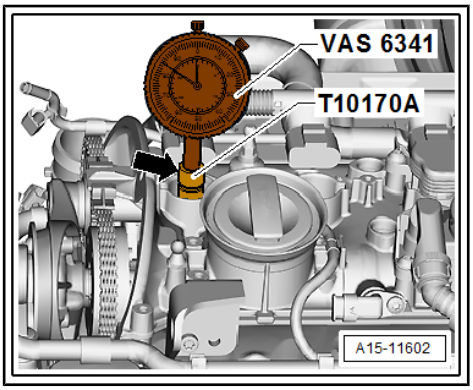
Test sequence

– Remove top cover for timing chain ⇒ page 73 .

– Remove the sound dampening system ⇒ Body Work; Rep. gr. 66 .
– Rotate V-ribbed belt pulley crankshaft with the counterholder - T10355- in direction of arrow until the marks -arrows- are almost on top.
– Remove spark plug for cylinder 1.



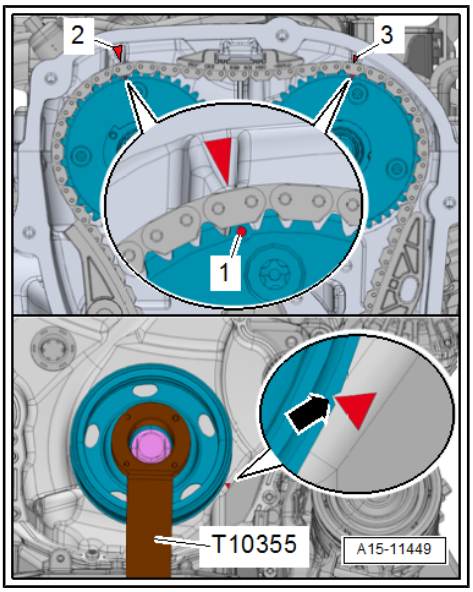
– Screw in the adapters for dial gauge - T10170- or -T10170A- into the spark plug thread as far as the stop.
– Insert the dial gauge with extension - T10170A/1- up to the stop and fix in place using the clamping screw -arrow-.
– Slowly turn the crankshaft in the running direction of the engine as far as the maximum pointer swing. Once the maximum pointer swing is reached (reversal point), the piston is at “ODT”.



Note

If the piston is turned beyond the “ODT”, turn the crankshaft a further 2 turns in the running direction of the engine. Do not rotate the engine against its running direction.

- The notch on the V-ribbed belt pulley and the marking on the cover for the bottom cover for timing chain must face each other -arrow.-
- Markings -1- of the camshaft chain sprocket must lie opposite to markings -2 and 3- on the cylinder head

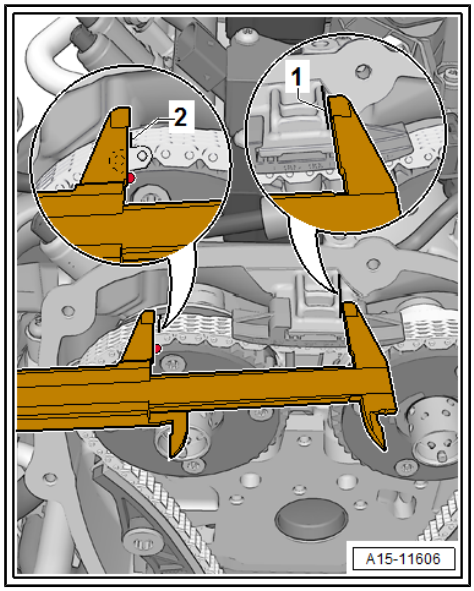


– Measure the distance from the edge -1- to the mark -2- on the chain sprocket, exhaust camshaft.

• Specified value: 74...77 mm

– If the setpoint value is reached, measure the distance between the mark and the exhaust camshaft -3- and the mark on the chain sprocket, inlet camshaft -4-.

• Specified value: 124...127 mm



Note

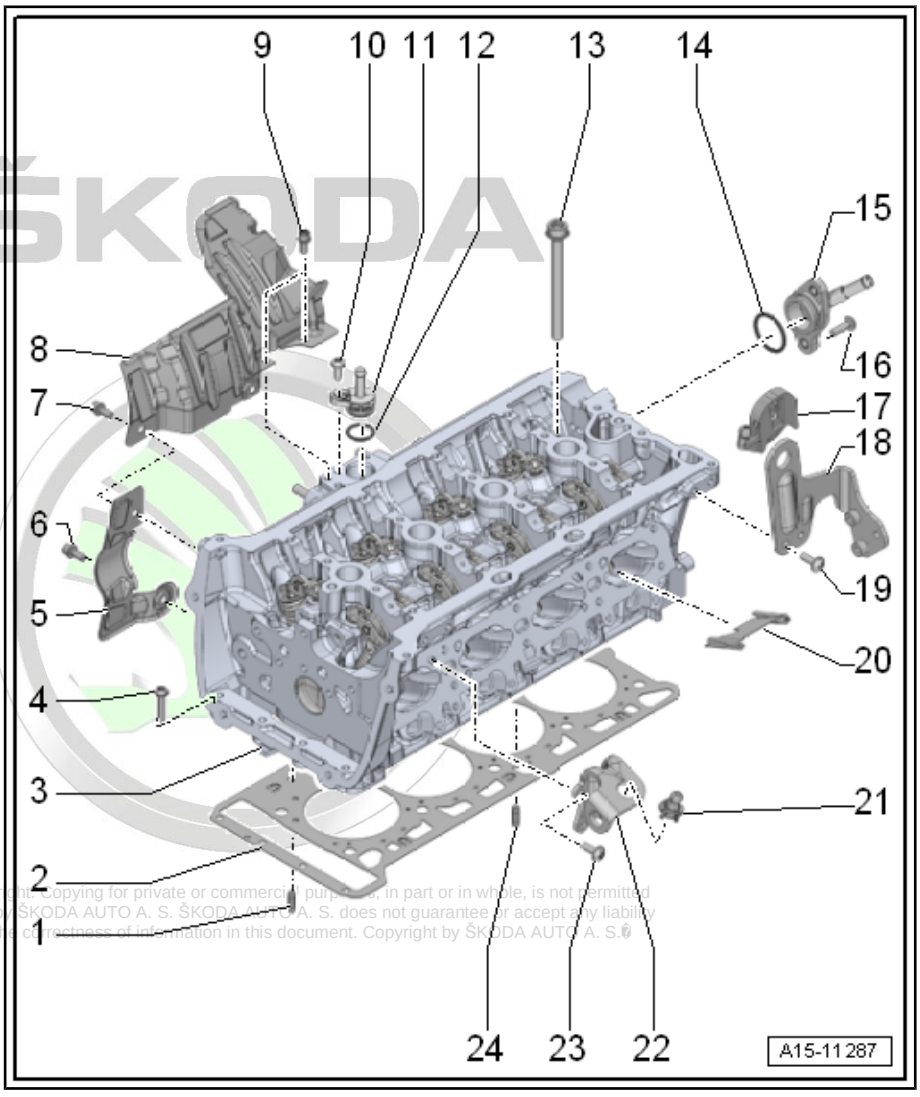
The offset of a tooth means a deviation of around 6 mm from the setpoint value. If an offset is found, the timing chain will need to be remounted.

3 Cylinder head

3.1 Cylinder head - summary of components

Note

- *Replace cylinder head bolts.*
- *During assembly work, replace self-locking nuts and screws which are tightened to a torquing angle, sealing rings and seals.*
- *Do not remove the plastic bases supplied as a protection for the open valves until just before fitting on the cylinder head.*
- *When the cylinder head or the cylinder head gasket is replaced, the coolant and engine oil must be replaced.*



1 - Fit pin

2 - Cylinder head gasket

- ❑ replace
- ❑ Fitting position: The part number faces the cylinder head.

3 - Cylinder head

- ❑ removing and installing ⇒ page 101
- ❑ check for distortion ⇒ page 101

4 - Screw

- ❑ replace
- ❑ pay attention to order for slackening ⇒ page 100
- ❑ pay attention to order for tightening ⇒ page 100

5 - Heat shield

6 - 9 Nm

7 - 9 Nm

8 - Heat shield

9 - 9 Nm

10 - 9 Nm

11 - Inlet connections

- ❑ for coolant hose

12 - O-ring

- ❑ replace
- ❑ Moisten with coolant

13 - Cylinder head bolt

- ❑ replace
- ❑ pay attention to order for slackening ⇒ page 100

- ❑ pay attention to order for tightening ⇒ page 100

14 - O-ring
- ❑ replace
- ❑ Moisten with coolant

15 - Inlet connections
- ❑ for coolant hose

16 - 9 Nm

17 - Support
- ❑ for engine cover

18 - Engine suspension eye

19 - 8 Nm + torque a further 90° (1/4 turn)
- ❑ replace

20 - Divider plate

21 - Ball pin
- ❑ for engine cover

22 - Engine suspension eye

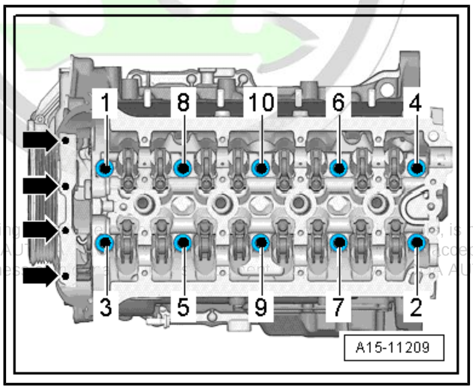
23 - 8 Nm + torque a further 90° (1/4 turn)
- ❑ replace

24 - Fit pin

Follow the specified order for loosening cylinder head bolts

– Remove bolts -arrows-.

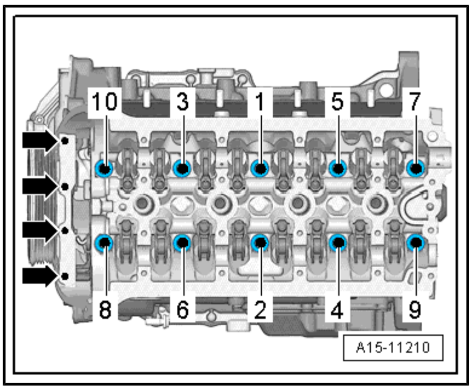
– Release the cylinder head bolts in the order -1 … 10-.



Follow the specified order for tightening cylinder head bolts

– Tighten cylinder head screws in the order -1 ... 10- as follows:

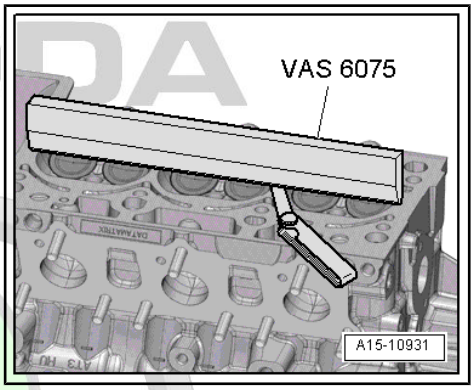
1. Pre-tighten with the torque wrench to 40 Nm.
2. 90° (torque a further 90° (1/4 turn).
3. 90° (torque a further 90° (1/4 turn).
4. Pretighten screws -arrows- to 4 Nm.
5. Tighten screws -arrows- further by 90° (1/4 turns).



Checking cylinder head for distortion

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

♦ Maximum permitted distortion: 0.05 mm



3.2 Removing and installing cylinder head

Special tools and workshop equipment required

♦ Socket insert - T10070-

♦ Screw plug set for engine , e.g. -VAS 6122-

Removing

Note

♦ *Fit all cable straps on again in the same place when installing.*

♦ *Use suitable plugs to seal the open channels on the inlet connection and exhaust tract, e.g. from the screw plug set for engine - VAS 6122- .*

– Drain coolant ⇒ page 158 .

– Remove the camshafts ⇒ page 113 .

WARNING

Avoid damage to valves and piston crowns.

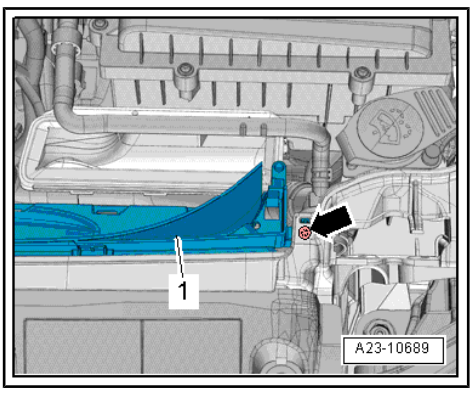
♦ *The crankshaft may not be turned any further when the camshafts are removed.*

– Remove pre-exhaust pipe with catalytic converter ⇒ page 297 .

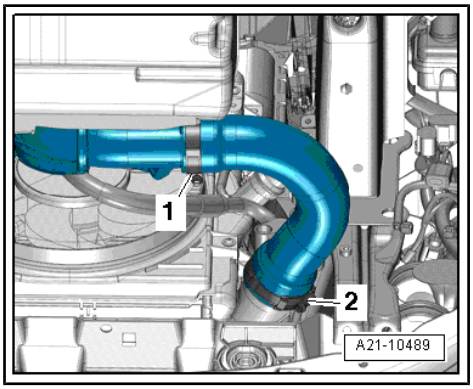
– Remove lambda probe - G39- ⇒ page 288 .

– Release screw left and right -arrow-.

– Unclip and remove the air guide pipe bottom -1-.



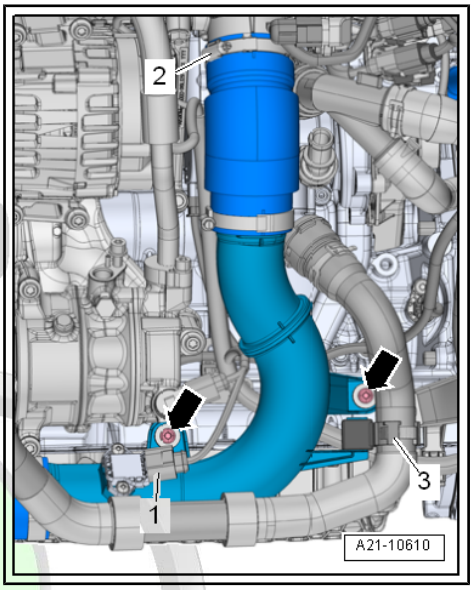
– Loosen hose clamp -2- and remove air guide hose from the charge air cooler.
– Open open lines and connections immediately with a clean plug, e.g. from the screw plug set for engine - VAS 6122- .



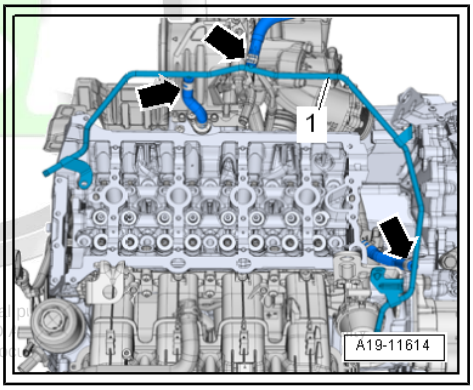
Note

Do not pay attention to the position -1-.

– Loosen hose clamp -2-.
– Expose coolant hose -3-.
– Unscrew screws -arrows-.
– Remove plug -1- from the charge pressure sender - G31- and remove the right air guide.



– Loosen hose clamps -arrows- and remove coolant hoses.
– Lay coolant hose -1- to side.

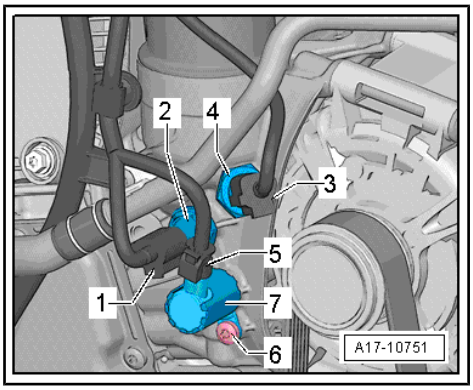


– Disconnect existing electrical plug connections:

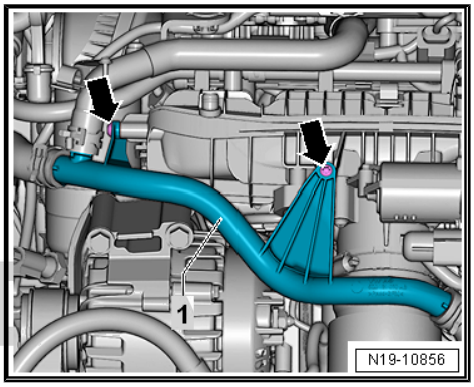
1 - for oil pressure switch - F22-

2 - for oil pressure switch for reduced oil pressure - F378-

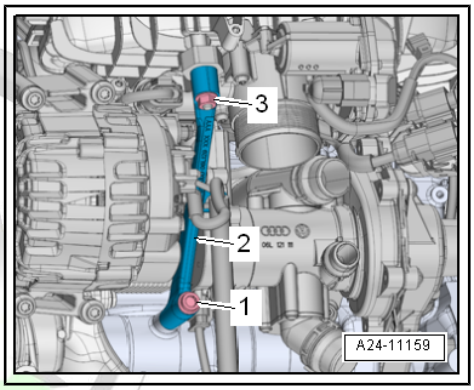
5 - for control valve for piston cooling nozzle - N522-



– Remove bolts -arrows-.



– Undo screw -1- and nut -3- and remove holder -2- for intake manifold.



– Disconnect existing electrical plug connections:

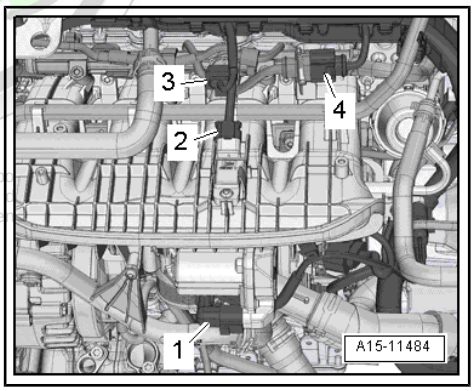
1 - for throttle valve control unit - J338-

2 - for intake air temperature sender - G42- with manifold pressure sender - G71-

3 - for fuel pressure sender - G247-

– Remove plug connection -4- from the mounting bracket.

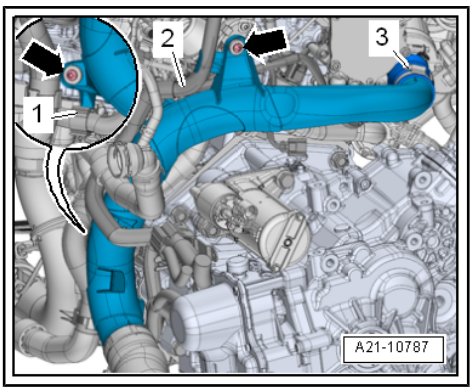
– Unclip the electric harness and lay it to the side.



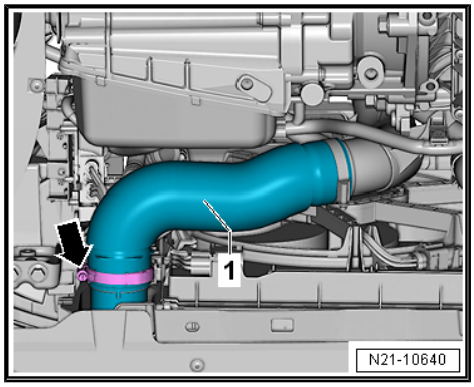
– Expose the electrical wiring harnesses -1 and 2- on the air guide pipe.

– Loosen hose clamp -3-.

– Remove screws -arrows- and remove air guide pipe downwards.



– Loosen hose clamp -arrow- and remove air guide hose -1- from the charge air cooler.

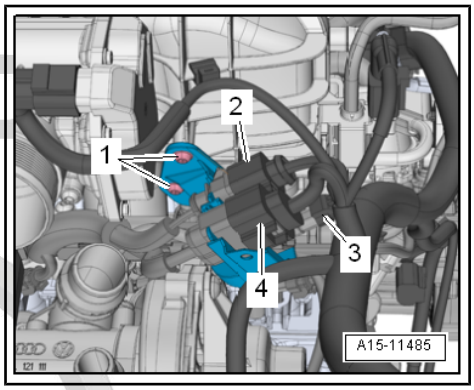


– Remove the plug connection -3- for knock sensor 1 - G61- from the mounting bracket and disconnect.

– Disconnect the connectors -2 and 4-.

Note

Do not pay attention to the position -1-.



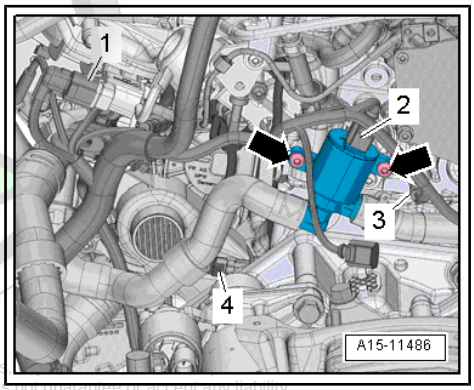
– Expose the connectors and expose electric cables:

1 - for valve for intake manifold flap - N316-

2 - for coolant shut-off valve - N82-

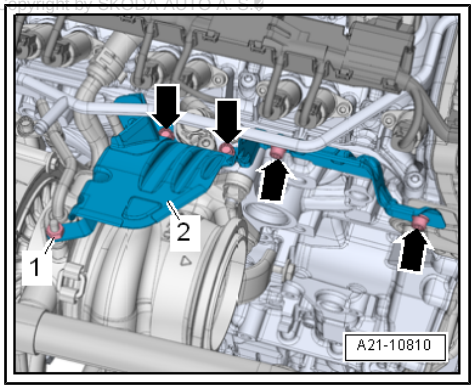
3 - for coolant temperature sender - G62-

4 - for oil pressure switch, stage 3 - F447-

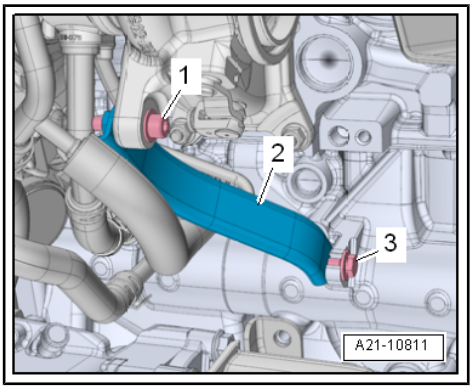


– Unscrew screws -arrows- and nuts -1-.

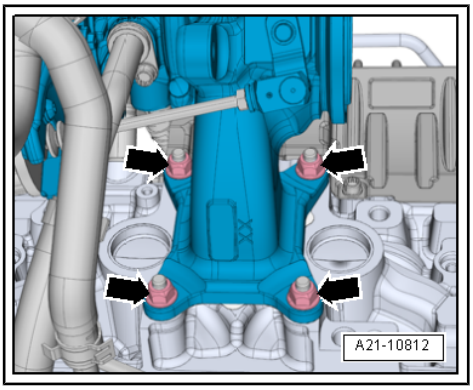
– Remove heat shield - 2 -.



– Remove screw -1-, only slacken screw -3-.
– Remove bracket -2- for the turbocharger.

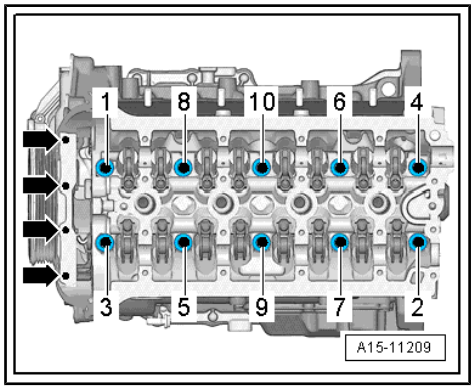


– Unscrew the nuts -arrows-.
– Remove the turbocharger from the cylinder head and strap up towards the rear.



– Remove bolts -arrows-.

– Unscrew cylinder head bolt with Polydrive socket - T10070- in the order -1...10-.



Note

- *Check whether all lines and cables have been loosened!*
- *When removing the cylinder head, pay attention to the tensioning and guide rail.*

– Remove cylinder head.

– Place the cylinder head on a clean base (foam).

Install

WARNING

Risk of damaging sealing surfaces.

- *Carefully 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.*

Danger of leaks from 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.*

Risk of damage to the open valves.

- *The plastic packing pieces for protecting the open valves when installing the exchange cylinder head must not be removed until immediately before fitting the cylinder head.*

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

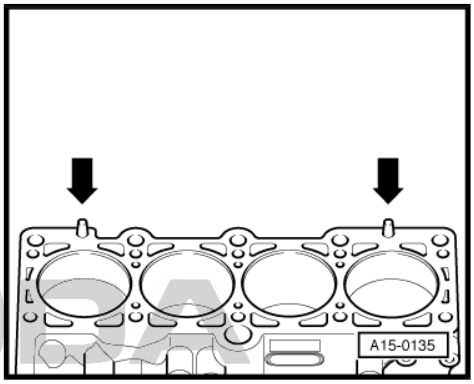
- *Carefully crank engine at least 2 revolutions to ensure that no valve touches the piston when the engine is started.*

Note

- *Replace screws which have been tightened to torquing angle.*
- *Replace the gaskets, the sealing rings and the self-locking nuts.*
- *Note the different sealants for sealing surfaces and cylinder head bolts.*
- *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 camshafts are installed.*
- *Hose connections as well as charge air pipes and -hoses must be free of oil and grease before being installed.*
- *Secure all hose connections with hose clamps which 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.*
- *When the cylinder head or the cylinder head gasket is replaced, the coolant and engine oil must be replaced.*

– Fit on cylinder head gasket.

- Pay attention to fitted pins in cylinder block -arrows-.
- Observe fitting location of cylinder head gasket, the identification (part number) must be legible from the inlet side.



WARNING

Make sure no parts are damaged by the timing chain when turning the crankshaft.

If the crankshaft has been turned in the meantime:

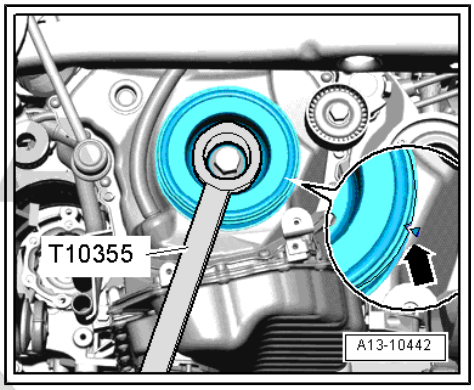
– Position piston for cyl. 1 on “TDC” and turn back crankshaft slightly.
– Insert the cylinder head.
– Insert cylinder head bolts and tighten by hand.
– Tightening sequence, cylinder head cover
⇒ Fig. ““Follow the specified order for tightening cylinder head bolts”“ , page 100 .

Note

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

– Rotate the V-ribbed belt pulley with counterholder - T10355- into the “TDC” position.

• The notch on the crankshaft V-ribbed belt pulley and the marking on the cover for the bottom cover for timing chain must face each other -arrow.-



Installation is carried out in the reverse order. However, pay attention to the following:

– Install camshafts ⇒ page 113 .

– Change engine oil ⇒ Maintenance ; Booklet Octavia III .

– Replace coolant ⇒ page 158 .

Tightening torques

• Cylinder head ⇒ page 99

• Coolant pipes ⇒ page 181

• Exhaust gas turbocharger ⇒ page 232

• Pre-exhaust pipe ⇒ page 296

3.3 Checking compression

Special tools and workshop equipment required

♦ Spark plug wrench , e.g. -3122 B-

♦ Compression tester , e.g. -V.A.G 1763-

Test conditions

• Engine oil temperature must be at least 30°C

• Battery voltage at least 12.7 V.

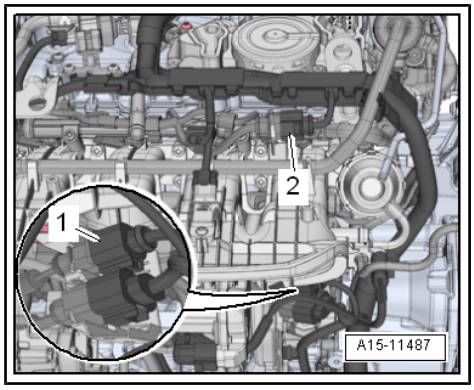
Test sequence

– Remove ignition coils with power output stage ⇒ page 311 .

– Disconnect electrical plug connections:

1 - for injection valves -N30...N33-

2 - for injection valves 2 -N532...N535-



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

– Check the compression pressure with the compression gauge inspection device - V.A.G 1763- and the adapter - V.A.G 1763/6- .

Note

Use of tester ⇒ Operating Instructions .

– Have a second mechanic operate the starter with the throttle valve fully opened until no further pressure rise is indicated by the tester.

Compression readings

New engine	Wear limit	Maximum difference between cylinders
1.1…1.4 MPa (11…14 bar)	0.7 MPa (7 bar)	0.3 MPa (3 bar)

If the specified values are not reached, test the combustion chamber for tightness ⇒ page 109 .

Installation is carried out in the reverse order. However, pay attention to the following:

– Install spark plugs ⇒ Maintenance ; Booklet Octavia III .
– Install ignition coils ⇒ page 311 .
– Delete the contents of the fault memory for the engine control unit at the end of the work as error messages were stored due to disconnecting the plugs ⇒ Vehicle diagnostic tester.

3.4 Testinf the combustion chamber for tightness

Special tools and workshop equipment required

♦ Pressure hose - MP1-210 (VW 653/3)- (replace gasket ring with a spark plug gasket ring)
♦ Spark plug socket and extension

Test sequence

– Unscrew the spark plugs.
– Position piston of the relevant cylinder to dead centre.
– Screw the pressure hose MP 1-210 into the spark plug thread.
– Connect pressure hose to compressed air.
– With the assistance of a second mechanic, lock the screw at the crankshaft on TDC position in order to avoid the displacement of the piston after pressure build-up.

– Build up a pressure of approx. 0.3 MPa (3 bar) in the combustion chamber.
– 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.

4 Valve gear

Note

- *Cylinder head and cylinder head cover may only be used together.*
- *After installing the camshafts, the engine must not be started for about 30 minutes. The hydraulic clearance compensation elements must settle (otherwise valves would strike the pistons).*
- *After carrying out work on the valve gear, carefully crank engine at least 2 revolutions to ensure that no valve touches the piston when the engine is started.*
- *Always replace seals and gasket rings.*
- *After removing the camshafts, carry out an adjustment of the timing chain length ⇒ Vehicle diagnostic tester.*

4.1 Valve gear - Summary of components

1 - Exhaust valve
- ❑ do not rework, only grinding in is permissible
- ❑ Valve dimensions ⇒ page 132
- ❑ inspecting valve guides ⇒ page 131

2 - Cylinder head

3 - Valve stem seal
- ❑ replace ⇒ page 125

4 - Valve spring

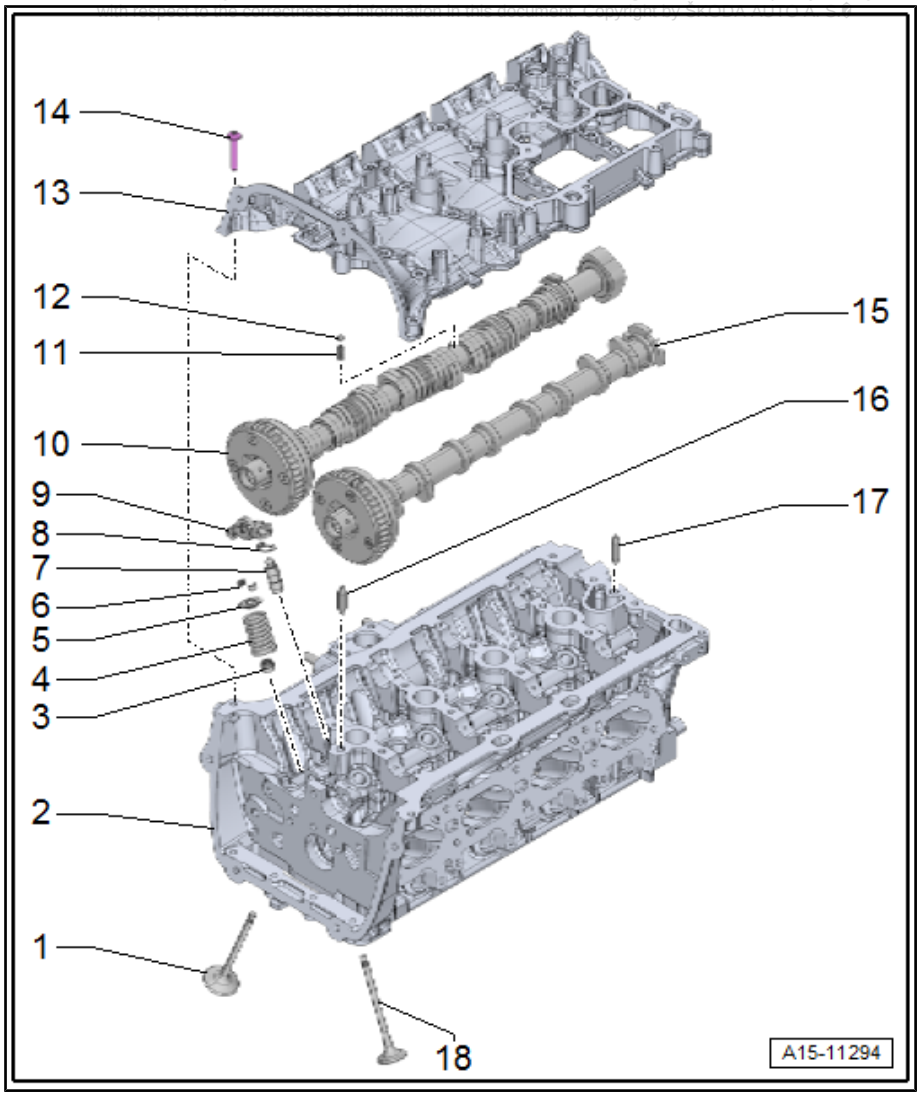
5 - Valve spring plate

6 - Valve collets

7 - Hydraulic balancing element
- ❑ Do not interchange
- ❑ Oil contact surface

8 - Locking clip
- ❑ for hydraulic balancing element

9 - Roller rocker finger
- ❑ removing and installing ⇒ page 113
- ❑ mark the fitting position for re-installation
- ❑ Check smooth operation of cylindrical-roller bearings
- ❑ oil the contact surfaces before installing



10 - Exhaust camshaft

- ❑ removing and installing ⇒ page 113
- ❑ Install ball for camshaft slide ⇒ page 124
- ❑ Slack: max. 0.04 mm

11 - Spring

- ❑ no spare part

12 - Ball

- ❑ for camshaft slide

13 - Cylinder head cover

- ❑ with integrated camshaft bearings
- ❑ reworking is not permitted
- ❑ remove old sealant residues
- ❑ order of tightening ⇒ page 111

14 - Screw

- ❑ slacken ⇒ page 111
- ❑ Tightening torque and tightening order ⇒ page 112

15 - Inlet camshaft

- ❑ removing and installing ⇒ page 113
- ❑ Slack: max. 0.04 mm

16 - Fit pin

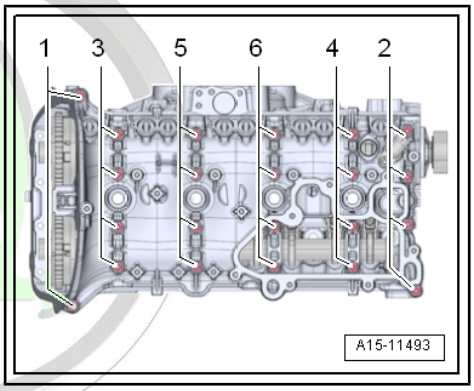
17 - Fit pin

18 - Inlet valve

- ❑ do not rework, only grinding in is permissible
- ❑ Valve dimensions ⇒ page 132
- ❑ inspecting valve guides ⇒ page 131

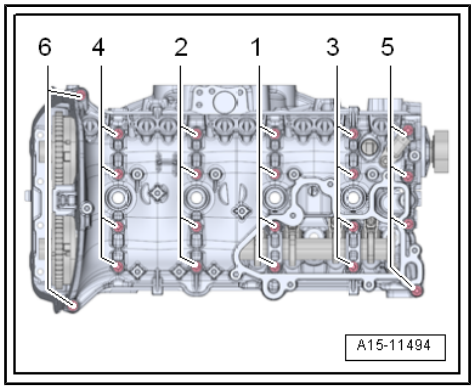
Undo screws for cylinder head cover

– Loosen screws for camshaft housing in the sequence -1 … 6-.



Cylinder head cover - tightening sequence

– Replace bolts.

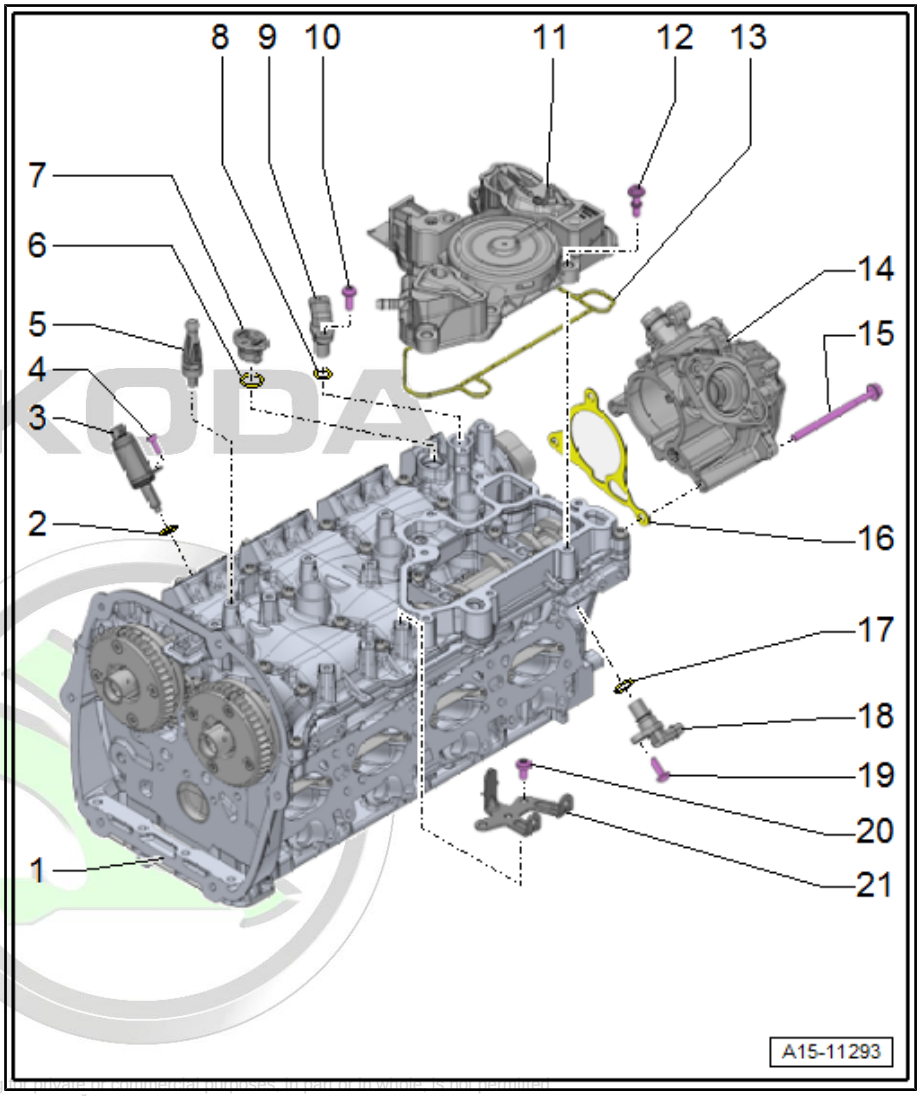


Note

Make sure that the cylinder head cover is not tilted.

1. Tighten screws in the order -1 … 6- in several stages as follows.
2. Tighten the bolts in the sequence -1…6- to 8 Nm.
3. Turn screws further in the sequence -1 … 6- by 90° ($^1/_4$ turn).

4.2 Oil trap and vacuum pump - Summary of components



1 - Cylinder head

2 - O-ring
- ❑ replace
- ❑ wet with engine oil

3 - Positioning element for camshaft adjustment (exhaust camshaft)

4 - 5 Nm

5 - ball pin, 9 Nm
- ❑ for engine cover

6 - O-ring
- ❑ replace
- ❑ wet with engine oil

7 - Plug

8 - O-ring
- ❑ replace
- ❑ wet with engine oil

9 - Hall sender 3 - G300-
- ❑ removing and installing ⇒ page 312

10 - 9 Nm

11 - Oil separator
- ❑ removing and installing ⇒ page 148

12 - Screw
- ❑ Tightening torque and tightening order ⇒ page 147

13 - Gasket
- ❑ replace

14 - Vacuum pump
- ❑ removing and installing ⇒ Chassis; Rep. gr. 47

15 - Screw

- ❑ for brake vacuum pump
- ❑ Tightening torque ⇒ Chassis; Rep. gr. 47

16 - Gasket

- ❑ replace if damaged

17 - O-ring

- ❑ replace
- ❑ wet with engine oil

18 - Hall sender - G40-

- ❑ removing and installing ⇒ page 312

19 - 9 Nm

20 - 9 Nm

21 - Support

- ❑ For solenoid valve 1 for activated charcoal filter - N80-

4.3 Removing and installing camshafts

Special tools and workshop equipment required

- ♦ Assembly tool - T10352/2-
- ♦ Counterholder - T10355-
- ♦ Drift - T40196-
- ♦ Assembly lever - T40243-
- ♦ Assembly tool - T40266-
- ♦ Rig tool - T40267-
- ♦ Camshaft clamp - T40271-
- ♦ Protective gloves
- ♦ Silicone sealant ⇒ ETKA - Electronic catalogue of original parts
- ♦ 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.

Removing

Note

- ♦ *The sealing surfaces of the lower cylinder head cover and the top cylinder head must not be reworked.*
- ♦ *The camshaft bearings are integrated in the cylinder head/ cylinder head cover. Before removing of the cylinder head cover, the camshaft timing shaft must be relieved.*
- ♦ *Fit all cable straps on again in the same place when installing.*

– Remove the sound dampening system ⇒ Body Work; Rep. gr. 50 .

– Remove air filter housing ⇒ page 258 .

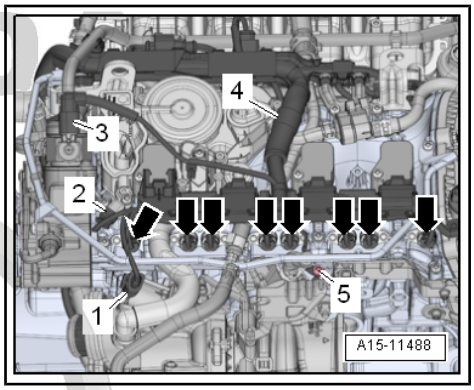
– Remove top cover for timing chain ⇒ page 73 .

– Remove top coolant pipe ⇒ page 183 .

– Removing ignition coils ⇒ page 311 .
– Disconnect electrical plug connections:

1 - for turbocharger divert air valve - N249-
2 - for hall sender 3 - G300-
3 - for fuel pressure regulating valve - N276-

– Disconnect connectors -arrows- from the positioning elements for camshaft adjustment.
– Release screw -5- and battery earth strap.
– Undo the electric wiring harness from the clip -4- and swivel out towards the front.

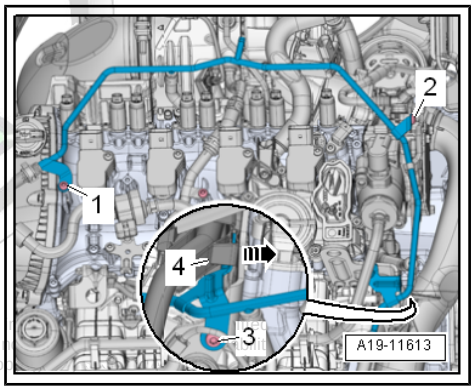


– Unlock the catches -arrow-, remove the wiring guide upwards out of the bracket and push forwards.

WARNING

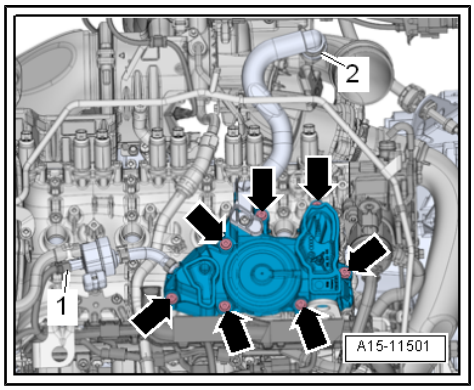
Risk of damaging the coolant lines.

- *Do not change the bending form of the coolant pipes.*



– Undo the screws -1, 2 and 3- and swivel the coolant pipe to the rear a little carefully.

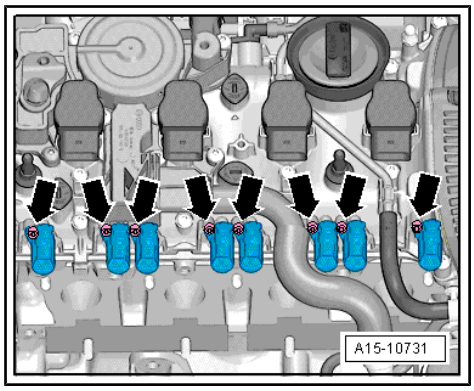
– Disconnect connectors -1- from activated charcoal filter solenoid valves 1 - N80- .
– Press release buttons on the hose -2- for crankcase ventilation and remove from cylinder head cover.
– Release screws-arrows- and remove holder.



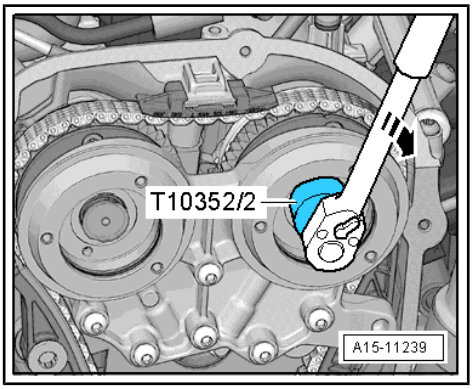
– Remove the positioning elements for the camshaft adjustment -arrows-.

WARNING

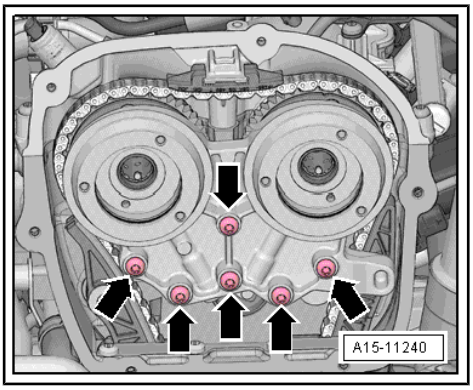
The control valves have a left-hand thread.



– Use the assembly device - T10352/2- to remove the left and right control valve in -direction of arrow-.

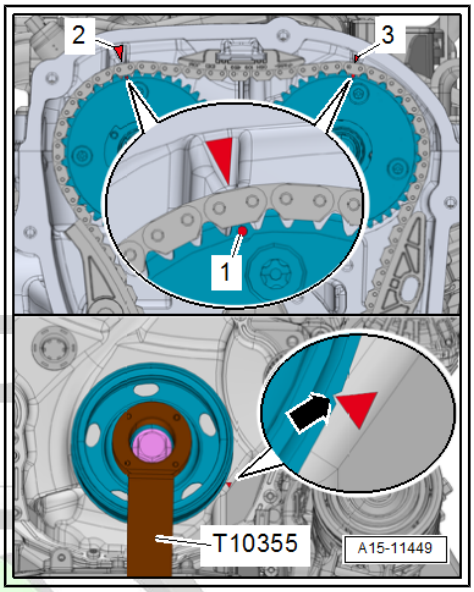


– Screw out screws -arrows- and screws arrows and remove engine cap.

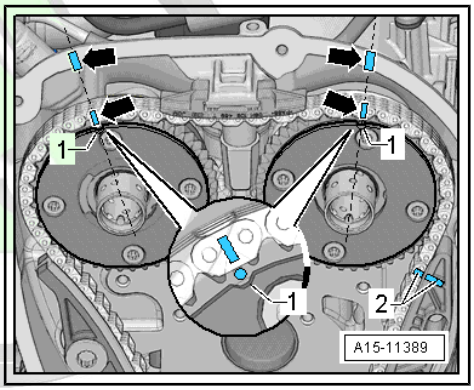


– Rotate the V-ribbed belt pulley with counterholder - T10355- into the “TDC” position.

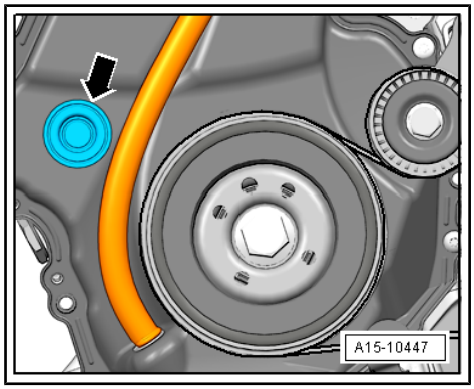
- The notch on the V-ribbed belt pulley and the marking on the cover for the bottom cover for timing chain must face each other -arrow.-
- Markings -1- of the camshaft chain sprocket must lie opposite to markings -2 and 3- on the cylinder head



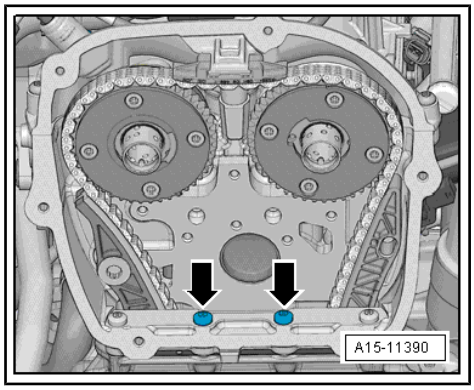
– The mutual position of the camshaft timing shaft/cylinder head -arrows- for the marks on the chain sprockets -1- with a water-proof felt-tip pen.



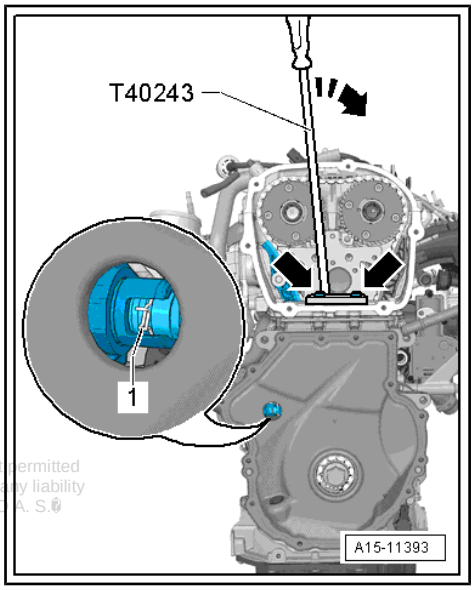
– Remove screw plug -1-.



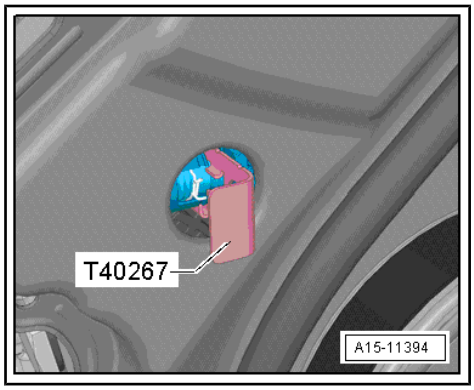
– Remove bolts -arrows-.



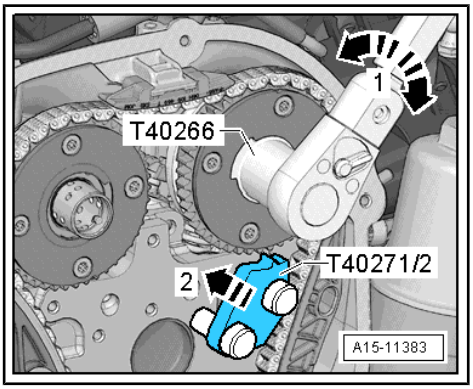
– Screw in assembly lever - T40243- -arrows-.
– Press compress circlip -1- of the chain tensioner together, and hold in place.
– Press the assembly lever - T40243- slowly in -direction of arrow- and hold in place.



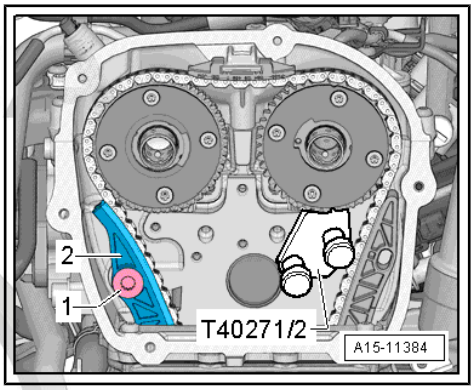
– Secure the chain tensioner using the extractor - T40267- .
– Remove assembly lever - T40243-



– Attach camshaft clamp - T40271/2- at the cylinder head and slide into the teething of the chain sprocket in -direction of arrow 2-; turn inlet camshaft with an assembly device - T40266- in -direction of arrow 1- where required.

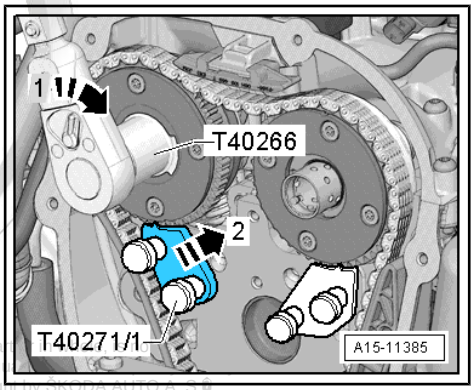


– Undo the screw -1- and move the tensioning rail -2- downwards.



– Screw camshaft clamp - T40271/1- onto cylinder head.

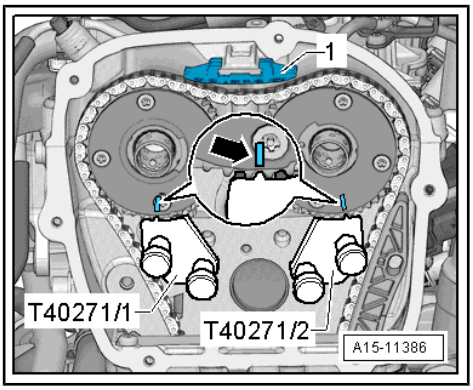
– Turn exhaust camshaft with assembly tool - T40266- in -direction of arrow 1- and move camshaft clamp - T40271/1- into the teething of the chain sprocket in -direction of arrow 2-.



– Using a waterproof felt-tip pen, mark the chain sprockets around the pegs of the camshaft clamp - T40271/1- and camshaft clamp - T40271/2- -arrow-.

– Remove top guide rail -1-, unlock the locking mechanism with a screwdriver, and push the guide rail forwards.

– Remove the camshaft timing shaft from the chain sprockets.

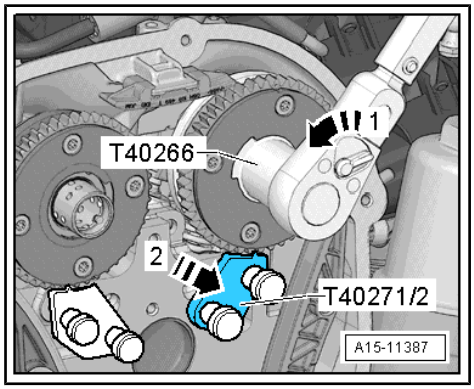


WARNING

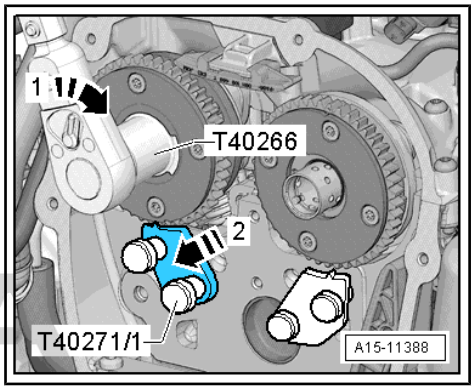
Avoid damage to valves and piston crowns.

- *When the camshaft timing shaft was removed from the cylinder head, the crankshaft must not be turned further.*

– Turn inlet camshaft with assembly tool - T40266- in -direction of arrow 1- and move camshaft clamp - T40271/2- out of the teething of the chain sprocket in -direction of arrow 2- and release the camshaft.



– Turn exhaust camshaft with assembly tool - T40266- in -direction of arrow 1- and move camshaft clamp - T40271/1- out of the teething of the chain sprocket in -direction of arrow 2- and release the camshaft.



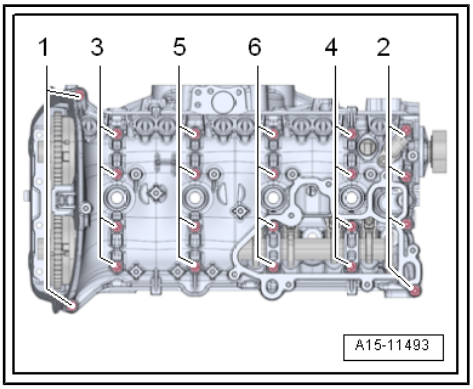
– Remove the high pressure pump ⇒ page 285 .

– Remove vacuum pump ⇒ Suspension; Rep. gr. 47 .

– Loosen and remove screws for cylinder head cover in the sequence -1 … 6-.

– Remove cylinder head cover.

– Take out camshafts.



Note

Do not remove and do not move the slide, which is an element of the camshaft ⇒ page 124 .

WARNING

Risk of contamination to the hinge system and bearings.

- ***Cover opened engine parts.***

Install

Note

- *Make sure that all roller rocker fingers correctly rest on the end of the valve stem.*
- *The pistons must not be positioned at top dead centre.*

WARNING

Risk of injury to eyes.

- ***Wear safety goggles!***

WARNING

Risk of contamination to the hinge system and bearings.

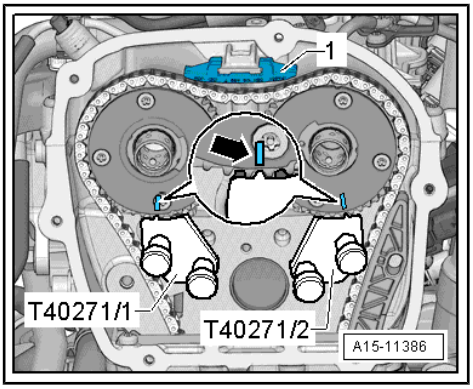
- ***Cover opened engine parts.***

– Remove residual sealant on the cylinder head and camshaft housing using a chemical sealant remover.

– Clean oil and grease from sealing surfaces.

– Oil contact surfaces of camshafts.

– When replacing the camshafts, the marks -arrow- must be transferred to the new camshafts.

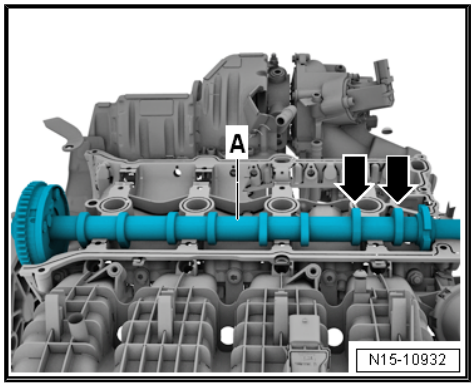


WARNING

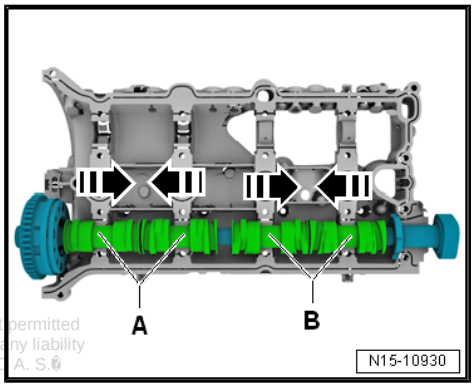
Avoid damage to valves and piston crowns.

- ***When the camshaft timing shaft was removed from the cylinder head, the crankshaft must not be turned further.***

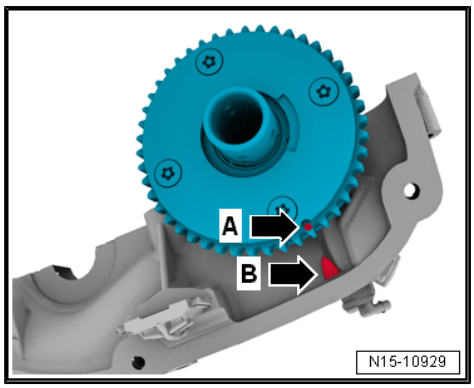
– Engage inlet camshaft -A- in the cylinder head. Turn the cam on cylinder 4 -arrows- upwards.



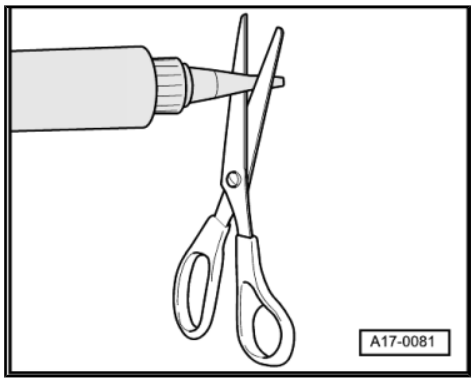
– Insert the outlet camshaft into the cylinder head cover, as shown in the figure. The cam pair -A and B- must settle towards each other.



– Turn the exhaust camshaft until the markings -A and B- face each other.

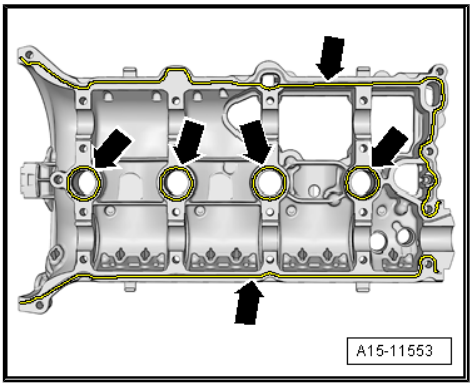


– Cut off nozzle on tube at front marking (∅ of nozzle approx. 2 mm).



– Apply silicone sealant to the clean sealing surface of the oil pan, as shown arrows -arrows-.

♦ Thickness of sealant bead: 2...3 mm.



Note

♦ *The cylinder head cover must be installed within 5 minutes after applying the silicone sealant.*

♦ *The sealant bead must not be thicker than specified otherwise excess sealant may get into the oil pan and clog the strainer in the oil suction pipe.*

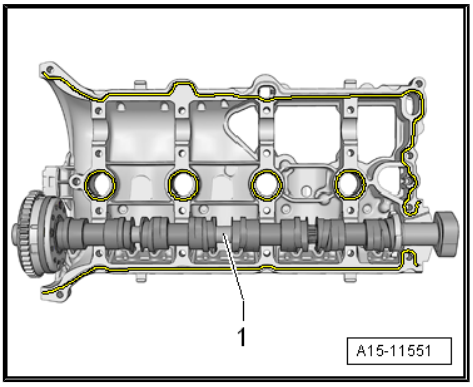
♦ *Pay attention to the use by date on sealant.*

Sealant ⇒ ETKA - Electronic catalogue of original parts

Note

Do not remove or move the slide, it is an element of the camshaft.
⇒ page 124

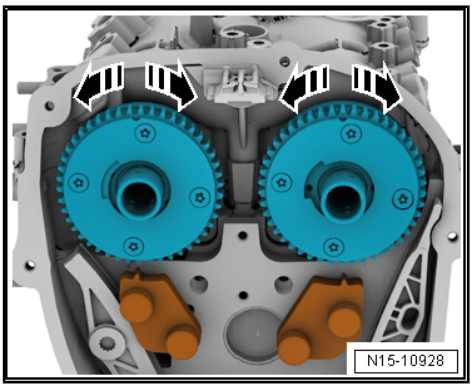
– Place cylinder head cover with exhaust camshaft -1- on the cylinder head.



– Using the hand, lightly press on the cylinder head cover, while doing so, lightly turn the camshaft so that the cover sits onto the cylinder head tension-free.

– Replace screws for cylinder head cover.

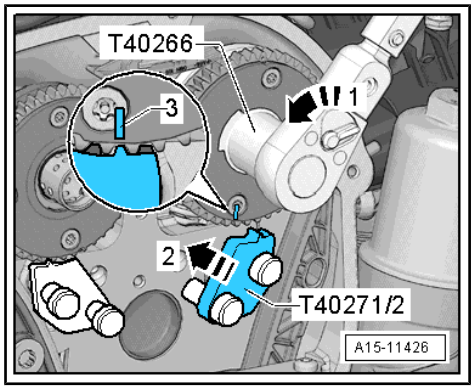
– Tighten screws in several stages, tightening sequence ⇒ page 112 .



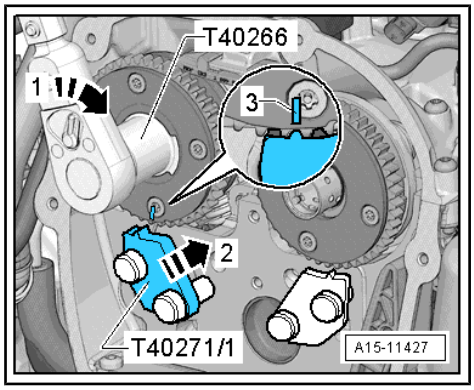
Note

Make sure that the cylinder head cover is not tilted.

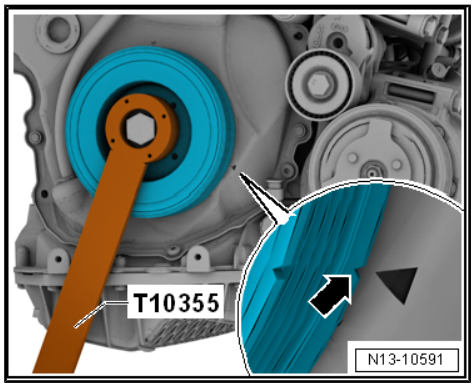
– Turn the inlet camshaft in -direction of arrow 1- until the mark -3- coincides with the camshaft clamp - T40271/2- .
– Move the camshaft clamp - T40271/2- into the teething of the chain sprocket in -direction of arrow 2-.



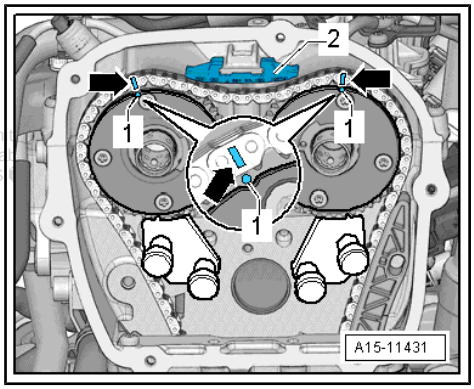
– Turn the inlet camshaft in -direction of arrow 1- until the mark -3- coincides with the camshaft clamp - T40271/1- .
– Move the camshaft clamp - T40271/1- into the teething of the chain sprocket in -direction of arrow 2-.



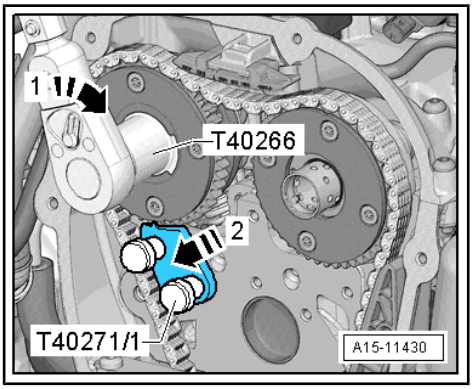
– Rotate the V-ribbed belt pulley with counterholder - T10355- into the “TDC” position.
• The notch on the V-ribbed belt pulley and the marking on the cover for the bottom cover for timing chain must face each other -arrow.-



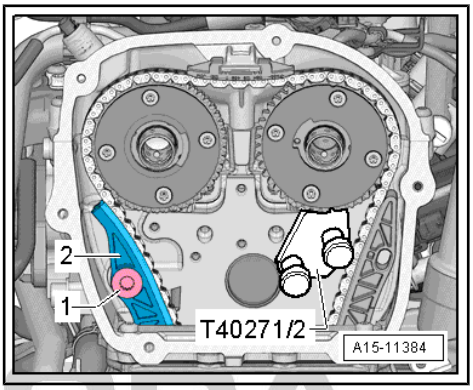
– Place the camshaft timing shaft into position; do so by positioning the marks on the chain links -arrows- into the right position vis-a-vis the chain sprockets -1-.
– Install top guide rail -2-.



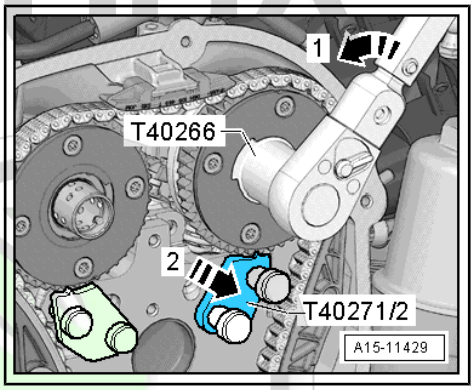
– Turn exhaust camshaft with assembly tool - T40266- in -direction of arrow 1- and move camshaft clamp - T40271/1- out of the teething of the chain sprocket in -direction of arrow 2- and release the camshaft.



– Insert the tensioning rail -2- upwards and screw in the screw -1-.

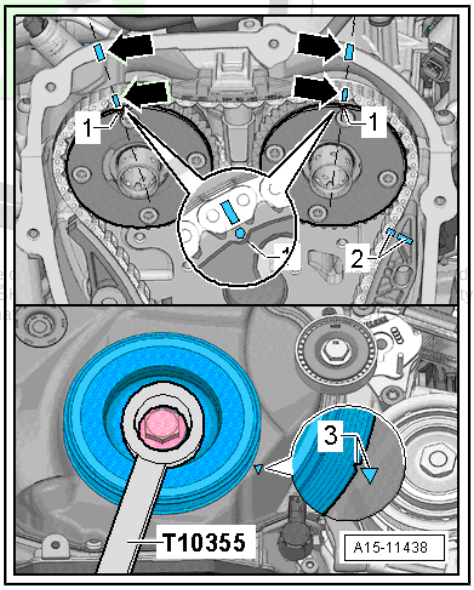


– Turn inlet camshaft with assembly tool - T40266- in -direction of arrow 1- and move camshaft clamp - T40271/2- out of the teething of the chain sprocket in -direction of arrow 2- and release the camshaft.

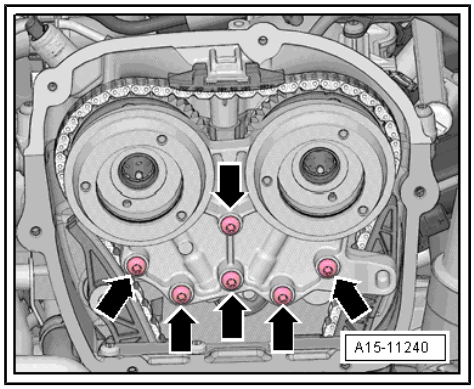


– Check the control times, the marks on the camshaft timing shaft and on the cylinder head -arrows- must coincide with the marks on the chain sprockets.

