



## Workshop Manual

CC 2012 ➤, Golf 2020 ➤,  
Golf Cabriolet 2012 ➤,  
Golf Variant 2021 ➤, Scirocco 2015 ➤,  
Sharan 2016 ➤, T-Roc 2018 ➤,  
Tiguan 2008 ➤

4-cylinder direct injection engine (1.4 l engine, 4V, EA 211, turbocharger)									
Engine ID	CZC A	CZD A	CZD B	DJKA	CZD C				

Edition 08.2020





## List of Workshop Manual Repair Groups

### Repair Group

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

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## 00 – Technical data

### 1 Safety information

(VRL014321; Edition 08.2020)

⇒ [r1.1 egulations for working on fuel supply", page 1](#)

⇒ [m1.2 easures when working on vehicles with start/stop system", page 1](#)

⇒ [p1.3 recautions when using testers and measuring instruments during a road test", page 2](#)

⇒ [p1.4 recautions when working on the cooling system", page 2](#)

⇒ [p1.5 recautions when working on ignition system", page 2](#)

#### 1.1 Safety regulations for working on fuel supply

##### Risk of injury from highly pressurised fuel.

The fuel system is pressurised. Injury from fuel spray possible.

Before opening the fuel system:

- Wear protective goggles.
- Wear protective gloves.
- To release pressure, wrap a clean cloth around the connection and carefully loosen the connection.

##### Danger of fire caused by escaping fuel

When the battery is connected and the driver door opens, the door contact switch activates the fuel pump. Escaping fuel can ignite and cause a fire.

- Disconnect voltage supply to fuel pump before opening the fuel system.

#### 1.2 Safety measures when working on vehicles with start/stop system

##### Risk of injury from engine starting unexpectedly

If the vehicle's start/stop system is activated, the engine can start unexpectedly. A message in the dash panel insert indicates whether the start/stop system is activated.

- Deactivate start/stop system by switching off the ignition.





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

#### **Risk of injury caused by unsecured testing and measuring instruments**

When the front passenger airbag is triggered in an accident, insufficiently secured testing and measuring instruments become dangerous projectiles.

- Secure testing and measuring instruments on the rear seat.

or

- Have a second person operate the test and measuring equipment on the rear seat.

### 1.4 Safety precautions when working on the cooling system

#### **Danger of scalding by hot coolant**

When the motor is hot, the cooling system is under high pressure. Danger of scalding by steam and hot coolant.

- Wear protective gloves.
- Wear protective goggles.
- Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.

### 1.5 Safety precautions when working on ignition system

#### **Risk of injury due to electric shock**

The ignition system is under high voltage when the engine is running. Touching the ignition system may result in an electric shock.

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

#### **Risk of damage to components**

Connecting or disconnecting electric cables or washing the engine while it is running may damage components.

- Switch off the ignition before connecting or disconnecting electric cables.
- Switch off the ignition before washing the engine.



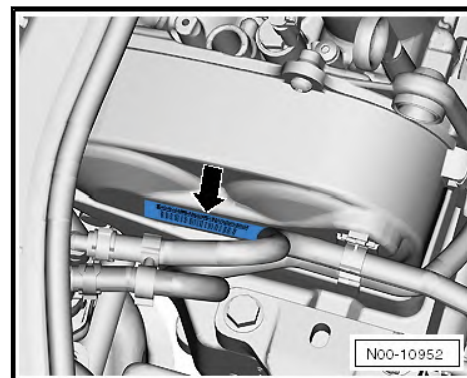


## 2 Identification

⇒ [n2.1 umber/engine data", page 3](#)

### 2.1 Engine number/engine data

The engine code and the engine number are located on the sticker -arrow- on the upper toothed belt guard.



The engine code is also on the vehicle data sticker and on the crankcase above the gearbox.

The engine number consists of up to 9 characters (alphanumeric). The first part (max. 3 letters) represents the "engine code". The second part (six characters) represents the "serial number". After 999,999 engines with the same code letters have been produced, the first of the six digits is replaced by a letter.

#### Vehicles with four digit engine codes

Four-place engine codes are being introduced, starting with letter "C". The first 3 places show the mechanical design of engine and are stamped on the engine as previously. The fourth digit denotes the performance and torque rating of the engine and depends on the engine control unit -J623-. The four-digit engine code can be found on the identification plate, the vehicle data sticker and on the engine control unit.



#### Note

*Fitting locations of vehicle data sticker ⇒ Maintenance; Booklet ; Vehicle data sticker.*

Engine code		CZDA	CZDB	CZDC	CZCA	DJKA
Manufactured		05.14 ➤	05.14 ➤	05.15 ➤	04.15 ➤	08.18 ➤
Exhaust emission standard		EU 6	EU 6		EU 6	EU6AG
Displacement	cm <sup>3</sup>	1395	1395	1395	1395	1395
Power	kW at rpm	110/5000-6000	92/5000-6000	96/5000-6000	92/5000-6000	110/5000
Torque	Nm at rpm	250/1500-3500	200/1400-4000	200/1400-4000	200/1400-4000	250/1500-4000
Bore	Diameter, mm	74.5	74.5	74.5	74.5	74.5
Stroke	mm	80.0	80.0	80.0	80.0	80.0





Engine code	CZDA	CZDB	CZDC	CZCA	DJKA
Compression ratio	10.0	10.0	10.0	10.0	10.5
Valves per cylinder	4	4	4	4	4
RON min.	95 unleaded (in exceptional circumstances min. 91 RON, however with reduced performance)	95 unleaded (in exceptional circumstances min. 91 RON, however with reduced performance)	95 unleaded (in exceptional circumstances min. 91 RON, however with reduced performance)	95 unleaded (in exceptional circumstances min. 91 RON, however with reduced performance)	95 unleaded (in exceptional circumstances min. 91 RON, however with reduced performance)
Injection, ignition system	Motronic ME 17	Motronic ME 17	Motronic ME 17	Motronic ME 17	Motronic MED 17/01/2027
Firing order	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2

Volkswagen Technical Site: <https://vwts.ru>





### 3 Repair notes

⇒ [f3.1 or cleanliness", page 5](#)

⇒ [i3.2 nformation", page 5](#)

⇒ [r3.3 epair instructions", page 5](#)

⇒ [o3.4 bjects in engine", page 7](#)

⇒ [c3.5 orrosion", page 7](#)

⇒ [a3.6 nd attachment of lines", page 7](#)

⇒ [r3.7 adiator and condensers", page 7](#)

⇒ [v3.8 acuum system", page 7](#)

#### 3.1 Rules for cleanliness

When working on the fuel supply and injection system, pay particular attention to the following rules for cleanliness:

- ◆ Thoroughly clean all connections and adjacent areas before disconnecting.
- ◆ Place removed parts on a clean surface and cover them over. Use lint-free cloths only.
- ◆ Carefully cover opened components or seal them if repairs cannot be carried out immediately.
- ◆ Install clean components only: do not remove replacement parts from packing until immediately before installing. Do not use parts that have been kept unpackaged (for example in toolboxes).
- ◆ If system is open, do not work with compressed air. Do not move the vehicle.
- ◆ Make sure that no fuel gets onto the coolant hoses. Should this occur, the coolant hoses must be cleaned immediately.
- ◆ Protect disconnected electrical connectors from dirt and water, and reconnect them only when dry.

#### 3.2 General information

- ◆ For the applicable current flow diagrams, refer to ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

#### 3.3 General repair instructions

⇒ [n3.3.1 otes on injection", page 5](#)

⇒ [n3.3.2 otes on ignition system", page 6](#)

⇒ [n3.3.3 otes on charge air system", page 6](#)

##### 3.3.1 General notes on injection

- ◆ The engine control unit has a self-diagnosis capability. Before carrying out repairs and fault finding, read event memory. Also the vacuum hoses and connections must be checked (unmetered air).
- ◆ Fuel hoses in engine compartment may only be secured with spring-type clips ⇒ Electronic parts catalogue (ETKA). The use of crimp-type or screw-type clips is not permissible.
- ◆ For trouble-free operation of electrical components, a voltage of at least 11.5 V is necessary.





- ◆ Do not use sealants containing silicone. Particles of silicone drawn into the engine will not be burnt in the engine and damage the Lambda probe.
- ◆ Certain tests may lead to a fault being detected by the control unit and stored. Therefore, after completing all the checks and repairs, read the event memory and clear it if necessary ⇒ Vehicle diagnostic tester.

### 3.3.2 General notes on ignition system

- ◆ Disconnecting and connecting the battery must only be done with the ignition switched off, otherwise the engine control unit could be damaged.
- ◆ The engine control unit and other components feature self-diagnosis; checking ⇒ Vehicle diagnostic tester.
- ◆ For trouble-free operation of electrical components, a voltage of at least 11.5 V is necessary.
- ◆ Certain tests may lead to a fault being detected by the control unit and stored. Therefore, after completing all the checks and repairs, read the event memory and clear it if necessary ⇒ Vehicle diagnostic tester.

Safety precautions ⇒ [p1.5 recautions when working on ignition system", page 2](#) .

Setting data, spark plugs:⇒ Maintenance; Booklet ; Service tables

### 3.3.3 General notes on charge air system

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

- ◆ Route all the various lines (e.g. for fuel, hydraulics, coolant and refrigerant, brake fluid and vacuum) and electrical cables in their original positions.
- ◆ Ensure that there is sufficient clearance to all moving or hot components.

**If a mechanical fault is found on the turbocharger, e.g. a destroyed compressor impeller, just renewing the turbocharger is not enough. To avoid subsequent damage, the following work must be carried out:**

- ◆ Clean any oil lines.
- ◆ Change engine oil and renew oil filter.
- ◆ Check air filter housing, air filter element and intake hoses for soiling.
- ◆ Check the whole charge air path and charge air cooler for foreign objects.
- ◆ The charge air system must be free of leaks.
- ◆ Renew self-locking nuts.
- ◆ Hose connections and hoses for charge air system must be free of oil and grease before assembly.
- ◆ To secure hose connections, use only approved clamps ⇒ Electronic parts catalogue (ETKA).
- ◆ Spring-type clip pliers are recommended for installation of spring-type clips.
- ◆ Before connecting oil supply line, fill turbocharger at union with engine oil.





- ◆ After installing turbocharger, run engine for about 1 minute at idling speed to ensure that oil is supplied to the turbo-charger.

### 3.4 Foreign objects in engine

Prevent the ingress of foreign bodies during work on the engine.

Seal open channels and connections using suitable plugs from the engine bung set -VAS 6122-.

### 3.5 Contact corrosion

Contact corrosion can occur if non-approved fasteners are used on the vehicle (bolts, nuts, washers etc.).

For this reason, only connecting elements with a special surface coating have been fitted.

In addition, rubber, plastic and adhesives are made of non-conductive materials.

If there is any doubt about the suitability of parts, a general rule is to use new parts ⇒ Electronic Parts Catalogue (ETKA).

### 3.6 Routing and attachment of lines

- ◆ Mark the lines for the fuel, hydraulic and vacuum systems and for the activated charcoal filter system as well as electrical lines before they are removed.
- ◆ Where necessary, make sketches or take photographs.
- ◆ To avoid damaging pipes and wires, ensure adequate clearance from all moving or hot components in the engine compartment on account of the confined space.

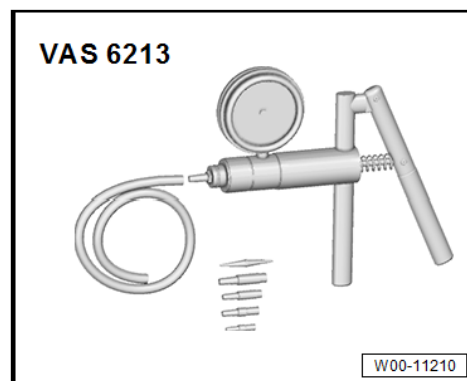
### 3.7 Fitting radiator and condensers

Even if installed correctly, the radiator, the condenser and the charge air cooler may have small dents in their fins. This does not mean that these components have been damaged. It is not permissible to renew radiators, condensers or charge air coolers only because of such minor dents.

### 3.8 Checking vacuum system

**Special tools and workshop equipment required**

- ◆ Hand operated vacuum pump -VAS 6213-



#### Sequence of operations

- Check all vacuum lines throughout entire vacuum system for:
  - ◆ Cracks





- ◆ Marten bites
- ◆ Crushing
- ◆ Porous areas and other leaks
- Check vacuum line to solenoid valve and from solenoid valve to relevant component.
- If a fault has been entered in the event memory, make sure to check not only all vacuum lines leading to the specified component, but also those leading to other components.
- If pressure cannot be built-up using hand vacuum pump -VAS 6213- or pressure immediately drops again, check hand vacuum pump and connecting hoses for leaks.





## 10 – Removing and installing engine

### 1 Removing and installing motor

⇒ [m1.1 otor", page 9](#)

⇒ [e1.2 ngine and gearbox", page 60](#)

⇒ [e1.3 ngine on engine and gearbox support", page 61](#)

⇒ [e1.4 ngine", page 63](#)

#### 1.1 Removing motor

⇒ [e1.1.1 ngine, Golf Cabriolet and Scirocco", page 9](#)

⇒ [e1.1.2 ngine, Sharan, CC and Tiguan", page 22](#)

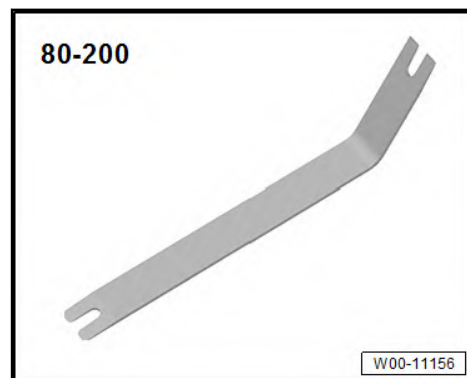
⇒ [e1.1.3 ngine, T-Roc", page 36](#)

⇒ [e1.1.4 ngine, Golf 2020, Golf Estate 2021", page 45](#)

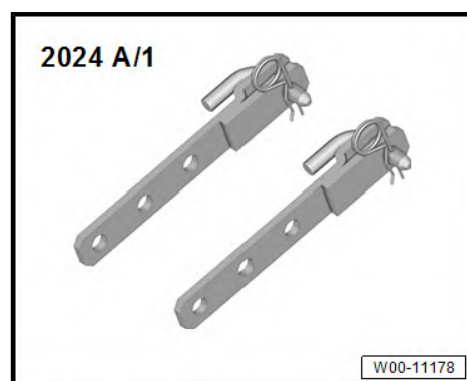
##### 1.1.1 Removing engine, Golf Cabriolet and Scirocco

Special tools and workshop equipment required

◆ Release lever -80 - 200-



◆ Extension -2024 A /1- of lifting tackle -2024 A-



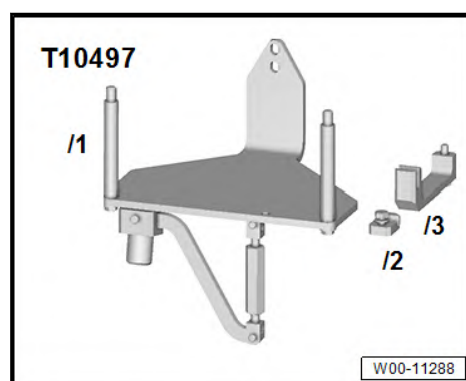




- ◆ Engine and gearbox jack -V.A.G 1383 A-



- ◆ Engine support -T10497-



- ◆ Drip tray for workshop hoist -VAS 6208-



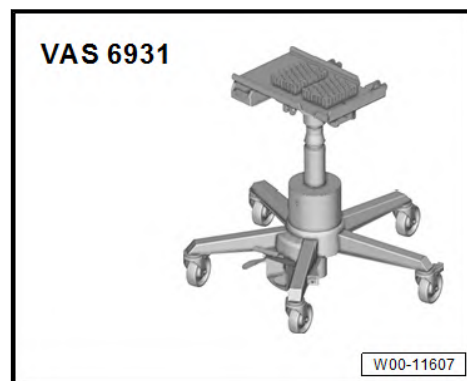
- ◆ Spring-type clip pliers -VAS 6362-



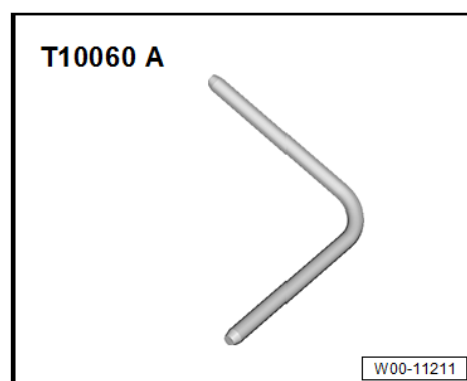




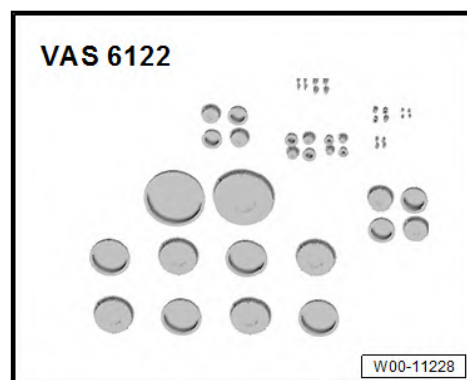
- ◆ Engine and gearbox jack -VAS 6931-



- ◆ Locking pin -T10060 A-



- ◆ Engine bung set -VAS 6122-



- ◆ Commercially available stepladder
- ◆ Safety glasses
- ◆ Safety gloves

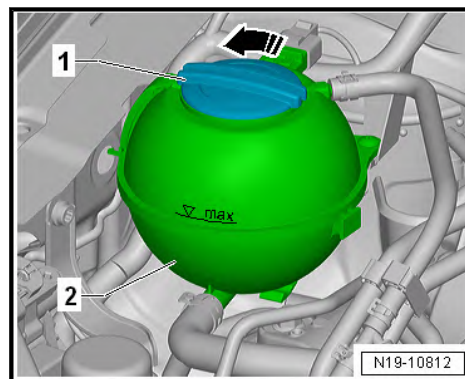
#### Sequence of operations



#### Note

- ◆ *The engine is removed downwards together with the gear-box.*
- ◆ *Reinstall all cable ties in the same locations when installing.*
- Open filler cap -1- on coolant expansion tank.





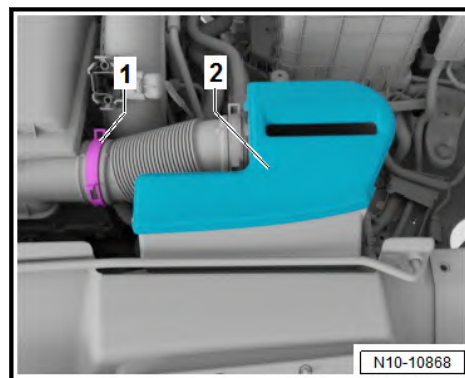
**CAUTION**

When the motor is hot, the cooling system is under high pressure. Danger of scalding by steam and hot coolant.

Skin and other parts of the body may be scalded.

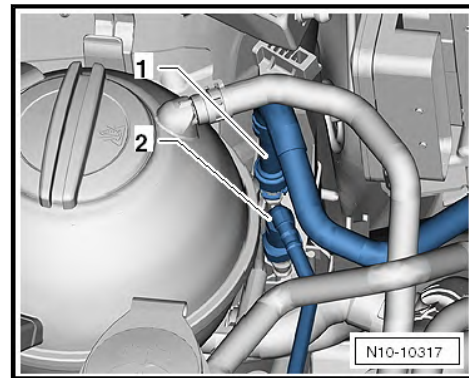
- Wear protective gloves.
- Wear protective goggles.
- Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.

- Remove air filter housing ⇒ [a3.2 nd installing air filter housing](#), page 472 .
- Release hose clip -1- and detach air intake hose.

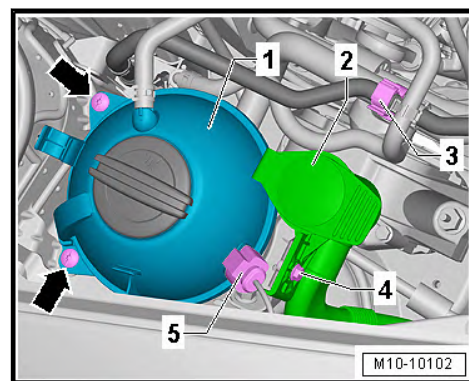


- Unclip upper part -2- of air duct, and remove it.
- Unclip lower part of air duct, and remove it.
- Remove air pipe ⇒ [a2.5 nd installing air pipe](#), page 441 .
- Remove battery tray -1- ⇒ Electrical system; Rep. gr. 27; Battery; Removing and installing battery tray.
- Open plug-in connectors -1- and -2- of fuel lines, and pull off fuel lines. Disconnect plug-in connectors ⇒ Rep. gr. 20; Plug-in connectors; Disconnecting plug-in connectors.

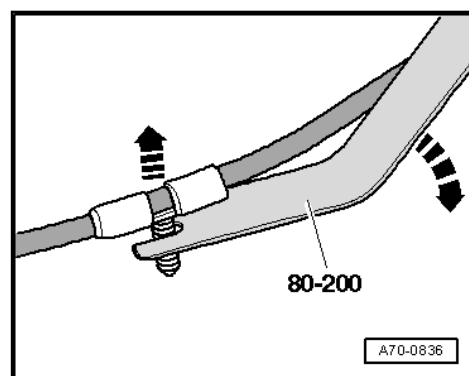




- Move lines to one side.
- Remove activated charcoal filter ⇒ Rep. gr. 20; Activated charcoal filter system; Removing and installing activated charcoal filter.
- Unscrew bolt -4- and turn filler neck for washer fluid reservoir -2- towards front.

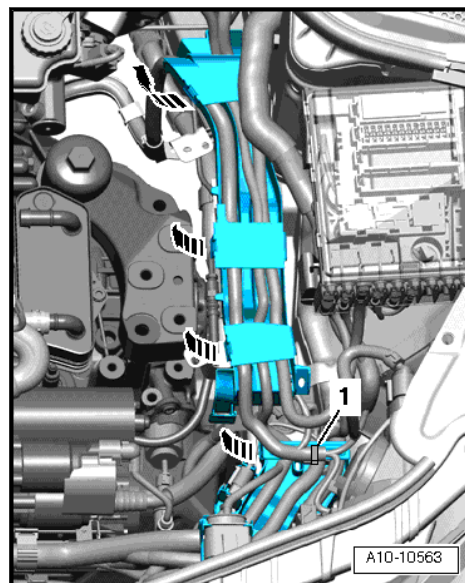


- Open clip -3- and pull connector -5- off coolant expansion tank -1-.
- Unscrew bolts -arrows-, and place coolant expansion tank -1- on engine with coolant hoses connected.
- For the work steps below use removal lever -80 - 200- to unclip the binding clips.

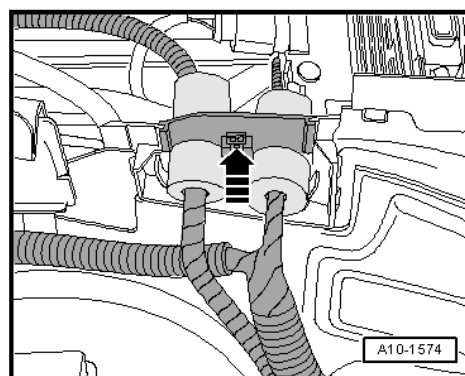


- Release and pull off connector on engine control unit -J623- ⇒ [c6 control unit", page 495](#) .
- Open cable duct latches on longitudinal member -arrows-.

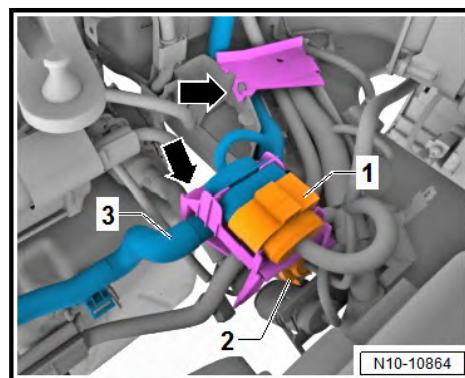




- Release feed-through for engine wiring harness -arrow-, and pull it off upwards.

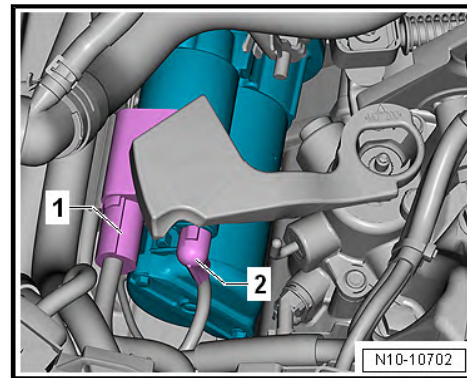


- Release and disconnect connectors -1- and -2-.

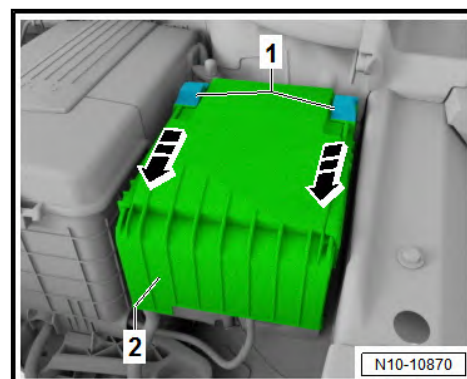


- Open locking elements -arrows- of cable guide, and place engine wiring harness -3- on engine.
- Move electrical lines free.
- Secure cables to engine using a cable tie.
- Disconnect electrical connector -2-.

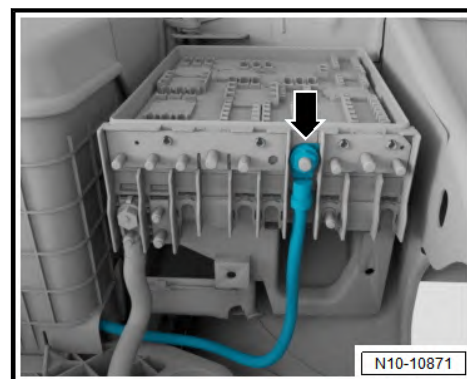




- Push back cover for battery positive terminal -1-, and unbolt battery positive cable from starter solenoid switch.
- Unbolt earth wire from body.
- Release fasteners -1- in -direction of arrow-, and remove cover -2- for electronics box in engine compartment.



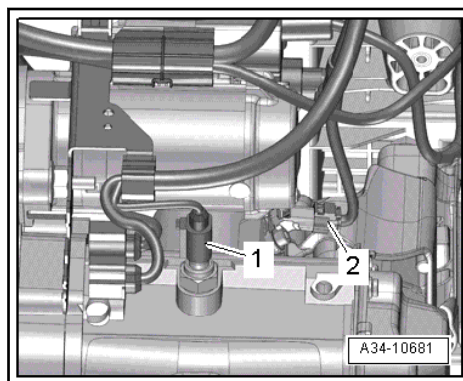
- Remove nut -arrow-, detach electrical wiring and move clear.







## Manual gearbox

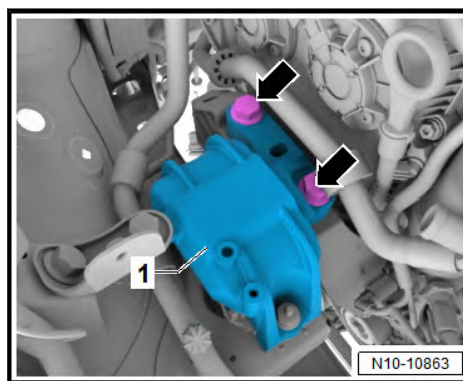


- Separate electrical connectors -1- and -2-.
- Remove selector mechanism from gearbox ⇒ Rep. gr. 34; Selector mechanism; Removing and installing selector mechanism.
- Remove clutch slave cylinder ⇒ Rep. gr. 30; Clutch mechanism; Removing and installing clutch slave cylinder.
- Do not remove line from clutch slave cylinder while doing so.
- Lay clutch slave cylinder with clutch line connected to one side.

## Dual clutch gearbox

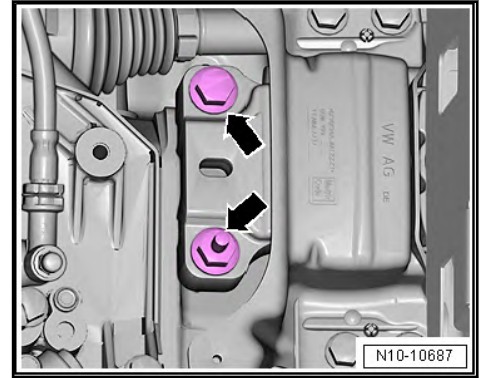
- Remove selector lever cable, pull connector of mechatronic off and remove all retainers from gearbox ⇒ Rep. gr. 34; Removing and installing gearbox

## Continued for all vehicles



- Unscrew bolts -arrows- on engine mounting approx. 2 turns.
- Unscrew bolts -arrows- on gearbox mounting approx. 2 turns.



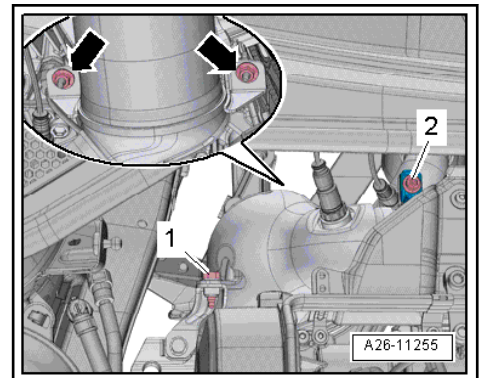


- Remove left and right front wheel ⇒ Running gear, axles, steering; Rep. gr. 44; Wheels, tyres and alignment.
- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- Remove left and right front wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66; Wheel housing liners; Assembly overview - front wheel housing liner.

#### Vehicles with air conditioning system

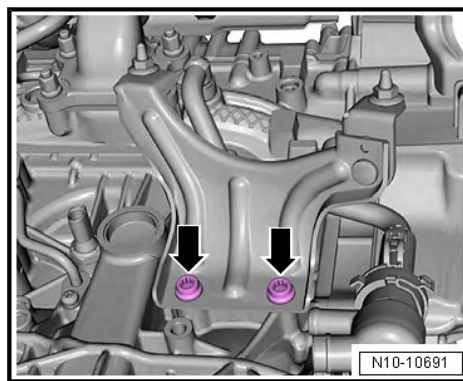
- Remove poly V-belt ⇒ [a1.3 nd installing poly-V belt", page 129](#).
- Remove air conditioner compressor with refrigerant lines connected from engine ⇒ Heating, air conditioning; Rep. gr. 87; Air conditioner compressor; Removing air conditioner compressor from and installing to bracket.
- Remove air conditioner compressor (with refrigerant lines connected) from bracket, and secure it to vehicle.

#### Continued for all vehicles

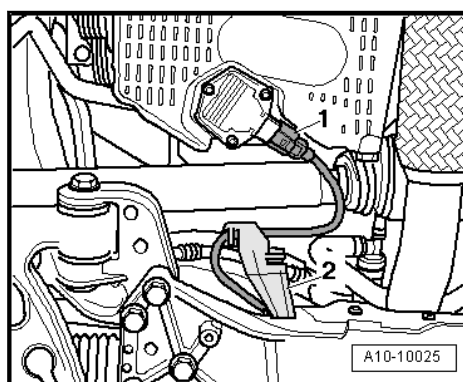


- Unscrew bolt -2- and remove screw-type clip.
- Unscrew bolt -1- and nuts -arrows-, and secure catalytic converter to vehicle.



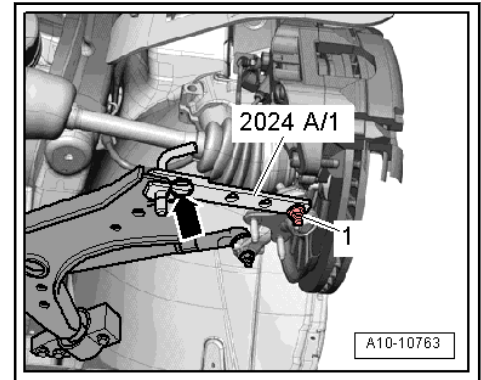


- Undo bolts -arrow- and remove bracket.
- Disconnect electrical connector -1- on oil level and oil temperature sender -G266-.

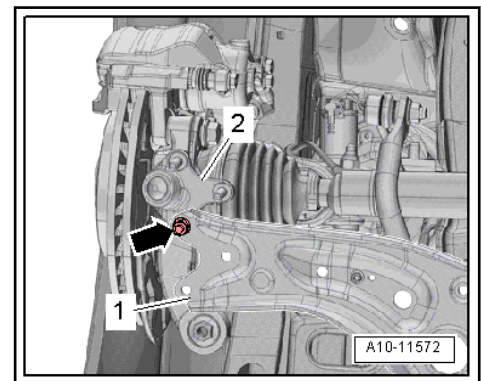


- Detach wire from retainer -2-.
- Remove coupling rod on anti-roll bar ⇒ Running gear, axles, steering; Rep. gr. 40; Subframe; Removing and installing coupling rod.
- Remove pendulum support ⇒ [a2.4 nd installing pendulum support", page 87](#) .
- Remove heat shield for right drive shaft ⇒ Running gear, axles, steering; Rep. gr. 40; Drive shaft; Removing and installing drive shaft heat shield.
- If fitted, unbolt front left vehicle level sender -G78- on transverse link ⇒ Running gear, axles, steering; Rep. gr. 43; Vehicle level sender; Assembly overview - front vehicle level sender.
- Remove drive shafts ⇒ Running gear, axles, steering; Rep. gr. 40; Drive shaft; Removing and installing drive shaft, raise and tie.
- Swivel front left suspension strut outwards and support with extension -2024 A /1-, as shown in illustration.

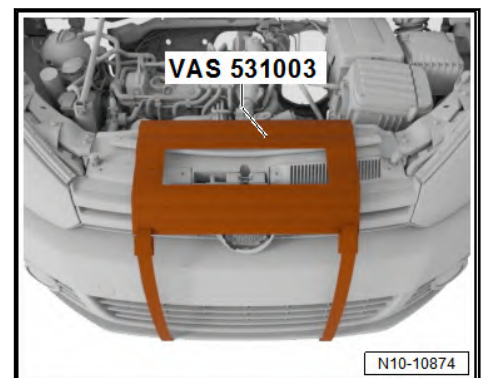




- Secure locking pin and swivel joint with locating pin -arrow- and nut -1-.
- Secure swivel joint -2- (right-side) to transverse link -1- with nut -arrow-, as shown in illustration.