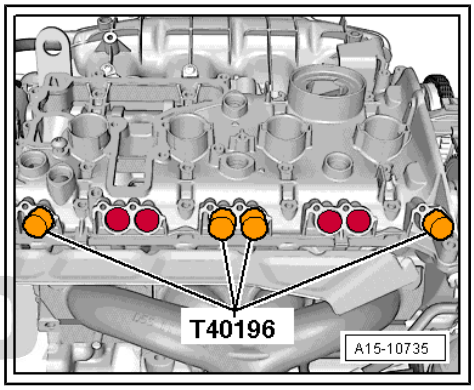
- The markings on the camshaft timing shaft and the guide rail of the camshaft timing shaft -2- must face each other.
- The notch on the V-ribbed belt pulley must face the arrow marking on the bottom cover for the timing chain -3-.



– Slide in the bearing cap and tighten the screws -arrows- until hand-tight.
– Remove the extractor - T40267- .
– Tighten the screws -arrows- for the bearing cap ⇒ page 81 .
– Install the control valves -Pos. 6- ⇒ page 81 .



– Insert the mandrel -T40196- at the positions shown in the screen.
– Turn the crankshaft in direction of rotation of engine by 4 turns.
– Remove mandrel -T40196- .
– Install top cover for timing chain ⇒ page 73 .



Carry out an adjustment of the timing chain length 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 - Adaption after work on chain drive`

Further installation occurs in reverse order.

4.4 Install ball for camshaft slide

Special tools and workshop equipment required

♦ Spacer - T40191/1-

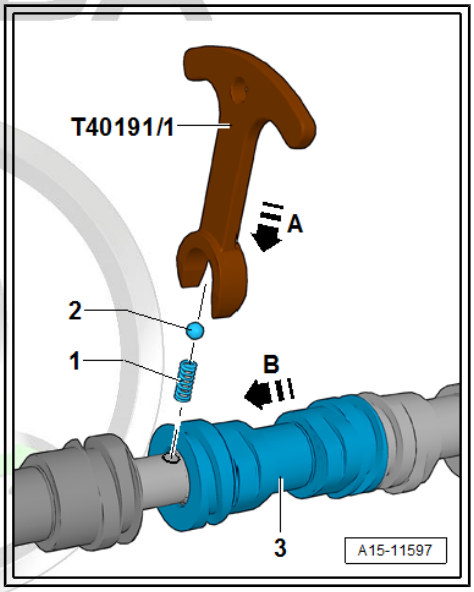
Install

WARNING

Risk of eye damage by jumping out the balls.

Wear safety goggles!

– Insert spring -1- into the camshaft.
– Install ball -2- onto the spring in the camshaft.
– Press the balls and springs with spacer - T40191/1- in direction of arrow -A- downwards, and hold in place.
– Move the camshaft slide -3- in direction of arrow -B-.



4.5 Replacing valve stem seals

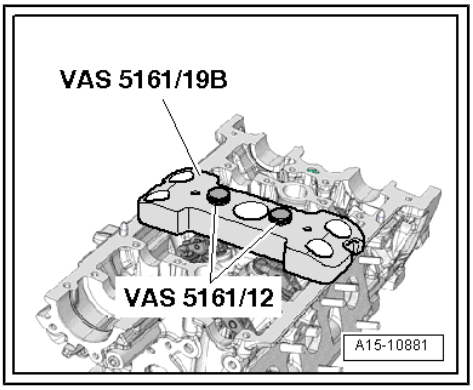
4.5.1 Removing and installing valve stem seal with cylinder head installed

Special tools and workshop equipment required

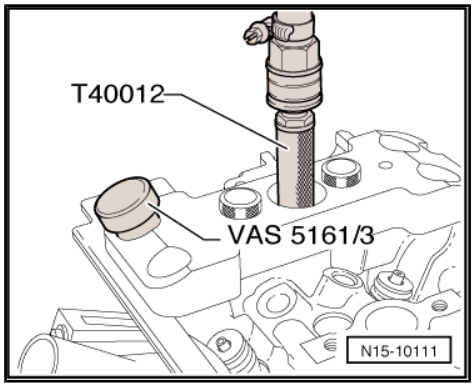
- Spark plug wrench , e.g. -3122 B-
- Valve supporting plate - MP1-218-
- Valve stem seal extractor - MP1-230 (3364)-
- Valve stem seal fitting tool - MP1-233 (3365)-
- Adapter - T40012-
- Disassembly and assembly device for valve collets - VAS 5161-
- Guide plate for FSI engine - VAS 5161/19B-

Remove valve stem seal

– Remove the camshafts ⇒ page 113 .
– When installing again, mark the assignment of the roller rocker arms and the hydraulic clearance compensation elements.
– Remove the roller rocker arms together with hydraulic balancing elements and lay aside on a clean surface.
– Remove the spark plugs with spark plug wrench - 3122 B- .
– Screw the guide plate for the FSI engine - VAS 5161/19B- with knurled screws - VAS 5161/12- onto the cylinder head as shown.
– Position piston of the relevant cylinder to “dead centre”.

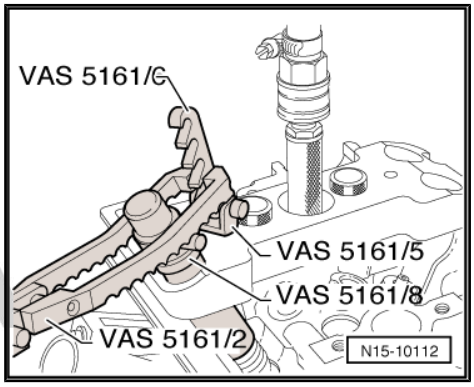


– Screw the adapter - T40012- into the plug connector thread.
– Activate compressed air source with a pressure of at least 0.6 MPa (6 bar).
– Undo the fixed valve collets with impact drift - VAS 5161/3- and plastic hammer.



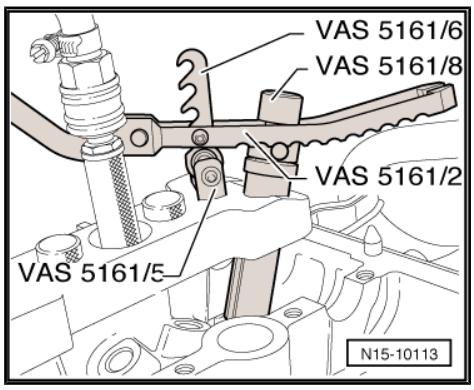
For inlet side

– Screw in detent part - VAS 5161/6- with interlocking fork - VAS 5161/5- into the middle threaded bore of the guide plate for the FSI engine - VAS 5161/19B- .
– Plug the assembly cartridge - VAS 5161/8- into the guide plate for the FSI engine - VAS 5161/19B- .
– Hook pressure fork - VAS 5161/2- into the detent part - VAS 5161/6- .

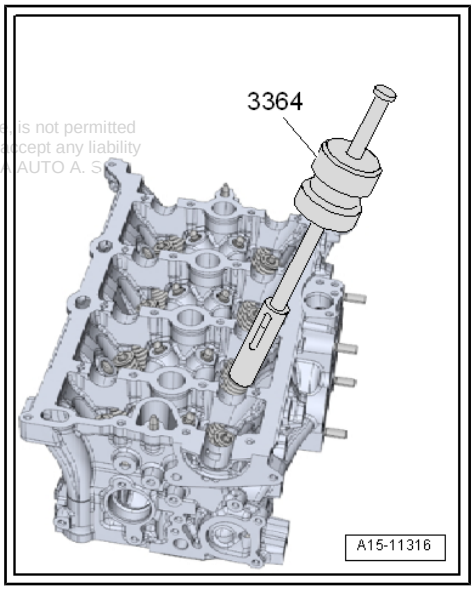


For exhaust side

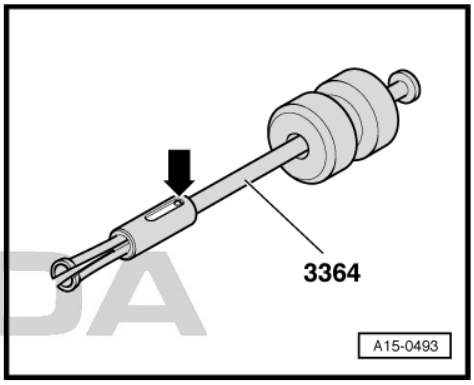
– Screw in detent part - VAS 5161/6- with interlocking fork - VAS 5161/5- into the outer threaded bore of the guide plate for the FSI engine - VAS 5161/19B- .
– Press the engine cartridge - VAS 5161/8- downwards and at the same time turn the knurled screw on the assembly cartridge - VAS 5161/8- towards the right so that the tips engage between the valve collets.
– Move the knurled screw to and fro slightly, by doing so the valve collets are pressed apart and are installed in the assembly cartridge.
– Let go of the pressure fork - VAS 5161/2- .
– Remove the assembly cartridge - VAS 5161/8- .



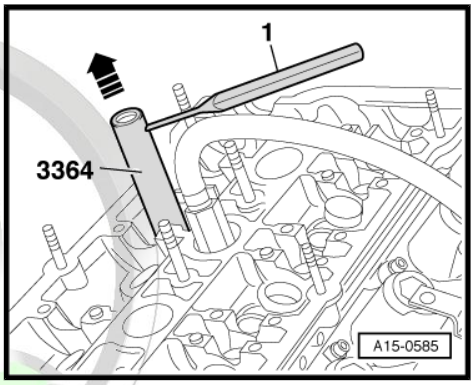
– Pull off valve stem seal with extractor for valve stem seal - 3364- .



– If the valve stem seal extractor - 3364- cannot be used due to space constraints, drive out the roll pin -arrow- with a mandrel and remove the final impacter.
– Set the lower part of the valve stem seal extractor - 3364- onto the valve stem seal.



– Insert the mandrel -1- into the bore in the lower part of the extractor.
– Attach an assembly lever to the extractor and remove the valve stem seal -arrow-.

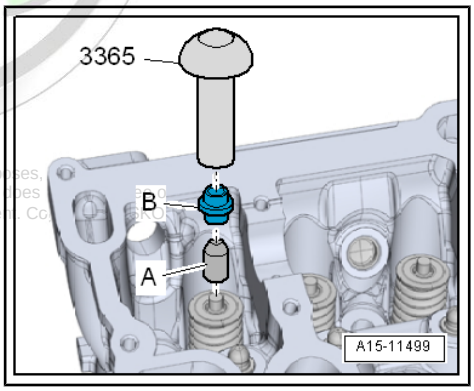


Install the valve stem seal

WARNING

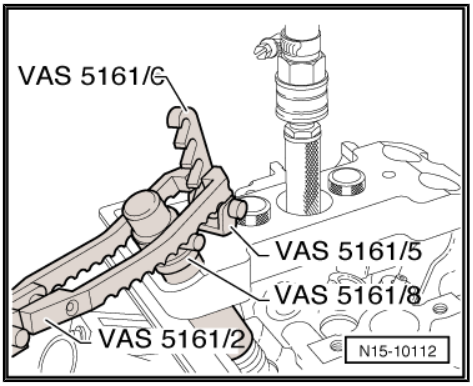
Risk of damage to the valve stem seals during installation.

- ***Fit the plastic bushing -A-, which is attached to the new valve stem seals -B-, onto the valve stem.***

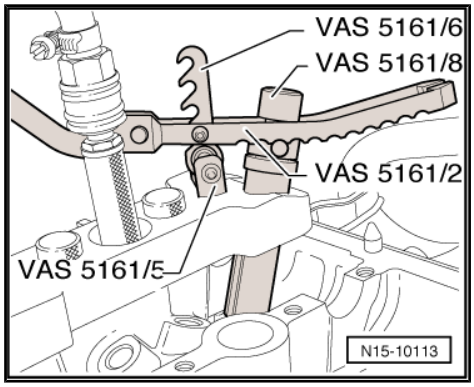


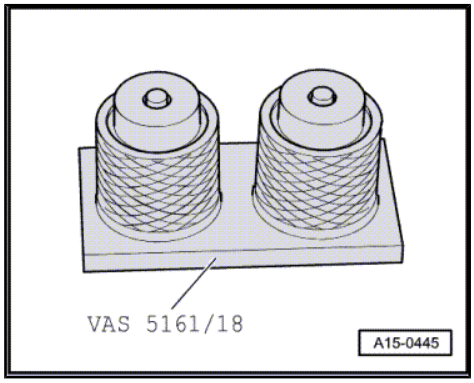
– Lightly oil sealing lip of the valve stem seal.
– Slide the valve stem seal onto the plastic bushing.
– Carefully press the valve stem seal with the valve stem seal insertion tool - 3365- onto the valve guide.
– Remove plastic sleeve.
– Insert the valve spring and the valve spring retainer.
– Install the assembly/disassembly device - VAS 5161- as shown.

Inlet side



Outlet side





Note

- *If the valve collets were removed from the assembly cartridge, first of all they must be inserted into the insertion device - VAS 5161/18- .*
- *Press the assembly cartridge -VAS 5161/8- from the top onto the insertion device and lift up the valve collets.*

– Press the assembly cartridge - VAS 5161/8- with pressure fork - VAS 5161/2- down, turn the knurled screw on the assembly cartridge to and fro, pulling them upward as you do so.

– Relieve the pressure fork - VAS 5161/2- while the knurled screw on the assembly cartridge is drawn.

– Remove the assembly/diassembly device - VAS 5161- .

Installation is carried out in the reverse order. However, pay attention to the following:

– Install camshafts ⇒ page 113 .

4.5.2 Removing and installing valve stem seal with cylinder head removed

Special tools and workshop equipment required

- Extractor - MP1-230 (3364)-
- Valve stem seal fitting tool - MP1-233 (3365)-
- Disassembly and assembly device for valve collets - VAS 5161-
- Guide plate for FSI engine - VAS 5161/19B-
- Engine and gearbox support - VAS 6095-
- Cylinder head tensioning device - VAS 6419-

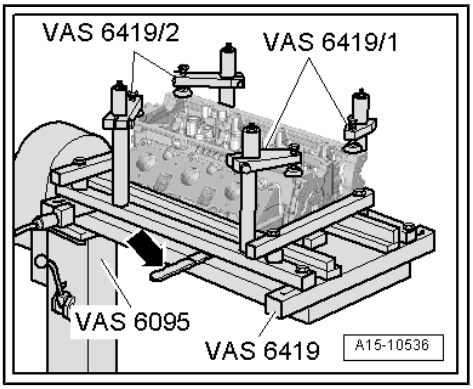
Work procedure

– Remove the camshafts ⇒ page 113 .

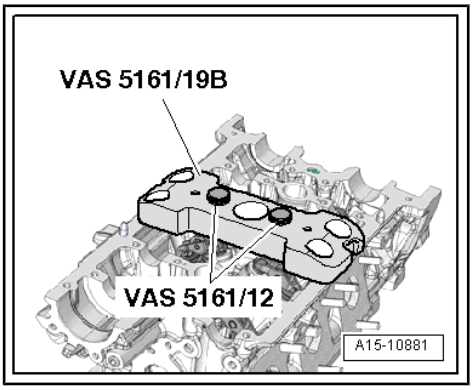
– When installing again, mark the assignment of the roller rocker arms and the hydraulic clearance compensation elements.

– Remove the roller rocker arms together with hydraulic balancing elements and lay aside on a clean surface.

– 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.

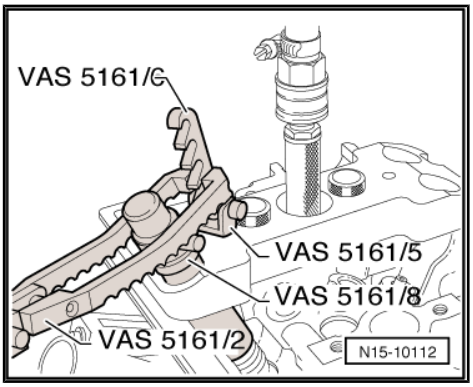


– Screw the guide plate for the FSI engine - VAS 5161/19B- with knurled screws - VAS 5161/12- onto the cylinder head as shown.
– Insert the impact drift -VAS 5161/3- into the guide plate and knock off the tightly fitted valve collets using a plastic hammer.



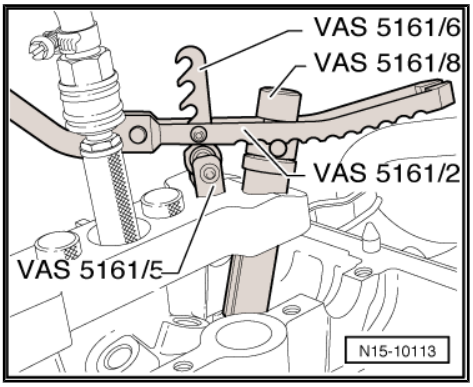
For inlet side

– Screw in detent part - VAS 5161/6- with interlocking fork - VAS 5161/5- into the middle threaded bore of the guide plate for the FSI engine - VAS 5161/19B- .
– Plug the assembly cartridge - VAS 5161/8- into the guide plate for the FSI engine - VAS 5161/19B- .
– Hook pressure fork - VAS 5161/2- into the detent part - VAS 5161/6- .

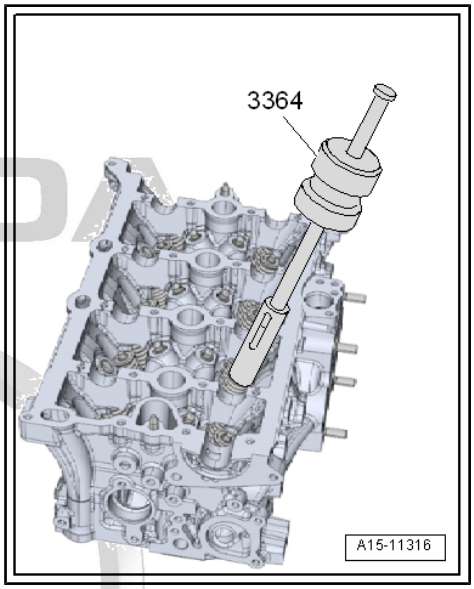


For exhaust side

– Screw in detent part - VAS 5161/6- with interlocking fork - VAS 5161/5- into the outer threaded bore of the guide plate for the FSI engine - VAS 5161/19B- .
– Press the engine cartridge - VAS 5161/8- downwards and at the same time turn the knurled screw on the assembly cartridge - VAS 5161/8- towards the right so that the tips engage between the valve collets.
– Move the knurled screw to and fro slightly, by doing so the valve collets are pressed apart and are installed in the assembly cartridge.
– Let go of the pressure fork - VAS 5161/2- .
– Remove the assembly cartridge - VAS 5161/8- .



– Pull off valve stem seals with extractor - MP1-230 (3364)- .

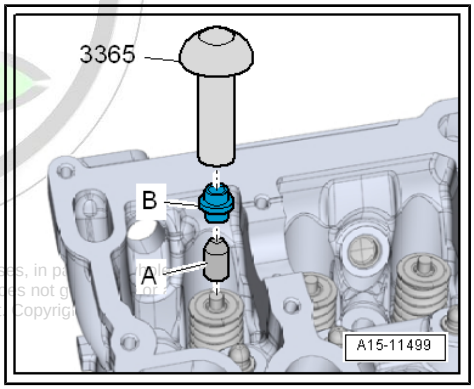


Install the valve stem seal

WARNING

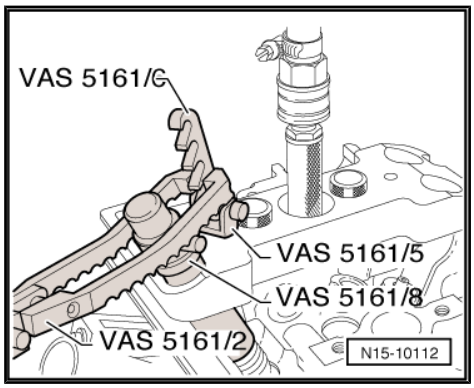
Risk of damage to the valve stem seals during installation.

- ***Fit the plastic bushing -A-, which is attached to the new valve stem seals -B-, onto the valve stem.***

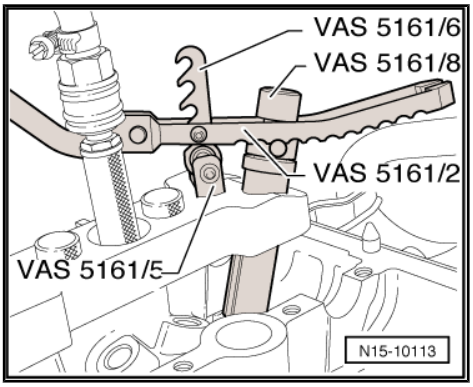


– Lightly oil sealing lip of the valve stem seal.
– Slide the valve stem seal onto the plastic bushing.
– Carefully press the valve stem seal with the valve stem seal insertion tool - MP1-233 (3365)- onto the valve guide.
– Remove plastic sleeve.
– Insert the valve spring and the valve spring retainer.
– Install the disassembly and assembly device for the valve collets - VAS 5161- as shown.

Inlet side

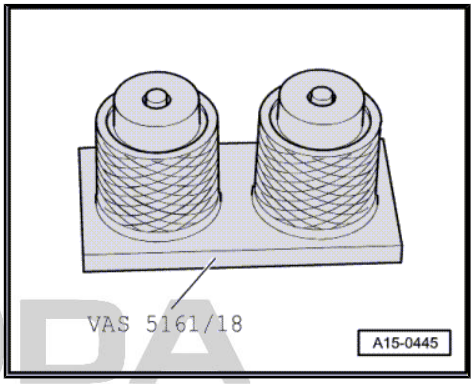


Outlet side



Note

- *If the valve collets were removed from the assembly cartridge, first of all they must be inserted into the insertion device - VAS 5161/18- .*
- *Press the assembly cartridge -VAS 5161/8- from the top onto the insertion device and lift up the valve collets.*



– Press the assembly cartridge - VAS 5161/8- with pressure fork - VAS 5161/2- down, turn the knurled screw on the assembly cartridge to and fro, pulling them upward as you do so.
– Relieve the pressure fork - VAS 5161/2- while the knurled screw on the assembly cartridge is drawn.
– Remove the disassembly and assembly device for valve collets - VAS 5161-

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

– Install camshafts ⇒ page 113 .

4.6 Checking valve guides

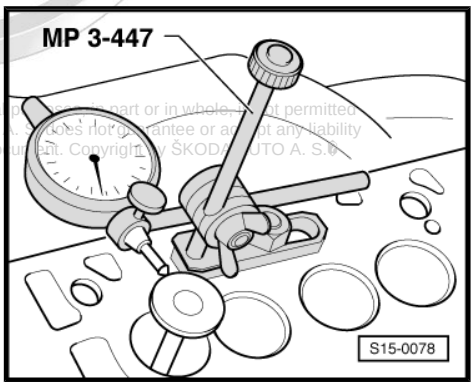
Special tools and workshop equipment required

- Universal dial gauge holder - MP 3-447 (VW 387)-
- Dial gauge

Test sequence

– Insert valve into the 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 guide and exhaust valve in exhaust guide.
– Determine valve rock.

  The wear limit for inlet and exhaust valve: 0.8 mm



Note

- *If the wear limit is exceeded, repeat measurement with new valves. If the wear limit is again exceeded, replace cylinder head. The valve guides cannot be replaced.*
- *If the valve is replaced when carrying out repair work, use a new valve for the measurement.*

4.7 Valve dimensions

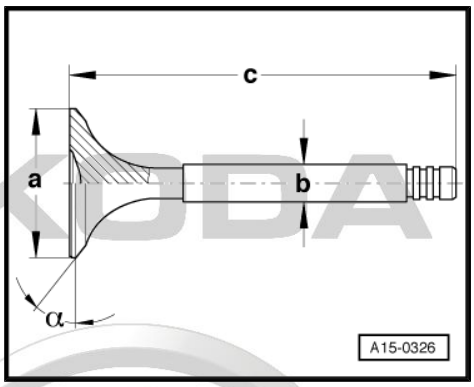
Testing valves

– Check valves on the shank and seat surface for scoring.

– If scoring is clearly visible, change valve.

Note

Inlet and exhaust valves must not be reworked. Only lapping-in is permitted.



Dimension		Inlet valve	Exhaust valve
∅ a	mm	33.85 ± 0.10	28.0 ± 0.1
∅ b	mm	5.98 ± 0.01	5.96 ± 0.01
c	mm	104.0 ± 0.2	101.9 ± 0.2
α	∠°	45	45

17 – Lubrication

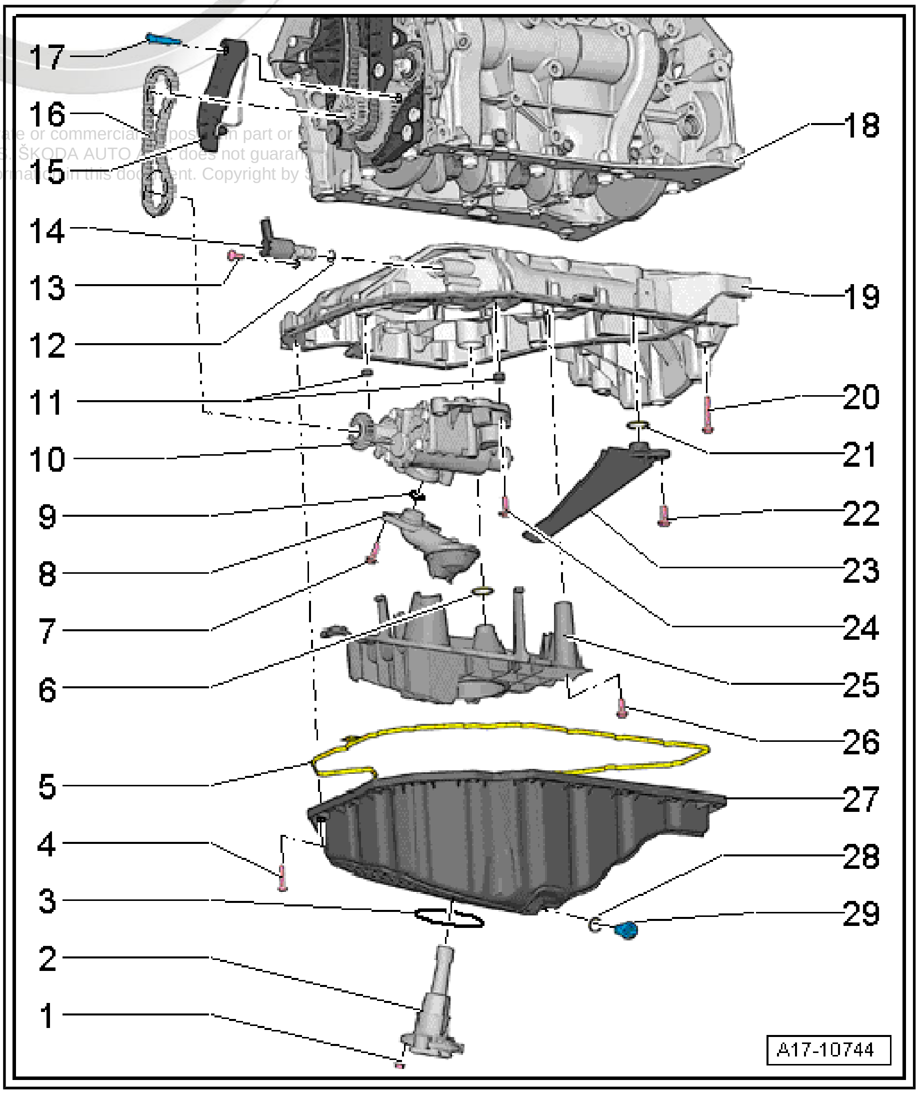
1 Oil sump and oil pump

Note

- *If considerable quantities of metal swarf or abrasion is found in the engine oil when carrying out engine repairs, carefully clean the oil galleries in order to avoid consequential damage and additionally replace the oil injection nozzles and the engine oil cooler.*
- *The oil level must not be above the max. marking - risk of damage to catalytic converter!*

Check the oil level, amount of oil and oil specification ⇒ Maintenance ; Booklet Octavia III

1.1 Oil sump and oil pump - Summary of components



1 - 9 Nm

2 - Oil level and oil temperature sender - G266-

- ❑ removing and installing ⇒ page 135

3 - Gasket

- ❑ replace

4 - Screw

- ❑ replace
- ❑ Tightening torque and tightening order ⇒ page 135

5 - Gasket

- ❑ only for the lower part of the oil sump made from sheet metal

6 - O-ring

- ❑ replace
- ❑ wet with engine oil

7 - 4 Nm + torque a further 45° (1/8 turn)

- ❑ replace

8 - Suction line

- ❑ Clean strainer if dirty

9 - O-ring

- ❑ replace
- ❑ wet with engine oil

10 - Oil pump

- ❑ removing and installing ⇒ page 138

11 - Fitting sleeve

12 - O-ring

- ❑ replace
- ❑ wet with engine oil

13 - 4 Nm + torque a further 90° (1/4 turn)

- ❑ replace

14 - Oil pressure control valve - N428-

- ❑ removing and installing ⇒ page 152

15 - Chain tensioner

16 - Drive chain for oil pump

- ❑ Mark direction of rotation before removing.

17 - 9 Nm

18 - Cylinder block

19 - Sump top part

- ❑ removing and installing ⇒ page 140

20 - Screw

- ❑ replace
- ❑ Tightening torque and tightening order ⇒ page 135

21 - O-ring

- ❑ replace
- ❑ wet with engine oil

22 - 4 Nm + torque a further 45° (1/8 turn)

- ❑ replace

23 - Oil return pipe

24 - 8 Nm + torque a further 90° (1/4 turn)

- ❑ replace

25 - Baffle

- ❑ replace

26 - 4 Nm + torque a further 45° (1/8 turn)

- ❑ replace

27 - Sump bottom part

- ❑ Different diameters⇒ ETKA - Electronic Catalogue of Original Parts
- ❑ removing and installing ⇒ page 136

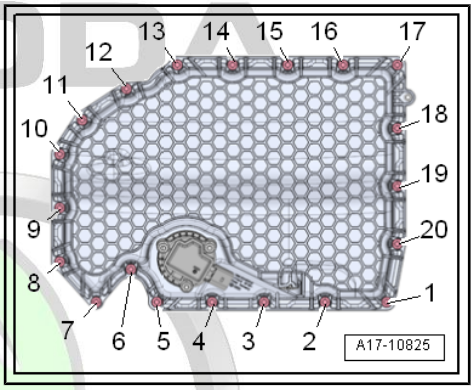
28 - Seal / O-ring

- ❑ Seal for the lower part of the oil sump made from sheet metal
- ❑ O-ring for the lower part of the oil sump made from plastic
- ❑ replace
- ❑ Wet O-ring with engine oil

29 - Oil discharge cap with thread or screw plug

- ❑ Oil discharge cap with thread for lower part of the oil sump made from sheet metal
- ❑ Oil discharge cap with thread 30 Nm
- ❑ Screw plugs for the lower part of the oil sump made from plastic
- ❑ Tighten screw plugs up to stop

Lower part of the oil lump made from plastic - tightening sequence



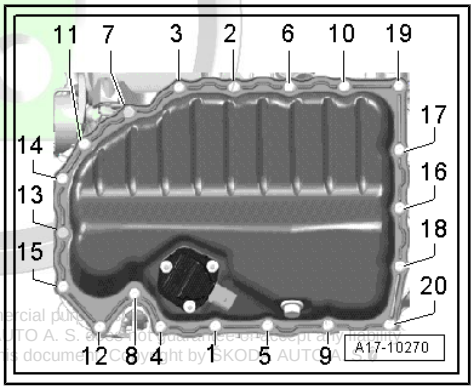
Note

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

– Tighten screws -1 to 20- in 2 stages in the order shown:

1. Tighten screws to 8 Nm.
2. 90° (torque a further 90° ($^1/_4$ turn).

Lower part of the oil lump made from sheet-metal - tightening sequence

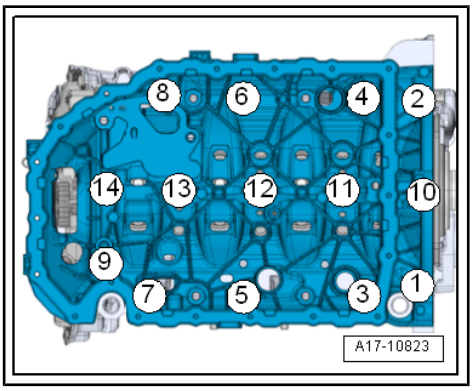


Note

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

– Tighten screws -1 to 20- in 2 stages in the order shown:
– 1. Tighten screws to 8 Nm.
– 2. 45° (torque a further 45° ($^1/_8$ turn).

Top part of oil sump - tightening sequence



Note

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

– Tighten screws -1 to 14- in the order shown:
– 1. Tighten screws -1 to 14- to 8 Nm.
– 2. Torque screws -1 and 2- a further 180° ($^1/_2$ turn.)
– 3. Tighten screws -3 to 9- a further 45° ($^1/_8$ turns).
– 4. Tighten screw -10- a further 180° ($^1/_2$ turns).
– 5. Tighten screws -11 to 14- a further 90° ($^1/_4$ turns).

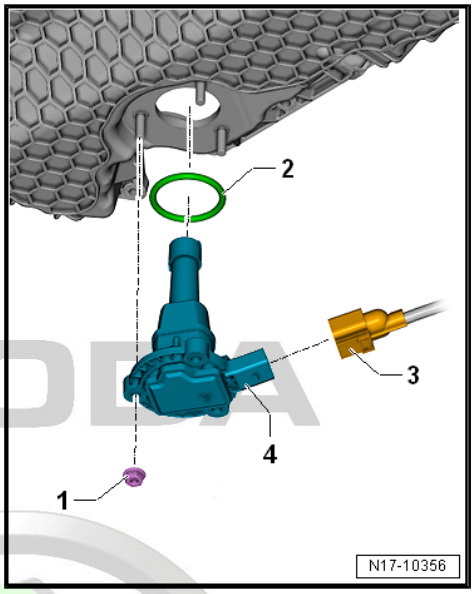
1.2 Removing and installing oil level and oil temperature sender - G266-

Removing

- Engine oil is drained ⇒ Maintenance ; Booklet Octavia III

– Unplug connector -3-.

– Unscrew nuts -1- and remove the oil level- and oil temperature sender - G266- -4-.



Install

Installation is carried out in the reverse order. However, pay attention to the following:

- Tightening torques ⇒ page 133 .

Note

Replace gasket ring -2-.

– Fill with engine oil and check the oil level ⇒ Maintenance ; Booklet Octavia III .

1.3 Removing and installing oil sump bottom 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

Removing

- Engine oil is drained ⇒ Maintenance ; Booklet Octavia III

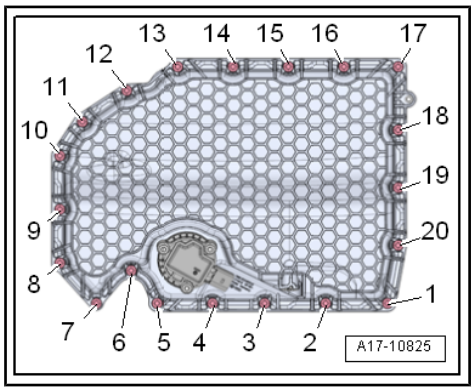
– Remove oil level and oil temperature sender - G266- ⇒ page 135 .

For vehicles with the lower part of the oil sump made from plastic:

– Undo screws -1 … 20-.

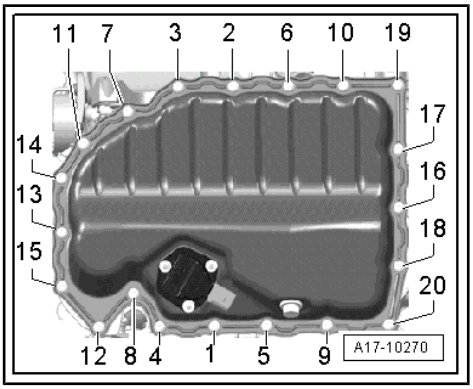
– Remove lower part of oil sump.

For vehicles with the lower part of the oil sump made from sheet metal:



– Undo screws -1 … 20-.

– Carefully loosen lower part of the oil sump from the bonding.



Install

- Tightening torques
⇒ “1.1 Oil sump and oil pump - Summary of components”, page 133 .

For vehicles with the lower part of the oil sump made from sheet metal:

Note

- *Pay attention to the use by date on sealant.*
- *The oil pan must be installed within 5 minutes after applying the silicone sealant.*
- *Replace screws which have been tightened to torquing angle.*
- *Replace the gaskets, the sealing rings and the self-locking nuts.*

– Spray sealant remover onto sealing flange and allow it to take effect.

– Remove sealant residues from the upper part of the oil sump using a flat scraper.

WARNING

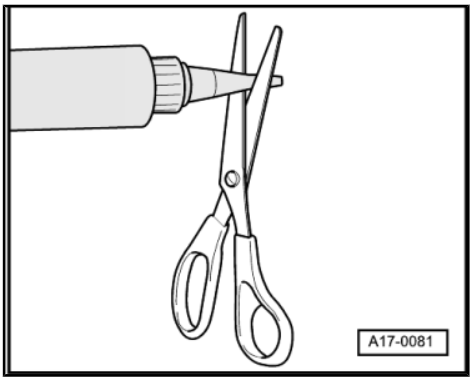
Risk of injury to eyes.

- ***Wear safety goggles!***

– Remove the remaining sealant on the cylinder block and on the oil pan with chemical sealant remover.

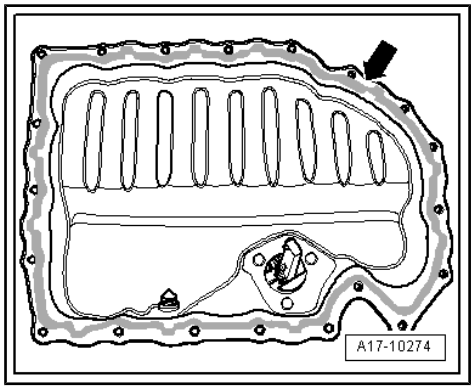
– Clean sealing surfaces, they must be free of oil and grease.

– Cut off nozzle on tube at front marking (∅ of nozzle approx. 3 mm).



– Apply silicone sealant to the clean sealing surface of the upper part of the oil sump, as shown in the illustration -arrow-.

♦ Thickness of sealant bead: 2 ... 3 mm.



Note

♦ *The oil pan must be installed within 5 minutes after applying the silicone sealant.*

♦ *The sealant bead must not be thicker than specified otherwise excess sealant may get into the oil pan and clog the strainer in the oil suction pipe.*

Note

Let sealing compound dry for approx. 30 minutes after installing oil sump. Only then fill with engine oil.

– Immediately put the oil sump into position and tighten the screws, tightening sequence and -sequence ⇒ page 135 .

Continued for all vehicles

– Fill with engine oil and check the oil level ⇒ Maintenance ; Booklet Octavia III .

1.4 Removing and installing oil pump

Special tools and workshop equipment required

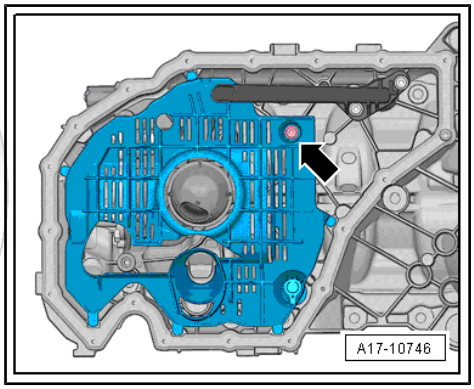
♦ Assembly tool - T10118-

♦ Rig tool - T40265-

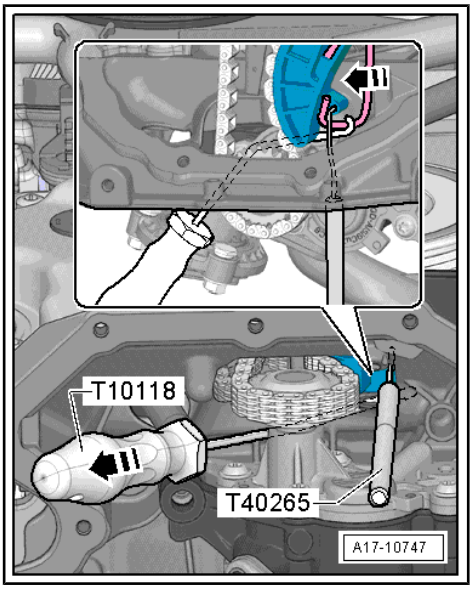
Removing

– Remove oil sump bottom part ⇒ page 136 .

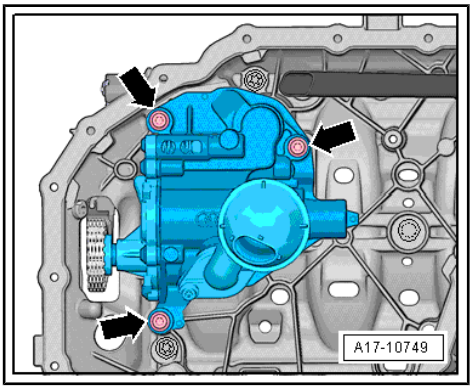
– Remove screw -arrow- and remove the baffle.



– Remove the spring on the chain tensioner with the assembly device - T10118- in -direction of arrow- and secure with the extractor - T40265- .



– Release screws -arrows- and remove oil pump.



Install

Installation is carried out in the reverse order. However, pay attention to the following:

– Check whether both dowel sleeves are present for centering the oil pump.

– Before installing the oil pump, check the sieve in the suction line and the oil channels in the upper part of the oil sump for dirt.

– Place the chain sprocket of the oil pump into the final drive chain, and install the oil pump.

WARNING

Risk of destruction of the engine.

- *The following work step must be followed, otherwise the spring of the chain tensioner will not jump into the fitting position.*

– Remove the spring on the chain tensioner with the assembly device - T10118- in -direction of arrow- and secure with the extractor - T40265- .

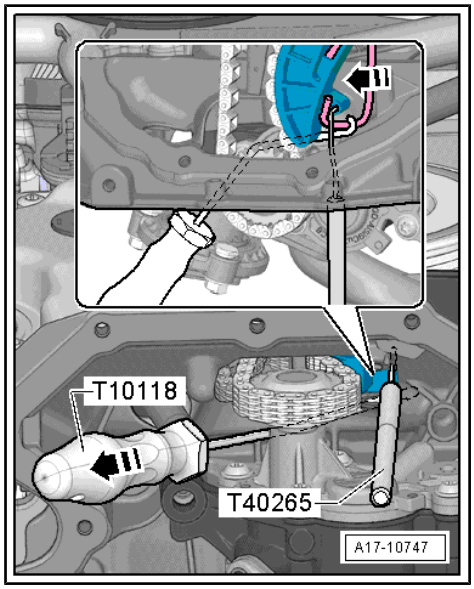
– Insert the O-Ring ⇒ page 133 -Pos. 6- onto the new baffle and wet with engine oil.

– Insert the new baffle and screw tight.

– Install oil sump bottom part ⇒ page 136 .

– Fill with engine oil and check the oil level ⇒ Maintenance ; Booklet Octavia III .

• Tightening torques
⇒ "1.1 Oil sump and oil pump - Summary of components", page 133 .



1.5 Removing and installing oil sump top part

Special tools and workshop equipment required

♦ Assembly tool - T10118-

♦ Rig tool - T40265-

♦ 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

Removing

• Gearbox removed

– Remove oil sump bottom part ⇒ page 136 .

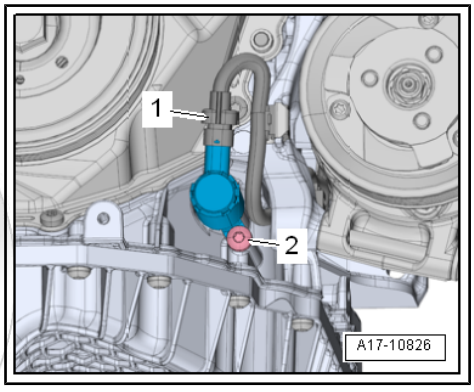
– Remove rear sealing flange ⇒ page 51 .

– Remove oil pump ⇒ page 138 .

– Unplug connector -1-.

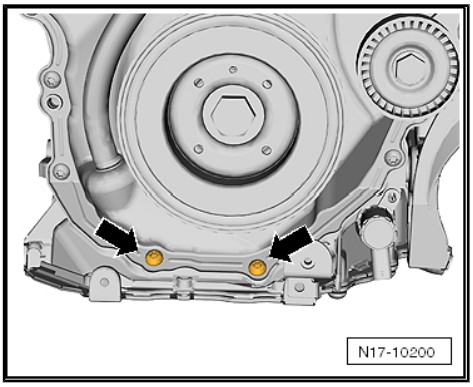
Note

Do not pay attention to the position -2-.

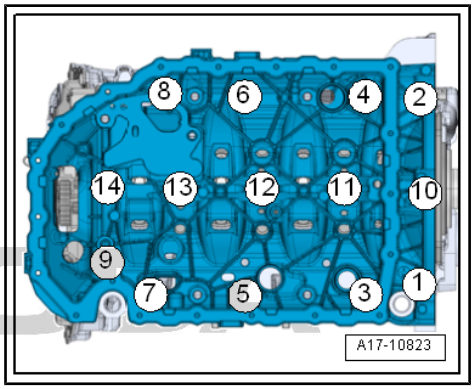


– Unscrew screws -arrows-.

– Using a sharp flat spatula, cut through the bottom cover for timing chain at the contact point with the upper part of the oil sump.



– Release screws -1...14- and remove the upper part of the oil sump. If necessary, undo the oil pan by applying slight blows with a rubber-headed hammer.



WARNING

First of all, prise open the upper part of the oil sump on the gearbox side. When prising open be careful not to bend the cover for the timing chains.

Install

- Tightening torques ⇒ page 133
- ♦ Silicone sealant ⇒ ETKA - Electronic Catalogue of Original Parts .

Note

- ♦ *Pay attention to the use by date on sealant.*
- ♦ *The upper part of the oil sump must be installed within 5 minutes after applying the silicone sealant.*
- ♦ *Replace screws which have been tightened to torquing angle.*
- ♦ *Replace the gaskets, the sealing rings and the self-locking nuts.*

WARNING

Risk of injury to eyes.

- ♦ ***Wear safety goggles!***

– Remove residual sealant on the cylinder block, upper part of the oil pan, and on the bottom cover with chemical sealant remover.

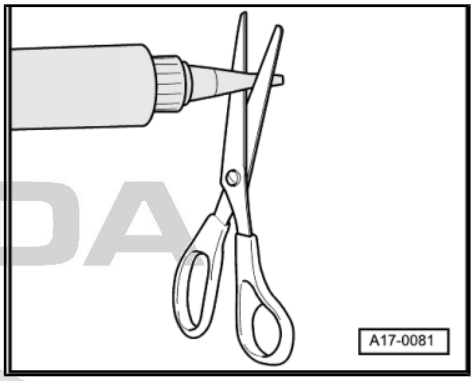
Note

Check the cover for the timing chain for deformation. To do so, firstly put the upper part of the oil sump into position without sealant, and then check the gap between the cover and the upper part of the oil sump. If you can see deformations and if the cover cannot be lined up straight any more, replace it after the installation of the upper part of the oil sump.

– Clean sealing surfaces, they must be free of oil and grease.

– Check oil channels in the oil sump top part and in the crankcase for contamination.

– Cut off nozzle on tube at front marking (∅ of nozzle approx. 2 mm).



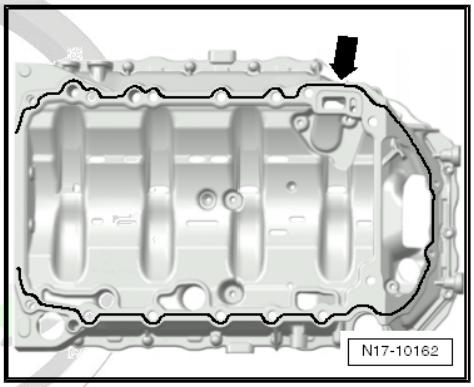
WARNING

Risk of blockage of the lubrication system through excess sealant.

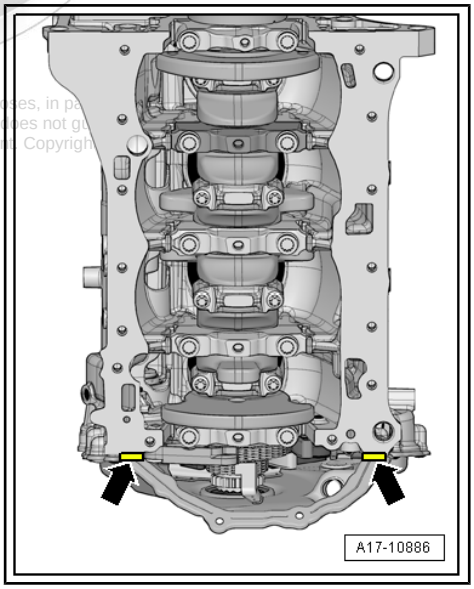
- *The sealant bead must not be thicker than specified.*

– Apply sealant bead arrow onto the clean sealing surface of the oil sump top part, as shown in the illustration -arrow-.

- Thickness of sealant bead: 2...3 mm.



– Apply silicone sealant, as shown -arrows-, between the cylinder block and the bottom cover for the timing chain.



WARNING

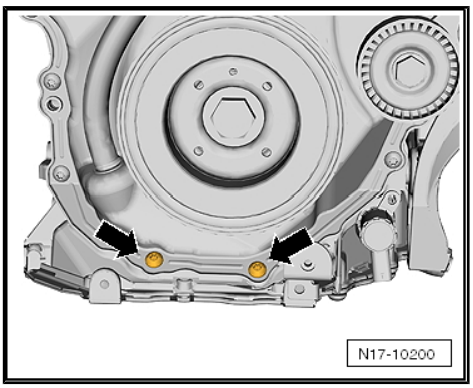
- *The upper part of the oil sump must be installed within 5 minutes after applying the silicone sealant.*
- *The sealant bead must not be thicker than specified otherwise excess sealant may get into the oil pan and clog the strainer in the oil suction pipe.*
- *On the gearbox side, the upper part of the oil sump and the upper part of the crankcase must connect flush to each other.*

– Immediately put the upper part of the oil sump into position and tighten the screws, tightening sequence and -sequence ⇒ page 135 .

– Screw in the screws -arrow- and tighten in two stages:

– 1. Tighten screws to 8 Nm.

– 2. 45° (torque a further 90° ($^1/_8$ turn).



– Install rear sealing flange ⇒ page 51 .

– Install oil pump ⇒ page 138 .

– Insert the new baffle and screw tight.

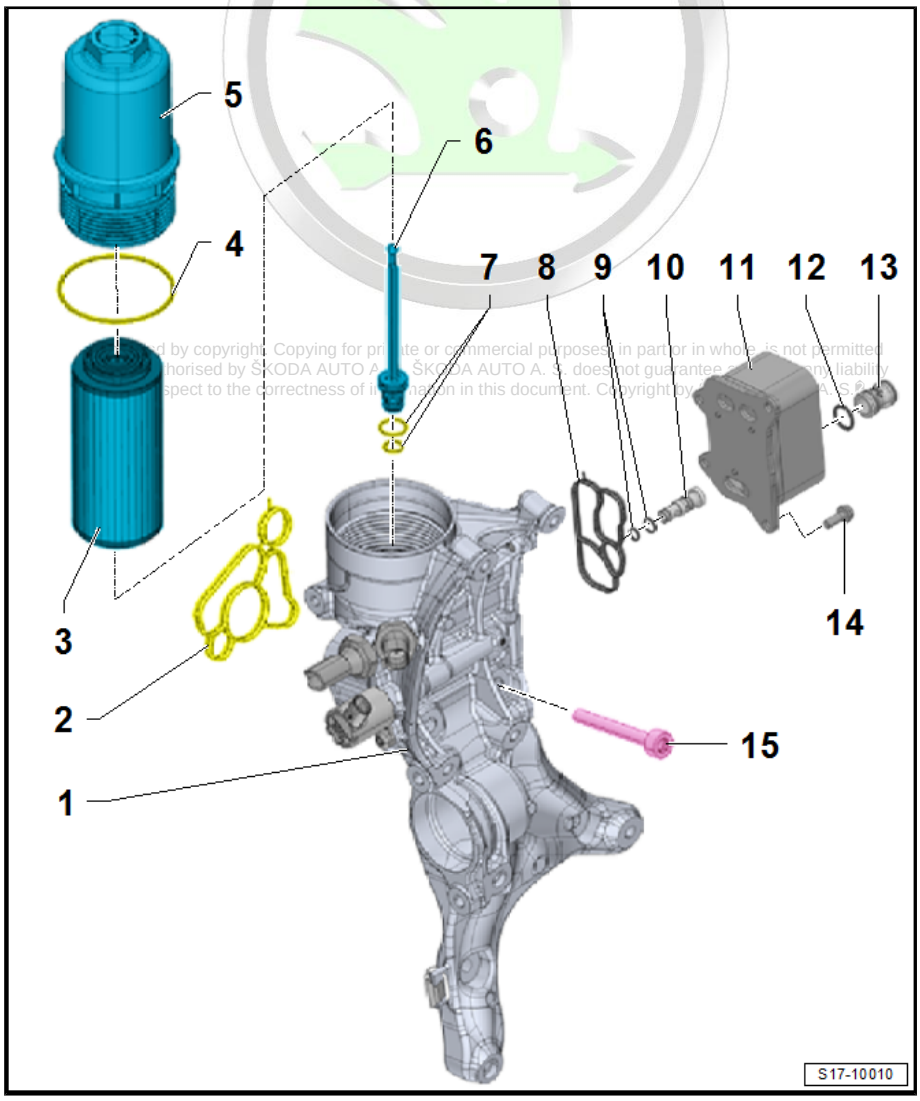
– Install oil sump bottom part ⇒ page 136 .

Further installation occurs in reverse order.

– Fill with engine oil and check the oil level ⇒ Maintenance ; Booklet Octavia III .

2 bracket for auxiliary units with oil filter and engine oil cooler

2.1 Bracket for auxiliary units with oil filter and engine oil cooler - Summary of components



1 - Bracket for auxiliary units
- ❑ removing and installing ⇒ page 46

2 - Gasket
- ❑ replace

3 - Oil filter
- ❑ removing and installing ⇒ Maintenance ; Booklet Octavia III

4 - O-ring
- ❑ replace
- ❑ wet with engine oil
- ❑ Component part of the oil filter -Position 3-

5 - Oil filter cover, 25 Nm

6 - Oil discharge stud
- ❑ replace

7 - O-rings
- ❑ Component part of the oil discharge stud -Position 6-

8 - Gasket
- ❑ replace

9 - O-rings
- ❑ replace
- ❑ wet with engine oil

10 - Mechanical switching valve
- ❑ removing and installing ⇒ page 146

11 - Engine oil cooler
- ❑ pay attention to the notes ⇒ page 133
- ❑ removing and installing ⇒ page 145

12 - Sealing ring
- ❑ replace
- ❑ Moisten with coolant

13 - Connecting studs

14 - 8 Nm + torque a further 45° (1/8 turn)
- ❑ replace

15 - Screw

❑ Tightening torque and tightening order ⇒ page 44

2.2 Removing and installing engine oil cooler

Special tools and workshop equipment required

♦ Catch pan , e.g. -VAS 6208-

Removing

WARNING

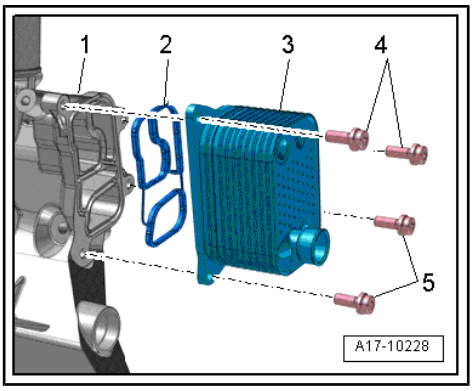
Danger of scalding due to hot steam and hot coolant.

- *When the engine is warm, the cooling system is under pressure.*
- *Cover the cap on the coolant expansion tank with a cloth and open carefully.*

– Drain coolant ⇒ page 158 .

– Remove the bracket for auxiliary units ⇒ page 46

– Unscrew screws -4-, -5- and remove the engine oil cooler -3- with seal -2-.



Install

Installation is carried out in the reverse order. However, pay attention to the following:

- Tightening torques
  ⇒ "2.1 Bracket for auxiliary units with oil filter and engine oil cooler - Summary of components", page 144 .

Note

♦ *Renew gaskets and seals.*

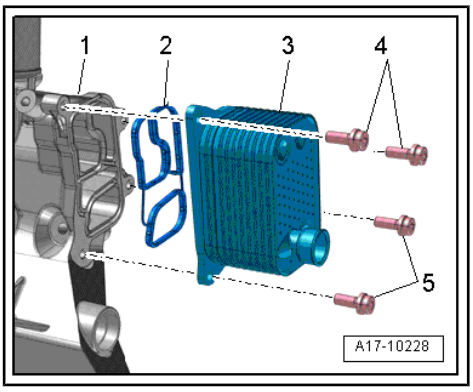
♦ *Secure all hose connections with hose clamps which comply with the series design ETKA - ⇒ Electronic Catalogue of Original Parts .*

– Install the engine oil cooler -3- with a new seal -2-.

– Install the bracket for auxiliary units ⇒ page 46 .

– Replenish coolant ⇒ page 158 .

– Fill with engine oil and check the oil level ⇒ Maintenance ; Booklet Octavia III .

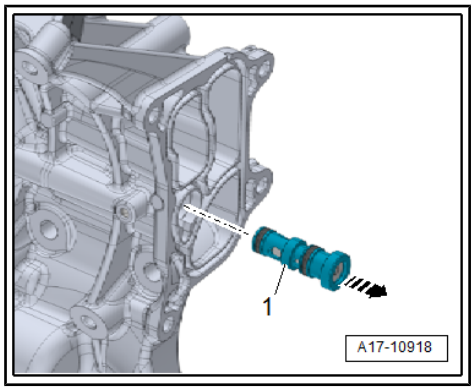


2.3 Removing and installing the mechanical switch valve

Removing

– Remove engine oil cooler ⇒ page 145 .

– Remove mechanical switch valve -1- from the bracket for auxiliary units -arrow-.



Install

Installation is carried out in the reverse order. However, pay attention to the following:

Note

- *Renew gaskets and seals.*
- *Secure all hose connections with hose clamps which comply with the series design ⇒ ETKA - Electronic Catalogue of Original Parts .*

– Wet the O-rings for mechanical switch valve with engine oil cooler and install the switch valve.

– Install the engine oil cooler ⇒ page 145 .

3 Crankcase ventilation

3.1 Crankcase ventilation - Summary of components

1 - Cylinder head cover

2 - Gasket
- ❑ replace

3 - Hose
- ❑ to activated charcoal filter solenoid valve 1 -N80-

4 - Oil separator
- ❑ removing and installing ⇒ page 148

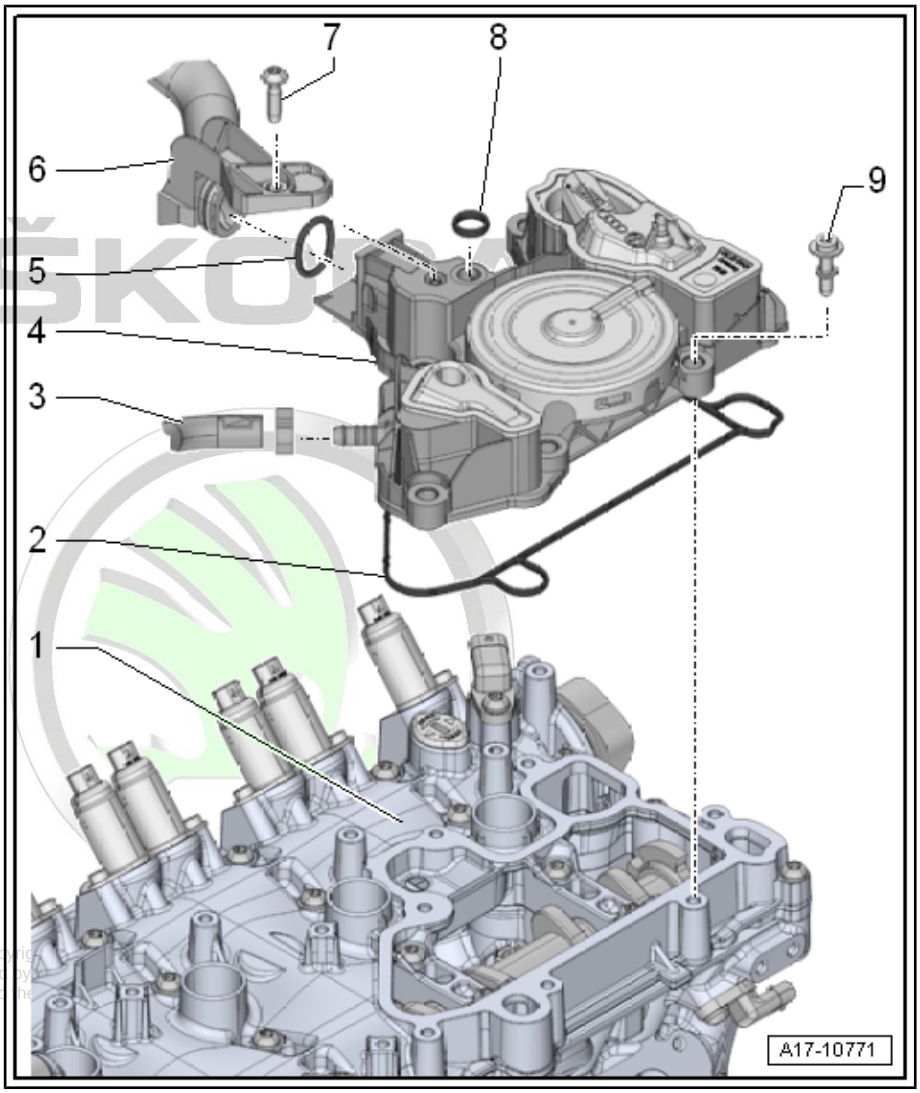
5 - Sealing ring
- ❑ replace

6 - Hose
- ❑ for crankcase ventilation
- ❑ to exhaust gas turbocharger

7 - 4 Nm
- ❑ thread forming
- ❑ position and screw in by to allow the screw to find the old thread, then tighten the screw to the torque

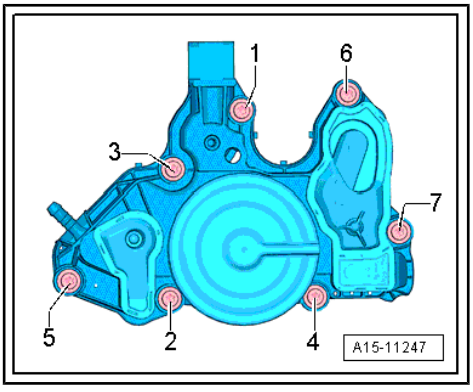
8 - Sealing ring
- ❑ replace

9 - 9 Nm
- ❑ thread forming
- ❑ position and screw in by to allow the screw to find the old thread, then tighten the screw to the torque
- ❑ order of tightening ⇒ page 147



Oil trap - tightening sequence

– Tighten the bolts in the sequence -1…7- to 9 Nm.



3.2 Removing and installing oil separator

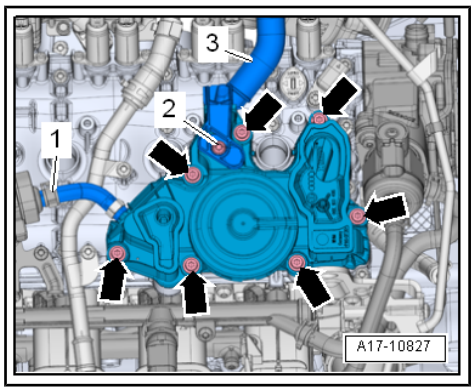
Removing

– Remove ignition coils for cylinders -3- and -4- ⇒ page 311 .

– Undo the hose clamp -1- and remove the hose from electrical solenoid valve 1 for the activated charcoal filter - N80- .

– Undo screw -2- and remove hose -3- for the breather from the oil trap.

– Remove screws -arrows- and screws arrows and remove oil trap.



Install

Installation is carried out in the reverse order. However, pay attention to the following:

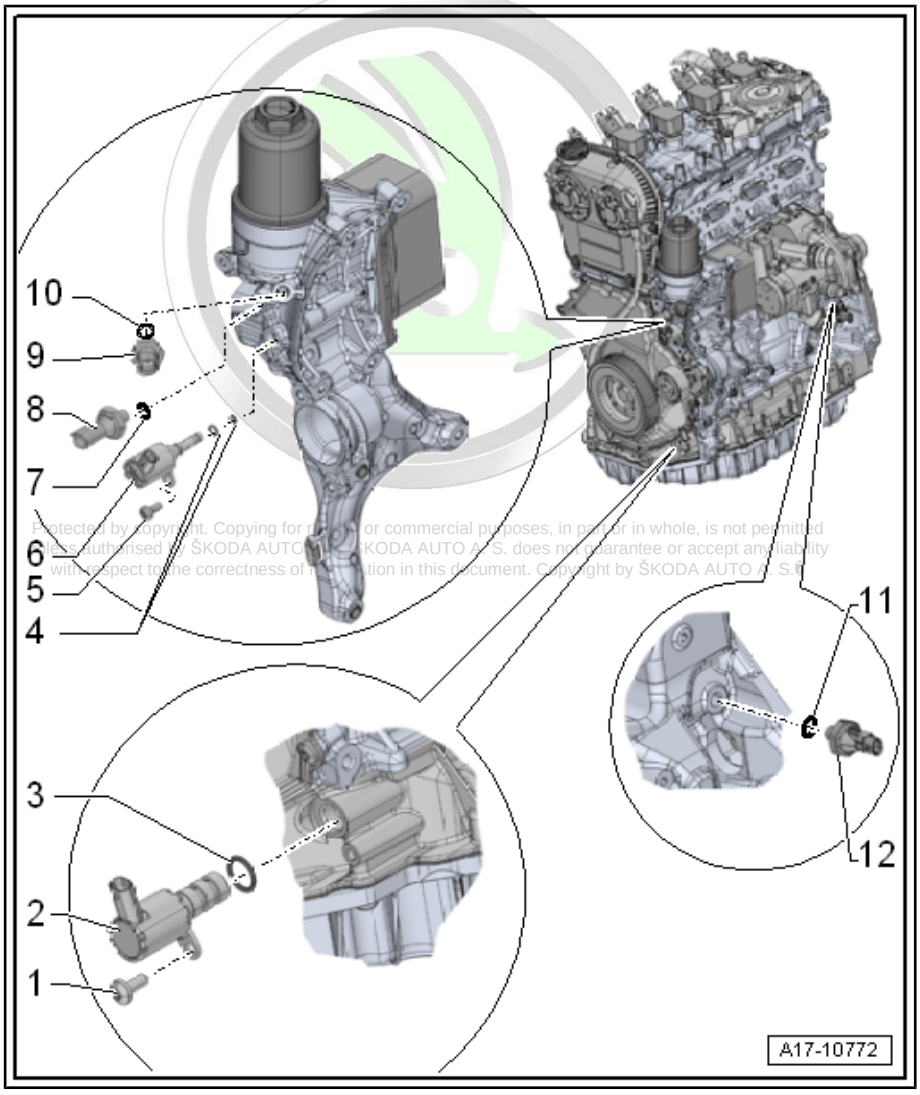
- Tightening torques ⇒ page 147 .

Note

- *Renew gaskets and seals.*
- *Secure all hose connections with hose clamps which comply with the series design ETKA - ⇒ Electronic Catalogue of Original Parts .*

4 Oil pressure switch

4.1 Oil pressure switch- Summary of components



1 - 4 Nm + torque a further 90° (1/4 turn)

- ❑ replace

2 - Oil pressure control valve - N428-

- ❑ removing and installing ⇒ page 152

3 - O-ring

- ❑ replace
- ❑ wet with engine oil

4 - O-rings

- ❑ replace
- ❑ wet with engine oil

5 - 4 Nm + torque a further 45° (1/8 turn)

- ❑ replace

6 - Control valve for piston cooling nozzles - N522-

- ❑ removing and installing ⇒ page 150

7 - Sealing ring

- ❑ replace

8 - Oil pressure switch - F22- , 20 Nm

- ❑ Isolation blue or grey
- ❑ removing and installing ⇒ page 150

9 - Oil pressure switch for reduced oil pressure - F378- , 20 Nm

- ❑ Isolation brown
- ❑ removing and installing ⇒ page 151

10 - Sealing ring

- ❑ replace

11 - Sealing ring

- ❑ replace

12 - Oil pressure switch, stage 3 - F447- , 20 Nm

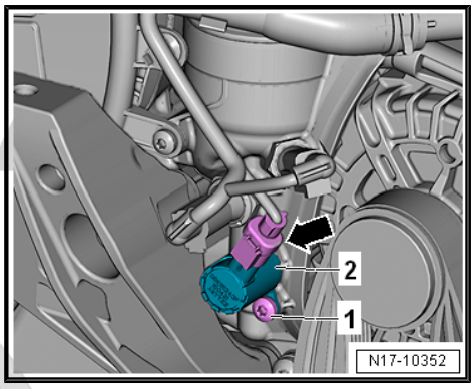
- ❑ removing and installing ⇒ page 151

4.2 Removing and installing control valve for piston cooling nozzles - N522-

Removing

Note

Place cloths under bracket for auxiliary units to catch escaping coolant.



– Remove connector -arrow- from the control valve for piston cooling nozzles - N522- .
– Unscrew the screw -1- and remove the control valve for piston cooling nozzles - N522- -2-.

Install

Installation is carried out in the reverse order. However, pay attention to the following:

- Tightening torques ⇒ page 149

Note

- *Replace O-rings.*
- *To prevent oil loss, immediately insert a new control valve for piston cooling nozzles - N522- into the bore hole.*

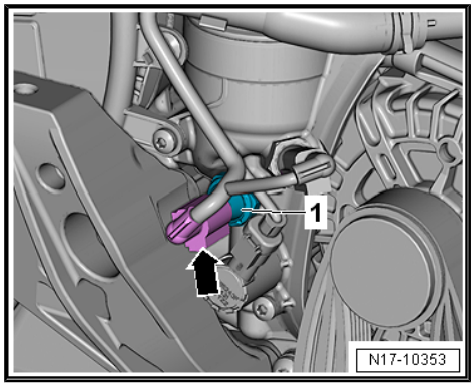
– Check the engine oil level ⇒ Maintenance ; Booklet Octavia III .

4.3 Removing and installing oil pressure switch - F22-

Removing

Note

Place cloths under bracket for auxiliary units to catch escaping coolant.



– Disconnect connector -arrow- from the oil pressure switch - F22- .
– Screw out oil pressure switch - F22- -1-.

Install

Installation is carried out in the reverse order. However, pay attention to the following:

- Tightening torques ⇒ page 149

Note

- *Renew seal.*
- *To prevent oil loss, immediately insert a new oil pressure switch - F22- into the bore hole.*

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

4.4 Removing and installing oil pressure switch for reduced oil pressure - F378-

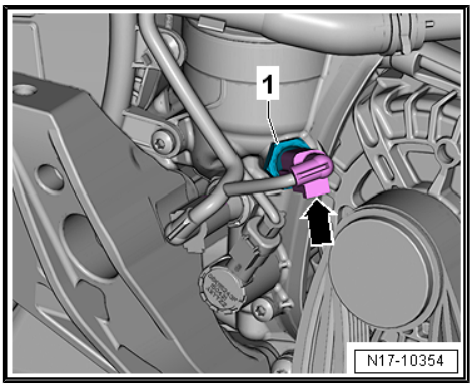
Removing

Note

Place cloths under bracket for auxiliary units to catch escaping coolant.

– Remove connector -arrow- from the oil pressure switch for reduced oil pressure - F378- .

– Unscrew the oil pressure switch for reduced oil pressure - F378- -1-.



Install

Installation is carried out in the reverse order. However, pay attention to the following:

- Tightening torques ⇒ page 149

Note

- *Renew seal.*
- *To prevent oil loss, immediately insert a new oil pressure switch for reduced oil pressure - F378- into the bore hole.*

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

4.5 Removing and installing oil pressure switch, stage 3 - F447-

Special tools and workshop equipment required

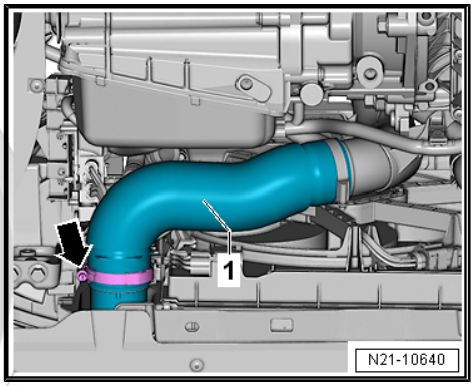
- Hinged wrench - T40175-

Removing

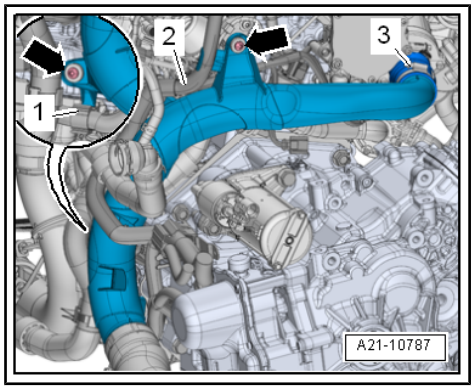
– Remove the sound dampening system ⇒ Body Work; Rep. gr. 50 .

– Remove air filter housing ⇒ page 258 .

– Loosen hose clamp -arrow- and remove air guide hose -1- from the charge air cooler.



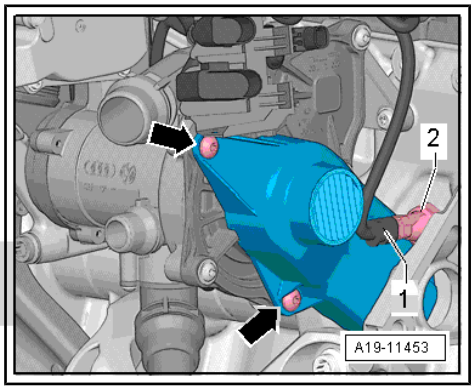
– Expose electric wiring harness -1- and -2- at the air guide pipe.
– Loosen hose clamp -3-.
– Remove screws -arrows- and remove air guide pipe downwards.



– Unplug connector -1- from the oil pressure switch, stage 3 - F447- .
– Release screws-arrows- and remove toothed belt protector.

Note

Collect any engine oil which flows out with a cloth.



– Unscrew oil pressure switch, stage 3 - F447- -2- with hinged wrench - T40175- .

Install

Installation is carried out in the reverse order. However, pay attention to the following:

Note

- *Renew seal.*
- *To prevent oil loss, immediately insert a new oil pressure switch, stage 3 - F447- into the bore hole.*

– Check the engine oil level ⇒ Maintenance ; Booklet Octavia III .

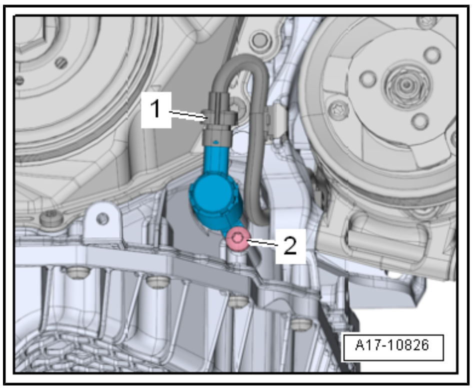
4.6 Removing and installing valve for oil pressure control - N428-

Special tools and workshop equipment required

- Catch pan , e.g. -VAS 6208-

Removing

– Remove V-ribbed belt ⇒ page 44 .
– Place a catch pan - VAS 6208- under the engine.



– Unplug connector -1-.
– Unscrew screws -2- and remove oil pressure control valve - N428- .

Install

Installation is carried out in the reverse order. However, pay attention to the following:

Note

Renew O-ring.

4.7 Testing oil pressure

Special tools and workshop equipment required

♦ Oil pressure tester - V.A.G 1342-

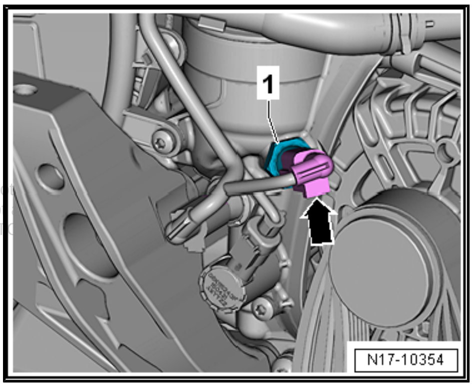
Test requirements

• Oil level o.k.
• Engine oil temperature at least 80°C (radiator fan must have run once).

Test procedure

Note

Place cloths under bracket for auxiliary units to catch escaping coolant.



– Remove connector -arrow- from the oil pressure switch for reduced oil pressure - F378- .
– Unscrew the oil pressure switch for reduced oil pressure - F378- -1-.
– Screw the oil testing device - V.A.G 1342- into the oil filter holder instead of the oil pressure switch.

– Screw in the oil pressure switch for reduced oil pressure - F378- into the oil pressure testing device - V.A.G 1342- .
– Start engine.
• Oil pressure in idle: 0.12…0.21 MPa (1.2...2.1 bar)
• Oil pressure at 2000 rpm: 0.16…0.21 MPa (1.6...2.1 bar)
• Oil pressure at 3700 rpm: 0.3…0.4 MPa (3...4 bar)

Note

While running in, the oil pressure at 2000 rpm can be 0.3…0.4 MPa (3 ... 4 bar).

Assembling

• Tightening torques ⇒ page 144
– Install oil pressure switch for reduced oil pressure - F378-

4.8 Check oil pressure for piston cooling nozzles

Special tools and workshop equipment required

- ♦ Oil pressure tester - V.A.G 1342-
- ♦ Adapter for measuring system - VAS 5571-

Test requirements

- Oil level o.k.
- Engine oil temperature at least 80°C (radiator fan must have run once).

Test procedure

– Remove oil pressure switch, stage 3 - F447- ⇒ page 151 .

– Screw the oil pressure switch, stage 3 - F447- into the oil pressure testing device - V.A.G 1342- .

– Screw in the oil testing device - V.A.G 1342- instead of the oil pressure switch, stage 3 - F447- .

– Connect the adapter for measuring system/DSO (2-pin) - VAS 5571- to the oil pressure switch.

– Connect the contact on the oil pressure switch, stage 3 - F447- to the adapter for measuring system/DSO (2-pin) - VAS 5571- .

– Inspecting oil pressure ⇒ Vehicle diagnostic tester.

19 – Cooling

1 Cooling system

WARNING

Hot steam may escape when the coolant expansion reservoir is opened. Wear eye protection and protective clothing to avoid eye injuries and scalding. Cover the cap with a cloth and open carefully.

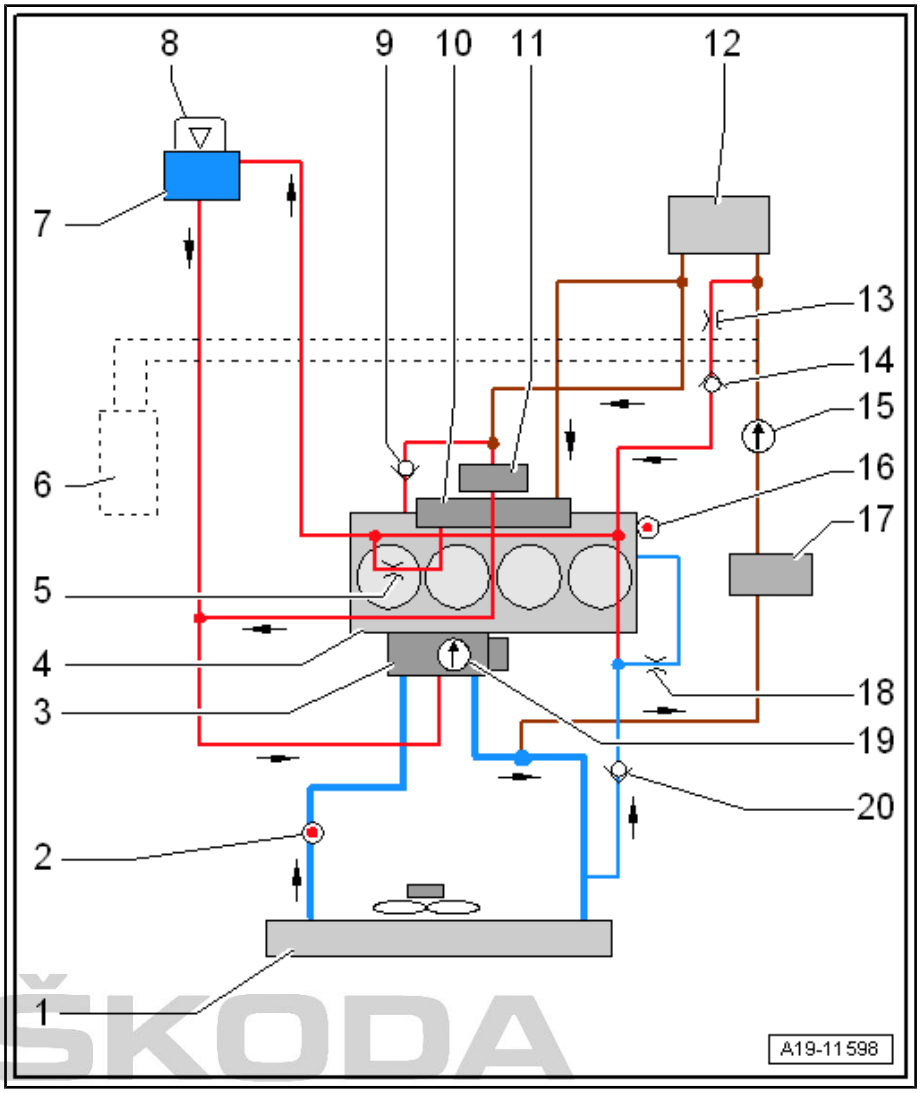
Note

- *When the engine is warm the cooling system is under pressure. If necessary, release pressure before beginning repair work.*
- *The hose connections are secured with spring-type clips. In case of repair, only use spring-type clips ⇒ ETKA - Electronic Catalogue of Original Parts .*
- *Spring-type clip pliers are recommended for installation of spring-type clips.*
- *Renew gaskets and seals.*
- *When installing fit the coolant hoses free of stress, without them touching any other components (pay attention to the marking on the coolant connection).*
- *The arrows which are on the coolant pipes and the coolant hose ends must stand opposite to each other.*

1.1 Connection diagram for coolant hoses for vehicles with manual gearbox

Note

- *Blue = large coolant circuit.*
- *Red = small coolant circuit.*
- *Brown = heating circuit.*
- *The arrows point in the coolant flow direction.*



1 - Coolant radiator

- ❑ fill with fresh coolant after replacing

2 - Coolant temperature sender at radiator outlet - G83-

3 - Positioning element for engine temperature adjustment - N493-

4 - Cylinder head/cylinder block

- ❑ fill with fresh coolant after replacing

5 - Choke

6 - Auxiliary heating

- ❑ Equipment variants

7 - Coolant expansion tank

8 - Cap for coolant expansion tank

- ❑ Check pressure relief valve ⇒ page 161

9 - Non-return valve

10 - Exhaust pipe

- ❑ Component part of the cylinder head

11 - Exhaust gas turbocharger

12 - Heat exchanger of heating system

- ❑ fill with fresh coolant after replacing

13 - Choke

14 - Non-return valve

15 - Coolant recirculation pump - V51-

- ❑ electric

16 - Coolant temperature sender - G62-

17 - Coolant shut-off valve - N82-

18 - Choke

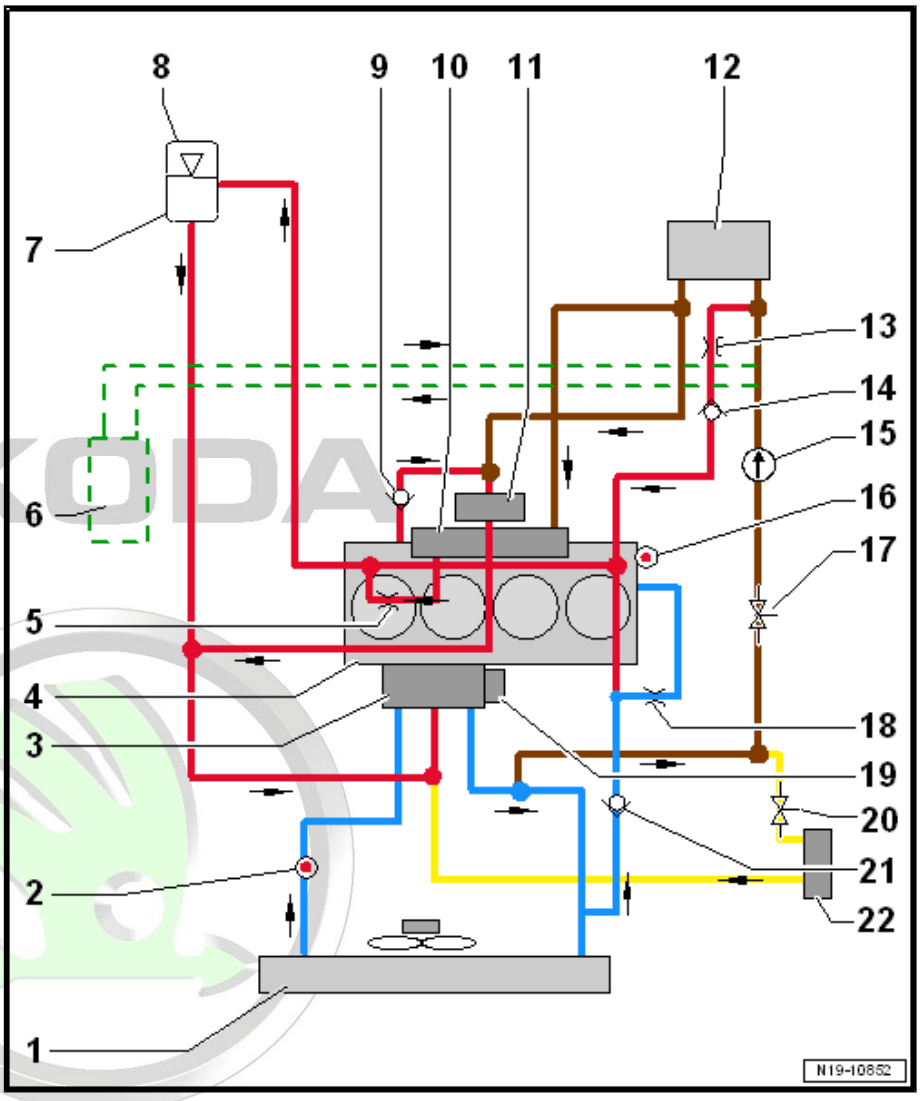
19 - Coolant pump

20 - Non-return valve

1.2 Connection diagram for coolant hoses for vehicles with automatic transmission DSG

Note

- *Blue = large coolant circuit.*
- *Red = small coolant circuit.*
- *Brown = heating circuit.*
- *Yellow = gearbox oil cooler circuit*
- *The arrows point in the coolant flow direction.*



1 - Coolant radiator

- ❑ fill with fresh coolant after replacing

2 - Coolant temperature sender at radiator outlet - G83-

3 - Positioning element for engine temperature adjustment - N493-

4 - Cylinder head/cylinder block

- ❑ fill with fresh coolant after replacing

5 - Choke

6 - Auxiliary heating

- ❑ Equipment variants

7 - Coolant expansion tank

8 - Cap for coolant expansion tank

- ❑ Check pressure relief valve ⇒ page 161

9 - Non-return valve

10 - Exhaust pipe

- ❑ Component part of the cylinder head

11 - Exhaust gas turbocharger

12 - Heat exchanger of heating system

- ❑ fill with fresh coolant after replacing

13 - Choke

14 - Non-return valve

15 - Coolant recirculation pump - V51-

- ❑ electric

16 - Coolant temperature sender - G62-

17 - Coolant shut-off valve - N82-

18 - Choke

19 - Coolant pump

20 - Coolant shut-off valve - N82-

21 - Non-return valve

22 - Gearbox oil cooler

1.3 Draining and filling coolant

Special tools and workshop equipment required

- Adapter for cooling system tester - V.A.G 1274/8-
- Cooling system charge unit - VAS 6096-
- Catch pan , e.g. -VAS 6208-
- Hose binding claw - VAS 6362-
- Refractometer
- Protective goggles
- Protective gloves

Draining

WARNING

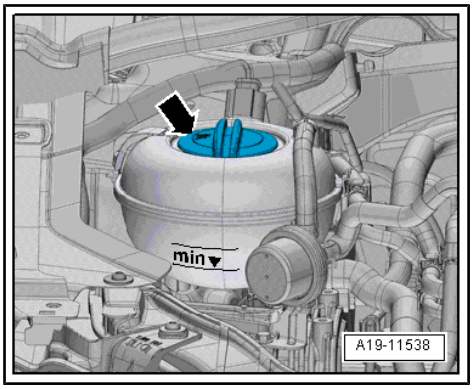
Danger of scalding due to hot steam and hot coolant.

- *When the engine is warm, the cooling system is under overpressure.*
- *Reduce pressure by covering the cap of the coolant expansion tank with a cloth and opening it carefully.*

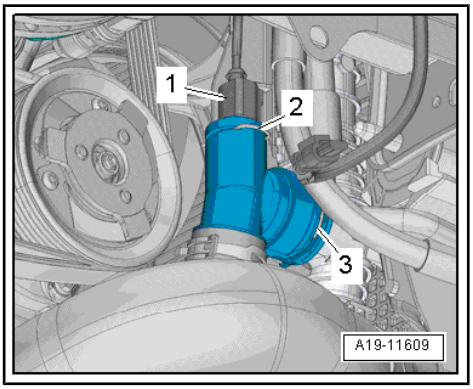
– Open cap -arrow- for coolant expansion tank.

– Remove the sound dampening system ⇒ Body Work; Rep. gr. 50 .

– Place drip tray for workshop crane - VAS 6208- .



– Raise holding clamp -3-, remove bottom right coolant hose from radiator, allow coolant to drain.



Note

Ignore positions -1, 2-.

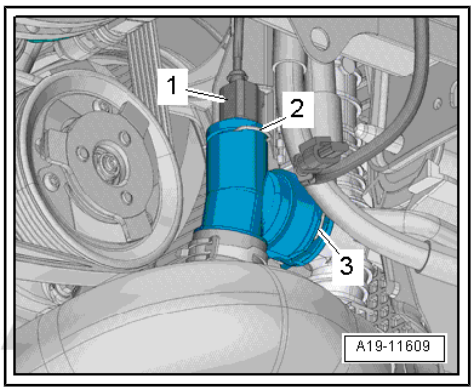
Filling up

Select the appropriate coolant additive from the ⇒ ETKA - Electronic catalogue of original parts .

– In a clean reservoir mix drinking water and coolant additive in the correct mixing ratio ⇒ Maintenance ; Booklet Octavia III .

Work procedure

– Connect coolant hose with quick coupling -3- to radiator bottom right ⇒ page 186 .

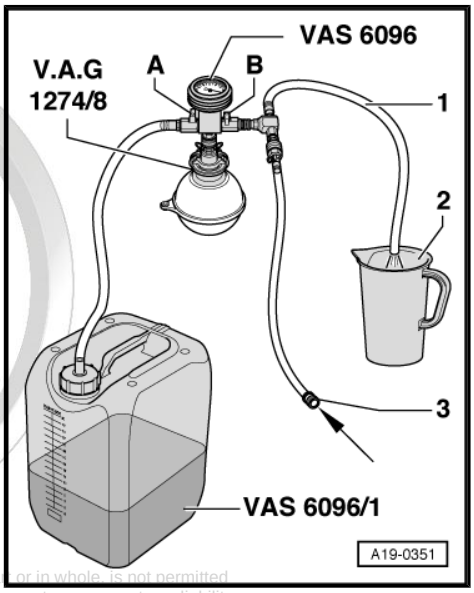


– Fill up the coolant reservoir of the device -VAS 6096- with at least 10 litres of pre-mixed coolant mixed to the correct ratio ⇒ Maintenance ; Booklet Octavia III :

– Screw the adapter for cooling system testing device - V.A.G 1274/8- into the coolant expansion bottle.

– 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 valves for the coolant circuit ⇒ Vehicle diagnostic tester.

– Open the valve -B-, while doing so turn the lever in the direction of flow.

• A vacuum is generated 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 of -VAS 6096- is filled with coolant.

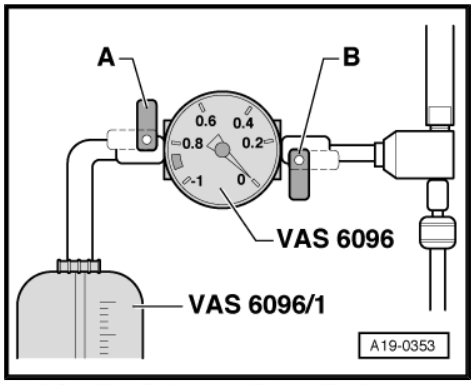
– Close valve -A- again.

– Leave the valve -B- open a further 2 minutes.

• A further vacuum is generated in the cooling system by the vacuum pump; the display instrument pointer must move into the green area.

– Close valve -B-.

• The display instrument pointer must move into the green area- the vacuum in the cooling system will be sufficient for subsequent filling.



Note

♦ *If the pointer is located below the green range, repeat the whole procedure.*

♦ *If the vacuum drops, the cooling system must be checked for leak points.*

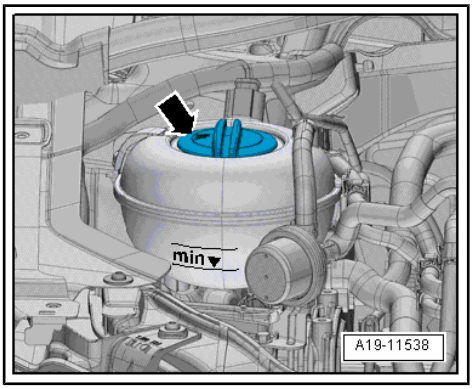
– Disconnect pneumatic hose.

– Open valve -A-.

• Vacuum in the cooling system causes the coolant to be drawn out of the coolant expansion reservoir -VAS 6096- and the cooling system is filled.

– Remove cooling system charge unit - VAS 6096- from the coolant expansion tank.

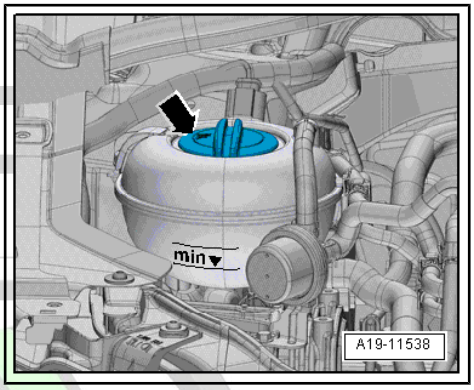
– Fill up coolant up to “Max” marking.



Note

Hose connections as well as charge air pipes and -hoses must be free of oil and grease before being installed.

– Install the noise insulation ⇒ Body Work; Rep. gr. 50 .
– 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 about 1500 rpm.
– With the engine running, fill coolant up to the overflow hole on the expansion tank.
– Seal the cap on the coolant expansion tank until it latches 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 ⇒ page 159 .

1.4 Checking cooling system for leaks

1.4.1 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

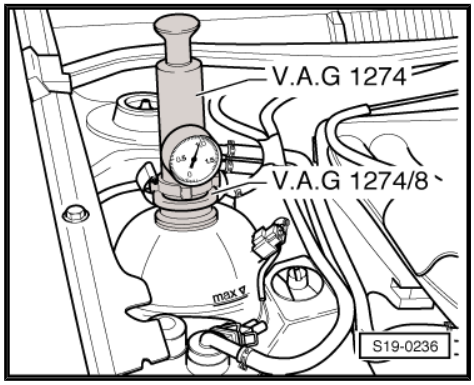
• Engine is at operating temperature.

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 compensation bottle.
– 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 over-pressure of approx. 0.1 MPa (1.0 bar).

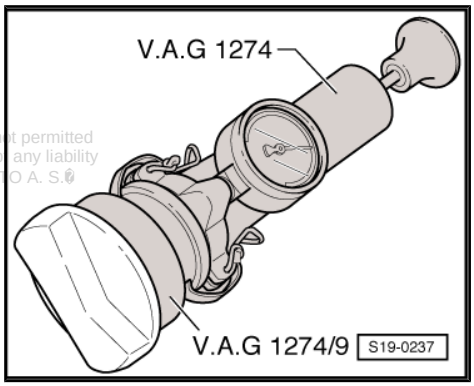


If pressure drops:

– 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.

1.4.2 Checking with the cooling system testing device - V.A.G 1274 B-

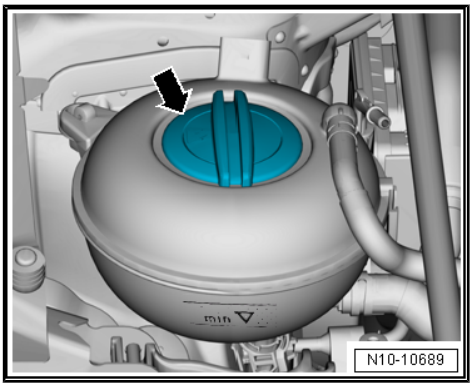
Special tools and workshop equipment required

♦ 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

– Open cap -arrow- for coolant expansion tank.

• Engine at operating temperature.



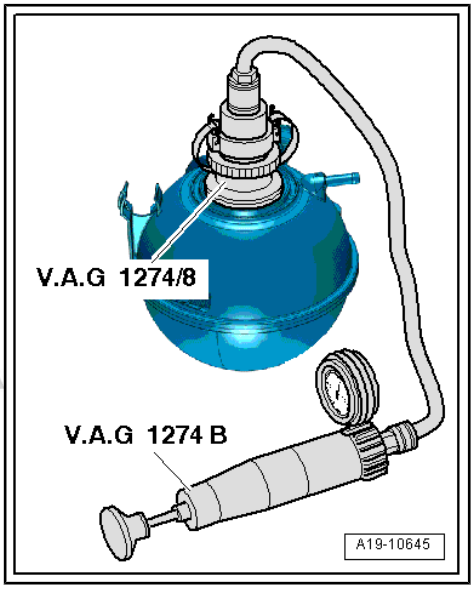
WARNING

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.*

– Position the cooling system testing device - V.A.G 1274 B- with adapter -V.A.G 1274/8- onto the coolant expansion tank.

– Using hand pump on tester, build up a pressure of approx. 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«.*

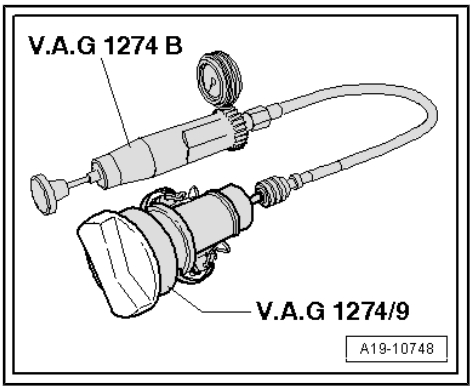
– If the pressure drops determine leak positions and repair.

Check pressure relief valve in cap.

– Position the cooling system testing device - V.A.G 1274 B- with adapter -V.A.G 1274/9- on the cap.

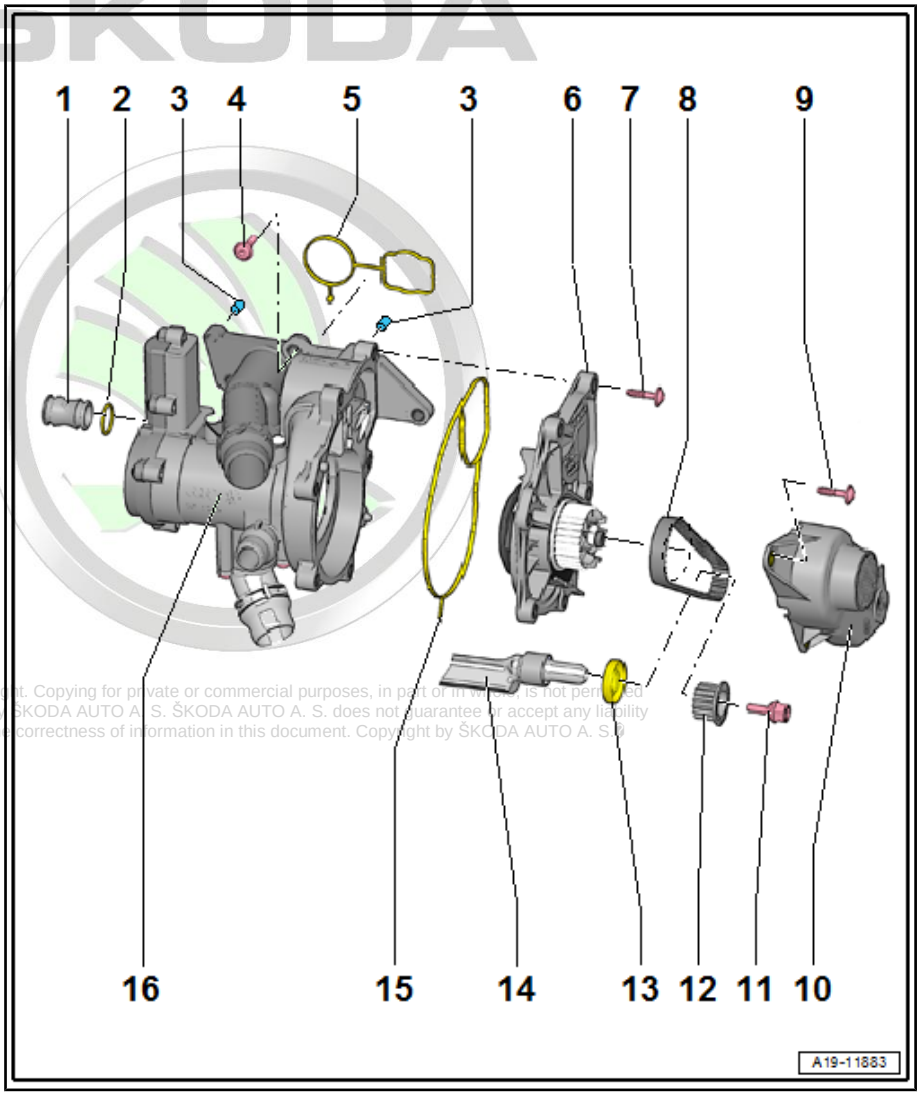
– Build up overpressure using hand pump on cooling system tester.

♦ The pressure relief valve should open at a pressure of 1.4...1.6 bar.



2 Coolant pump and positioning element for engine temperature control

2.1 Coolant pump and positioning element for engine temperature control - Summary of components



1 - Connecting studs

2 - O-ring

- ❑ replace
- ❑ Moisten with coolant

3 - Fit pin

4 - 9 Nm

5 - Gasket

- ❑ replace

6 - Coolant pump

- ❑ removing and installing ⇒ page 170
- ❑ remove the protective cap on the new coolant pump

7 - 9 Nm

- ❑ order of tightening ⇒ page 165

8 - Toothed belt

- ❑ For coolant pump drive
- ❑ removing and installing ⇒ page 168

9 - 9 Nm

10 - Toothed belt guard

11 - 10 Nm + torque a further 90° (1/4 turn)

- ❑ Left-hand thread
- ❑ replace

12 - Drive wheel

- ❑ Check fitting position

13 - Sealing ring for balancing shaft for inlet camshaft

- ❑ replace ⇒ page 62

14 - Balancing shaft

15 - Gasket

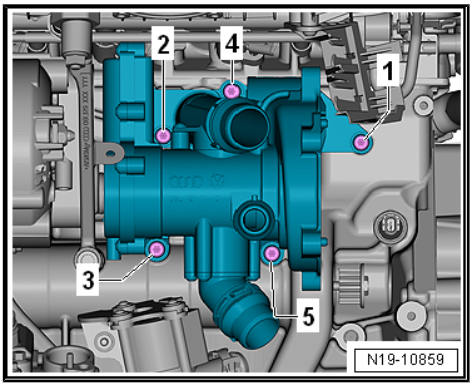
- ❑ replace

16 - Positioning element for engine temperature adjustment - N493-

- ❑ removing and installing ⇒ page 176

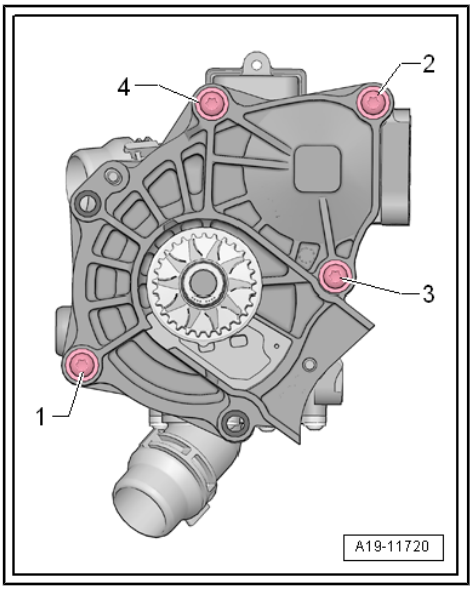
Positioning element for engine temperature control - N493- - tightening sequence

– Tighten screws in the sequence -1 … 5-.



Coolant pump- tightening sequence

– Tighten screws on the coolant pump in the sequence -1 … 4-.



2.2 Coolant recirculation pump- Summary of components

1 - Coolant hose

2 - Coolant shut-off valve - N82-

- ❑ removing and installing ⇒ page 174

3 - Coolant recirculation pump - V51-

- ❑ electric
- ❑ With holder
- ❑ removing and installing ⇒ page 173

4 - Support

- ❑ for coolant recirculation pump - V51-

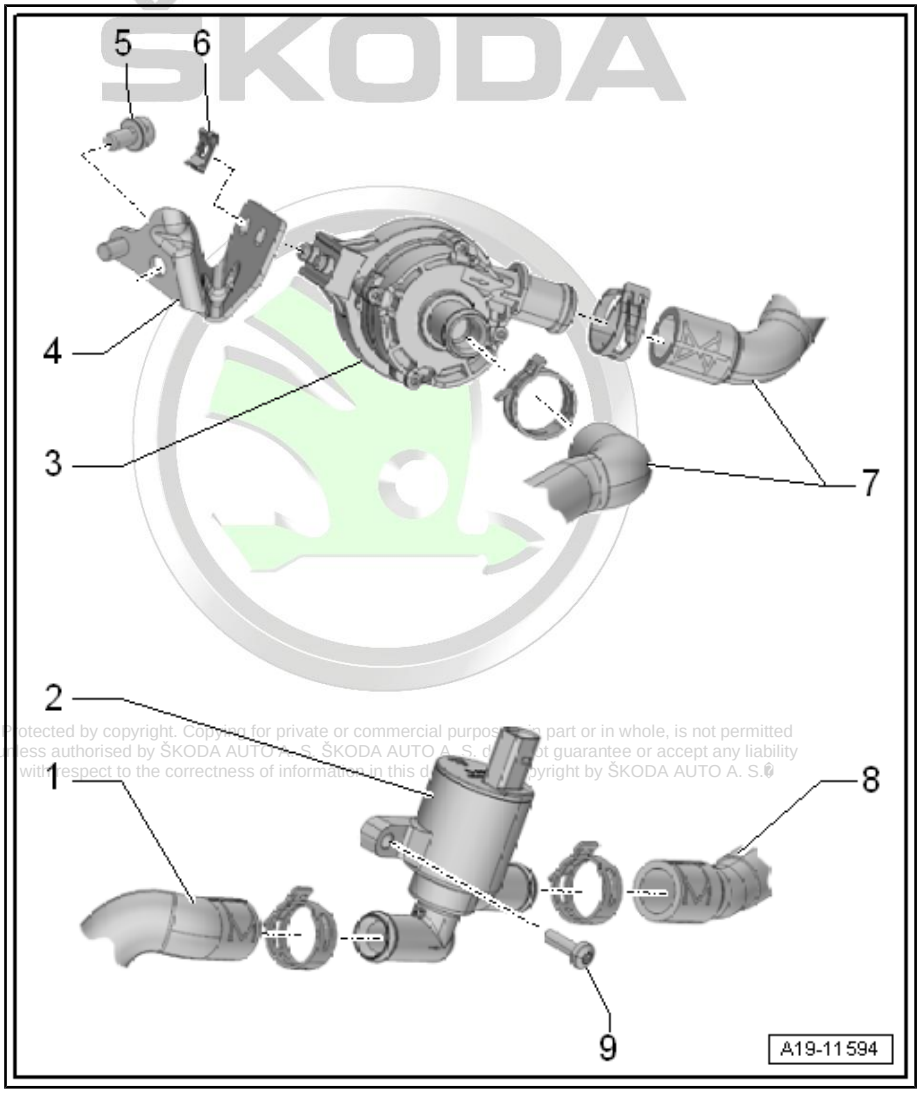
5 - 20 Nm

6 - Clip

7 - Coolant hose

8 - Coolant hose

9 - 9 Nm



2.3 Coolant valve for gearbox - N488-

Vehicles with automatic transmission DSG 0D9

1 - 9 Nm

2 - Coolant hose

3 - 9 Nm

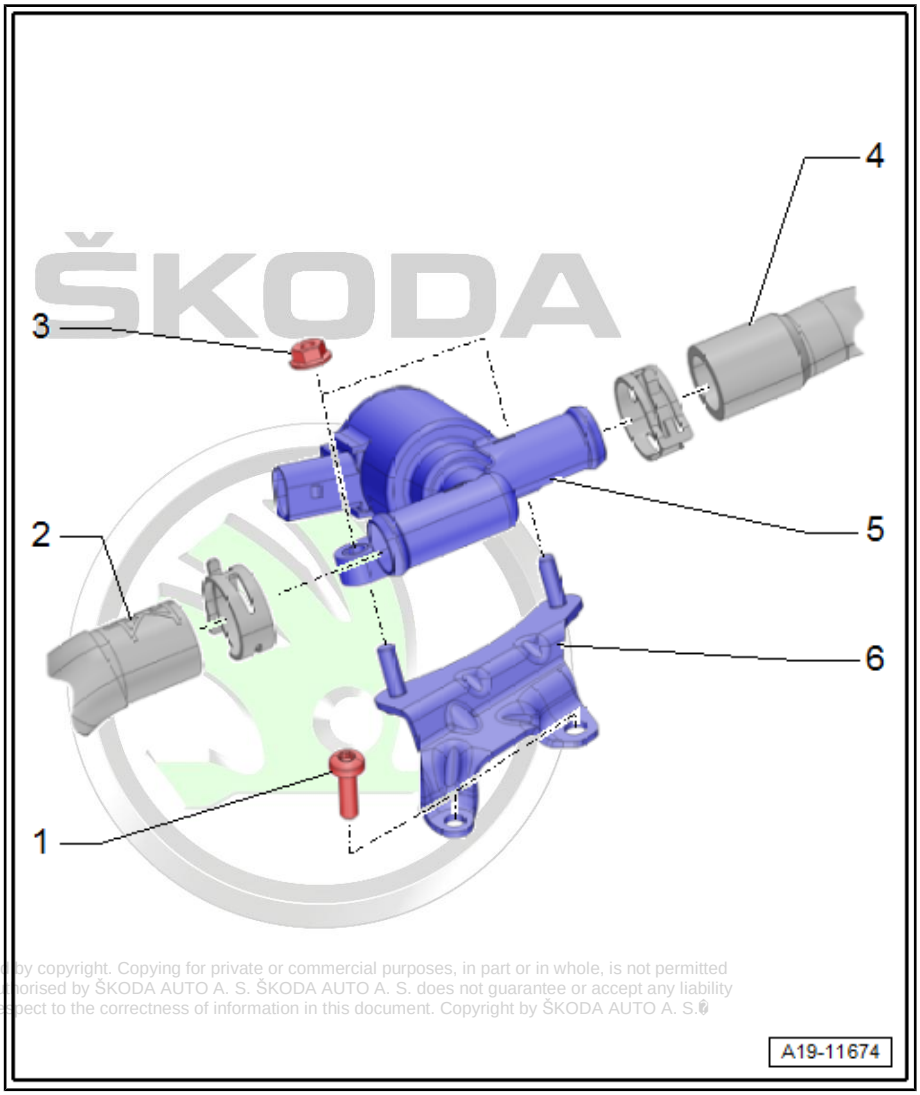
4 - Coolant hose

5 - Coolant valve for gearbox - N488-

- ❑ removing and installing ⇒ page 175

6 - Support

- ❑ for coolant valve for gearbox - N488-



2.4 Coolant temperature sender - Summary of components

1 - Retaining clip

- ❑ Check for secure seating

2 - O-ring

- ❑ replace

3 - Coolant temperature sender at radiator outlet - G83-

- ❑ removing and installing ⇒ page 179

4 - O-ring

- ❑ replace
- ❑ Moisten with coolant

5 - O-ring

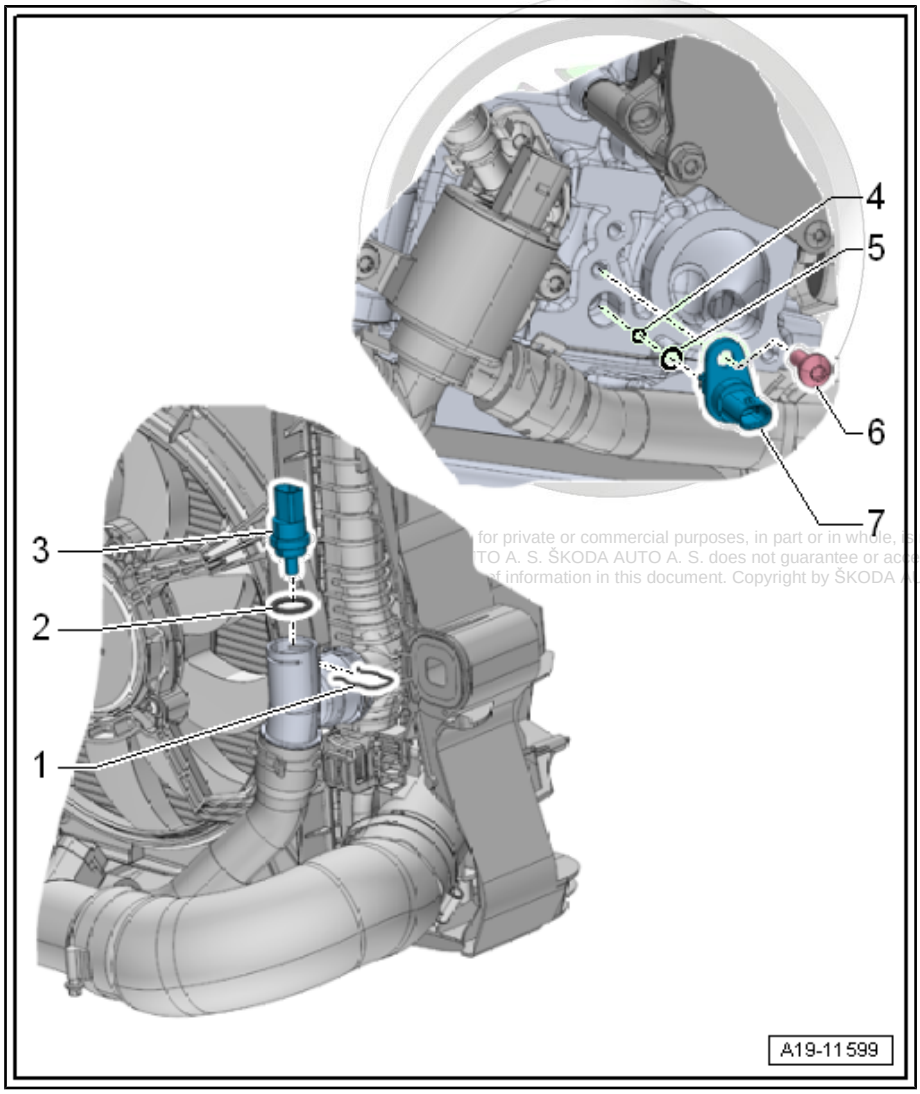
- ❑ replace
- ❑ Moisten with coolant

6 - 4 Nm + torque a further 45° (1/8 turn)

- ❑ replace

7 - Coolant temperature sender - G62-

- ❑ removing and installing ⇒ page 178



2.5 Removing and installing toothed belt for coolant pump

Special tools and workshop equipment required

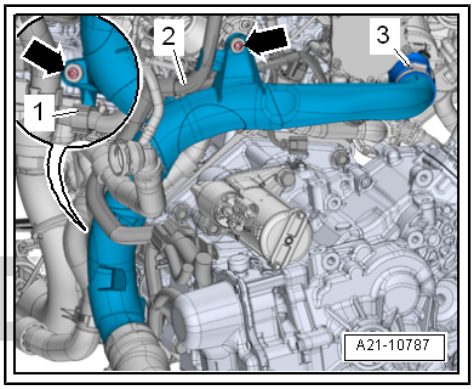
♦ Insertion tool - T10360-

Removing

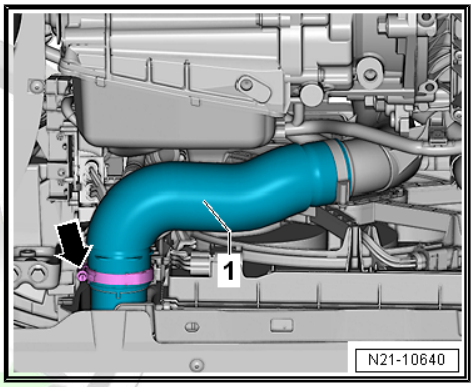
– Drain coolant ⇒ page 158 .

– Remove air filter housing ⇒ page 258 .

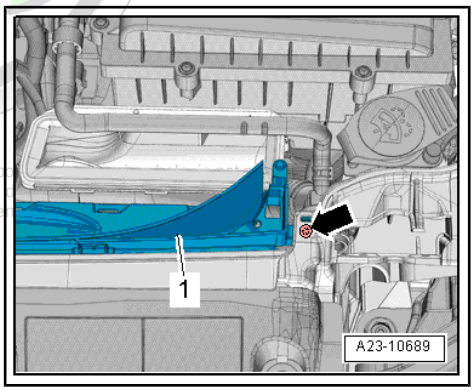
– Expose the electrical wiring harnesses -1 and 2- on the air guide pipe.
– Loosen hose clamp -3-.
– Remove screws -arrows- and remove air guide pipe downwards.



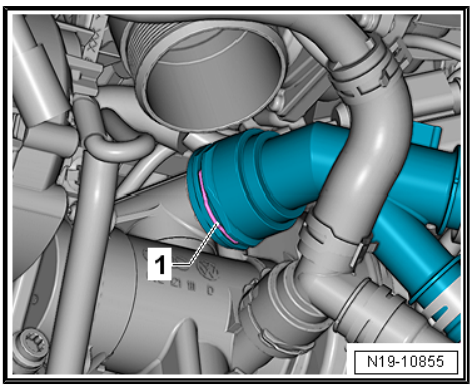
– Loosen hose clamp -arrow- and remove air guide hose -1- from the charge air cooler.



– Release screw left and right -arrow-.
– Unclip and remove the air guide pipe bottom -1-.

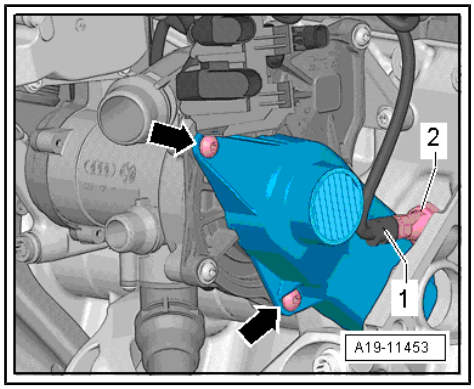


– Raise hose clamp -1-, and push to one side.



– Unplug connector -1- from the oil pressure switch, stage 3 - F447- -2-.

– Release screws-arrows- and remove toothed belt protector.

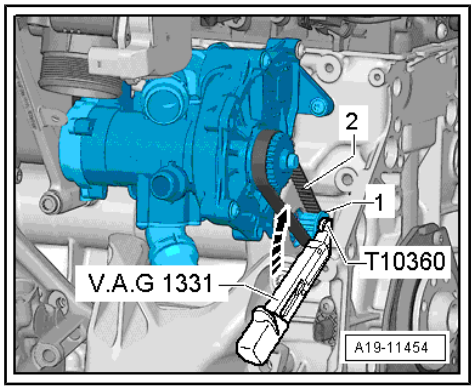


WARNING

Risk of damaging the thread.

- *The screw for the drive wheel has a left-hand thread.*

– Secure the toothed belt gear -1- of the coolant pump by pressing on the toothed belt -2- and undoing the screw with torque wrench - V.A.G 1331- and tool insert - T10360- .



– Remove the toothed belt - 2 -.

Install

Installation is carried out in the reverse order. However, pay attention to the following:

Note

- *Replace the screw for the drive gear -Pos. 11- ⇒ page 164 .*
- *Observe the fitting position of the drive gear-Pos. 12- ⇒ page 164 .*

– Replenish coolant ⇒ page 158 .

2.6 Removing and installing coolant pump

Removing

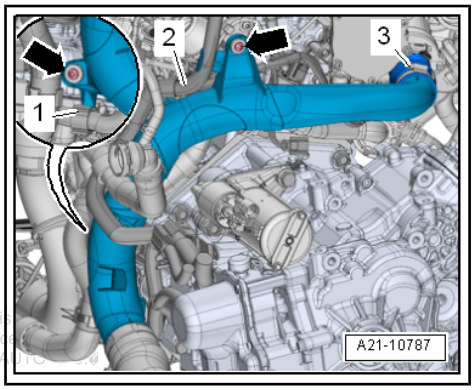
– Drain coolant ⇒ page 158 .

– Remove air filter housing ⇒ page 258 .

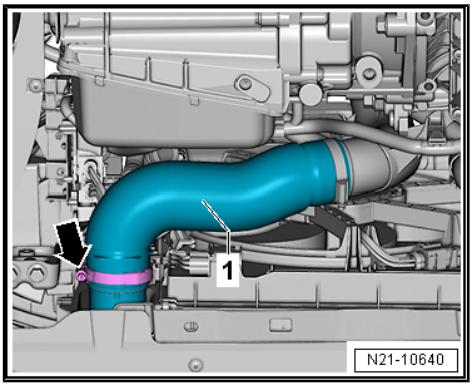
– Expose the electrical wiring harnesses -1 and 2- on the air guide pipe.

– Loosen hose clamp -3-.

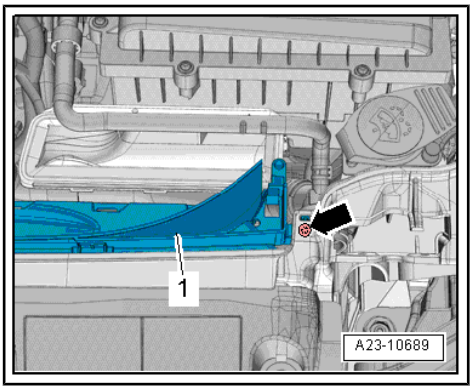
– Unscrew the screws -arrows- and remove the air guide pipe.



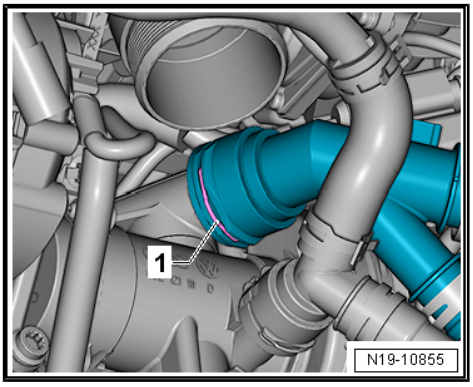
– Loosen hose clamp -arrow- and remove air guide hose -1- from the charge air cooler.



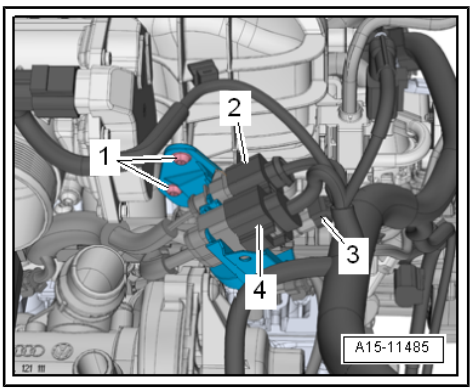
– Release screw left and right -arrow-.
– Unclip and remove the air guide pipe bottom -1-.



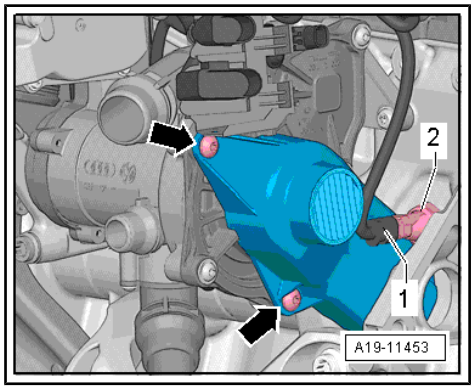
– Raise hose clamp -1-, and push to one side.



– Disconnect the connectors -2, 3 and 4-, unscrew the securing bolts -1- and put the bracket to one side.



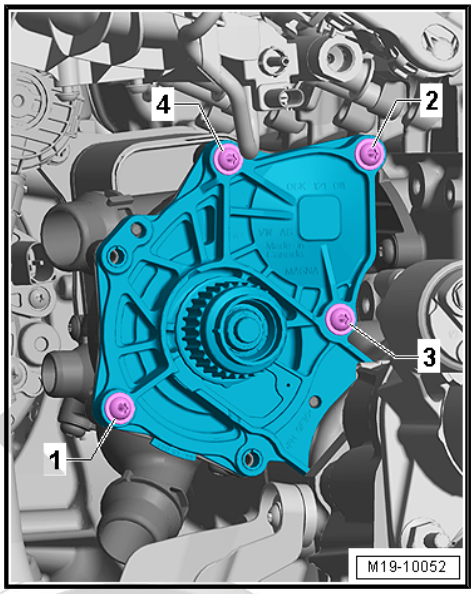
– Unplug connector -1- from the oil pressure switch, stage 3 - F447- -2-.
– Release screws-arrows- and remove toothed belt protector.



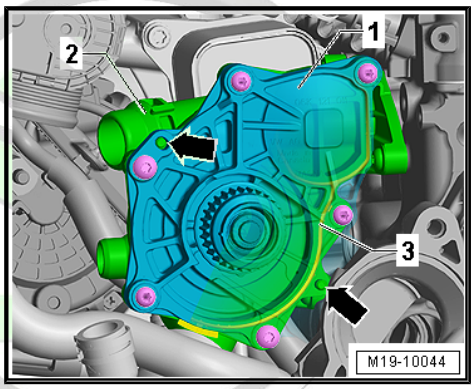
– Undo screws -1…4- and remove toothed belt from the coolant pump.
– Unscrew screws -1…4- and remove coolant pump from the positioning element for engine temperature control - N493- .

Install

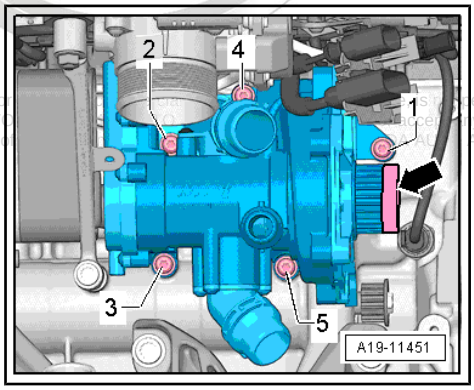
Installation is carried out in the reverse order. However, pay attention to the following:



– Insert coolant pump and make sure it is fitted correctly -arrows-.
– At the same time, make sure the gasket -3- is fitted correctly.
• Tightening torque of screws for coolant pump ⇒ page 165 .



– If a new coolant pump was fitted, remove the protective cap -arrow-.
– Replenish coolant ⇒ page 158 .



2.7 Removing and installing coolant recirculation pump - V51-

Special tools and workshop equipment required

- Hose clamps up to 25 mm - 3094-
- Hose binding claw - VAS 6340-
- Hose binding claw - VAS 6362-

Removing

Note

When installing, re-attach all of the heat protection sleeves in the same position.

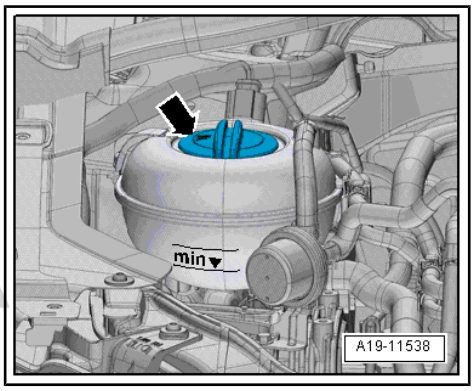
WARNING

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.

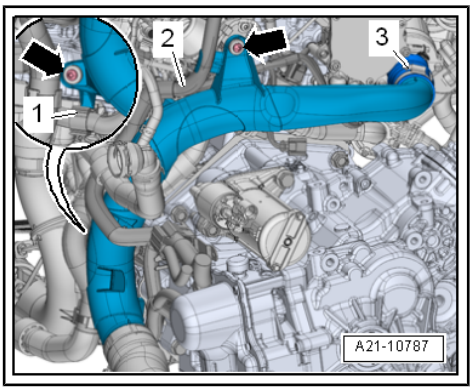
– Remove the sound dampening system ⇒ Body Work; Rep. gr. 50 .



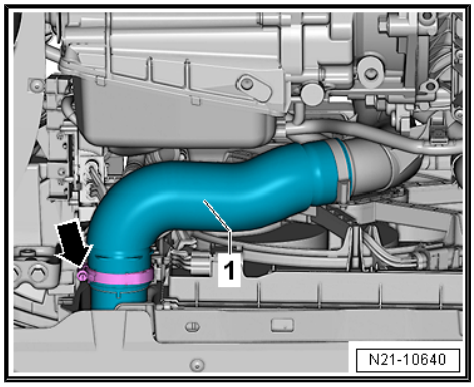
– Expose electric wiring harness -1- and -2- at the air guide pipe.

– Loosen hose clamp -3-.

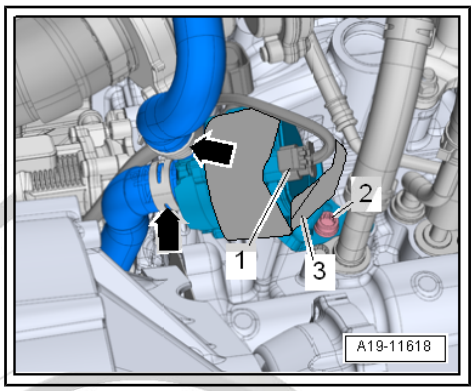
– Unscrew the screws -arrows- and remove the air guide pipe.



– Loosen hose clamp -arrow- and remove air guide hose -1- from the charge air cooler.



– Open heat protection sleeve -3-.
– Unplug connector -1-.
– At the coolant hoses pump - V51- , disconnect coolant hoses with hose clamps -3094- .



Note

Place a cloth below to absorb leaking coolant.

– Loosen hose clamps -arrows- and remove coolant hoses.
– Unscrew screw -2- and remove coolant recirculation pump - V51- .

Install

Installation is carried out in the reverse order. However, pay attention to the following:

Note

Secure all hose connections with hose clamps which comply with the series design ETKA - ⇒ Electronic Catalogue of Original Parts .

– Check coolant level ⇒ page 161 .

2.8 Removing and installing coolant shut-off valve - N82-

Special tools and workshop equipment required

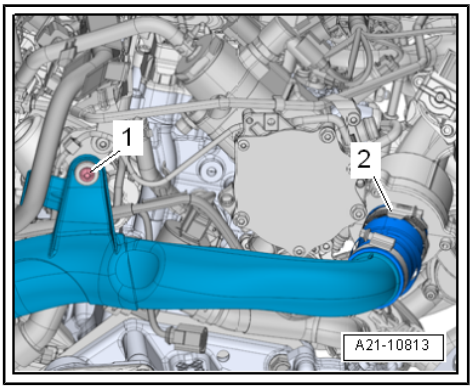
- Hose clamps up to 25 mm - 3094-
- Hose binding claw

Removing

– Remove air filter housing ⇒ page 258 .

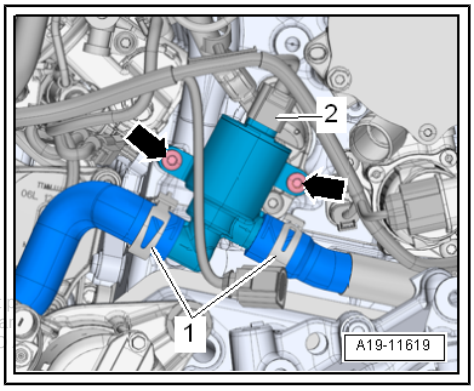
– Loosen hose clamp -2-.

– Unscrew the screw -1- and press the left-hand air guide pipe to the left with light force.



– Unplug connector -2-.

– Disconnect the coolant hoses from the coolant shut-off valve - N82- with hose clamps -3094- .



Note

Place a cloth below to absorb leaking coolant.

– Loosen hose clamps -1- and remove coolant hoses.

– Unscrew screws -arrows- and remove the coolant shut-off valve - N82-

Install

Installation is carried out in the reverse order. However, pay attention to the following:

Note

Secure all hose connections with hose clamps which comply with the series design ETKA - ⇒ Electronic Catalogue of Original Parts .

– Check coolant level ⇒ page 159 .

2.9 Removing and installing coolant valve for cylinder head - N488-

Vehicles with automatic transmission DSG 0D9

Special tools and workshop equipment required

♦ Hose clamps up to 25 mm - 3094-

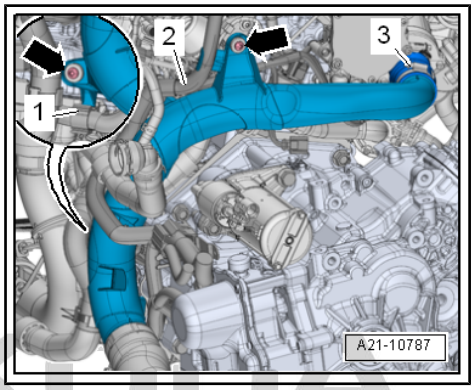
♦ Hose binding claw

Removing

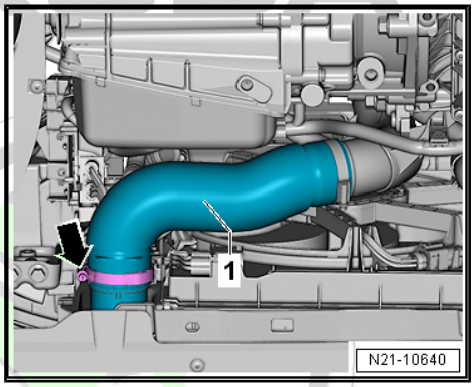
– Remove the sound dampening system ⇒ Body Work; Rep. gr. 50 .

– Remove air filter housing ⇒ page 258 .

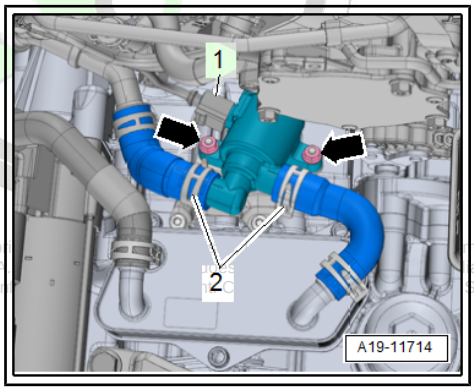
– Expose the electrical wiring harnesses -1 and 2- on the air guide pipe.
– Slacken screw clamp -3-.
– Unscrew the screws -arrows- and remove the air guide pipe.



– Loosen hose clamp -arrow- and remove air guide hose -1- from the charge air cooler.



– Unplug connector -1-.
– Unclamp the coolant hoses from the coolant valve for cylinder head - N488- with hose clamps -3094- .



Note

Place a cloth below to absorb leaking coolant.

– Loosen hose clamps -2- and remove coolant hoses.
– Unscrew the nuts -arrows- and remove the coolant valve for cylinder head - N488- .

Install

Installation is carried out in the reverse order. However, pay attention to the following:

Note

Secure all hose connections with hose clamps which comply with the series design ETKA - ⇒ Electronic Catalogue of Original Parts .

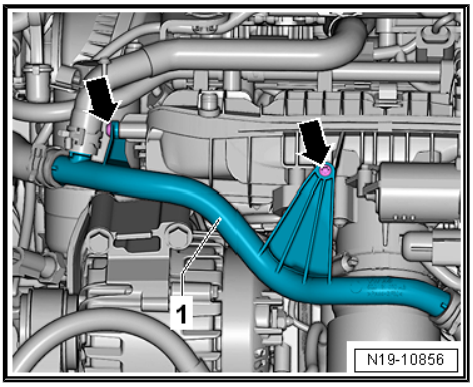
– Check coolant level ⇒ page 159 .

2.10 Removing and installing positioning element for engine temperature control - N493-

Removing

– Remove coolant pump ⇒ page 170 .
– Remove throttle valve module - J338- ⇒ page 268 .

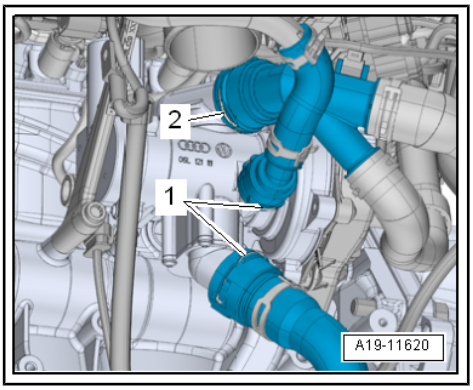
– Unscrew propshaft from angle gearbox -arrows-.



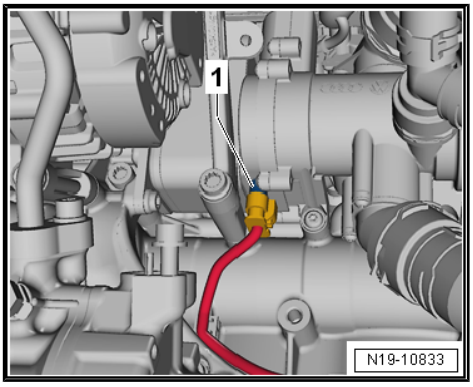
– Raise holding clamps -1- and remove the coolant hoses.

Note

Do not pay attention to the position -2-.

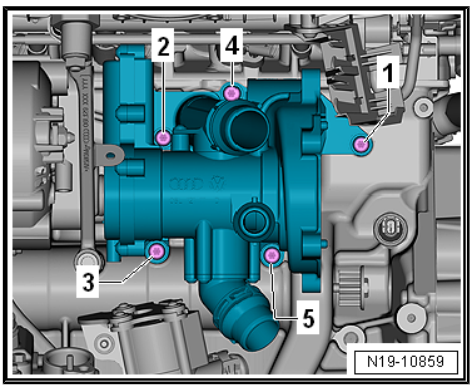


– Remove connector -1- from the positioning element for engine temperature control - N493- .



– Undo screws -1 … 5-.

– Remove the positioning element for engine temperature control - N493- from the fitted pins and remove from the engine oil cooler.



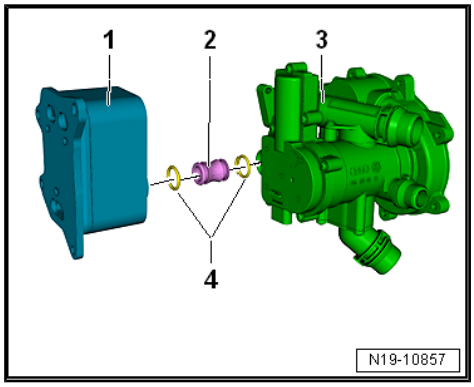
Install

Installation is carried out in the reverse order. However, pay attention to the following:

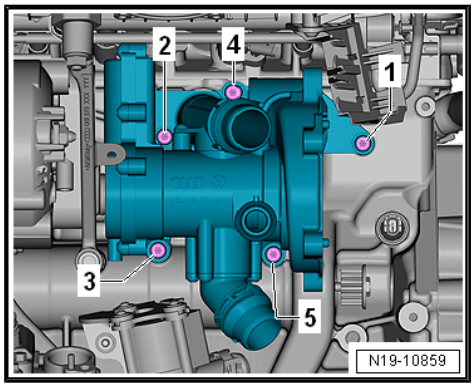
Note

Replace gaskets and O-rings.

– Wet the O-rings -4- with coolant additive ⇒ ETKA - Electronic Catalogue of Original Parts .
– Check whether both fitted pins are present in the cylinder block, insert if necessary.
– Insert connecting piece -2- into the engine oil cooler-1-.
– Place the positioning element for engine temperature control - N493- -3- into the connecting piece and slide onto the fitted pin in the cylinder block.



– Tighten the screws of the positioning element for engine temperature control - N493- ⇒ page 165 .
– Install coolant pump ⇒ page 170 .
– Replenish coolant ⇒ page 158 .

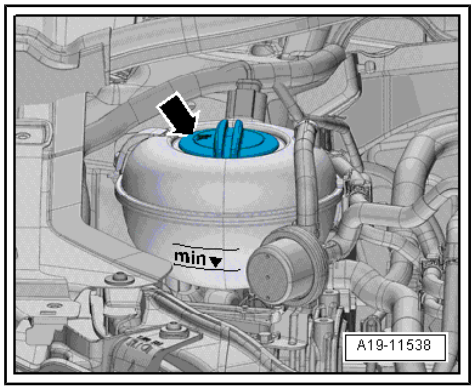


2.11 Removing and installing coolant temperature sender - G62-

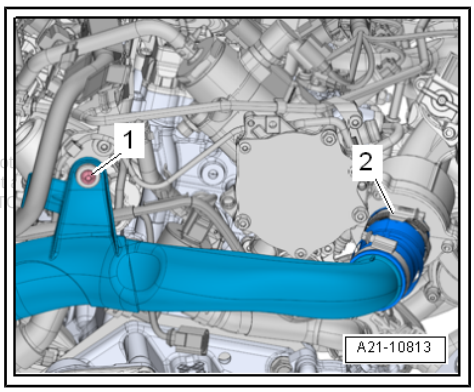
Removing

• Engine cold

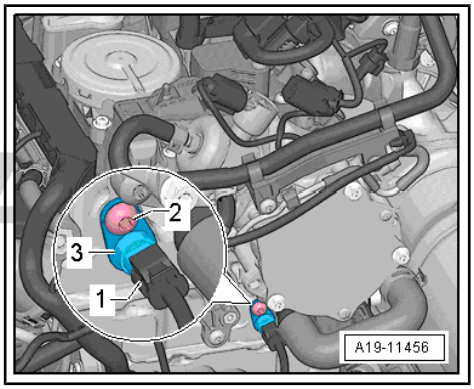
– To release the residual pressure in the cooling system, briefly open the screw cap -arrow- on the coolant expansion tank, and seal it until it latches into position.
– Remove air filter housing ⇒ page 258 .