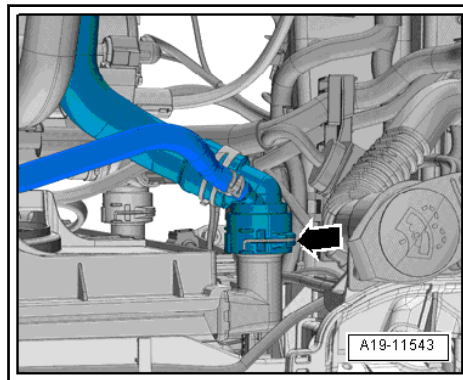


- Remove radiator cowl ⇒ [a4.5 nd installing radiator cowl](#), [page 407](#) .
- Attach protective mat -VAS 531003- to vehicle as shown in illustration.

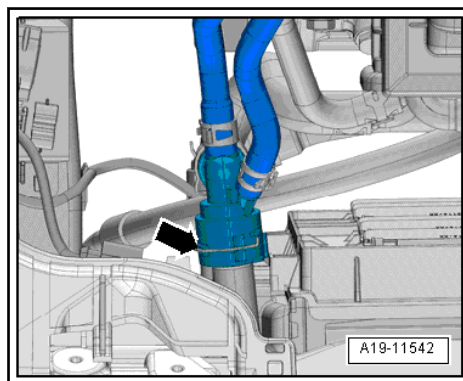


- Place drip tray for workshop hoist -VAS 6208- underneath.
- Drain coolant ⇒ [a1.3 nd adding coolant](#), [page 340](#) .
- Lift retaining clip -arrow- and disconnect coolant hose (top left) from radiator.

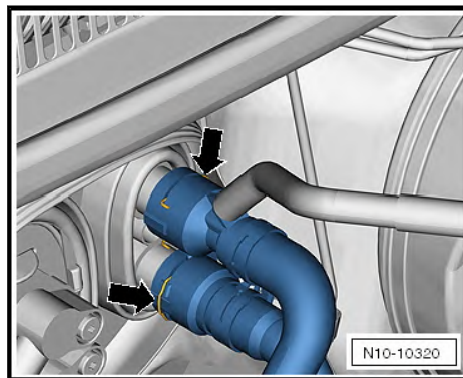




- Lift retaining clip -arrow- and disconnect coolant hose (top right) from water radiator for charge air cooling circuit.

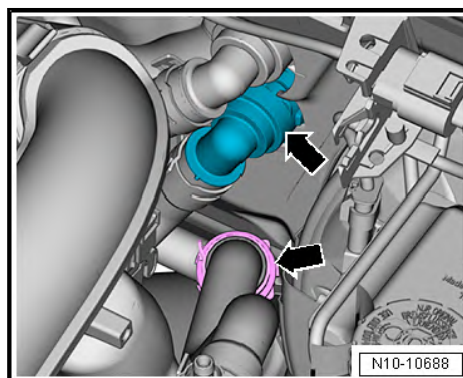


#### Vehicles with no auxiliary heater



- Lift retaining clips -arrows- and disconnect coolant hoses from heat exchanger for heater.

#### Vehicles with auxiliary heater

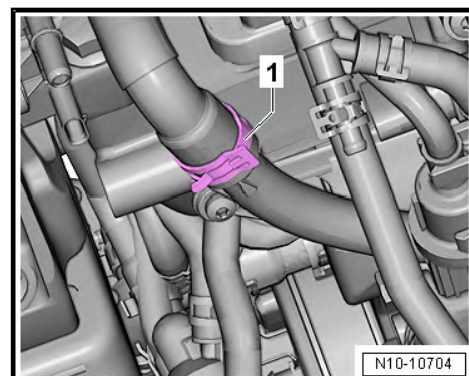




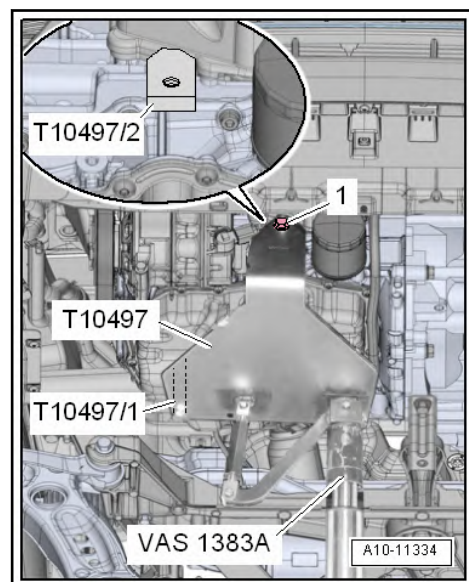


- Release retaining clip and hose clip and pull off both coolant hoses -arrows-.

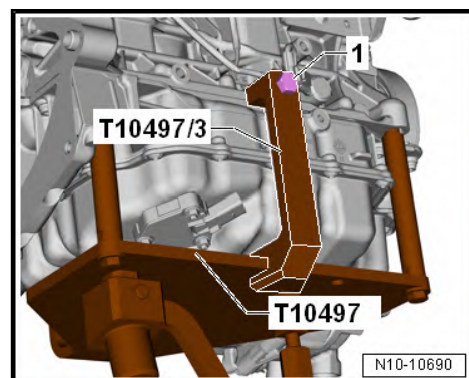
Continued for all vehicles



- Release hose clip -1- and pull off coolant hose.
- Apply clamping piece T10497/2 at housing rib on cylinder block, as shown in illustration.



- Position engine support T10497 with pin T10497/1 on cylinder block.
- Screw in bolt -1- through hole "B" in engine support T10497 and tighten it to 20 Nm.
- Fit adapter -T10497/3- to engine support -T10497- and tighten bolt -1- to 20 Nm.







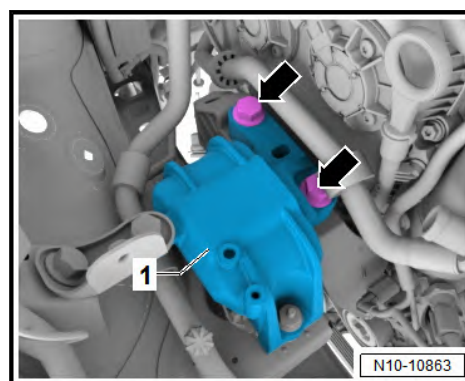
- Insert engine and gearbox jack in engine support T10497 and raise engine/gearbox assembly slightly.



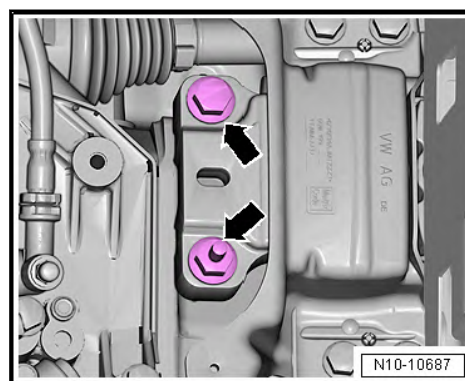
#### Note

*To unscrew bolts for assembly mounting use commercially available stepladder.*

- Remove bolts -arrows- for engine mounting.



- Remove bolts -arrows- securing gearbox mounting.



- Check that all vacuum lines and electrical wiring between engine, gearbox, subframe and body have been detached.
- When lowering, carefully guide engine/gearbox assembly with assembly carrier out of engine compartment.
- First lower engine/gearbox assembly slightly.
- Then push gearbox end of engine/gearbox assembly forwards and only then lower further.

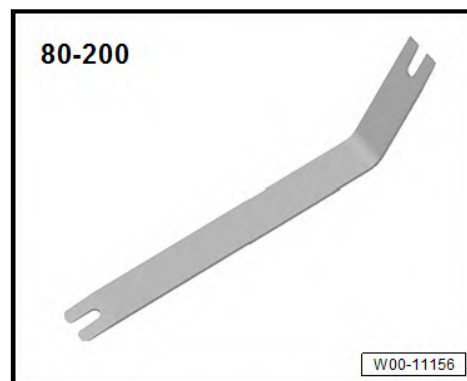
### 1.1.2 Removing engine, Sharan, CC and Tiguan

**Special tools and workshop equipment required**

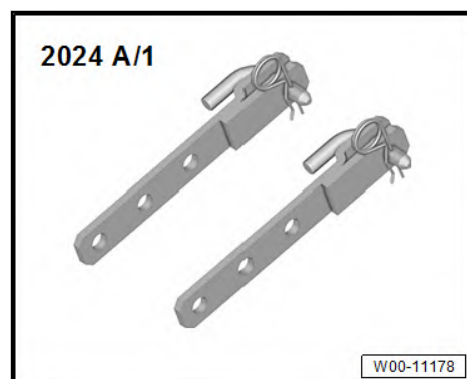




- ◆ Release lever -80 - 200-



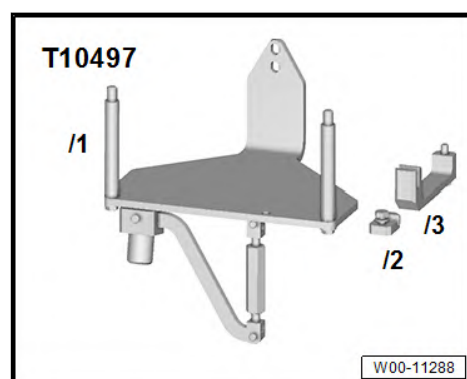
- ◆ Extension -2024 A /1- of lifting tackle -2024 A-



- ◆ Engine and gearbox jack -V.A.G 1383 A-



- ◆ Engine support -T10497-







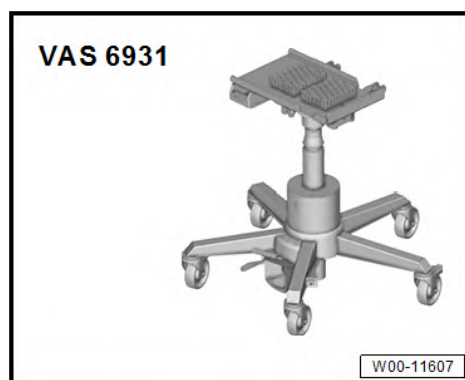
- ◆ Drip tray for workshop hoist -VAS 6208-



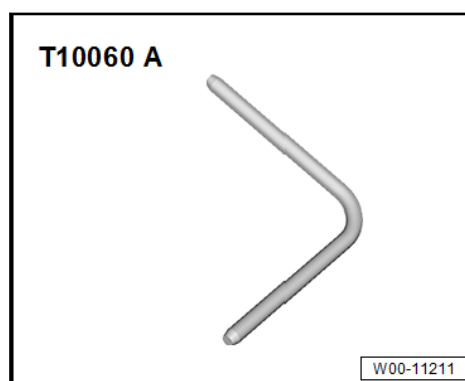
- ◆ Spring-type clip pliers -VAS 6362-



- ◆ Engine and gearbox jack -VAS 6931-



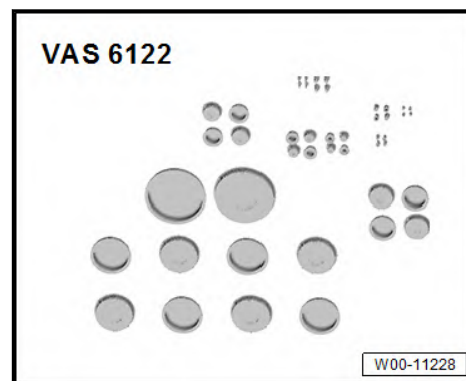
- ◆ Locking pin -T10060 A-







- ◆ Engine bung set -VAS 6122-



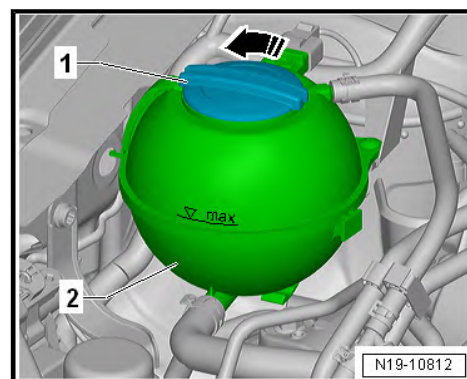
- ◆ Commercially available stepladder
- ◆ Safety glasses
- ◆ Safety gloves

#### Sequence of operations



#### Note

- ◆ *The engine is removed downwards together with the gear-box.*
- ◆ *Reinstall all cable ties in the same locations when installing.*
- Open filler cap -1- on coolant expansion tank.



#### CAUTION

When the motor is hot, the cooling system is under high pressure. Danger of scalding by steam and hot coolant.

Skin and other parts of the body may be scalded.

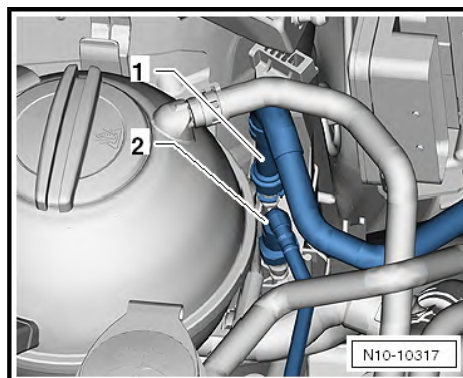
- Wear protective gloves.
- Wear protective goggles.
- Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.

- Remove air filter housing ⇒ [a3.2 nd installing air filter housing", page 472](#) .
- Remove air pipe ⇒ [a2.5 nd installing air pipe", page 441](#) .
- Remove battery tray -1- ⇒ Electrical system; Rep. gr. 27; Battery; Removing and installing battery tray.



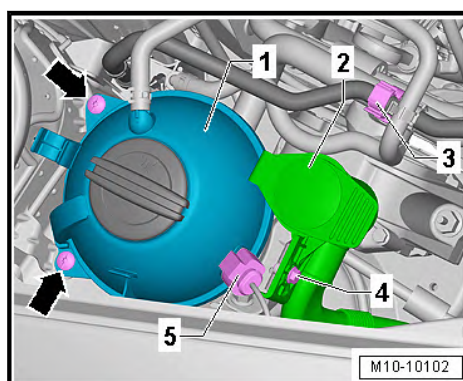


- Open plug-in connectors -1- and -2- of fuel lines, and pull off fuel lines. Disconnect plug-in connectors ⇒ Rep. gr. 20; Plug-in connectors; Disconnecting plug-in connectors.



- Move lines to one side.

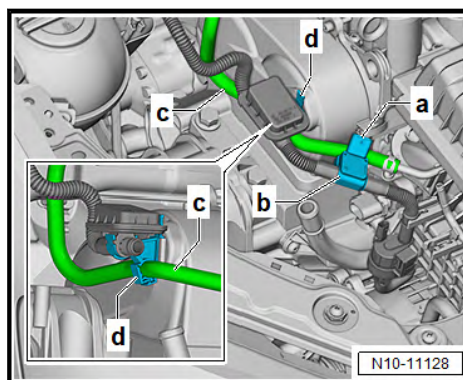
**CC:**



- Unscrew bolt -4- and turn filler neck for washer fluid reservoir -2- towards front.

#### **Sharan with petrol particulate filter**

- Pull off connector -a- from activated charcoal filter line -b-.



- Unclip activated charcoal filter line -b- and fuel line -c- from bracket -d-.
- Place activated charcoal filter lines -b- and fuel line -c- aside.

#### **Continued for all vehicles:**

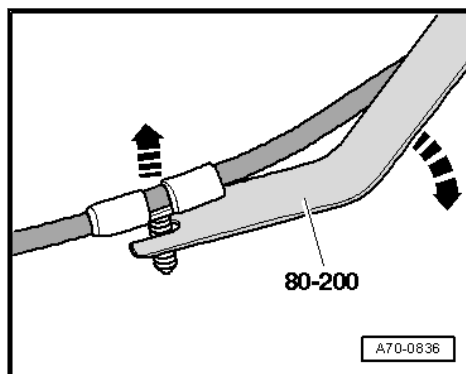
- Open clip -3- and pull connector -5- off coolant expansion tank -1-.
- Unscrew bolts -arrows-, and place coolant expansion tank -1- on engine with coolant hoses connected.



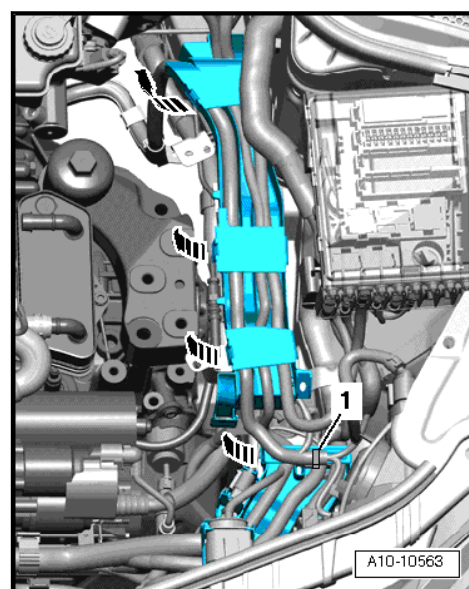


# Note

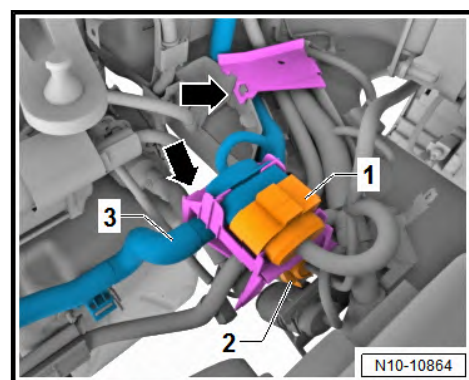
For the work steps below use removal lever -80 - 200- to unclip the binding clips.



- Release and pull off connector on engine control unit -J623- ➔ [c6 control unit", page 495](#) .
- Open cable duct latches on longitudinal member -arrows-.



- Release and disconnect connectors -1- and -2-.

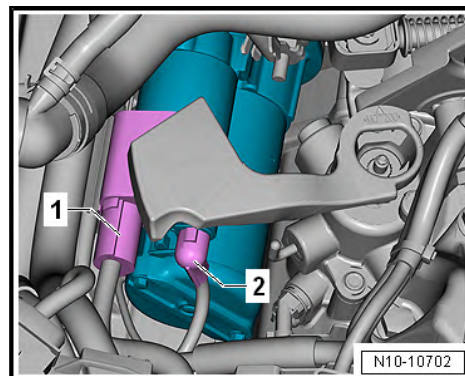


- Open locking elements -arrows- of cable guide, and place engine wiring harness -3- on engine.
- Move electrical lines free.

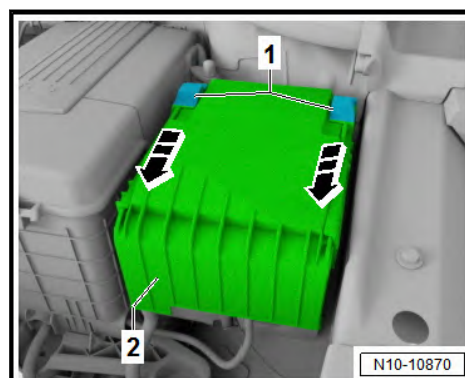




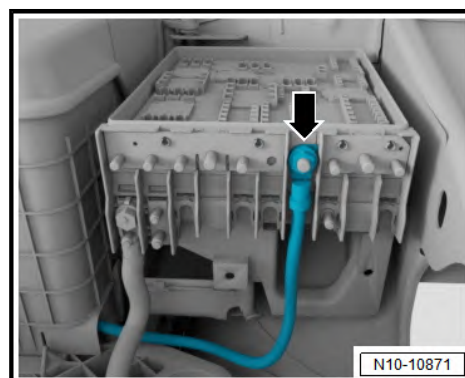
- Secure cables to engine using a cable tie.
- Disconnect electrical connector -2-.



- Push back cover for battery positive terminal -1-, and unbolt battery positive cable from starter solenoid switch.
- Unbolt earth wire from body.
- Release fasteners -1- in -direction of arrow-, and remove cover -2- for electronics box in engine compartment.



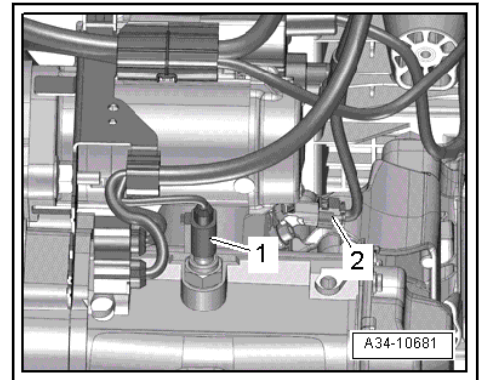
- Remove nut -arrow-, detach electrical wiring and move clear.







## Manual gearbox



- Separate electrical connectors -1- and -2-.
- Remove selector mechanism from gearbox ⇒ Rep. gr. 34; Selector mechanism; Removing and installing selector mechanism.
- Remove clutch slave cylinder ⇒ Rep. gr. 30; Clutch mechanism; Removing and installing clutch slave cylinder.
- Do not remove line from clutch slave cylinder while doing so.
- Lay clutch slave cylinder with clutch line connected to one side.

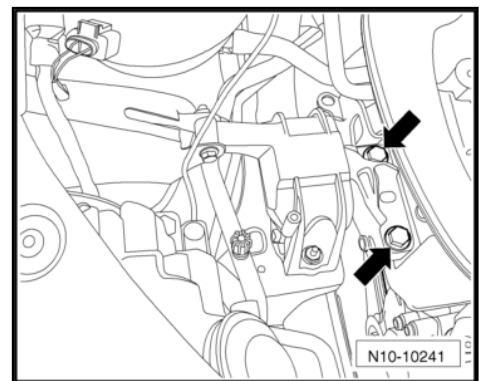
## Dual clutch gearbox

- Remove selector lever cable, pull connector of mechatronic off and remove all retainers from gearbox:⇒ Rep. gr. 34; Removing and installing gearbox

## Sharan with petrol particulate filter

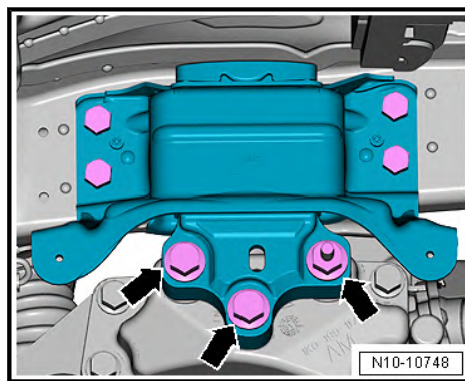
- Remove brake servo vacuum pump ⇒ Rep. gr. 47; Vacuum system; Assembly overview – electric vacuum pump.

## Continued for all vehicles



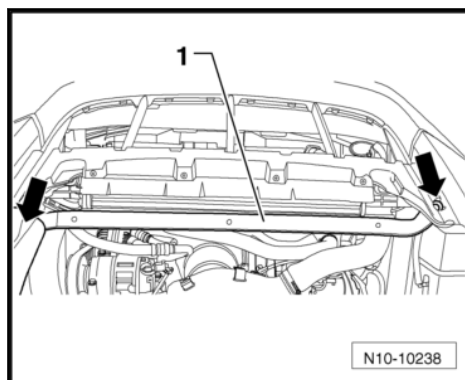
- Unscrew bolts -arrows- on engine mounting approx. 2 turns.
- Unscrew bolts -arrows- on gearbox mounting approx. 2 turns.





- Remove left and right front wheel ⇒ Running gear, axles, steering; Rep. gr. 44; Wheels, tyres and alignment.
- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- Remove left and right front wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66; Wheel housing liners; Assembly overview - front wheel housing liner.

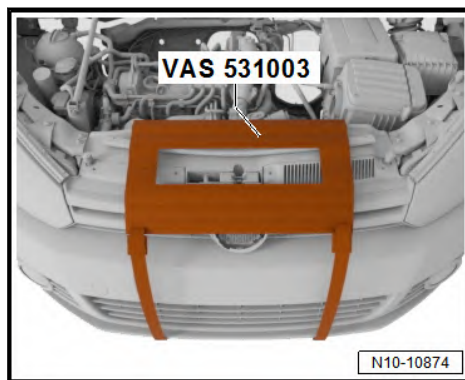
#### Tiguan:



- If fitted, remove cross piece -1-. To do this, unscrew bolts -arrows-.

#### Continued for all vehicles:

- Remove radiator cowl ⇒ [a4.5 nd installing radiator cowl", page 407](#) .
- Attach protective mat -VAS 531003- to vehicle as shown in illustration.

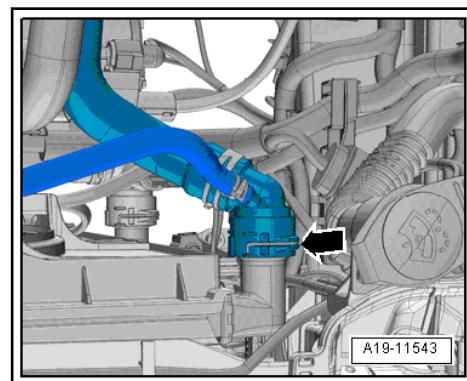


- Place drip tray for workshop hoist -VAS 6208- underneath.
- Drain coolant ⇒ [a1.3 nd adding coolant", page 340](#) .

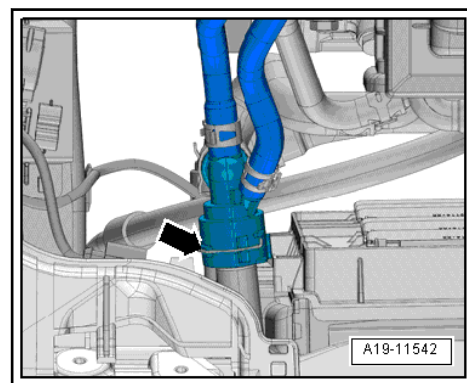




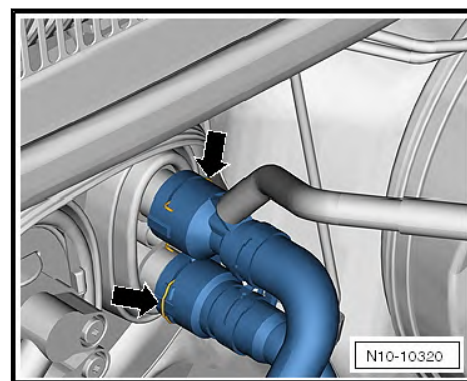
- Lift retaining clip -arrow- and disconnect coolant hose (top left) from radiator.



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



#### Vehicles with no auxiliary heater

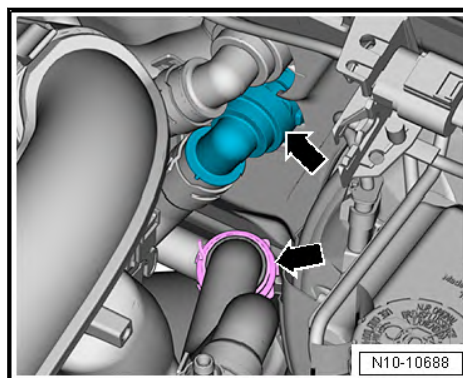


- Lift retaining clips -arrows- and disconnect coolant hoses from heat exchanger for heater.





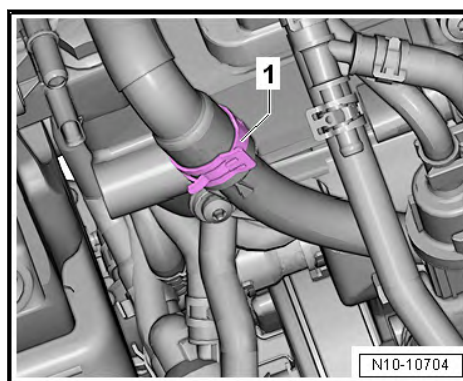
### Vehicles with auxiliary heater



- Release retaining clip and hose clip and pull off both coolant hoses -arrows-.

#### Continued for all vehicles:

- Release hose clip -1- and pull off coolant hose.

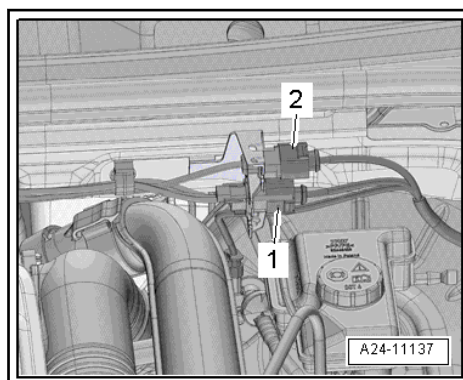


### Vehicles with air conditioning system

- Remove poly V-belt ➔ [a1.3 nd installing poly-V belt", page 129](#) .
- Remove air conditioner compressor with refrigerant lines connected from engine ➔ Heating, air conditioning; Rep. gr. 87; Air conditioner compressor; Removing air conditioner compressor from and installing to bracket.
- Remove air conditioner compressor (with refrigerant lines connected) from bracket, and secure it to vehicle.

#### Continued for all vehicles

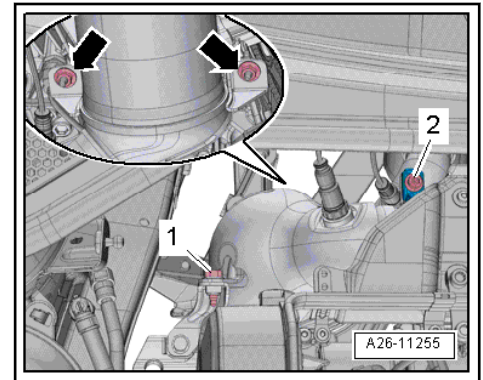
- Remove connectors -1- and -2- from retainer, release them, and pull them off.



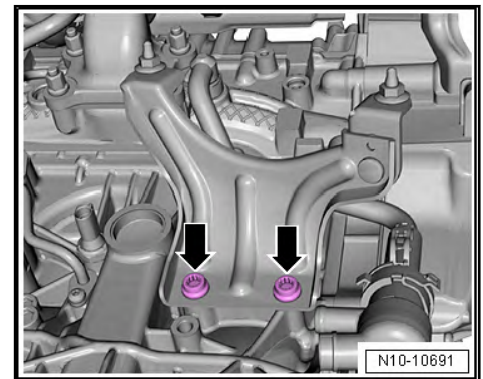




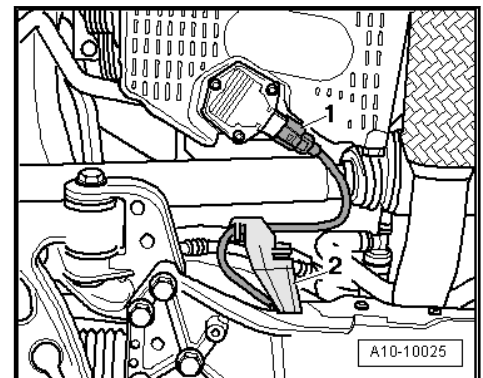
- Unscrew bolt -2- and remove screw-type clip.



- Unscrew bolt -1- and nuts -arrows-, and secure catalytic converter to vehicle.
- Undo bolts -arrow- and remove bracket.



- Disconnect electrical connector -1- on oil level and oil temperature sender -G266-.



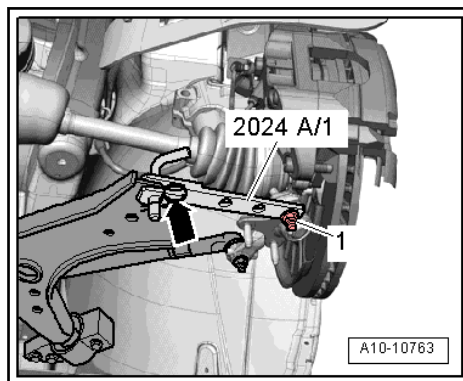
- Detach wire from retainer -2-.
- Remove coupling rod on anti-roll bar ⇒ Running gear, axles, steering; Rep. gr. 40; Subframe; Removing and installing coupling rod.
- Remove pendulum support ⇒ [a2.4 nd installing pendulum support", page 87](#) .
- Remove heat shield for right drive shaft ⇒ Running gear, axles, steering; Rep. gr. 40; Drive shaft; Removing and installing drive shaft heat shield.
- If fitted, unbolt front left vehicle level sender -G78- on transverse link ⇒ Running gear, axles, steering; Rep. gr. 43; Ve-



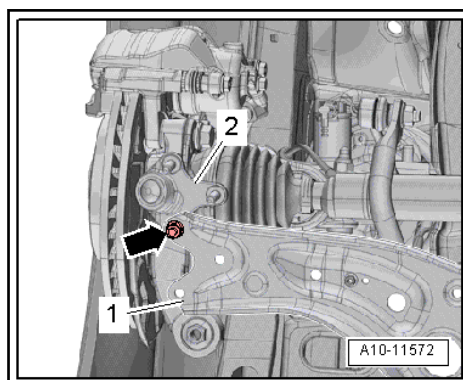


hicle level sender; Assembly overview - front vehicle level sender.

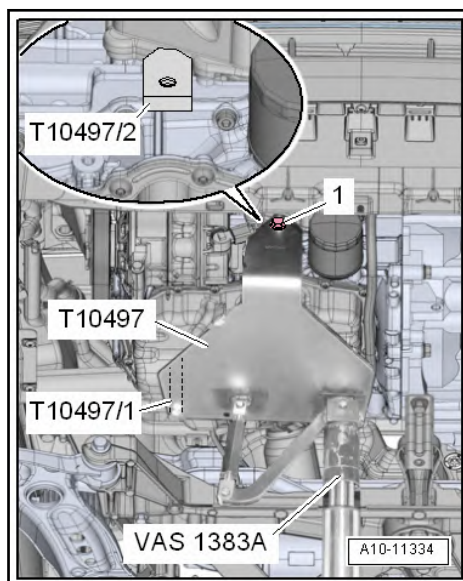
- Remove drive shafts ⇒ Running gear, axles, steering; Rep. gr. 40; Drive shaft; Removing and installing drive shaft, raise and tie.
- Swivel front left suspension strut outwards and support with extension -2024 A /1-, as shown in illustration.



- Secure locking pin and swivel joint with locating pin -arrow- and nut -1-.
- Secure swivel joint -2- (right-side) to transverse link -1- with nut -arrow-, as shown in illustration.



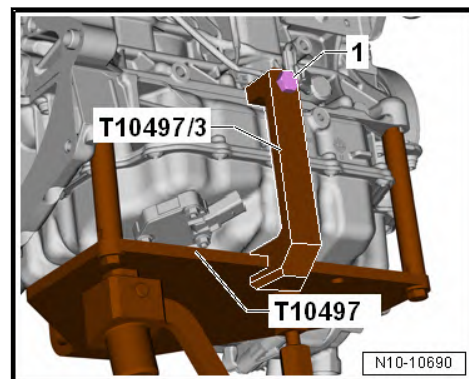
- Apply clamping piece T10497/2 at housing rib on cylinder block, as shown in illustration.