– Loosen hose clamp -2-.
– Unscrew the screw -1- and press the left-hand air guide pipe to the left with light force.



– Unplug connector -1-.



Note

- *Place a cloth below to absorb leaking coolant.*
- *To prevent losing too much coolant, insert the new coolant temperature sender - G62- into the connection fitting right away.*

– Unscrew the screw -2- and remove the coolant temperature sender - G62- -3-.

Install

Installation is carried out in the reverse order. However, pay attention to the following:

Note

Replace O-rings.

– Check coolant level ⇒ page 159 .

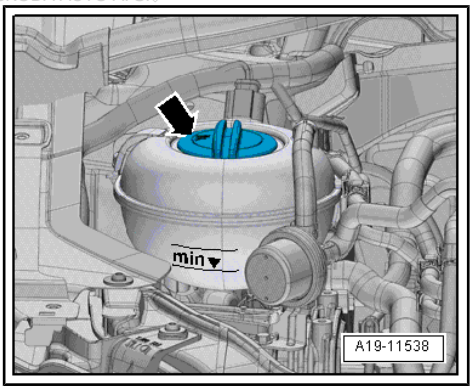
2.12 Remove and install the coolant temperature sender at the cooler outlet - G83-

Removing

• Engine cold

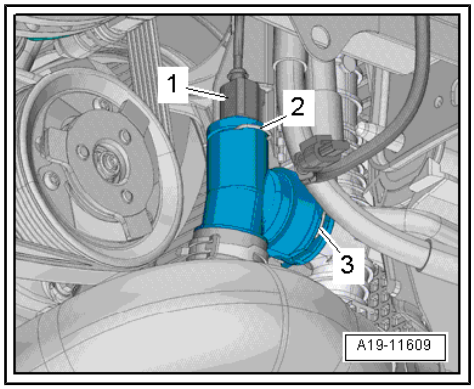
– To release the residual pressure in the cooling system, briefly open the screw cap -arrow- on the coolant expansion tank, and seal it until it latches into position.

– Remove the sound dampening system ⇒ Body Work; Rep. gr. 50 .



– Unplug connector -1-.

– Remove the holding clamp -2- and coolant temperature sender at radiator outlet - G83- -3-.



Note

- *Place a cloth below to absorb leaking coolant.*
- *To prevent losing too much coolant, insert the new coolant temperature sender on the radiator outlet - G83- into the connection fitting right away.*

Install

Installation is carried out in the reverse order. However, pay attention to the following:

Note

Renew O-ring.

– Check coolant level ⇒ page 159 .

3 Coolant pipes

3.1 Coolant pipe - Summary of components

1 - Front coolant pipe
- ❑ removing and installing ⇒ page 181

2 - 6 Nm

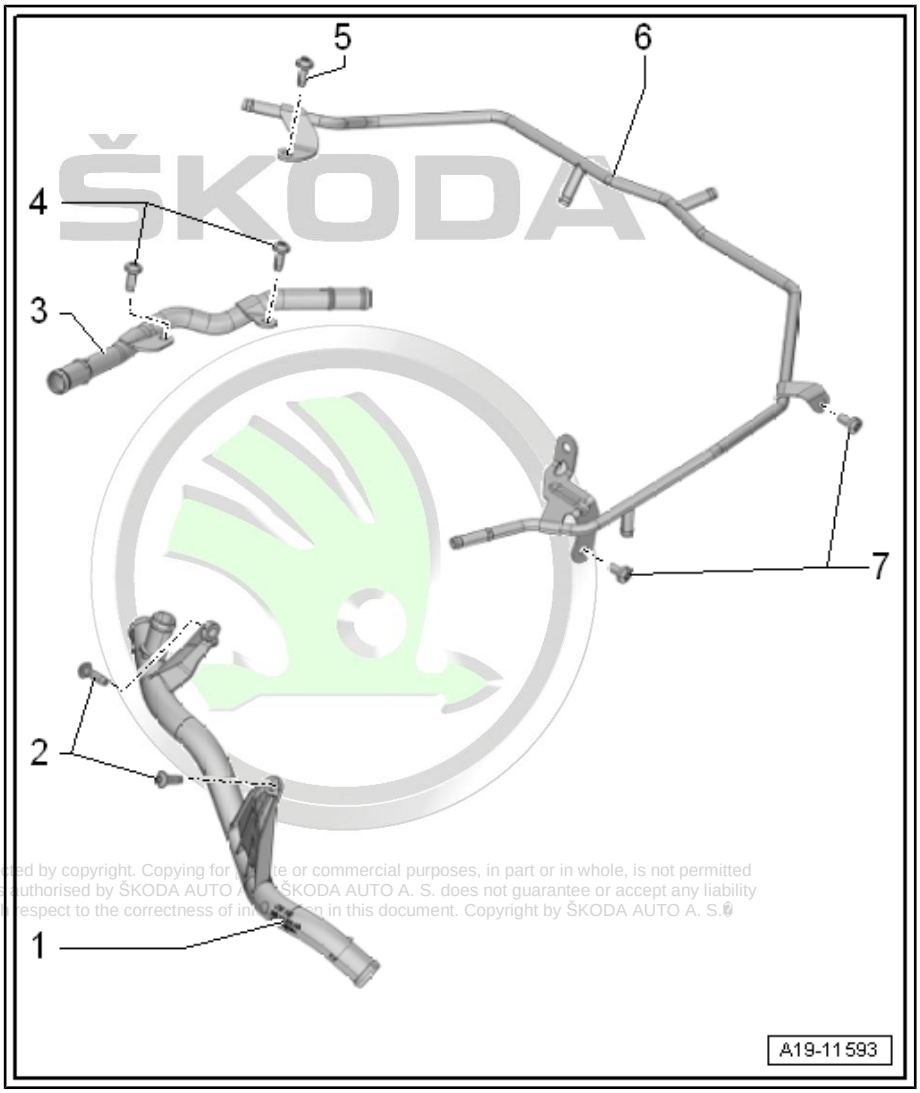
3 - Top coolant pipe
- ❑ removing and installing ⇒ page 183

4 - 9 Nm

5 - 9 Nm

6 - Coolant line

7 - 9 Nm



3.2 Removing and installing the front coolant pipe

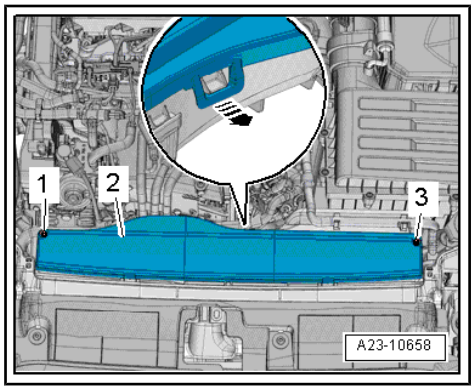
Special tools and workshop equipment required

- Hose clamps up to 25 mm - 3094-
- Hose binding claw - VAS 6362-

Removing

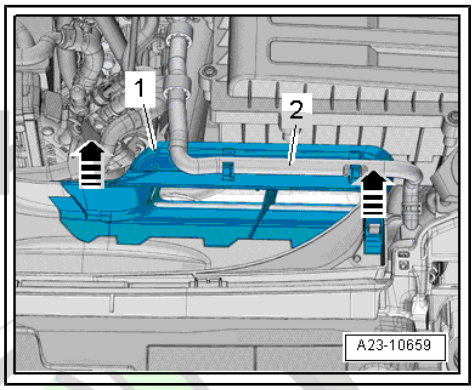
– Release screws -1, 3-.

– Unlock latch -arrow- and remove cover -2-.



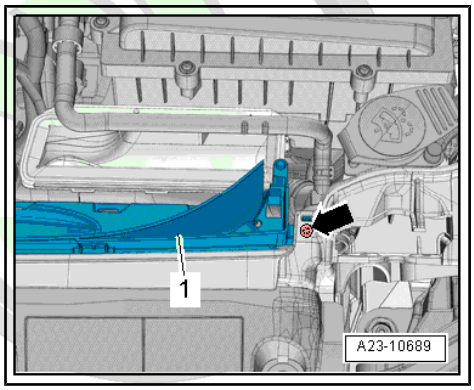
– Expose coolant hose -2-.

– Unlock catches -arrows- and remove the air guide pipe top -1-.



– Release screw left and right -arrow-.

– Unclip and remove the air guide pipe bottom -1-.



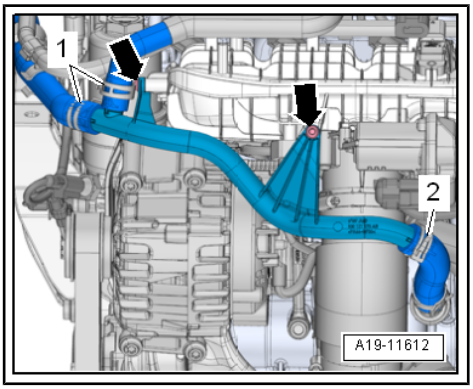
Note

In order to collect flowing out coolant, place a cloth below the coolant pipe.

– Unclip and remove the coolant hoses -1, 2- with hose clamps up to 25 mm - 3094- .

– Loosen hose clamps arrows and remove coolant hoses.

– Release screws -arrows- and remove coolant pump at the front.



Install

Installation is carried out in the reverse order. However, pay attention to the following:

- Tightening torques ⇒ page 181

Note

Secure all hose connections with hose clamps which comply with the series design ETKA - ⇒ Electronic Catalogue of Original Parts .

– Check coolant level ⇒ page 159 .

3.3 Removing and installing top coolant pipe

Special tools and workshop equipment required

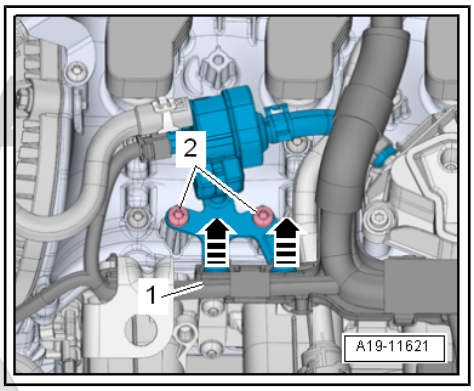
♦ Hose clamps up to 25 mm - 3094-

♦ Hose binding claw - VAS 6362-

Removing

– Remove ignition coil for cylinder 3 ⇒ page 311 .

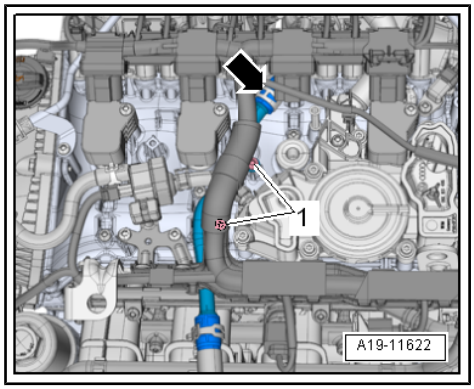
– Unlock latches -arrows- and remove wiring -1- from mounting bracket.



– Unclip and remove the coolant hoses -arrows- with hose clamps up to 25 mm - 3094- .

– Loosen hose clamps arrows and remove coolant hoses.

– Release screw -1- and remove top coolant pump.



Install

Installation is carried out in the reverse order. However, pay attention to the following:

- Tightening torques ⇒ page 181

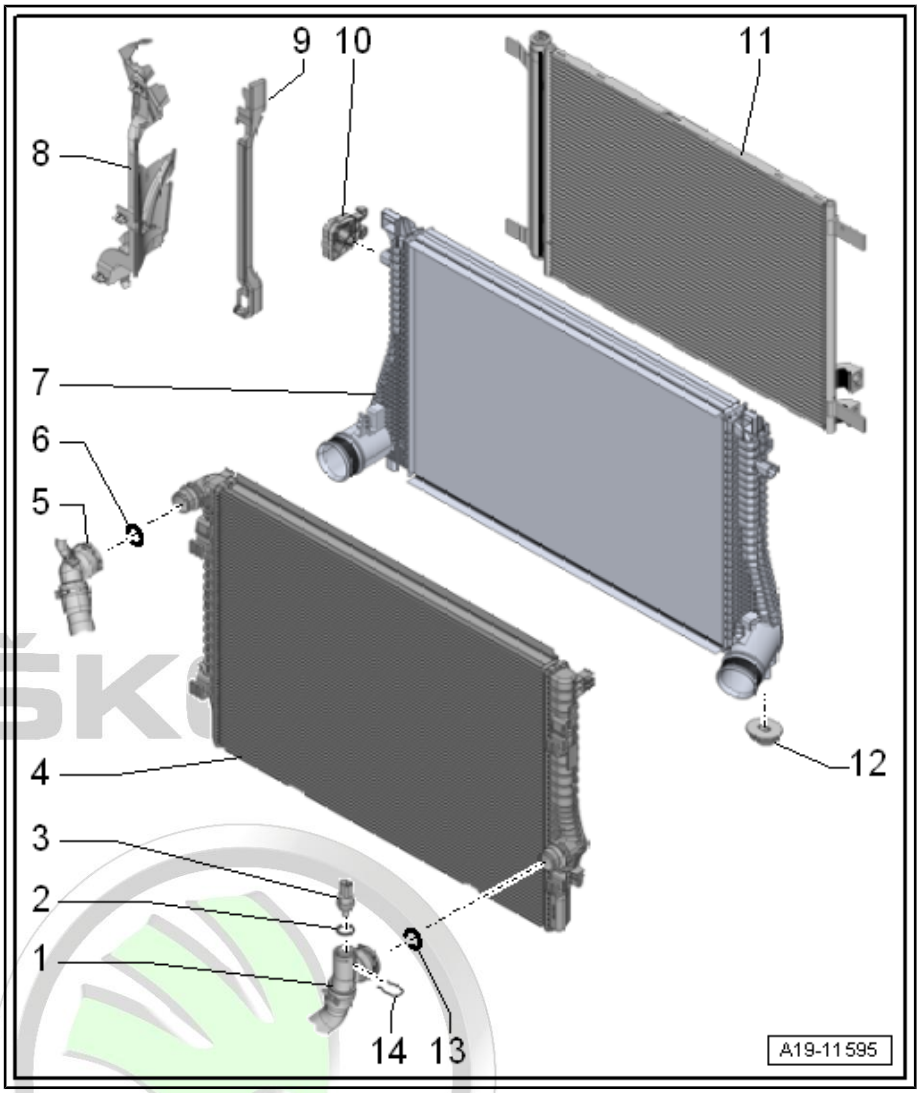
Note

Secure all hose connections with hose clamps which comply with the series design ETKA - ⇒ Electronic Catalogue of Original Parts .

– Check coolant level ⇒ page 159 .

4 Radiator and radiator fan

4.1 Cooler for coolant- Summary of components



1 - Coolant hose
- ❑ while removing, raise holding clamps
- ❑ connect ⇒ page 186

2 - O-ring
- ❑ replace
- ❑ Moisten with coolant

3 - Coolant temperature sender at radiator outlet - G83-
- ❑ removing and installing ⇒ page 179

4 - Coolant radiator
- ❑ removing and installing ⇒ page 186
- ❑ fill with fresh coolant after replacing

5 - Coolant hose
- ❑ while removing, raise holding clamps
- ❑ connect ⇒ page 186

6 - O-ring
- ❑ replace
- ❑ Moisten with coolant

7 - Charge air cooler
- ❑ removing and installing ⇒ page 241

8 - Air deflector

9 - Air deflector

10 - Rubber bush
- ❑ for charge air cooler

11 - Condenser
- ❑ removing and installing ⇒ Air conditioning; Rep. gr. 87

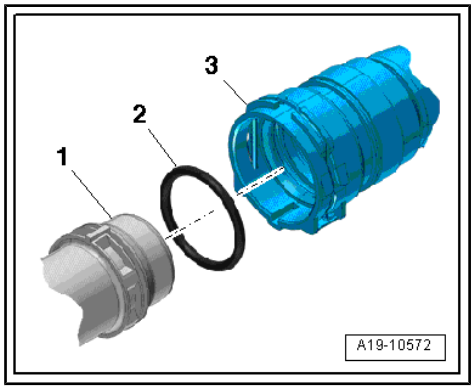
12 - Rubber bush
- ❑ for charge air cooler

13 - O-ring
- ❑ replace
- ❑ Moisten with coolant

14 - Retaining clip
- ❑ for coolant temperature sender at radiator outlet - G83-

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 coolant pipe -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 Fan shroud and radiator fan - Summary of components

1 - 5 Nm

2 - Fan shroud

❑ removing and installing ⇒ page 189

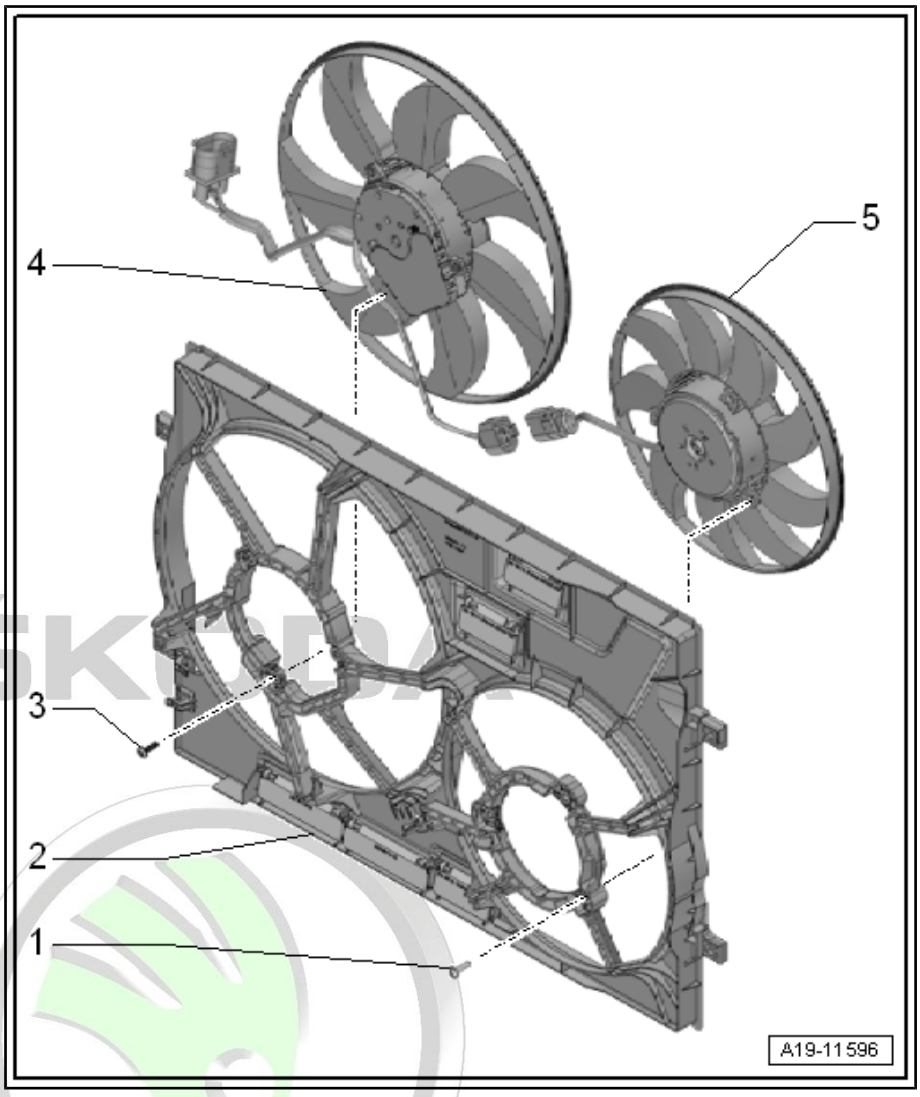
3 - 5 Nm

4 - Radiator fan - V7-

❑ removing and installing ⇒ page 190

5 - Radiator fan 2 - V177-

❑ removing and installing ⇒ page 190

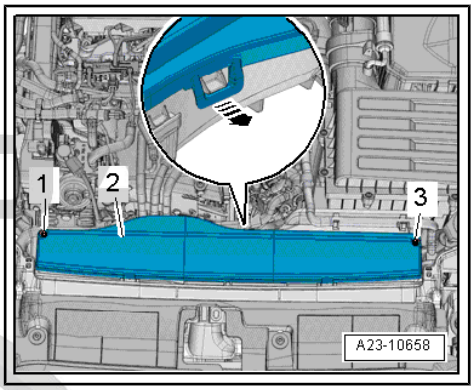


4.3 Removing and installing radiator fan for coolant

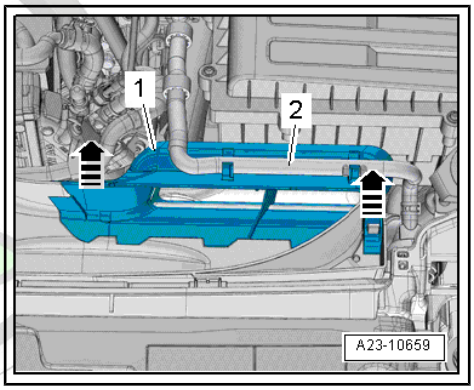
Removing

- Drain coolant ⇒ page 158 .
- Removing fan shroud ⇒ page 189 .

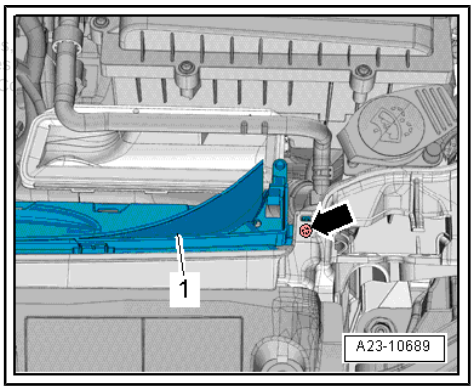
– Remove front bumper ⇒ Body Work; Rep. gr. 63 .
– Release screws -1, 3-.
– Unlock latch -arrow- and remove cover -2-.



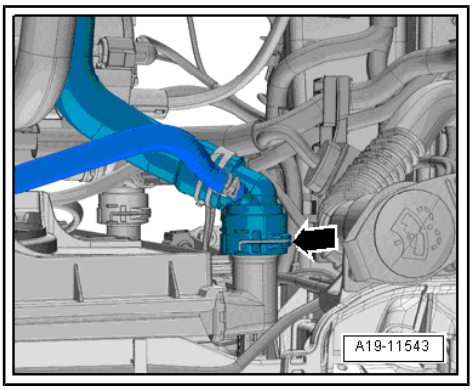
– Expose coolant hose -2-.
– Unlock catches -arrows- and remove the air guide pipe top -1-.



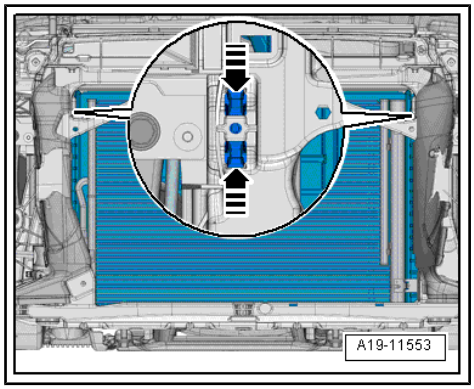
– Release screw left and right -arrow-.
– Unclip and remove the air guide pipe bottom -1-.



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

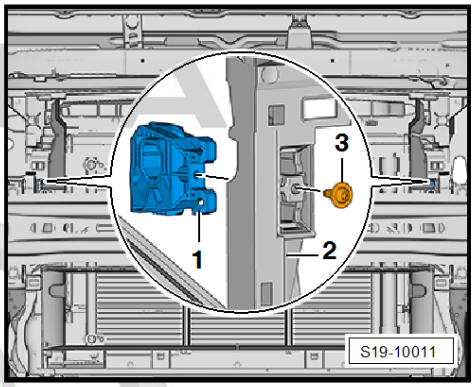


– Press the catches for the top radiator bearing -arrows- at the same time, e..g with screwdrivers, and unclip the bearing on both sides.
– Partially tilt cooler into the engine compartment.

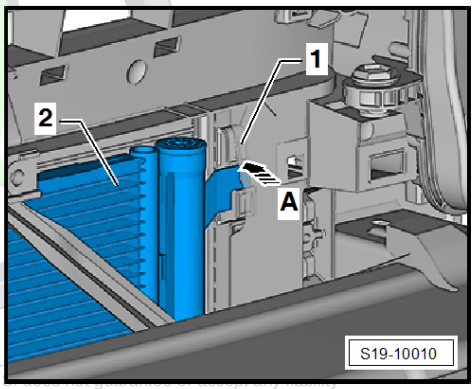


Note

If the fuse breaks, 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 .

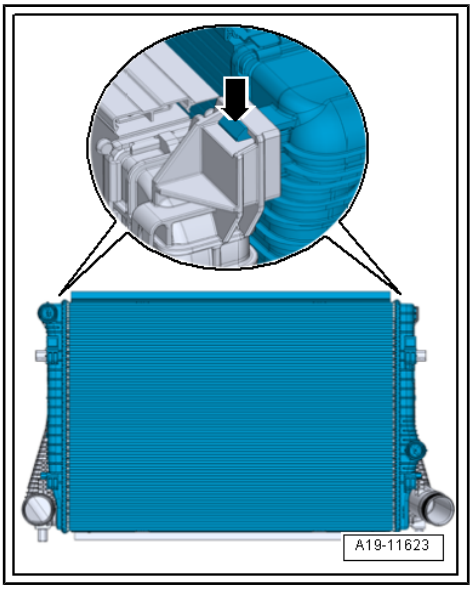


– Unlock the left and right catches from the cooler -1- -arrow A- and raise the condenser.
– Press the radiator downwards until the radiator bearing deflects at the bottom, to do so, unhook the condenser -2- from the radiator -1-.
– Strap capacitor to the lock support.
– Remove the cooler for the charge air circuit from the vehicle together with the cooler for coolant.



– Press left and right radiator locking lugs simultaneously -arrow- and remove coolant radiator from the charge air circuit radiator.

– Secure charge air cooler



Install

Installation is carried out in the reverse order. However, pay attention to the following:

Note

- *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.*
- *Replace O-rings.*
- *If the radiator has been replaced, all the entire coolant must be replaced.*

– Install front bumper ⇒ Body Work; Rep. gr. 63 .

– Install fan shroud ⇒ page 189 .

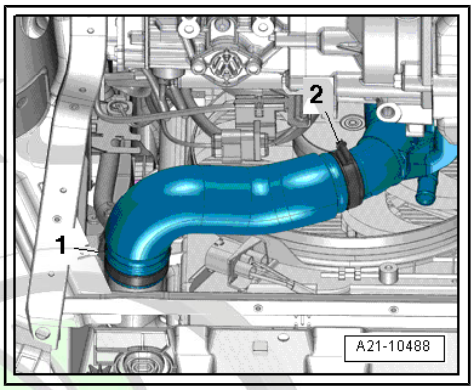
– Replenish coolant ⇒ page 158 .

4.4 Removing and installing fan shroud

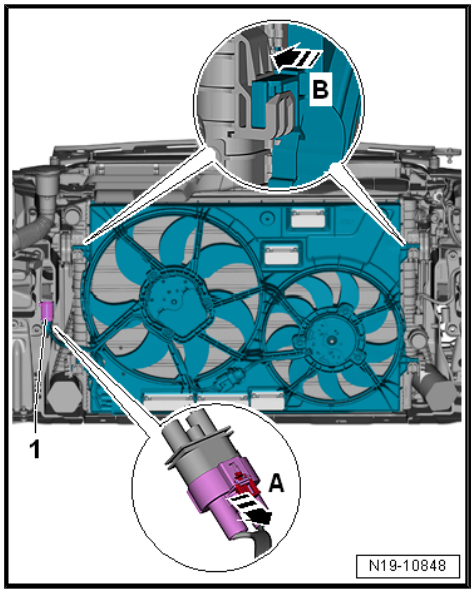
Removing

– Remove the sound dampening system ⇒ Body Work; Rep. gr. 50 .

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



– Remove connector -1- for radiator fan. To do so, slide the fuse in -direction of arrow A- and push the catch downwards.
– Press locking lugs for fan shroud left and right simultaneously -arrow B- and remove fan shroud downwards from the radiator.



Install

Installation is carried out in the reverse order.

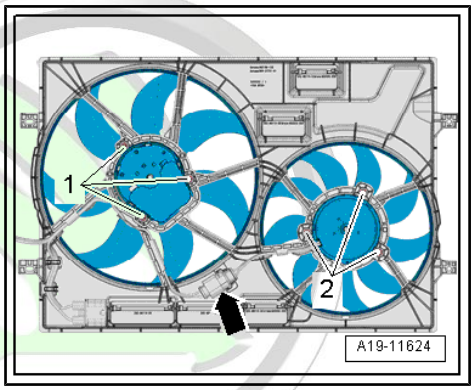
4.5 Removing and installing radiator fan - V7- -V177-

Removing

Note

All cable straps should be fitted on again in the same place when installing.

– Removing fan shroud ⇒ page 189 .
– Disconnect plug connection -arrow-.
– Remove screws -1- and remove the radiator fan - V7- .
– Remove screws -2- and remove the radiator fan - V177- .



Install

Installation is carried out in the reverse order. However, pay attention to the following:

• Tightening torques ⇒ page 186
– Install fan shroud ⇒ page 189 .

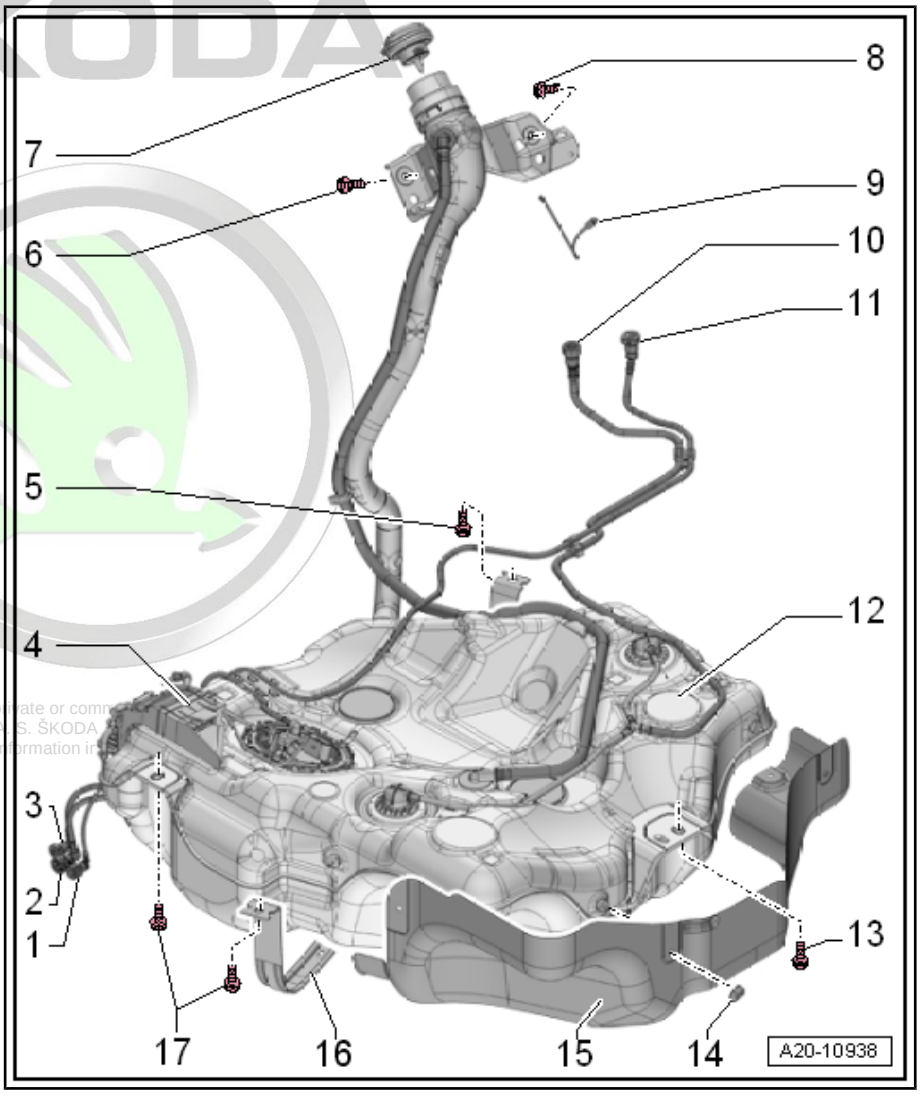
20 – Fuel supply system

1 Fuel tank

Note

- *Fuel hoses at the engine must only be secured with spring-type clamps ⇒ ETKA - Electronic catalogue of original parts .*
- *Spring-type clip pliers are recommended for installation of spring-type clips.*

1.1 Fuel containers for vehicles with front-wheel drive - Summary of components



1 - Fuel line

- ❑ Vehicles with auxiliary heating, the auxiliary heating from the dosing pump
- ❑ do not kink
- ❑ disconnect and connect ⇒ page 223

2 - Fuel feed line

- ❑ to the engine
- ❑ pushed into the fuel tank
- ❑ do not kink
- ❑ disconnect and connect ⇒ page 223

3 - Vent line

- ❑ to activated charcoal filter solenoid valve 1 - N80-
- ❑ pushed into the fuel tank
- ❑ do not kink
- ❑ disconnect and connect ⇒ page 223

4 - Support

- ❑ For fuel pump control unit - J538-

5 - 20 Nm + torque a further 90° (1/4 turn)

- ❑ replace

6 - 8 Nm + torque a further 90° (1/4 turn)

- ❑ replace

7 - Screw cap

- ❑ screw in until there is an audible click
- ❑ with securing to prevent any loss during tank fuel filler flap operation

8 - 8 Nm

- ❑ for attaching the fuel filler neck

- ❑ for discharging the electrostatic charge ⇒ page 192
- ❑ replace

9 - Earth connection

- ❑ for fuel filler neck
- ❑ for discharging the electrostatic charge ⇒ page 192

10 - Vent line

- ❑ to the activated charcoal filter system
- ❑ pushed into the fuel tank
- ❑ do not kink
- ❑ disconnect and connect ⇒ page 223

11 - Vent line

- ❑ to the activated charcoal filter system
- ❑ pushed into the fuel tank
- ❑ do not kink
- ❑ disconnect and connect ⇒ page 223

12 - Fuel tank

- ❑ removing and installing ⇒ page 195

13 - 20 Nm + torque a further 90° (1/4 turn)

- ❑ replace

14 - 2 Nm

- ❑ Heat shield

15 - Heat shield

- ❑ for fuel tank

16 - Tensioning strap

- ❑ Check fitting position

17 - 20 Nm + torque a further 90° (1/4 turn)

- ❑ replace

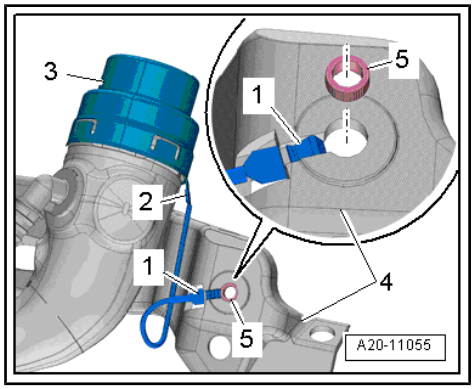
Earth connection for fuel filler neck

– 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-.

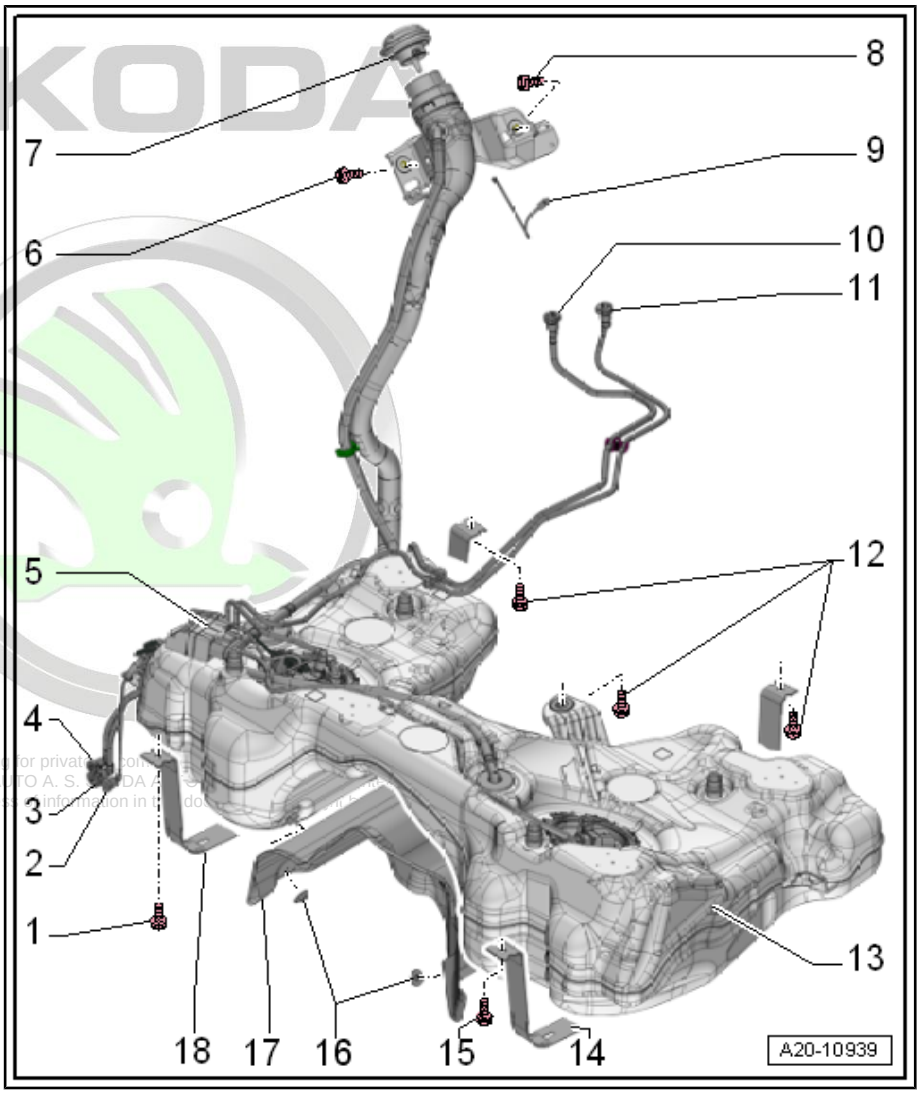


WARNING

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*

1.2 Fuel containers for vehicles with all-wheel drive - Summary of components



1 - 20 Nm + torque a further 90° (1/4 turn)

- ❑ replace

2 - Fuel line

- ❑ Vehicles with auxiliary heating, the auxiliary heating from the dosing pump
- ❑ do not kink
- ❑ disconnect and connect ⇒ page 223

3 - Fuel feed line

- ❑ to the engine
- ❑ pushed into the fuel tank
- ❑ do not kink
- ❑ disconnect and connect ⇒ page 223

4 - Vent line

- ❑ to activated charcoal filter solenoid valve 1 - N80-
- ❑ pushed into the fuel tank
- ❑ do not kink
- ❑ disconnect and connect ⇒ page 223

5 - Fuel pump control unit - J538-

- ❑ removing and installing ⇒ page 221

6 - 8 Nm + torque a further 90° (1/4 turn)

- ❑ replace

7 - Screw cap

- ❑ screw in until there is an audible click
- ❑ with securing to prevent any loss during tank fuel filler flap operation

8 - 8 Nm + torque a further 90° (1/4 turn)

- ❑ for attaching the fuel filler neck
- ❑ for discharging the electrostatic charge ⇒ page 192
- ❑ replace

9 - Earth connection

- ❑ for fuel filler neck
- ❑ for discharging the electrostatic charge ⇒ page 192

10 - Vent line

- ❑ to the activated charcoal filter system
- ❑ pushed into the fuel tank
- ❑ do not kink
- ❑ disconnect and connect ⇒ page 223

11 - Vent line

- ❑ to the activated charcoal filter system
- ❑ pushed into the fuel tank
- ❑ do not kink
- ❑ disconnect and connect ⇒ page 223

12 - 20 Nm + torque a further 90° (1/4 turn)

- ❑ replace

13 - Fuel tank

- ❑ removing and installing ⇒ page 199

14 - Tensioning strap left

15 - 20 Nm + torque a further 90° (1/4 turn)

- ❑ replace

16 - 2 Nm

- ❑ Nut for heat shield

17 - Heat shield

- ❑ for fuel tank

18 - Tensioning strap right

1.3 Extract fuel from the fuel tank

Special tools and workshop equipment required

- ♦ Hose adapter , e.g. -V.A.G 1318/16-
- ♦ Adapter , e.g. -V.A.G 1318/17-
- ♦ Measuring tool set , e.g. -V.A.G 1594 C-
- ♦ Battery
- ♦ Catch pan for fuel

Note

If there are functional problems of the fuel delivery unit suction off fuel with fuel extraction device, e.g. -VAS 5190- .

Work procedure

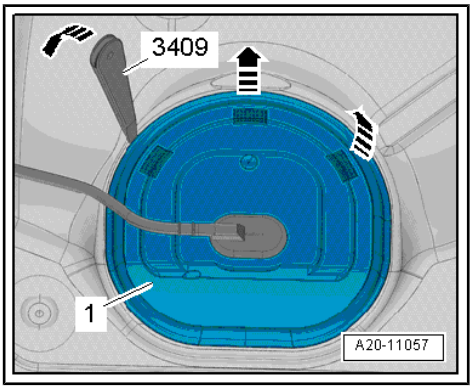
Note

- ♦ *Safety precautions when working on the fuel supply system* *⇒ page 3* .
- ♦ *Rules of cleanliness when working on the fuel supply system* *⇒ page 5* .

– 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- .

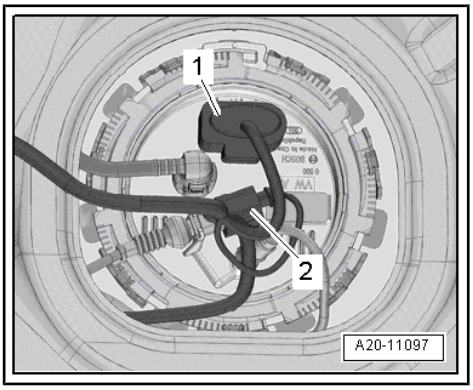


Vehicles with auxiliary heating

– Disconnect the dosing pump - V54- -2- 2-pin plug connection.

Continued for all vehicles

– Disconnect the 5-pin plug connection -1- and the black feed line ⇒ page 223 .



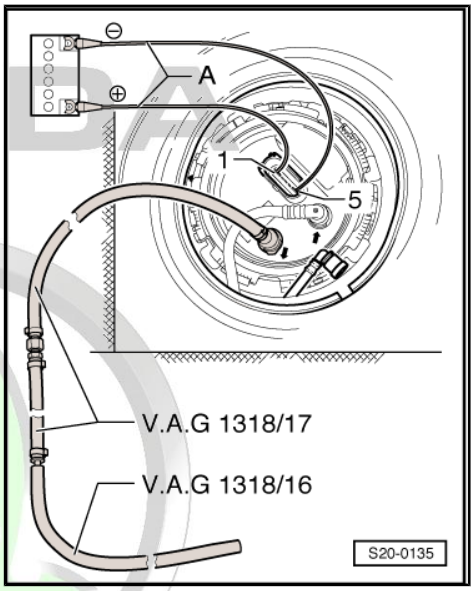
– Connect the adapter -V.A.G 1318/16- with the adapter -V.A.G 1318/17- and fit this “drain pipe” thus prepared onto the feed support of the fuel delivery unit.

– Hold the “drain pipe” in a suitable fuel tank.

– Connect the battery and the contacts of the fuel pump with adapter cables -A- from the adapter cable set - V.A.G 1594/C- as follows:

  Battery positive terminal (+) to contact -1- of the fuel pump

  Battery negative terminal (-) to contact -5- of fuel pump



The fuel delivery unit runs and suctions off fuel.

WARNING

In order to prevent an overflow of fuel in case of a too small fuel tank, the fuel pump must not run unattended.

1.4 Removing and installing the fuel tank

For vehicles with front-wheel-drive

Special tools and workshop equipment required

- Engine and gearbox jack , e.g. -V.A.G 1383 A-
- 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 ⇒ page 194 .

Removing

Note

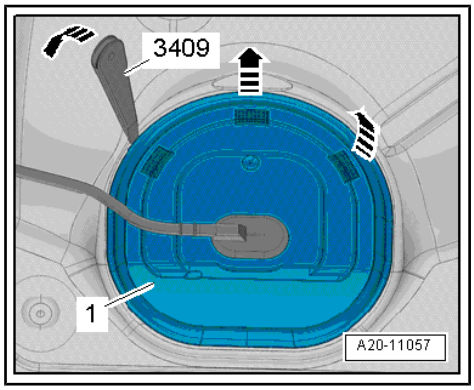
- *Safety precautions when working on the fuel supply system* ⇒ page 3 .
- *Rules of cleanliness when working on the fuel supply system* ⇒ page 5 .

– Switch off ignition and all electrical loads, and pull out ignition key.

– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

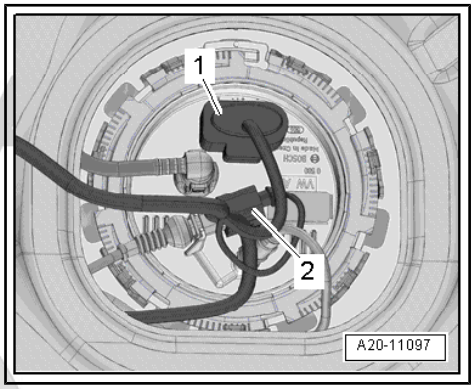
– Unclip cover -1- for closing flange using the disassembly wedge - 3409- from the uptake -arrows-.

– Disconnect plug connection -1- at fuel pump.



Vehicles with auxiliary heating

– Disconnect plug connection -2- from auxiliary heating dosing pump.

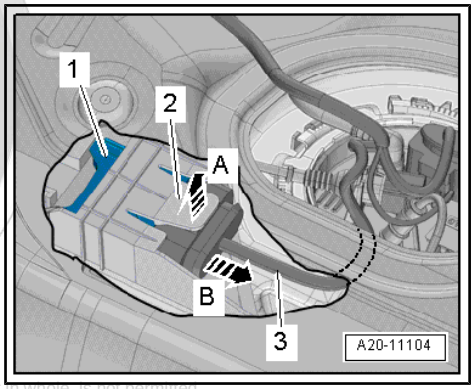


Continued for all vehicles

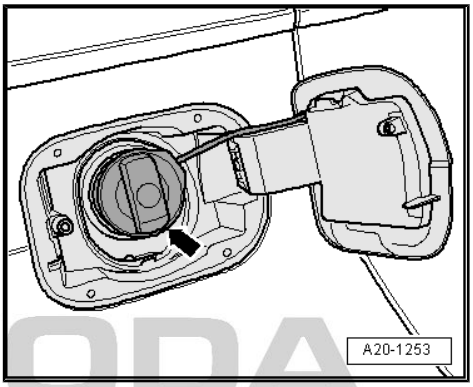
– Push up pick-up coupling -2- -arrow A-. To do so, reach between bottom plate and fuel tank with a finger.

– 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.



– Clean the area around the fuel filler neck.
– Unscrew cap -arrow- from fuel filler neck.

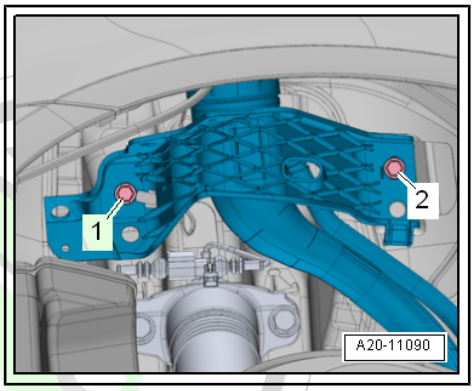


Note

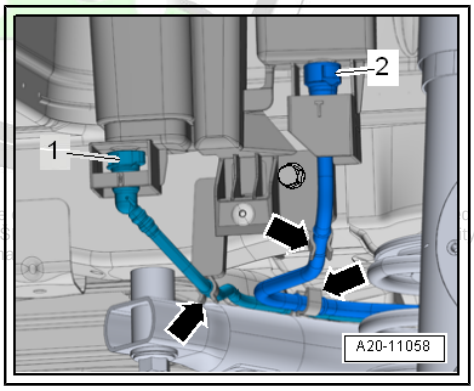
Close the opening of the fuel filler neck with a clean cloth so that no dirt can penetrate.

– Removing the rear right wheel.
– Remove the rear right wheelhouse liner ⇒ Body Work ⇒ Rep. gr. 66 .

– Unscrew screws -1 and 2- for fuel filler neck.

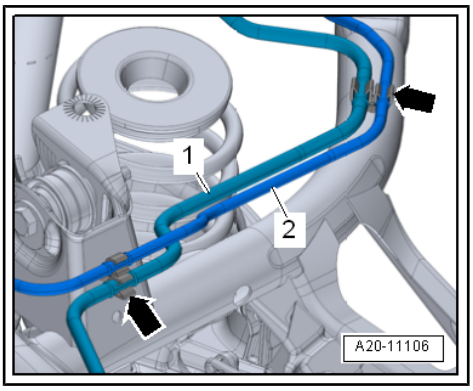


– Disconnect ventilation lines -1 and 2- at activated charcoal filter ⇒ page 223 .
– Loosen ventilation lines from fasteners on the holder -arrows-.



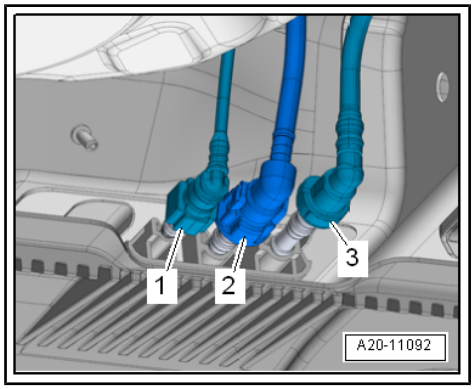
– Loosen ventilation line -1 and 2- from fastener on the holder -arrows-
– Remove the rear silencer:

♦ with the engine with identification characters CJSA ⇒ page 301
♦ with the engine with identification characters CHHB ⇒ page 306



Continued for all vehicles

– Disconnect vent line -3- and fuel line -2- ⇒ page 223 .



Note

For vehicles with auxiliary heating, the fuel line -1- for the dosing pump - V54- must also be disconnected ⇒ page 223 .

WARNING

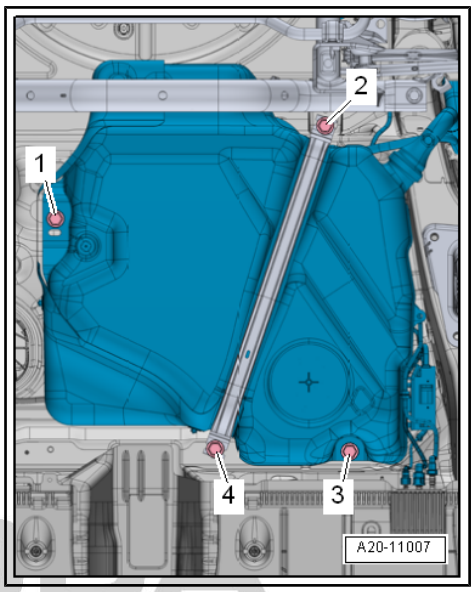
Risk of accident from fuel tank weight.

The fuel tank must be empty for removal.

Note

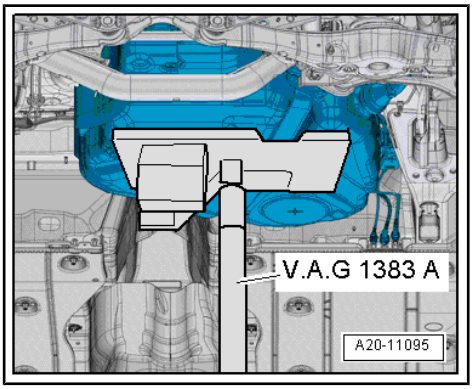
Mark the fitting position of the tensioning strap before removal.

– Release fixing screw -4-.
– Remove bracket for exhaust system.
– Unscrew holding down bolt -2- and remove tensioning strap.



– As shown in the illustration, place the engine and gearbox jack - V.A.G 1383 A- under the vehicle for support purposes and support the fuel tank.

– Unscrew the securing bolts -1 and 3-.



Note

The following work step needs a second mechanic.

– Lower fuel tank by pivoting it in the side downwards.

– At the same, unscrew the fuel filler neck using a second mechanic.

Install

– Check both earth connections for corrosion, if necessary remove corrosion.

– Check the fitting position of the earth lead ⇒ page 192 .

– 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 1383 A- .

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.

1.5 Removing and installing the fuel tank

For vehicles with four-wheel drive

Special tools and workshop equipment required

- Engine and gearbox jack , e.g. -V.A.G 1383 A-
- 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 ⇒ page 194 .

Removing

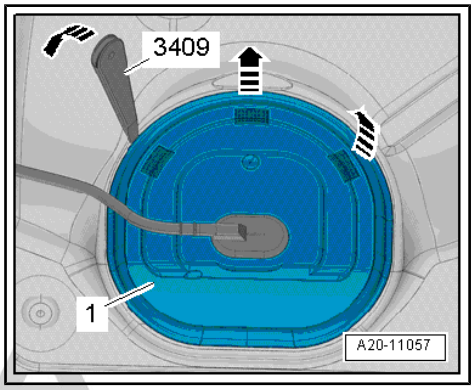
Note

- *Safety precautions when working on the fuel supply system ⇒ page 3 .*
- *Rules of cleanliness when working on the fuel supply system ⇒ page 5 .*

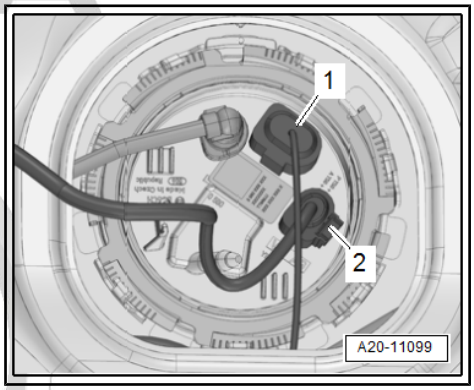
– Switch off ignition and all electrical loads, and pull out ignition key.

– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

– Unclip cover -1- for the right closing flange using the disassembly wedge - 3409- from the uptake -arrows-.



– Disconnect plug connection -2- at the closing flange.



Note

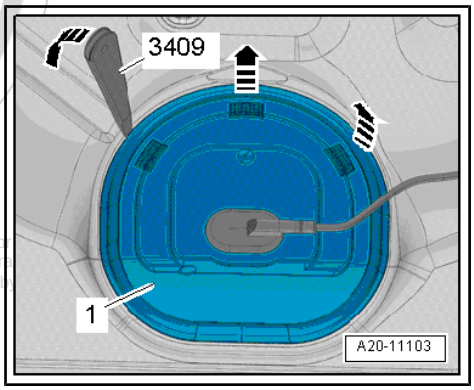
Do not pay attention to the position -1-.

Vehicles with auxiliary heating

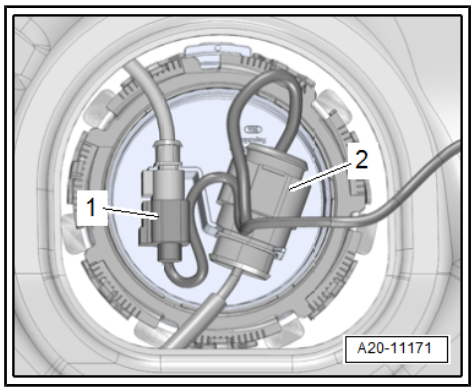
– Disconnect plug connection for auxiliary heating dosing pump.

Continued for all vehicles

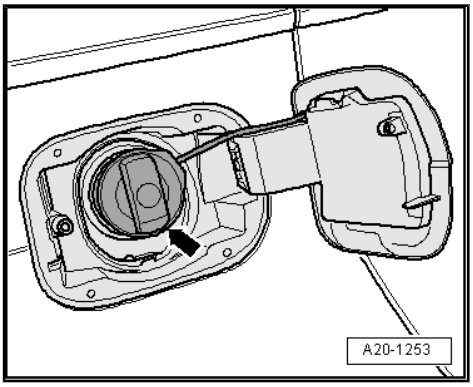
– Unclip cover -1- for the left closing flange using the disassembly wedge - 3409- from the uptake -arrows-.



– Disconnect the plug connection -1- for the Haldex coupling.
– Disconnect plug connection -2- at the closing flange.
– Open the fuel-tank lid unit.
– Clean the area around the fuel filler neck.



– Unscrew cap -arrow- from fuel filler neck.



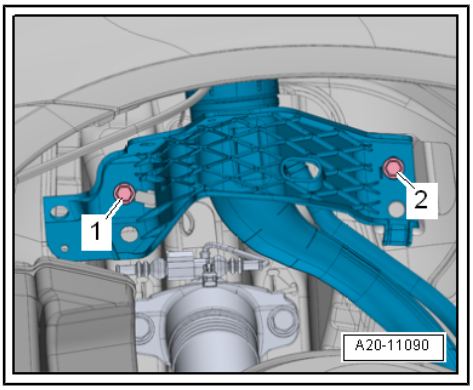
Note

Close the opening of the fuel filler neck with a clean cloth so that no dirt can penetrate.

– Removing the rear right wheel.

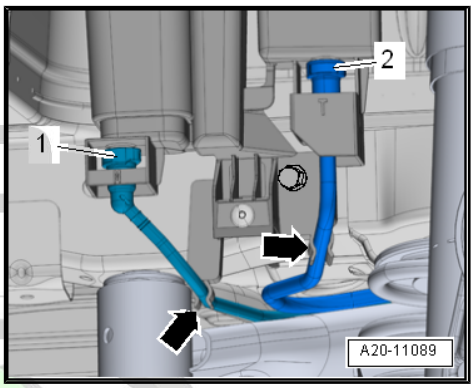
– Remove the rear right wheelhouse liner ⇒ Body Work ⇒ Rep. gr. 66 .

– Unscrew screws -1 and 2- for fuel filler neck.



– Disconnect ventilation lines -1 and 2- at activated charcoal filter ⇒ page 223 .

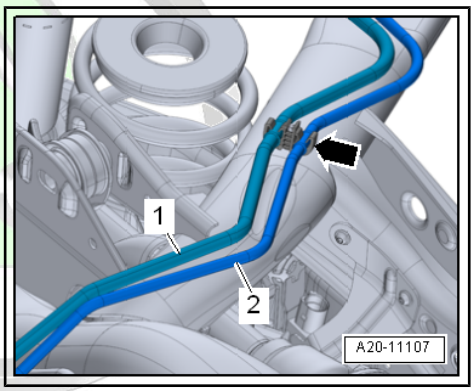
– Loosen ventilation lines from fasteners on the holder -arrows-.



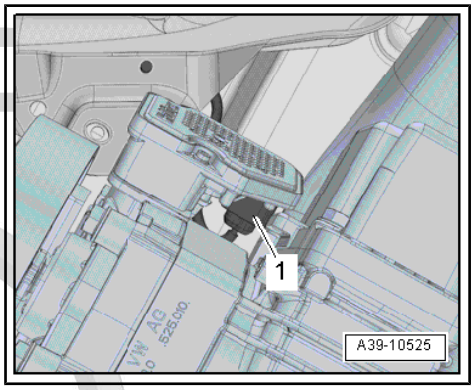
– Loosen ventilation line -1 and 2- from fastener on the holder -arrow-.

– Remove the rear silencer ⇒ page 306 .

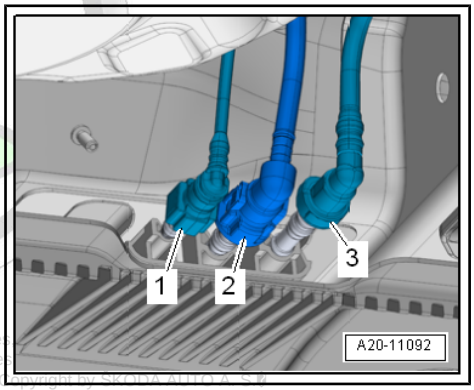
– Remove propshaft ⇒ Final drive - differential gear; Rep. gr. 39 .



– Disconnect the plug connection -1- for the Haldex coupling.
– Remove underfloor trim panel ⇒ Body Work; Rep. gr. 66 .



– Disconnect vent line -3- and fuel line -2- ⇒ page 223 .



Note

For vehicles with auxiliary heating, the fuel line -1- for the dosing pump - V54- must also be disconnected ⇒ page 223 .

WARNING

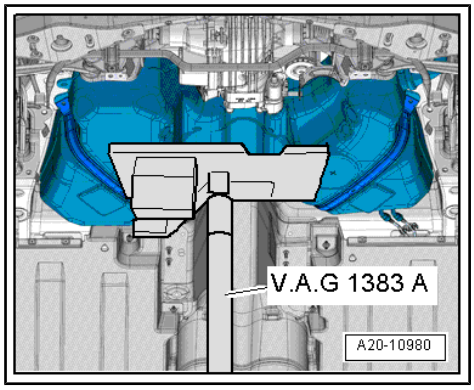
Risk of accident from fuel tank weight.

The fuel tank must be empty for removal.

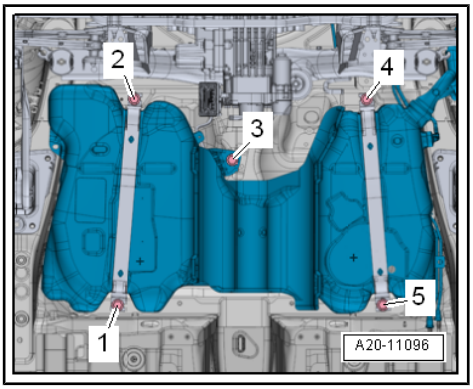
Note

The following work step needs a second mechanic.

– As shown in the illustration, place the engine and gearbox jack - V.A.G 1383 A- under the vehicle for support purposes and support the fuel tank.
– At the same time, with the aid of a second mechanic, support the fuel tank at the rear edge.



– Remove the securing bolts -1...5-.



Note

To provide a clearer illustration, the fuel tank is shown without the engine and gearbox jack - V.A.G 1383 A- .

– Lower fuel tank by pivoting it in the side downwards.

– At the same, unscrew the fuel filler neck using a second mechanic.

Install

– Check both earth connections for corrosion, if necessary remove corrosion.

– Check the fitting position of the earth lead ⇒ page 192 .

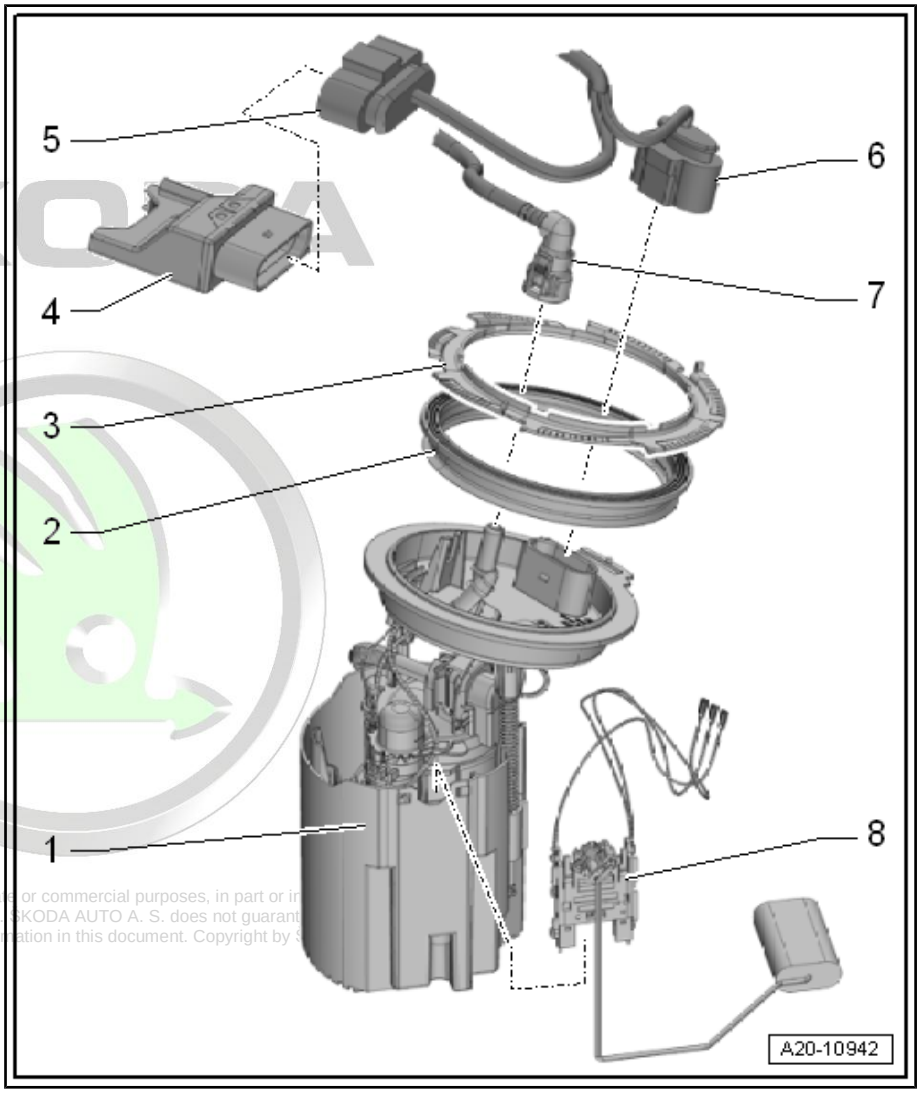
– Guide the filler neck between body and rear axle with the assistance of a 2nd mechanic. Then position the fuel tank onto the engine/gearbox jack - V.A.G 1383 A- .

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.

1.6 Fuel delivery unit and sender for fuel gauge display - Summary of components

For vehicles with front-wheel-drive



1 - Fuel delivery unit

- ❑ with fuel system pressurisation pump -G6-
- ❑ with integrated fuel filter, the fuel filter cannot be replaced individually
- ❑ Checking electric fuel pump ⇒ Vehicle diagnostic tester
- ❑ removing and installing ⇒ page 206
- ❑ Fill the vehicle with at least 5 litres of fuel after installing

2 - Sealing ring

- ❑ replace
- ❑ install when dry

3 - Lock ring, 110 Nm

- ❑ loosen and/or tighten using wrench - T30101 (3087)-

4 - Fuel pump control unit - J538-

- ❑ removing and installing ⇒ page 221

5 - Connector

- ❑ For fuel pump control unit - J538-
- ❑ Ensure safe locking by pulling

6 - Connector

- ❑ for fuel pump for predelivery system - G6- and sender for fuel gauge display - G-
- ❑ Ensure safe locking by pulling

7 - Fuel feed line

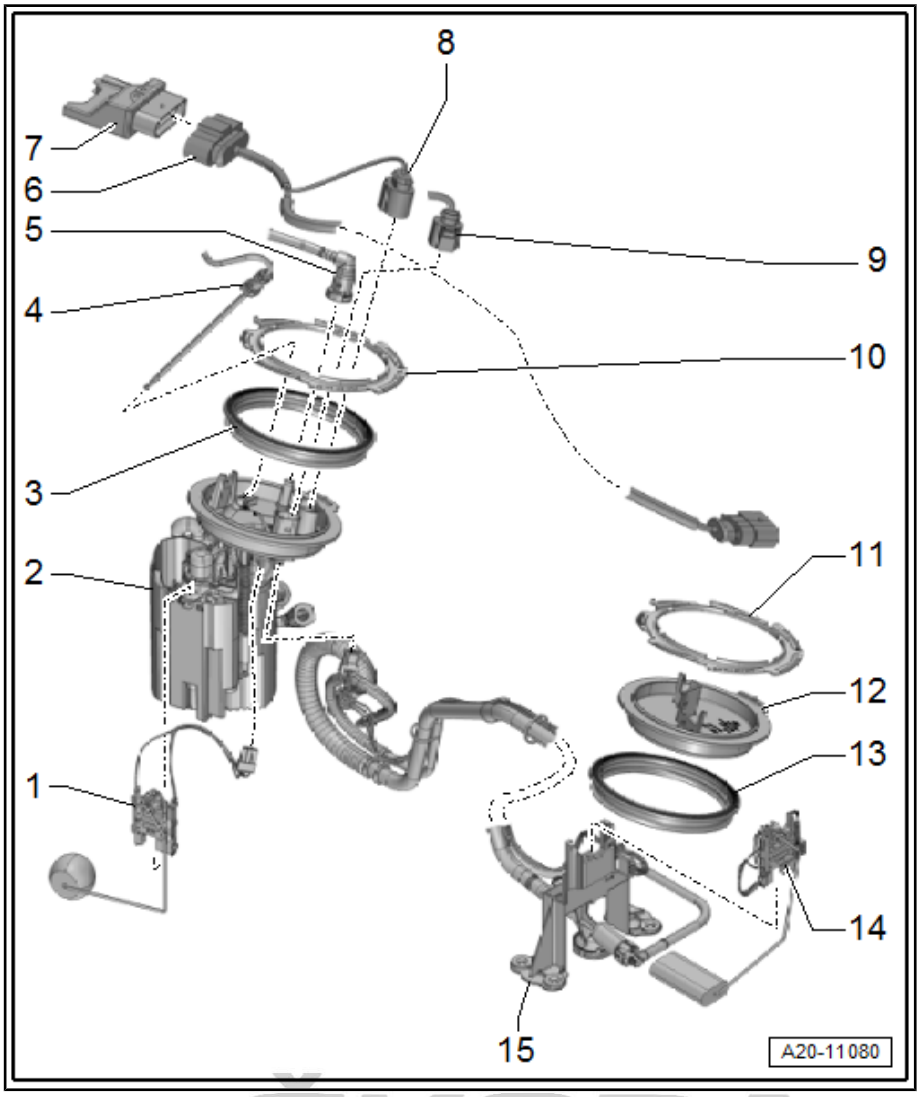
- ❑ to the engine
- ❑ do not kink
- ❑ disconnect and connect ⇒ page 223

8 - Fuel gauge sender - G-

- ❑ Run the electrical test on the fuel pump control unit - J538- ⇒ Vehicle diagnostic tester
- ❑ removing and installing ⇒ page 213

1.7 Fuel delivery unit and sender for fuel gauge display - Summary of components

For vehicles with four-wheel drive



1 - Fuel gauge sender - G-

- ❑ Run the electrical test on the fuel pump control unit - J538- ⇒ Vehicle diagnostic tester
- ❑ removing and installing ⇒ page 213

2 - Fuel delivery unit

- ❑ with fuel system pressurisation pump -G6-
- ❑ with integrated fuel filter, the fuel filter cannot be replaced individually
- ❑ Checking electric fuel pump ⇒ Vehicle diagnostic tester
- ❑ removing and installing ⇒ page 209
- ❑ Fill the vehicle with at least 5 litres of fuel after installing

3 - Sealing ring

- ❑ replace
- ❑ install when dry

4 - Fuel line

- ❑ to auxiliary heating
- ❑ do not kink
- ❑ removing and installing ⇒ page 209

5 - Fuel feed line

- ❑ to the engine
- ❑ do not kink
- ❑ disconnect and connect ⇒ page 223

6 - Connector

- ❑ For fuel pump control unit - J538-
- ❑ Ensure safe locking by pulling

7 - Fuel pump control unit - J538-

- ❑ check ⇒ Vehicle diagnostic tester
- ❑ removing and installing ⇒ page 221

8 - Connector

- ❑ for fuel pump for predelivery system - G6- and sender for fuel gauge display - G-
- ❑ Ensure safe locking by pulling

9 - Connector

- ❑ for sender for fuel gauge display - G- and fuel gauge sender 2 - G169-
- ❑ Ensure safe locking by pulling

10 - Lock ring, 110 Nm

- ❑ loosen and/or tighten using wrench - T30101 (3087)-

11 - Lock ring, 110 Nm

- ❑ loosen and/or tighten using wrench - T30101 (3087)-

12 - Closing flange

- ❑ removing and installing ⇒ page 214

13 - Sealing ring

- ❑ replace
- ❑ install when dry

14 - Fuel gauge sender 2 - G169-

- ❑ run an electrical test ⇒ Vehicle diagnostic tester
- ❑ removing and installing ⇒ page 214

15 - Uptake with suction jet pump

- ❑ not available as spare part
- ❑ welded with the fuel tank
- ❑ Function of the suction jet pump ⇒ page 222

1.8 Removing and installing fuel delivery unit with sender for fuel gauge display - G-

For vehicles with front-wheel-drive

Special tools and workshop equipment required

- ♦ Disassembly wedge - 3409-
- ♦ Key - T30101 (3087)-

Removing

- The fuel tank must not be more than $^{3}/_{4}$ full.