- Position engine support T10497 with pin T10497/1 on cylinder block.
- Screw in bolt -1- through hole "B" in engine support T10497 and tighten it to 20 Nm.
- Fit adapter -T10497/3- to engine support -T10497- and tighten bolt -1- to 20 Nm.



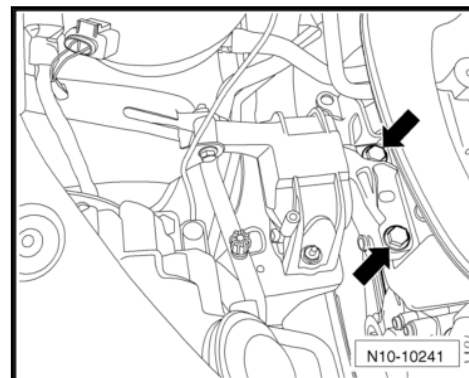
- Insert engine and gearbox jack in engine support T10497 and raise engine/gearbox assembly slightly.



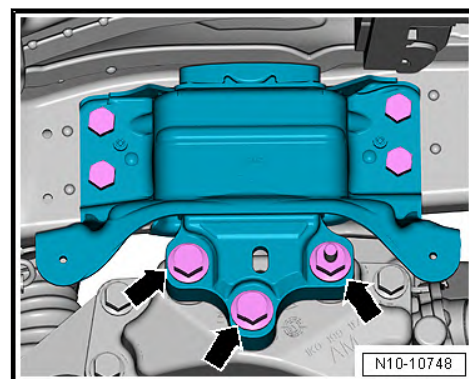
#### Note

*To unscrew bolts for assembly mounting use commercially available stepladder.*

- Remove bolts -arrows- for engine mounting.



- Remove bolts -arrows- securing gearbox mounting.



- Check that all vacuum lines and electrical wiring between engine, gearbox, subframe and body have been detached.

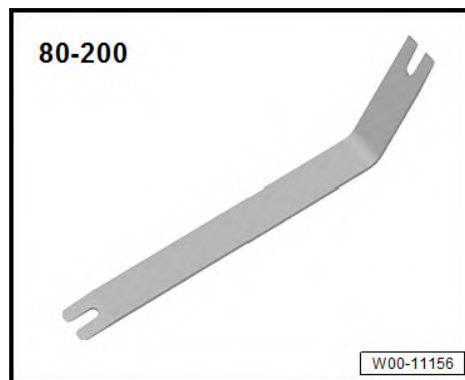




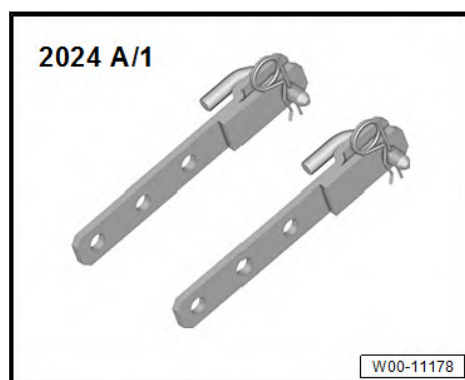
- When lowering, carefully guide engine/gearbox assembly with assembly carrier out of engine compartment.
- First lower engine/gearbox assembly slightly.
- Then push gearbox end of engine/gearbox assembly forwards and only then lower further.

### 1.1.3 Removing engine, T-Roc

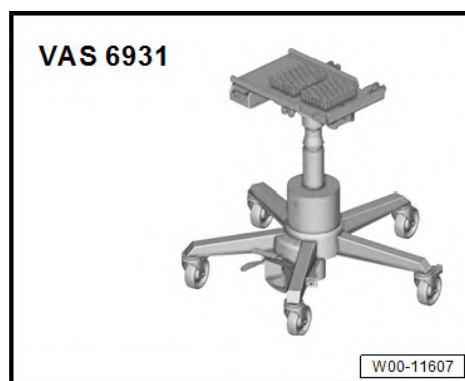
- ◆ Removal lever -80 - 200-



- ◆ Extension -2024 A /1- of lifting tackle -2024 A-



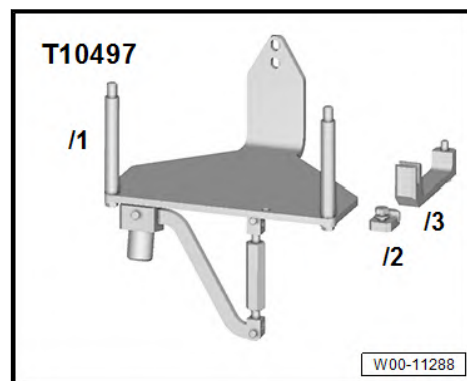
- ◆ Engine and gearbox jack -V.A.G 1383 A- or -VAS 6931-







◆ Engine support -T10497-



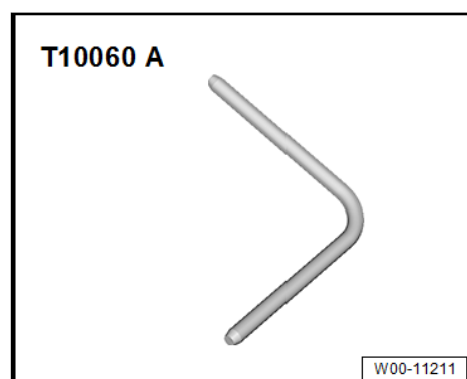
◆ Drip tray for workshop hoist -VAS 6208-



◆ Spring-type clip pliers -VAS 6362-



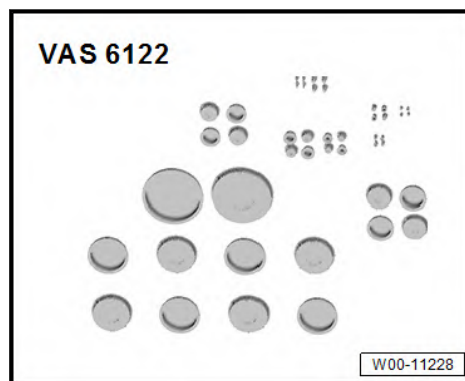
◆ Locking pin -T10060 A-







- ♦ Engine bung set -VAS 6122-



- ♦ Protective mat -VAS 531003- (not shown)
- ♦ Commercially available stepladder (not shown)
- ♦ Safety glasses
- ♦ Safety gloves

#### Sequence of operations



#### Note

- ♦ *The engine is removed downwards together with the gear-box.*
- ♦ *Reinstall all cable ties in the same locations when installing.*



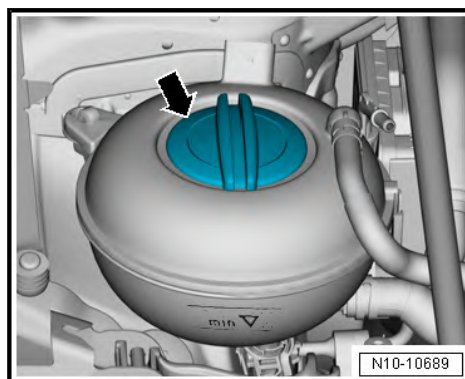
#### CAUTION

When the motor is hot, the cooling system is under high pressure. Danger of scalding by steam and hot coolant.

Skin and other parts of the body may be scalded.

- Wear protective gloves.
- Wear protective goggles.
- Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.

- Open filler cap -arrow- for coolant expansion tank.

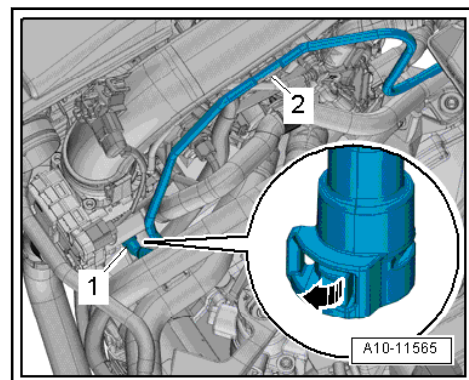


- Remove air filter housing ⇒ [a3.2 nd installing air filter housing](#), page 472 .
- Unclip gearbox breather from battery tray.
- Remove battery tray ⇒ Electrical system; Rep. gr. 27; Battery; Removing and installing battery tray.





- If fitted, remove vacuum pump for brakes -V192- ⇒ Brake system; Rep. gr. 47; Vacuum system; Removing and installing electric vacuum pump (for brakes).
- Release vacuum hose -1- -arrow-, and pull it off.



- Move clear vacuum hose at air pipe -2-.

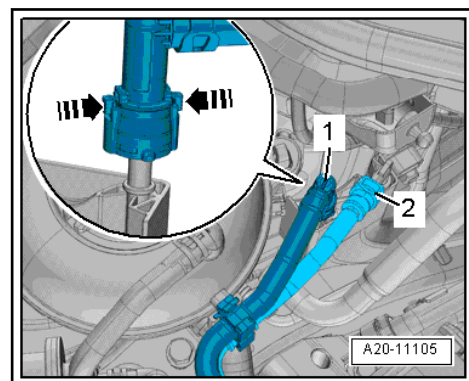
### **CAUTION**

The fuel system is pressurised.

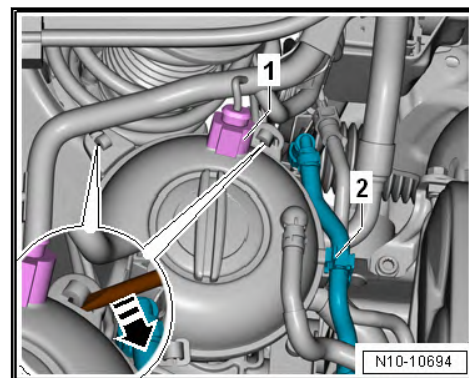
Danger of injury through fuel spray.

- Wear protective goggles.
- Wear protective gloves.
- To release pressure, wrap a clean cloth around the connection and carefully loosen the connection.

- Open plug-in connectors -1- and -2- of fuel lines, and pull off fuel lines. Disconnect plug-in connectors ⇒ Rep. gr. 20; Plug-in connectors; Disconnecting plug-in connectors.



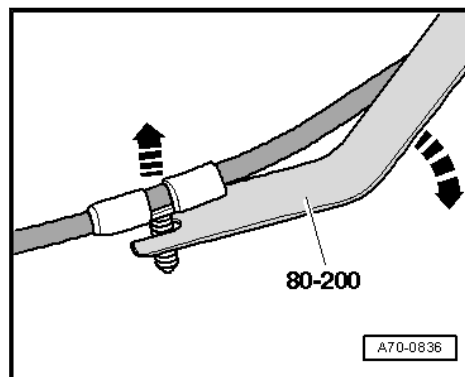
- Release and pull off electrical connector -1-.



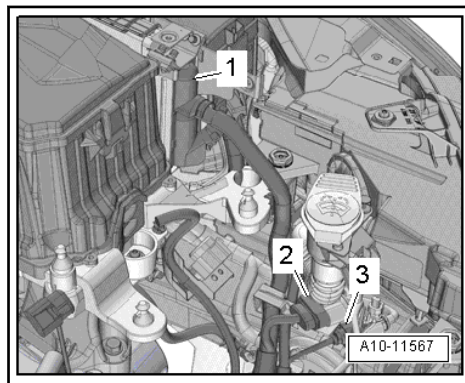




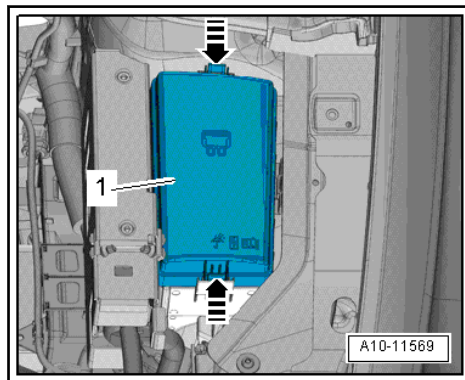
- Disconnect bracket -2- with fuel hoses.
- Use a screwdriver to release catch -arrow-, and place coolant expansion tank on engine.
- For the work steps below use removal lever -80 - 200- to unclip the binding clips.



- Release and pull off electrical connector -1- on engine control unit -J623- ➔ [c6 control unit", page 495](#).

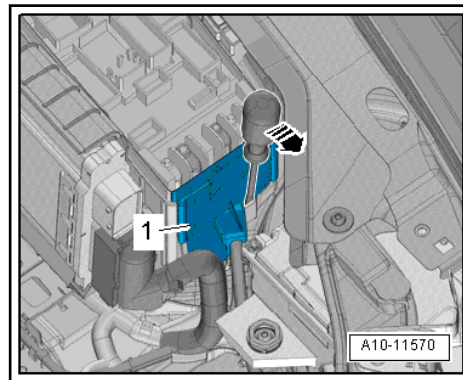


- Remove connectors -2- and -3- from retainer, release them, and pull them off.
- Move electrical lines free.
- Unbolt earth wire from body.
- Release catch -arrows-, and remove cover -1- for electronics box in engine compartment.

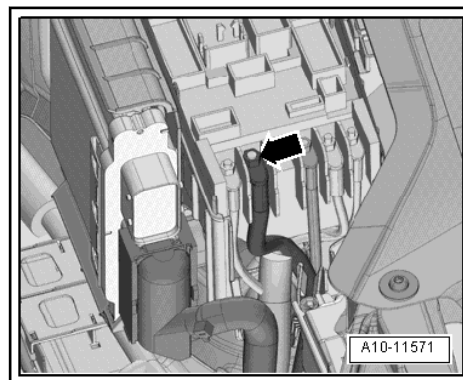


- Use a screwdriver to release catch -arrow-, and pull off cover -1- for electronics box in engine compartment upwards.



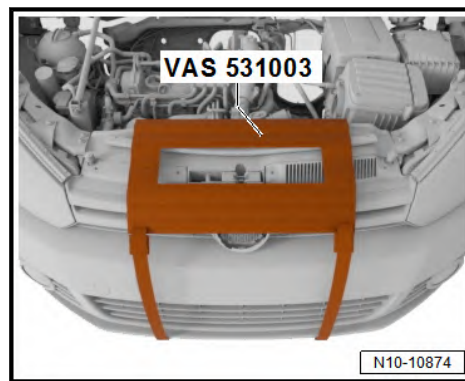


- Remove nut -arrow-, detach electrical wiring and move clear.



- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- Release and pull off electrical connector on starter ⇒ Electrical system; Rep. gr. 27; Starter; Removing and installing starter.
- Unscrew B+ wire from starter solenoid switch ⇒ Electrical system; Rep. gr. 27; Starter; Removing and installing starter.
- Release and pull off electrical connector from gearbox ⇒ Rep. gr. 34; Removing and installing gearbox.
- Remove selector mechanism from gearbox ⇒ Rep. gr. 34; Selector mechanism; Removing and installing selector mechanism.
- Unbolt earth cable on gearbox.
- Remove left and right front wheel ⇒ Running gear, axles, steering; Rep. gr. 44; Wheels, tyres and alignment.
- Remove lower front wheel housing liner on left and right ⇒ General body repairs, exterior; Rep. gr. 66; Wheel housing liner; Assembly overview - front wheel housing liner.
- Remove radiator cowl ⇒ [a4.5 nd installing radiator cowl", page 407](#) .
- Attach protective mat -VAS 531003- to vehicle as shown in illustration.





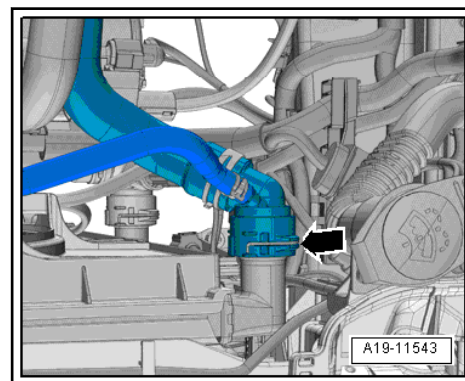
#### Vehicles with air conditioner:

- Remove poly V-belt ⇒ [a1.3 nd installing poly-V belt](#), [page 129](#) .
- Remove air conditioner compressor with refrigerant lines connected from engine ⇒ Heating, air conditioning; Rep. gr. 87; Air conditioner compressor; Removing air conditioner compressor from and installing to bracket.
- Remove air conditioner compressor (with refrigerant lines connected) from bracket, and secure it to vehicle.

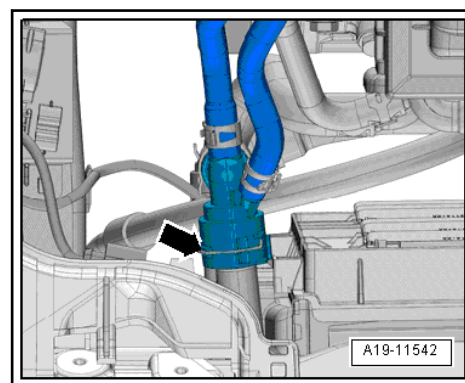
#### Continued for all vehicles

- Release and pull off connector on oil level and oil temperature sender -G266- ⇒ [a1.6 nd installing oil level and oil temperature senderG266](#), [page 314](#) .
- Remove pendulum support ⇒ [a2.4 nd installing pendulum support](#), [page 87](#) .
- Remove heat shield from turbocharger ⇒ [page 191](#) .
- Remove catalytic converter from engine, put it aside, and secure it to vehicle ⇒ [a2.2 nd installing catalytic converter](#), [page 570](#) .
- Remove heat shield for right drive shaft ⇒ Running gear, axles, steering; Rep. gr. 40; Drive shaft; Removing and installing drive shaft heat shield.
- Remove right drive shaft ⇒ Running gear, axles, steering; Rep. gr. 40; Drive shaft; Removing and installing drive shaft.
- Remove left drive shaft ⇒ Running gear, axles, steering; Rep. gr. 40; Drive shaft; Removing and installing drive shaft.
- Place drip tray for workshop hoist -VAS 6208- underneath.
- Drain coolant ⇒ [a1.3 nd adding coolant](#), [page 340](#) .
- Lift retaining clip -arrow- and disconnect coolant hose (top left) from radiator.

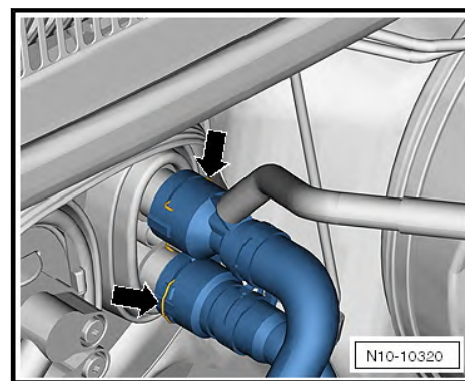




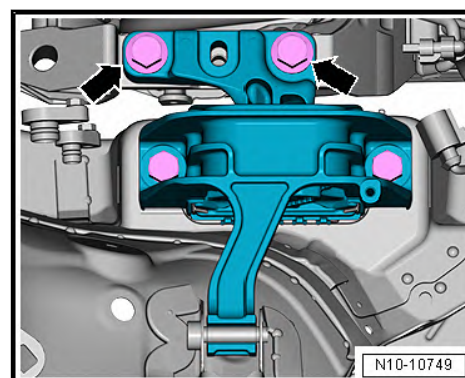
- Lift retaining clip -arrow- and disconnect coolant hose (top right) from water radiator for charge air cooling circuit.



- Place a cloth underneath heat exchanger for heater to catch escaping coolant.
- Lift retaining clips -arrows- and disconnect coolant hoses from heat exchanger for heater.



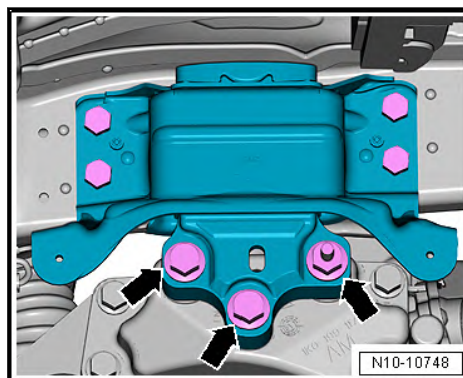
- Unscrew bolts -arrows- on engine mounting approx. 2 turns.



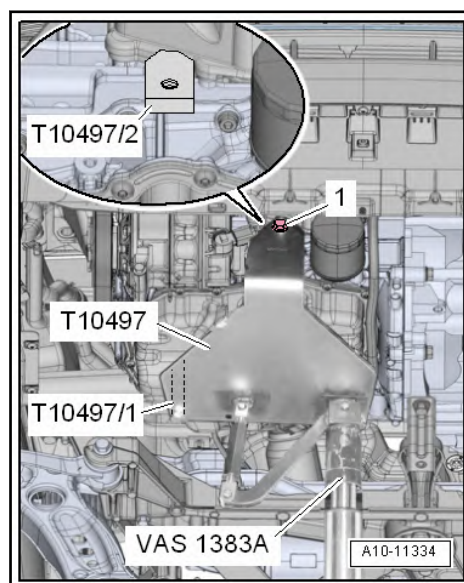




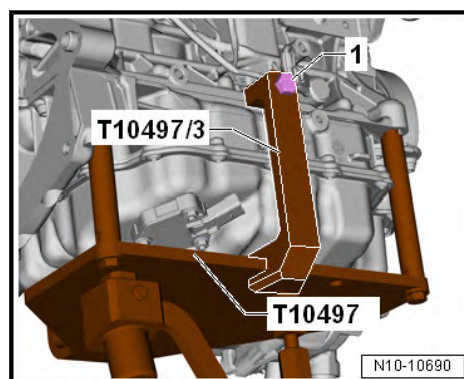
- Unscrew bolts -arrows- on gearbox mounting approx. 2 turns.



- Position clamping piece -T10497/2- on housing rib of cylinder block as shown in illustration.



- Position engine bracket -T10497- with pin -T10497/1- on cylinder block.
- Screw in bolt -1- through hole "B" in engine support -T10497- and tighten to 20 Nm.
- Fit adapter -T10497/3- to engine support -T10497- and tighten bolt -1- to 20 Nm.



- Insert engine and gearbox jack -V.A.G 1383 A- in engine support -T10497- and raise engine/gearbox assembly slightly.





- To unscrew bolts for assembly mounting use commercially available stepladder.
- Completely unscrew bolts for engine mounting.
- Completely unscrew bolts for gearbox mounting.

**! NOTICE**

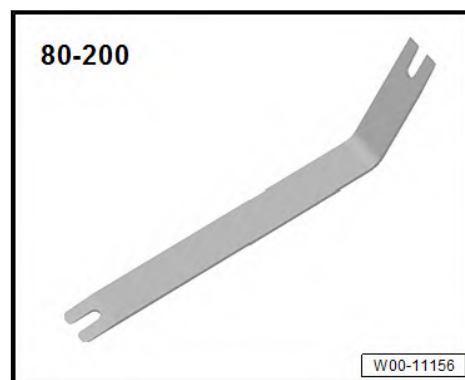
**Danger of damage to lines and hoses as well as engine compartment as engine/gearbox assembly is lowered.**

- Check that all connections between engine, gearbox, sub-frame and body have been disconnected.
- When lowering, carefully guide engine/gearbox assembly with assembly carrier out of engine compartment.
- First lower engine/gearbox assembly slightly.
- Push gearbox end of engine/gearbox assembly forwards, and only then lower further.

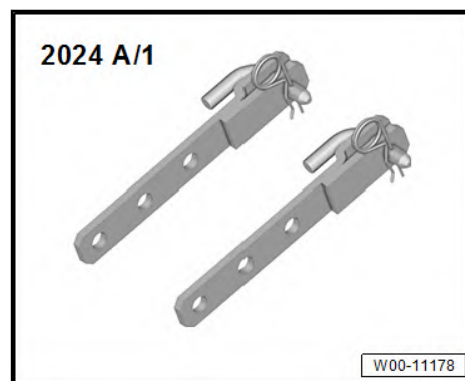
### 1.1.4 Removing engine, Golf 2020, Golf Estate 2021

Special tools and workshop equipment required

- ◆ Removal lever -80-200-



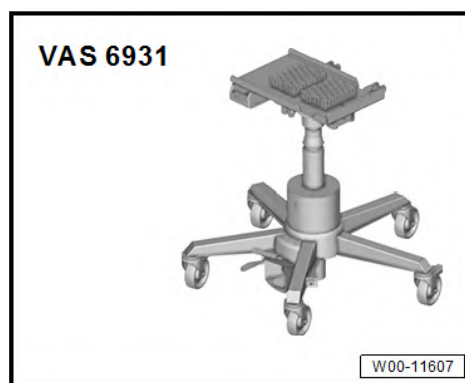
- ◆ Extension -2024 A /1- of lifting tackle -2024 A-



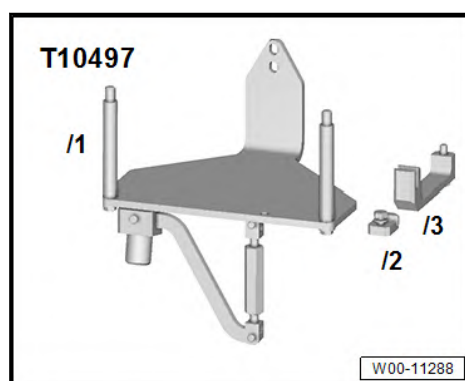




- ◆ Engine and gearbox jack -VAS 6931-



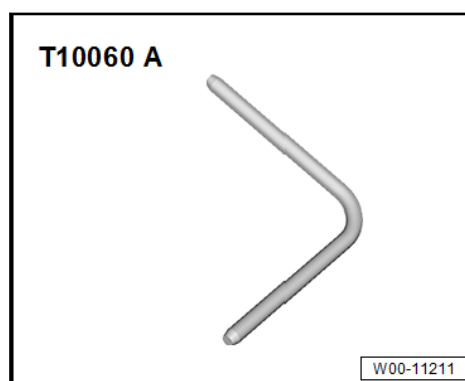
- ◆ Engine support -T10497B-



- ◆ Spring-type clip pliers -VAS 6362-



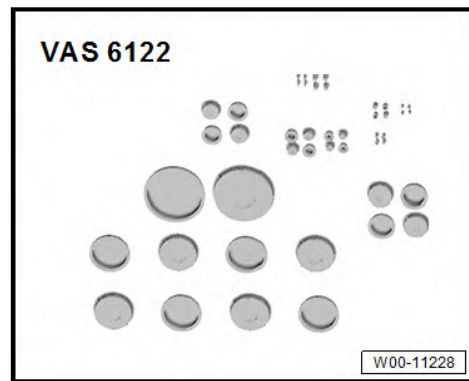
- ◆ Locking pin -T10060 A-







◆ Engine bung set -VAS 6122-



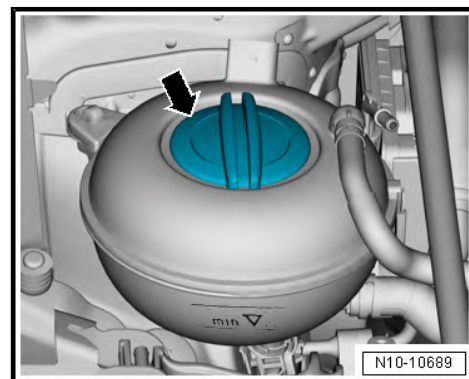
- ◆ Protective mat -VAS 531003- (not shown)
- ◆ Commercially available stepladder (not shown)
- ◆ Commercially available drip tray (not shown)
- ◆ Safety glasses
- ◆ Safety gloves

**Sequence of operations**



**Note**

- ◆ *The engine is removed downwards together with the gear-box.*
- ◆ *Reinstall all cable ties in the same locations when installing.*
- Open filler cap -arrow- of coolant expansion tank.



**CAUTION**

When the motor is hot, the cooling system is under high pressure. Danger of scalding by steam and hot coolant.

Skin and other parts of the body may be scalded.

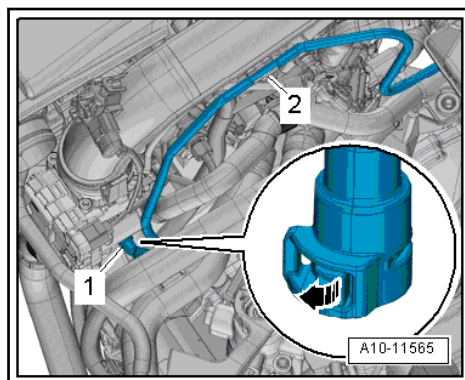
- Wear protective gloves.
- Wear protective goggles.
- Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.

- Remove air filter housing ⇒ [a3.2 nd installing air filter housing", page 472](#) .
- Disconnect battery ⇒ Electrical system; Rep. gr. 27; Battery; Disconnecting and reconnecting battery.

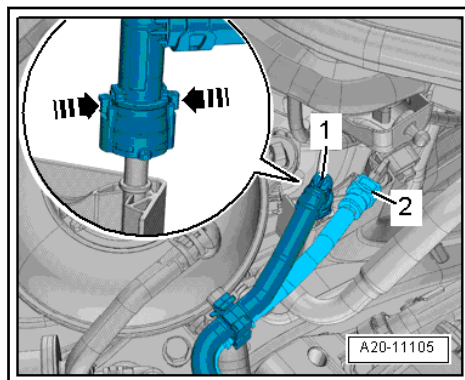




- Remove battery and battery tray ⇒ Electrical system; Rep. gr. 27; Battery; Removing and installing battery tray.
- Release catch -arrow- and disconnect vacuum hose -1-.



- Move clear vacuum hose at air pipe -2-.
- Open plug-in connectors -1- and -2- of fuel lines, and pull off fuel lines. Disconnect plug-in connectors ⇒ Rep. gr. 20; Plug-in connectors; Disconnecting plug-in connectors.



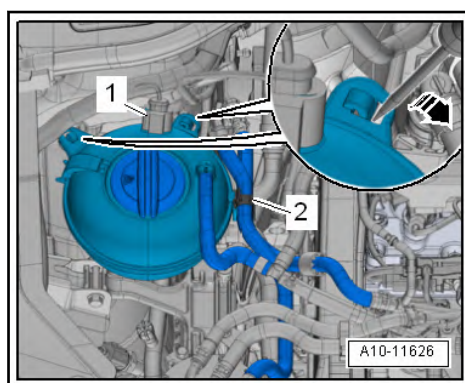
**CAUTION**

The fuel system is pressurised.

Danger of injury through fuel spray.

- Wear protective goggles.
- Wear protective gloves.
- To release pressure, wrap a clean cloth around the connection and carefully loosen the connection.

- Disconnect electrical connector -1-.



- Disconnect bracket -2- with fuel hoses.



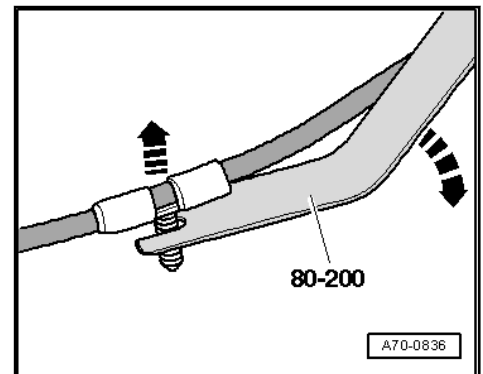


- Remove coolant hoses from engine. To do this, open retainers.
- Using a screwdriver, release fasteners -arrow- and move coolant expansion tank to one side.

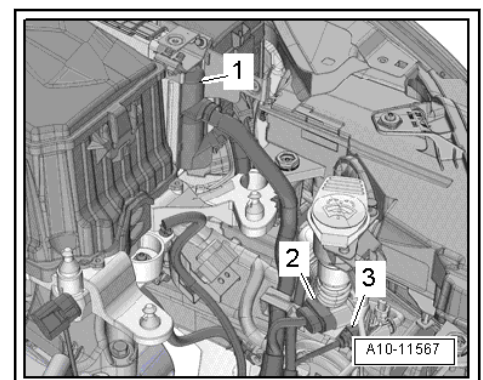
#### Vehicles with fuel quality sender -G446-:

- Remove fuel quality sender -G446- from engine mounting  
⇒ Rep. gr. 20; Senders and sensors; Overview of fitting locations - senders and sensors.

#### Continued for all vehicles

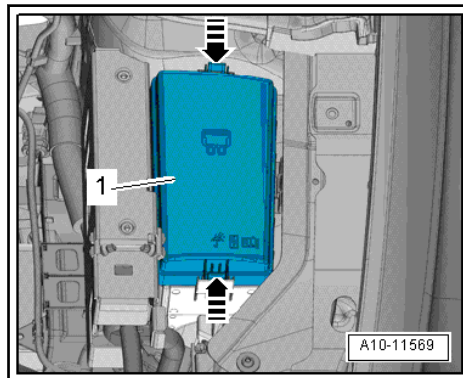


- For the work steps below use removal lever -80 - 200- to unclip the binding clips.
- Unplug upper electrical connector -1- at engine control unit -J623- ⇒ [c6 ontrol unit", page 495](#) .

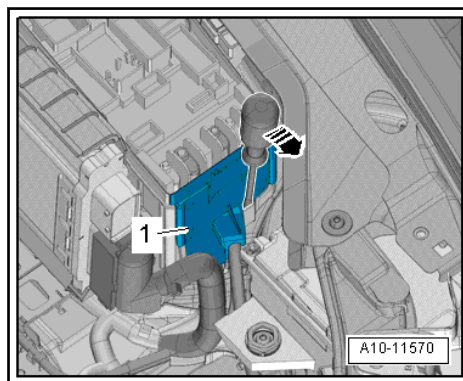


- Remove electrical connectors -2- and -3- from retainer and disconnect.
- Move electrical lines free.
- Unbolt earth wire from body.
- Release catches -arrows- and detach cover -1- for electronics box in engine compartment.

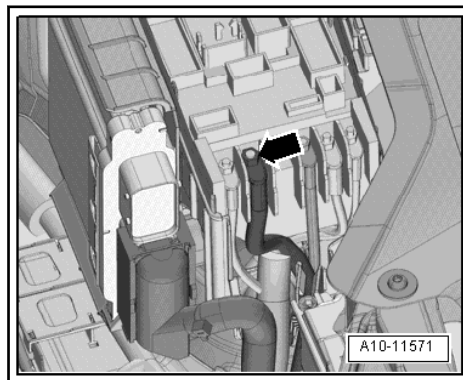




- Release catch using a screwdriver -arrow- and detach cover -1- for electronics box in engine compartment upwards.



- Remove nut -arrow-, detach electrical wiring and move clear.



- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- Release and pull off electrical connector on starter ⇒ Electrical system; Rep. gr. 27; Starter; Removing and installing starter.
- Unscrew B+ wire from starter solenoid switch ⇒ Electrical system; Rep. gr. 27; Starter; Removing and installing starter.
- Remove earth wire from body.

### Manual gearbox

- Release and pull off electrical connector from gearbox ⇒ Rep. gr. 34; Removing and installing gearbox.
- Remove selector mechanism from gearbox ⇒ Rep. gr. 34; Selector mechanism; Removing and installing selector mechanism.





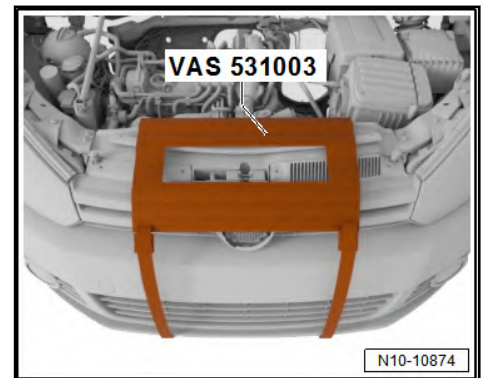
- Remove clutch slave cylinder ⇒ Rep. gr. 30; Clutch mechanism; Removing and installing clutch slave cylinder.

#### Dual clutch gearbox

- Remove selector lever cable, pull connector of mechatronic off and remove all retainers from gearbox:⇒ Rep. gr. 34; Removing and installing gearbox

#### Continued for all vehicles

- Remove left and right front wheel ⇒ Running gear, axles, steering; Rep. gr. 44; Wheels, tyres and alignment.
- Remove left and right front wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66; Wheel housing liners; Assembly overview - front wheel housing liner.
- Remove radiator cowl ⇒ [a4.5 nd installing radiator cowl", page 407](#).
- Attach protective mat -VAS 531003- to vehicle as shown in illustration.



#### Vehicles with air conditioner:

- Remove poly V-belt ⇒ [a1.3 nd installing poly-V belt", page 129](#).
- Remove air conditioner compressor with refrigerant lines connected from engine ⇒ Heating, air conditioning; Rep. gr. 87; Air conditioner compressor; Removing air conditioner compressor from and installing to bracket.
- Detach air conditioner compressor from bracket (refrigerant hoses remain connected) and tie up to right side.
- Do NOT stretch, kink or bend refrigerant lines and hoses while doing so.

#### CAUTION

Risk of freezing injury caused by refrigerant.

- Do not open refrigerant circuit of air conditioning system.

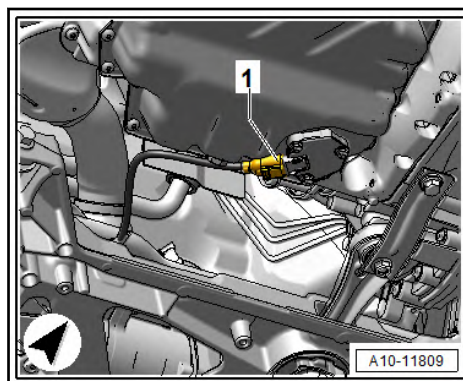
#### Vehicles with all-wheel drive:

- Remove propshaft from bevel box ⇒ Rep. gr. 39; Propshaft; Removing and installing propshaft.
- Remove bracket for bevel box ⇒ Rep. gr. 34; Bevel box; Assembly overview - bevel box.
- Remove bevel box ⇒ Rep. gr. 34; Bevel box; Removing bevel box.

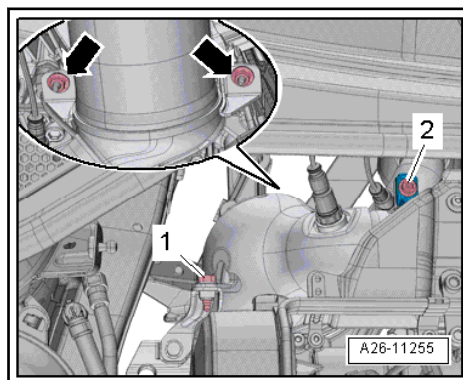




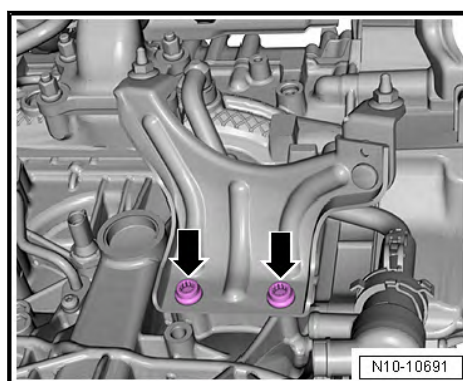
Continued for all vehicles



- Release and pull off connector -1- on oil level and oil temperature sender -G266-.
- Remove pendulum support ⇒ [a2.4 nd installing pendulum support”, page 87](#) .
- Unscrew bolt -2- and remove screw-type clip.

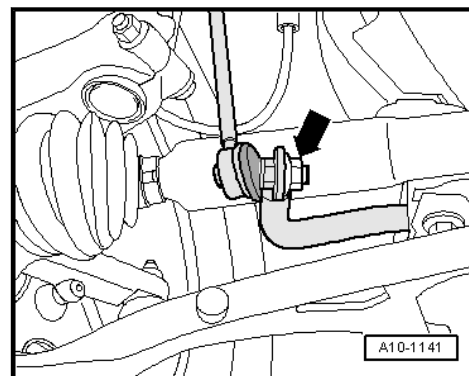


- Remove bolt -1- and nuts -arrows- and tie up catalytic converter.
- Undo bolts -arrow- and remove bracket.

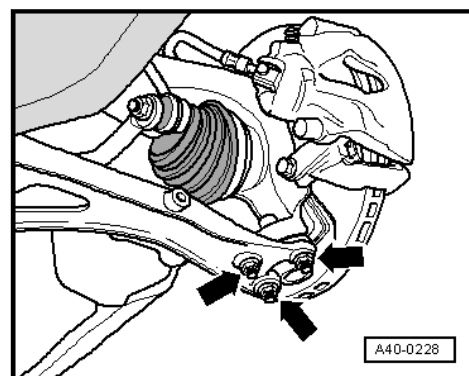


- Unscrew nuts for coupling rod -arrow- on left and right of anti-roll bar.

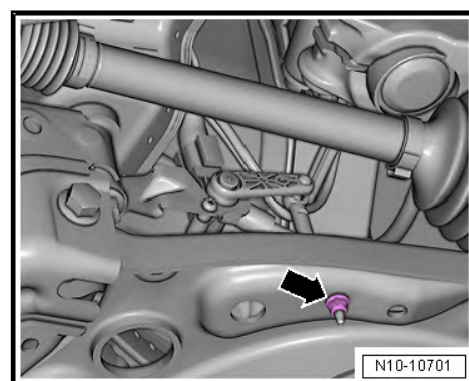




- Remove heat shield for right drive shaft ⇒ Running gear, axles, steering; Rep. gr. 40; Drive shaft; Removing and installing drive shaft heat shield.
- Unscrew nuts -arrows- for swivel joint on left and right.



- Detach swivel joint from transverse link on left and right.
- If fitted, remove nut -arrow- from front left vehicle level sender -G78-.



- Unbolt drive shaft from gearbox on left and right, and tie it up ⇒ Running gear, axles, steering; Rep. gr. 40; Drive shaft; Assembly overview - drive shaft.

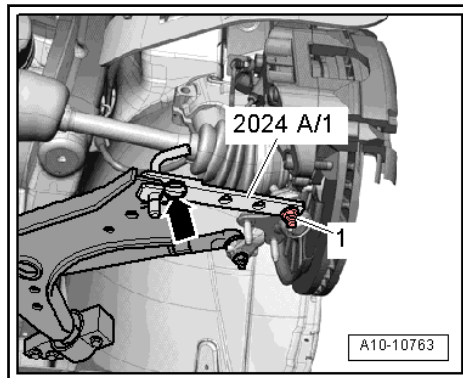


#### Note

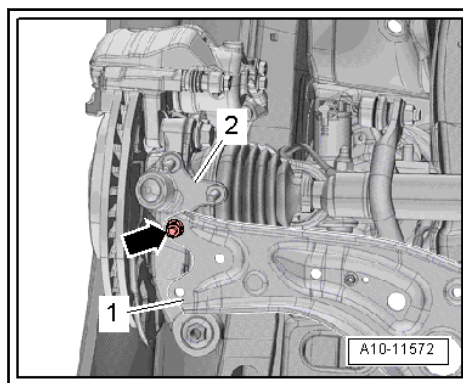
*Make sure not to damage the surface protection of the drive shaft.*

- Swivel front left suspension strut outwards and support with extension -2024 A /1-, as shown in illustration.

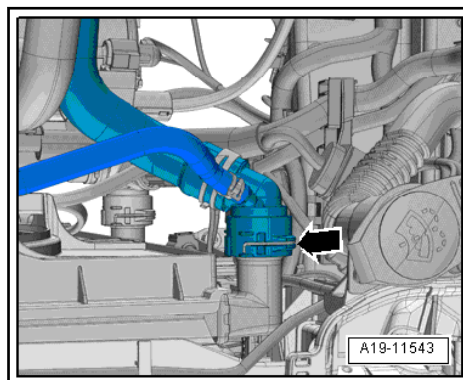




- Secure locking pin and swivel joint with locating pin -arrow- and nut -1-.
- Secure swivel joint -2- (right-side) to transverse link -1- with nut -arrow-, as shown in illustration.

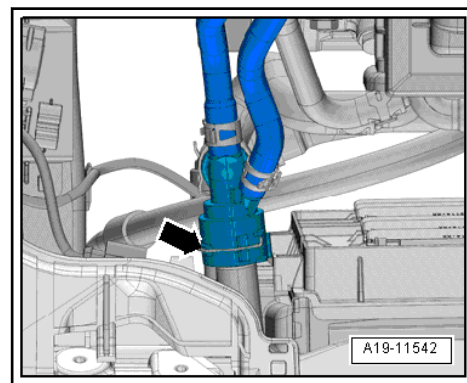


- Place drip tray for workshop hoist -VAS 6208- underneath.
- Drain coolant ⇒ [a1.3 nd adding coolant", page 340](#) .
- Lift retaining clip -arrow- and disconnect coolant hose (top left) from radiator.

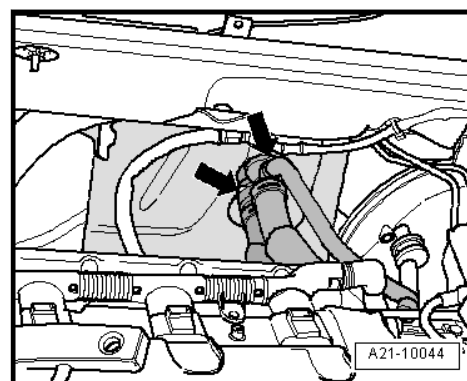


- If present, raise retaining clip -arrow-. Remove upper right coolant hose from water radiator for charge air cooling circuit.



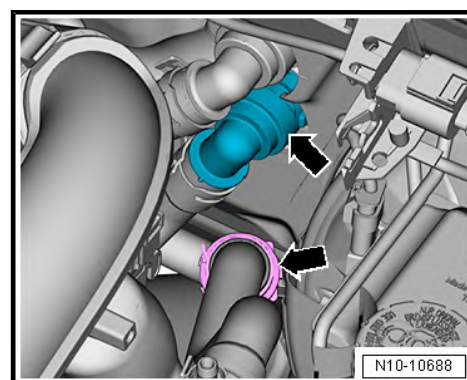


#### Vehicles with no auxiliary heater



- Lift retaining clips -arrows- and disconnect coolant hoses from heat exchanger for heater.

#### Vehicles with auxiliary heater

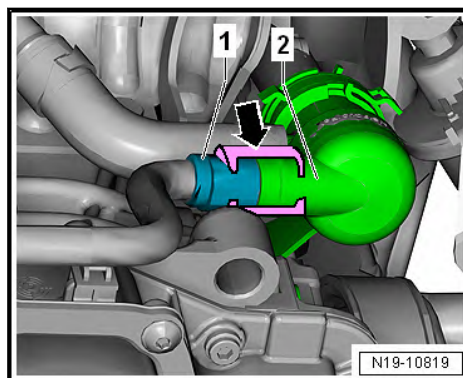


- Release retaining clip and hose clip and pull off both coolant hoses -arrows-.

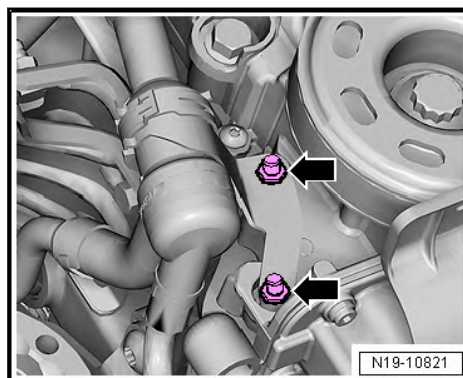




## Vehicles with engine preheating element -Z97-



- Unclip locking mechanism -arrow-.
- Pull off wiring -1- on engine preheating element -Z97- -2-.
- Unclip all cable ties from wiring harness -1- on engine. Secure wiring harness to side of vehicle.
- Pull off lower coolant hose on engine preheating element -Z97-, and remove coolant pipe.
- Unscrew nuts -arrows- and remove engine preheating element -Z97- with bracket.

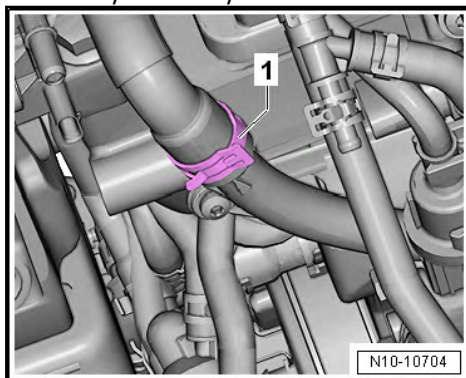


## Continued for all vehicles



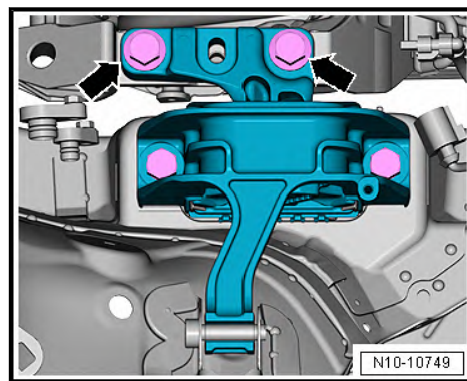
### Note

- ◆ Place a cloth underneath to catch escaping coolant.
- ◆ Release hose clip -1- and pull off coolant hose.

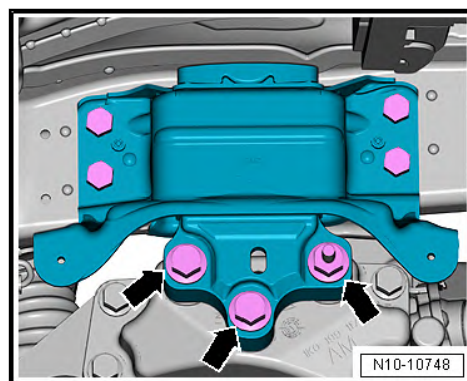


- Unscrew bolts -arrows- on engine mounting approx. 2 turns.



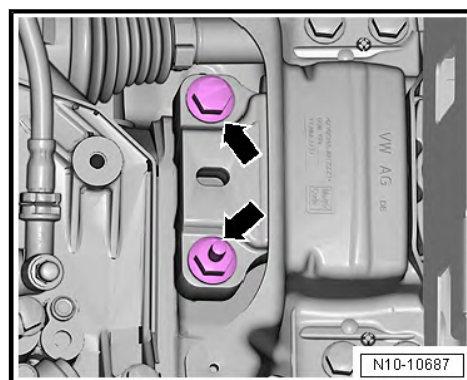


Vehicles with 3 gearbox securing bolts:



- Unscrew bolts -arrows- on gearbox mounting approx. 2 turns.

Vehicles with 2 gearbox securing bolts:

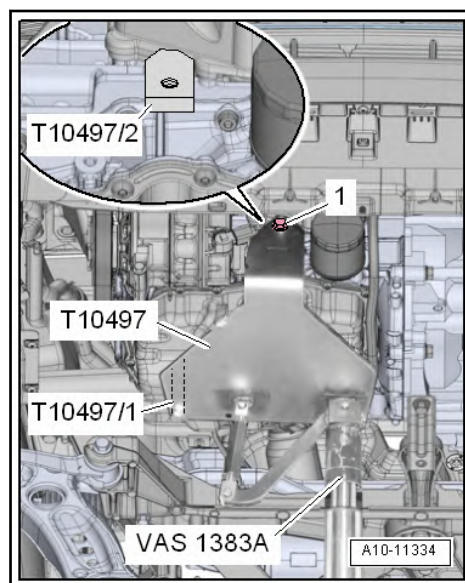


- Unscrew bolts -arrows- on gearbox mounting approx. 2 turns.

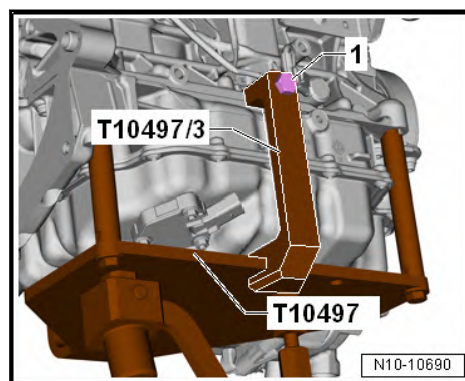




Continued for all vehicles



- Position clamping piece -T10497/2- on housing rib of cylinder block as shown in illustration.
- Position engine bracket -T10497- with pin -T10497/1- on cylinder block.
- Screw in bolt -1- through hole "B" in engine support -T10497- and tighten to 20 Nm.
- Fit adapter -T10497/3- to engine support -T10497- and tighten bolt -1- to 20 Nm.



- Insert engine and gearbox jack -V.A.G 1383 A- in engine support -T10497- and raise engine/gearbox assembly slightly.

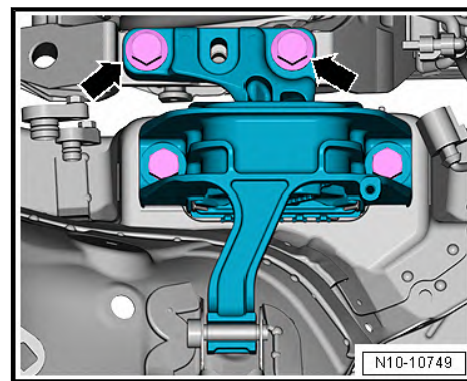


Note

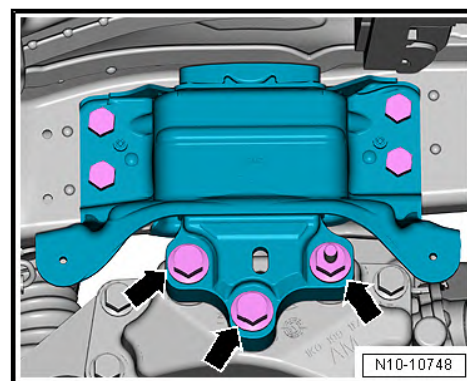
*To unscrew bolts for assembly mounting use commercially available stepladder.*

- Remove bolts -arrows- for engine mounting.



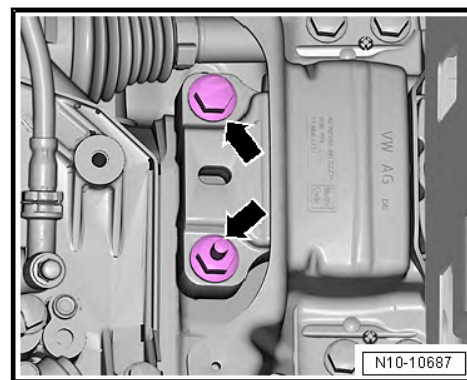


Vehicles with 3 gearbox securing bolts:



- Remove bolts -arrows- securing gearbox mounting.

Vehicles with 2 gearbox securing bolts:



- Remove bolts -arrows- securing gearbox mounting.

Continued for all vehicles



#### Note

- ◆ Risk of damage to the vacuum lines or electrical wiring as well as damage to the engine compartment.
  - ◆ Check that all vacuum lines and electrical wiring between engine, gearbox, subframe and body have been detached.
  - ◆ When lowering, carefully guide engine/gearbox assembly with assembly carrier out of engine compartment.
- First lower engine/gearbox assembly slightly.





- Then push gearbox end of engine/gearbox assembly forwards and only then lower further.

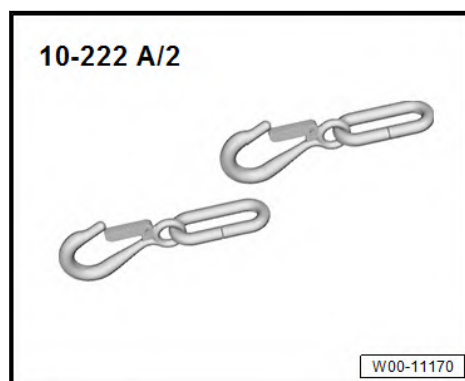
## 1.2 Separating engine and gearbox

### Special tools and workshop equipment required

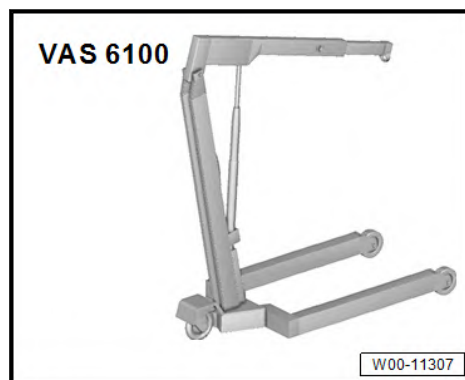
- ◆ Shackle -10 - 222 A /12-



- ◆ Hook -10 - 222 A /2-



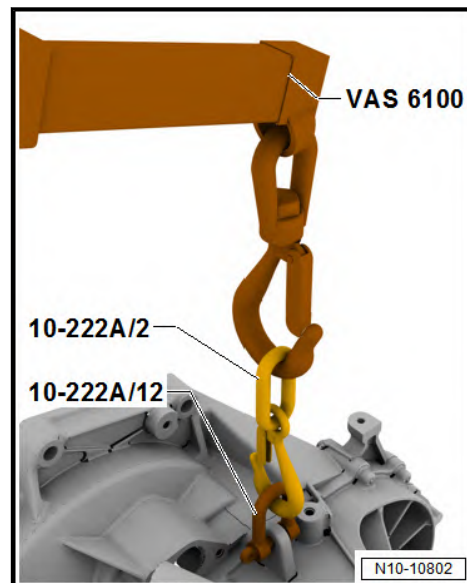
- ◆ Workshop hoist -VAS 6100-



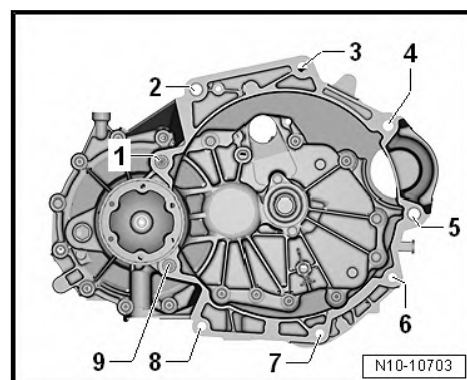
### Sequence of operations

- Engine/gearbox assembly removed and attached to engine support T10497.
- Remove starter ⇒ Electrical system; Rep. gr. 27; Starter; Removing and installing starter.
- Bolt shackle -10 - 222 A /12- to gearbox.





- Attach workshop hoist -VAS 6100- with hook -10 - 222 A /2- to shackle -10 - 222 A /12-.
- Remove bolts -1, 2, 3, 6, 7, 8, 9- securing gearbox to engine.

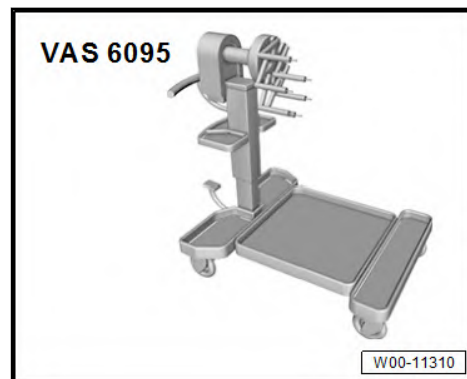


- Pull gearbox off engine.

### 1.3 Securing engine on engine and gearbox support

Special tools and workshop equipment required

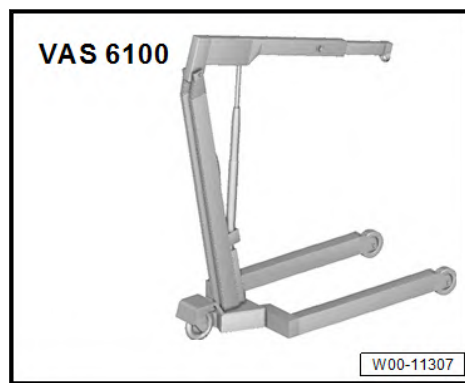
- ◆ Engine and gearbox support -VAS 6095-





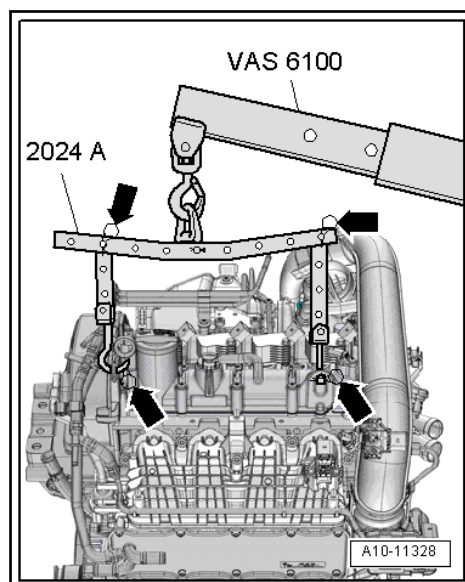


♦ Workshop hoist -VAS 6100-



**Sequence of operations**

- Gearbox detached from engine ⇒ [e1.2 ngine and gearbox](#), [page 60](#) .
- Secure lifting tackle -2024 A- on engine, and attach it to workshop hoist -VAS 6100- as shown in illustration.



- In order to match the lifting tackle to the centre of gravity of the engine, the holes in the hook rail must be allocated as shown in the illustration.
- The support hooks and retaining pins on the lifting tackle must be secured with locking pins -arrows-.

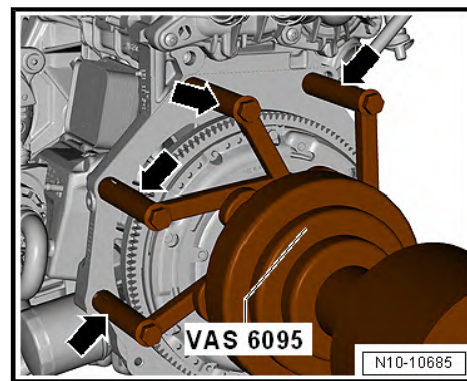


**Note**

*Avoid any risk of accident caused by loose components of the lifting tackle.*

- Lift engine off T10497 using workshop hoist -VAS 6100-.
- Secure engine to engine and gearbox bracket -VAS 6095- using pins -arrows- as shown in illustration.





## 1.4 Installing engine

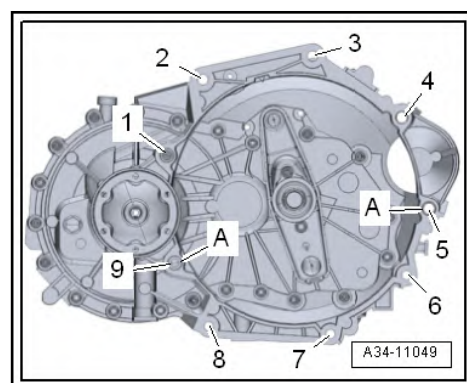
### Sequence of operations

- Engine/gearbox assembly secured to engine support T10497.



#### Note

- ◆ *Renew bolts that are tightened with turning further angle.*
- ◆ *Renew self-locking nuts and bolts, and seals, O-rings and gaskets.*
- ◆ *Secure all hose connections with hose clips corresponding to the series equipment → Electronic parts catalogue.*
- ◆ *Reinstall all cable ties in the same locations when installing.*
- Install intermediate plate ⇒ [page 147](#) .
- If there are no dowel sleeves -A- in the cylinder block for centring the engine and gearbox, insert new dowel sleeves.

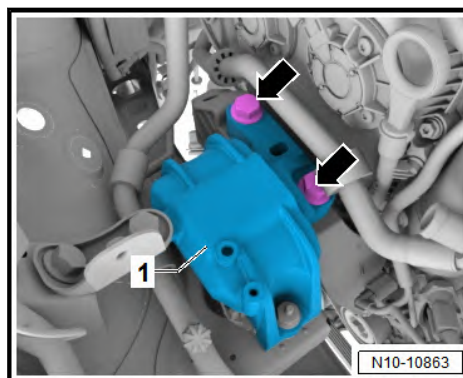


- Bolt gearbox to engine at positions -1, 2, 3, 6, 7, 8, 9-.
- Install gearbox support.
- Take up engine/gearbox assembly with engine support T10497.
- Guide engine/gearbox assembly into body.
- Use engine and gearbox jack to properly align assembly mountings free of stress.



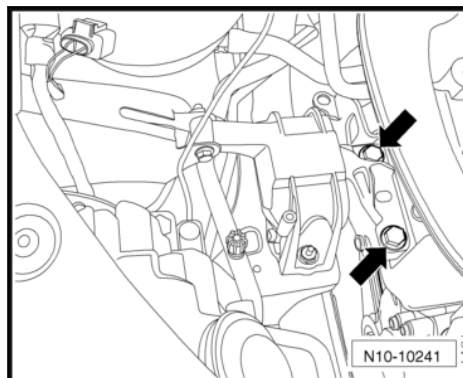


## Engine mounting, version 1



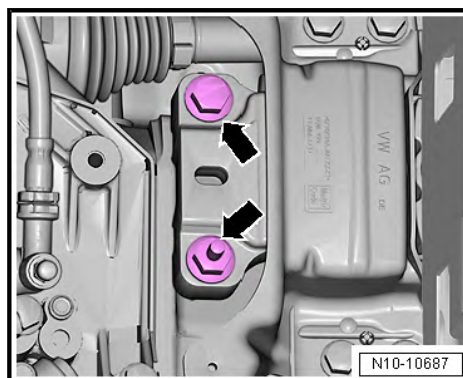
- First screw bolts -arrows- for engine mountings into stop by hand.

## Engine mounting, version 2



- First screw bolts -arrows- for engine mountings into stop by hand.

## Vehicles with 2 bolts between gearbox mounting and gearbox bracket



- First screw bolts -arrows- for gearbox mountings into stop by hand.



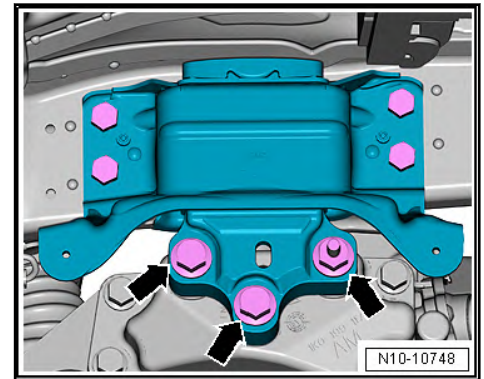
### Note

The bolts are tightened to final torque only after adjusting the assembly mountings ⇒ [a2.7 ssembly mountings](#), page 118.





## Vehicles with 3 bolts between gearbox mounting and gearbox bracket



- First screw bolts -arrows- for gearbox mountings into stop by hand.



### Note

*The bolts are tightened to final torque only after adjusting the assembly mountings ⇒ [a2.7 ssembly mountings](#), page 118 .*

### Continued for all vehicles

- Detach engine support T10497 from engine.
- Install starter ⇒ Electrical system; Rep. gr. 27; Starter; Assembly overview - starter.
- Install air pipe ⇒ [o2.1 verview - charge air system](#), page 433 .
- Installing air ducts ⇒ [o2.1 verview - charge air system](#), page 433 .

### Vehicles with manual gearbox

- Install clutch slave cylinder ⇒ Rep. gr. 30; Clutch mechanism; Removing and installing clutch slave cylinder.
- Install cables with cable support bracket ⇒ Rep. gr. 34; Selector mechanism; Assembly overview - selector cables.

### Vehicles with dual clutch gearbox

- Install selector lever cable, fit connector of mechatronic and install all retainers on gearbox:⇒ Rep. gr. 34; Removing and installing gearbox

### Continued for all vehicles

- Install catalytic converter ⇒ [a2.2 nd installing catalytic converter](#), page 570 .
- Install drive shafts ⇒ Running gear, axles, steering; Rep. gr. 40; Drive shaft; Assembly overview - drive shaft.
- Install transverse link, swivel joint and coupling rod ⇒ Running gear, axles, steering; Rep. gr. 40; Lower transverse link, swivel joint; Assembly overview - lower transverse link, swivel joint.
- Install air conditioner compressor ⇒ Heating, air conditioning; Rep. gr. 87; Air conditioner compressor; Removing and installing air conditioner compressor.
- Install poly V-belt ⇒ [a1.3 nd installing poly-V belt](#), page 129 .





- ➔ Electrical system; Rep. gr. 97; Relay carriers, fuse carriers, electronics boxes; Overview of fitting locations - relay carriers, fuse carriers, electronics boxes
- ➔ Current flow diagrams, Electrical fault finding and Fitting locations.
- Install engine control unit -J623- ➔ [c6 ontrol unit", page 495](#) .
- Connect coolant hoses with plug-in connector ➔ [page 388](#) .
- Install pendulum support ➔ [a2.4 nd installing pendulum support", page 87](#) .

### Tiguan

- If present, install cross piece ➔ General body repairs, exterior; Rep. gr. 66.

### Continued for all vehicles

- Install left and right front wheel housing liner ➔ General body repairs, exterior; Rep. gr. 66; Wheel housing liners; Assembly overview - front wheel housing liner.
- Install front wheels ➔ Running gear, axles, steering; Rep. gr. 44; Wheels, tyres; Changing wheel.
- Install noise insulation ➔ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview – noise insulation.
- Adjust assembly mountings ➔ [a2.7 ssembly mountings", page 118](#) .
- Install battery tray ➔ Electrical system; Rep. gr. 27; Battery; Removing and installing battery tray.
- Install air filter housing ➔ [a3.2 nd installing air filter housing", page 472](#) .
- Add coolant ➔ [page 343](#) .