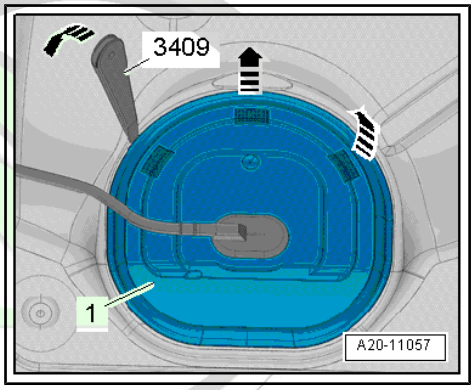
Note

- ♦ *If necessary, extract fuel from the fuel tank ⇒ page 194 .*
- ♦ *Observe the safety instructions before starting fitting work ⇒ page 3 .*
- ♦ *Observe rules for cleanliness ⇒ page 5 .*

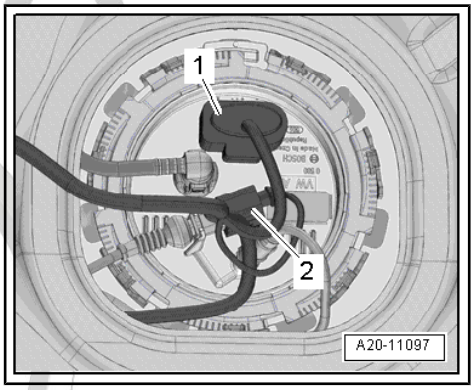
– Switch off ignition and all electrical loads, and pull out ignition key.

– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

– Unclip cover -1- for closing flange using the disassembly wedge - 3409- from the uptake -arrows-.



– Disconnect plug connection -1- at fuel pump.



Vehicles with auxiliary heating

– Disconnect plug connection -2- from auxiliary heating dosing pump.

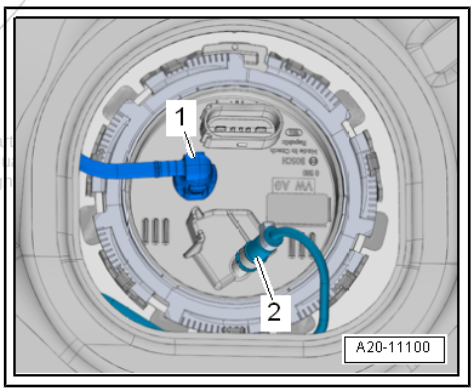
Continued for all vehicles

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.

– Disconnect fuel line -1- at the closing flange ⇒ page 223



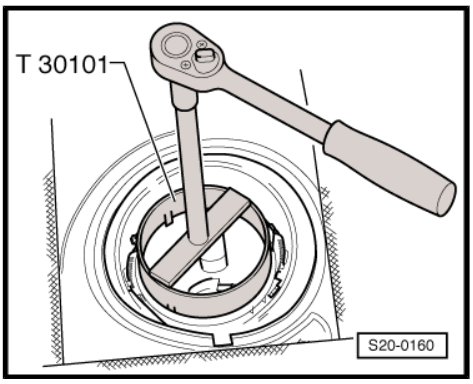
Vehicles with auxiliary heating

– Loosen hose clamp, fuel line -2- to the dosing pump for the auxiliary heating from the closing flange.

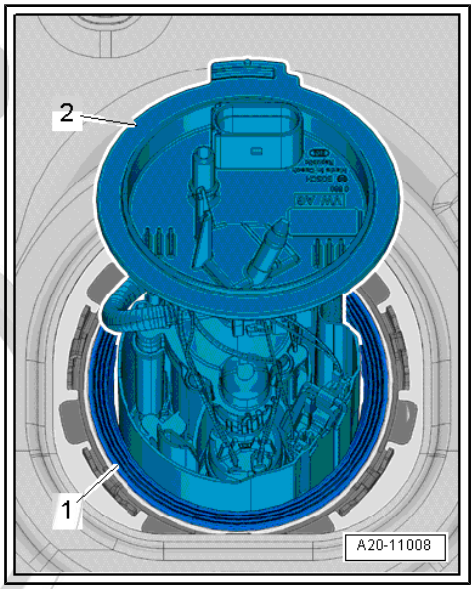
Continued for all vehicles

– Open lock ring with the wrench - T30101 (3087)- .

– 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 delivery unit before disposing of it if you wish to replace the fuel delivery unit.*

– 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.

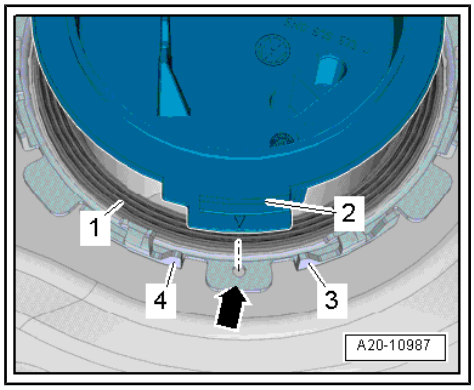
Caution

Risk of leakage.

The gasket ring must not get damaged or squashed when inserting the sealing flange.

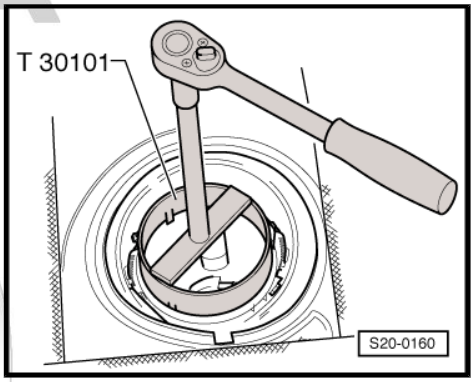
– Press down the closing flange against the spring force and bring it into the installation position.

• 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.



– Insert lock ring and tighten using the wrench - T30101 (3087)- .

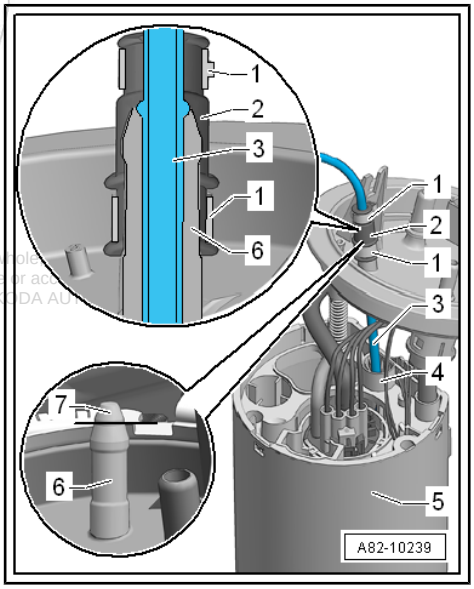
– Connect fuel lines ⇒ page 223 .



Vehicles fitted with auxiliary heating

– When the fuel delivery unit was replaced, disconnect the cover -7- from the removal connection -6- at the marked isolating points and insert the standpipe -3- into the room -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. However, pay attention to the following:

– After installing the fuel delivery unit, refuel with at least 5 litres of fuel.

1.9 Removing and installing fuel delivery unit with sender for fuel gauge display - G-

For vehicles with four-wheel drive

Special tools and workshop equipment required

- Disassembly wedge - 3409-
- Key - T30101 (3087)-

Removing

- The fuel tank must not be more than $^{3}/_{4}$ full.

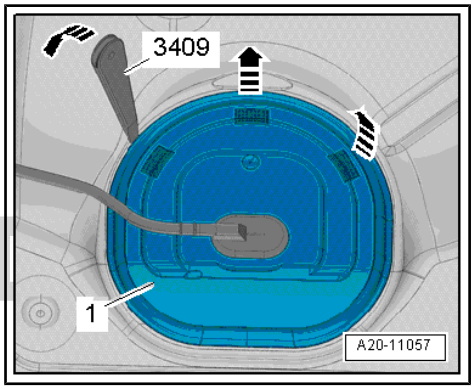
Note

- *If necessary, extract fuel from the fuel tank ⇒ page 194 .*
- *Observe the safety instructions before starting fitting work ⇒ page 3 .*
- *Observe rules for cleanliness ⇒ page 5 .*

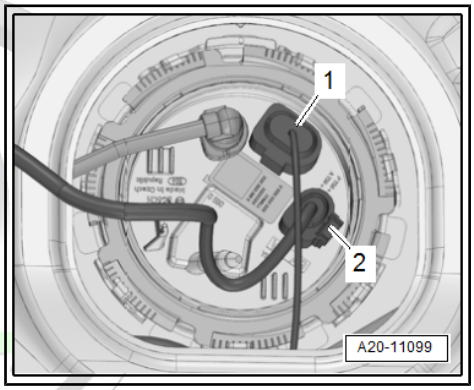
– Switch off ignition and all electrical loads, and pull out ignition key.

– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

– Unclip cover -1- for the right closing flange using the disassembly wedge - 3409- from the uptake -arrows-.



– Disconnect plug connections -1 and 2- at fuel pump.



Vehicles with auxiliary heating

– Disconnect plug connection for auxiliary heating dosing pump.

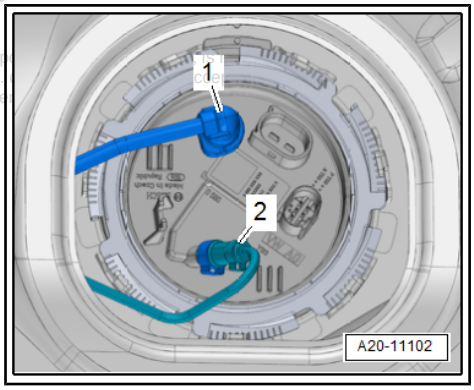
Continued for all vehicles

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.

– Disconnect fuel line -1- at the closing flange ⇒ page 223

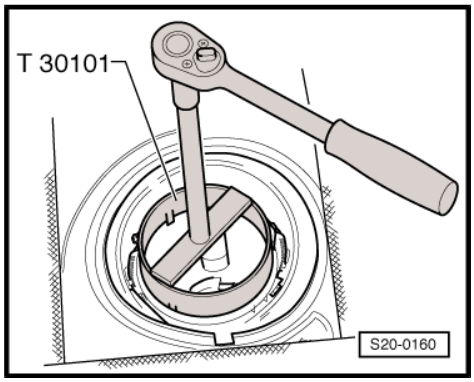


Vehicles with auxiliary heating

– Loosen hose clamp, fuel line -2- to the dosing pump for the auxiliary heating from the closing flange.

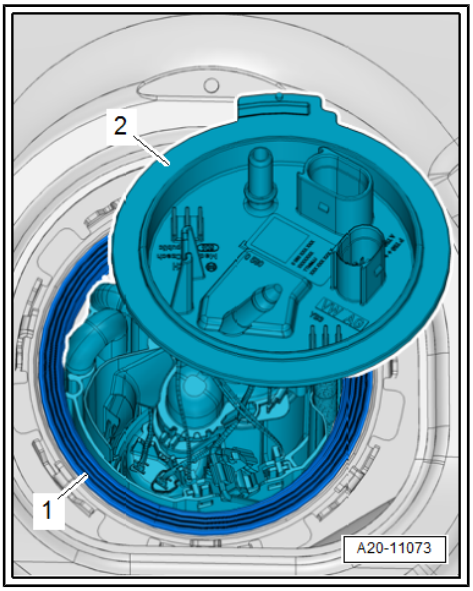
Continued for all vehicles

– Open lock ring with the wrench - T30101 (3087)- .



– Pull sealing flange -2- carefully out of the fuel tank opening.

– Remove sealing ring -1- from fuel tank opening.

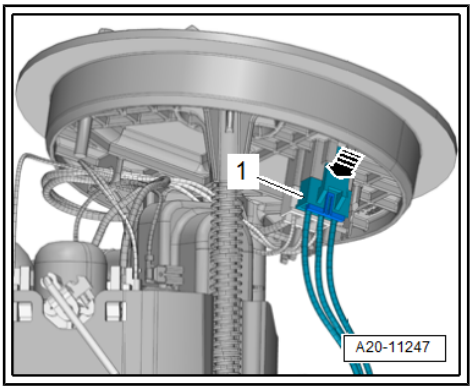


WARNING

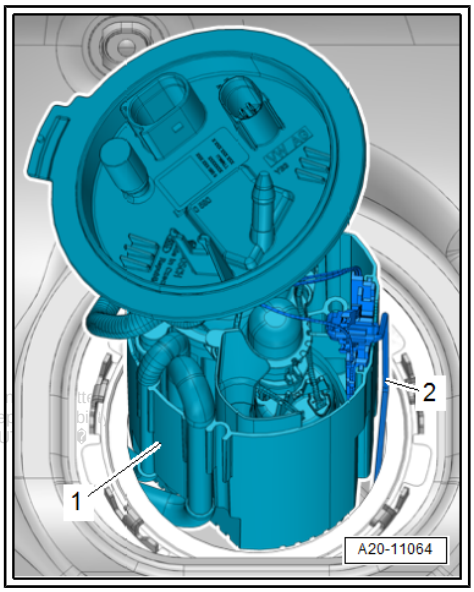
Beware of fuel flowing out of the fuel pump that is still full - accident hazard.

Put cleaning cloth underneath to collect fuel.

– Unlock the catch -arrow- and disconnect the plug connection -1- from the closing flange.



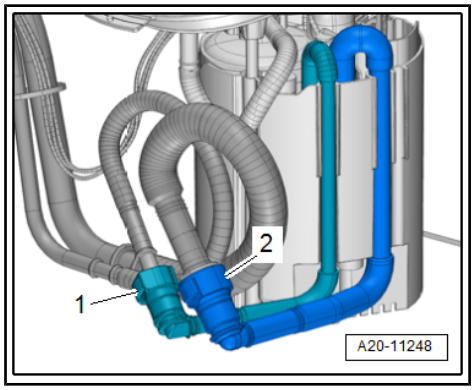
– Pull fuel delivery unit -1- with the fuel gauge sender - G- -2- carefully out of the fuel tank opening by turning and tilting as appropriate.



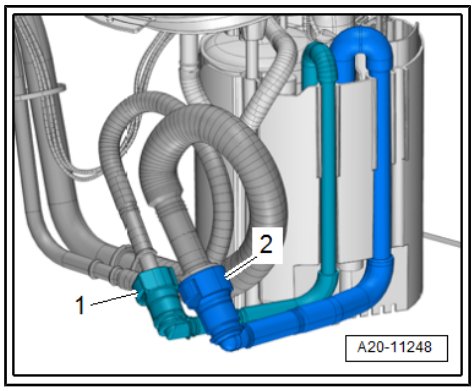
Note

- *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 delivery unit before disposing of it if you wish to replace the fuel delivery unit.*

– Pull the fuel lines out of the fuel tank opening.



– Press the unlocking on the connecting piece and remove fuel feed lines -1 and 2- .



Install

Further installation occurs in reverse order. However, pay attention to the following:

- Replace gasket ring.
- Make sure the hoses fit tightly.
- When connecting the connectors, make sure the locking is correct.

– 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.

Caution

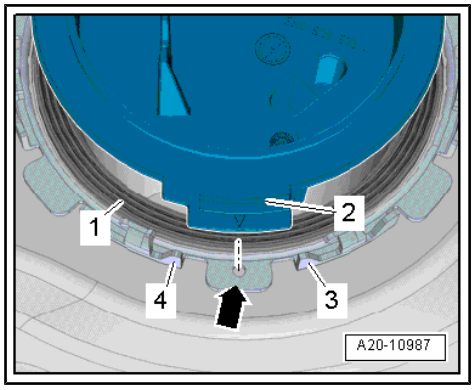
Risk of leakage.

The gasket ring must not get damaged or squashed when inserting the sealing flange.

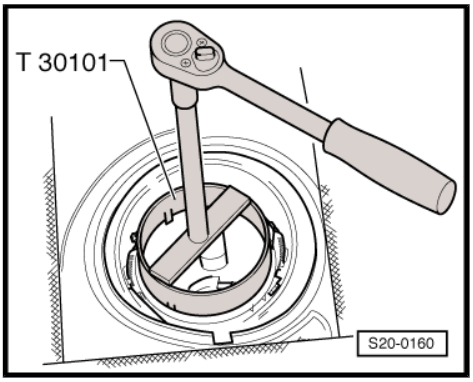
– Insert the fuel delivery unit into the fuel tank in such a way that the float arm of the sender for the fuel gauge display - G- is not bent.

– Press down the closing flange against the spring force and bring it into the installation position.

• 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.



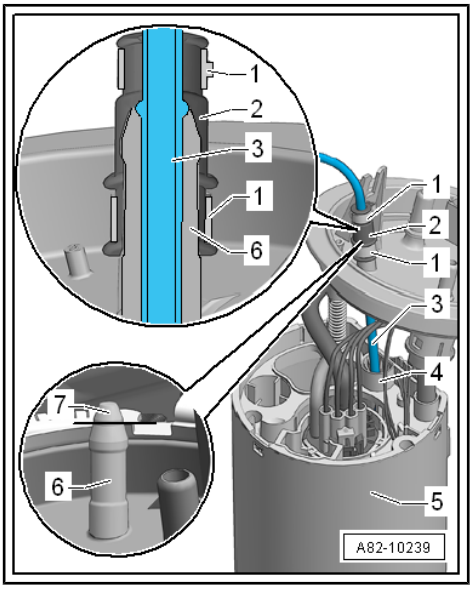
– Insert lock ring and tighten using the wrench - T30101 (3087)- .



– Connect fuel lines ⇒ page 223 .

Vehicles fitted with auxiliary heating

– When the fuel delivery unit was replaced, disconnect the cover -7- from the removal connection -6- at the marked isolating points and insert the standpipe -3- into the room -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

– After installing the fuel delivery unit, refuel with at least 5 litres of fuel.

1.10 Removing and installing the sender for fuel gauge display - G-

Removing

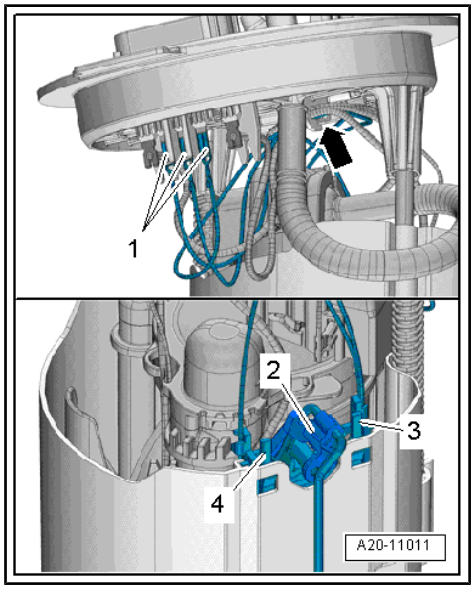
– Observe safety instructions ⇒ page 3 .

– Observe rules for cleanliness ⇒ page 5 .

For vehicles with front-wheel-drive

– Remove fuel delivery unit ⇒ page 206 .

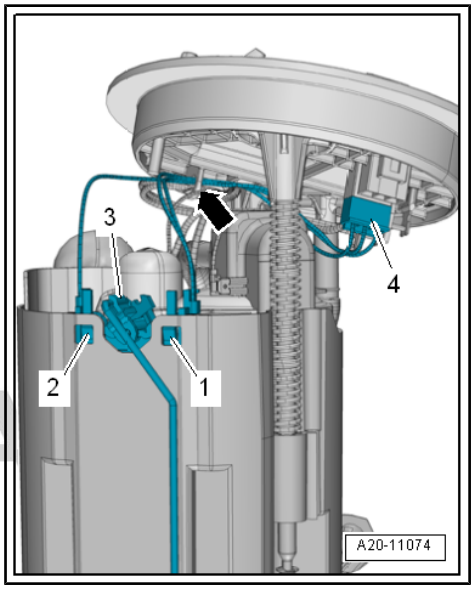
– Disconnect plug connections -1- on the closing flange, thereby unlocking the plug lock.
– Unhook the electric cable from the holder -arrow- and expose it.
– Unlock catches on uptake clamps -3 and 4- and at the same time pull the sender for fuel gauge display - G- -2- upwards.



For vehicles with four-wheel drive

Remove fuel delivery unit ⇒ page 209 .

– Disconnect plug connection -4- on the closing flange, thereby unlocking the plug lock.
– Unhook the electric cable from the holder -arrow- and expose it.
– Unlock catch on uptake clamps -1 and 2- and at the same time pull the sender for fuel gauge display - G- -3- upwards.



Install

Installation is carried out in the reverse order. However, 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.

1.11 Removing and installing fuel gauge sender 2 - G169-

For vehicles with four-wheel drive

Special tools and workshop equipment required

- Disassembly wedge - 3409-
- Key - T30101 (3087)-

Removing

- The fuel tank must not be more than $^{3}/_{4}$ full.

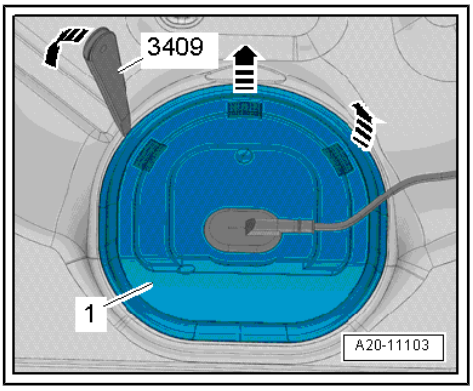
Note

- *If necessary, extract fuel from the fuel tank ⇒ page 194 .*
- *Observe the safety instructions before starting fitting work ⇒ page 3 .*
- *Observe rules for cleanliness ⇒ page 5 .*

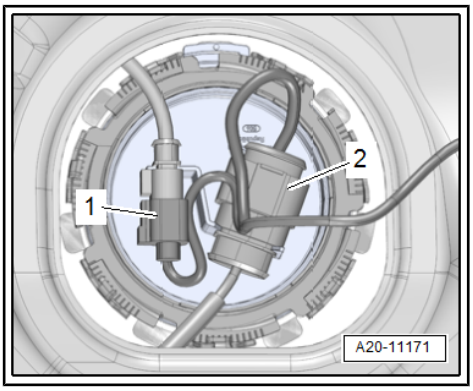
– Switch off ignition and all electrical loads, and pull out ignition key.

– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

– Unclip cover -1- for the left closing flange using the disassembly wedge - 3409- from the uptake -arrows-.



– Disconnect plug connections -1 and 2- at fuel pump.

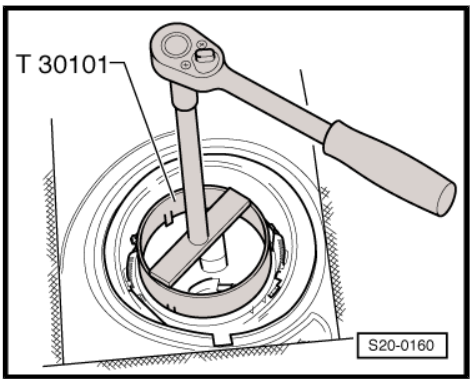


– Open lock ring with the wrench - T30101 (3087)- .

WARNING

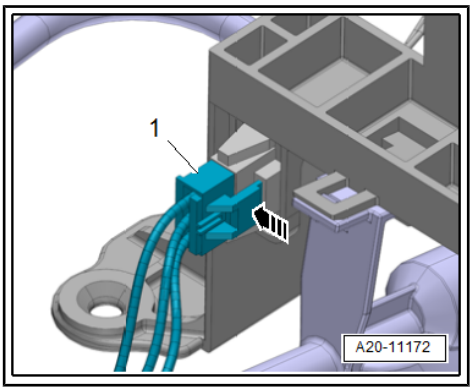
Beware of fuel flowing out of the fuel pump that is still full - accident hazard.

Put cleaning cloth underneath to collect fuel.



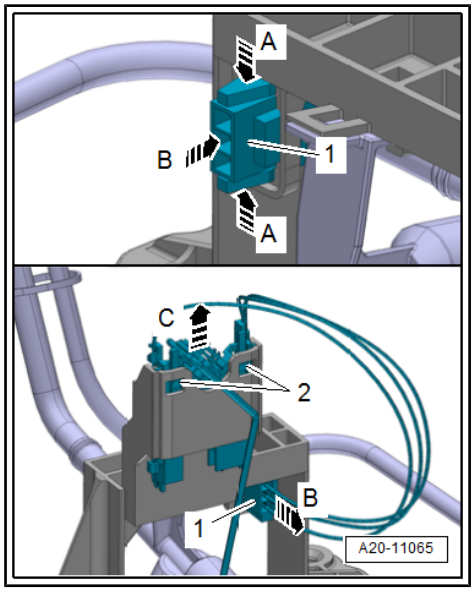
– Pull closing flange and the gasket ring out of the fuel tank opening.

– Insert the hand into the fuel tank opening, unlock the connector lock -arrow- and remove the connector -1-.



– Unlock the plug fuse -arrows A- in the fuel tank opening, and press out the connector -1- from the holder -arrow B-.

– Unlock the catches -2- and pull out the fuel gauge sender 2 - G169- upwards -arrow C-.



Install

Installation is carried out in the reverse order. However, pay attention to the following:

- ♦ Replace gasket ring.
- ♦ When connecting the connectors, make sure the locking is correct.

– Insert the fuel gauge sender 2 - G169- into the line on the mounting bracket and press downwards until it audibly clicks into place.

– Connect all electric cables to fuel delivery unit.

– 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.

Caution

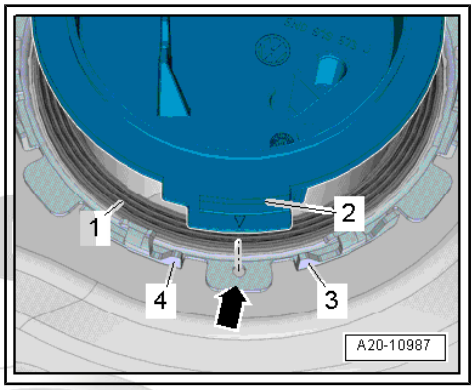
Risk of leakage.

The gasket ring must not get damaged or squashed when inserting the sealing flange.

– Bring closing flange into the fitting position.

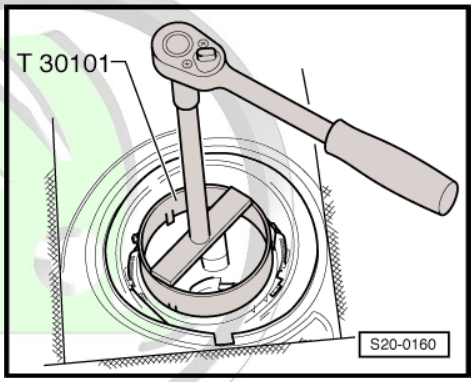
• Clutch -2- on closing flange must point to opening -arrow- on the lock ring and be located between tabs -3 and 4- on the fuel tank.

– Press the closing flange downwards against the coil spring compressor.



– Insert lock ring and tighten using the wrench - T30101 (3087)- .

Further installation occurs in reverse order.



1.12 Check fuel delivery unit

Special tools and workshop equipment required

- ♦ Pressure gauge , e.g. -VAS 6550-

- Remote control , e.g. -V.A.G 1348/3A- with adapter cable , e.g. -V.A.G 1348/3-3 -
- Auxiliary measuring set - V.A.G 1594/C-
- Handheld multimeter - V.A.G 1526C-
- Disassembly wedge - 3409-
- Measuring vessel

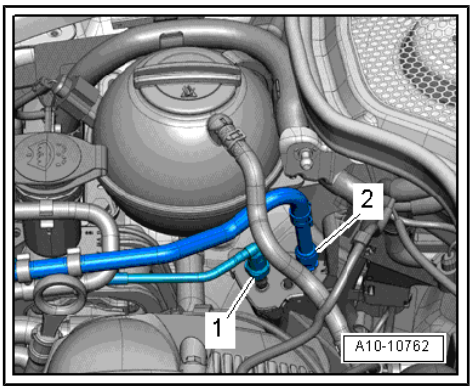
1.12.1 Checking fuel pressure

Note

- *Safety precautions when working on the fuel supply system* ⇒ page 3 .
- *Rules of cleanliness when working on the fuel supply system* ⇒ page 5 .
- *Test conditions when working on the fuel supply system* ⇒ page 5 .

– Remove high pressure pipe -2- ⇒ page 223 .

– Connect pressure tester - VAS 6550- to fuel supply line with adapter - VAS 6550/2- .

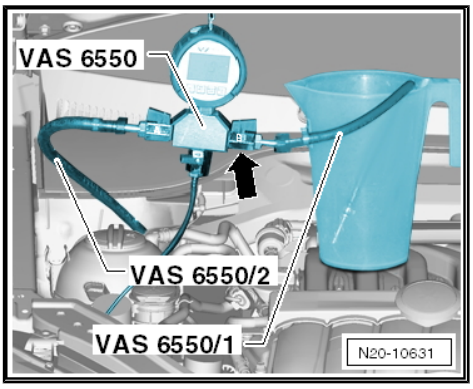


– Fit hose line - VAS 6550/1- and keep in a fuel-resistant measuring vessel.

Caution

Risk of fuel dripping out.

- ***Make sure that the shut-off tap -C- is closed.***
- ***Lever points in the direction of flow.***



– Open shut-off taps -A and B-.

– Switch on ignition until bubble-free fuel flows out.

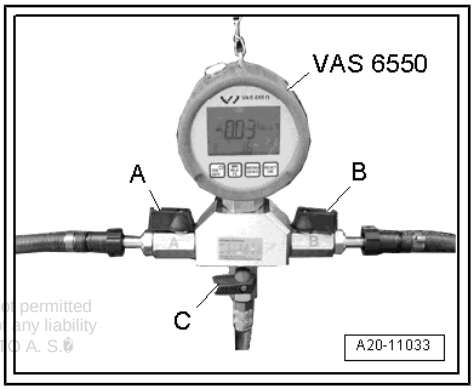
– Close shut-off tap -B- to will build fuel pressure.

– Read off fuel pressure on pressure gauge.

• Specified value: 0.35…0.7 MPa (3.5…7 bar)

If the specification is not attained:

– Perform fuel delivery quantity check ⇒ page 219 .



1.12.2 Testing holding pressure

Note

- *Safety precautions when working on the fuel supply system* ⇒ page 3 .
- *Rules of cleanliness when working on the fuel supply system* ⇒ page 5 .
- *Test conditions when working on the fuel supply system* ⇒ page 5 .

– Check leaktightness and while doing so observe pressure drop at pressure gauge - VAS 6550- .

- The pressure must not drop below 0.3 MPa (3 bar) after 10 minutes.

If the pressure again falls below 0.3 MPa (3 bar):

- Check line connections between pressure gauge - VAS 6550- and fuel feed line for leaktightness.
- Check pressure gauge - VAS 6550- for leaks.
- Check fuel lines and its connections for tightness.

If no fault is found:

- Non-return valve in the fuel delivery unit is leaking:

– Replace fuel delivery unit:

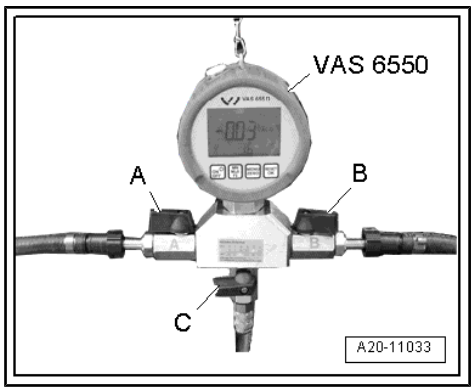
- Vehicles with front-wheel drive ⇒ page 206
- Vehicles with four-wheel drive ⇒ page 209

Assembly is carried out in the reverse order. When installing, observe the following:

- Ignition must be switched off.

Note

Reduce fuel pressure before removing the pressure gauge, while doing so open the shut-off tap -C- and let the fuel drain into the measuring vessel.



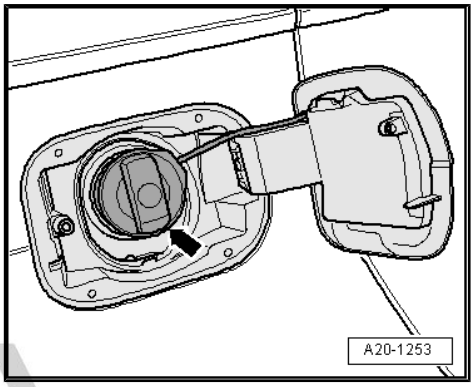
1.12.3 Checking fuel delivery rate

Note

- *Safety precautions when working on the fuel supply system* ⇒ page 3 .
- *Rules of cleanliness when working on the fuel supply system* ⇒ page 5 .
- *Test conditions when working on the fuel supply system* ⇒ page 5 .

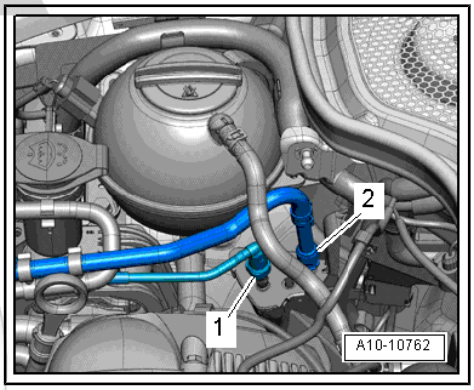
– Open the fuel-tank lid unit.

– Unscrew cap -arrow- from fuel filler neck.



– Remove high pressure pipe -2- ⇒ page 223 .

– Connect pressure tester - VAS 6550- to fuel supply line with adapter - VAS 6550/2- .

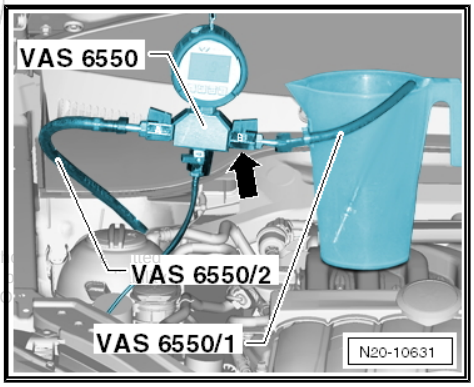


– Fit hose line - VAS 6550/1- and keep in a fuel-resistant measuring vessel.

Caution

Risk of fuel dripping out.

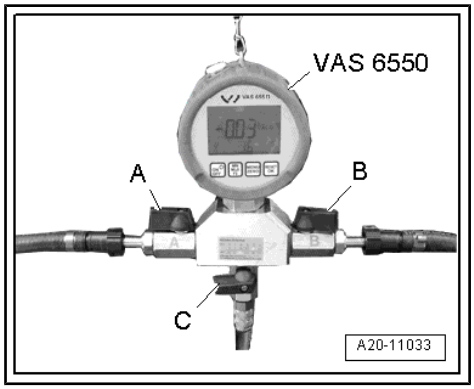
- ***Make sure that the shut-off tap -C- is closed.***
- ***Lever points in the direction of flow.***



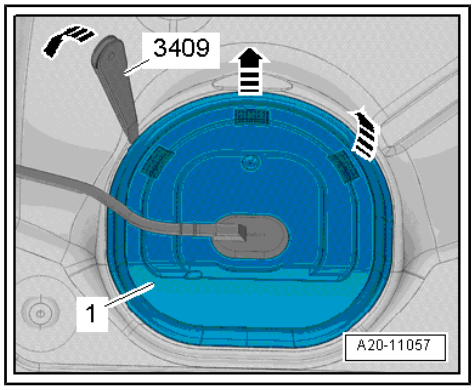
– Open shut-off taps -A and B-.

• The levers are housed in the flow direction.

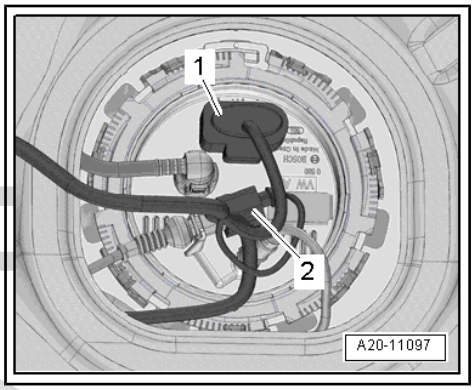
– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .



– Loosen catch pegs -arrows- of the cover -1- with disassembly wedge - 3409- and remove the cover.



– Disconnect plug connection -1- at the closing flange.



Note

Do not pay attention to the position -2-.

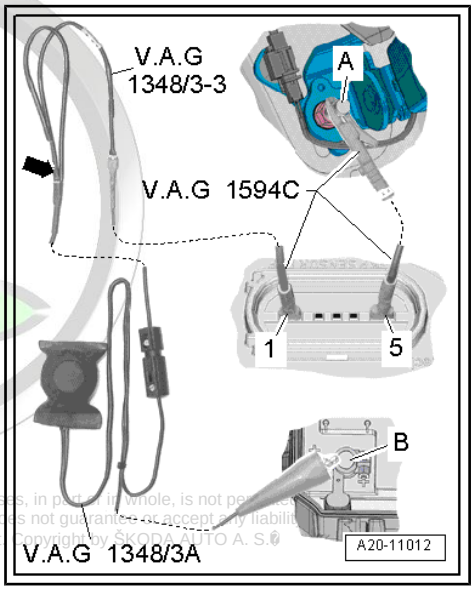
– Connect the remote control to the V.A.G 1348 - V.A.G 1348/3- on the connector and fuel pump.

– Connect remote control - V.A.G 1348/3A- with adapter line - V.A.G 1348/3-3- and with the line of the adapter set - V.A.G 1594/C- to contact -1-.

– Mask second plug contact of the adapter - V.A.G 1348/3-3- with short-circuit proof tape -arrow-.

– Connect contact -5- with line of auxiliary measuring set - V.A.G 1594/C- to body mass -A-.

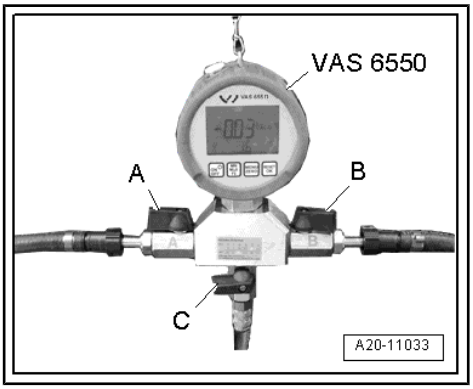
– Connect alligator clips to the positive terminal “+” -B- of the battery.



Note

Primary pressure must be built up against which the fuel delivery unit must work when the fuel delivery flow in the fuel line is being measured. This primary pressure is set as follows using pressure gauge VAS 6550:

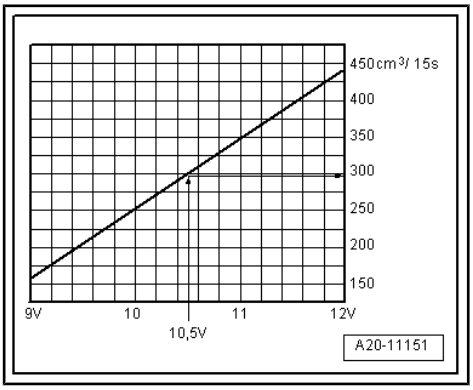
– Operate remote control - V.A.G 1348/3A - . While doing this, slowly close the shut-off tap -B- until the pressure gauge displays a pressure of 0.4 MPa (4 bar). From this point on do not move position of shut-off tap.



– Empty measuring glass.

– Activate remote control for 15 seconds.

– Compare fuel quantity delivered with minimum flow quantity in the diagram cm^3/15s.



Note

Voltage at the fuel pump when engine is not running and pump is approximately 2 volts less than battery voltage.

If the minimum delivery volume is not reached, it can be caused by the following faults:

- Fuel lines squashed.
- The fuel filter is clogged.
- The fuel pressure sender is defective.
- Fuel delivery unit defective.

Installation is carried out in the reverse order.

1.13 Removing and installing fuel pump control unit -J538-

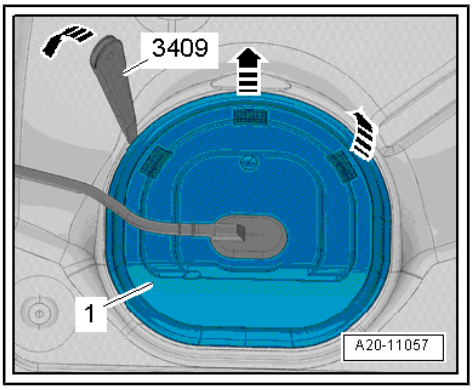
Special tools and workshop equipment required

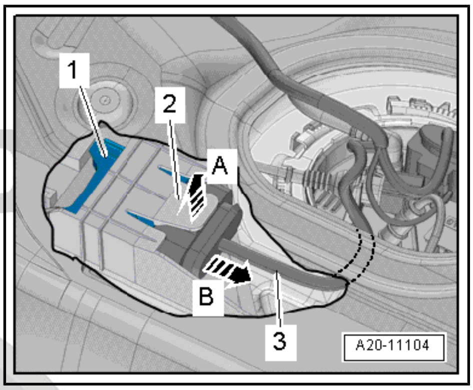
- Disassembly wedge - 3409-

– Switch off ignition and all electrical loads, and pull out ignition key.

– Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

– Unclip cover -1- for the right closing flange using the disassembly wedge - 3409- from the uptake -arrows-.





- 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.

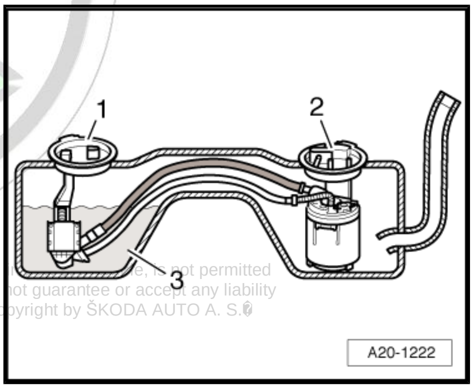
Install

- Push fuel pump control unit - J538- into the uptake and push in until there is an audible click.

Further installation occurs in reverse order.

1.14 Suction spray pump

For vehicles with four-wheel drive



On vehicles with four-wheel drive, the fuel tank consists of a left and right chamber. Supplying fuel from the left half of the fuel tank -3- to the delivery chamber of the fuel delivery unit -2- on the right is the purpose of the socalled suction jet pump -1-.

Fault caused by faulty suction jet pump

> ⚠ Caution
>
> *Vehicle breakdown due to faulty suction jet pump.*
>
> *In the event of a fault to the suction jet pump, the vehicle may brake down due to a lack of fuel even if the fuel tank is up to 1/4 full.*

If the suction jet pump fails to work, up to 15 l of fuel (up to approx. 1/4 content of the tank) will remain in the left-hand area of the fuel tank from where the suction jet pump cannot draw fuel.

If the vehicle remains broken down due to a lack of fuel even if the fuel tank is up to approx. 1/4 full, proceed as follows:

- Inspecting fuel pump ⇒ Vehicle diagnostic tester.

When the fuel delivery unit is OK and the fuel is not drawn in:

- Add around 5 litres of fuel.
- Start engine.

When the engine starts:

- Replace fuel tank ⇒ page 199 .

suction jet pump not for separate delivery

2 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 precautions ⇒ page 3 .*
- *Observe rules for cleanliness ⇒ page 5 .*

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.

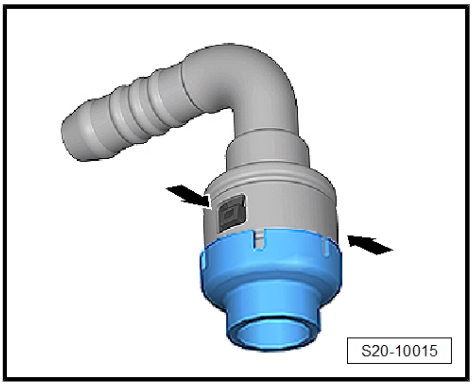
Note

When the push-fit coupling is fitted with a plastic circlip, leave it inserted when removing and installing the quick release.

Variant 1

Quick coupling with release buttons -arrows- on right and left.

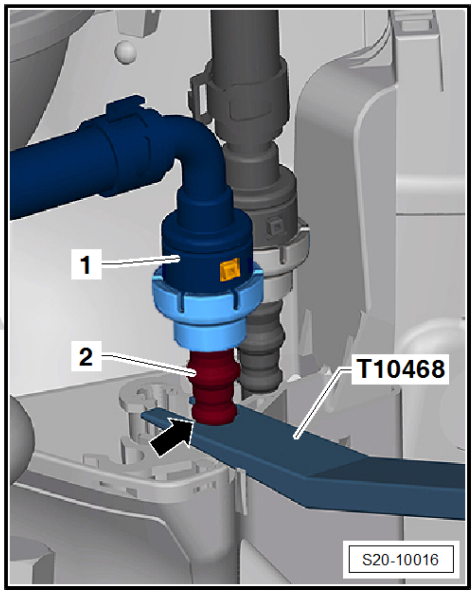
Opening



The separation point -1- in the engine compartment must be held.

– Insert the lever - T10468- between the heat shield and the stop -arrow- of the fuel feed line -2- and hold it.

Continued for all separation points

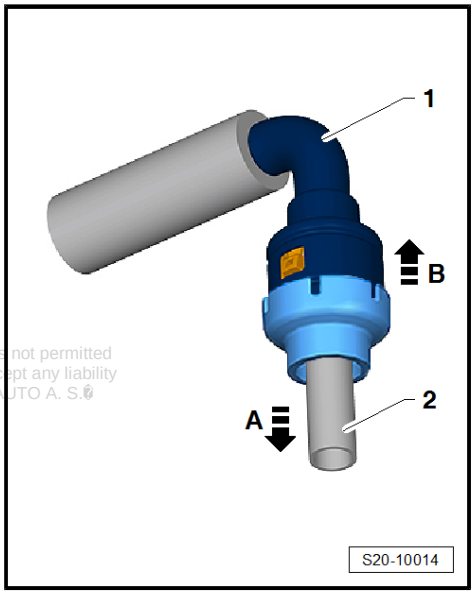


– Push push-on coupling -1- in -direction of arrow A-.

– Press release buttons and pull push-on coupling -1- off fuel line -2- in -direction of arrow B-.

Pay attention to the colour assignment when installing ⇒ page 223 .

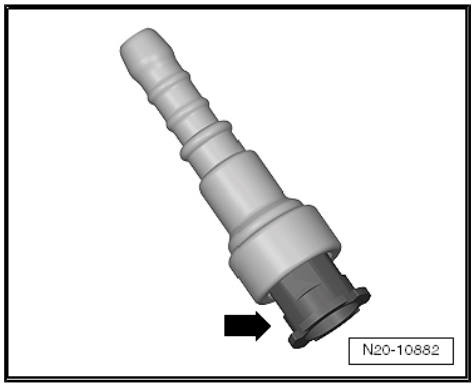
– Check the quick coupling for firm seating by pulling in the opposite direction!



Variant 2

Quick coupling with pull release -arrow-.

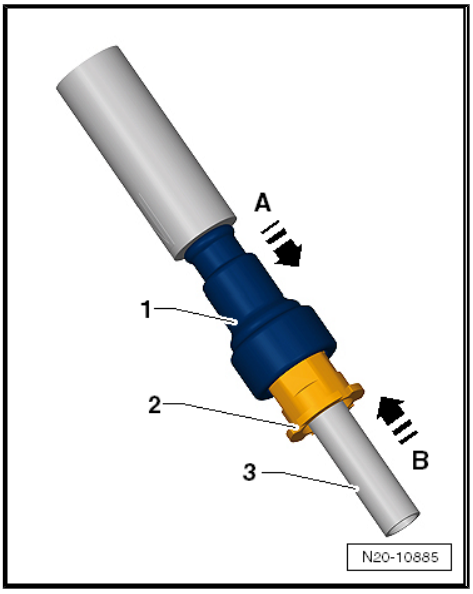
Opening



– Push push-on coupling -1- in -direction of arrow A-.
– Pull pull-release mechanism -2- in -direction of arrow B-.
– Pull push-on coupling -1- off fuel line -3- in -direction of arrow B-.

Pay attention to the colour assignment when installing ⇒ page 223 .

– Check the quick coupling for firm seating by pulling in the opposite direction!



Variant 3

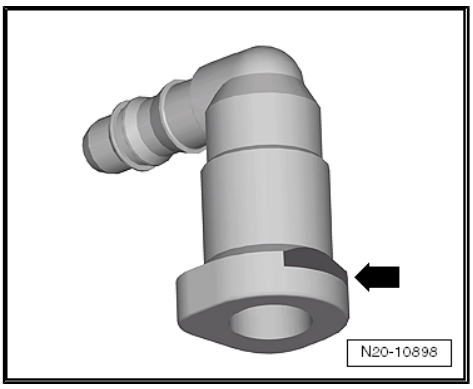
Quick coupling with front release button -arrow-.

Opening

– Press the release button -arrow- and detach the quick coupling.

Pay attention to the colour assignment when installing ⇒ page 223 .

– Check the quick coupling for firm seating by pulling in the opposite direction!



Variant 4

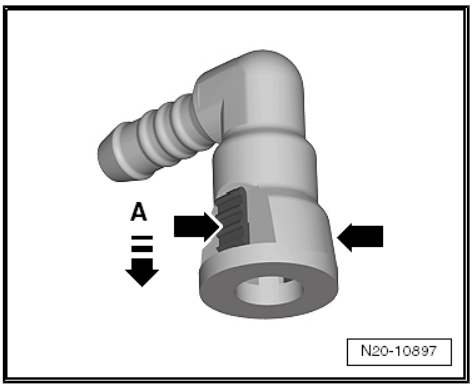
Quick coupling with release buttons -arrows- on right and left.

Opening

– Press push-on 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 223 .

– Check the quick coupling for firm seating by pulling in the opposite direction!



Variant 5

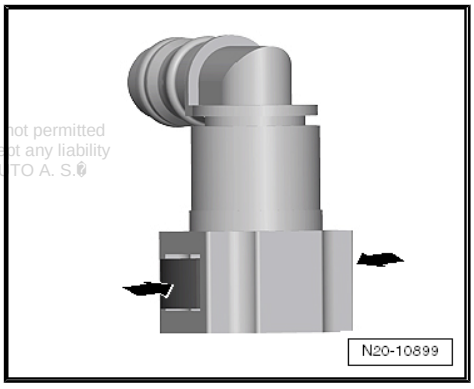
Quick coupling with release buttons -arrows- on right and left.

Opening

– Press release buttons -arrows- and pull push-on coupling off.

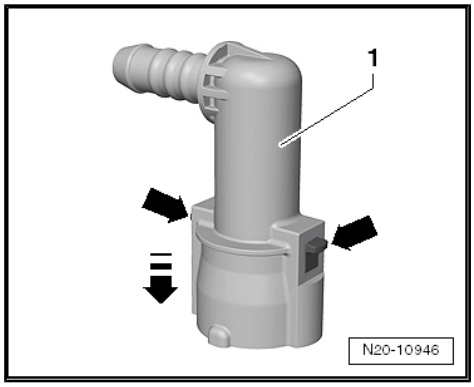
Pay attention to the colour assignment when installing ⇒ page 223 .

– Check the quick coupling for firm seating by pulling in the opposite direction!



Variant 6

Quick coupling with release buttons -arrows- on right and left.



Opening

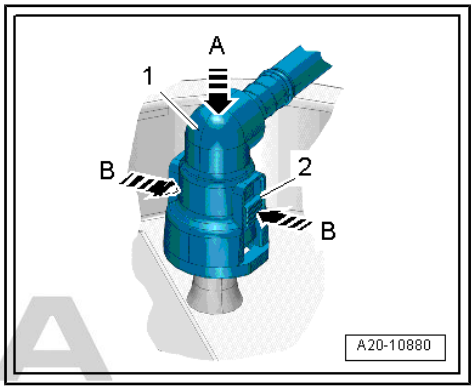
– Press push-on coupling -1- in -direction of arrow- and hold pressed.
– Press release buttons -arrows- and pull push-on coupling off.

Pay attention to the colour assignment when installing
⇒ page 223 .

– Check the quick couplings for firm seating by pulling in the opposite direction!

Variant 7

Quick coupling -1- with release buttons -2- right and left.



Opening

– Press push-on coupling -1- in -arrow direction A- and hold pressed.
– Press release buttons -2- in -arrow direction B- and remove quick coupling- 1-.

Pay attention to the assignment of the colours when installing
⇒ page 223 .

The quick coupling must be heard to click into place.

– Check the quick couplings for firm seating by pulling in the opposite direction!

3 Accelerator pedal

3.1 Accelerator pedal module - Summary of components

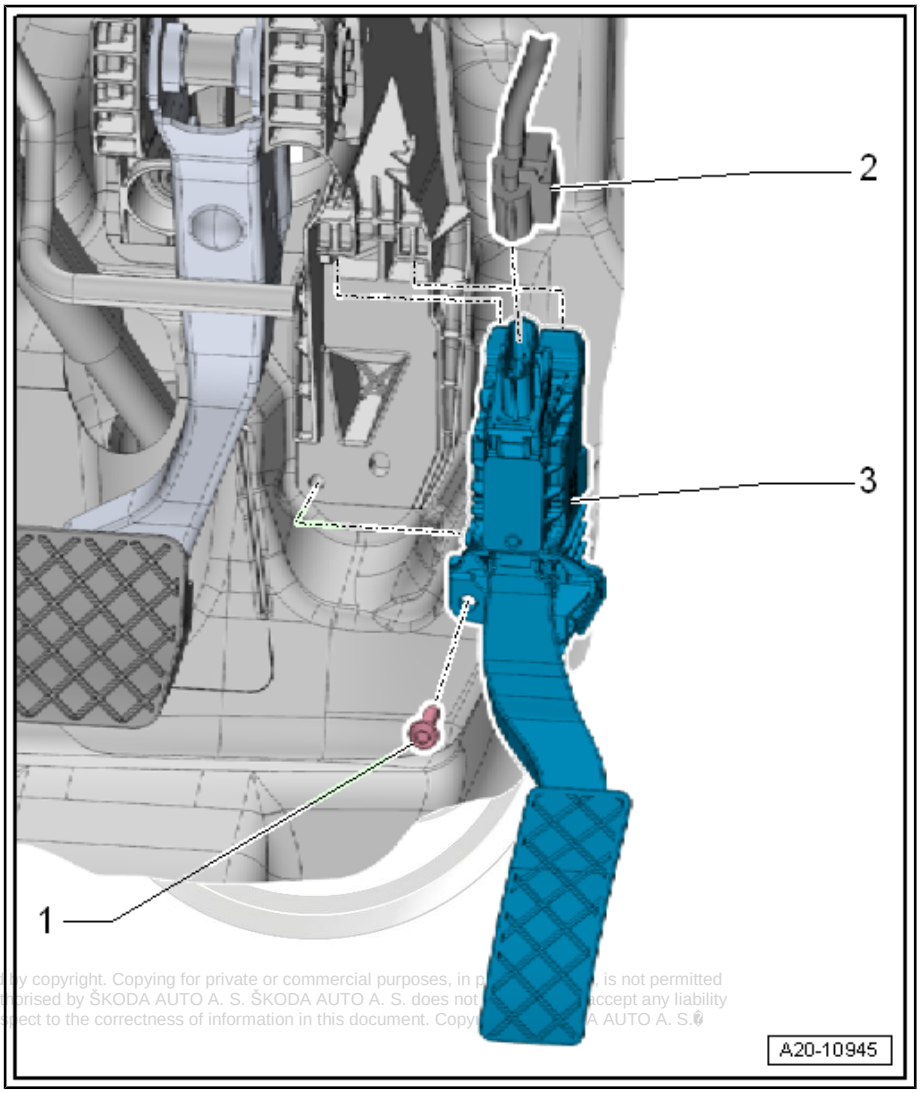
1 - 6 Nm

2 - Connector

- ❑ Ensure safe locking by pulling.

3 - Accelerator pedal module

- ❑ with accelerator pedal position sender - G79- and 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



3.2 Removing and installing accelerator module

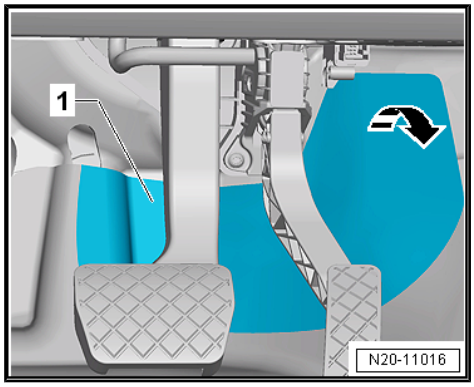
Removing

Caution

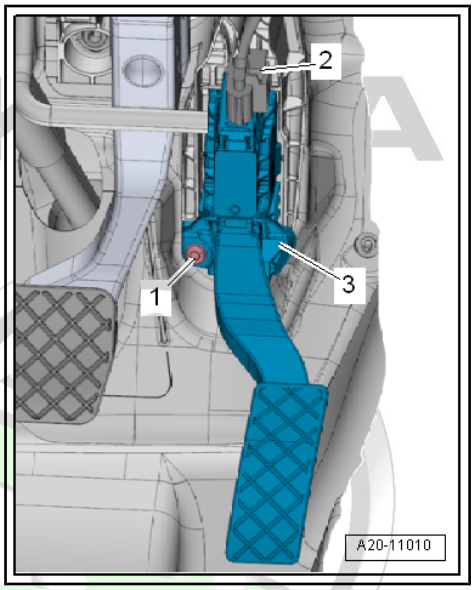
Risk of damage to knee airbag surface by mechanical stress.

After completion of the visual inspection, check that the knee airbag surface is not damaged.

– 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. However, pay attention to the following:

– If the accelerator pedal module was replaced on vehicles with automatic gearbox DSG, the engine control unit must be adapted ⇒ Vehicle diagnostic tester.

Caution

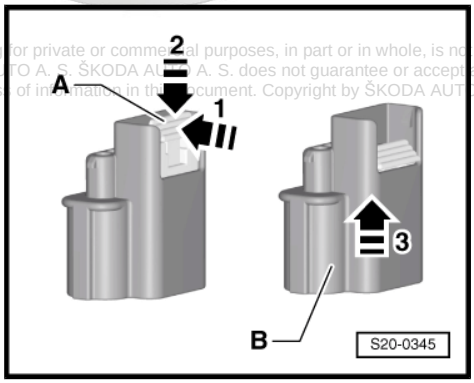
Risk of damage to knee airbag surface by mechanical stress.

After completion of the visual inspection, check that the knee airbag surface is not damaged.

3.2.1 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

– Slightly press the piston slide valve -A- (grey) in -direction of arrow 1- and push it up to the stop in -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-.

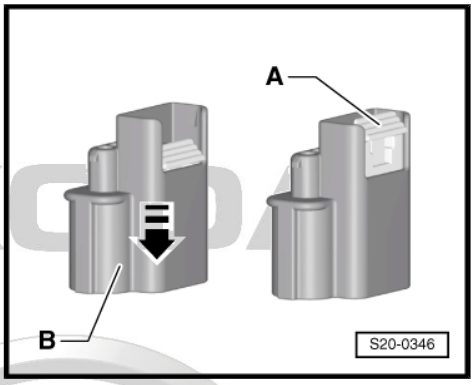
  The piston slide valve -A- remains in the bottom position.

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.

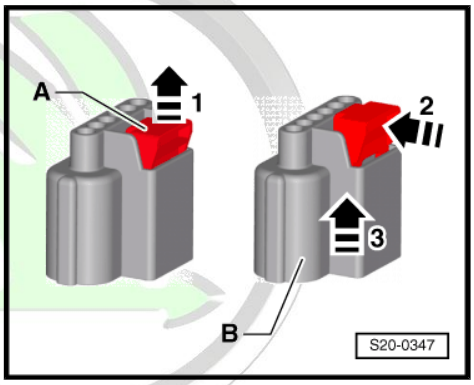


Disconnect connector 8K0 973 706

– 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- upwards in -direction of arrow 3-.

  The piston slide valve -A- remains in the top position.



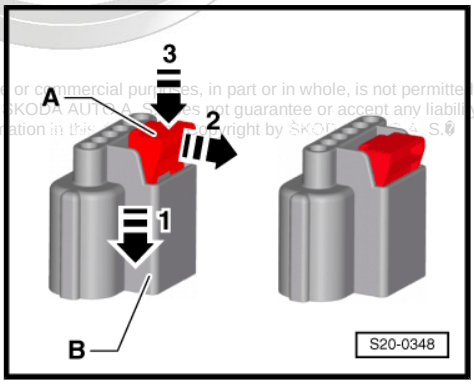
Fit on connector 8K0 973 706

– Push the socket housing -B- downwards up to the stop in -direction of arrow 1-.

– Slightly press the piston slide valve in -direction of arrow 2- and push it downwards in -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.



4 Activated charcoal filter system

4.1 Activated charcoal container system - Summary of components

1 - Vent line

- ❑ to activated charcoal filter solenoid valve 1 - N80-
- ❑ pushed into the fuel tank
- ❑ disconnect and connect ⇒ page 223

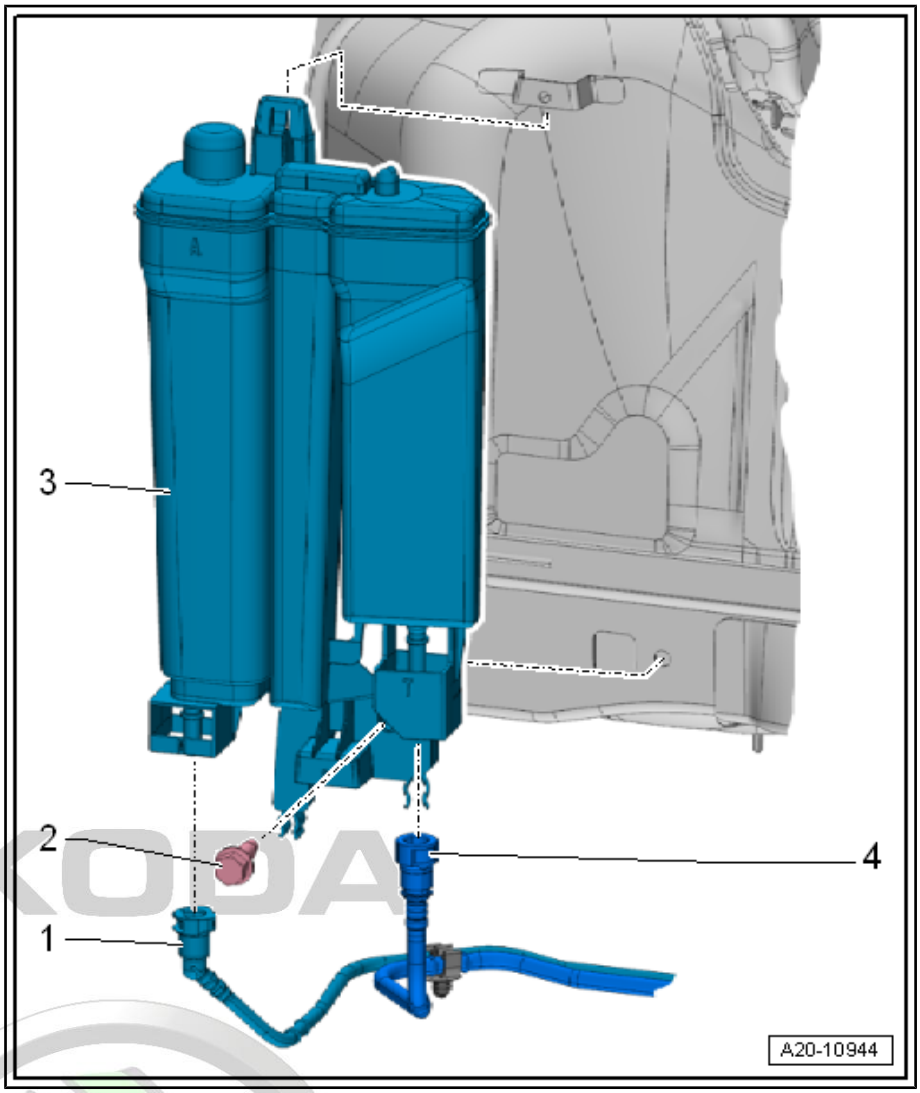
2 - 20 Nm

3 - Activated charcoal filter

- ❑ Installation location in wheelhouse under the wheelhouse liner
- ❑ removing and installing ⇒ page 230

4 - Vent line

- ❑ to fuel tank
- ❑ disconnect and connect ⇒ page 223



4.2 Removing and installing activated charcoal filter

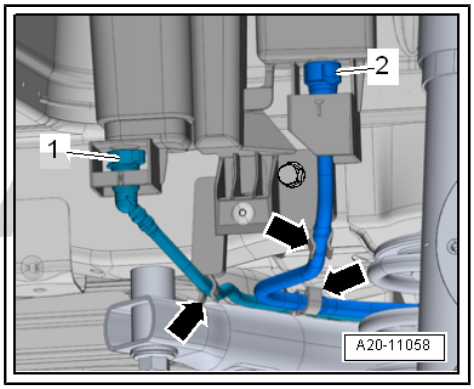
– Observe safety instructions ⇒ page 3 .

– Observe rules for cleanliness ⇒ page 5 .

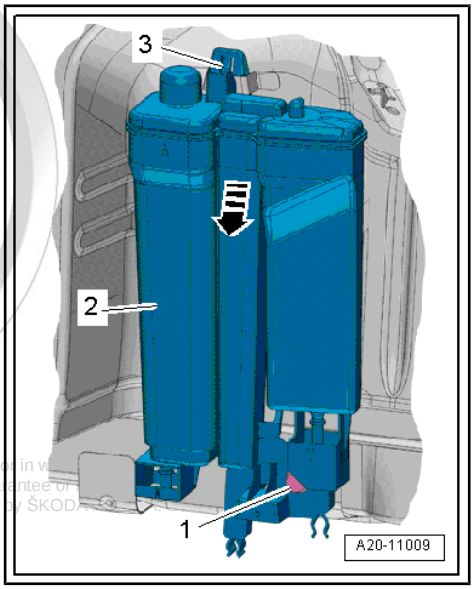
– Remove right rear wheel ⇒ Chassis; Rep. gr. 44 .

– Remove the rear right wheelhouse liner ⇒ Body Work; Rep. gr. 66 .

– Disconnect ventilation lines -1 and 2- at activated charcoal filter ⇒ page 223 .
– 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.

21 – Turbocharging/supercharging

1 Exhaust gas turbocharger

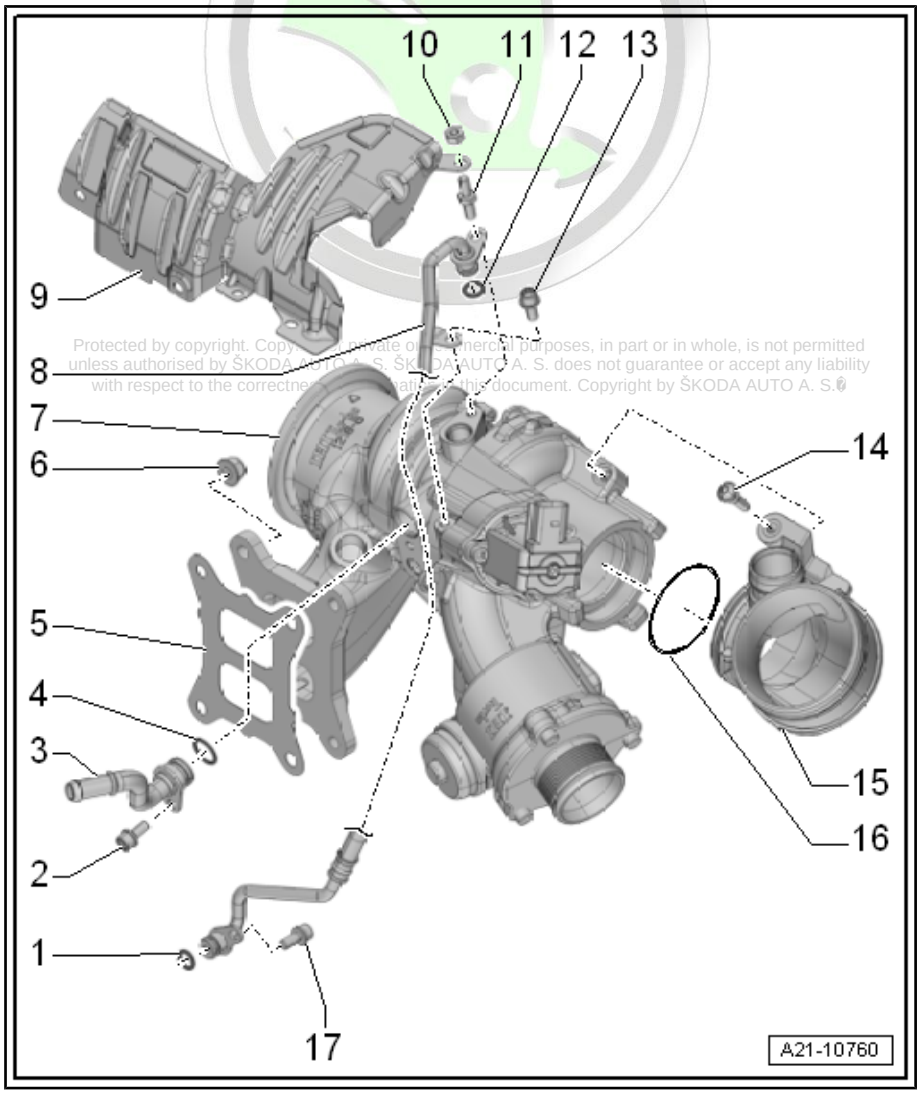
Note

Observe the general notes for assembly work on the charge air system with exhaust gas turbocharger ⇒ page 7 .

1.1 Exhaust turbocharger - Summary of components

Part I

Part II ⇒ page 232



1 - O-ring
- ❑ replace
- ❑ wet with engine oil

2 - 9 Nm

3 - Coolant feed line

4 - O-ring
- ❑ replace
- ❑ Moisten with coolant

5 - Gasket
- ❑ replace

6 - 25 Nm
- ❑ replace

7 - Exhaust gas turbocharger
- ❑ removing and installing ⇒ page 234

8 - Oil feed line

9 - Heat shield

10 - 9 Nm

11 - 9 Nm

12 - O-ring
- ❑ replace
- ❑ wet with engine oil

13 - 9 Nm

14 - 9 Nm

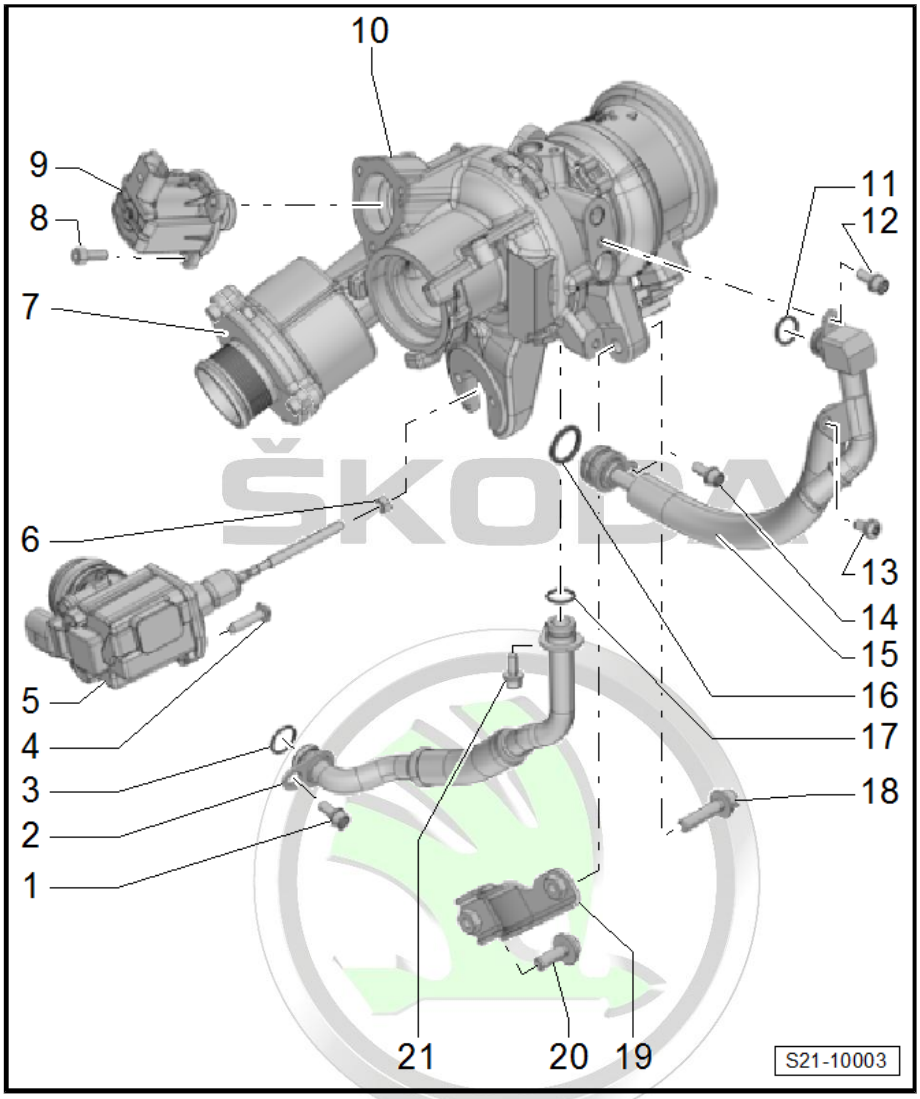
15 - Supports

16 - O-ring
- ❑ replace

17 - 9 Nm

Part II

Part I ⇒ page 232



1 - 9 Nm

2 - Oil return-flow line

3 - O-ring

- ❑ replace
- ❑ wet with engine oil

4 - 10 Nm

5 - Charge pressure regulator - V465-

- ♦ 1.8 l engines: removing and installing, setting ⇒ page 234
- ♦ 2.0 l engines: adjust ⇒ page 239

6 - 10 Nm

7 - Supports

8 - 8 Nm

9 - Turbocharger divert air valve - N249-

- ❑ with integrated gasket ring
- ❑ Check fitting position ⇒ page 234

10 - Exhaust gas turbocharger

- ❑ removing and installing ⇒ page 234

11 - O-ring

- ❑ replace
- ❑ Moisten with coolant

12 - 9 Nm

13 - 9 Nm

14 - 9 Nm

15 - Coolant return-flow line

16 - O-ring

- ❑ replace
- ❑ Moisten with coolant

17 - O-ring

- ❑ replace
- ❑ wet with engine oil

18 - 30 Nm

- ❑ coat with Hot bolt paste; Hot bolt paste ⇒ ETKA - Electronic Catalogue of Original Parts

19 - Support

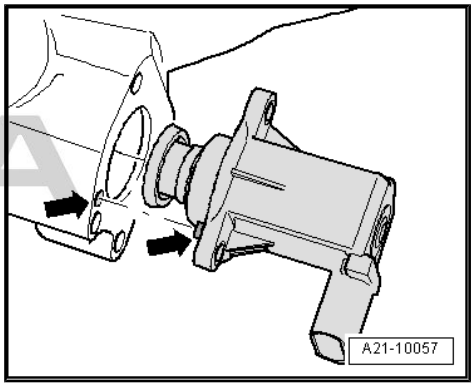
- ❑ for exhaust gas turbocharger

20 - 30 Nm

21 - 9 Nm

fitting position turbocharger divert air valve - N249-

– Note fitting position -arrows-.



1.2 Removing and installing exhaust gas turbocharger

Special tools and workshop equipment required

- Pliers for spring strap clamps
- Screw plug set for engine , e.g. -VAS 6122-

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, 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.

Removing

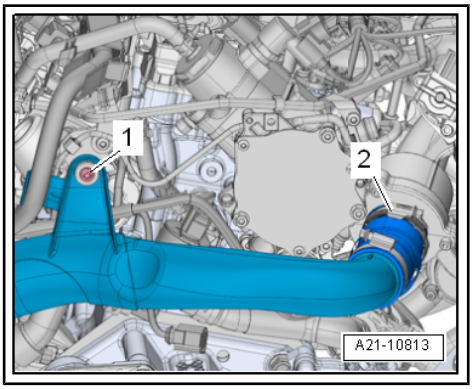
WARNING

Risk of malfunctions caused by soiling.

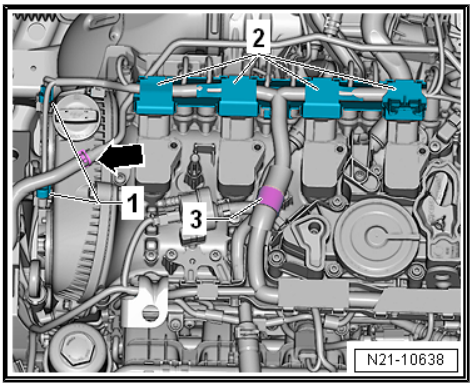
- *Observe rules for cleanliness ⇒ page 5 .*

– Drain coolant ⇒ page 158 .
– Remove pre-exhaust pipe with catalytic converter ⇒ page 297 .
– Remove air filter housing ⇒ page 258 .
– Remove lambda probe - G39- ⇒ page 288 .

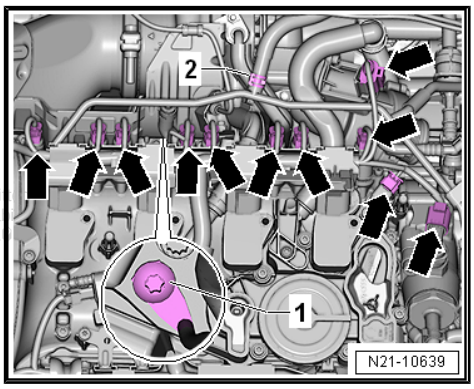
– Loosen hose clamp -2-.
– Unscrew the screw -1- and press the left-hand air guide pipe to the left with light force and remove from the exhaust gas turbocharger.



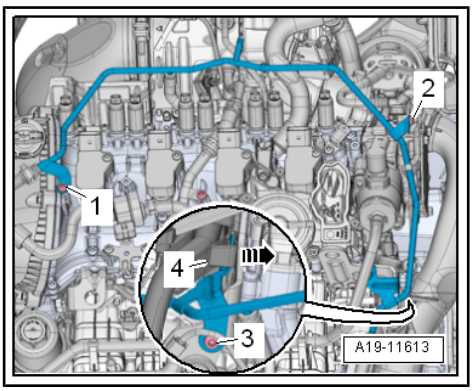
– Detach coolant hose -arrow-.
– Disconnect plugs -1 and 2-.
– Open mounting bracket-3-.



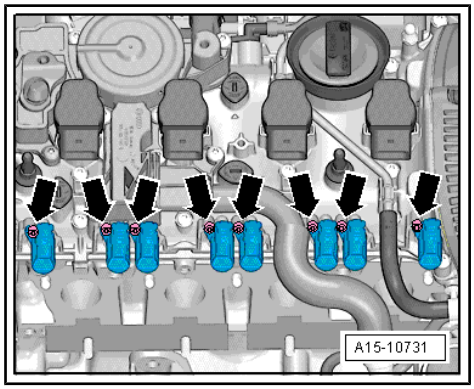
– Undo the screw -1- or earth strap, remove the connector -arrows- and place the entire wire harness to one side.
– Loosen hose clamp -2- and remove coolant hose.



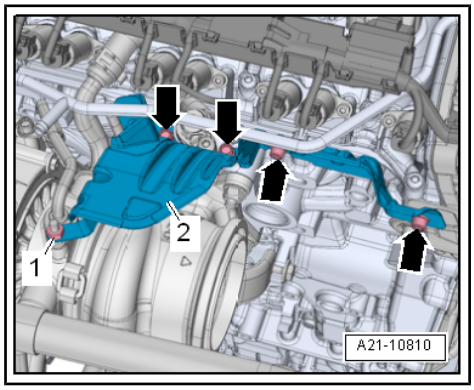
– Unlock the catch -arrow- and remove the cable shaft -4- from the bracket upwards.
– Remove the screws -1, 2, 3- and tilt the coolant pipe to one side.



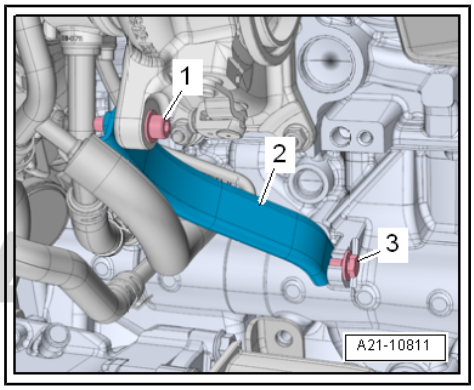
– Remove positioning elements for camshaft adjustment -arrows-.



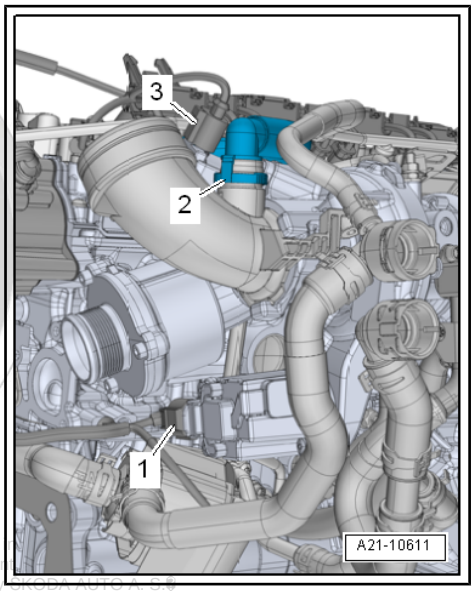
– Remove the nuts -1- and screws -arrows-.
– Remove heat shield - 2 -.



– Remove screw -1-, only slacken screw -3-.
– Remove bracket -2- for the turbocharger.

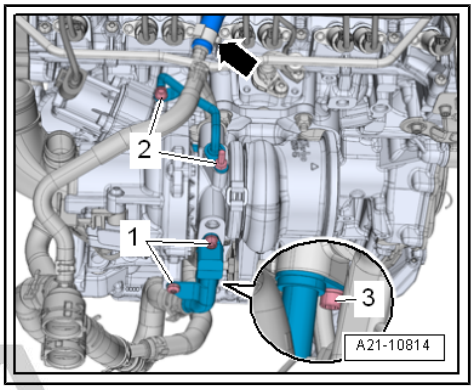


– Disconnect the connectors -1 and 3-.
– Press release buttons on the hose -2- for crankcase ventilation and remove from cylinder head cover.



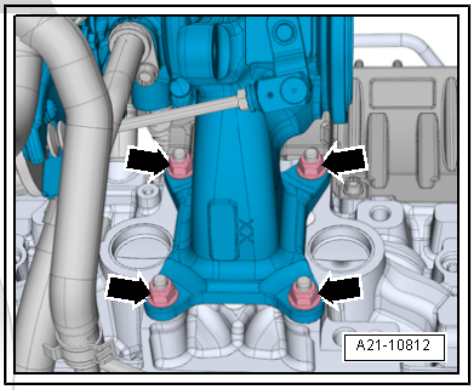
– Screw out screws -1- and remove connection fitting.

– Unscrew the screws -2 and 3- and remove the oil feed line and oil return line.



– Unscrew the nuts -arrows-.

– Remove turbocharger from cylinder head and remove upwards.



Install

Installation is carried out in the reverse order. However, pay attention to the following:

Tightening torques: ⇒ page 232

Note

- *Replace self-locking nuts and gasket rings, gaskets and O-rings.*
- *Coat stud bolts on the turbocharger with Hot bolt paste; Hot bolt paste ⇒ ETKA - Electronic Catalogue of Original Parts*
- *Fill exhaust turbocharger with engine oil through the connection fitting of the oil feed line.*
- *Hose connections and hoses for the charge air system must be free of oil and grease before being installed.*
- *Secure all hose connections with hose clamps which comply with the series design ETKA - ⇒ Electronic Catalogue of Original Parts .*

– Install exhaust pipe with catalytic converter ⇒ page 297 .

– Align exhaust system free of stress ⇒ page 308 .

– Replenish coolant ⇒ page 158 .

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

Note

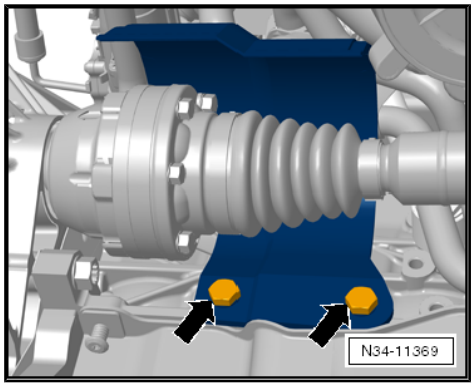
after installing the exhaust turbocharger run the engine approx. 1 minute in idle and do not increase speed immediately in order to ensure the supply of oil to the turbocharger.

1.3 Removing and installing charge pressure regulator - V465- , adjusting

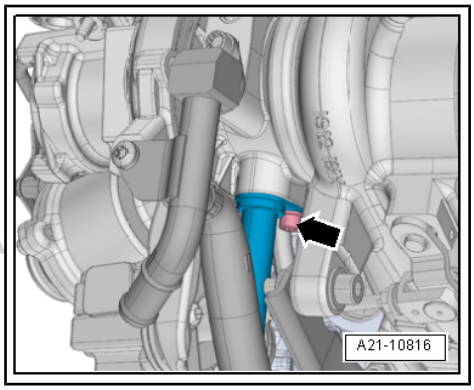
Removing

– Remove pre-exhaust pipe with catalytic converter ⇒ page 297 .

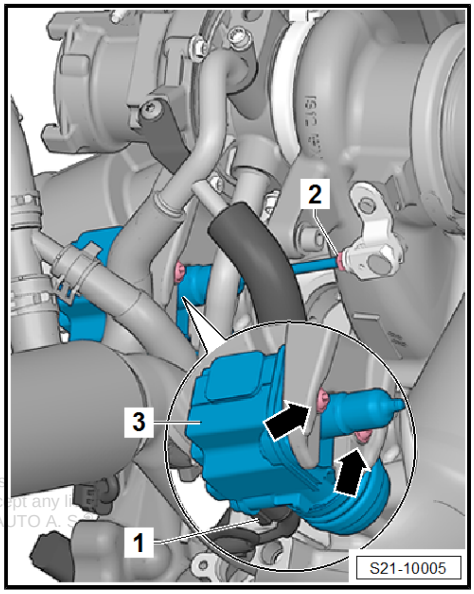
– Release screws -arrows- and remove heat shield for right drive shaft.



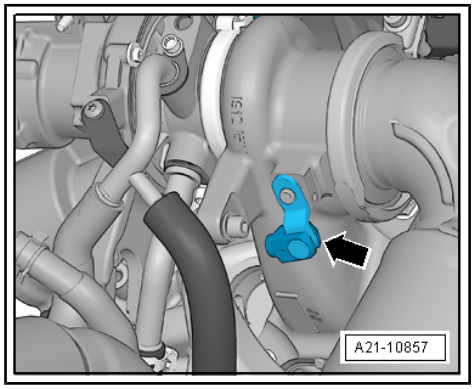
– Unscrew screw -arrow- and remove oil return line.



– Unplug connector -1-.
– Unscrew locknut -2- and unscrew operating lever.
– Release screws -arrows- and remove charge pressure regulator - V465- .



– Check the bypass valve -arrow- for smooth operation.



Note

If there is any resistance, replace the turbocharger ⇒ page 234 .

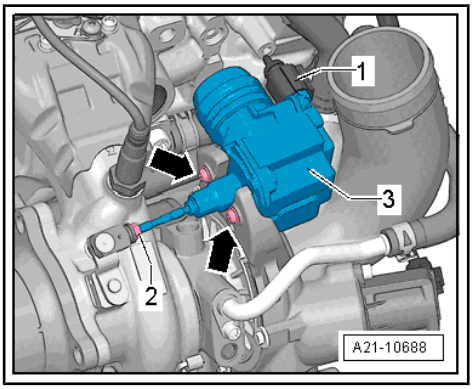
Install

Installation is carried out in the reverse order. However, pay attention to the following:

- Tightening torques: ⇒ page 232

– Screw in operating rod of the charge pressure regulator into the joint element up to half of the threaded section.

– Screw the charge pressure regulator - V465- -3- with screws -arrows-.
– Connect the connector -1- to the charge pressure regulator - V465- .



Set charge pressure regulator - V465- as follows:

– Switch on the ignition and choose ⇒ Vehicle diagnostic tester.
– On the display press consecutively the following buttons:

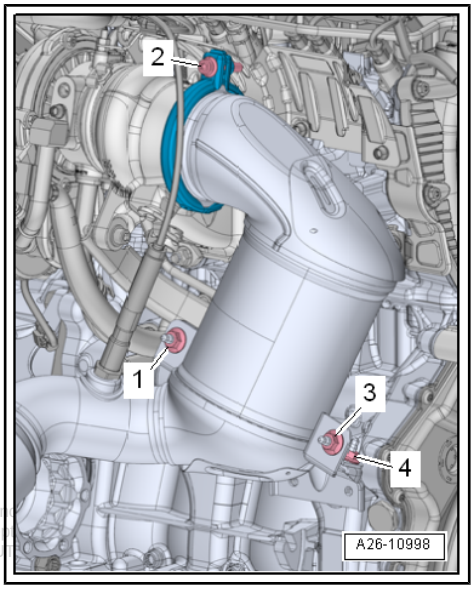
♦ `01 - Engine electronics`
♦ `01 - Targeted functions`
♦ `01 - Basic setting`
♦ `01 - Charge pressure regulator - V465 - setting`

– Set specified value by adjusting the operating rod; specified value ⇒ Vehicle diagnostic tester.
– Secure the operating rod with locknut -2-.
– Install exhaust pipe with catalytic converter ⇒ page 297 .

1.4 Set charge pressure regulator - V465-

Removing

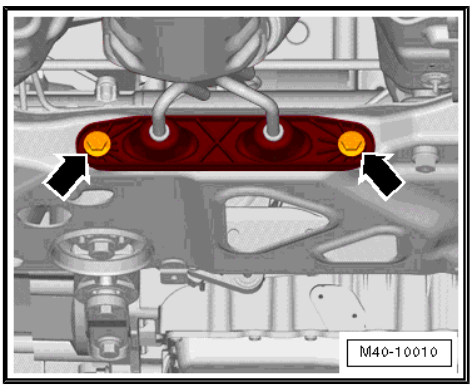
– Screw out screw -2- and remove camshaft sprocket.
– Unscrew nuts -1 and 3-.



Note

♦ *For a clearer illustration, the installation position while the engine is removed is shown.*
♦ *Do not pay attention to the position -4-.*

– Release screws -arrows-.



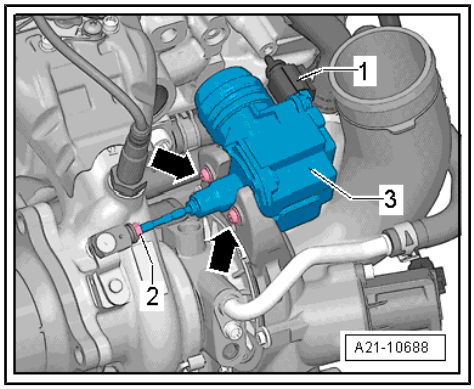
Set charge pressure regulator - V465- as follows:

– 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.

– Secure the operating rod with locknut -2-.



Note

Do not pay attention to position -1 and 3-.

Install

Installation is carried out in the reverse order. However, pay attention to the following:

- Tightening torques ⇒ page 232

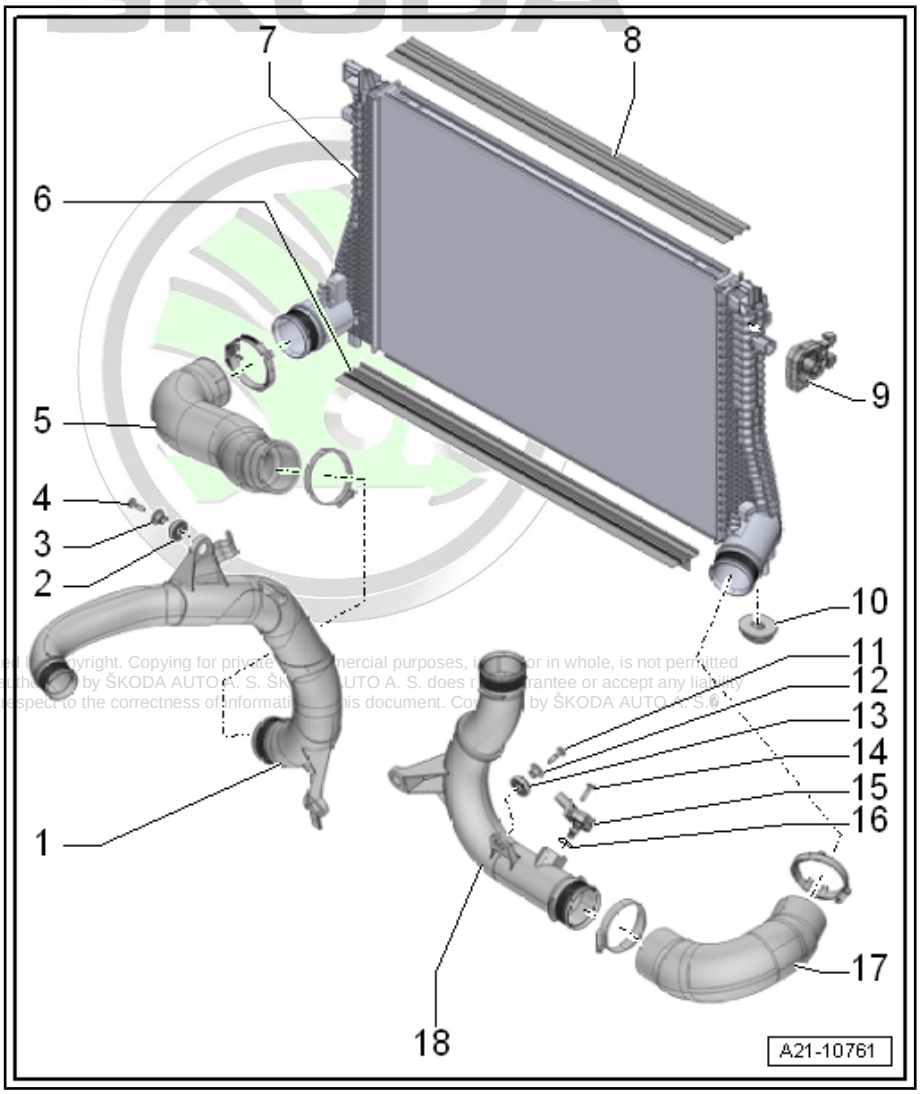
2 Charge air system with exhaust gas turbocharger

Observe the general notes for assembly work on the charge air system with exhaust gas turbocharger ⇒ page 7 .

2.1 Charge air cooling - Summary of components

Note

- *Before an inspection or a repair, check all the air guide pipes and air guide hoses as well as vacuum lines for tight connection and leaktightness.*
- *Observe rules for cleanliness ⇒ page 5 .*
- *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.*



1 - Air guide pipe

2 - Grommet

3 - Spacer sleeve

4 - 7 Nm

5 - Air guide hose

- ❑ installing ⇒ page 242

6 - Air deflector

7 - Charge air cooler

- ❑ removing and installing ⇒ page 242

8 - Air deflector

9 - Rubber bush

- ❑ for charge air cooler

10 - Rubber bush

- ❑ for charge air cooler

11 - 7 Nm

12 - Spacer sleeve

13 - Grommet

14 - 5 Nm

15 - Charge pressure sender - G31-

- ❑ removing and installing ⇒ page 243

16 - O-ring

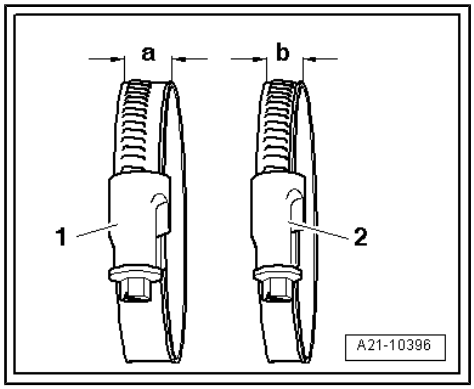
- ❑ replace

17 - Air guide hose

- ❑ installing ⇒ page 242

18 - Air guide pipe

Install air guide with screw clamps



Note

- *Hose connections as well as charge air pipes and -hoses must be free of oil and grease before being installed.*
- *Secure all hose connections with hose clamps which 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 - Hose clamp -b- = 9 mm wide: 3 Nm

2.2 Removing and installing charge air cooler

Special tools and workshop equipment required

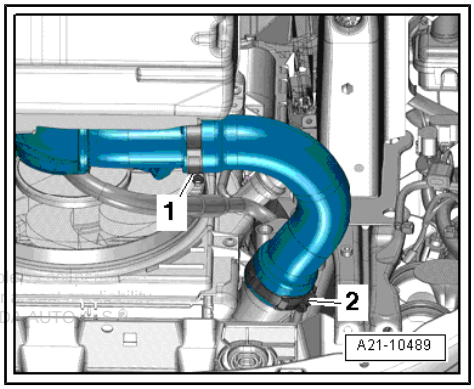
- Screw plug set for engine , e.g. -VAS 6122-

Removing

– Remove coolant radiator ⇒ page 186 .

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

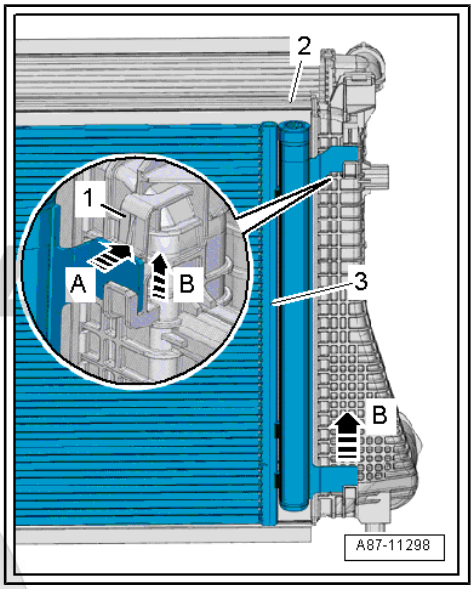
– Close open lines and connections with clean plugs.



– With the aid of a second mechanic, release the clamps -1- left and right in -direction of arrow A-. Remove condenser -3- from support upwards -arrows B-.

– Strap condenser to the lock support.

– Remove charge air cooler downwards.



Install

Installation is carried out in the reverse order. However, pay attention to the following:

- Tightening torques ⇒ page 241

Note

- *Hose connections and hoses for the charge air system must be free of oil and grease before being installed.*
- *Secure all hose connections with hose clamps which 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.*

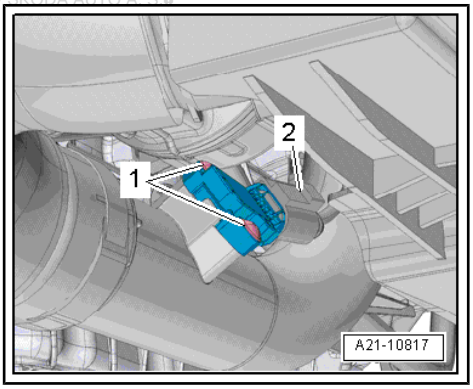
2.3 Removing and installing the charge pressure sender - G31-

Removing

– Remove the sound dampening system ⇒ Body Work; Rep. gr. 50 .

– Unplug connector -2-.

– Unscrew the screws -1- and charge pressure sender - G31- from the air guide pipe.



Install

Installation is carried out in the reverse order. However, pay attention to the following:

Tightening torques ⇒ page 241

Note

Renew O-ring.

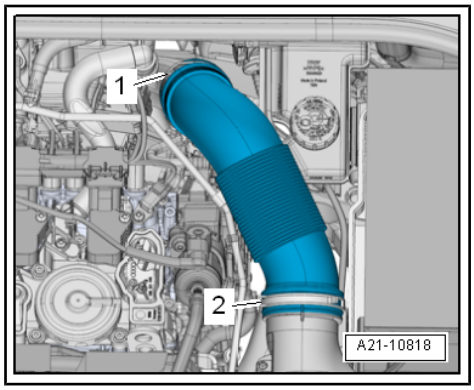
2.4 Checking the charge-air system for leaktightness

Special tools and workshop equipment required

- Tester for charge air systems - V.A.G 1687-

Work procedure

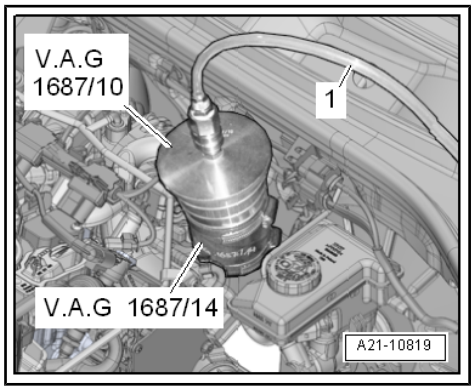
– Loosen hose clamps -1 and 2- and remove air guide pipe.



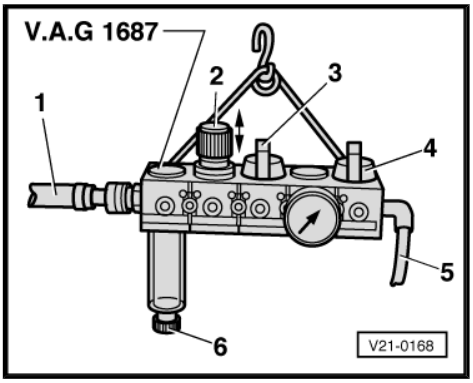
– Connect adapter with with - V.A.G 1687/10- with -V.A.G 1687/14- to the exhaust gas turbocharger.

– Connect tester for the charge air systems - V.A.G 1687- to the adapter.

Prepare tester for charge air system - V.A.G 1687- as follows:



– Unscrew pressure relief valve-2- completely, close valves -3- and -4-.



Note

The rotary knob must be slightly 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 -1- using a commercially available intermediate piece.

Note

If there is water in the inspection glass, drain water via the drain plug -6-.

– Open valve -3-.

WARNING

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. If necessary regulate the 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 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 coupling.*

Assembling

Assembly is carried out in the reverse order.

24 – Mixture preparation - injection

1 Fitting location of the injection system

1.1 Installation location overview - fuel injection system

The modules A through H are not represented in the overview figure.

1 - Inlet camshaft control valve 1 - N205-

- ❑ Fitting location ⇒ page 254
- ❑ removing and installing ⇒ page 73

2 - Camshaft control valve 1 in the exhaust - N318-

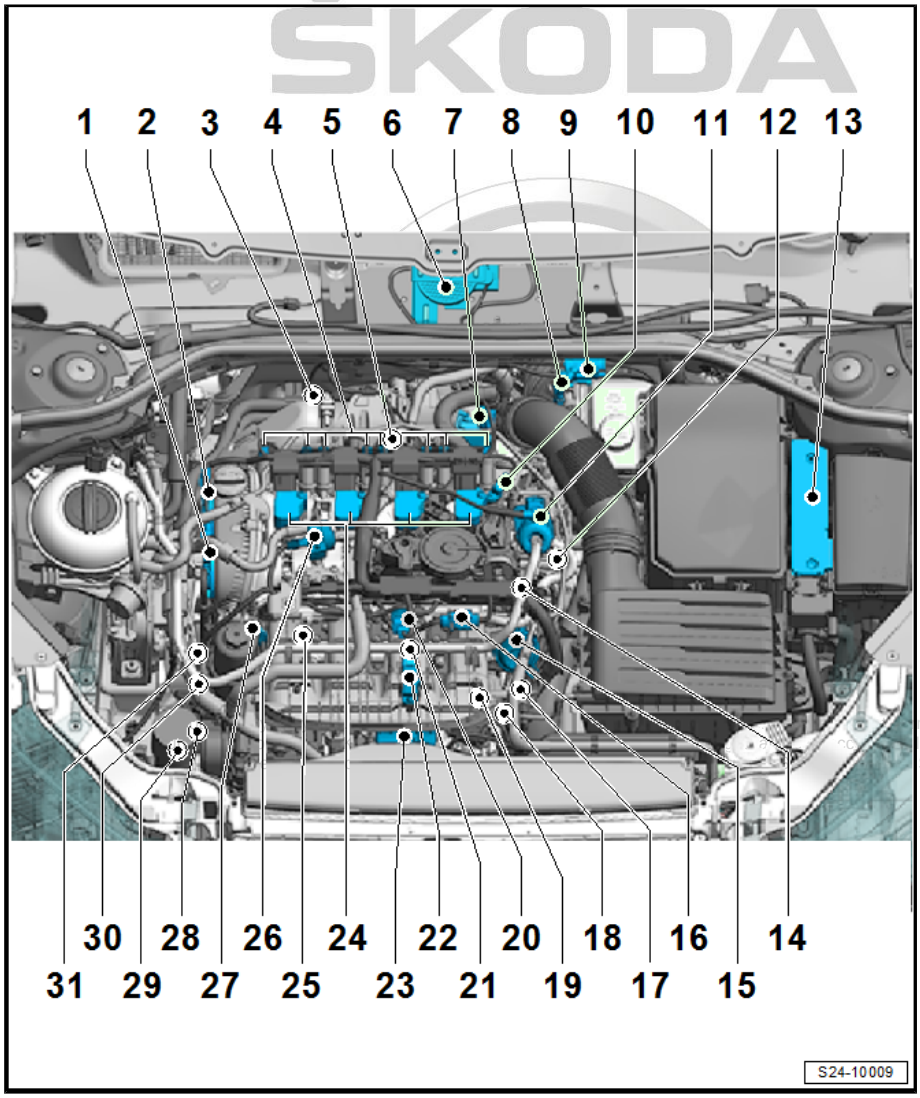
- ❑ Fitting location ⇒ page 254
- ❑ removing and installing ⇒ page 73

3 - Lambda probe after catalytic converter - G130-

- ❑ Fitting location ⇒ page 256
- ❑ removing and installing ⇒ page 289

4 - Positioning elements for camshaft adjustment (exhaust camshaft)

- ❑ Positioning element A for camshaft adjustment - N580-
- ❑ Positioning element B for camshaft adjustment - N581-
- ❑ Positioning element A for camshaft adjustment - N588-
- ❑ Positioning element B for camshaft adjustment - N589-
- ❑ Positioning element A



for camshaft adjustment
- N596-

- ❑ Positioning element B for camshaft adjustment - N597-
- ❑ Positioning element A for camshaft adjustment - N604-
- ❑ Positioning element B for camshaft adjustment - N605-
- ❑ Fitting location ⇒ page 251
- ❑ removing and installing ⇒ page 110

5 - Lambda probe - G39-

- ❑ Fitting location ⇒ page 255
- ❑ removing and installing ⇒ page 288

6 - Engine noise speaker

- ❑ for 2.0 l engines only
- ❑ removing and installing ⇒ page 294

7 - Turbocharger divert air valve - N249- and charge pressure regulator - V465-

- ❑ Components are fitted directly onto the turbocharger
- ❑ Fitting location of the charge pressure regulator - V465- ⇒ page 256
- ❑ Fitting location of the turbocharger divert air valve - N249- ⇒ page 256
- ❑ removing and installing ⇒ page 232

8 - Hall sender 3 - G300- , 9 Nm

- ❑ Fitting location ⇒ page 251
- ❑ removing and installing ⇒ page 312

9 - Brake light switch - F- and brake pedal switch - F47-

- ❑ Fitting location ⇒ page 250
- ❑ removing and installing ⇒ Chassis; Rep. gr. 40

10 - Connector

- ❑ for lambda probe - G39-
- ❑ for lambda probe downstream of catalytic converter - G130-
- ❑ Fitting location ⇒ page 255

11 - High pressure pump with fuel pressure regulating valve - N276-

- ❑ Fitting location ⇒ page 253
- ❑ removing and installing ⇒ page 285

12 - Coolant temperature sender - G62- , 9 Nm

- ❑ Fitting location ⇒ page 254
- ❑ removing and installing ⇒ page 178

13 - Engine control unit - J623-

- ❑ removing and installing ⇒ page 291

14 - Hall sender - G40- , 9 Nm

- ❑ Fitting location ⇒ page 252
- ❑ removing and installing ⇒ page 312

15 - Vacuum setting element for intake manifold flaps

- ❑ Fitting location ⇒ page 252

16 - Plug for injection valves MPI

17 - Valve for intake manifold flap - N316-

- ❑ Fitting location ⇒ page 252

18 - Engine speed sender - G28-

- ❑ Fitting location ⇒ page 253
- ❑ Wet seal with oil
- ❑ Replace bolts
- ❑ 4 Nm + torque a further 45° ($^1/_8$ turn)
- ❑ removing and installing ⇒ page 312

19 - Connector

- ❑ for knock sensor 1 - G61-
- ❑ for valve for intake manifold flap - N316-
- ❑ for fuel pressure sender - G247-
- ❑ for potentiometer for intake manifold flap - G336-
- ❑ for hall sender - G40-
- ❑ for injection valves FSI - N30...N33-
- ❑ Fitting location ⇒ page 253

20 - Fuel pressure sender for low-pressure - G410- , 15 Nm

- ❑ Fuel pressure sender for low-pressure - G410- must be fitted with the adapter
- ❑ Fitting location ⇒ page 252
- ❑ removing and installing ⇒ page 281

21 - Knock sensor 1 - G61- , 20 Nm

- ❑ For removal, remove the coolant pump with coolant regulator
- ❑ removing and installing ⇒ page 311

22 - Intake air temperature sender - G42- with manifold pressure sender - G71-

- ❑ Fitting location ⇒ page 252

23 - Throttle valve module - J338-

- ❑ with throttle valve drive for electronic power control - G186- , Angle gearbox 1 for anti-stall drive - G187- and angle gearbox 2 for anti-stall drive - G188-
- ❑ clean the original throttle valve control unit - J338- before re-installing ⇒ page 269
- ❑ after removal or installation or replacement of the throttle valve control unit - J338- it must be readjusted to the engine control unit - J623- . ⇒ Vehicle diagnostic tester
- ❑ Fitting location ⇒ page 254

24 - Ignition coils with a power output stage

- ❑ Fitting location ⇒ page 251
- ❑ removing and installing ⇒ page 311

25 - Fuel pressure sender - G247- , 27 Nm

- ❑ Fitting location ⇒ page 252
- ❑ removing and installing ⇒ page 279

26 - Activated charcoal filter solenoid valve 1 - N80-

- ❑ Fitting location ⇒ page 251

27 - Potentiometer for intake manifold flap - G336-

- ❑ Fitting location ⇒ page 253

28 - Coolant temperature sender at radiator outlet - G83-

- ❑ Fitting location ⇒ page 254
- ❑ removing and installing ⇒ page 179

29 - Charge pressure sender - G31-

- ❑ Fitting location ⇒ page 254
- ❑ removing and installing ⇒ page 243

30 - Oil pressure control valve - N428-

- ❑ Fitting location ⇒ page 255
- ❑ removing and installing ⇒ page 152

31 - Oil pressure switch - F22- , oil pressure switch for reduced oil pressure - F378- and control valve for piston cooling nozzles - N522-

- ❑ Fitting location ⇒ page 255
- ❑ Check, Removing and installing ⇒ page 150

A - Injection valves FSI

- ❑ Fitting location ⇒ page 251
- ❑ Injector, cylinder 1 - N30-
- ❑ Injector, cylinder 2 - N31-
- ❑ Injector, cylinder 3 - N32-
- ❑ Injector, cylinder 4 - N33-
- ❑ removing and installing ⇒ page 271

B - Injection valves MPI

- ❑ Fitting location ⇒ page 252
- ❑ Injector 2, cylinder 1 - N532-
- ❑ Injector 2, cylinder 2 - N533-
- ❑ Injector 2, cylinder 3 - N534-
- ❑ Injector 2, cylinder 4 - N535-
- ❑ removing and installing ⇒ page 275

C - Fuel pump control unit - J538-

- ❑ Fitting location ⇒ page 251
- ❑ removing and installing ⇒ page 221

D - Clutch position sender - G476-

- ❑ only fitted on vehicles with manual transmission
- ❑ Fitting location ⇒ page 250

E - Accelerator pedal position sender - G79- and accelerator pedal position sender 2 - G185-

- ❑ Fitting location ⇒ page 250
- ❑ on accelerator pedal (both senders integrated into a housing)
- ❑ removing and installing ⇒ page 227

F - Radiator fan control unit - J293-

- ❑ integrated in radiator fan

G - Oil pressure switch, stage 3 - F447-

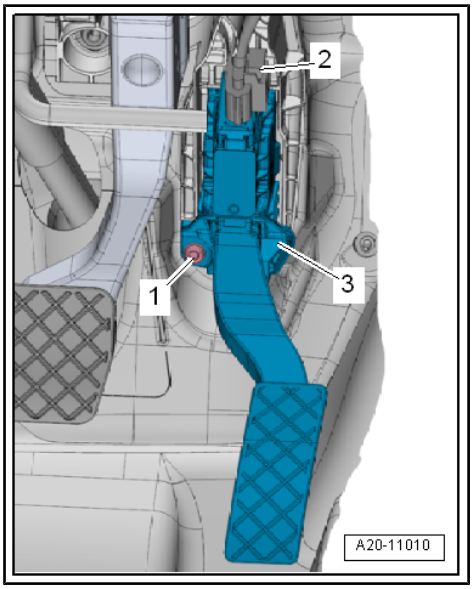
- ❑ Fitting location ⇒ page 253
- ❑ Check, Removing and installing ⇒ page 151

H - Electrical solenoid valve left for electro-hydraulic engine bearing - N144- and electrical solenoid valve right for electro-hydraulic engine bearing - N145-

- ❑ not fitted on all vehicles (depends on transmission type)

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

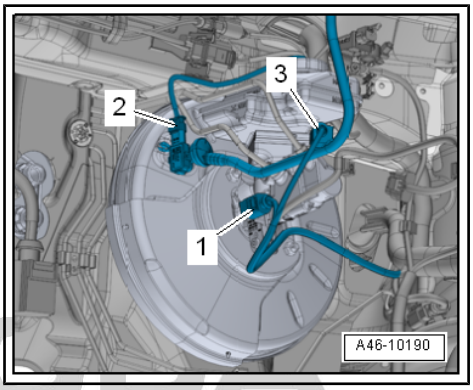
2 - Plug for gas pedal module



Note

Accelerator pedal position sender - G79- and accelerator pedal position sender 2 - G185- are incorporated into the accelerator pedal module and cannot be replaced individually.

Fitting location for brake light switch - F- / brake pedal switch - F63- and vacuum sender - G608-

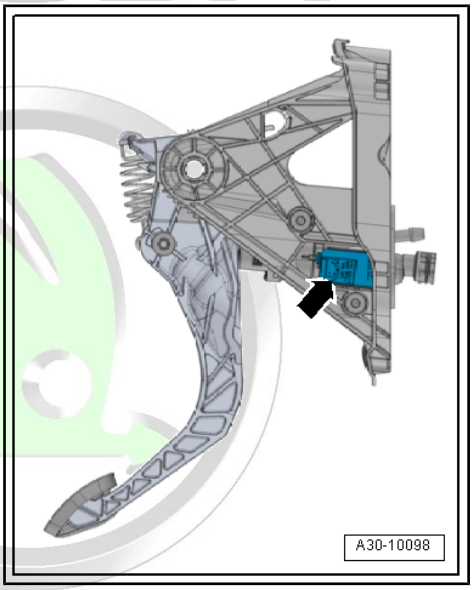


♦ In engine compartment at brake servo unit.

1 - Brake light switch - F- / Brake pedal switch - F63-

2 - Vacuum sender - G608-

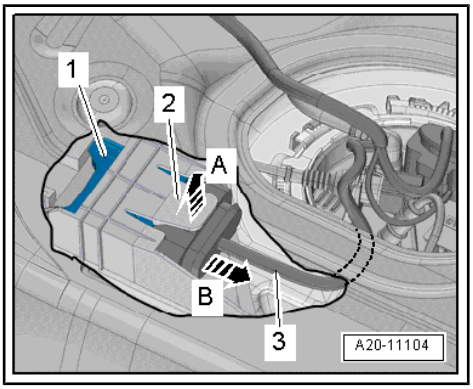
Clutch position sender - G476- -2-



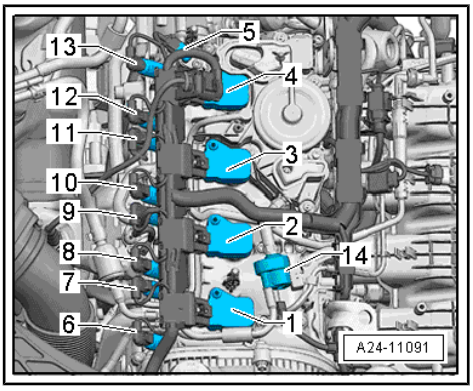
• On bearing bracket for clutch pedal -arrow-.

Removal and installation of ⇒ gearbox; Rep. gr. 30 .

Fuel pump control unit - J538- -1-



Ignition coils and positioning elements



1 - Ignition coil 1 with output stage - N70-

2 - Ignition coil 2 with output stage - N127-

3 - Ignition coil 3 with output stage - N291-

4 - Ignition coil 4 with output stage - N292-

5 - Hall sender 3 - G300-

6 - Positioning element A for camshaft adjustment - N580- (for cylinder 1)

7 - Positioning element B for camshaft adjustment - N581- (for cylinder 1)

8 - Positioning element A for camshaft adjustment - N588- (for cylinder 2)

9 - Positioning element B for camshaft adjustment - N589- (for cylinder 2)

10 - Positioning element A for camshaft adjustment - N596- (for cylinder 3)

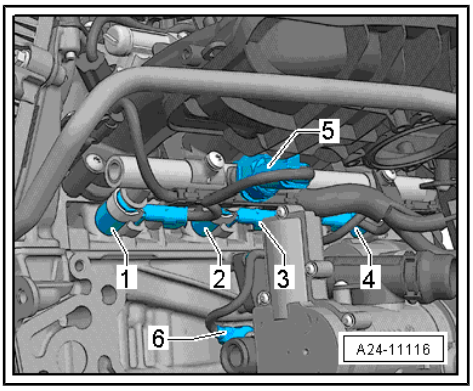
11 - Positioning element B for camshaft adjustment - N597- (for cylinder 3)

12 - Positioning element A for camshaft adjustment - N604- (for cylinder 4)

13 - Positioning element B for camshaft adjustment - N605- (for cylinder 4)

14 - Activated charcoal filter solenoid valve 1 - N80-

Injection valves FSI



1 - Injector, cylinder 1 - N30-

2 - Injector, cylinder 2 - N31-

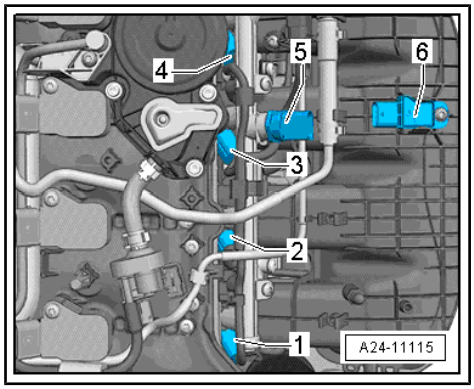
3 - Injector, cylinder 3 - N32-

4 - Injector, cylinder 4 - N33-

5 - Fuel pressure sender - G247-

6 - Knock sensor 1 - G61-

Injection valves MPI



1 - Injector 2, cylinder 1 - N532-

2 - Injector 2, cylinder 2 - N533-

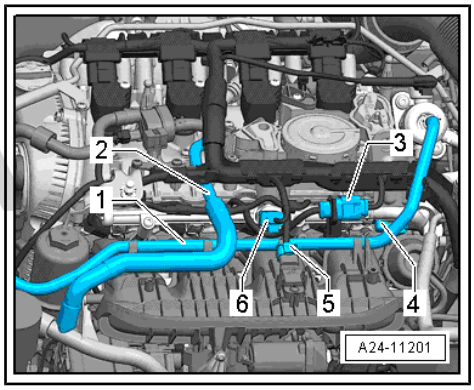
3 - Injector 2, cylinder 3 - N534-

4 - Injector 2, cylinder 4 - N535-

5 - Fuel pressure sender for low-pressure - G410-

6 - Intake air temperature sender - G42- with manifold pressure sender - G71-

View from above



1 - Fuel feed line

2 - Coolant line

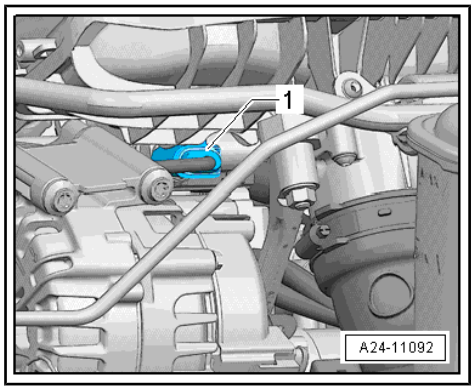
3 - Plug for injection valves MPI

4 - Hall sender - G40-

5 - Intake air temperature sender - G42- with manifold pressure sender - G71-

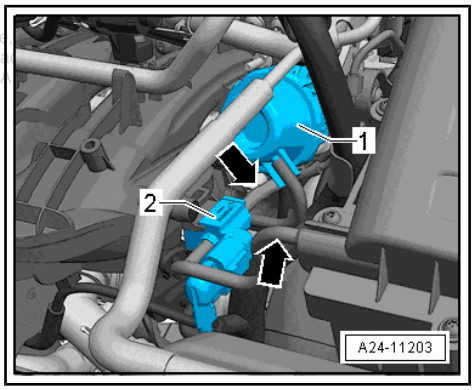
6 - Fuel pressure sender for low-pressure - G410-

Fuel pressure sender in high-pressure range



1 - Fuel pressure sender - G247-

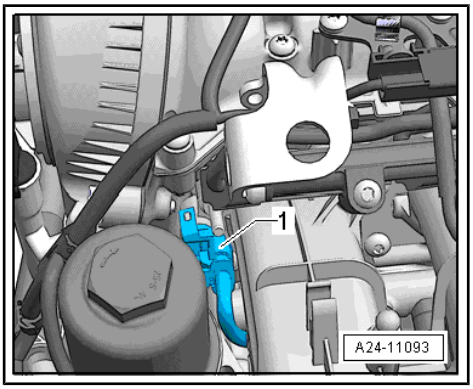
Intake manifold change-over



1 - Vacuum setting element for intake manifold flaps

2 - Valve for intake manifold flap - N316-

Potentiometer for intake manifold flap - G336- -1)-



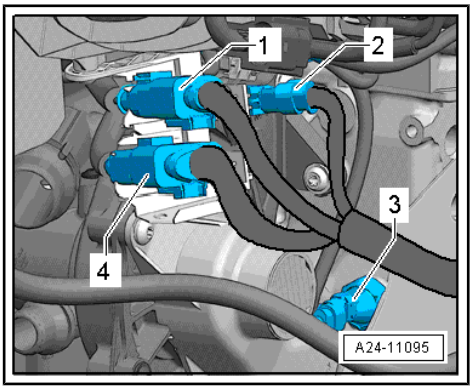
Connector

1 - Injection valves FSI

2 - for knock sensor 1 - G61-

3 - Oil pressure switch, stage 3 - F447-

4 - for valve for intake manifold flap - N316- , fuel pressure sender - G247- , Potentiometer for intake manifold - G336- , coolant temperature sender - G62- , hall sender - G40-



High-pressure pump and hall sender

1 - Hall sender 3 - G300-

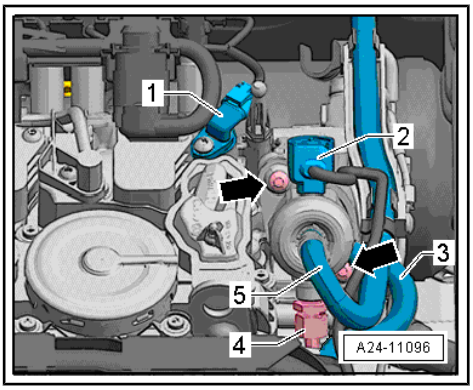
2 - Control valve for fuel pressure - N276-

3 - Fuel feed line for fuel distributor to injection valve MPI

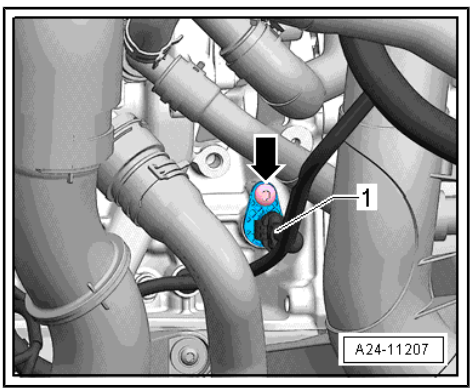
4 - Fuel feed line for fuel distributor to injection valve FSI

5 - Fuel feed line from fuel tank

- Securing bolts -arrows-



Engine speed sender - G28- -1-



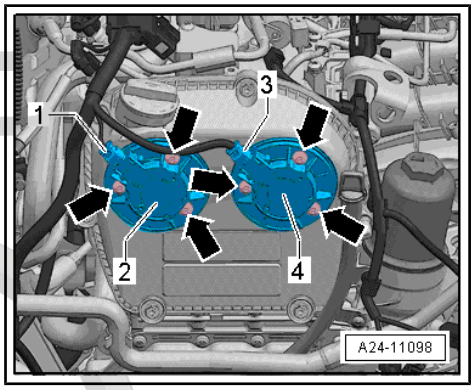
Valves for camshaft control

1 - Connector for valve 1 for camshaft control in exhaust - N318-

2 - Camshaft control valve 1 in the exhaust - N318-

3 - Connector for camshaft control valve 1 - N205-

4 - Inlet camshaft control valve 1 - N205-

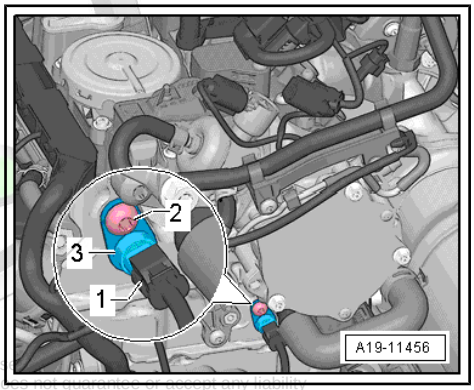


Coolant temperature sender - G62-

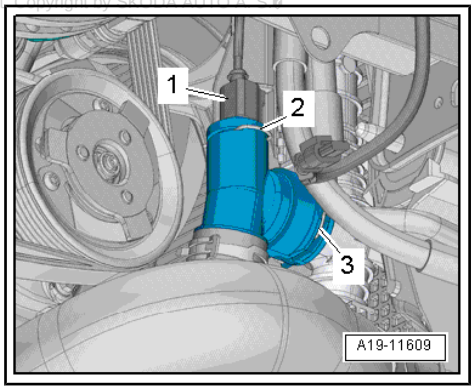
1 - Connector for coolant temperature sender - G62-

2 - Screw

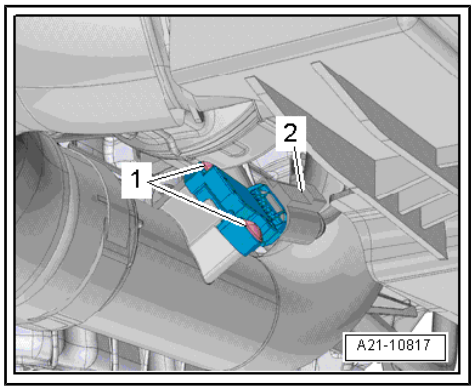
3 - Coolant temperature sender - G62-



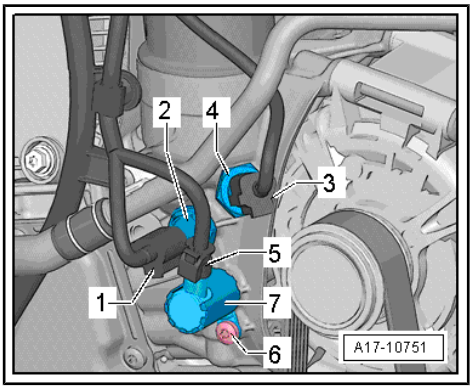
Coolant temperature sender at radiator outlet - G83-



Charge pressure sender - G31- -2-



Oil pressure switch



1 - Connector for oil pressure switch - F22-

2 - Oil pressure switch - F22-

3 - Connector for oil pressure switch for reduced oil pressure - F378-

4 - Oil pressure switch for reduced oil pressure - F378-

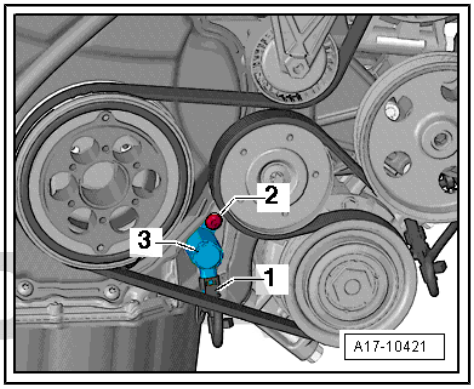
5 - Connector for control valve for piston cooling nozzles - N522-

6 - Screw

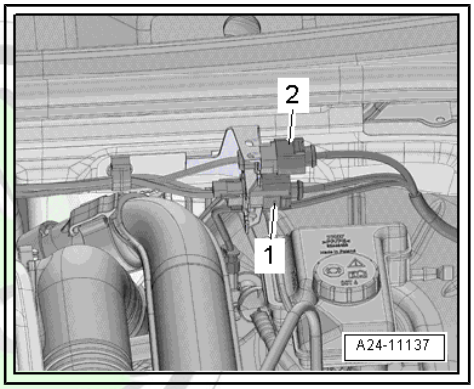
7 - Control valve for piston cooling nozzles - N522-

Removing and installing ⇒ Rep. gr. 17 .

Oil pressure control valve - N428- -3-



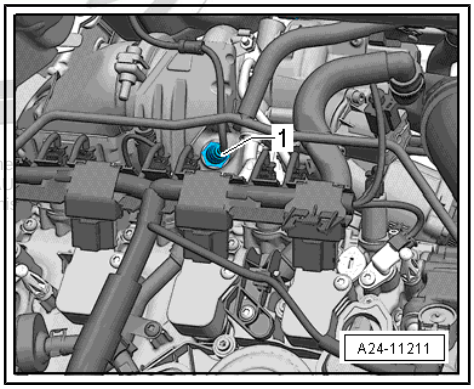
Lambda probes



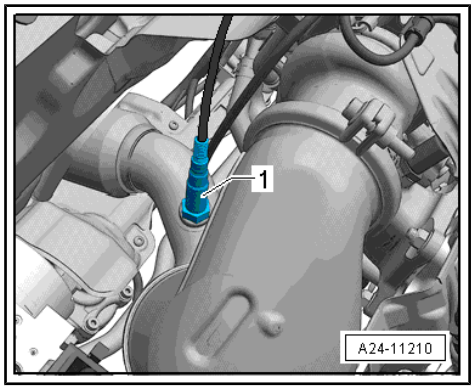
1 - Connector for lambda probe downstream of catalytic converter - G130-

2 - Connector for lambda probe - G39-

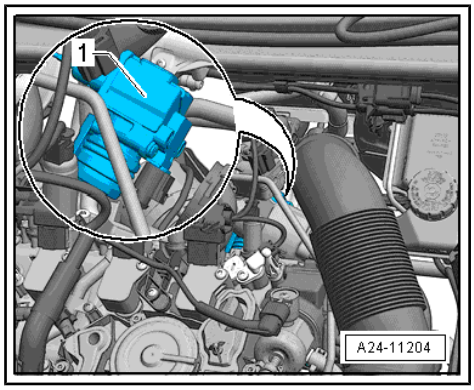
Lambda probe - G39- -1-



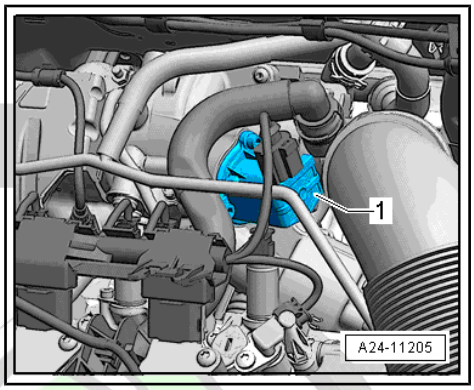
Lambda probe after catalytic converter - G130- -1-



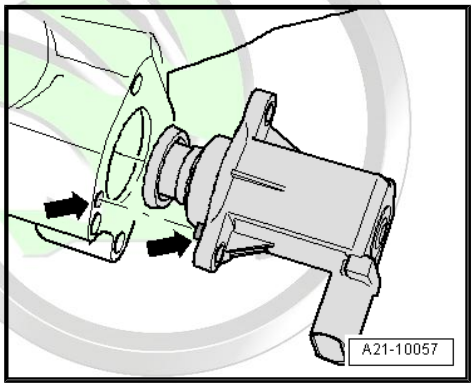
Charge pressure regulator - V465- -1-



Turbocharger divert air valve - N249- -1-

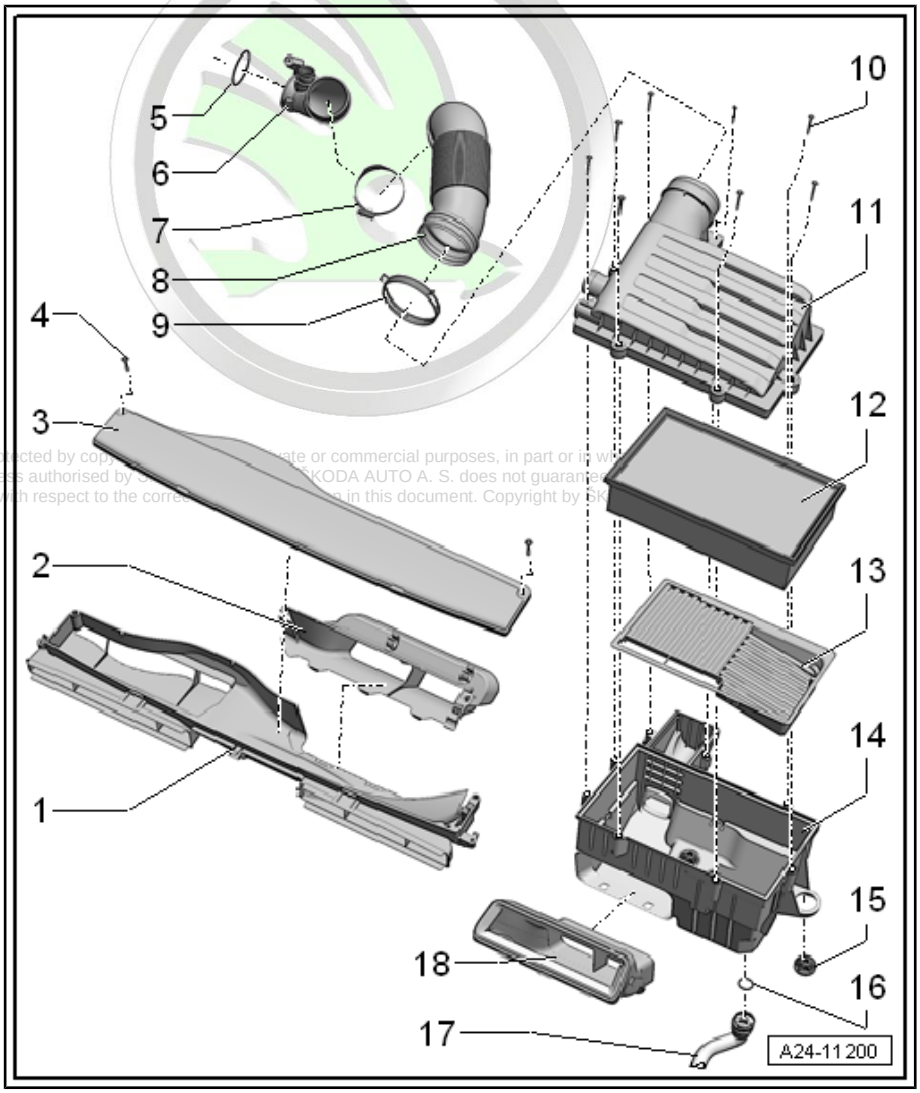


Note the fitting position of the turbocharger divert air valve - N249-



2 Air filter

2.1 Air filter - Summary of components



1 - Air guide lower part
- ❑ on the lock support

2 - air guide pipe top
- ❑ on the lock support

3 - Cover
- ❑ for air guide

4 - 2 Nm

5 - Sealing ring

6 - Air guide hose

7 - Screw clamp

8 - Air guide hose

9 - Spring strap clamp

10 - 2 Nm

11 - Air filter upper part
- ❑ removing and installing ⇒ page 258

12 - Filter element
- ❑ Keep to change intervals ⇒ Maintenance ; Booklet Octavia III

13 - Insert
- ❑ for air filter lower part

14 - Air filter lower part
- ❑ clean to remove dirt, leaves and salt residues

15 - Rubber buffer

16 - O-ring
- ❑ Renew if damaged

17 - Water drain hose
- ❑ with valve
- ❑ clean

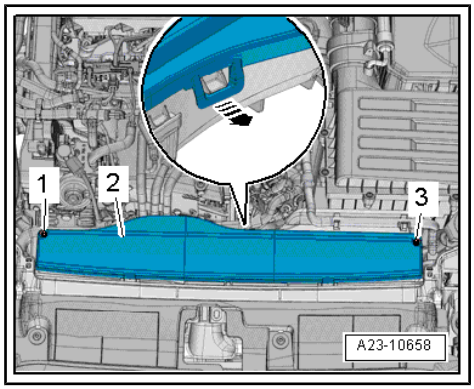
18 - Air deflector
- ❑ on the air filter lower part

2.2 Removing and installing air filter housing

Removing

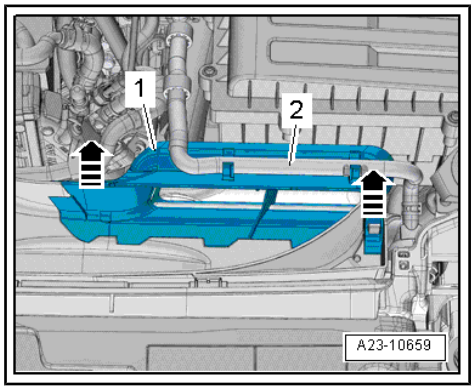
– Release screws -1 and 3-.

– Unlock latch -arrow- and remove cover -2-.



– Expose coolant hose -2-.

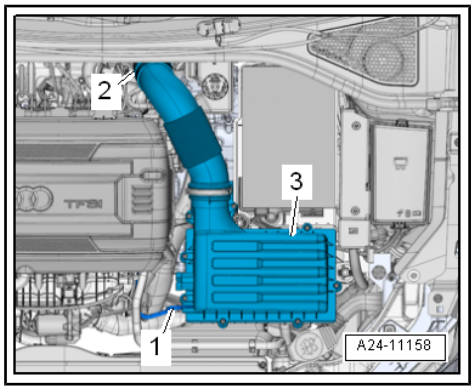
– Unlock catches -arrows- and remove the air guide pipe top -1-.



– Disconnect vacuum hose -1-.

– Loosen hose clamp -2- and remove air guide hose.

– Undo the air filter housing -3- from the rubber bolts and remove it upwards.



Install

Note

- *Use a silicone-free lubricant for installing the air guide hose.*
- *Secure all hose connections with hose clamps which comply with the series design: ⇒ ETKA - Electronic Catalogue of Original Parts. .*

– Check air guide hose (fresh air side) for salt deposits, dirt and leaves.

– Check suction channel up to air filter insert for dirt.

– Install air filter housing.

Note

The water discharge hose must be laid straight and pointing downwards, without any kinks.