### Note

- ◆ *Drained-off coolant may only be used again if the cylinder head and cylinder block have not been renewed.*
- ◆ *Soiled coolant must not be reused.*

### If a new base engine has been installed:

- Depending on the version and the variant of the engine control unit, there may be differences in the availability of functions.
- Only the functions that are supported by the respective engine control unit must be performed.
- Perform the function 0001 - Adaption after sender replacement ➔ Vehicle diagnostic tester.
- Perform the function 0001 - Reset learnt injector values ➔ Vehicle diagnostic tester.
- Perform the function 0001 - Adapt / adjust charge pressure positioner -V465- ➔ Vehicle diagnostic tester.
- Perform the function 0001 - Adaption of lambda probes ➔ Vehicle diagnostic tester.

### Specified torques

- ◆ ➔ [o2.1 verview - assembly mountings", page 68](#)





- ◆ Securing gearbox to engine ⇒ Rep. gr. 34; Removing and installing gearbox; Installing gearbox

Bolted connection		Specified torque
Nuts and bolts	M6	10 Nm
	M8	20 Nm
	M10	45 Nm
	M12	60 Nm





## 2 Assembly mountings

⇒ [o2.1 verview - assembly mountings", page 68](#)

⇒ [a2.2 nd installing engine mounting", page 80](#)

⇒ [a2.3 nd installing gearbox mountings", page 85](#)

⇒ [a2.4 nd installing pendulum support", page 87](#)

⇒ [e2.5 ngine in installation position", page 89](#)

⇒ [a2.6 djustment of assembly mountings \(engine and gearbox mountings\)", page 117](#)

⇒ [a2.7 ssembly mountings", page 118](#)

### 2.1 Assembly overview - assembly mountings

⇒ [o2.1.1 verview - assembly mountings, Golf Cabriolet, Scirocco and CC", page 68](#)

⇒ [o2.1.2 verview - assembly mountings, Sharan and Tiguan", page 71](#)

⇒ [o2.1.3 verview – assembly mountings, T-Roc", page 74](#)

⇒ [o2.1.4 verview – assembly mountings, Golf 2020, Golf Estate 2021", page 77](#)

#### 2.1.1 Assembly overview - assembly mountings, Golf Cabriolet, Scirocco and CC





## 1 - Connection

### 2 - Bolt

- ☐ Connection to engine mounting and body
- ☐ Renew after removal
- ☐ 20 Nm +90°

### 3 - Bolt

- ☐ Connection to engine mounting and body
- ☐ Renew after removal
- ☐ 20 Nm +90°

### 4 - Bolts

- ☐ Engine mounting to engine support
- ☐ Renew after removal
- ☐ 60 Nm +90°

### 5 - Bolt

- ☐ For bracket for activated charcoal filter
- ☐ Renew after removal
- ☐ 20 Nm +90°

### 6 - Centre hex stud

- ☐ Engine mounting to body
- ☐ Renew after removal
- ☐ 40 Nm +90°

### 7 - Bolt

- ☐ Engine mounting to body
- ☐ Renew after removal
- ☐ 40 Nm +90°

### 8 - Engine mounting

- ☐ Removing and installing ⇒ [a2.2 nd installing engine mounting", page 80](#)

### 9 - Bracket

- ☐ For activated charcoal filter

### 10 - Bolt

- ☐ Engine support to engine
- ☐ Renew after removal
- ☐ Specified torque: ⇒ [page 70](#)

### 11 - Engine support

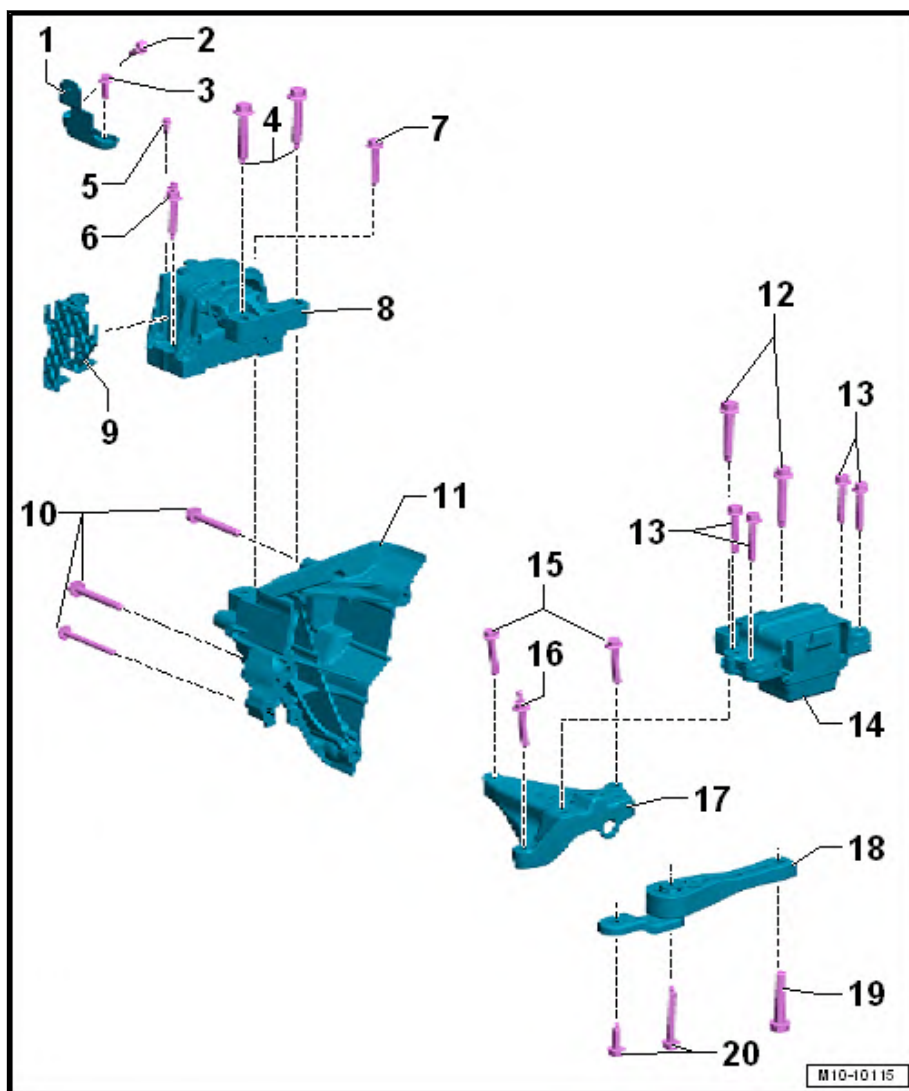
- ☐ Removing and installing ⇒ [a1.6 nd installing engine support", page 136](#)
- ☐ Tightening sequence ⇒ [Fig. "Engine support - specified torque and installation sequence", page 70](#)

### 12 - Bolt

- ☐ Gearbox mounting to gearbox support
- ☐ Renew after removal
- ☐ 60 Nm +90°

### 13 - Bolt

- ☐ Gearbox mounting to body







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

#### 14 - Gearbox mounting

- ☐ Illustration shows version for dual clutch gearbox.

#### 15 - Bolt

- ☐ Gearbox support to gearbox

#### Specified torques

- ☐ Vehicles with manual gearbox ⇒ Rep. gr. 34; Removing and installing gearbox; Specified torques for gearbox
- ☐ Vehicles with dual clutch gearbox ⇒ Rep. gr. 34; Removing and installing gearbox; Specified torques for gearbox

#### 16 - Centre hex stud

- ☐ Gearbox support to gearbox

#### Specified torques

- ☐ Vehicles with manual gearbox ⇒ Rep. gr. 34; Removing and installing gearbox; Specified torques for gearbox
- ☐ Vehicles with dual clutch gearbox ⇒ Rep. gr. 34; Removing and installing gearbox; Specified torques for gearbox

#### 17 - Rear final drive support

#### 18 - Pendulum support

- ☐ Removing and installing ⇒ [page 71](#)
- ☐ Bolt pendulum support to gearbox and then to subframe.

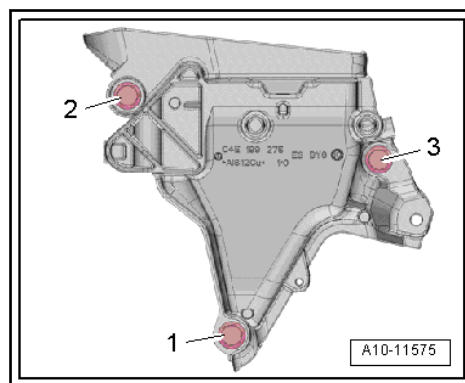
#### 19 - Bolt

- ☐ Pendulum support to sub-frame
- ☐ Renew after removal
- ☐ Specified torque: ⇒ [page 71](#)

#### 20 - Bolts

- ☐ Pendulum support to gearbox
- ☐ Renew after removal
- ☐ Specified torque: ⇒ [page 71](#)

### Engine support - specified torque and installation sequence



#### Note

*Renew bolts that are tightened with turning further angle.*

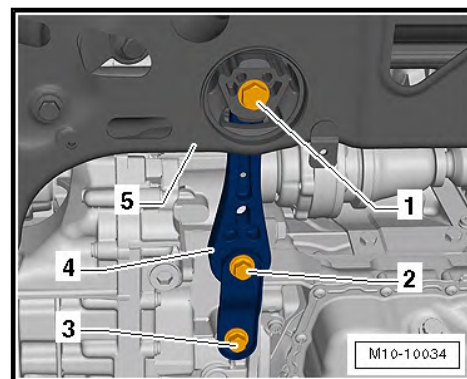
- Tighten bolts in stages in the sequence -1 ... 3-.





Stage	Bolts	Specified torque/turning further angle
1st	-1 ... 3-	7 Nm
2nd	-1 ... 3-	40 Nm
3rd	-1 ... 3-	Turn 90° further

**Tightening sequence for pendulum support**



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

Stage	Bolts	Specified torque/turning further angle
1st	-2, 3-	50 Nm
2nd	-1-	130 Nm
3rd	-1 ... 3-	Turn 90° further

## 2.1.2 Assembly overview - assembly mountings, Sharan and Tiguan





#### 1 - Bolt

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

#### 2 - Bolt

- ☐ Engine mounting to body
- ☐ Renew after removal
- ☐ 40 Nm +90°

#### 3 - Engine mounting

- ☐ Removing and installing ⇒ [a2.2 nd installing engine mounting", page 80](#)

#### 4 - Bolt

- ☐ Engine mounting to body
- ☐ Renew after removal
- ☐ 40 Nm +90°

#### 5 - Bolts

- ☐ Engine mounting to engine support
- ☐ Renew after removal
- ☐ 60 Nm +90°

#### 6 - Pendulum support

- ☐ Removing and installing ⇒ [a2.4 nd installing pendulum support", page 87](#)
- ☐ Tightening sequence ⇒ [page 73](#)

#### 7 - Bolt

- ☐ Pendulum support to subframe ⇒ Running gear, axles, steering; Rep. gr. 40; Subframe; Assembly overview - subframe
- ☐ Bolt pendulum support to gearbox and then to subframe.
- ☐ Renew after removal
- ☐ ⇒ [Fig. "Tightening sequence for pendulum support", page 73](#)
- ☐ 100 Nm +90°

#### 8 - Bolt

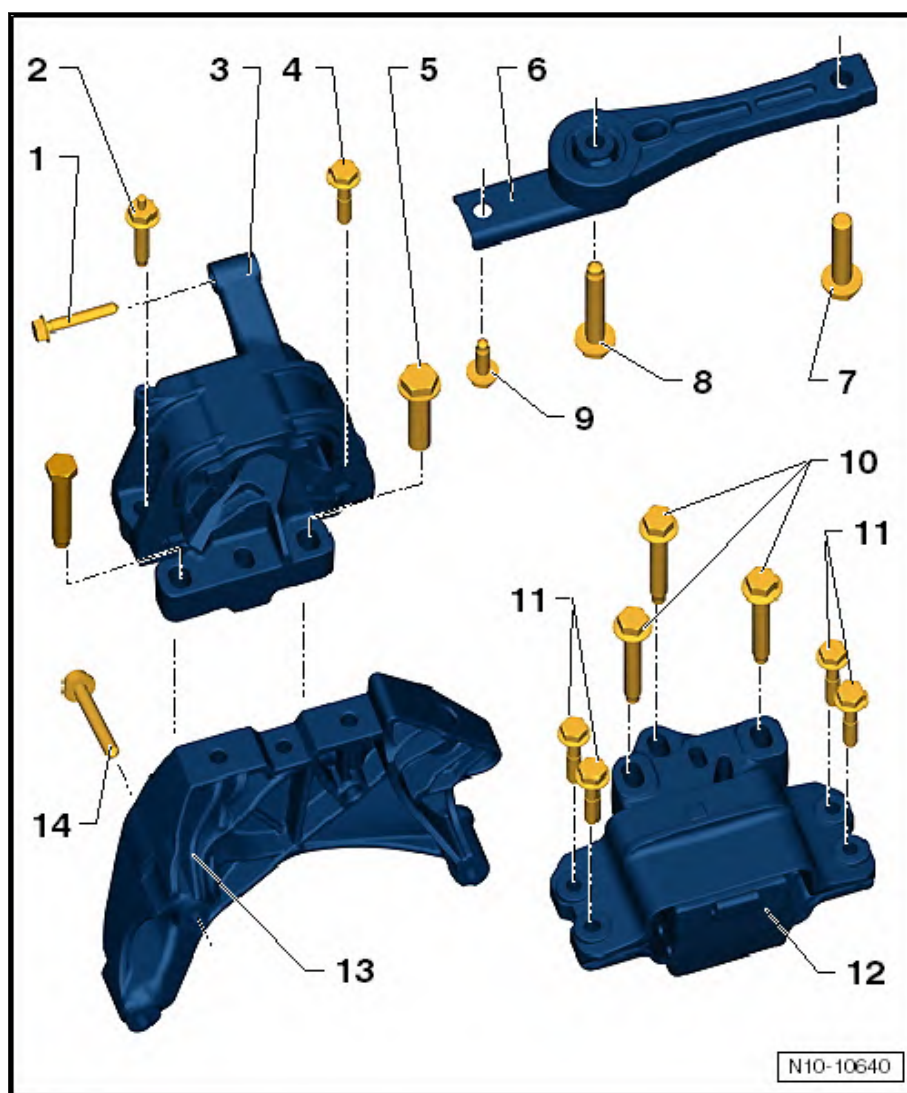
- ☐ Pendulum support to gearbox
- ☐ Renew after removal
- ☐ ⇒ [Fig. "Tightening sequence for pendulum support", page 73](#)
- ☐ 50 Nm +90°

#### 9 - Bolt

- ☐ Pendulum support to gearbox
- ☐ Renew after removal
- ☐ ⇒ [Fig. "Tightening sequence for pendulum support", page 73](#)
- ☐ 50 Nm +90°

#### 10 - Bolts

- ☐ Gearbox mounting to gearbox
- ☐ Renew after removal







- ☐ 60 Nm +90°

#### 11 - Bolts

- ☐ Gearbox mounting to body
- ☐ Renew after removal
- ☐ 40 Nm +90°

#### 12 - Gearbox mounting

- ☐ Illustration shows version for dual clutch gearbox.
- ☐ Removing and installing ⇒ [a2.3 nd installing gearbox mountings", page 85](#)

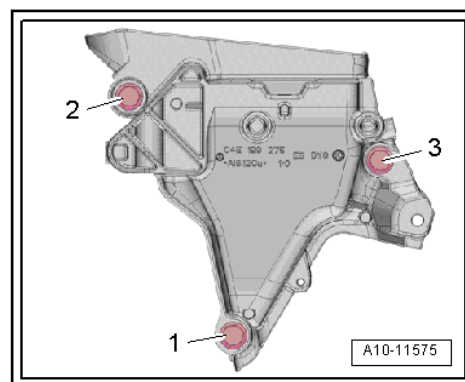
#### 13 - Engine support

- ☐ Removing and installing ⇒ [a1.6 nd installing engine support", page 136](#)
- ☐ Tightening sequence ⇒ [page 73](#)

#### 14 - Bolts

- ☐ Engine support to engine
- ☐ Renew after removal
- ☐ Tightening sequence ⇒ [page 73](#)

### Engine support - specified torque and installation sequence



#### Note

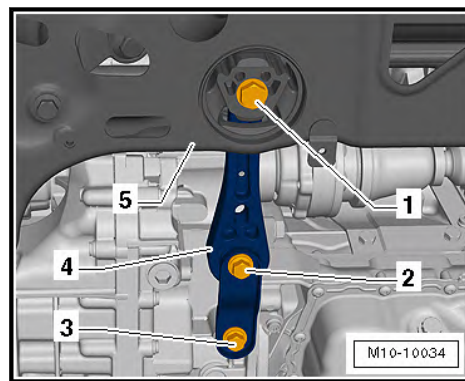
*Renew bolts that are tightened with turning further angle.*

- Tighten bolts in stages in the sequence shown.

Stage	Bolts	Specified torque/turning further angle
1st	-1 ... 3-	7 Nm
2nd	-1 ... 3-	40 Nm
3rd	-1 ... 3-	Turn 90° further

#### Tightening sequence for pendulum support





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

Stage	Bolts	Specified torque/turning further angle
1st	-2, 3-	50 Nm
2nd	-1-	100 Nm
3rd	-1 ... 3-	Turn 90° further

### 2.1.3 Assembly overview – assembly mountings, T-Roc





#### 1 - Bolt

- ☐ Engine mounting to body
- ☐ Renew after removal
- ☐ 40 Nm +90°

#### 2 - Bolts

- ☐ Engine mounting to engine support
- ☐ Renew after removal
- ☐ 60 Nm +90°

#### 3 - Engine mounting

- ☐ Removing and installing ⇒ [a2.2 nd installing engine mounting", page 80](#)

#### 4 - Engine support

- ☐ Removing and installing ⇒ [a1.6 nd installing engine support", page 136](#)
- ☐ Tightening sequence ⇒ [page 76](#)

#### 5 - Bolts

- ☐ Gearbox mounting to gearbox
- ☐ Renew after removal
- ☐ 60 Nm +90°

#### 6 - Bolts

- ☐ Gearbox mounting to body
- ☐ Renew after removal
- ☐ 50 Nm +90°

#### 7 - Gearbox mounting

- ☐ Removing and installing ⇒ [a2.3 nd installing gearbox mountings", page 85](#)

#### 8 - Bolt

- ☐ Do not loosen

#### 9 - Bolt

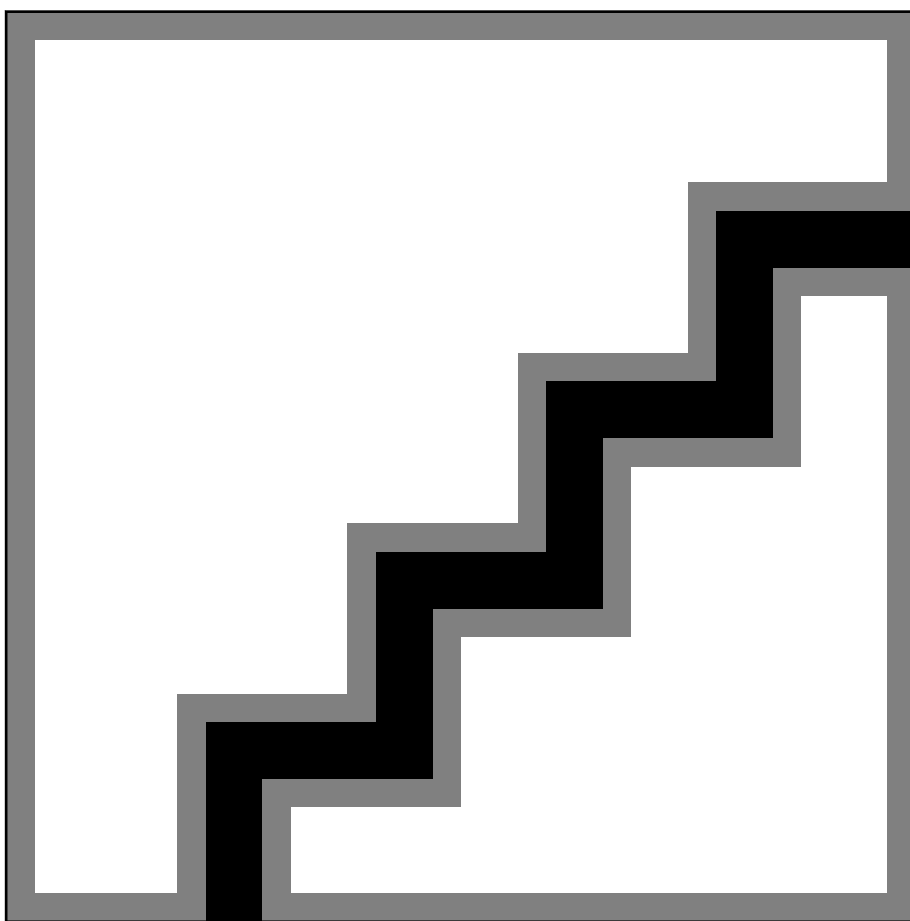
- ☐ Pendulum support to subframe ⇒ Running gear, axles, steering; Rep. gr. 40; Subframe; Assembly overview - subframe
- ☐ Bolt pendulum support to gearbox and then to subframe.
- ☐ Renew after removal
- ☐ ⇒ [Fig. "Pendulum support - specified torque and tightening sequence", page 76](#)
- ☐ 130 Nm +90°

#### 10 - Bolt

- ☐ Pendulum support to gearbox
- ☐ Renew after removal
- ☐ ⇒ [Fig. "Pendulum support - specified torque and tightening sequence", page 76](#)
- ☐ 60 Nm +90°

#### 11 - Bolt

- ☐ Pendulum support to gearbox
- ☐ Renew after removal







- ❑ ➔ Fig. ““Pendulum support - specified torque and tightening sequence””, page 76
- ❑ 60 Nm +90°

## 12 - Pendulum support

- ❑ Removing and installing ➔ a2.4 nd installing pendulum support”, page 87
- ❑ Tightening sequence ➔ Fig. ““Pendulum support - specified torque and tightening sequence””, page 76

## 13 - Nut

- ❑ Do not loosen

## 14 - Bolt

- ❑ Engine support to engine
- ❑ Renew after removal
- ❑ Tightening sequence ➔ page 76

## 15 - Bolt

- ❑ Engine support to engine
- ❑ Renew after removal
- ❑ Tightening sequence ➔ page 76

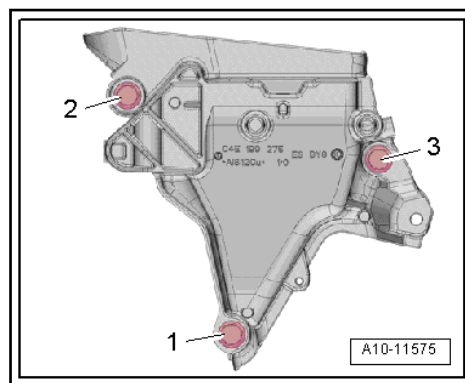
## 16 - Bolt

- ❑ Engine support to engine
- ❑ Renew after removal
- ❑ Tightening sequence ➔ page 76

## 17 - Bolt

- ❑ Renew after removal
- ❑ 25 Nm +90°

## Engine support - specified torque and installation sequence



### Note

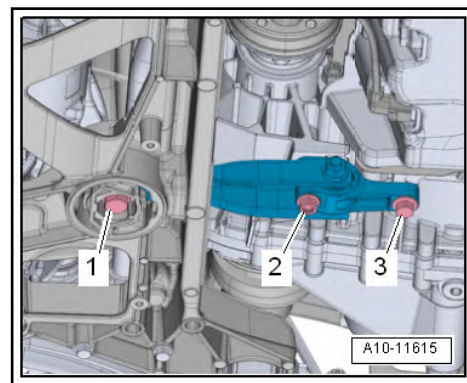
*Renew bolts that are tightened with turning further angle.*

– Tighten bolts in stages in the sequence shown.

Stage	Bolts	Specified torque/turning further angle
1st	-1 ... 3-	7 Nm
2nd	-1 ... 3-	40 Nm
3rd	-1 ... 3-	Turn 90° further

## Pendulum support - specified torque and tightening sequence





#### Note

*Renew bolts that are tightened with turning further angle after each removal.*

- Tighten bolts in stages in the sequence shown.

Stage	Bolts	Specified torque/turning further angle
1st	-2, 3-	60 Nm
2nd	-1-	130 Nm
3rd	-1 ... 3-	Turn 90° further

### 2.1.4 Assembly overview – assembly mountings, Golf 2020, Golf Estate 2021





## 1 - Engine mounting

- ☐ Removing and installing ⇒ [a2.2 nd installing engine mounting", page 80](#)

## 2 - Bolt

- ☐ Renew after removal
- ☐ 25 Nm +90°

## 3 - Bolt

- ☐ Engine mounting to body
- ☐ Renew after removal
- ☐ 40 Nm +90°

## 4 - Nut

- ☐ 9 Nm

## 5 - Earth strap

## 6 - Hanger bolt

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

## 7 - Bolt

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

## 8 - Gearbox mounting

- Only vehicles with manual gearbox

## 9 - Bolt

- ☐ Renew
- ☐ 60 Nm +90°

## 10 - Bolt

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

## 11 - Bolt

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

## 12 - Bolt

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

## 13 - Gearbox mounting

- Only vehicles with dual clutch gearbox or automatic gearbox

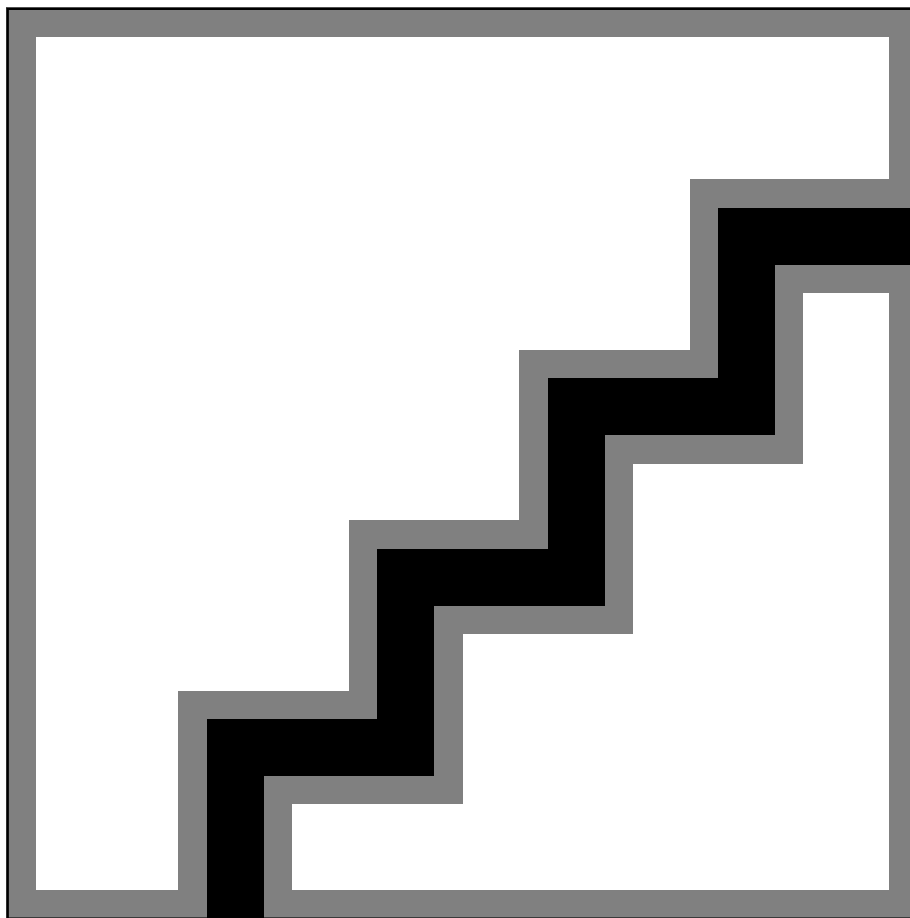
## 14 - Pendulum support

- ☐ Removing and installing ⇒ [a2.4 nd installing pendulum support", page 87](#)
- ☐ Tightening sequence ⇒ [page 79](#)

## 15 - Bolt

- ☐ Renew after removal
- ☐ ⇒ [Fig. "Pendulum support - specified torque and tightening sequence", page 76](#)
- ☐ 130 Nm +90°

## 16 - Bolt







- ☐ Renew after removal
- ☐ ➔ Fig. ““Pendulum support - specified torque and tightening sequence””, page 76
- ☐ 60 Nm +90°

#### 17 - Bolt

- ☐ Renew after removal
- ☐ ➔ Fig. ““Pendulum support - specified torque and tightening sequence””, page 76
- ☐ 60 Nm +90°

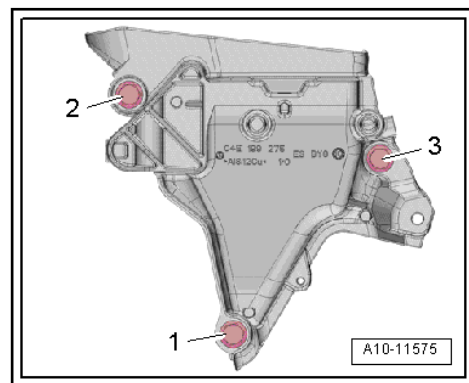
#### 18 - Engine support

- ☐ Removing and installing ➔ a1.6 nd installing engine support”, page 136
- ☐ Tightening sequence ➔ page 79

#### 19 - Bolt

- ☐ Renew after removal
- ☐ Specified torque: ➔ page 79

### Engine support - specified torque and installation sequence



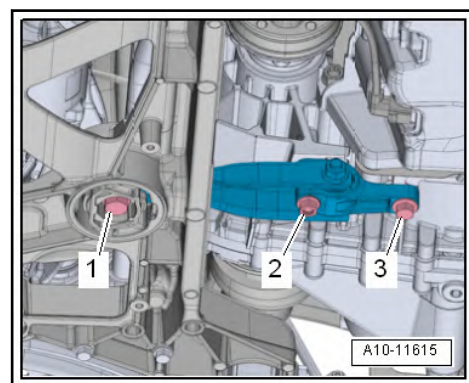
#### Note

*Renew bolts that are tightened with turning further angle.*

- Tighten bolts in stages in the sequence shown.

Stage	Bolts	Specified torque/turning further angle
1st	-1 ... 3-	7 Nm
2nd	-1 ... 3-	40 Nm
3rd	-1 ... 3-	Turn 90° further

### Pendulum support - specified torque and tightening sequence







## Note

*Renew bolts that are tightened with turning further angle after each removal.*

- Tighten bolts in stages in the sequence shown.

Stage	Bolts	Specified torque/turning further angle
1st	-2, 3-	60 Nm
2nd	-1-	130 Nm
3rd	-1 ... 3-	Turn 90° further

## 2.2 Removing and installing engine mounting

⇒ [a2.2.1 nd installing engine mounting, Golf Cabriolet, Scirocco and CC", page 80](#)

⇒ [a2.2.2 nd installing engine mountings, Sharan and Tiguan", page 82](#)

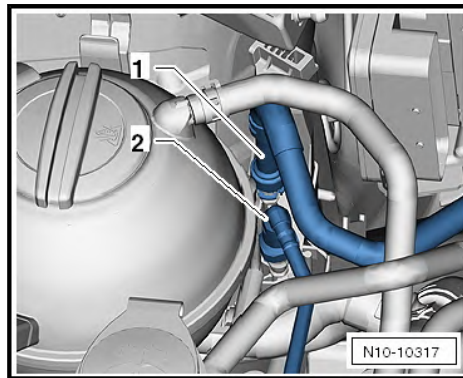
⇒ [a2.2.3 nd installing engine mounting, T-Roc", page 83](#)

⇒ [a2.2.4 nd installing engine mounting, Golf 2020, Golf Estate 2021", page 84](#)

### 2.2.1 Removing and installing engine mounting, Golf Cabriolet, Scirocco and CC

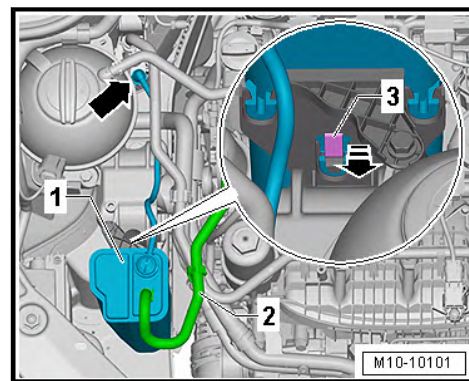
#### Removing

- Open plug-in connectors -1- and -2- of fuel lines, and pull off fuel lines. Disconnect plug-in connectors ⇒ Rep. gr. 20; Plug-in connectors; Disconnecting plug-in connectors.

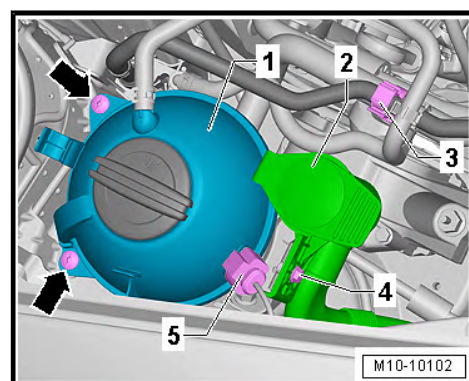


- Move lines to one side.
- Release locking lug -3- in direction of arrow, and remove activated charcoal filter -1- upwards.

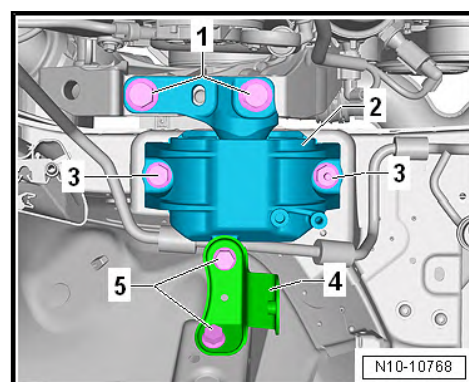




- Place activated charcoal filter -1- with breather line -arrow- and line -2- on engine.
- Unscrew bolt -4- and turn filler neck for washer fluid reservoir -2- towards front.



- Open clip -3- and pull connector -5- off coolant expansion tank -1-.
- Unscrew bolts -arrows-, and place coolant expansion tank -1- on engine with coolant hoses connected.
- Support engine in its installation position ⇒ [e2.5 engine in installation position", page 89](#) .
- Tighten spindle slightly to take up weight of engine/gearbox assembly; do not lift.
- Unscrew bolts -5-, and remove bracket -4-.



- Unscrew bolts -1- and -3-, and remove engine mounting -2- upwards.

### Installing

Install in reverse order of removal, observing the following:





- Checking adjustment of assembly mountings ⇒ [a2.6 djustment of assembly mountings \(engine and gearbox mountings\)](#), page 117 .

#### Specified torques

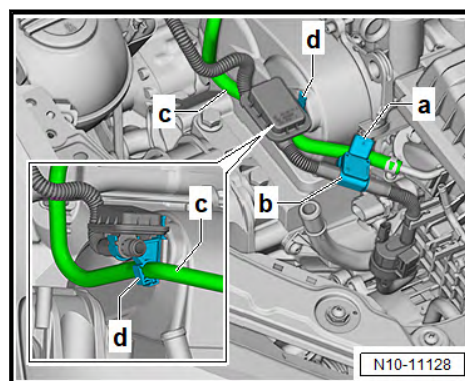
- ♦ ⇒ [o2.1 verview - assembly mountings](#), page 68

## 2.2.2 Removing and installing engine mountings, Sharan and Tiguan

### Removing

#### Sharan with petrol particulate filter

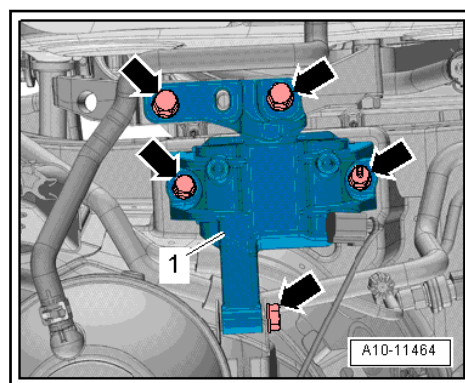
- Pull off connector -a- from activated charcoal filter line -b-.



- Unclip activated charcoal filter line -b- and fuel line -c- from bracket -d-.
- Place activated charcoal filter lines -b- and fuel line -c- aside.

#### Continued for all vehicles:

- Support engine in its installation position ⇒ [e2.5 ngine in installation position](#), page 89 .
- Tighten spindle slightly to take up weight of engine/gearbox assembly; do not lift.
- Unscrew bolts -arrows- and remove engine mounting -1-.



### Installing

Install in reverse order of removal, observing the following:

- Checking adjustment of assembly mountings ⇒ [a2.6 djustment of assembly mountings \(engine and gearbox mountings\)](#), page 117 .

#### Specified torques

- ♦ ⇒ [o2.1 verview - assembly mountings](#), page 68





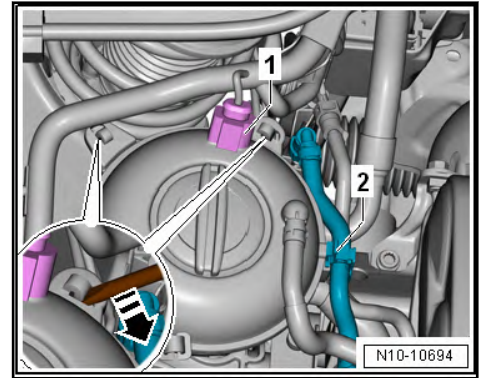
## 2.2.3 Removing and installing engine mounting, T-Roc

### Special tools and workshop equipment required

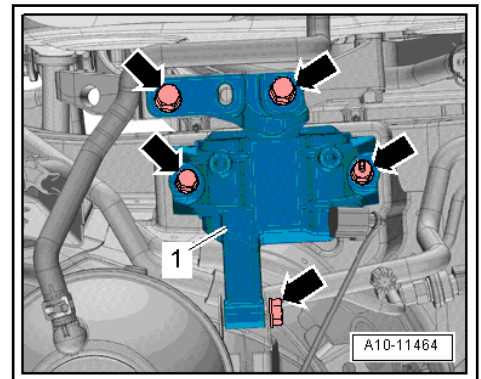
- ◆ Torque wrench (20-100 Nm) -VAS 5820A- (not illustrated)

### Removing

- Release and pull off electrical connector -1-.



- Disconnect bracket -2- with fuel hoses.
- Use a screwdriver to release catch -arrow-, and place coolant expansion tank on engine.
- If fitted, remove vacuum pump for brakes -V192- ⇒ Brake system; Rep. gr. 47; Vacuum system; Removing and installing electric vacuum pump (for brakes).
- Support engine in its installation position ⇒ [e2.5 ngine in installation position”, page 89](#) .
- Unscrew bolts -arrows- and remove engine mounting -1-.



### Installing

Install in reverse order of removal, observing the following:

- Checking adjustment of assembly mountings ⇒ [a2.6 djustment of assembly mountings \(engine and gearbox mountings\)”, page 117](#) .

### Specified torques

- ◆ ⇒ [o2.1 verview - assembly mountings”, page 68](#)

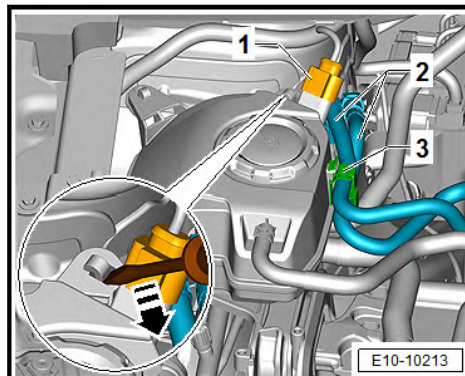




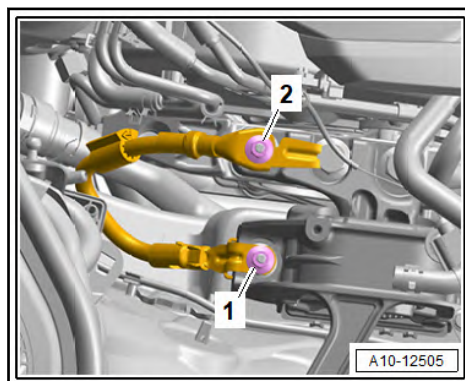
## 2.2.4 Removing and installing engine mounting, Golf 2020, Golf Estate 2021

### Removing

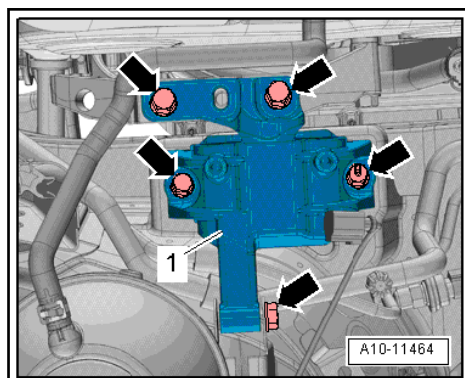
- Disconnect electrical connector -1-.



- Open bracket -3-, detach fuel hoses -2- from bracket.
- Using a screwdriver, release fasteners in direction of -arrow- and lay coolant expansion tank to one side.
- Unscrew nuts -1- and -2-, remove earth wire.



- Support engine in installation position. ➔ [e2.5 engine in installation position", page 89](#)



- Unscrew bolts -arrows- and remove engine mounting -1-.





## Installing



### Note

- ◆ *If specified torque and tightening sequence are not adhered to, used bolts may become loose.*
- ◆ *Renew bolts that are tightened with turning further angle.*

Install in reverse order of removal.

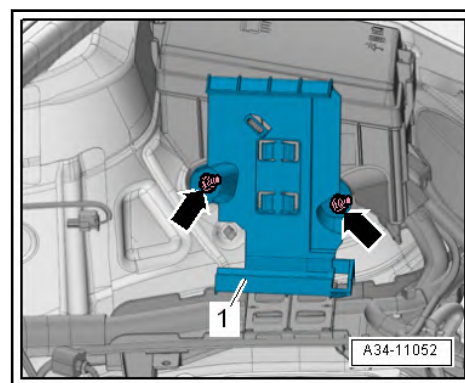
### Specified torques

- ◆ [⇒ o2.1 verview - assembly mountings", page 68](#)

## 2.3 Removing and installing gearbox mountings

### Removing

- Remove resonator for intake air [⇒ a3.4 nd installing resonator for intake air", page 476](#) .
- Remove air filter housing [⇒ a3.2 nd installing air filter housing", page 472](#) .
- Remove battery tray ⇒ Electrical system; Rep. gr. 27; Battery; Removing and installing battery tray.
- Remove engine control unit.
- Unscrew nuts -arrows- and remove bracket -1-.

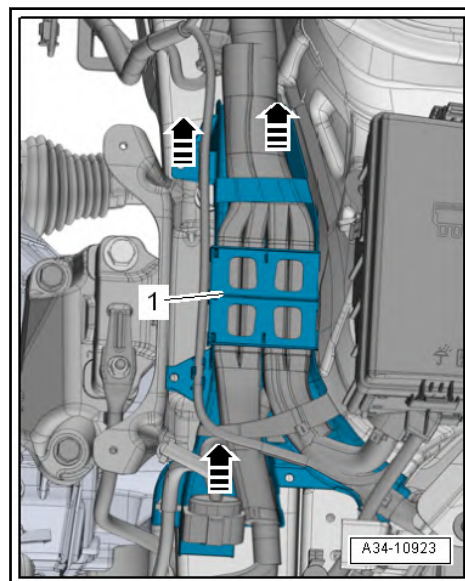


### Note

*Different types of brackets are fitted depending on version.*

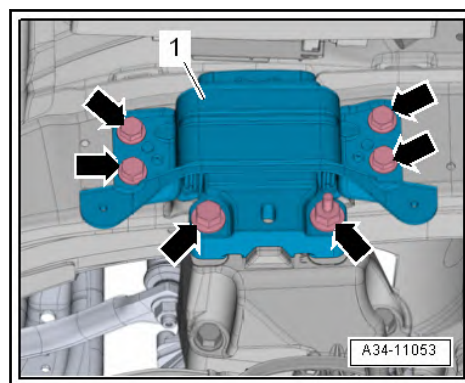
- Unclip wire guide -1- upwards -arrows-, and push it slightly to one side.





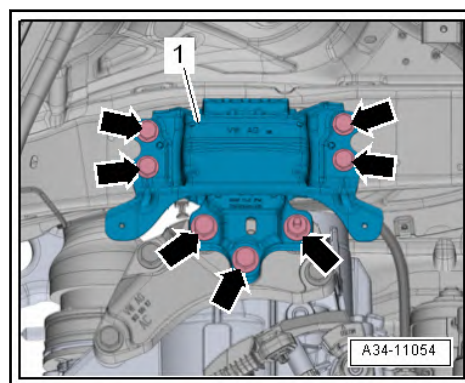
- Support engine in its installation position ⇒ [e2.5 ngine in installation position](#), page 89 .

**Vehicles with 2 bolts between gearbox mounting and gearbox bracket:**



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

**Vehicles with 3 bolts between gearbox mounting and gearbox bracket:**



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

### Installing

Install in reverse order of removal, observing the following:





- Renew bolts that are tightened with specified tightening angle.
- Tighten gearbox mounting on longitudinal member.
- Lift gearbox with spindle of support bracket until gearbox support makes contact with support arm of gearbox mounting.
- Gearbox support and support arm of gearbox mounting must be perfectly parallel to each other before screwing in bolts. If necessary, lift gearbox at rear using trolley jack.
- Start bolts by hand. Ensure to not screw in the bolts at an angle while doing so.
- First screw in bolts for gearbox mounting to stop by hand.
- Checking adjustment of assembly mountings ⇒ [a2.6 adjustment of assembly mountings \(engine and gearbox mountings\)", page 117](#) .
- When the bolts are tightened to specified torque, remove support bracket -10 - 222 A- from engine.

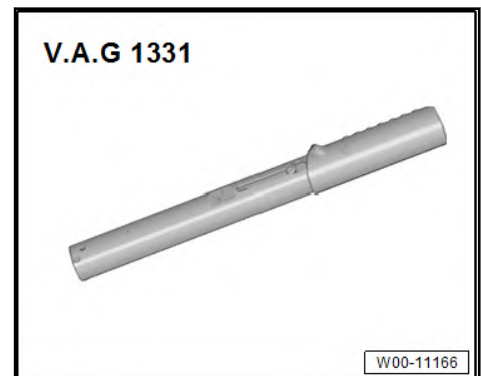
#### Specified torques

- ◆ ⇒ [o2.1 overview - assembly mountings", page 68](#)
- ◆ ⇒ [o3.1 overview - air filter housing", page 470](#)
- ◆ ⇒ Electrical system; Rep. gr. 27; Battery; Assembly overview - battery

## 2.4 Removing and installing pendulum support

#### Special tools and workshop equipment required

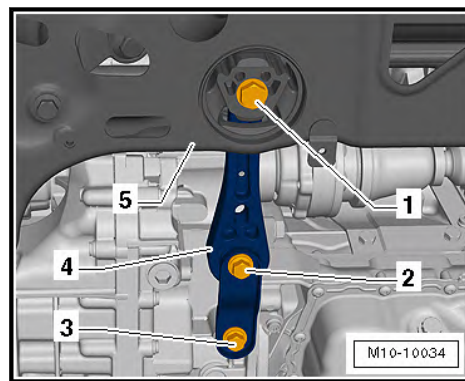
- ◆ Torque wrench -V.A.G 1331-



#### Removing

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- First unscrew bolt -1-.





- Then remove bolts -2- and -3-.
- Remove pendulum support -4- from subframe -5-.

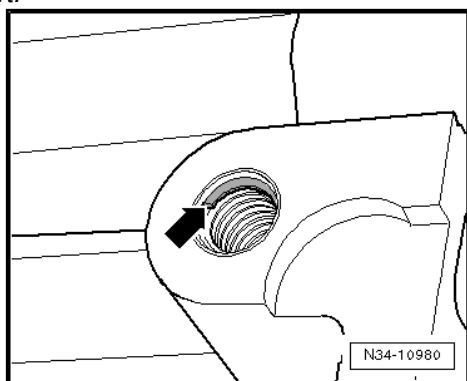
### Installing

Install in reverse order of removal, observing the following:



#### Note

*There are threaded inserts, e.g. "Heli-Coil" in the bolting holes for the pendulum support.*



*The shoulder on the first thread pitch -arrow- is an identifying feature.*

### Specified torques

- ♦ ➔ [o2.1 verview - assembly mountings", page 68](#)





## 2.5 Supporting engine in installation position

⇒ [e2.5.1 engine in installation position, Golf Cabriolet", page 89](#)

⇒ [e2.5.2 engine in installation position, Tiguan", page 93](#)

⇒ [e2.5.3 engine in installation position, Sharan", page 97](#)

⇒ [e2.5.4 engine in installation position, CC", page 101](#)

⇒ [e2.5.5 engine in installation position, Scirocco", page 103](#)

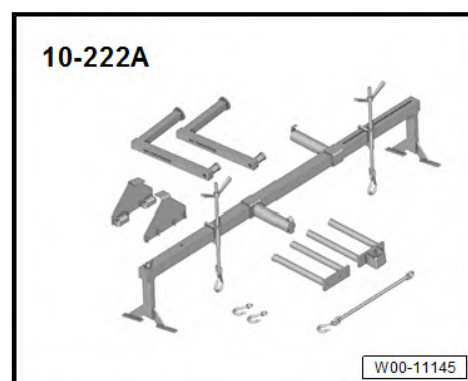
⇒ [e2.5.6 engine in installation position, T-Roc", page 107](#)

⇒ [e2.5.7 engine in installation position, Golf 2020, Golf Estate 2021", page 111](#)

### 2.5.1 Supporting engine in installation position, Golf Cabriolet

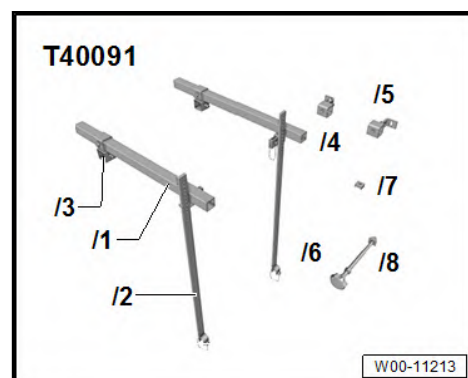
#### Special tools and workshop equipment required

- ◆ Square tube and 2 wing bolts from support bracket -10 - 222 A-



- ◆ Spindles -10-222A-

- ◆ Square tube -T40091/1-

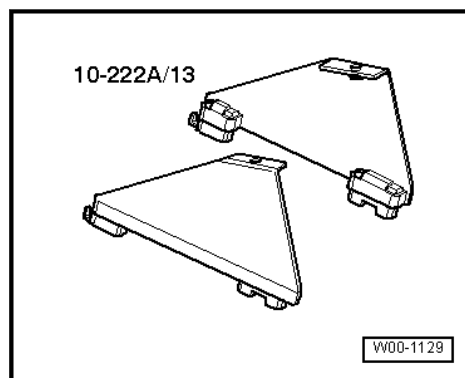


- ◆ Joints -T40091/3-

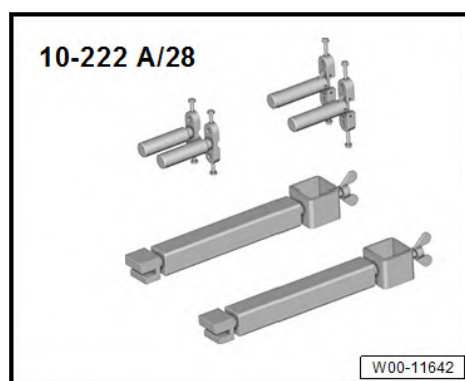




◆ Adapter -10-222A/13-



◆ Adapter -10-222A/28-

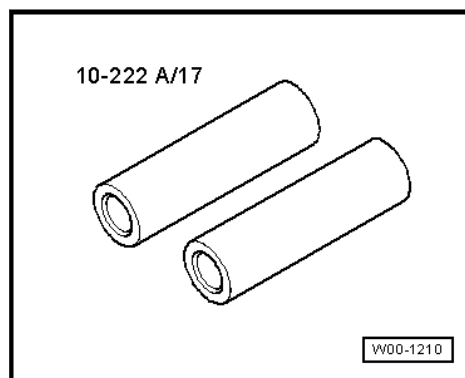


◆ Adapter -10-222A/28-2-

◆ Shackle -10 - 222 A /12-



◆ Spacer tube -10-222A/17-



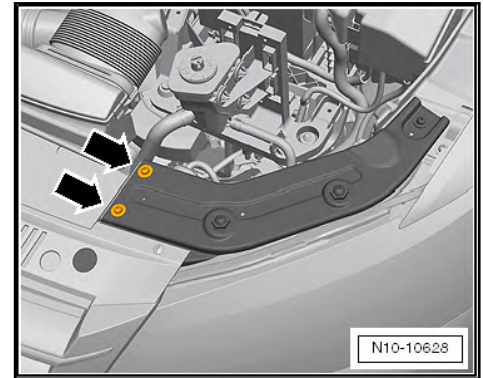
### Sequence of operations

- Remove resonator for intake air ⇒ [a3.4 nd installing resonator for intake air”, page 476](#) .

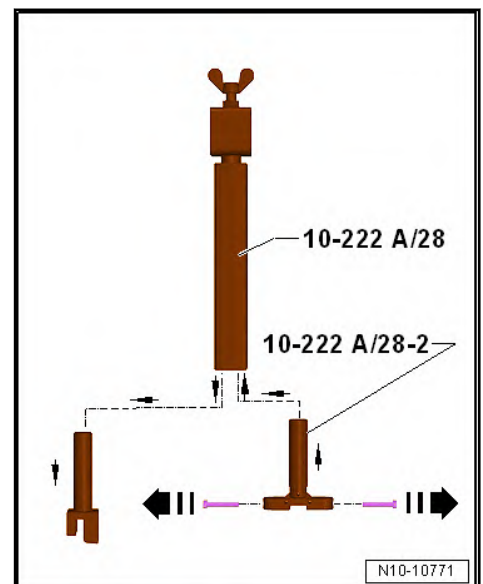




- Remove air filter housing ⇒ [a3.2 nd installing air filter housing", page 472](#) .
- Remove foam sections or seals from upper edge of left and right wings ⇒ General body repairs, exterior; Rep. gr. 50; Wings; Assembly overview - wings.
- Unscrew bolts -arrows- for retaining brackets on left and right of lock carrier.

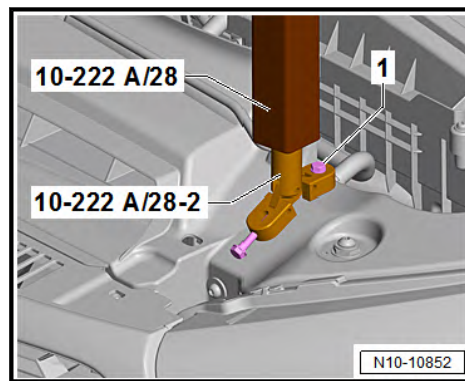


- Unscrew lower mounting from adapter -10 - 222 A /28-.

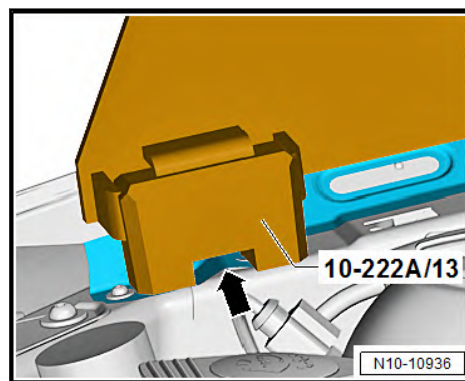


- Screw in adapter -10-222 A /28-2-.
- Unscrew one securing bolt -arrow- from adapter -10-222 A /28-2-.
- Bolt adapter -10-222 A /28-2- to lock carrier using securing bolt -1-.

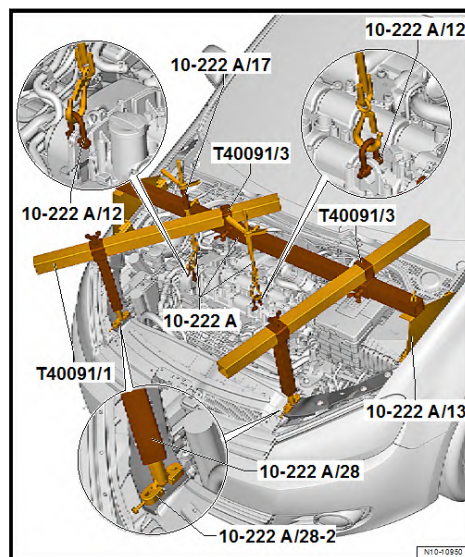




- The adapter -10-222A/13- must be positioned as shown in the illustration. The panel edge -arrow- must not be bent.



- Insert spacer tube -10-222A/17- between handle and spindle -10-222A- support as shown.



- Slide adapter -T40091/3- and spindle -10-222A- onto square section tube of support bracket -10 - 222 A- as shown.
- Bolt square section tube of support bracket -10 - 222 A- to adapter -10-222A/13-
- Push square section tube -T40091/1- into adapter -10 - 222 A /28- on left side.
- Push square section tube -T40091/1- into adapter - T40091/3- on left side.





- Push square section tube -T40091/1- into adapter -10 - 222 A /28- on right side.
- Push square section tube -T40091/1- into adapter - T40091/3- on right side.
- Screw shackles -10 - 222 A /12- onto support eyes on left and right sides.
- Hookspindle -10-222A- onto shackle -10 - 222 A /12- on right side.
- Attach spindle -10-222A- to shackle -10 - 222 A /12- on left side.
- Tighten all threaded connections of support bracket hand-tight.
- Align support bracket.
- Tighten all threaded connections of support bracket.
- Tighten spindle slightly to take up weight of engine/gearbox assembly; do not lift.

**! WARNING**

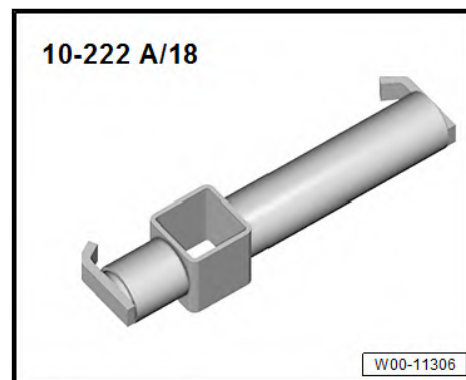
Risk of injury due to improper handling of the support bracket. Improper handling can lead to damage of the tool and subsequent injuries.

- Never loosen and dismantle the engine and gearbox mountings at the same time to avoid overloading of the support bracket.

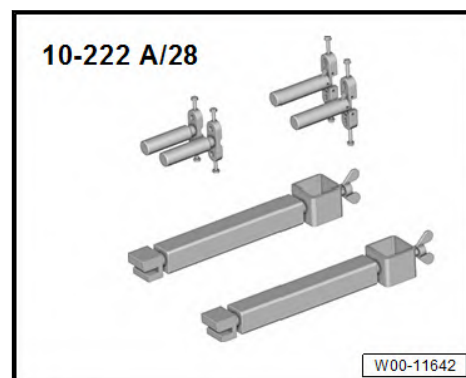
## 2.5.2 Supporting engine in installation position, Tiguan

Special tools and workshop equipment required

- ◆ Adapter -10 - 222 A /18-



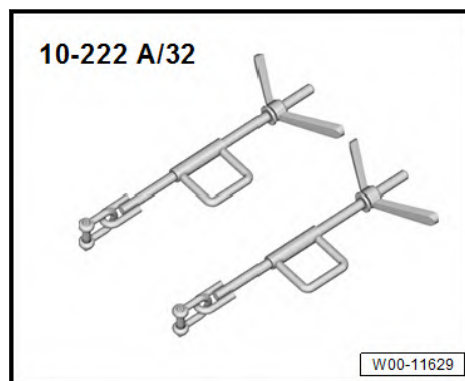
- ◆ Adapter -10 - 222 A /28-



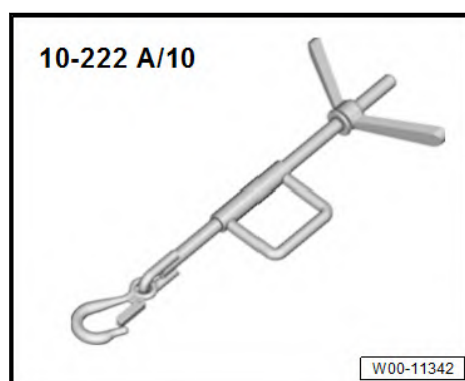




◆ Adapter -10 - 222 A /32-



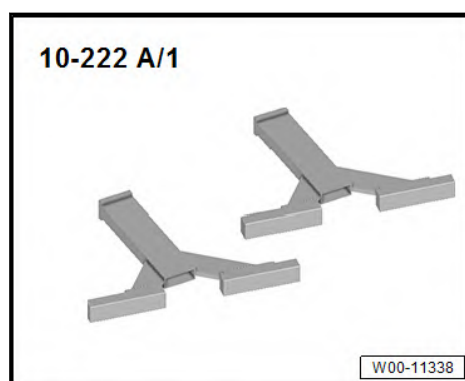
◆ Hook -10 - 222 A /10-



◆ Shackle -10 - 222 A /12-



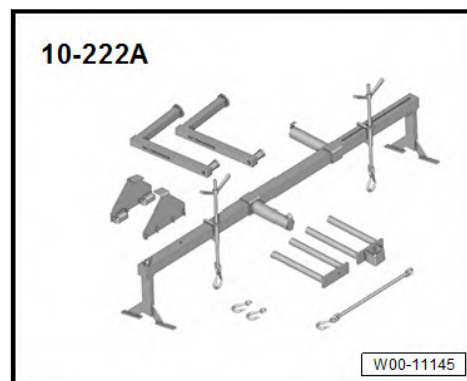
◆ Rack -10 - 222 A /1-



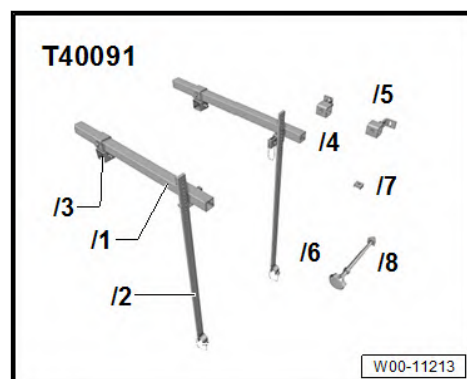




- ◆ Support bracket -10 - 222 A-



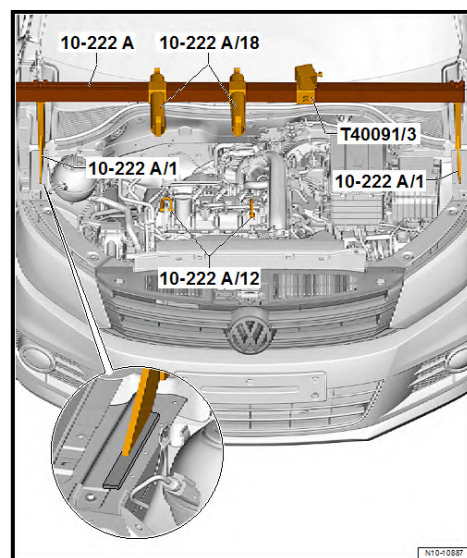
- ◆ Square tube -T40091/1-



- ◆ Swivel joint -T40091/3-

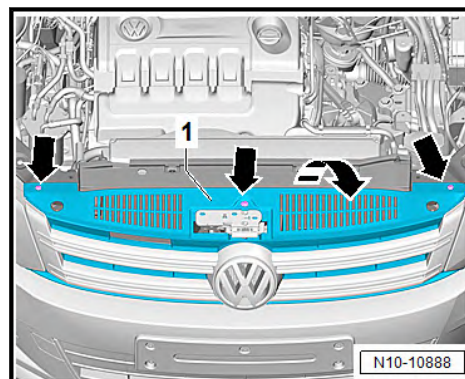
#### Sequence of operations

- Remove resonator for intake air ⇒ [a3.4 nd installing resonator for intake air](#), page 476 .
- Remove air filter housing ⇒ [a3.2 nd installing air filter housing](#), page 472 .
- Prepare support bracket as shown in illustration, and fit it onto edges of wings.

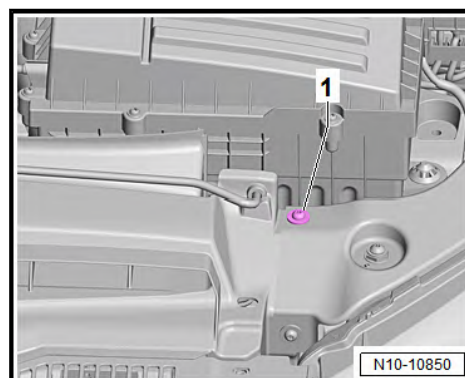


- Loosen 3 bolts -arrows- of trim -1-.

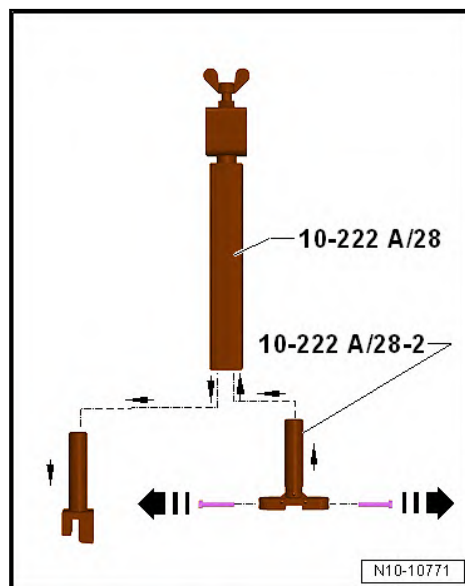




- Unscrew bolt -1- on left of lock carrier.

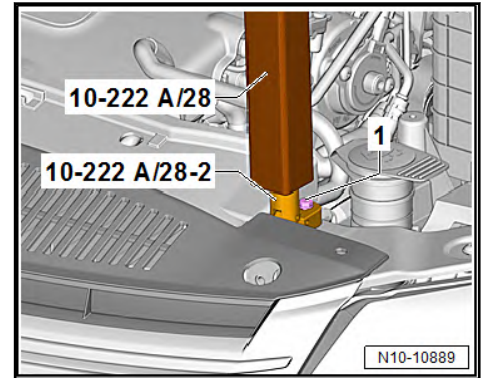


- Unscrew lower mounting from adapter -10 - 222 A /28- and replace with adapter -10-222 A /28-2-.

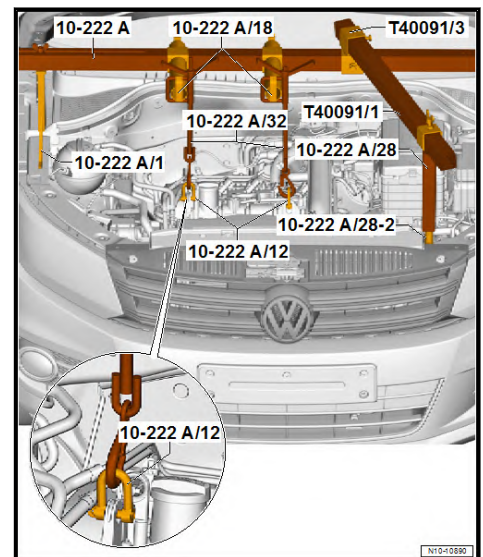


- Unscrew one securing bolt -arrow- from adapter -10-222 A / 28-2-.
- Bolt adapter -10-222 A /28-2- to lock carrier using securing bolt -1-.





- Slide square section tube -T40091/1- through adapter -10 - 222 A /28- and rotary joint -T40091/3-.
- Fit engine support bracket -10 - 222 A- as shown in illustration.



- Tighten all threaded connections of support bracket hand-tight.
- Tighten spindle slightly to take up weight of engine/gearbox assembly; do not lift.

#### **⚠ WARNING**

Risk of injury due to improper handling of the support bracket. Improper handling can lead to damage of the tool and subsequent injuries.

- Never loosen and dismantle the engine and gearbox mountings at the same time to avoid overloading of the support bracket.