3 Intake manifold and fuel distributor

3.1 Intake manifold - Summary of components

1 - Intake manifold

- ❑ removing and installing ⇒ page 264

2 - 9 Nm

3 - Valve for intake manifold flap - N316-

4 - Vacuum setting element for intake manifold flaps

5 - Screws for high pressure pump

- ❑ replace
- ♦ 1.8 l engines: 8 Nm + torque a further 90° ($^1/_4$ turn)
- ♦ 2.0 l engines: 20 Nm

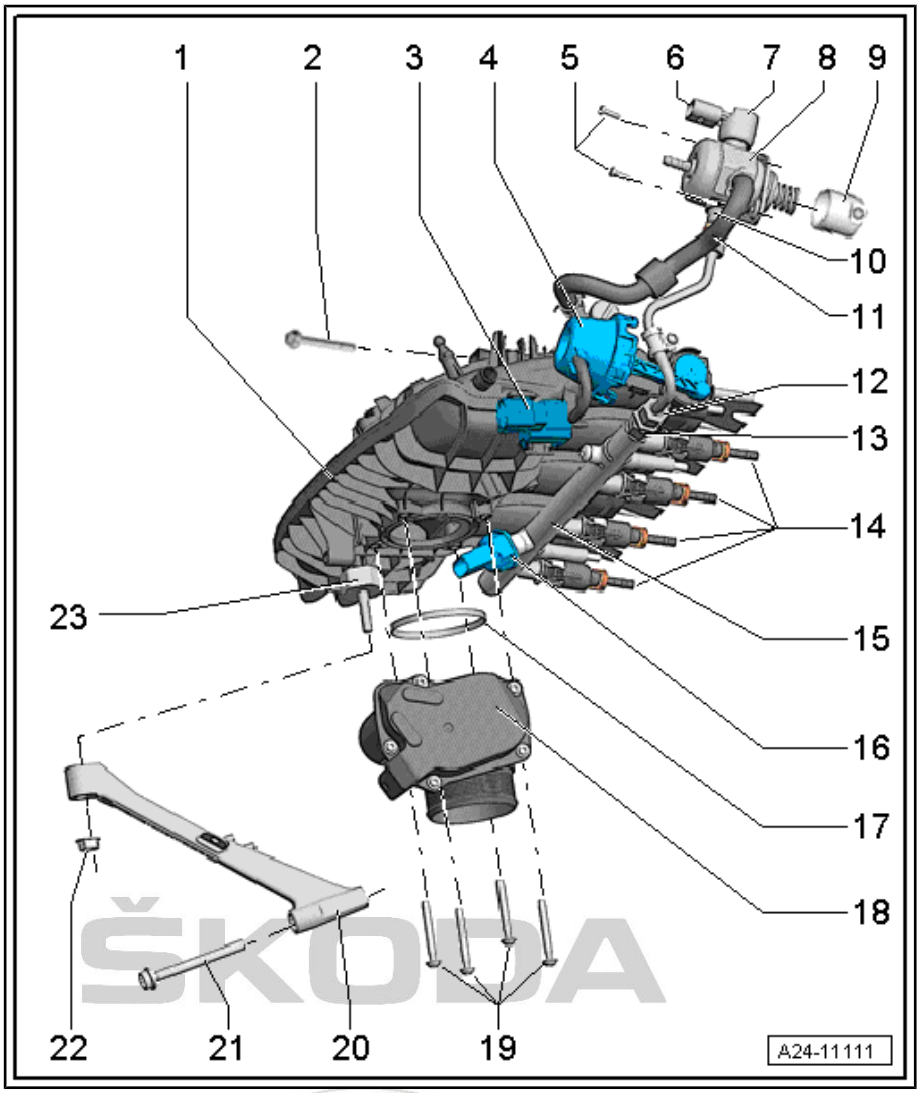
6 - Connector

- ❑ for fuel pressure regulating valve - N276-

7 - Control valve for fuel pressure - N276-

8 - High pressure pump

- ❑ with fuel pressure regulating valve - N276-
- ❑ The fuel tank has an electrical fuel pump which supplies fuel to the mechanical fuel pump
- ❑ when installing the high pressure pump, ensure that no dirt gets into the



fuel system.

- ❑ The high pressure system must not be exposed to any shock loads
- ❑ The fuel system must be de-pressurised before installing the high pressure pump; relieve the pressure in the fuel system. ⇒ page 4
- ❑ Install fuel lines free of tension
- ❑ removing and installing ⇒ page 285

9 - Roller tappet

- ❑ can remain inserted into the vacuum pump after removal of the high pressure pump, removable

10 - Fuel feed line

- ❑ for fuel distributor for injection valve FSI
- ❑ Wet ball end pieces of the fuel feed line with engine oil
- ❑ Install fuel feed line free of tension (make sure it is clean)

11 - Fuel feed line

- ❑ for fuel distributor for injection valve MPI
- ❑ Install fuel feed line free of tension (make sure it is clean)

12 - Union nut, 20 Nm

- ❑ for fuel feed line

13 - Connection fittings, 40 Nm

- ❑ for fuel feed line
- ❑ replace

14 - Injectors

- ❑ Replace O-ring and Teflon seal
- ❑ pay attention to correct installation position
- ❑ removing and installing ⇒ page 275

15 - Fuel distributor for injection valve FSI

16 - Fuel pressure sender - G247- , 27 Nm

- ❑ Moisten thread with clean engine oil
- ❑ removing and installing ⇒ page 278

17 - Sealing ring

- ❑ replace

18 - Throttle valve module - J338-

- ❑ with throttle valve drive for electronic power control - G186- , Angle gearbox 1 for anti-stall drive - G187- and angle gearbox 2 for anti-stall drive - G188-
- ❑ clean the original throttle valve control unit - J338- before re-installing ⇒ page 269
- ❑ after removal or installation or replacement of the throttle valve control unit - J338- it must be readjusted to the engine control unit - J623- . ⇒ Vehicle diagnostic tester

19 - 7 Nm

20 - Intake manifold support

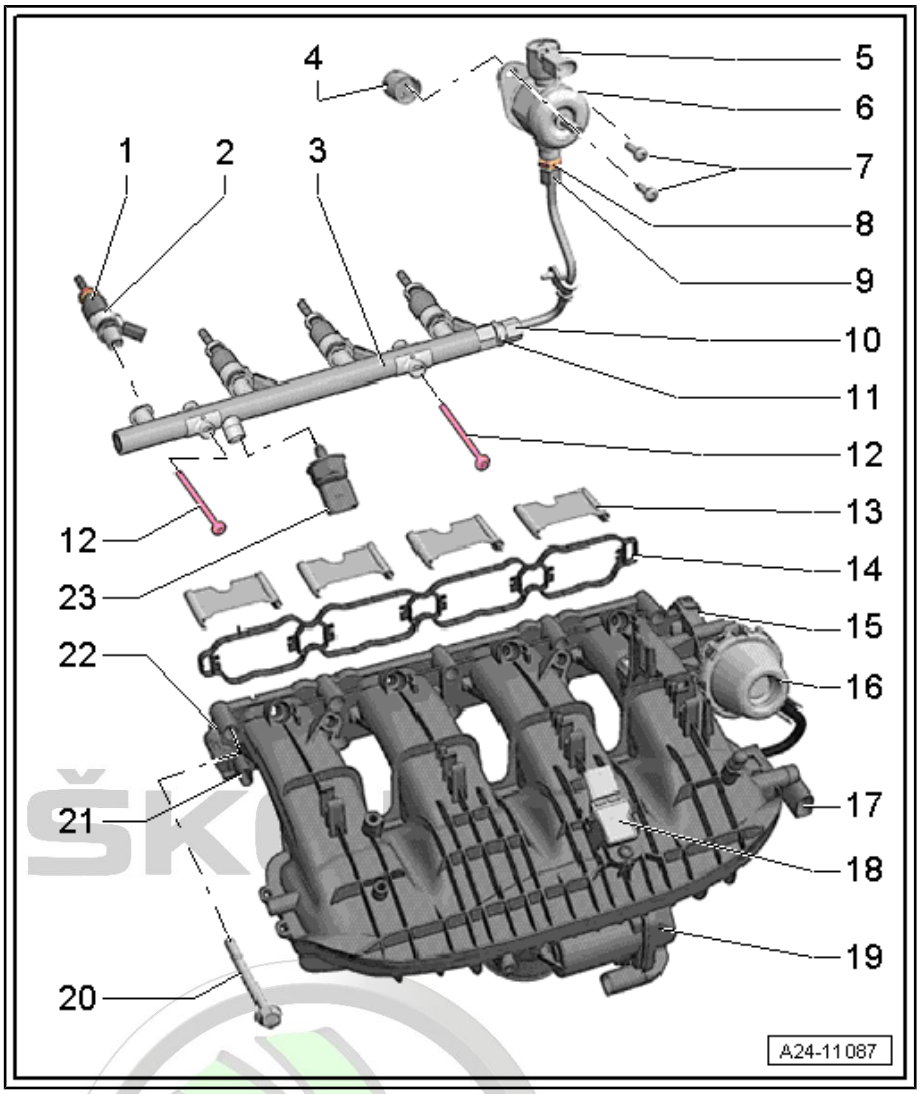
21 - 20 Nm

- ❑ for suction pipe stud

22 - 10 Nm

23 - Rubber bearing, 5 Nm

3.2 Fuel distributor FSI- summary of components



1 - Injector

- ❑ always replace with O-ring and combustion chamber sealing ring (Teflon seal)
- ❑ Replace O-rings.
- ❑ pay attention to correct installation position
- ❑ removing and installing ⇒ page 271

2 - Support ring

- ❑ replace

3 - Fuel distributor for injection valve FSI

4 - Roller tappet

5 - Control valve for fuel pressure - N276-

6 - High pressure pump

- ❑ with fuel pressure regulating valve - N276-
- ❑ The fuel tank has an electrical fuel pump which supplies fuel to the mechanical fuel pump
- ❑ when installing the high pressure pump, ensure that no dirt gets into the fuel system.
- ❑ The fuel system must be de-pressurised before installing the high pressure pump; relieve the pressure in the fuel system. ⇒ page 4
- ❑ Install fuel lines free of tension
- ❑ removing and installing ⇒ page 285

7 - Screws for high pressure pump

- ❑ replace

- ♦ 1.8 l engines: 8 Nm + torque a further 90° ($^1/_4$ turn)
- ♦ 2.0 l engines: 20 Nm

8 - Inlet connections

- ❑ for fuel feed line at high pressure pump
- ❑ replace

- ♦ 1.8 l engines: 40 Nm
- ♦ 2.0 l engines: 30 Nm

9 - Union nut, 27 Nm

- for fuel feed line

10 - Union nut, 20 Nm

- for fuel feed line

11 - Connection fittings, 40 Nm

- for fuel feed line at fuel distributor
- replace

12 - 9 Nm

13 - Divider plates

14 - Gasket

- Check, replace if damaged

15 - Adjusting flap for the intake manifold

16 - Vacuum setting element for intake manifold flaps

17 - Valve for intake manifold flaps - N316-

18 - Intake air temperature sender - G42- with manifold pressure sender - G71-

- 5 Nm

19 - Throttle valve module - J338-

- with throttle valve drive for electronic power control - G186- , Angle gearbox 1 for anti-stall drive - G187- and angle gearbox 2 for anti-stall drive - G188-
- clean the original throttle valve control unit - J338- before re-installing ⇒ page 269
- after removal or installation or replacement of the throttle valve control unit - J338- it must be readjusted to the engine control unit - J623- . ⇒ Vehicle diagnostic tester
- 7 Nm

20 - 9 Nm

21 - Potentiometer for intake manifold flap - G336-

- After each removal or installation or replacement, the Potentiometer for intake manifold flap - G336- must be readjusted to the engine control unit - J623- . ⇒ Vehicle diagnostic tester

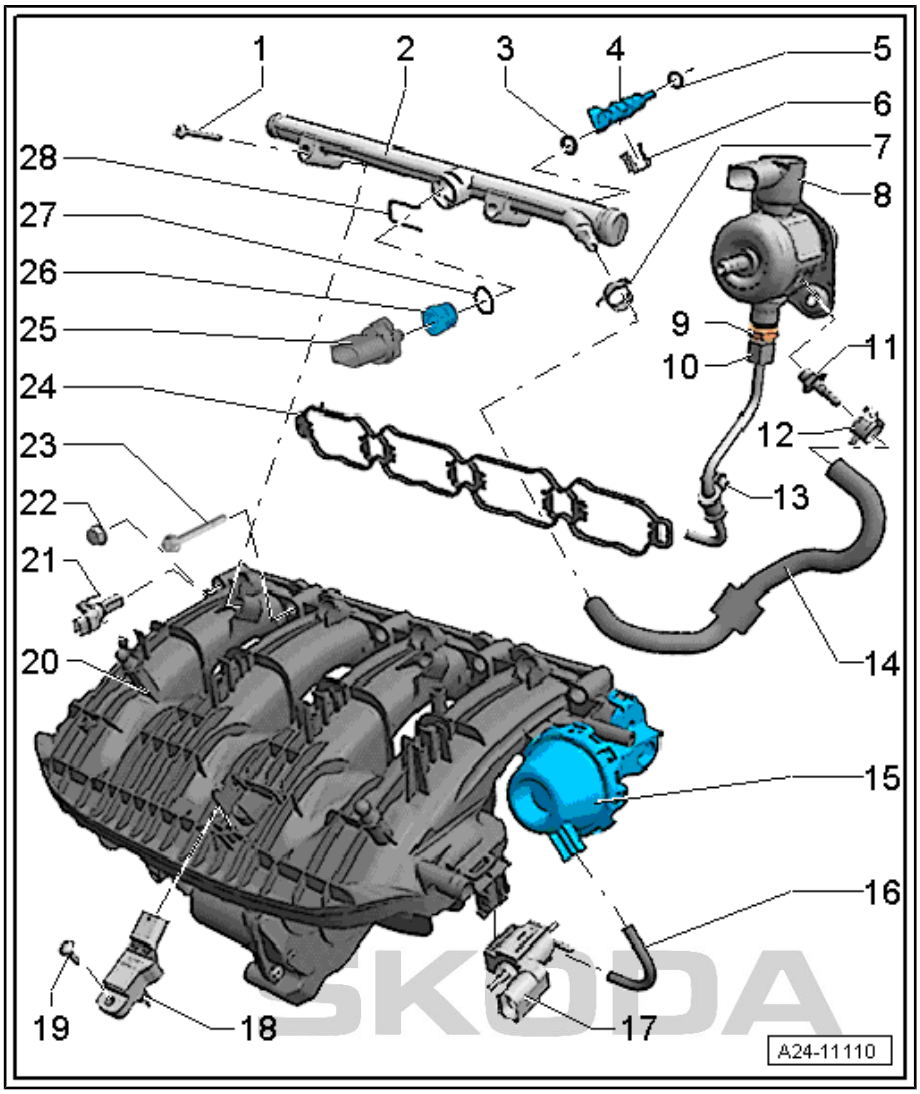
22 - Intake manifold

- removing and installing ⇒ page 264

23 - Fuel pressure sender - G247- , 27 Nm

- Moisten thread and cone with clean engine oil
- removing and installing ⇒ page 278

3.3 Fuel distributor MPI- summary of components



1 - 9 Nm

- ❑ for fuel distributor for injection valve MPI

2 - Fuel distributor for injection valve MPI

3 - O-ring

- ❑ replace

4 - Injector

- ❑ Replace O-rings.
- ❑ pay attention to correct installation position
- ❑ removing and installing ⇒ page 275

5 - O-ring

- ❑ replace

6 - Retaining clip

7 - Spring strap clamp

8 - High pressure pump

- ❑ with fuel pressure regulating valve - N276-
- ❑ The fuel tank has an electrical fuel pump which supplies fuel to the mechanical fuel pump
- ❑ when installing the high pressure pump, ensure that no dirt gets into the fuel system.
- ❑ The fuel system must be de-pressurised before installing the high pressure pump; relieve the pressure in the fuel system. ⇒ page 4
- ❑ Install fuel lines free of tension
- ❑ removing and installing ⇒ page 285

9 - Inlet connections

- ❑ for fuel feed line
- ❑ replace

- ♦ 1.8 l engines: 40 Nm
- ♦ 2.0 l engines: 30 Nm

10 - Union nut, 27 Nm

- ❑ for fuel feed line
- ❑ for fuel feed line for fuel distributor for injection valve FSI
- ❑ Wet ball end pieces of the fuel feed line with engine oil
- ❑ Install fuel feed line free of tension (make sure it is clean)

11 - Connection for fuel feed line

- ♦ 1.8 l engines: 15 Nm
- ♦ 2.0 l engines: 20 Nm

12 - Open warm-type clamp

- ❑ replace

13 - 5 Nm

14 - Fuel feed line

- ❑ for fuel distributor for injection valve MPI
- ❑ Install free of tension (make sure it is clean)

15 - Vacuum setting element for intake manifold flaps

16 - Vacuum hose

17 - Valve for intake manifold flap - N316-

18 - Intake air temperature sender - G42- with manifold pressure sender - G71-

19 - 5 Nm

20 - Intake manifold

- ❑ removing and installing ⇒ page 264

21 - Potentiometer for intake manifold flap - G336-

- ❑ After each removal or installation or replacement, the Potentiometer for intake manifold flap - G336- must be readjusted to the engine control unit - J623- . ⇒ Vehicle diagnostic tester

22 - Nuts for intake manifold, 9 Nm

23 - Screws for intake manifold, 9 Nm

24 - Gasket

- ❑ Check, replace if damaged

25 - Fuel pressure sender for low-pressure - G410- , 15 Nm

- ❑ must be bolted with adapter -Pos. 26-
- ❑ removing and installing ⇒ page 281

26 - Adapter, 15 Nm

- ❑ must be bolted with fuel pressure sender for low-pressure - G410-
- ❑ Renew O-ring

27 - O-ring

- ❑ replace

28 - Clip

- ❑ for securing the Fuel pressure sender for low-pressure - G410- in the fuel distributor

3.4 Removing and installing intake manifold

Special tools and workshop equipment required

- ♦ Assembly tool - T10118-
- ♦ Hose binding claw

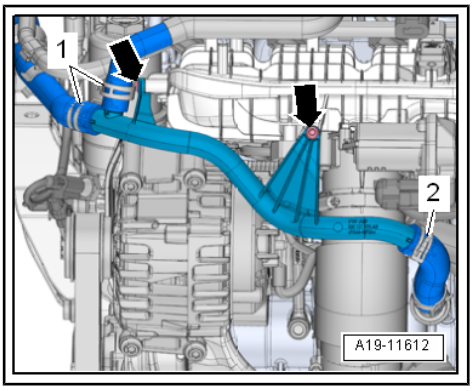
Note

When replacing the intake manifold, the potentiometer for intake manifold flap - G336- must be adapted to the engine control unit - J623 - ⇒ Vehicle diagnostic tester.

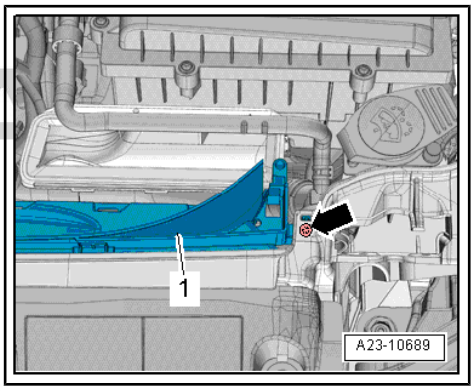
Removing

– Observe all safety measures and notes for assembly work on the fuel system, on the injection and ignition system as well as rules for cleanliness ⇒ page 3 .

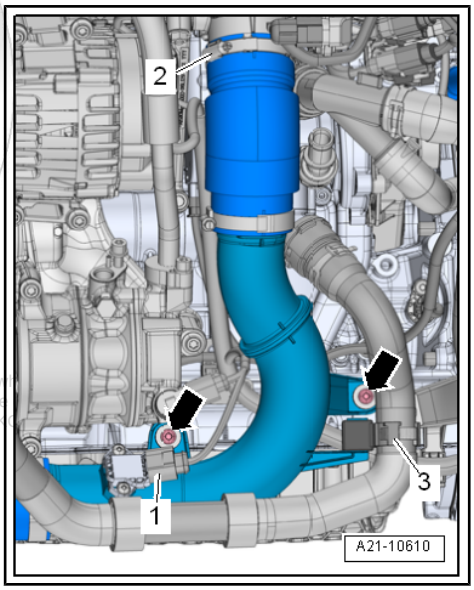
– Switch off ignition and all electrical loads, and pull out ignition key.
– Remove engine cover ⇒ page 10 .
– Undo screws -arrows- of the coolant line at the intake manifold.
– Remove air filter housing ⇒ page 258 .



– Release screw left and right -arrow-
– Unclip and remove the air guide pipe bottom -1-.
– Remove the sound dampening system ⇒ Body Work; Rep. gr. 50 .



– Expose coolant hose -3-.
– Disconnect plug -1- at charge pressure sender - G31- .
– Remove bolts -arrows-.
– Undo the hose clamp -2- for air guide hose and remove the air guide hose from the throttle flap control unit - J338- downwards.

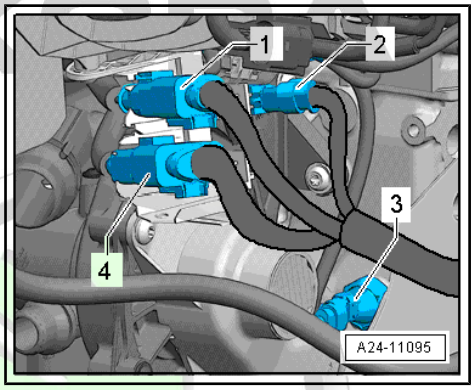


– Disconnect following plugs.

1 - From the injection valves FSI

2 - From knock sensor 1 - G61-

4 - From the valve for intake manifold flap - N316- , fuel pressure sender - G247- , Potentiometer for intake manifold - G336- , coolant temperature sender - G62- , hall sender - G40-



WARNING

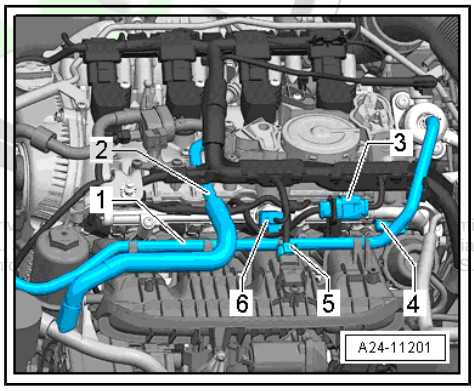
The fuel system is under pressure! Before opening the high-pressure area of the injection system, the fuel pressure must be reduced to residual pressure ⇒ page 4 .

– Detach fuel feed line hose -1- from intake manifold.

– Pull the plug -3- out of the holder.

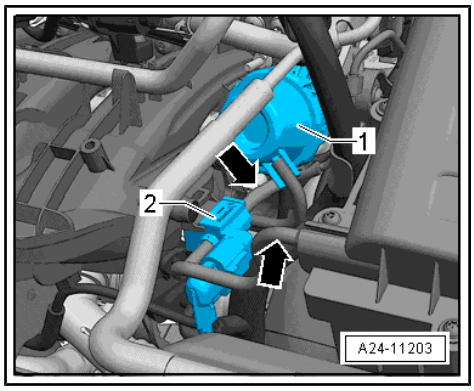
– Disconnect plugs -4, 5 and 6-.

– Disconnect the electrical wiring harness from the fuel distributor.

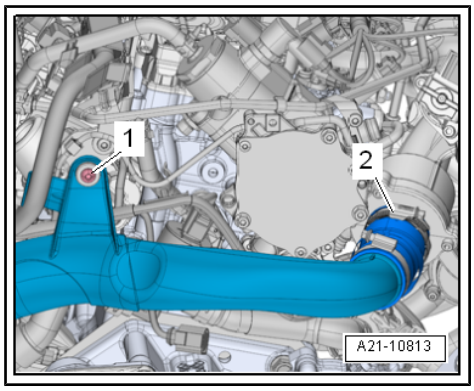


– Remove connector from valve for intake manifold flap - N316- -2-.

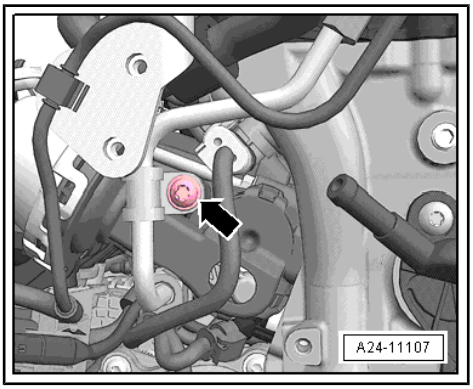
– Remove vacuum lines -arrows- from the valve for intake manifold flap - N316- -2- and from the air filter housing.



– Unscrew the screw -1- and press air guide pipe to the left.



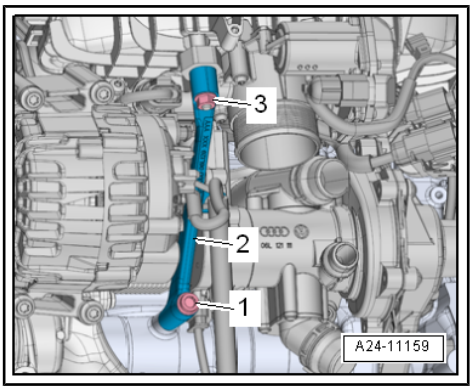
– Unscrew the holding clamp -arrow- for high-pressure line.
– Unscrew union nuts of high pressure line from the high-pressure pump and fuel distributor.
– Remove high pressure line.



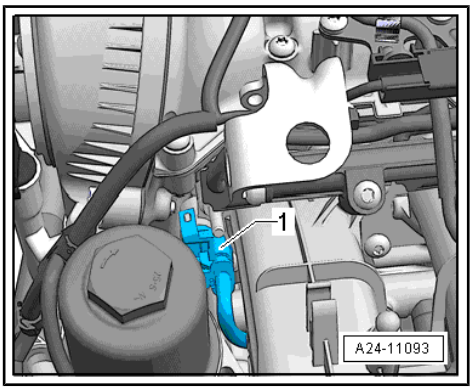
Note

- *The fuel system must be de-pressurised.*
- *Collect the fuel which flows out with a clean cloth.*
- *Close open connections with clean blind plugs. Make sure no dirt can get into the fuel system.*

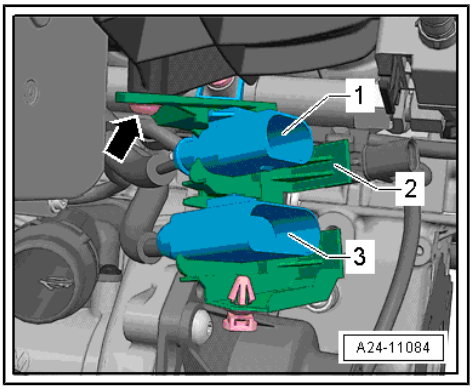
– Slightly undo the fastening nuts -3- and remove the screws -1- completely.



– Remove connector -1- from the potentiometer for intake manifold flap - G336- .
– Remove the screws from the intake manifold.



– Remove the intake manifold from the cylinder head with a light force, and unscrew the connector holder -arrow-.



Note

Seal intake passages with a clean cloth.

Install

– Screw the connector holder back on.
– Slide the suction pipe over the stud bolts (left and right below) on the cylinder head.
– Further installation occurs in reverse order.
• Tightening torque ⇒ page 259

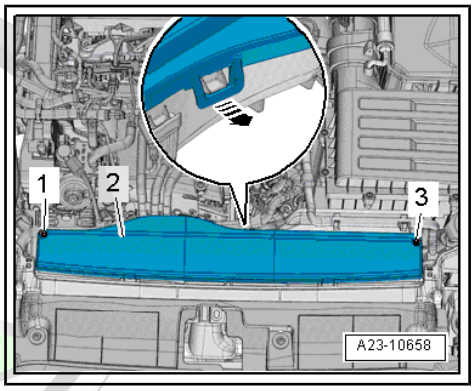
3.5 Removing and installing the throttle valve control unit - J338-

Removing

– Remove engine cover ⇒ page 10 .

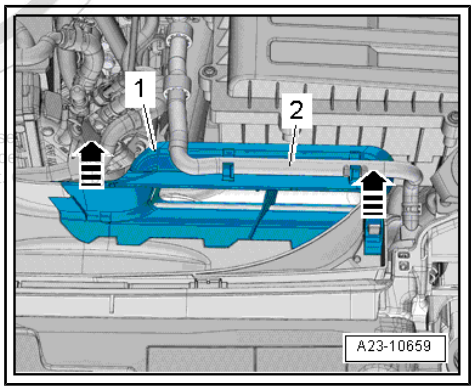
– Release screws -1 and 3-.

– Unlock latch -arrow- and remove cover -2-.



– Expose coolant hose -2-.

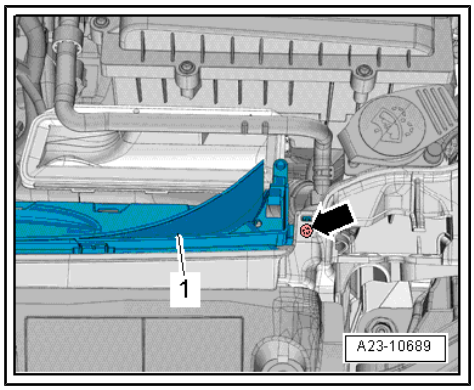
– Unlock catches -arrows- and remove the air guide pipe top -1-.



– Release screw left and right -arrow-

– Unclip and remove the air guide pipe bottom -1-.

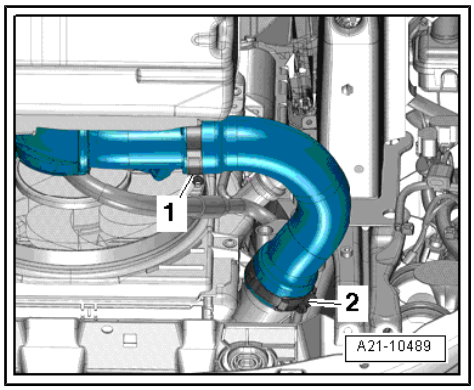
– Remove the sound dampening system ⇒ Body Work; Rep. gr. 50 .



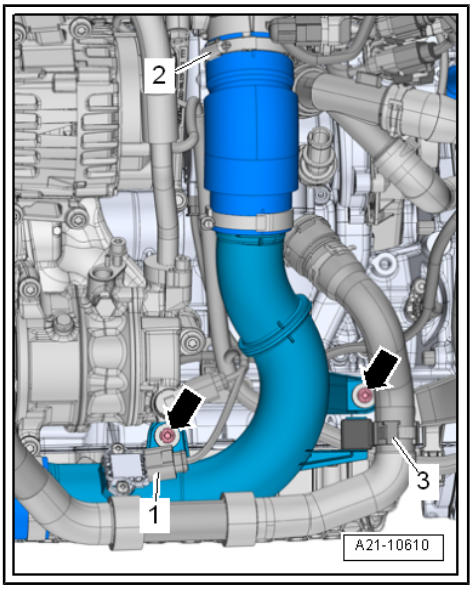
– Loosen hose clamp -2- and remove air guide hose from the charge air cooler.

Note

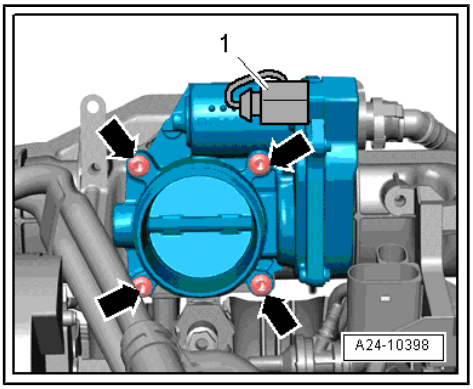
Do not pay attention to the position -1-.



– Expose coolant hose -3-.
– Disconnect plug -1- at charge pressure sender - G31- .
– Unscrew screws -arrows-.
– Undo the hose clamp -2- for air guide hose and remove the air guide hose from the throttle flap control unit - J338- .
– Remove air guide hose downwards.



– Disconnect the plug -1- from the throttle valve control unit - J338- .
– Unscrew screws -arrows- of the throttle flap control unit - J338- downwards, and remove the throttle flap control unit - J338- .



Install

Installation is carried out in the reverse order. However, pay attention to the following:

– Clean the original throttle valve control unit - J338- before re-installation ⇒ page 269 .
– Clean sealing surface of sealing ring.
– Renew seal.
• Tightening torques ⇒ page 259
– After replacing the throttle flap control unit - J338- the engine control unit - J623- will require readjustment ⇒ Vehicle diagnostic tester.

3.6 Clean throttle valve control unit - J338-

Note

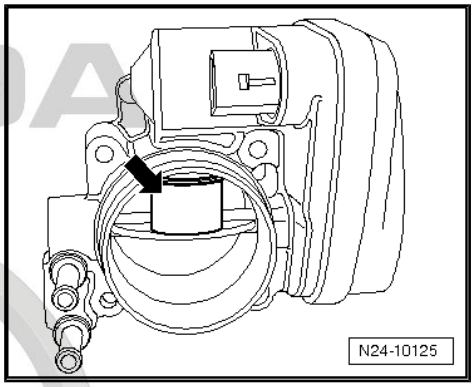
- *If a new engine control unit is fitted - J623- , the throttle valve control unit must be adapted.*
- *Soiling and carbonisation in the limit stop can lead to incorrect adjustment values.*
- *When cleaning the throttle valve housing it must not be scratched.*

Special tools and workshop equipment required

- Commercially available Acetone
- Paint brush

– Remove throttle valve module - J338- ⇒ page 268 .

– Open throttle valve by hand and lock in open position using wood or a plastic wedge -arrow-.

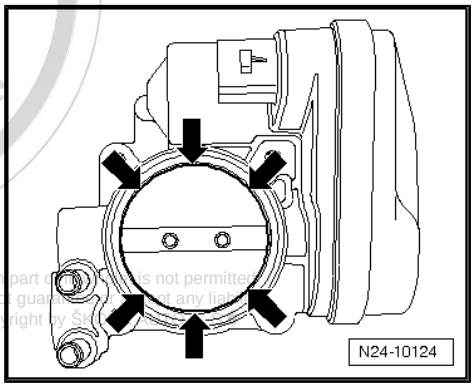


WARNING

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.*
- *Wear safety goggles and safety clothing, in order to avoid injuries and skin contact.*

– Thoroughly clean the throttle valve support, in particular the area of the closed throttle valve -arrows-, with commercially available acetone and a paint brush.



– Wipe out throttle valve housing with a lint-free cloth.

– Allow Acetone to dry off completely.

– Install throttle valve module - J338- ⇒ page 268 .

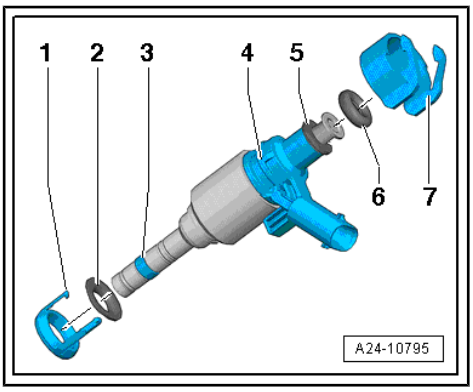
– Erase initialisation values and adapt the engine control unit - J623- to the throttle valve control unit - J338- ⇒ Vehicle diagnostic tester.

4 Injectors

4.1 Removing and installing the FSI injection valves

Special tools and workshop equipment required

- Set of tools for FSI engines - T10133-



Injection valves- Summary of components

1 - Intermediate ring - replace

2 - Holder - replace

3 - combustion chamber sealing ring (Teflon seal) replace: when installing, this must not be greased or treated with any other lubricant - replace.

4 - Injector

5 - Spacer - replace

6 - O-ring (when installing wet lightly with engine oil) - replace

7 - Support ring (the fuel distributor exerts force via the support ring that holds the injector in the cylinder head) - replace

Removing

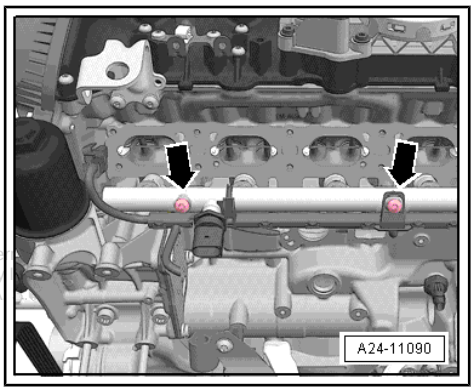
Note

Injectors must not be removed while the engine is cold.

– Removing the intake manifold ⇒ page 264 .

– Remove connector for fuel pressure sender - G247- and all of the connectors on the injection valves.

– Undo screws -arrows- and remove fuel distributor from the cylinder head.



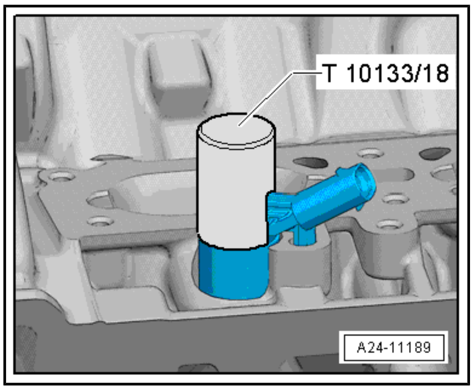
When the injection valves remain inserted in the fuel distributor.

– Carefully remove the injection valves from the guide of the fuel distributor.

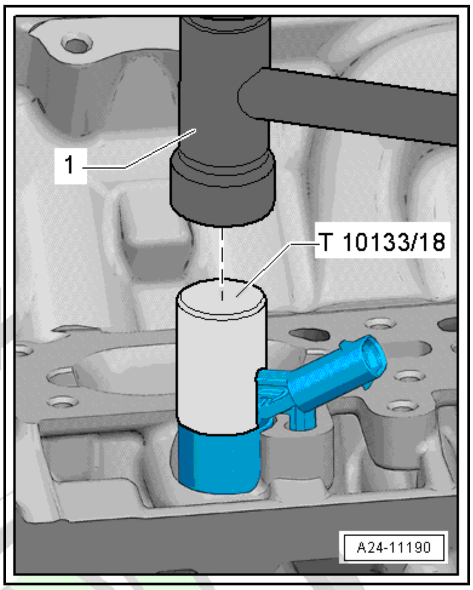
When the injection valves remain inserted in the cylinder head.

– Cover the open inlet channels with a clean cloth.

– Push sleeve -T10133/18- over the injection valve.



– Carefully tap on sleeve several times to loosen the injection valve.



Note

♦ *Use a torque wrench to pull out the injector.*

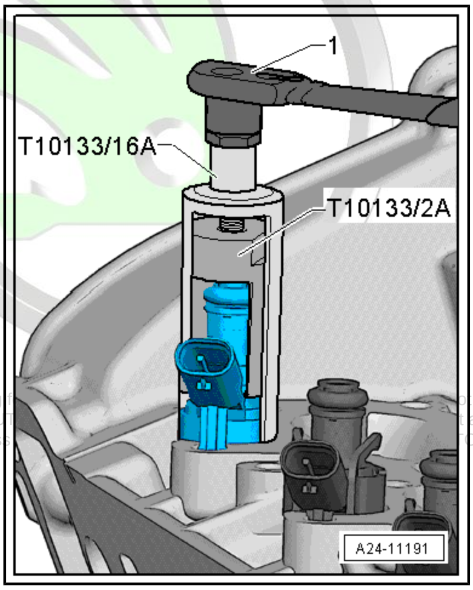
♦ *Set 5 Nm on the torque wrench.*

– Insert extractor -T10133/2A- into the groove of the injection valve.

– Afterwards, attach the extractor T10133/16A .

– Remove the injection valve by turning the screw with a torque wrench -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 hitting it.



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.*

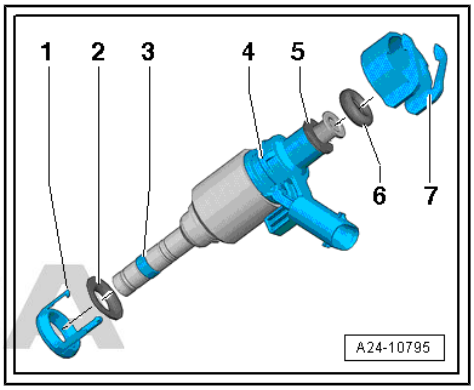
– Replace combustion chamber sealing ring and installing injection valve ⇒ page 273 .

4.1.1 Replace combustion chamber sealing ring (Teflon seal)

Note

The combustion chamber sealing ring (Teflon seal) must always be replaced before the injection valve is pre-installed.

– Remove old combustion chamber sealing ring -3- carefully with a suitable tool (e.g. cut open the seal with a knife, open up where necessary with a small screwdriver, and remove from the front). Make sure the groove and surrounding fins in the base of the groove are not damaged.

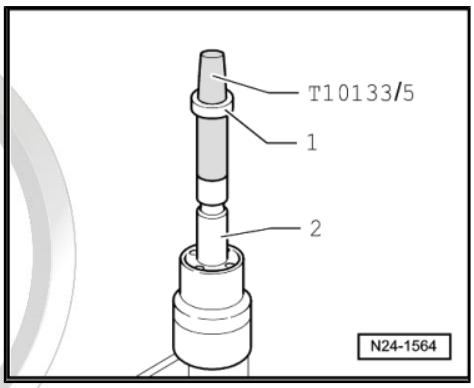


Note

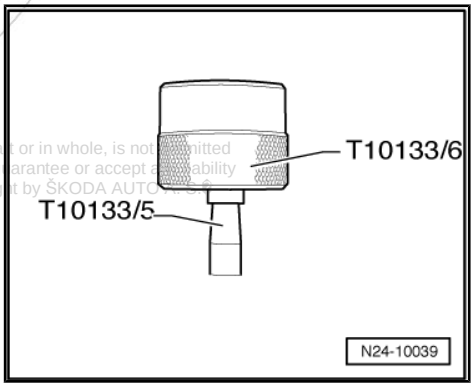
If the groove is damaged the injector valve must be replaced.

– Before installing the new combustion chamber sealing ring, clean the seal groove and shaft on the injection valve of combustion remnants with a clean cloth.

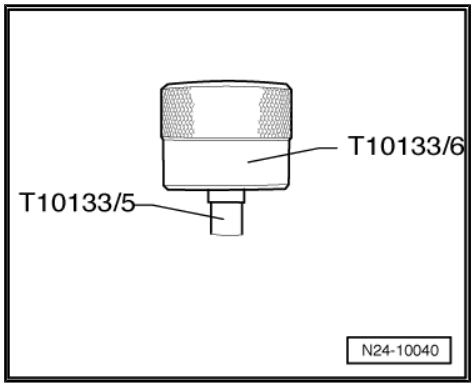
– Fit assembly cone -T10133/5- with the new combustion chamber sealing ring -1- onto the injector -2-.



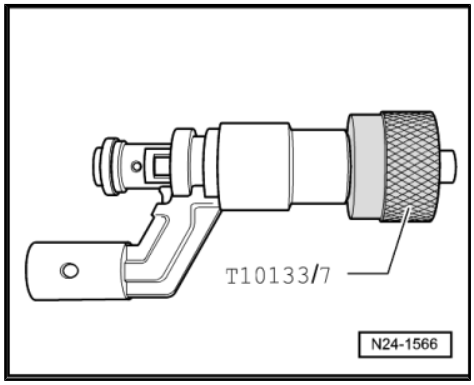
– Push combustion chamber sealing ring with assembly sleeve -T10133/6- as far as possible onto the assembly cone -T10133/5- .



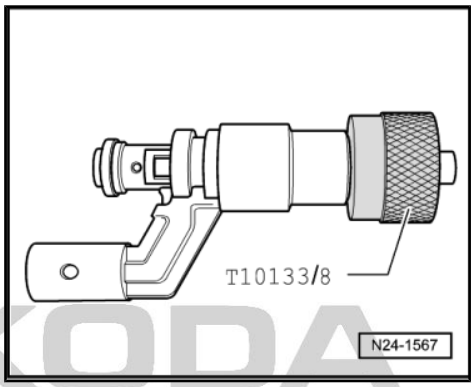
– Turn the assembly sleeve - T10133/6- and push the combustion chamber sealing ring to the end of the assembly cone - T10133/5- .
– Remove assembly cone - T10133/5- and slide the combustion chamber sealing ring with assembly sleeve - T10133/6- as far as the sealing ring groove.



– Press calibrating sleeve -T10133/7- with a gentle rotary movement (approximately 180°) up to the stop on the injector.
– Remove the calibrating sleeve -T10133/7- through the reverse direction of rotation again.



– Press calibrating sleeve -T10133/8- with a gentle rotary movement (approximately 180°) up to the stop on the injector.
– Remove the calibrating sleeve -T10133/8- through the reverse direction of rotation again.
– Replace O-ring for injection valve. Before installing, wet O-ring with clean engine oil.

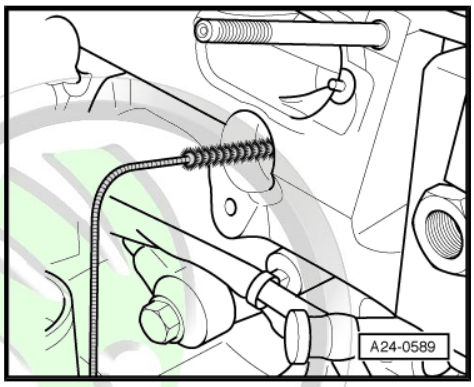


– Before installation of the injection valves, clean the bore holes of the high-pressure injection valves in the cylinder head with the nylon brush - T10133/4- .

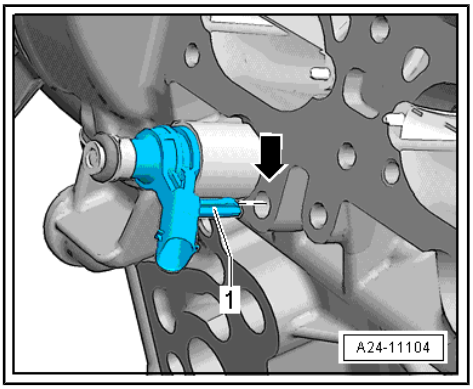
Note

- *The Teflon gasket ring of the injection valve must neither be oiled nor greased.*
- *When installing the injection valves, there should be no cleaning agents or oil in the bores in the cylinder head.*

– Press the injector valve 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.

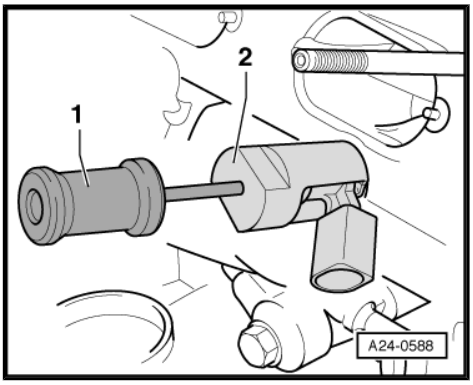


– The nose -1- and the bore -arrow- in the cylinder head must coincide.



Note

- *The injection valve must insert easily, if necessary wait until the combustion chamber sealing ring has been drawn together sufficiently.*
- *Pay attention to the correct seating and fitting position of the injection valves in the cylinder head.*
- *If the injection valve cannot be inserted by hand, to insert the injection valve, use the extractor - T10133/2A- -2- and the hammer - T10133/3- .*



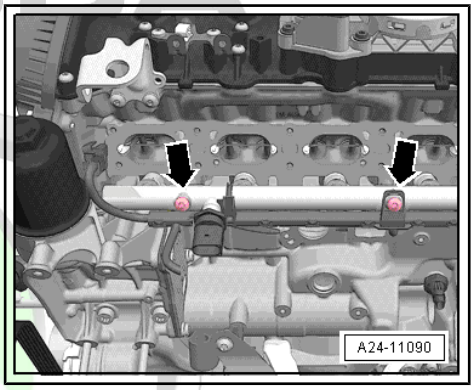
– Wet the O-rings of the injection valves with clean motor oil to insert them more easily into the fuel distributor.

– Place fuel distributor on the cylinder head and screw in the screws -arrows-.

– Connect connector for fuel pressure sender - G247- and all of the connectors on the injection valves.

– Installing the intake manifold ⇒ page 264 .

• Tightening torque: Fuel distributor FSI- summary of components ⇒ page 261



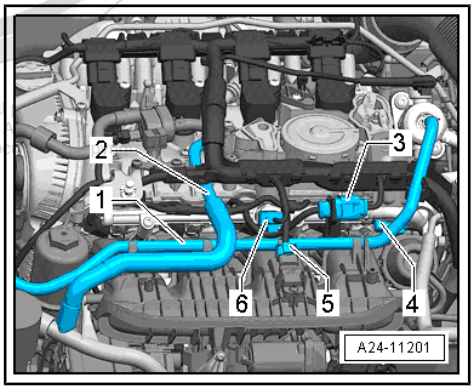
4.2 Removing and installing the MPI injection valves

Removing

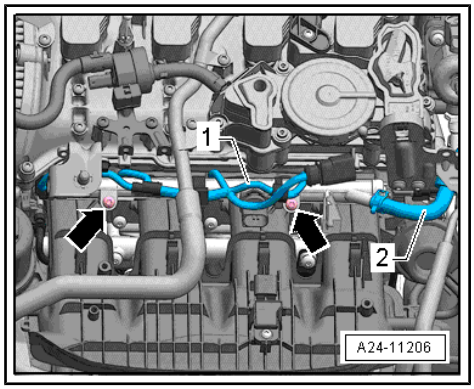
– Detach fuel feed line hose -1- from intake manifold.

– Pull the plug -3- out of the holder.

– Disconnect the connectors -4- and -5-.

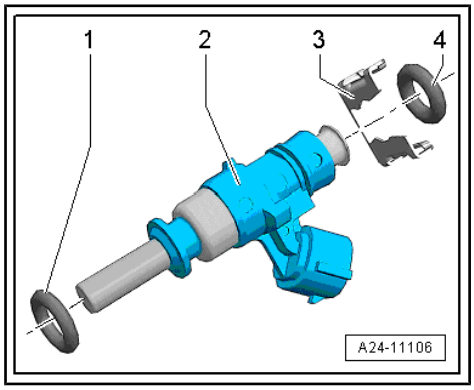


– Disconnect the electrical wiring harness -1- from the fuel distributor.
– Unscrew the screws -arrows- from the fuel distributor.
– Carefully remove the fuel distributor with injection valves upwards.
– Disconnect plug connections at the injection valves.



Injection valve MPI- summary of components

1 - O-ring (when installing wet lightly with engine oil) - replace
2 - Injector
3 - Retaining clip
4 - O-ring (when installing wet lightly with engine oil) - replace



Install

– Replace O-rings for injection valve. Before installing, wet O-rings with clean engine oil.
– Connect plug connections at the injection valves.
– Press fuel distributor with the injection valves into the bore in the intake manifold by hand up to the stop (oil and grease free).
– Further installation occurs in reverse order.
– Install fuel distributor.
• Tightening torque ⇒ page 261 .

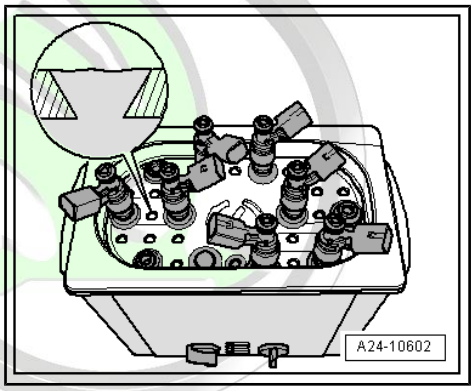
4.3 Clean injection valves FSI

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

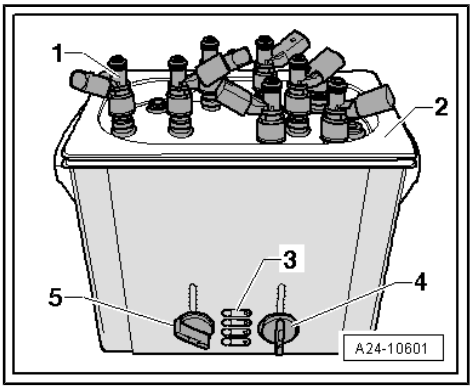
♦ *The ultrasound device must be filled with cleaning agent up to the top of the holes (see inset).*
♦ *Observe the safety and operating instructions of the ultrasound device.*



Clean

– Remove injection valves ⇒ page 271 .
– Fill ultrasound device with cleaning fluid.
– Push FSI injection valves -1- into the feeder plate for injection units - VAS 6418/1- -2- as far as they will go.

– Dip the FSI injection units with feeder plate for injection units - VAS 6418/1- into the cleaing fluid.
– 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.

– After cleaning the FSI injection valves, always replace the respective combustion chamber seal (Teflon seal) ⇒ page 273 .
– After, re-install the FSI injection valves ⇒ page 271 .

5 Sender

5.1 Removing and installing fuel pressure sender - G247-

If the fuel pressure sender - G247- fails, the fuel pressure control valve - N276- is switched off, the fuel delivery unit is controlled in full, and the engine works with the existing fuel pressure. There is a considerable reduction of the engine torque as a result.

Special tools and workshop equipment required

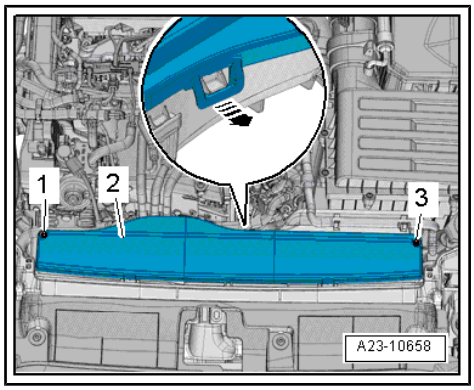
- Assembly tool - T10118-
- Polydrive socket - T40218- and standard socket insert 27 mm

Removing

– Remove engine cover ⇒ page 10 .

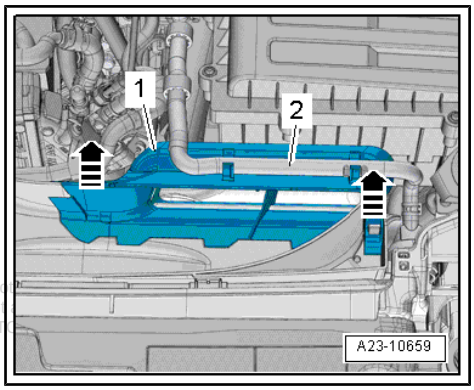
– Release screws -1 and 3-.

– Unlock latch -arrow- and remove cover -2-.



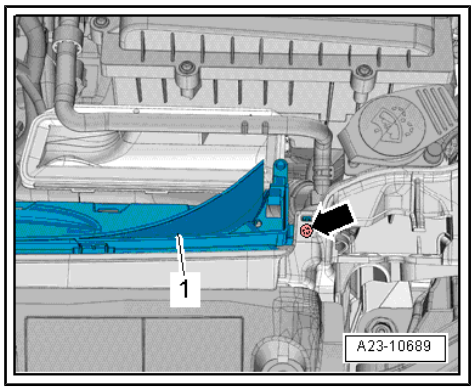
– Expose coolant hose -2-.

– Unlock catches -arrows- and remove the air guide pipe top -1-.



– Release screw left and right -arrow-

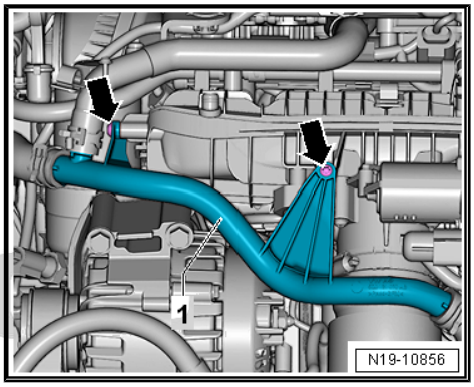
– Unclip and remove the air guide pipe bottom -1-.



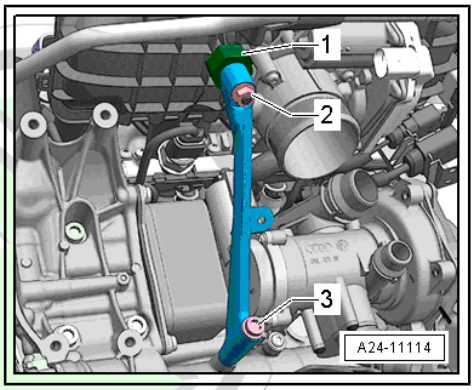
WARNING

The fuel system is under pressure! Before opening the system, you must remove the pressure in the high-pressure area ⇒ page 4 .

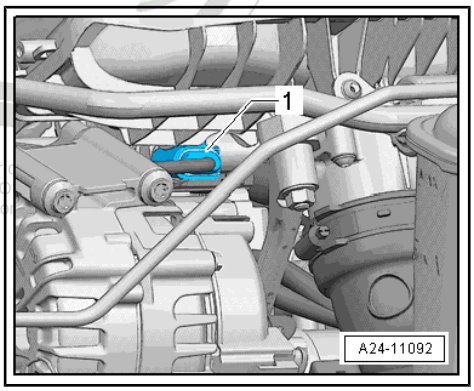
– Undo screws -arrows- of the coolant line at the intake manifold.



– Remove the intake manifold support, unscrew the nuts -2- and screw -3-.
– Remove the rubber bearing -1- for the intake manifold supports.



– Release plug from the fuel pressure sender - G247- -1- with assembly tool - T10118- .
– Unscrew fuel pressure sender - G247- -1- with Polydrive socket - T40218- .



Install

Installation is carried out in the reverse order. However, pay attention to the following:

- Tightening torque: Fuel distributor - summary of components ⇒ page 261

5.2 Check fuel pressure sender - G247-

Special tools and workshop equipment required

- Tester for pressure sensor - VAS 6394-
- Adapter - VAS 6394/2-
- Test adapter - VAS 5570-

Work procedure:

– Remove engine cover ⇒ page 10 .

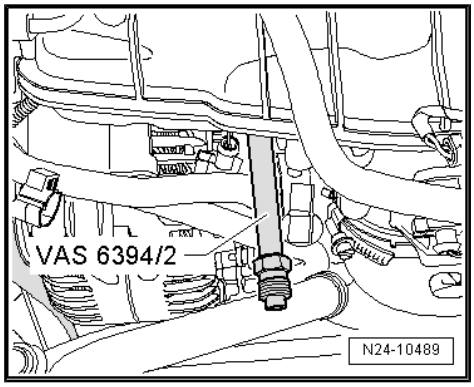
WARNING

The fuel system is under pressure! Before opening the system, you must remove the pressure in the high-pressure area ⇒ page 4 .

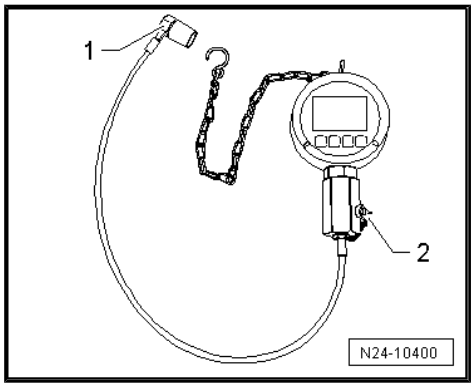
– Remove fuel pressure sender - G247- ⇒ page 278 .

– Instead of the fuel pressure sender - G247- insert the adapter - VAS 6394/2- and fix it with the tightening torque of the fuel pressure sender - G247- .

♦ Tightening torque: Fuel distributor ⇒ page 261



– Open the screw plug -2- of the digital pressure manometer - VAS 6394/1- and fix the removed fuel pressure sender - G247- with the tightening torque.



– Use the test adapter - VAS 5570- to establish the electrical connection between the vehicle and the fuel pressure sender - G247- .

– Connect vehicle diagnosis tester ⇒ Vehicle diagnostic tester.

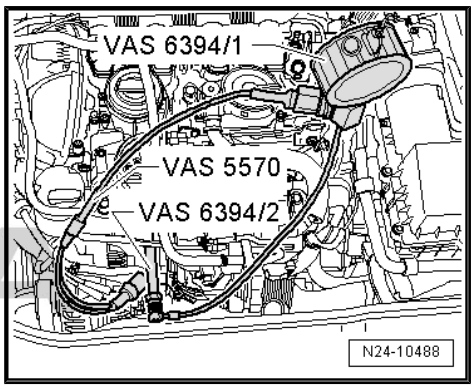
– Switch on ignition.

– Select self-diagnosis “engine electronics”.

– Then select “measured values”.

– In the function menu, select the “Fuel pressure”.

The actual value which is transmitted to the engine control unit by the fuel pressure sender - G247- is shown in the display field.

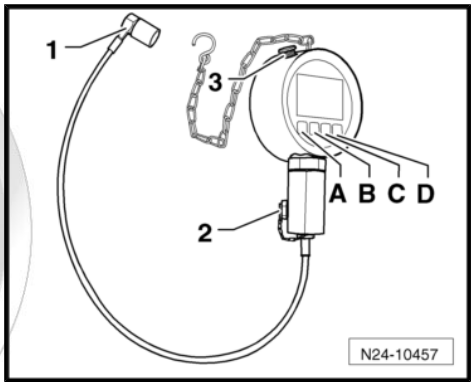


– Switch on the pressure manometer - VAS 6394/1- , for this step, briefly press the button -A- once.

Note

If the button -A- is pressed for 2 seconds, the illumination is switched on for 20 seconds.

The pressure manometer - VAS 6394/1- should indicate 0 bar; if this is not the case, press the button -C- once briefly for the zero value comparison.



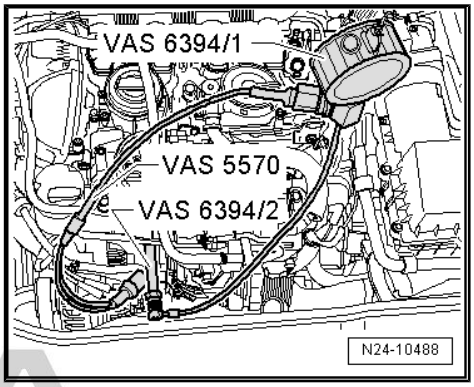
– Connect the pressure line of the pressure manometer - VAS 6394/1- to the adapter - VAS 6394/2- .

– Start engine.

– Compare the displayed pressure on the pressure manometer - VAS 6394/1- with the actual value at the vehicle diagnostics tester .

• The pressures may deviate a maximum 0.5 MPa (5 bar) from one another.

– If the deviation is greater than 0.5 MPa (5 bar), test a new Fuel pressure sender - G247- .



WARNING

The fuel system is under pressure! Before opening the system, you must remove the pressure in the high-pressure area ⇒ page 4 .

– Screw in the new Fuel pressure sender - G247- into the pressure manometer - VAS 6394/1- .

– Repeat the test with the new fuel pressure sender - G247- and compare both measured values.

If the measured values do not correspond now:

– Check electrical wiring between Fuel pressure sender - G247- and engine control unit⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

If the measured values now correspond:

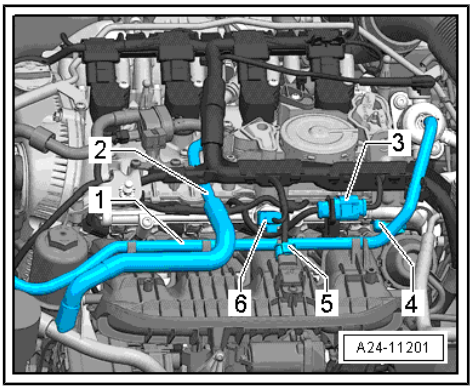
– Install the new Fuel pressure sender - G247- ⇒ page 278 .

5.3 Removing and installing fuel pump control unit for low-pressure - G410-

Removing

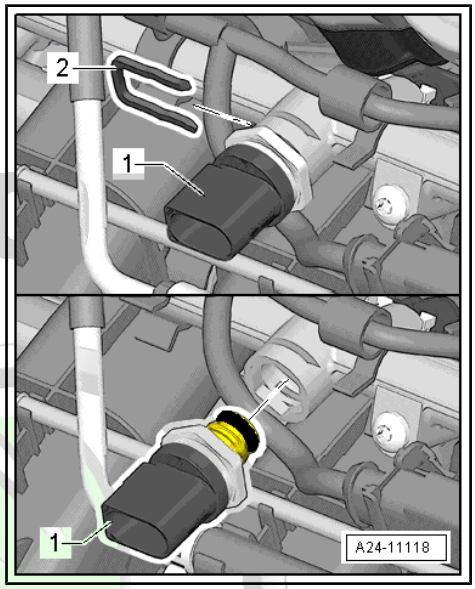
– Remove engine cover ⇒ page 10 .

– Remove connector -6- from the Fuel pressure sender for low-pressure - G410- .



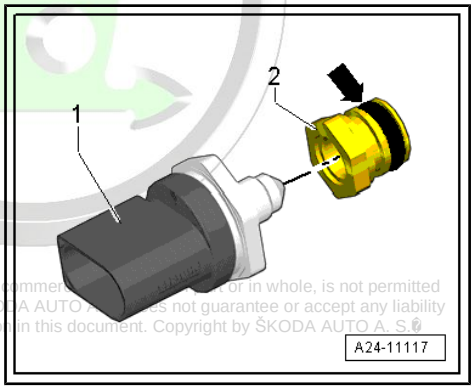
– Remove bracket - 2 -.

– Remove fuel Fuel pressure sender for low-pressure - G410- -1- from the fuel distributor.



– Remove the Fuel pressure sender for the low-pressure - G410- -1- from the adapter -2-.

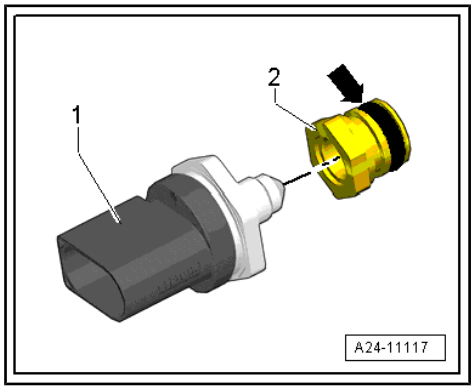
Install



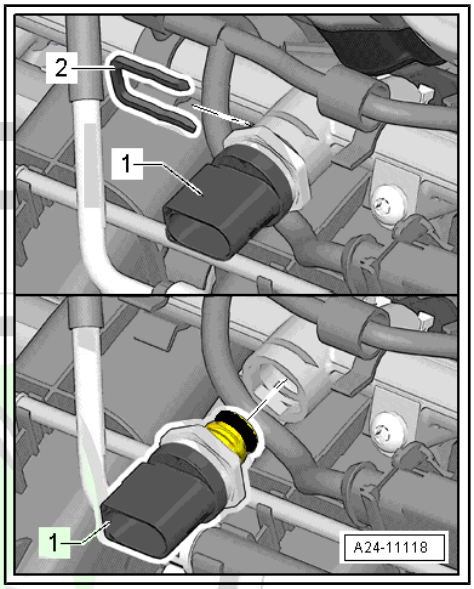
– Replace O-Ring -arrow-.

– Screw the adapter -2- with Fuel pressure sender for low-pressure - G410- -1-.

• Tightening torque ⇒ page 263 .



– Carefully slide the fuel pressure sender for low-pressure - G410- -1- into the fuel distributor up to stop.
– Secure the fuel pressure sender for the low-pressure - G410- by sliding in the bracket -2- into the groove.
– Mount plug.

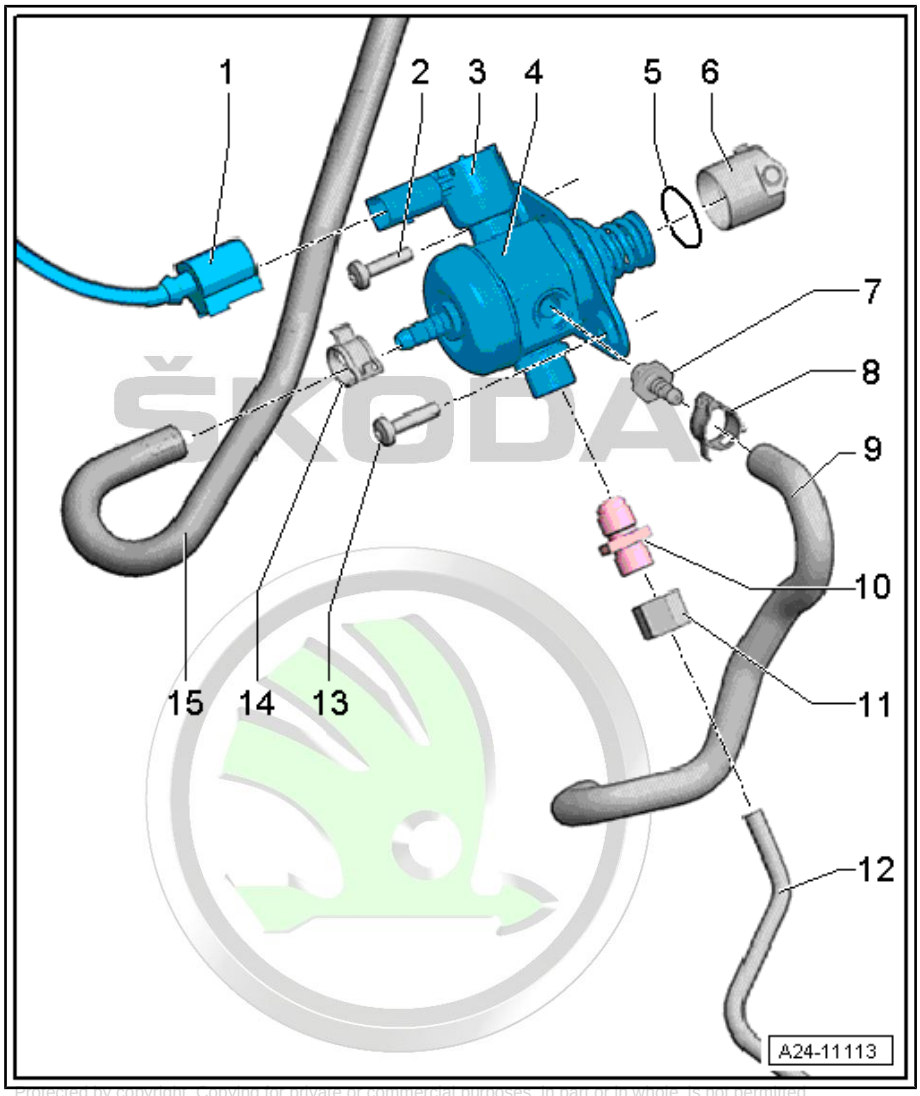


6 High pressure pump

6.1 High pressure pump - Summary of components

WARNING

The fuel system is under pressure! Before opening the system, you must remove the pressure in the high-pressure area ⇒ page 4 .



1 - Connector

- ❑ for fuel pressure regulating valve - N276-

2 - Screw for high pressure pump

- ❑ replace
- ♦ 1.8 l engines: 8 Nm + torque a further 90° ($^1/_4$ turn)
- ♦ 2.0 l engines: 20 Nm

3 - Control valve for fuel pressure - N276-

4 - High pressure pump

- ❑ The fuel tank has an electrical fuel pump which supplies fuel to the mechanical fuel pump
- ❑ when installing the high pressure pump, ensure that no dirt gets into the fuel system.
- ❑ The fuel system must be de-pressurised. ⇒ page 4
- ❑ Install fuel lines free of tension
- ❑ Check O-ring, replace if damaged
- ❑ removing and installing ⇒ page 285

5 - O-ring

- ❑ Renew if damaged

6 - Roller tappet

- ❑ under certain circumstances remain inserted into the vacuum pump after the removal of the high pressure pump

7 - Connection for fuel feed line

- ♦ 1.8 l engines: 15 Nm
- ♦ 2.0 l engines: 20 Nm

8 - Open warm-type clamp
- ❑ replace

9 - Fuel feed line
- ❑ for fuel distributor for injection valve MPI
- ❑ Install free of tension (make sure it is clean)

10 - Connection fittings, 40 Nm
- ❑ for fuel feed line
- ❑ replace

11 - Union nut, 27 Nm
- ❑ for fuel feed line

12 - Fuel feed line
- ❑ for fuel distributor for injection valve FSI
- ❑ Wet ball end pieces of the fuel feed line with engine oil
- ❑ Install fuel feed line free of tension (make sure it is clean)

13 - Screw for high pressure pump
- ❑ replace

- ♦ 1.8 l engines: 8 Nm + torque a further 90° ($^{1}/_{4}$ turn)
- ♦ 2.0 l engines: 20 Nm

14 - Spring strap clamp
- ❑ Renew if damaged

15 - Fuel feed line
- ❑ from fuel tank

6.2 Removing and installing the high pressure pump

Removing

Note

- ♦ *Installing and removing the high pressure pump only when the engine is cold.*
- ♦ *When installing the high pressure pump, ensure that no dirt gets into the fuel system.*
- ♦ *Collect the fuel which flows out with a cleaning cloth.*
- ♦ *O-ring and connection fitting must always be replaced.*
- ♦ *Always screw in fuel return pipes tension-free.*

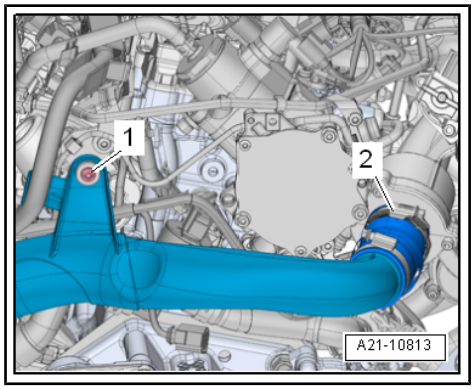
WARNING

The fuel system is under pressure! Before opening the high-pressure area of the injection system, the fuel pressure must be reduced to residual pressure ⇒ page 4 .

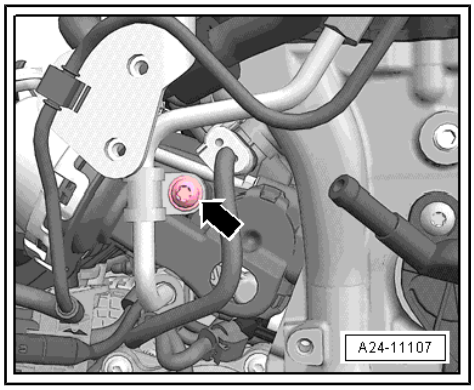
– Remove engine cover ⇒ page 10 .

– Remove air filter housing ⇒ page 258 .

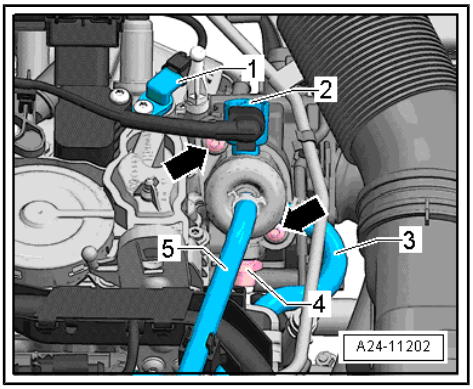
– Unscrew the screw -1- and press air guide pipe to the left.



– Unscrew on holding clamp -arrow-.



– Remove connector -2- from the Control valve for fuel pressure - N276- .



– Remove fuel lines -3, 4 and 5-.
– Remove bolts -arrows-.
– Carefully remove the high pressure pump. The roller tappet can remain inserted in the vacuum pump.

Install

– Replace O-ring for high-pressure pump.
– Check the roller tappet for damage before replacing, replace where necessary.
– Insert the roller tappet (note anti-rotation mechanism) into the vacuum pump.

Note

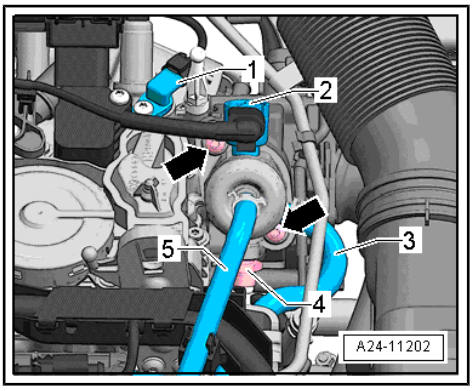
- *When inserting the high pressure pump, the roller tappet must be kept as cool as possible.*
- *When installing the same high pressure pump or one what has already run, replace the connection fittings of the fuel feed line (high-pressure side). See Summary of components- High pressure pump, -Pos. 9- ⇒ page 284 .*

– Turn the crankshaft until the roller tappet is in the lowest position.

– Replace the connection fittings on the high pressure pump.
– Insert and tighten the high pressure pump in the vacuum pump.
– Tighten screws until hand-tight.
- Tightening torque: High pressure pump - Summary of components ⇒ page 284 .

– Tighten screws crosswise to the required tightening torque ⇒ page 284 .
– Insert both fuel lines and secure with spring-type clips.
– Tighten the union nuts on the fuel feed line hand tight ⇒ page 284 .

– Insert connector -2- from the Control valve for fuel pressure - N276- again.

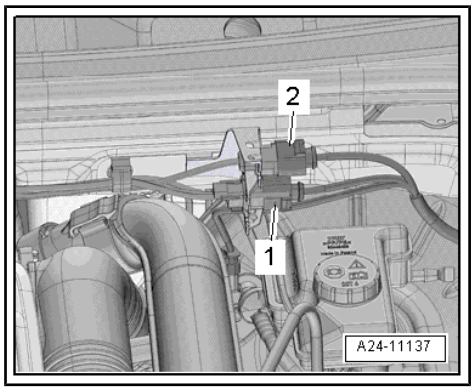


Note

Test fuel system for seal-tightness.

7 Lambda probes

7.1 Lambda probes- Summary of components

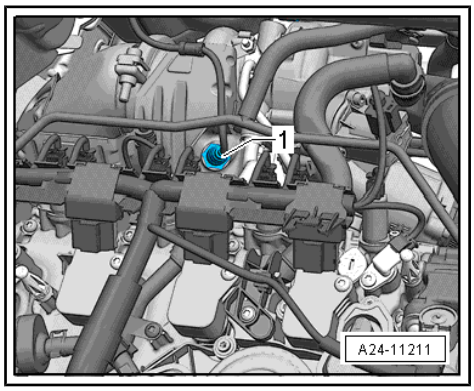


Connector for lambda probes

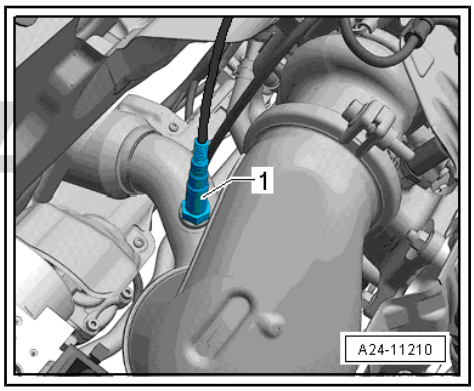
1 - Connector for lambda probe downstream of catalytic converter - G130-

2 - Connector for lambda probe - G39-

Lambda probe - G39- -1-



Lambda probe after catalytic converter - G130- -1-



- Tightening torque: 55 Nm

Note

- *The threads on 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 at the same points during reinstallation. Contact between the electrical cable connection and the front exhaust pipe must be prevented.*

Removing and installing the lambda probe - G39- ⇒ page 288 .

Removing and installing Lambda probe after catalytic converter - G130- ⇒ page 289 .

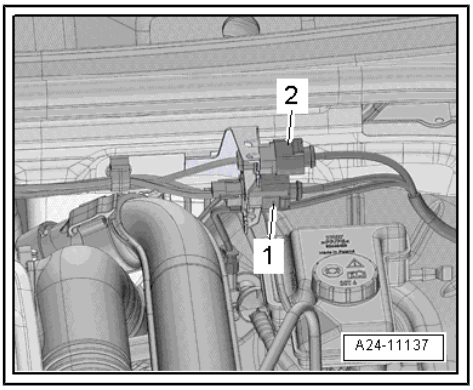
7.2 Removing and installing Lambda probe - G39-

Special tools and workshop equipment required

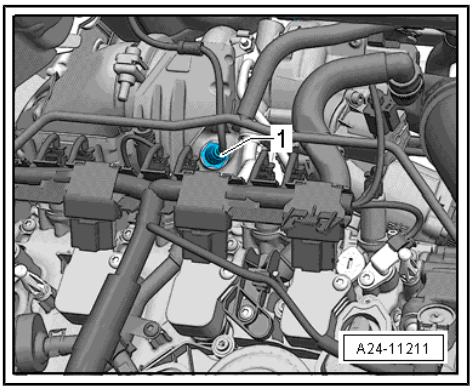
- Lambda probe open ring spanner set - 3337-

Removing

– Remove connector -2- from the Lambda probe - G39- .



– Unscrew the lambda probe - G39- -1- with a tool from the Lambda probe open ring spanner set - 3337- .



Install

When installing, pay attention to the following points:

Note

- *The threads on 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 at the same points during reinstallation. Contact between the electrical cable connection and the front exhaust pipe must be prevented.*

- Tightening torque ⇒ page 288 .

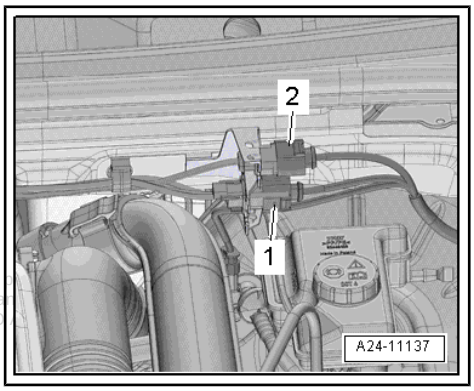
7.3 Removing and installing Lambda probe after catalytic converter - G130-

Special tools and workshop equipment required

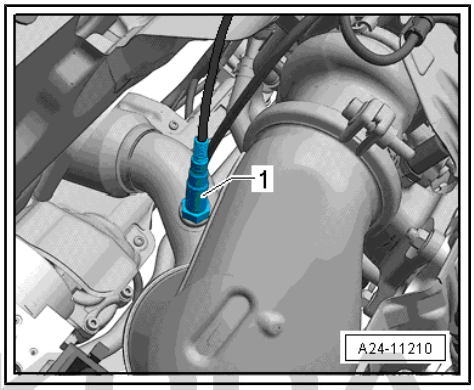
- Lambda probe open ring spanner set - 3337-

Removing

– Remove connector -1- from the Lambda probe after catalytic converter - G130- .



– Unscrew the lambda probe after catalytic converter - G130- -1- with a tool from the Lambda probe open ring spanner set - 3337- .



Install

When installing, pay attention to the following points:

Note

- *The threads on 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 at the same points during reinstallation. Contact between the electrical cable connection and the front exhaust pipe must be prevented.*

- Tightening torque ⇒ page 288 .

8 Engine control unit

8.1 Removing and installing engine control unit - J623- (without protective housing)

Removing

– 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 - Replace the engine control unit`

– Switch off ignition and pull out ignition key.

Caution

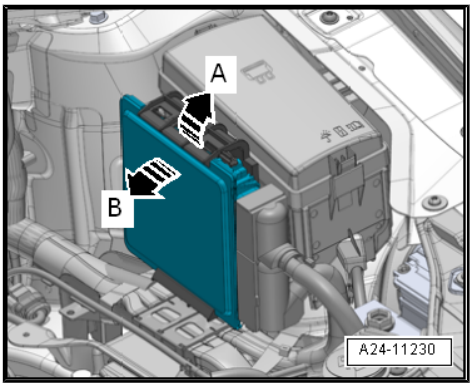
Prevent the engine control unit from touching the plus pole on the battery - risk of damage.

Note

During the course of production, several versions of mounting brackets were installed for the engine control unit - J623- . This has no effect on the working procedure for installation and removal.

– Unlock catch in -direction of arrow A- and remove the engine control unit -arrow B-.

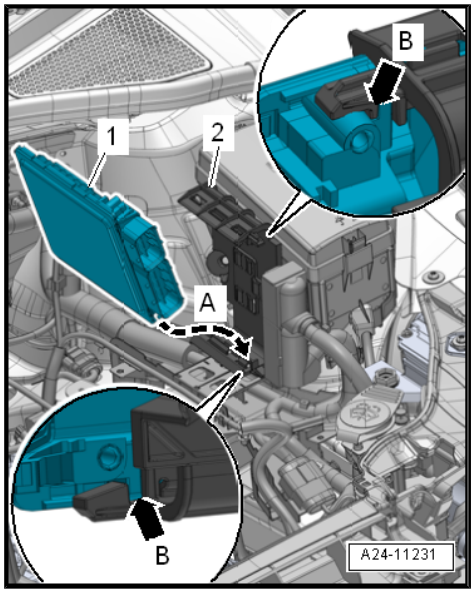
– Unlock plug connections for engine control unit - J623- and pull off.



Install

– Insert the engine control unit with the lower edge towards the front -arrow A-.

• The bridge of the engine control unit - J623- must engage in the recess -arrow B- top and bottom.



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

– Control the engine control unit - J623- 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 - Replace the engine control unit`

8.2 Removing and installing engine control unit - J623- (with protective housing)

Removing

Special tools and workshop equipment required

♦ Hot air blowers - VAS 1978/14A- -1- with push-on nozzle -2- from the wiring harness repair set - VAS 1978 B-

♦ commercially available miniature grinder

Removing

– Switch on the ignition and choose ⇒ Vehicle diagnostic tester.

– On the display press consecutively the following buttons:

♦ `01 - Engine electronics`

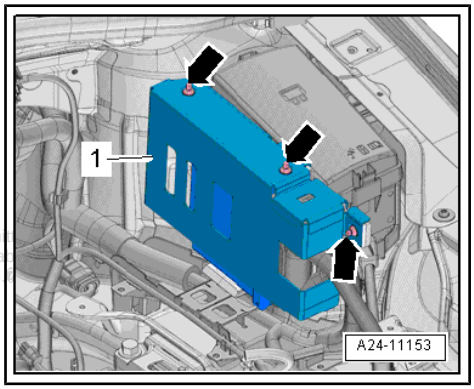
♦ `01 - Targeted functions`

♦ `01 - Basic setting`

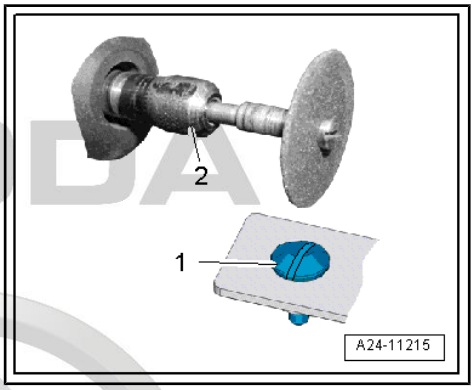
♦ `01 - Replace the engine control unit`

– Switch off ignition and pull out ignition key.

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.

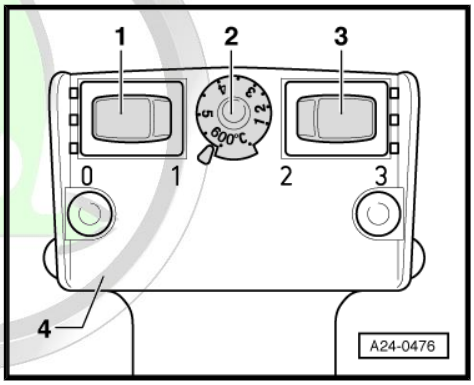


Note

- *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 the screw 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.

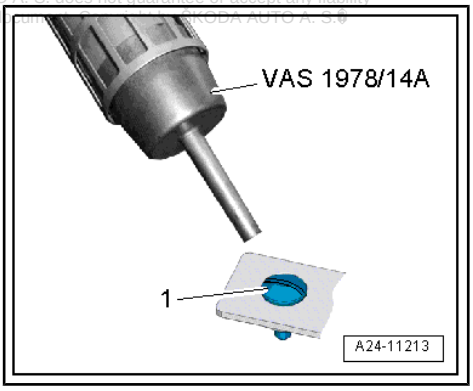


WARNING

Risk of burns from hot air blower.

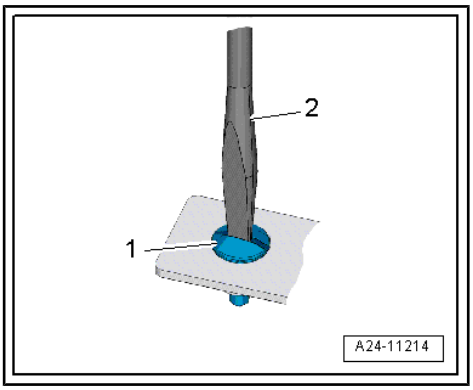
- ***Only warm up the pull-off screws with a hot air blower.***
- ***By warming the pull-off screws, the cover plate and parts in its vicinity are heated up strongly too. Where necessary, protect these parts by a piece of sheet covering.***

– Heat the shear bolt head -1- for approximately 20 to 30 seconds.



Continued for slackened screws:

– Release shear bolt -1- using the screwdriver -2-.



Caution

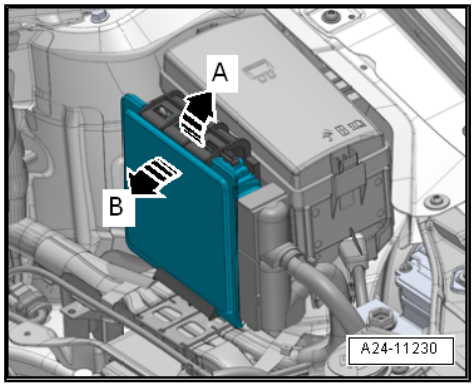
Prevent the engine control unit from touching the plus pole on the battery - risk of damage.

Note

During the course of production, several versions of mounting brackets were installed for the engine control unit - J623- . This has no effect on the working procedure for installation and removal.

– Unlock catch in -direction of arrow A- and remove the engine control unit -arrow B-.

– Unlock plug connections for engine control unit - J623- and pull off.



Install

Installation is carried out in the reverse order. However, pay attention to the following:

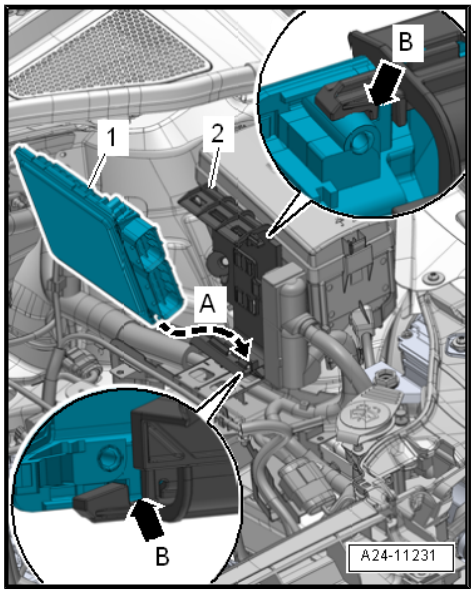
– Insert the engine control unit with the lower edge towards the front -arrow A-.

• The bridge of the engine control unit - J623- must engage in the recess -arrow B- top and bottom.

– 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:

– Control the engine control unit - J623- 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`

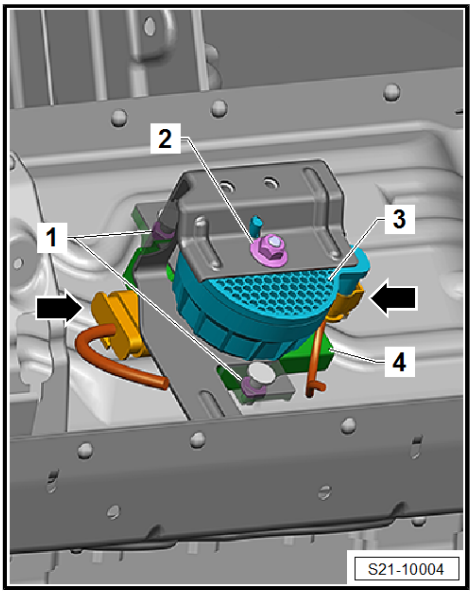
♦ `01 - Replace the engine control unit`

8.3 Removing and installing engine noise speaker

Removing

– Removing plenum chamber cover and then bulkhead plenum chamber ⇒ Body Work; Rep. gr. 50 .

– Disconnect the plug connections -arrows-.
– Unscrew nut -2- (7 Nm) and the control element of the engine noise speaker -3-.
– Unscrew nuts -1- (3 Nm) and the control element of the engine noise speaker -4-.



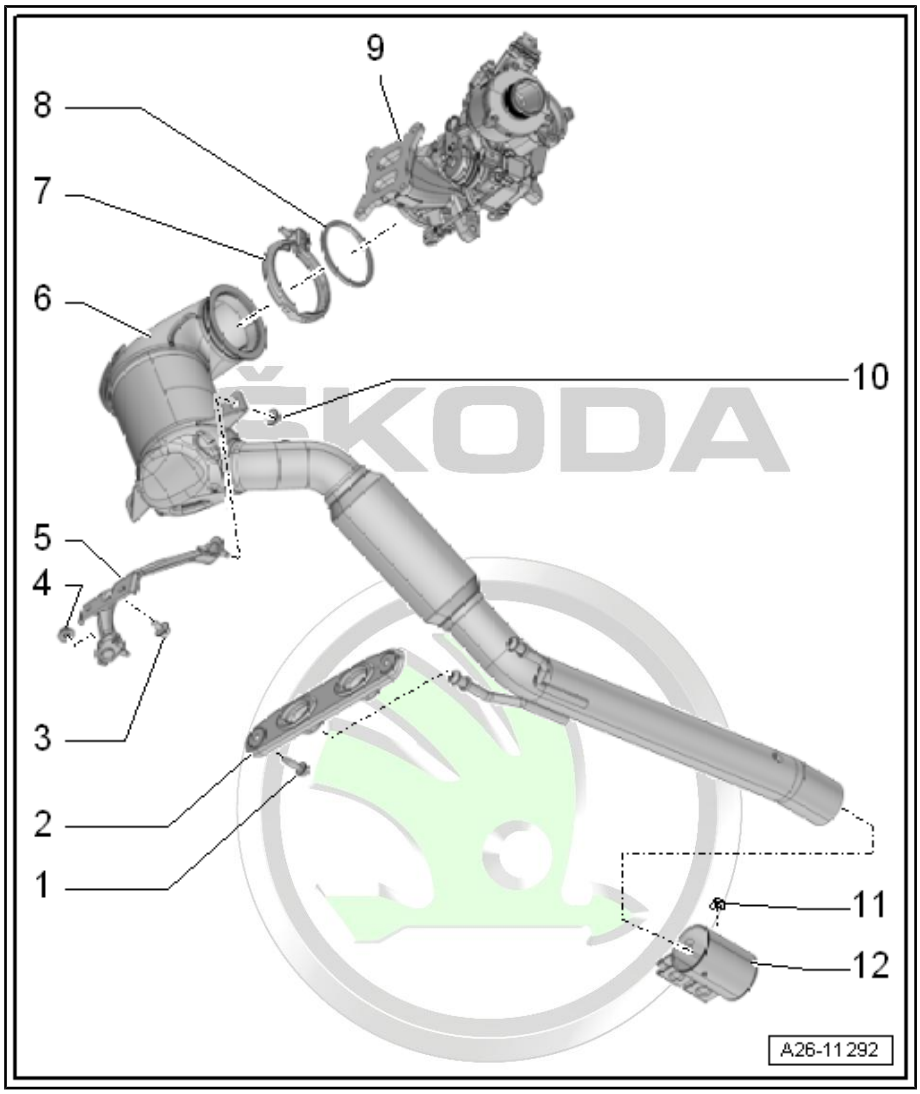
Install

Installation is carried out in the reverse order.

26 – Exhaust system

1 Removing and installing parts of the exhaust system

1.1 Front part of exhaust system - Summary of components



1 - 20 Nm

2 - Support

- ❑ Renew if damaged

3 - Screw

Tightening torque and tightening order ⇒ page 297

4 - Nut

Tightening torque and tightening order ⇒ page 297

5 - Catalytic converter holder

6 - 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 the wire mesh of the decoupling element.
- ❑ protect catayltic converter against shocks and blows
- ❑ removing and installing ⇒ page 297
- ❑ Remove the protection for the decoupling element on the spare part as late as possible
- ❑ Align exhaust system free of stress ⇒ page 308

7 - Fixing clamp

- ❑ replace
- ❑ Fitting position ⇒ page 297
- ❑ Tightening torque and tightening order ⇒ page 297

8 - Exhaust gas turbocharger

- ❑ removing and installing ⇒ page 234

9 - Nut

Tightening torque and tightening order ⇒ page 297

10 - 23 Nm

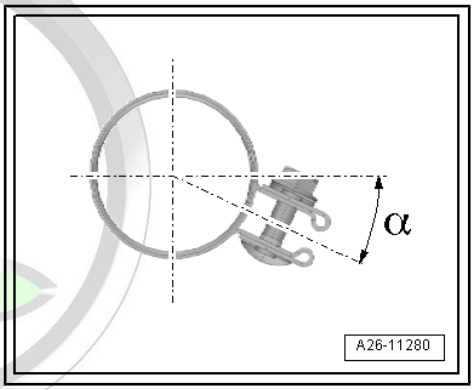
11 - Clamp

- ❑ before tightening, align exhaust system free of stress ⇒ page 308
- ❑ Fitting position ⇒ page 297
- ❑ Tighten bolted connections evenly

Installation position of front clamp

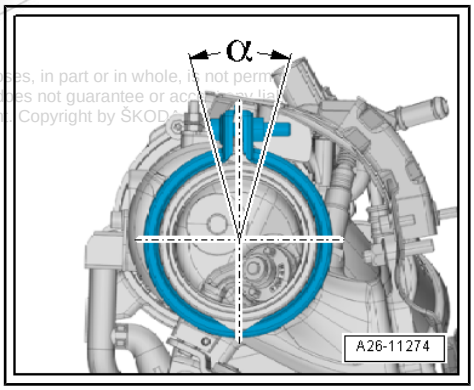
– Install clamping sleeve in the position shown.

- Angle -α- = approximately 20°.
- bolted connection points to the right.
- Nuts point upwards.



Fitting position of fixing clamp for turbocharger/catalytic converter

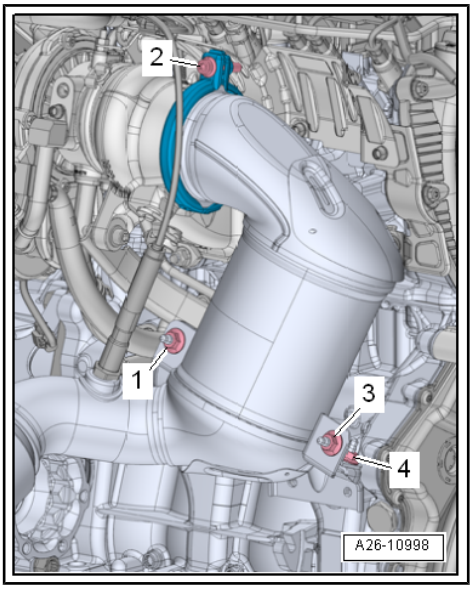
- Angle -α- = 30°.



Catalytic converter- tightening torque and tightening order

– Tighten all screw fittings step by step in the given sequence:

Stage	Fixing clamp/nut	Tightening torque
1.	-1, 3, 4-	by hand as far as the stop • It must still be possible to move the catalytic converter and the bracket
2.	-2-	Tighten fixing clamp to 15 Nm.
3.	-1, 3, 4-	tighten to 20 Nm



1.2 Removing and installing exhaust pipe

Note

The catalytic converter is remove with the pre-exhaust pipe.

Special tools and workshop equipment required

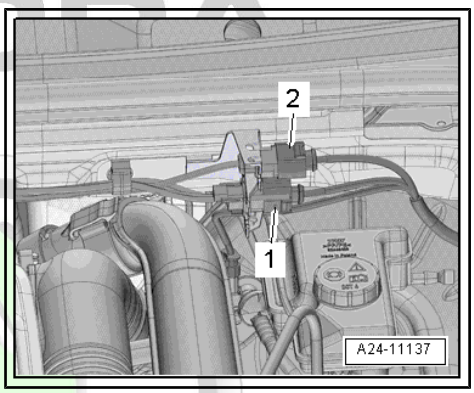
- Hot bolt paste ⇒ ETKA - Electronic Catalogue of Original Parts

Removing

Note

All cable straps should be fitted on again in the same place when installing.

– Take electrical plug connection -2- for Lambda probe in front of the catalytic converter - G39- out of the holder, disconnect and expose electric cables.

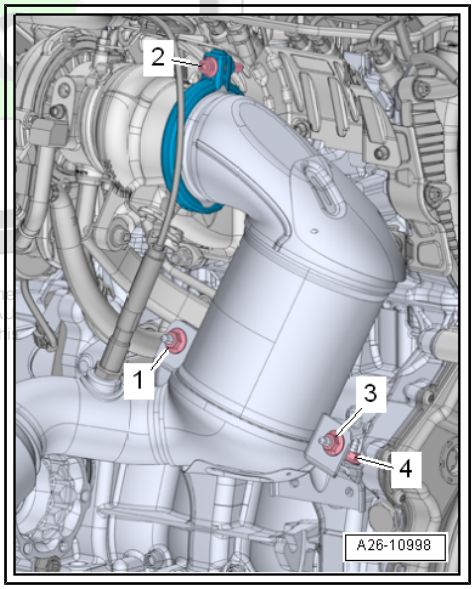


Note

Do not pay attention to the position -1-.

– Screw out screw -2- and remove camshaft sprocket.

– Unscrew nuts -1 and 3-.



Note

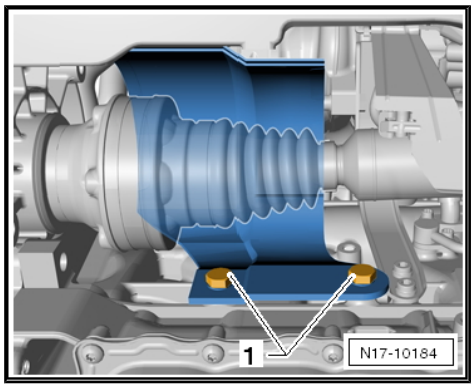
- *For a clearer illustration, the installation position while the engine is removed is shown.*
- *Do not pay attention to the position -4-.*

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.*

For vehicles with front-wheel-drive

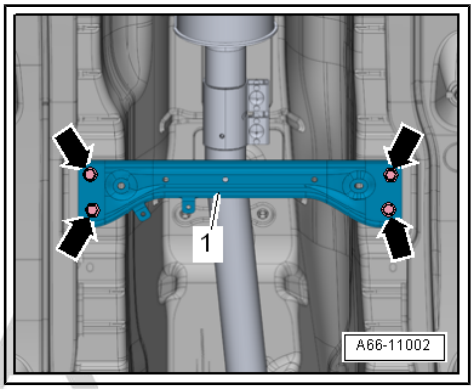
– Release screws -1- and remove heat shield for right drive shaft, if present.



Continued for all vehicles

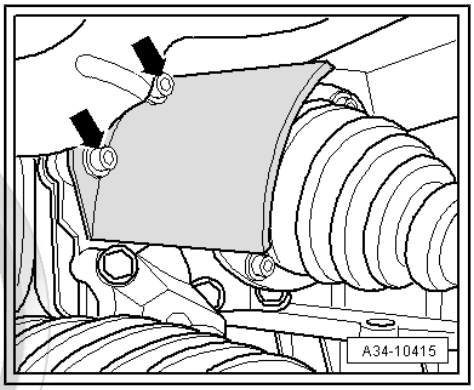
– Remove plastic cover for floor tunnel ⇒ Rep. gr. 50 .

– Undo screws (20 Nm) -arrows- and front tunnel bridge.



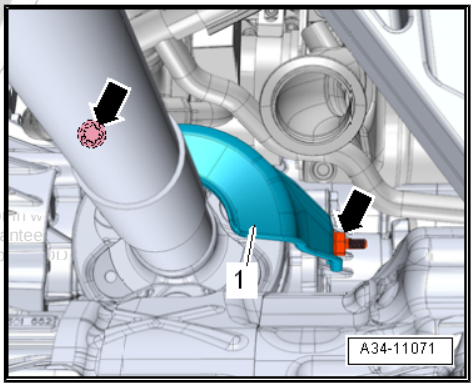
For vehicles with four-wheel drive

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

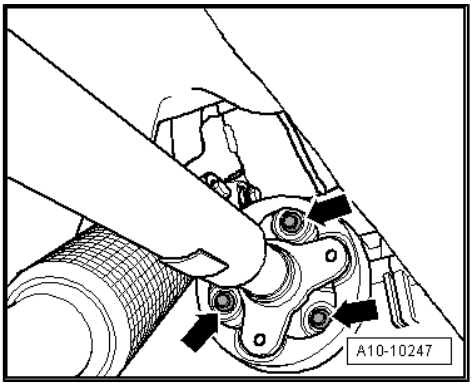


– Release screws -arrows- and remove heat shield -1-.

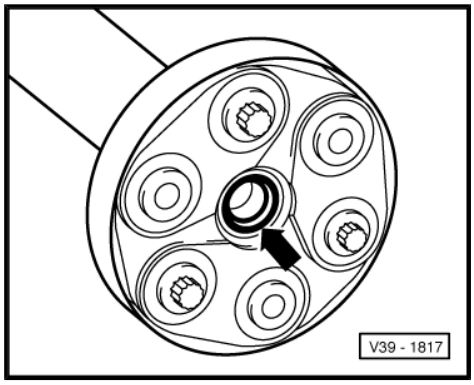
– To reinstall, mark the position of the flexible disk and the angle gearbox flange to each other.



– Unscrew the propshaft from the angle gearbox -arrows-, while counterholding with a lever on the triangular flange.



– Press the engine/gearbox unit in the driving direction to the front a little and remove from the propshaft from the angle gearbox.



Caution

Risk of damage to the gasket ring -arrow -on the flange of the propshaft.

Push propshaft horizontally as far back and towards the left vehicle side as possible.

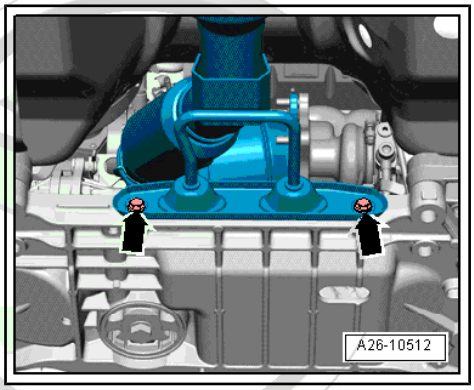
Note

In case of damaged gasket ring the propshaft must be replaced.

Continued for all vehicles

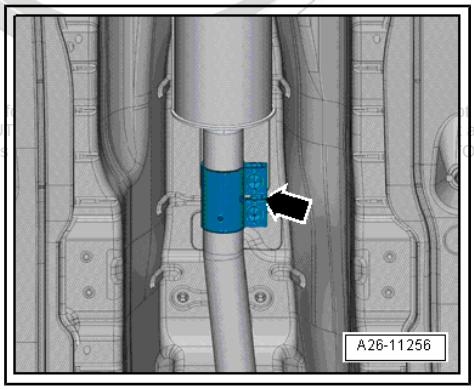
– Remove bolts -arrows-.

– Remove plug connection from holder, disconnect and expose lambda probe electric cable.



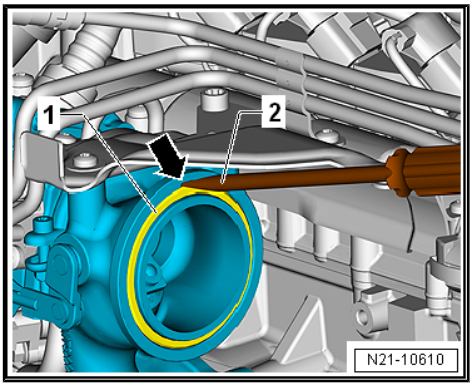
– Loosen the clamping sleeve -arrow- and slide it backwards.

– Remove pre-exhaust pipe with catalytic converter towards the rear.



– Push screwdriver -2- into the recess -arrow- of the exhaust gas turbocharger and lever out the sealing ring -1-.

– Replace gasket ring -1-.



Install

Installation is carried out in the reverse order. However, pay attention to the following:

Note

- *When re-fitting the exhaust pipe, note the following:*
- *Do not damage the wire mesh of the decoupling element.*

Note

- *Replace the gaskets and the self-locking nuts.*
- *coat with Hot bolt paste; Hot bolt paste ⇒ ETKA - Electronic Catalogue of Original Parts .*

– Position catalytic converter on turbocharger, loosely tighten fixing clamp

– Tighten nuts and fixing clamp ⇒ page 297 .

– Align exhaust system free of stress ⇒ page 308 .

1.3 Middle or rear part of the exhaust system - Summary of components

For vehicles with front-wheel drive and engine identification characters CJSA

1 - Clamping sleeve, 23 Nm

- ❑ align exhaust system free of stress before tightening ⇒ page 308
- ❑ Tighten bolted connections evenly

2 - Rear part of exhaust system

- ❑ for first equipment building unit with middle part of exhaust gas system, replace individually when carrying out repairs
- ❑ The separation point is marked by indentations on the exhaust pipe
- ❑ Align exhaust system free of stress ⇒ page 308

3 - Support

4 - Retaining strap

- ❑ Renew if damaged

5 - Support

6 - 20 Nm

7 - Retaining strap

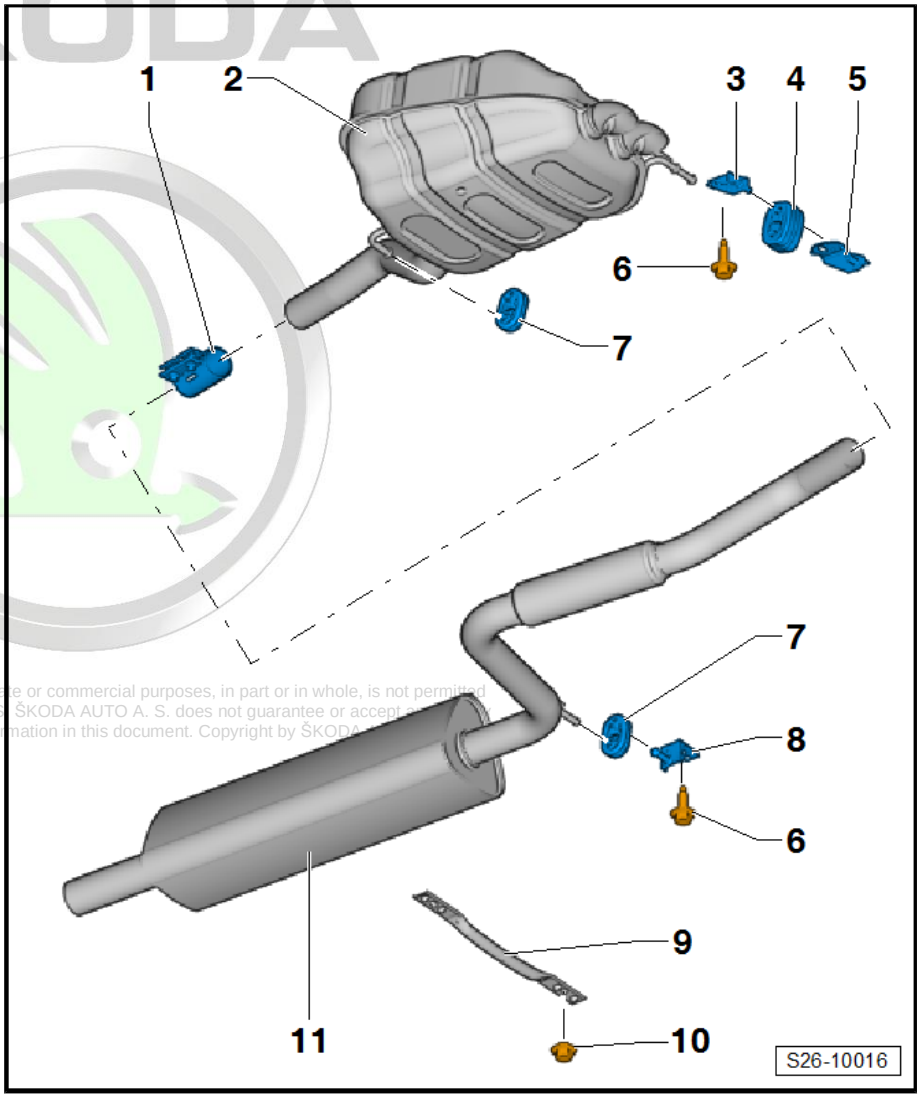
- ❑ Renew if damaged

8 - Support

9 - Rear tunnel bridge

- ❑ Removing and installing ⇒ Body Work; Rep. gr. 66

10 - 55 Nm



11 - Middle part of exhaust system

- ❑ for first equipment building unit with rear part of exhaust gas system, replace individually when carrying out repairs
- ❑ The separation point is marked by indentations on the exhaust pipe
- ❑ Align exhaust system free of stress ⇒ page 308

1.4 Middle or rear part of the exhaust system - Summary of components

For vehicles with front-wheel drive and engine identification characters CHHB

1 - Clamping sleeve, 23 Nm

- ❑ align exhaust system free of stress before tightening ⇒ page 308
- ❑ Fitting position ⇒ page 297
- ❑ Tighten bolted connections evenly

2 - Middle and rear silencer

- ❑ only supplied as complete assembly ⇒ ETKA - Electronic Catalogue of Original Parts
- ❑ Align exhaust system free of stress ⇒ page 308

3 - Retaining strap

- ❑ replace if damaged

4 - Exhaust tailpipe

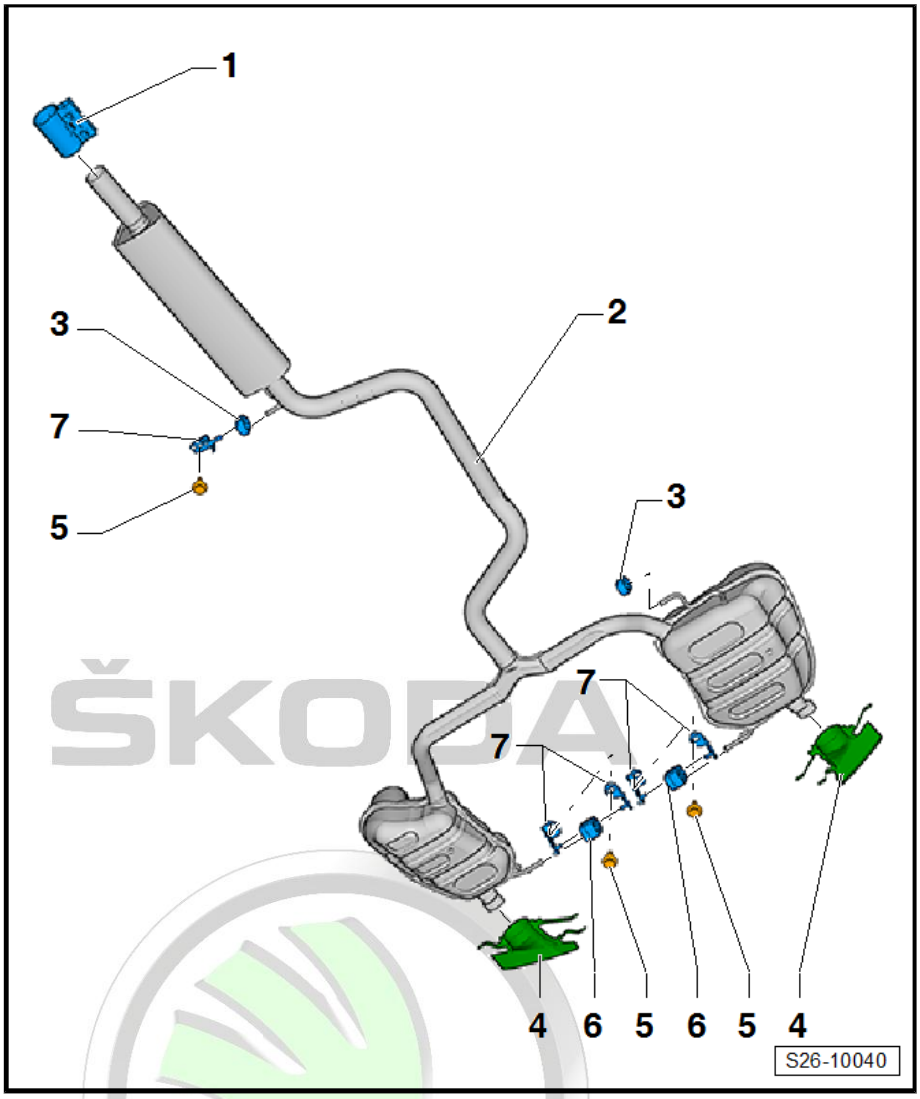
- ❑ Component part of the rear bumper

5 - 20 Nm

6 - Retaining strap

- ❑ replace if damaged

7 - Support



1.5 Middle or rear part of the exhaust system - Summary of components

For vehicles with four-wheel drive and engine identification characters CJSB

1 - Clamping sleeve, 23 Nm

- ❑ align exhaust system free of stress before tightening ⇒ page 308
- ❑ Fitting position ⇒ page 297
- ❑ Tighten bolted connections evenly

2 - Support

3 - 20 Nm

4 - Retaining strap

- ❑ replace if damaged

5 - Middle and rear silencer

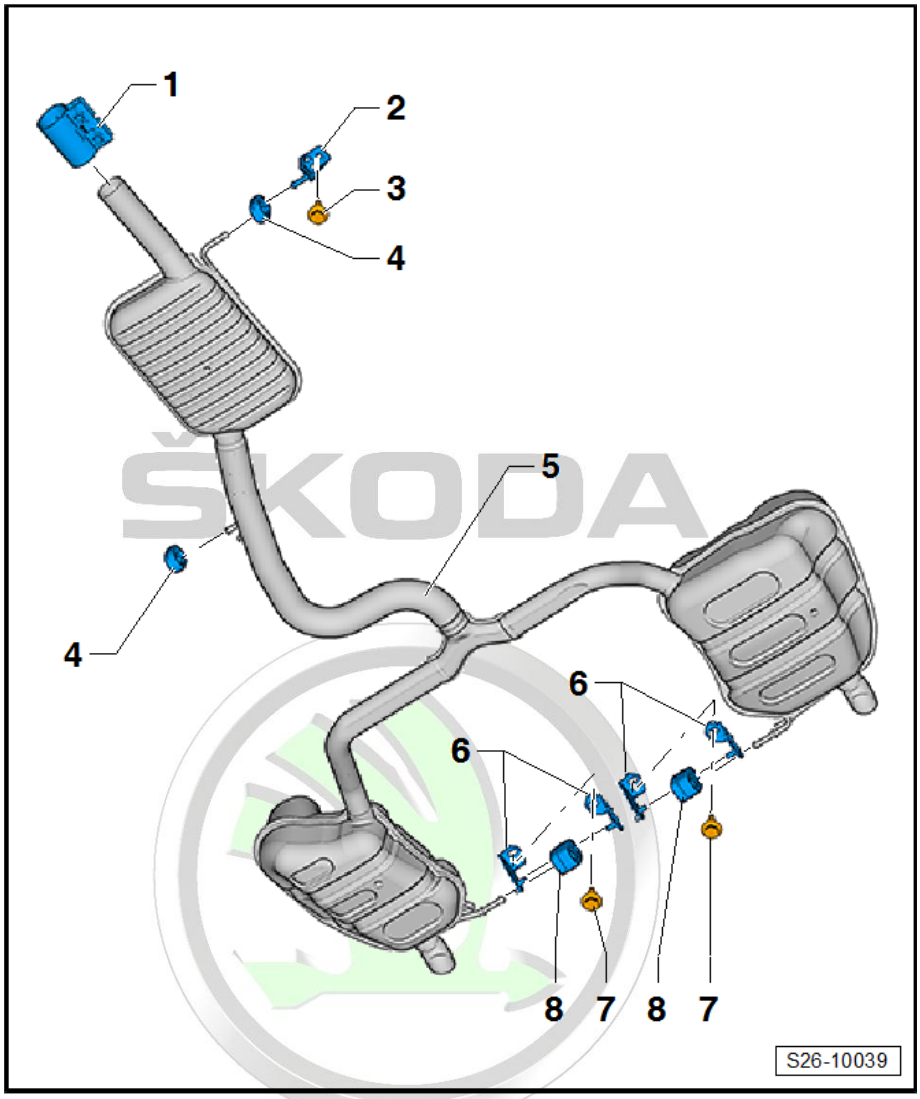
- ❑ only supplied as complete assembly ⇒ ETKA - Electronic Catalogue of Original Parts
- ❑ Align exhaust system free of stress ⇒ page 308

6 - Support

7 - 20 Nm

8 - Retaining strap

- ❑ replace if damaged



1.6 Replacing middle or rear part of the exhaust system

For vehicles with front-wheel drive and engine identification characters CJSA

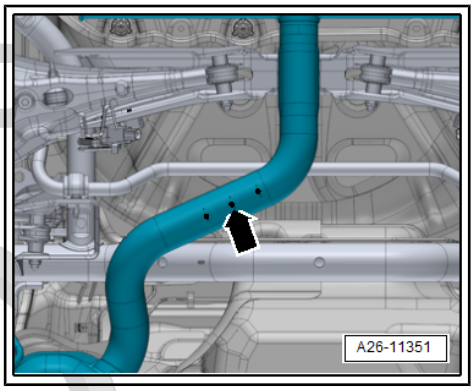
Special tools and workshop equipment required

♦ Body saw e.g. -V.A.G 1523/A-

Work procedure

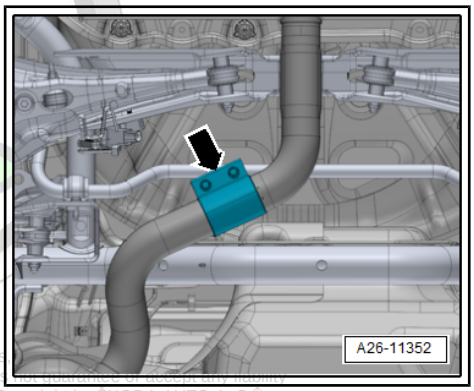
Vehicles with middle and rear part of the exhaust system as a building unit

– Use body saw to separate exhaust pipe at right angles at the separation point -arrow-, e.g. -V.A.G 1523/A- .



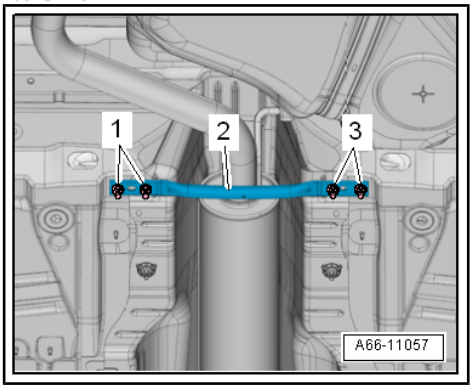
Vehicles with separable middle or rear part of the exhaust system

– Loosen the clamping sleeve -arrow- and slide it backwards.

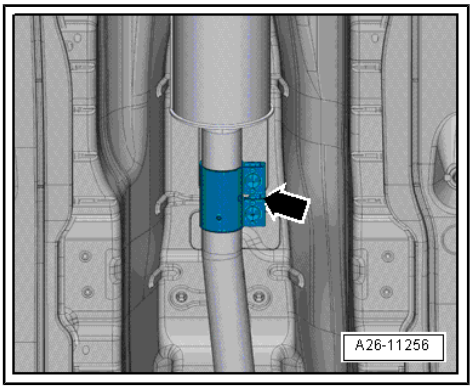


Replace middle part of exhaust system

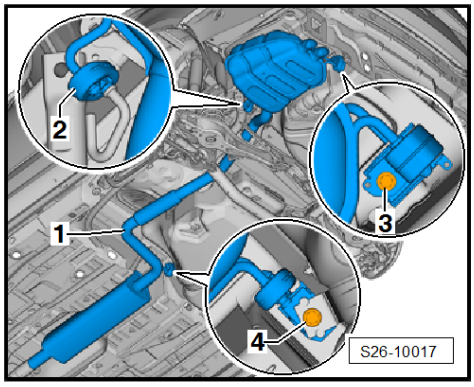
– Unscrew nuts -1 and 3- and remove the rear tunnel bridge -2-.



– Loosen the clamping sleeve -arrow- and slide it forwards.



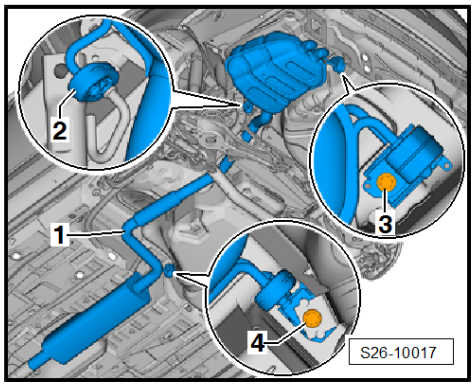
– Unscrew the screw -4- and remove the middle part of the exhaust system -1-.



Replace rear part of the exhaust system

– Unhook the retaining strap -2- on the rear part of the exhaust system.

– Unscrew the screw -3- and remove the rear part of the exhaust system.



Install

Installation is carried out in the reverse order. However, pay attention to the following:

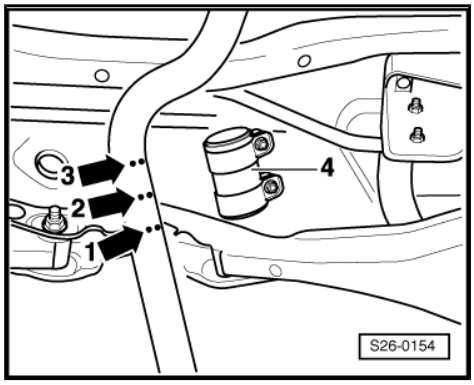
- Tightening torques ⇒ page 301 .

– When installing, position rear clamping sleeve -4- at the side markings -arrow 1- and -arrow 3-.

– Turn rear clamping sleeve -4- in such a way that the ends of the screws -arrow- do not protrude beyond the bottom edge of the clamping sleeve.

– Tighten bolted connections of clamping sleeve evenly to 23 Nm.

– Align exhaust system free of stress ⇒ page 308 .



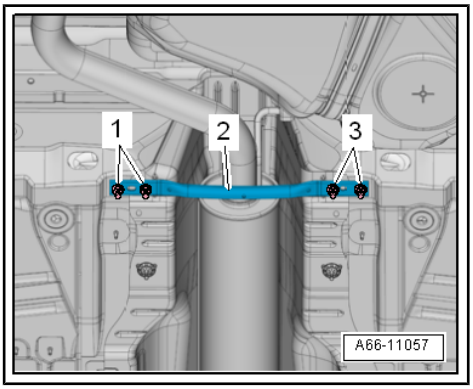
1.7 Removing and installing middle and rear part of the exhaust system

For vehicles with engine identification characters CJSB and CHHB

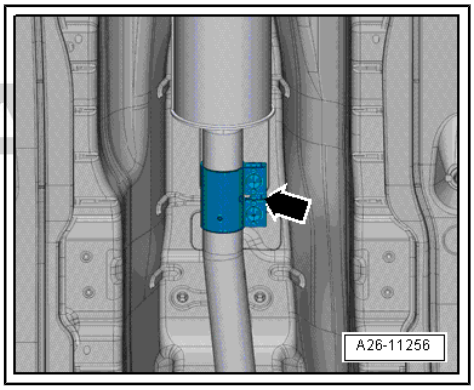
Removing

– Remove the rear left underfloor trim panel ⇒ Body Work; Rep. gr. 66 .

– Remove rear tunnel bridge -2- ⇒ Body work; Rep. gr. 66 .



– Loosen the clamping sleeve -arrow- and slide it backwards.



WARNING

Danger of accident caused by the weight of the middle and rear part of the exhaust system.

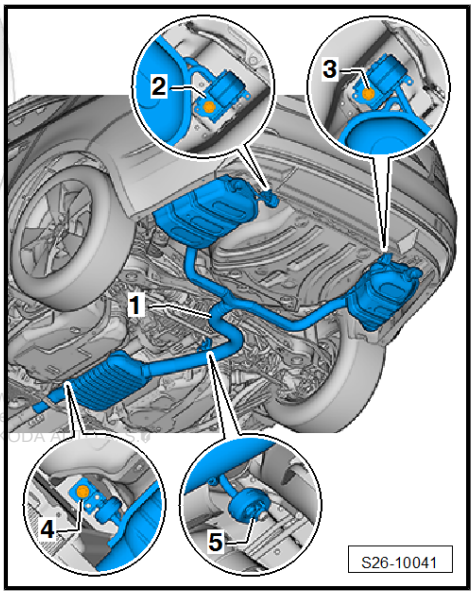
- *A second person is required for the further work.*

For vehicles with four-wheel drive and engine identification characters CJSB

– Unhook the retaining strap -5- on the middle part of the exhaust system -1-.

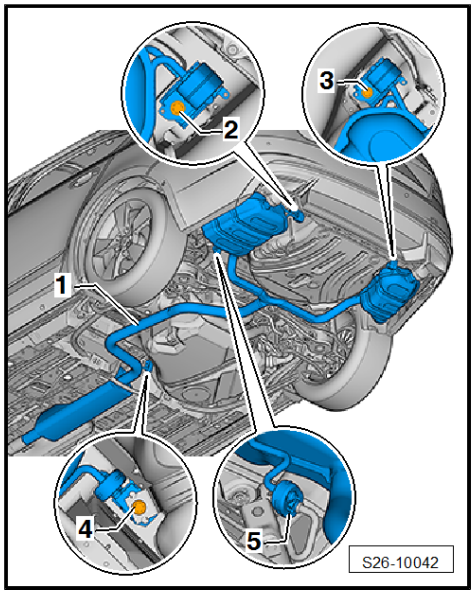
– Unscrew screws -2-, -3-, -4- and remove the middle and rear part of the exhaust system -1-.

For vehicles with front-wheel drive and engine identification characters CHHB



– Unhook the retaining strap -5- on the rear part of the exhaust system -1-.

– Unscrew screws -2-, -3-, -4- and remove the middle and rear part of the exhaust system -1-.



Install

Installation is carried out in the reverse order. However, pay attention to the following:

- Tightening torques for vehicles with four-wheel drive and engine identification characters CJSB ⇒ page 303
- Tightening torques for vehicles with front-wheel drive and engine identification characters CHHB ⇒ page 302
- Remove the rear left underfloor trim panel ⇒ Body Work; Rep. gr. 66

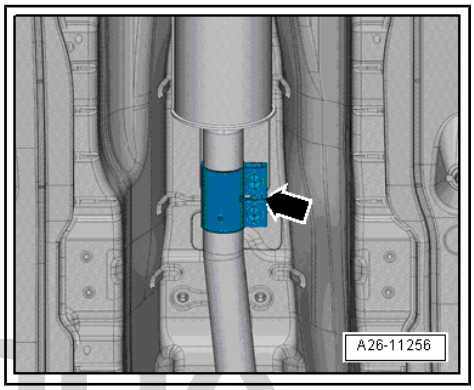
– Align exhaust system free of stress ⇒ page 308 .

1.8 Aligning exhaust system free of stress

Work procedure

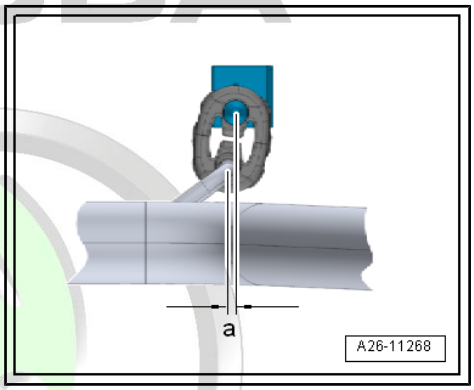
- The exhaust system is aligned when cold.

– Loosen bolted connections -arrow- on clamping sleeve arrow.



– Push the rear silencer so far forward until the pre-tensioning on the retaining strap on the exhaust pipe is -a- = 5 mm.

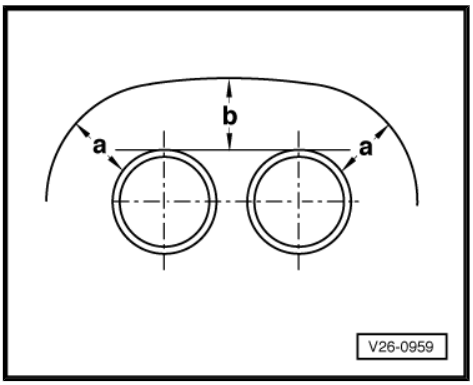
– Installing front clamping sleeve ⇒ page 297 .



1.9 Align exhaust tailpipes

Work procedure

- Align rear silencer in such a way that there is an equal distance -a- and -b- between bumper opening and exhaust tailpipes.
- For aligning the exhaust tailpipes, if necessary loosen hanger on the rear silencer.



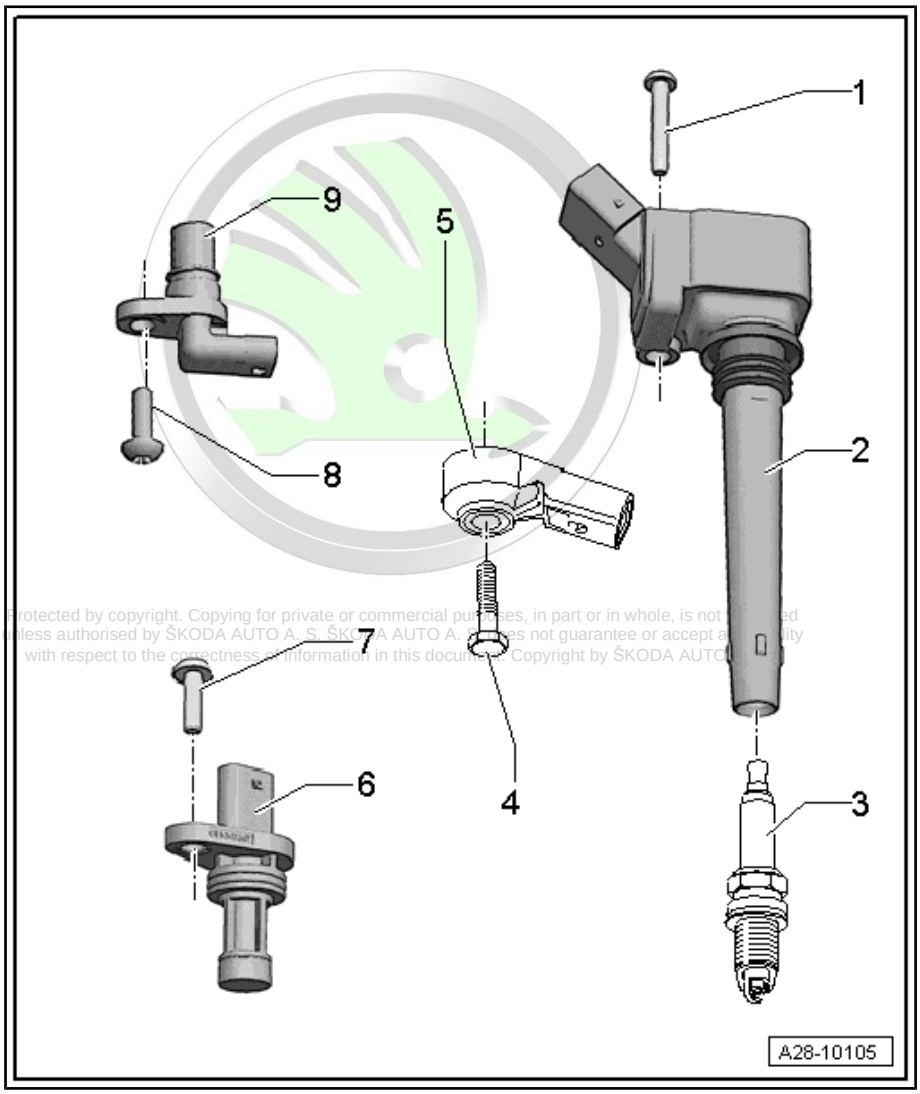
1.10 Inspecting the exhaust system for leak-tightness

- Start engine and run in idle.
- Seal off exhaust tailpipes for the duration of the leak check (e.g. with cloth or plug).
- Inspect connection points of cylinder head/exhaust manifold, exhaust gas turbocharger/pre-exhaust pipe etc. for leaktightness by listening and visual inspection.
- Eliminate any leak found.

28 – Ignition system

1 Ignition system

1.1 Ignition system - Summary of components



1 - 10 Nm

2 - 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 ⇒ page 311

3 - Spark plug, 30 Nm

- ❑ Change interval, type and electrode gap ⇒ Maintenance ; Booklet Octavia III
- ❑ use spark plug wrench e.g. - 3122 B- for removing and installing

4 - 20 Nm

- ❑ replace
- ❑ the tightening torque influences the knock sensor function

5 - Knock sensor 1 - G61-

- ❑ Gold-plated contacts.
- ❑ removing and installing ⇒ page 311

6 - Engine speed sender - G28-

- ❑ Check O-ring for damage
- ❑ removing and installing ⇒ page 312

7 - 10 Nm

8 - 9 Nm

9 - Hall sender - G40- and Hall sender 3 - G300-

- ❑ Removing and installing hall sender - G40- ⇒ page 312
- ❑ Removing and installing hall sender 3 - G300- ⇒ page 312
- ❑ Renew O-ring

1.2 Removing and installing ignition coils with output stage

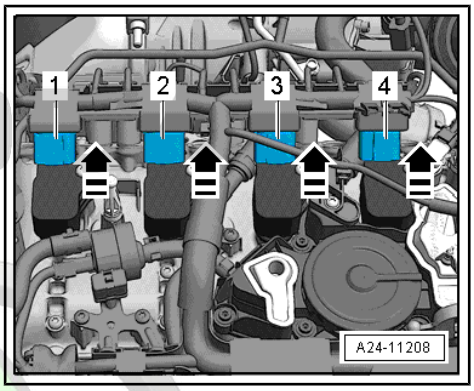
Removing:

– Remove engine cover ⇒ page 10 .

– Unlock and disconnect all connectors from ignition coils.

– Unscrew screw for ignition coil to be removed.

– Carefully remove ignition coil from the top.



Install

– Press the ignition coil by hand evenly on the ignition plug (do not use the impact tools).

– Screw ignition coil.

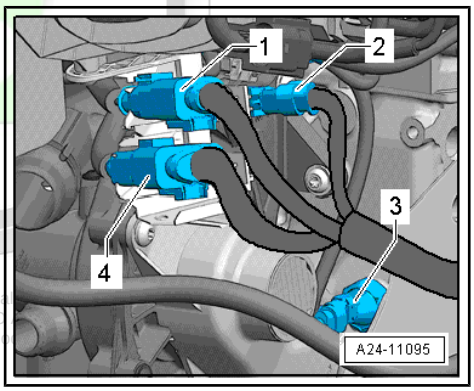
• Tightening torque ⇒ page 310 .

1.3 Remove knock sensor 1 - G61-

Removing

– Unplug connector -2- from the knock sensor, 1 - G61- .

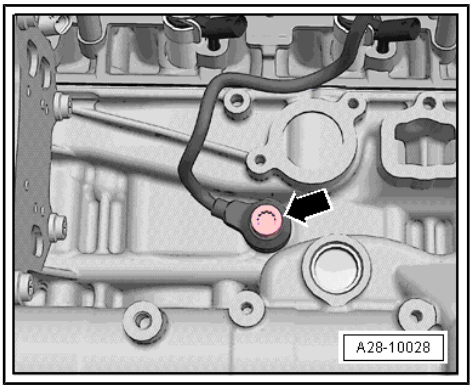
– Remove coolant pump and coolant regulator ⇒ page 170 .



Note

The knock sensor 1 - G61- is positioned underneath the intake manifold behind the coolant pump.

– Unscrew knock sensor 1 - G61- -arrow-.



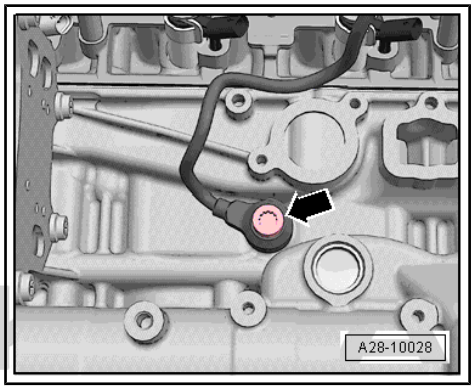
Install

Installation is carried out in the reverse order. However, pay attention to the following:

– Observe the fitting position of the knock sensor 1 - G61- .

• Tightening torque ⇒ page 310 .

– Install coolant pump with coolant regulator ⇒ page 170 .



1.4 Removing and installing Hall sender - G40-

Removing

– Remove engine cover ⇒ page 10 .

– Removing the intake manifold ⇒ page 264 .

– Unplug connector -1-.

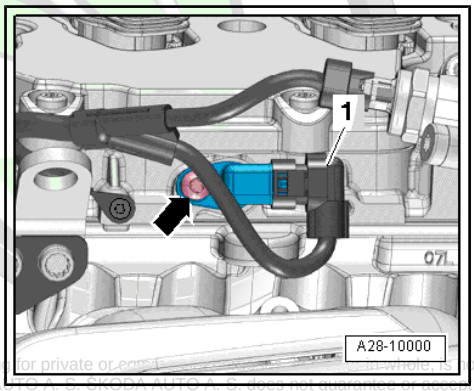
– Unscrew bolt -arrow- and remove camshaft clamp.

Install

Installation is carried out in the reverse order. However, pay attention to the following:

– Renew O-ring.

• Tightening torque ⇒ page 310



1.5 Removing and installing hall sender 3 - G300-

– Remove engine cover ⇒ page 10 .

– Unplug connector -1-.

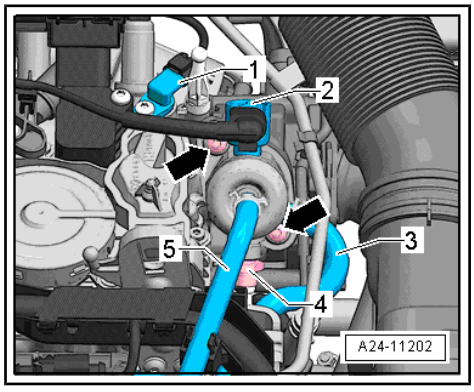
– Unscrew bolt and remove hall sender.

Install

Installation is carried out in the reverse order. However, pay attention to the following:

– Renew O-ring.

• Tightening torque ⇒ page 310 .

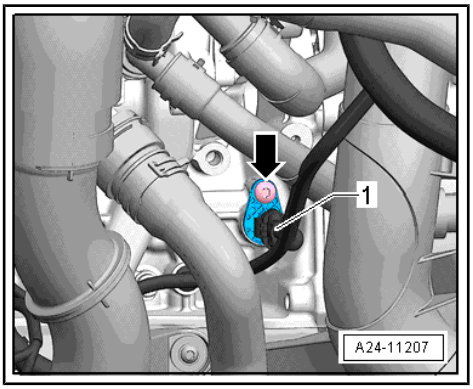


1.6 Removing and installing engine speed sender - G28-

– Remove the sound dampening system ⇒ Body Work; Rep. gr. 50 .

– Remove plug -1- on the engine speed - G28- .

– Unscrew fixing screw -arrow-.



Install

Installation is carried out in the reverse order. However, pay attention to the following:

- Tightening torque ⇒ page 310 .