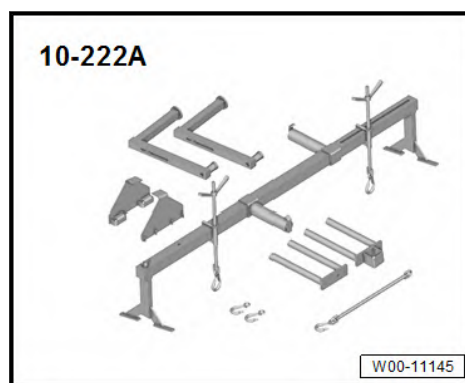
### 2.5.3 Supporting engine in installation position, Sharan

Special tools and workshop equipment required

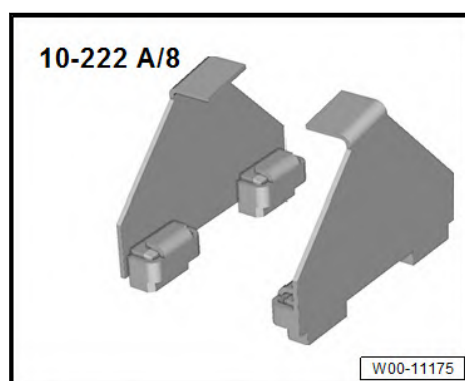




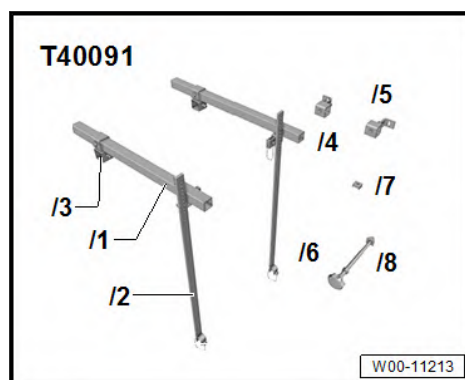
- ◆ Support bracket -10 - 222 A-



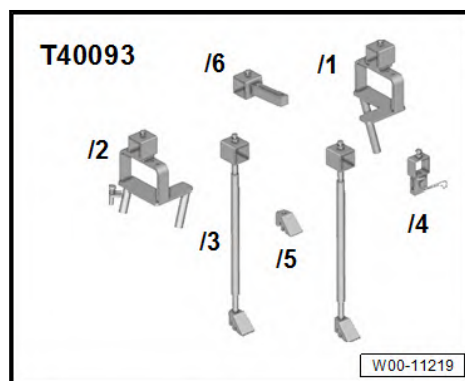
- ◆ Adapter -10 - 222 A /8-



- ◆ Square tube -T40091/1-



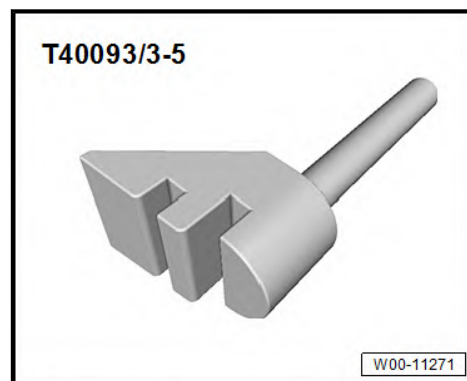
- ◆ Swivel joint -T40091/3-
- ◆ Support -T40093/3-







◆ Foot -T40093/3-5-

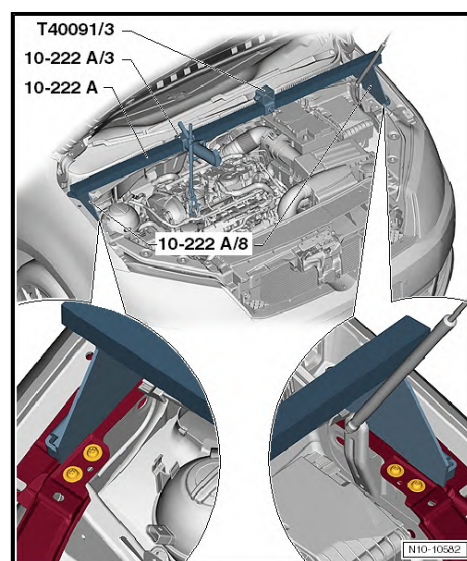


◆ Shackle -10 - 222 A /12-



**Setting up support bracket:**

- Remove plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50; Plenum chamber bulkhead; Removing and installing plenum chamber cover.
- Remove radiator grille ⇒ General body repairs, exterior; Rep. gr. 66; Radiator grille/front trim; Assembly overview - radiator grille.
- Push articulated joint -T40091/3- onto square tube of support bracket -10 - 222 A-.



- Push spindles of support bracket -10 - 222 A- onto square tube to left and right of articulated joint -T40091/3-.
- Spindles are located in front of square tube in direction of travel.

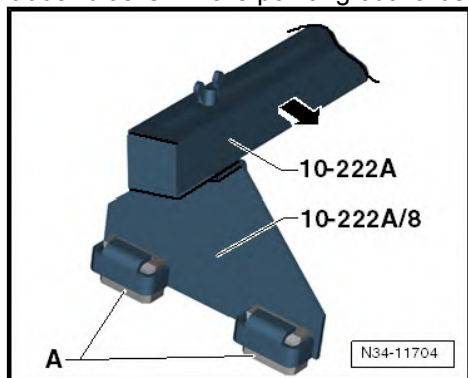




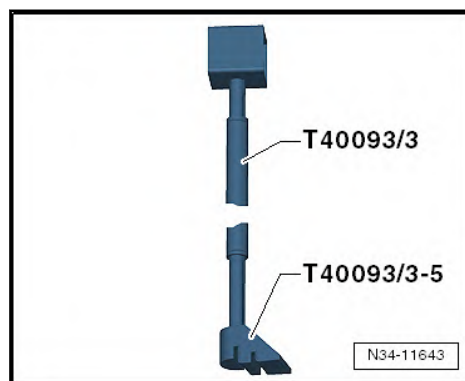
## Note

*Disregard adapter -10 - 222 A /3-.*

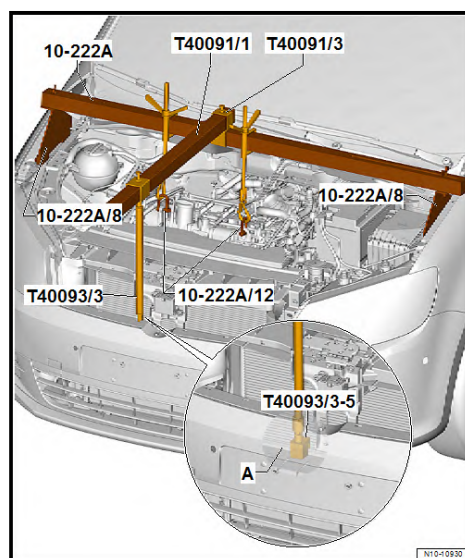
- Fit adapter -10 - 222 A /8- as shown, and bolt it to square tube.
- Rubber blocks -A- are pointing outwards.



- Set up support bracket -10-222 A- behind bonnet support.
- Screw foot -T40093/3-5- into support -T40093/3-.



- Push support -T40093/3- onto square tube -T40091/1-.



- Fit adapter -T40093/3- with foot -T40093/3-5- onto bumper carrier -A-.





- Push square tube -T40091/1- into rotary joint -T40091/3-.
- Align support bracket and tighten all bolts hand-tight.
- Insert hooks of spindles with shackles -10 - 222 A /12- into engine lifting eyes on both sides.
- Support engine in installation position.



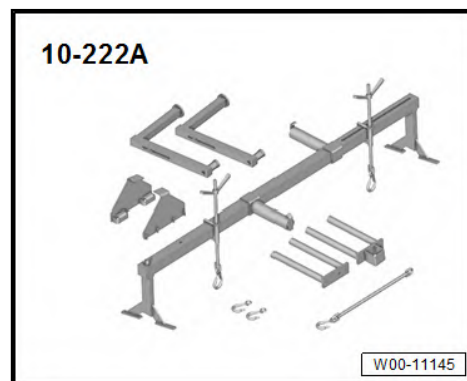
#### **WARNING**

**Risk of injury due to improper handling of the support bracket.**  
Improper handling can lead to damage of the tool and subsequent injuries.

- Never loosen and dismantle the engine and gearbox mountings at the same time to avoid overloading of the support bracket.

### **2.5.4 Supporting engine in installation position, CC**

Support bracket -10 - 222 A-

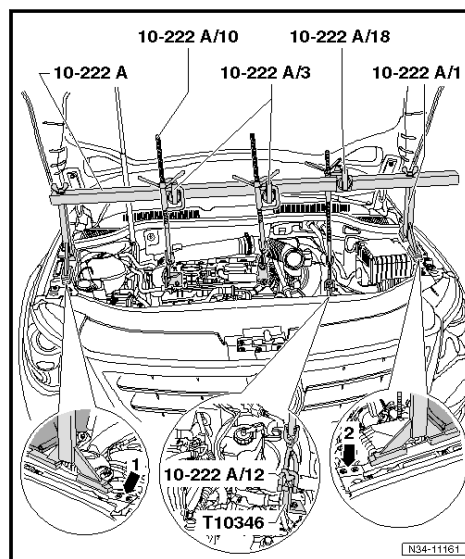


- ◆ Adapter -10 - 222 A /1-
- ◆ Adapter -10-222 A /3-
- ◆ Hook -10 - 222 A /10-
- ◆ Adapter -10 - 222 A /18- (longer tube points towards front end)
- ◆ Shackle -10-222 A /12-

#### **Setting up support bracket**

- Remove filler pieces from upper edges of both wings.
- If there are hose and cable connections in area of engine support eyes for support bracket -10-222A-, remove these now.
- Set up support bracket -10-222 A- in front of bonnet stay.



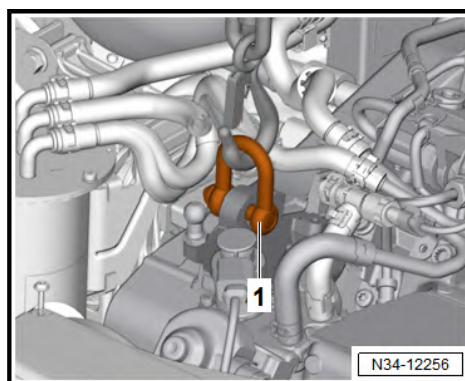


- Position adapter -10 - 222 A /1- as follows.
- On upper longitudinal members
- Directly next to plenum chamber cover
- Behind bolts -arrow 1- and -arrow 2-.
- Do not place the adapters -10-222 A /1- on the bolt-on plates of the wings. These may otherwise be damaged.

The surface of the two upper longitudinal members is different.

Therefore, the adapters -10 - 222 A /1- do not rest against them over the entire contact surface.

- Connect bracket -T10346- or -T10346/1- via shackle -10-222 A /12- to support bracket.
- Attach spindles in engine support eyes.



- If necessary, use shackle (-1-).
- 1- = shackle -10 - 222 A /12-
- Take up weight of engine/gearbox assembly and support bracket on spindles.





#### **WARNING**

Risk of injury due to improper handling of the support bracket. Improper handling can lead to damage of the tool and subsequent injuries.

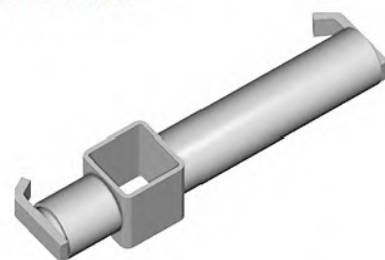
- Never loosen and dismantle the engine and gearbox mountings at the same time to avoid overloading of the support bracket.

## **2.5.5 Supporting engine in installation position, Scirocco**

Special tools and workshop equipment required

- ◆ Adapter -10 - 222 A /18-

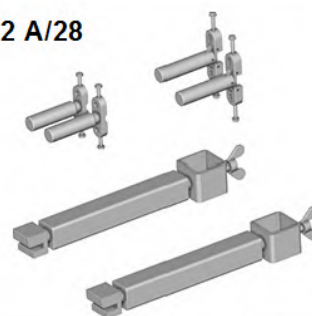
**10-222 A/18**



W00-11306

- ◆ Adapter -10 - 222 A /28-

**10-222 A/28**



W00-11642

- ◆ Adapter -10 - 222 A /32-

**10-222 A/32**

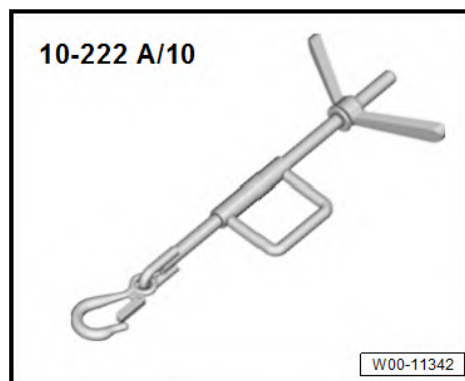


W00-11629

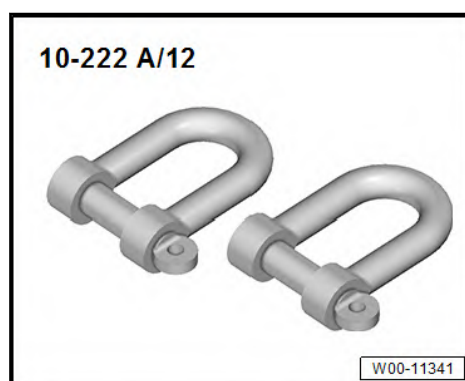




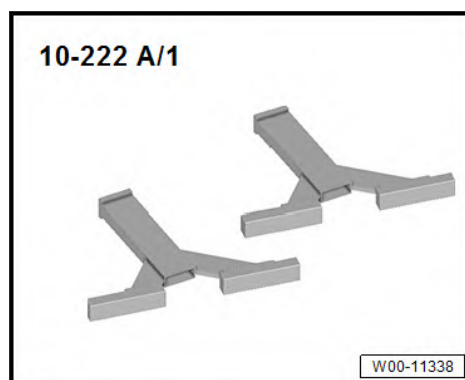
◆ Hook -10 - 222 A /10-



◆ Shackle -10 - 222 A /12-



◆ Rack -10 - 222 A /1-



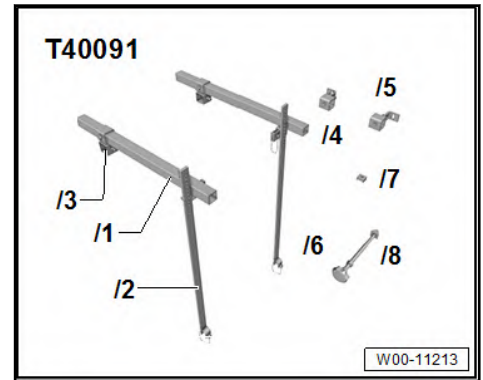
◆ Support bracket -10 - 222 A-







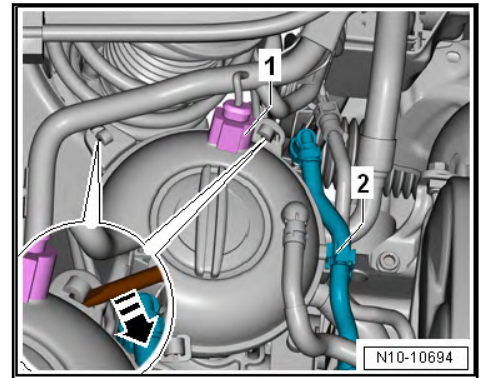
◆ Square tube -T40091/1-



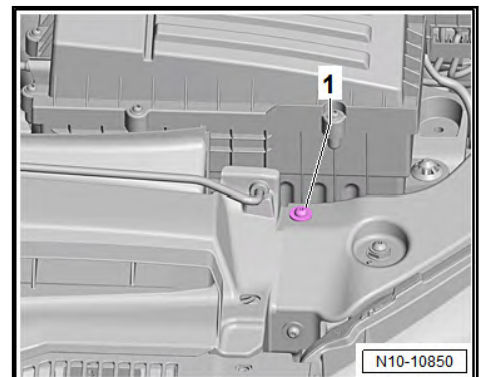
◆ Swivel joint -T40091/3-

**Sequence of operations**

- Remove resonator for intake air ⇒ [a3.4 nd installing resonator for intake air](#), page 476 .
- Remove air filter housing ⇒ [a3.2 nd installing air filter housing](#), page 472 .
- Disconnect electrical connector -1-.
- Move clear hose -2- from activated charcoal filter.

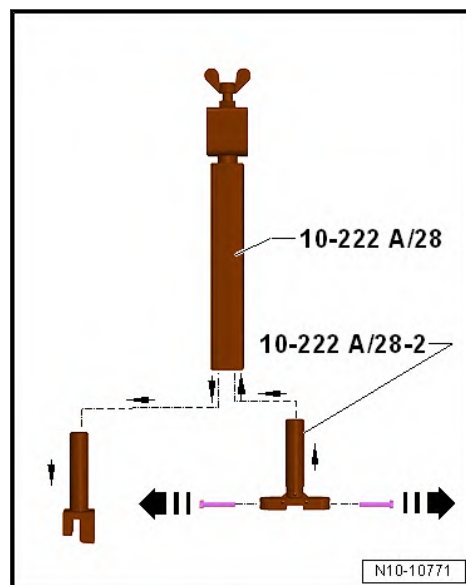


- Using a screwdriver, release fasteners -arrow- and move coolant expansion tank to one side.
- Unscrew bolt -1- on left of lock carrier.

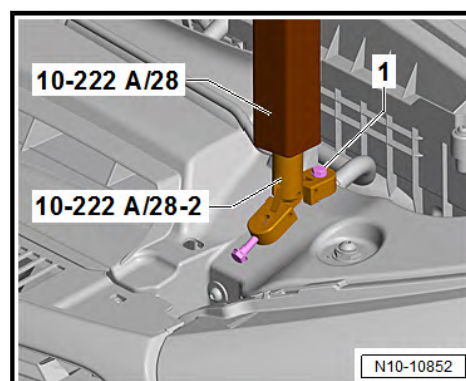


- Unscrew lower mounting from adapter -10 - 222 A /28- and replace with adapter -10-222 A /28-2-.

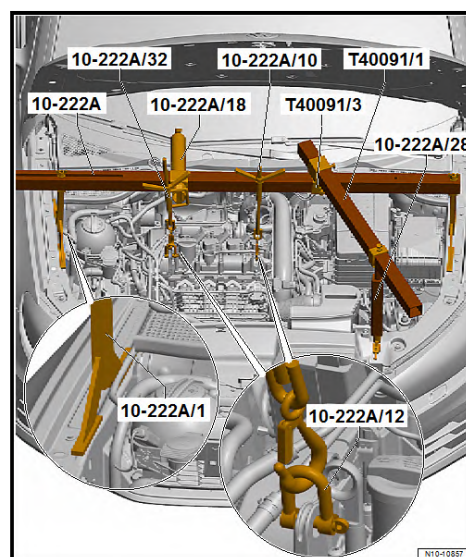




- Unscrew one securing bolt -arrow- from adapter -10-222 A / 28-2-.
- Bolt adapter -10-222 A /28-2- to lock carrier using securing bolt -1-.



- Slide square section tube -T40091/1- through adapter -10 - 222 A /28- and rotary joint -T40091/3-.
- Fit engine support bracket -10 - 222 A- as shown in illustration.







- Tighten all threaded connections of support bracket hand-tight.
- Tighten spindle slightly to take up weight of engine/gearbox assembly; do not lift.



#### **WARNING**

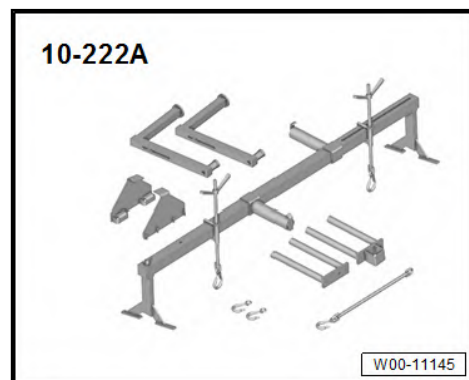
**Risk of injury due to improper handling of the support bracket. Improper handling can lead to damage of the tool and subsequent injuries.**

- Never loosen and dismantle the engine and gearbox mountings at the same time to avoid overloading of the support bracket.

## **2.5.6 Supporting engine in installation position, T-Roc**

**Special tools and workshop equipment required**

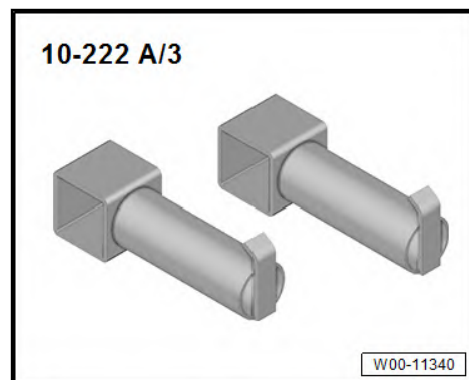
- ◆ Support bracket -10 - 222 A-



- ◆ Shackle -10 - 222 A /12-



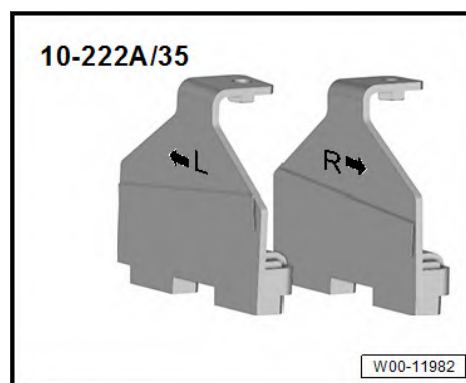
- ◆ Adapter -10-222A/3-



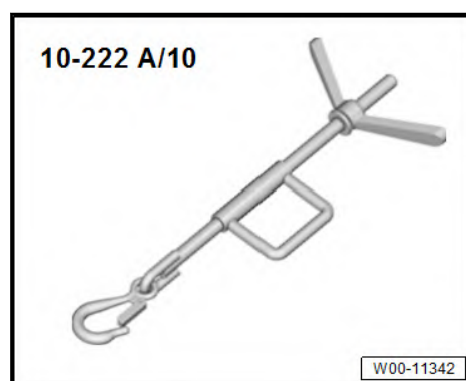




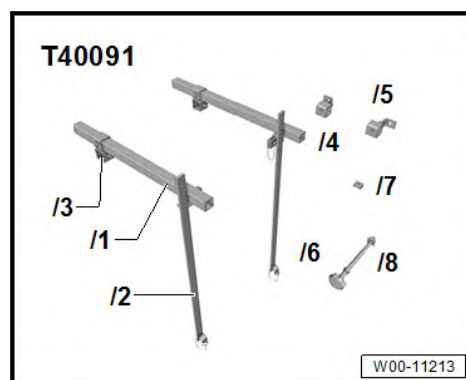
◆ Adapter -10-222A/35-



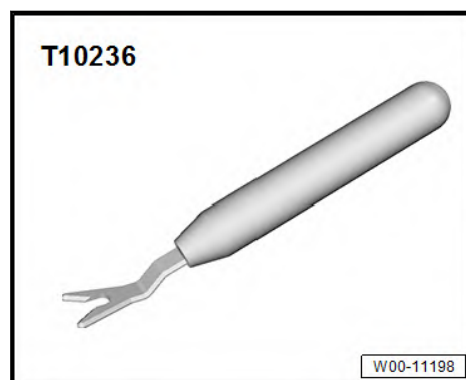
◆ Hook -10-222A/10-



◆ Tube -T40091/1-



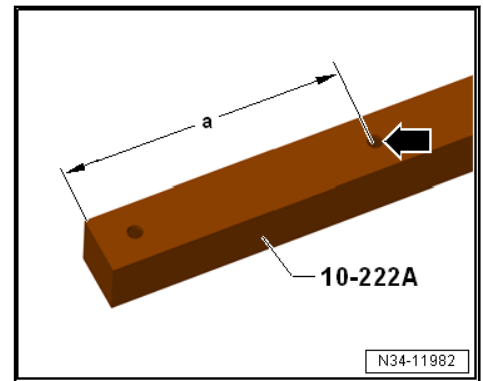
- ◆ Support joint -T40091/3-
- ◆ Support -T40093/3P- (not illustrated)
- ◆ Adapter -T40093/3-6A- (not shown)
- ◆ Release tool -T10236-







## Preparing support bracket -10 - 222 A-:



- If support bracket -10 - 222 A- does not yet have a hole (marked with -arrow-), drill it into support bracket accordingly.
- Dimension -a- = 225 mm.
- Hole  $\varnothing$  = 12.5 mm.

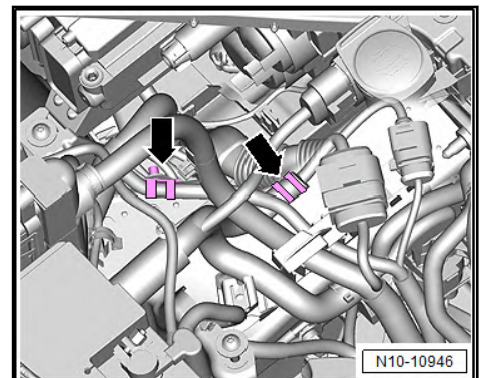
### Procedure



#### Note

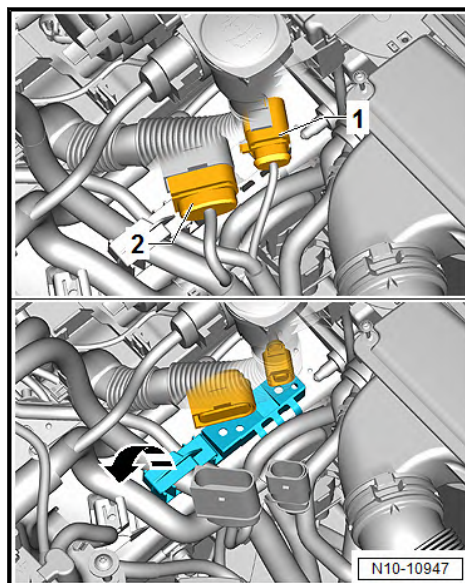
*The securing bolts of the assembly mountings may only be loosened if the engine is supported in installation position using the support bracket -10-222 A-.*

- Remove air filter housing ⇒ [a3.2 nd installing air filter housing](#), page 472 .
- Remove resonator for intake air ⇒ [a3.4 nd installing resonator for intake air](#), page 476 .
- Unclip wires -arrows- in front area of longitudinal member on left side. Use release tool -T10236- for this.



- Release and pull off electrical connectors -1- and -2-.





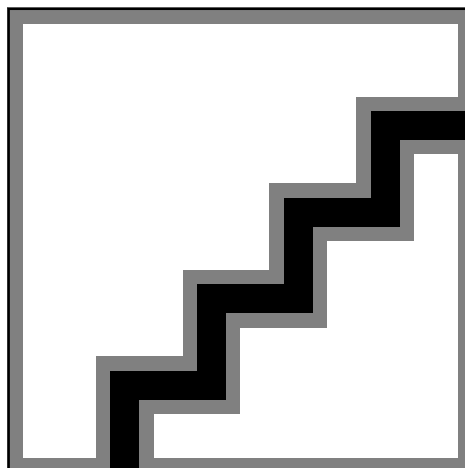
- Release electrical connector on bracket and unclip.
- Open locking element on bracket -arrow- on longitudinal member.
- Expose wiring harness leading to engine control unit on bracket.
- Expose positive wire leading to fuse carrier on bracket.
- Unclip wiring harness leading to engine control unit from bracket and battery tray. Use release tool -T10236- for this.
- If necessary, release and pull off wiring harness on engine control unit ⇒ [a6.3.3 nd installing engine control unitJ623 with protective housing, T-Roc", page 512](#) .
- Move aside wiring harnesses.
- Unclip bracket on longitudinal member using release tool -T10236-, and swivel it to right.



#### Note

*Make sure that neither the lines nor the bracket become trapped or damaged.*

**Setting up support bracket:**







Assemble engine support bracket -10-222 A- as shown:

A - Adapter -10-222A/35-

B - Square tube of support bracket -10-222 A-

C - Adapter -10-222A/3-

D - Hook -10-222A/10-

E - Support -T40091/3-

F - Tube -T40091/1-

G - Support -T40093/3P-

H - Adapter -T40093/3-6A-

I - Shackle -10 - 222 A /12-

- Bolt adapter-T40093/3-6A- -item H- to support -T40093/3P- -item G-, and fit it to left longitudinal member as shown in illustration.
- Position adapter -T40093/3-6A- -item H- next to filler tube for washer fluid reservoir.
- Adapter -T40093/3-6A- -item H- must engage with pin behind web of longitudinal member -arrow-.
- If necessary, push adapter -T40093/3-6A- -item H- into correct position.
- Align support bracket.
- Tighten all threaded connections of support bracket.
- Tighten hooks -10-222A/10- slightly to take up weight of engine/gearbox assembly; do not lift.



#### WARNING

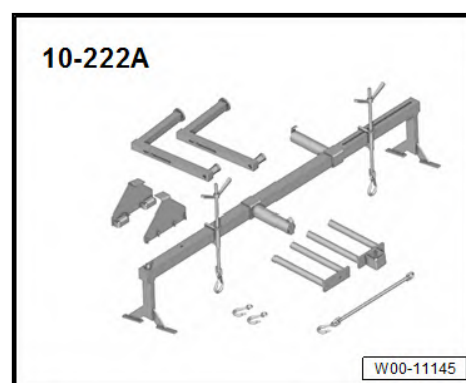
Risk of injury due to improper handling of the support bracket. Improper handling can lead to damage of the tool and subsequent injuries.

- Never loosen and dismantle the engine and gearbox mountings at the same time to avoid overloading of the support bracket.

## 2.5.7 Supporting engine in installation position, Golf 2020, Golf Estate 2021

Special tools and workshop equipment required

- ◆ Support bracket -10 - 222 A-

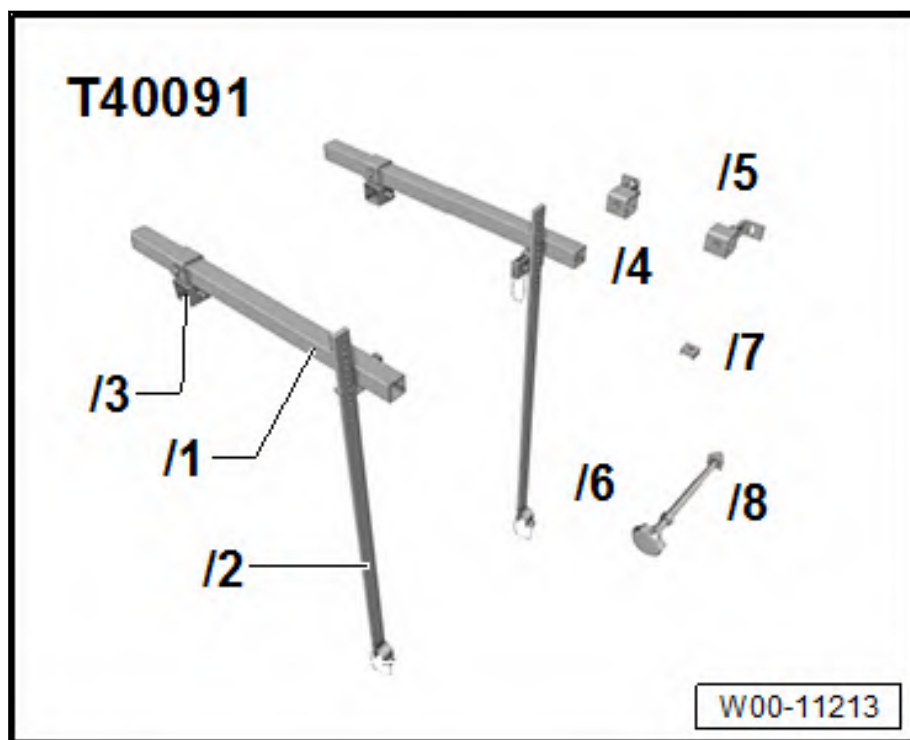


- ◆ Shackle -10 - 222 A /12-
- ◆ Adapter -10 - 222 A /18-

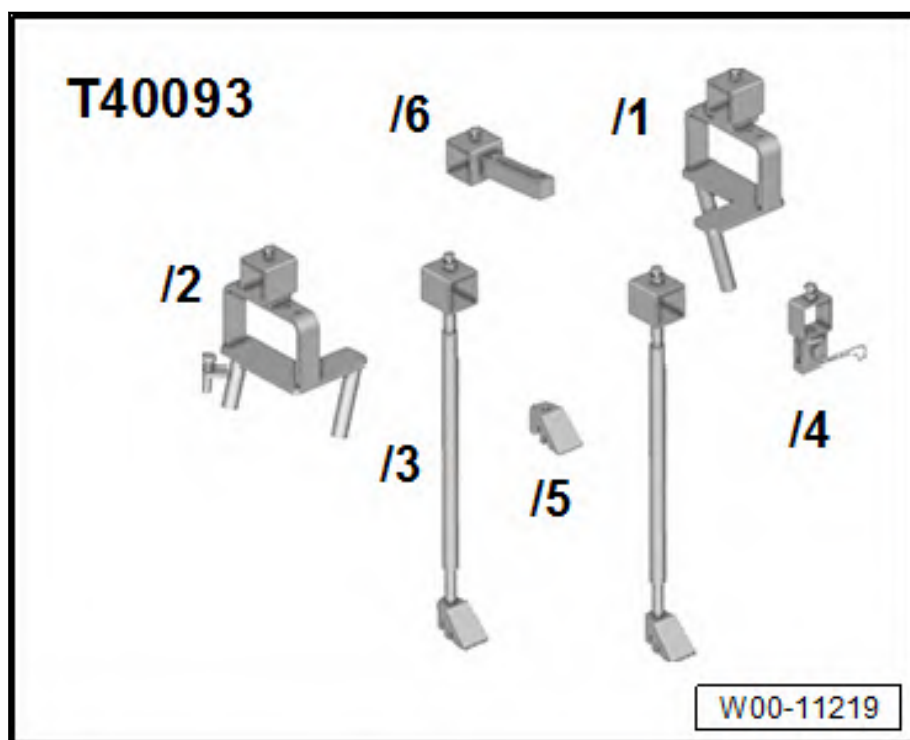




- ◆ Adapter -10 - 222 A /29-



- ◆ Adapter -T40091/1-
- ◆ Adapter -T40091/3-

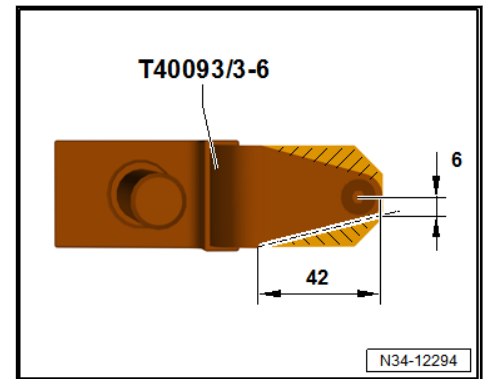


- ◆ Adapter -T40093/3-
- ◆ Adapter -T40093/3-6-





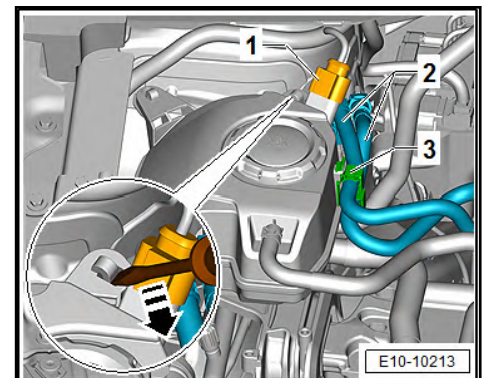
## Check adapters -T40093/3-6- and modify as necessary



- If necessary, cut off the marked area.
- Round off front edges.
- Protect adapter against corrosion.
- Then, mark adapters -T40093/3-6- as -T40093/3-6A-.

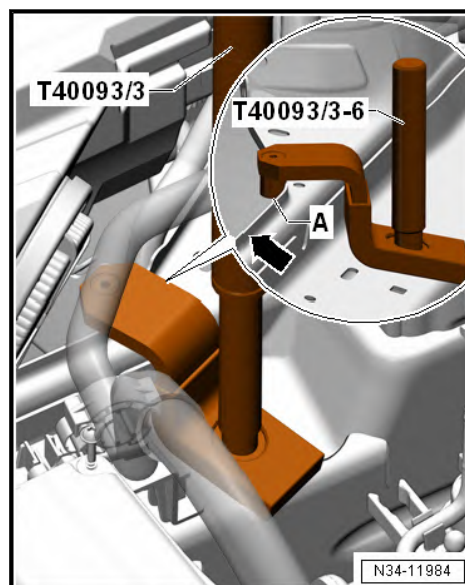
At a later point, support bracket -10-222 A- will be fitted onto longitudinal members with adapters -T40093/3-6A-.

- To prevent damage to the longitudinal members, wrap the front section of the adapters -T40093/3-6A- with textile-reinforced adhesive tape ⇒ Electronic parts catalogue (ETKA chemical substances).
- Remove resonator for intake air ⇒ [a3.4 nd installing resonator for intake air](#), page 476
- Remove air filter housing ⇒ [a3.2 nd installing air filter housing](#), page 472 .
- Disconnect electrical connector -1-.

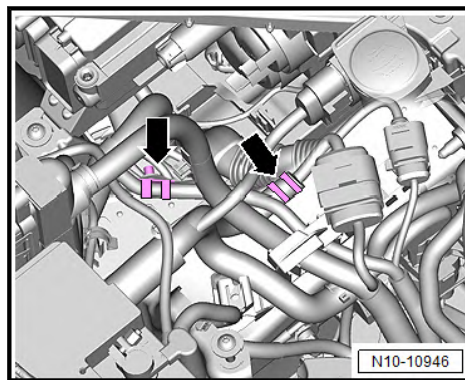


- Open bracket -3-, detach fuel hoses -2- from bracket.
- Using a screwdriver, release fasteners in direction of -arrow- and lay coolant expansion tank to one side.
- Screw adapter -T40093/3-6A- to support -T40093/3- and fit on right longitudinal member.



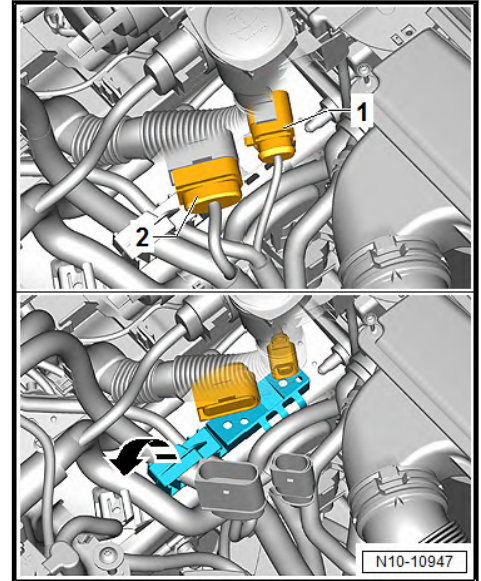


- If fitted, pull off electrical lines in front area of web on right longitudinal member -arrow-. Do not disconnect pipe/hose system.
- Unclip refrigerant line from retainer.
- Place adapter-T40093/3-6A- onto right longitudinal member.
- The adapter-T40093/3-6A- is locked with the pin -A- behind the flange of the longitudinal member -arrow-.
- Remove battery tray ⇒ Electrical system; Rep. gr. 27; Battery; Removing and installing battery tray.
- Unclip wires -arrows- in front area of longitudinal member on left side. Use release tool -T10236- for this.

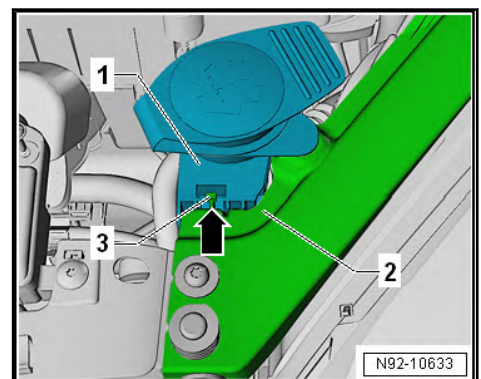


- Release and pull off connectors -1- and -2-.



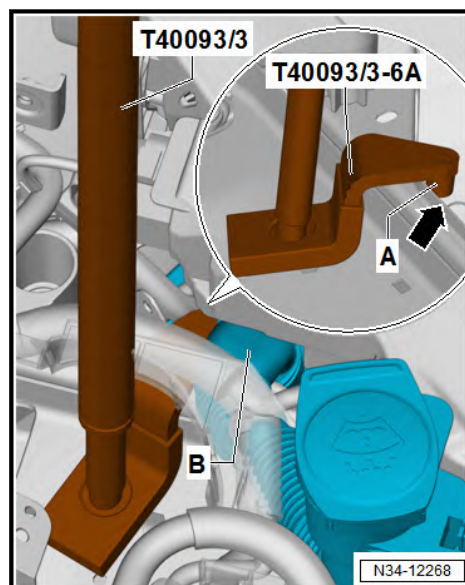


- Release connector on retainer and unclip.
- Open locking element on retainer -arrow- on longitudinal member.
- Expose wiring harness for engine control unit on bracket.
- Expose positive wire for fuse carrier on bracket.
- Unclip wiring harness leading to engine control unit from bracket and on battery tray. Use release tool -T10236- for this.
- If necessary, release and pull off wiring harness on engine control unit ⇒ [c6 control unit](#), [page 495](#) .
- Lay wiring harnesses aside.
- Use release tool -T10236- to unclip bracket on longitudinal member and swivel to right.
- Remove filler neck -1- at top on lock carrier -2-.



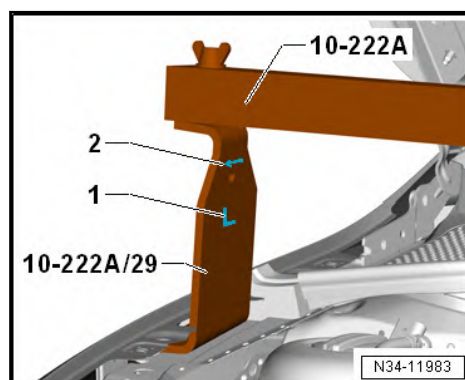
- To do this, release locking lug -3- in direction of -arrow-.
- Pull filler neck -1- upwards out of mounting.
- Screw adapter -T40093/3-6A- to -A- support -T40093/3- and fit on left longitudinal member.





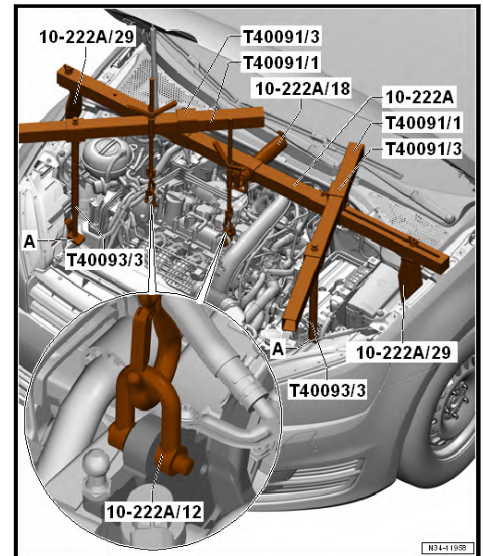
- Guide adapter -T40093/3-6A- below filler pipe of washer fluid reservoir.
- Place adapter -T40093/3-6A- onto left longitudinal member.
- Adapter -T40093/3-6A- must engage with pin -A- behind web of longitudinal member -arrow-.
- If necessary, push adapter -T40093/3-6A- into correct position.
- Note lines and retainers.

**Installation position of adapters -10 - 222 A /29-:**



- ◆ “L” = -1- adapter is used on “right-hand” side of vehicle.
- ◆ “R” adapter is inserted on “left” side of vehicle.
- ◆ On both sides of vehicle, insert adapters -10 - 222 A /29- between wing mounting flange and sheet metal for mounting wing underneath it.
- Fit engine support bracket -10 - 222 A- as shown in illustration.





- Tighten spindle slightly to take up weight of engine/gearbox assembly; do not lift.



#### WARNING

Risk of injury due to improper handling of the support bracket. Improper handling can lead to damage of the tool and subsequent injuries.

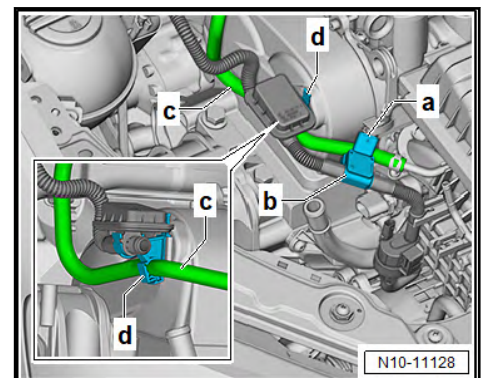
- Never loosen and dismantle the engine and gearbox mountings at the same time to avoid overloading of the support bracket.

## 2.6 Checking adjustment of assembly mountings (engine and gearbox mountings)

### Sequence of operations

#### Sharan with petrol particulate filter

- Pull off connector -a- from activated charcoal filter line -b-.

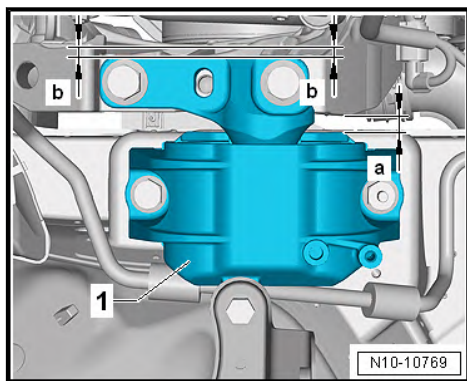


- Unclip activated charcoal filter line -b- and fuel line -c- from bracket -d-.
- Place activated charcoal filter lines -b- and fuel line -c- aside.

#### Continued for all vehicles:

- There must be a distance -a- of 10 to 13 mm between engine support and right longitudinal member.





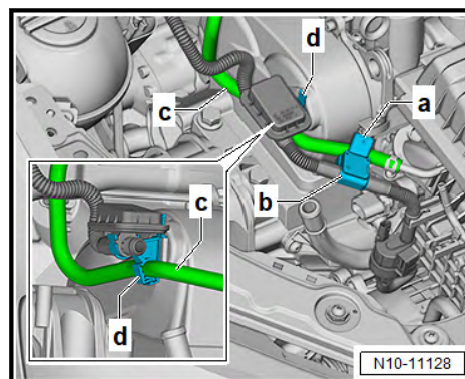
- The cast edge on the engine support -a- must be aligned parallel to support arm.
- Dimension -b- must be identical at front and rear.
- If there is a noise problem and dimension -a- is outside the tolerance range, adjust assembly mountings ⇒ [a2.7 ssembly mountings](#), page 118 .

## 2.7 Adjusting assembly mountings

### Sequence of operations

#### Sharan with petrol particulate filter

- Pull off connector -a- from activated charcoal filter line -b-.

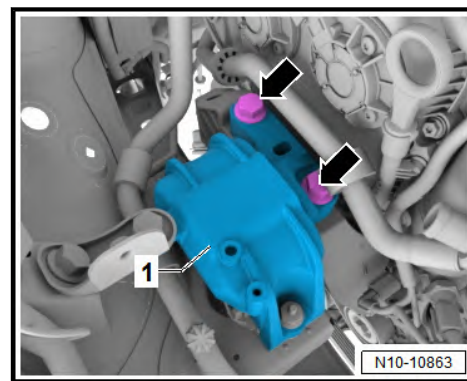


- Unclip activated charcoal filter line -b- and fuel line -c- from bracket -d-.
- Place activated charcoal filter lines -b- and fuel line -c- aside.

#### Continued for all vehicles:

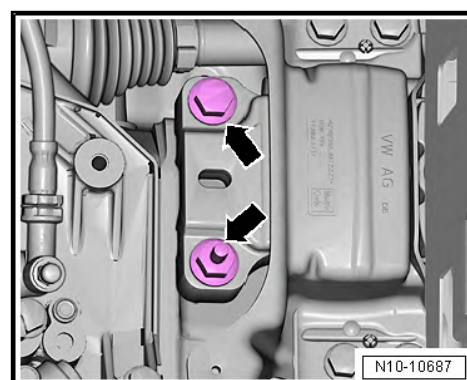
- Remove battery tray -1- ⇒ Electrical system; Rep. gr. 27; Battery; Removing and installing battery tray.
- Support engine in its installation position ⇒ [e2.5 ngine in installation position](#), page 89 .
- Unscrew engine mounting bolts -arrows- one after the other and renew them (if not already renewed when installing engine).



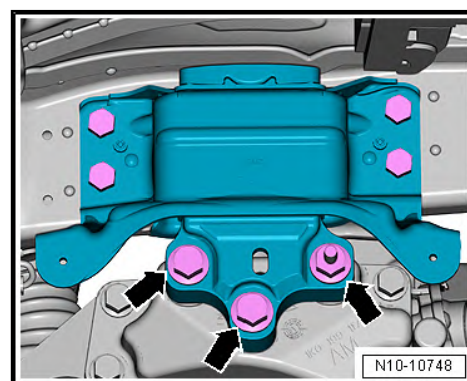


- First screw bolts in loosely.

**Vehicles with 2 bolts between gearbox mounting and gearbox bracket:**



**Vehicles with 3 bolts between gearbox mounting and gearbox bracket:**

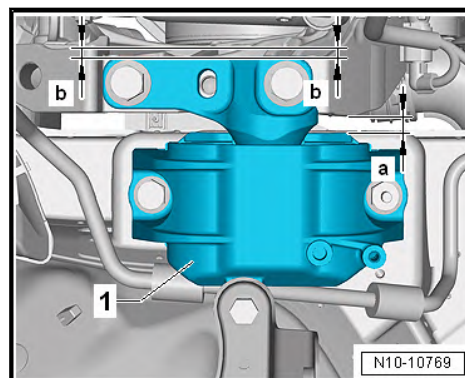


- Unscrew gearbox mounting bolts -arrows- one after the other, and renew them (if not already renewed when installing engine).
- Initially, screw in bolts -arrows- for gearbox mountings to stop by hand.





Continued for all vehicles:



- Using assembly lever, adjust engine/gearbox assembly until specifications listed below are attained:
- There must be a distance -a- = 10 mm between engine support and engine mounting.
- Side surface of the engine support casting should be located parallel to support arm of engine mounting.
- Dimension -b- must be identical on both sides.
- Tighten bolts for engine mounting.

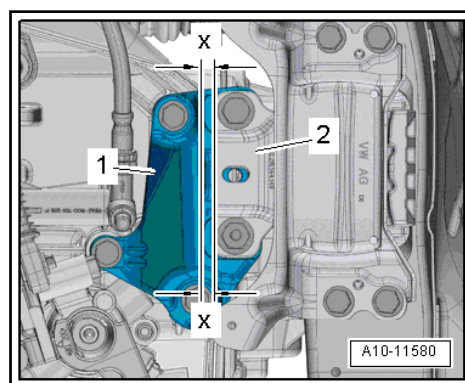


**Note**

*Distance -a- = 10 mm can also be checked with a metal rod of suitable size, or similar.*

- Tighten bolts for engine mounting.

**Vehicles with 2 bolts between gearbox mounting and gearbox bracket:**

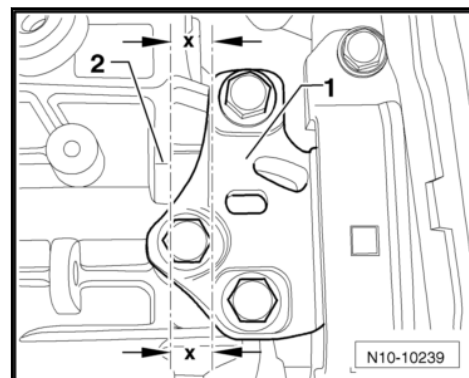


- On the gearbox side, ensure that the edges of the support arm -2- and gearbox support -1- are parallel.
- Distance -x- = distance -x-.





**Vehicles with 3 bolts between gearbox mounting and gearbox bracket:**



- On the gearbox side, ensure that the edges of the support arm -2- and gearbox support -1- are parallel.
- Distance -x- = distance -x-.

**Continued for all vehicles:**

- Tighten bolts for gearbox mounting.

Install in reverse order of removal.

**Specified torques**

- ◆ ⇒ [o2.1 verview - assembly mountings", page 68](#)
- ◆ ⇒ [o2.1 verview - charge air system", page 433](#)
- ◆ ⇒ Electrical system; Rep. gr. 27; Battery; Assembly overview - battery
- ◆ ⇒ [o3.1 verview - air filter housing", page 470](#)





## 13 – Crankshaft group

### 1 Cylinder block (pulley end)

⇒ [o1.1 verview - poly V-belt drive", page 122](#)

⇒ [o1.2 verview - sealing flange, belt pulley end", page 126](#)

⇒ [a1.3 nd installing poly-V belt", page 129](#)

⇒ [a1.4 nd installing tensioner for poly V-belt", page 133](#)

⇒ [a1.5 nd installing vibration damper", page 134](#)

⇒ [a1.6 nd installing engine support", page 136](#)

⇒ [c1.7 rankshaft oil seal - belt pulley end", page 139](#)

⇒ [a1.8 nd installing sealing flange on pulley end", page 142](#)

#### 1.1 Assembly overview - poly V-belt drive

⇒ [o1.1.1 verview - poly V-belt drive, vehicles without air conditioner compressor", page 122](#)

⇒ [o1.1.2 verview - poly V-belt drive, vehicles with air conditioner compressor", page 124](#)

##### 1.1.1 Assembly overview - poly V-belt drive, vehicles without air conditioner compressor





### 1 - Bolt

- ☐ Use counter-hold tool - T10475- to loosen and tighten
- ☐ Renew after removal
- ☐ 150 Nm +180°

### 2 - Vibration damper

- ☐ Removing and installing ⇒ [a1.5 nd installing vibration damper", page 134](#)

### 3 - Poly V-belt

- ☐ Check for wear
- ☐ Before removing, mark direction of rotation with chalk or felt-tipped pen
- ☐ Do not kink
- ☐ Poly V-belt routing ⇒ [page 130](#)
- ☐ Removing and installing ⇒ [a1.3 nd installing poly-V belt", page 129](#)
- ☐ When installing, make sure it is properly seated on pulleys.

### 4 - Bolt

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

### 5 - Tensioning device for poly V-belt

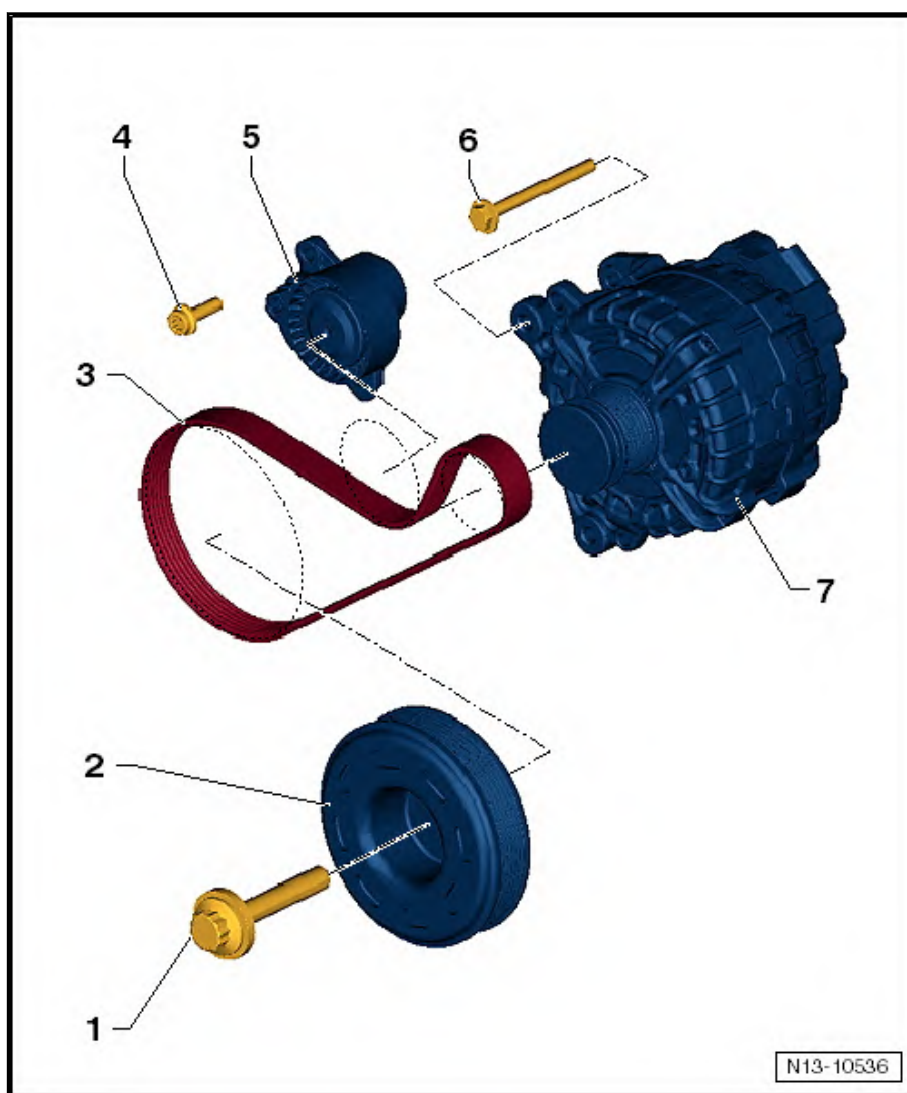
- ☐ Pivot with socket to slacken poly V-belt
- ☐ Lock with locking pin - T10060 A-.
- ☐ Removing and installing ⇒ [a1.4 nd installing tensioner for poly V-belt", page 133](#)

### 6 - Bolt

- ☐ Specified torque ⇒ Electrical system; Rep. gr. 27; Alternator; Assembly overview - alternator

### 7 - Alternator

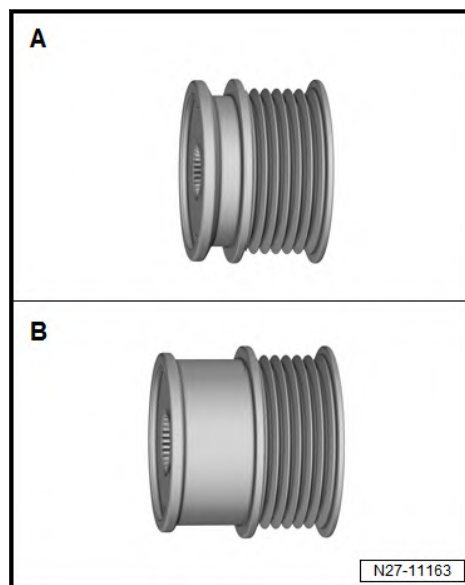
- ☐ Removing and installing ⇒ Electrical system; Rep. gr. 27; Alternator; Removing and installing alternator
- ☐ With freewheel
- ☐ Various versions of the overrunning alternator pulley, -A- or -B-, may be fitted depending on the type and version of alternator ⇒ [page 123](#) .



N13-10536

### Allocation of overrunning alternator pulley





For allocation, refer to ⇒ Electronic parts catalogue

### 1.1.2 Assembly overview - poly V-belt drive, vehicles with air conditioner compressor





### 1 - Poly V-belt

- ☐ Check for wear
- ☐ Before removing, mark direction of rotation with chalk or felt-tipped pen
- ☐ Do not kink
- ☐ Poly V-belt routing ⇒ [page 132](#)
- ☐ Removing and installing ⇒ [a1.3.1 nd installing poly V-belt, vehicles without air conditioner compressor](#), [page 129](#)
- ☐ When installing, make sure it is properly seated on pulleys.

### 2 - Bolt

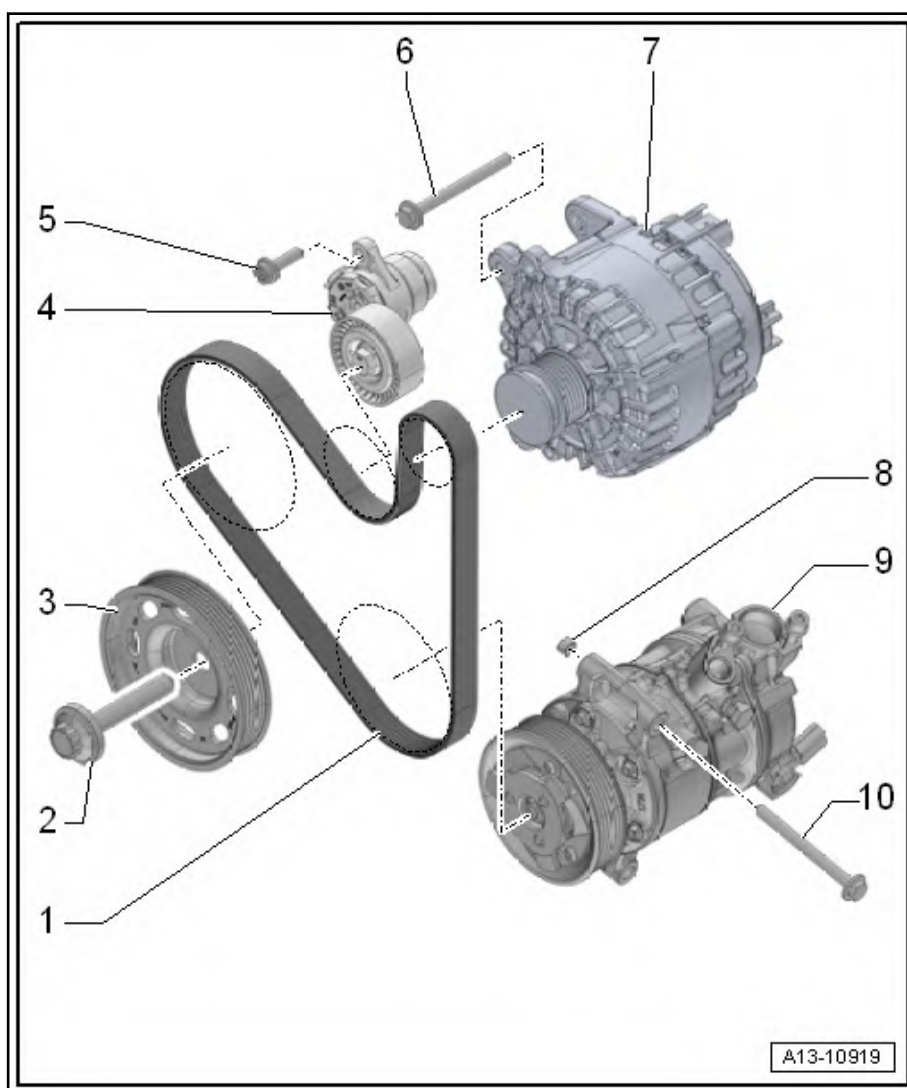
- ☐ Specified torque ⇒ [Item 1 \(page 123\)](#)

### 3 - Vibration damper

- ☐ Removing and installing ⇒ [a1.5 nd installing vibration damper](#), [page 134](#)

### 4 - Tensioning device for poly V-belt

- ☐ Pivot with socket to slacken poly V-belt
- ☐ Lock with locking pin - T10060 A-.
- ☐ Removing and installing ⇒ [a1.4 nd installing tensioner for poly V-belt](#), [page 133](#)



Volkswagen Technical Site: <https://vwts.ru>

### 5 - Bolt

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

### 6 - Bolt

- ☐ Specified torque ⇒ Electrical system; Rep. gr. 27; Alternator; Assembly overview - alternator

### 7 - Alternator

- ☐ Removing and installing ⇒ Electrical system; Rep. gr. 27; Alternator; Removing and installing alternator
- ☐ With freewheel
- ☐ Various versions of the overrunning alternator pulley, -A- or -B-, may be fitted depending on the type and version of alternator ⇒ [page 126](#).

### 8 - Dowel sleeve

- ☐ For air conditioner compressor

### 9 - Air conditioner compressor

- ☐ Do not unscrew or disconnect refrigerant lines
- ☐ Removing and installing ⇒ Heating, air conditioning system; Rep. gr. 87; Air conditioner compressor; Removing and installing air conditioner compressor from and to bracket

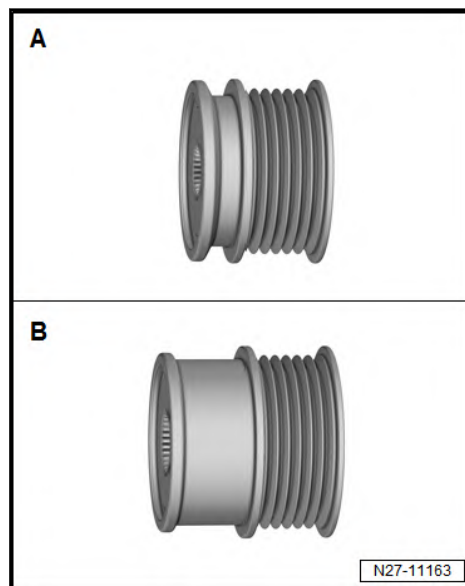
### 10 - Bolt





- ❑ Specified torque ⇒ Heating, air conditioning; Rep. gr. 87; Air conditioner compressor; Assembly overview - drive unit of air conditioner compressor.

#### Allocation of overrunning alternator pulley



For allocation, refer to ⇒ Electronic parts catalogue

### 1.2 Assembly overview - sealing flange, belt pulley end





#### 1 - Bolt

- ☐ Specified torque ➤ [Item 1 \(page 123\)](#)

#### 2 - Vibration damper

- ☐ Removing and installing ➤ [a1.5 nd installing vibration damper", page 134](#)

#### 3 - Seal

- ☐ For crankshaft on belt pulley end
- ☐ Renewing ➤ [c1.7 rank-shaft oil seal - belt pulley end", page 139](#)
- ☐ Do not oil

#### 4 - Sealing flange at belt pulley end

- ☐ Must seat on dowel pins.
- ☐ Removing and installing ➤ [a1.8 nd installing sealing flange on pulley end", page 142](#)

#### 5 - Bolt

- ☐ Different thread diameters ➤ Electronic parts catalogue
- ☐ Renew after removal
- ☐ Specified torque and tightening sequence ➤ [page 127](#)

#### 6 - Seal

- ☐ Renew after removal

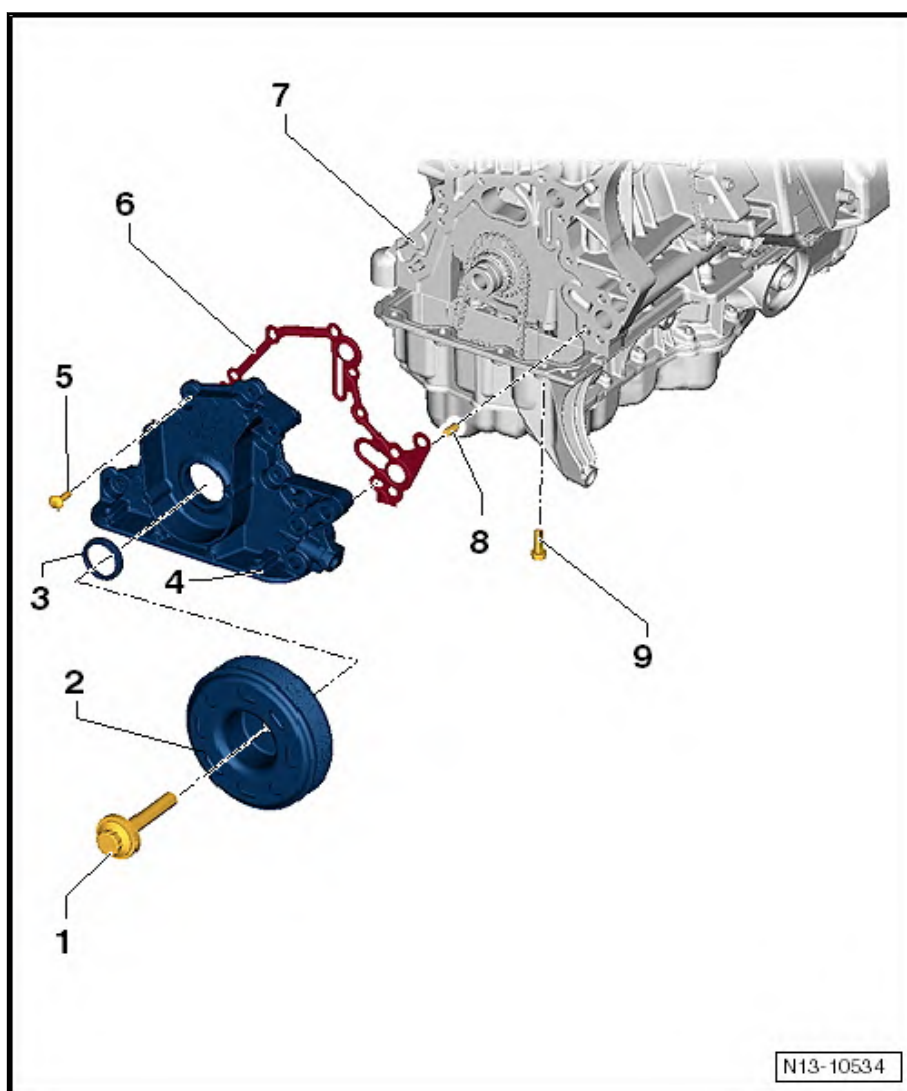
#### 7 - Cylinder block

#### 8 - Dowel pin

- ☐ Qty. 2

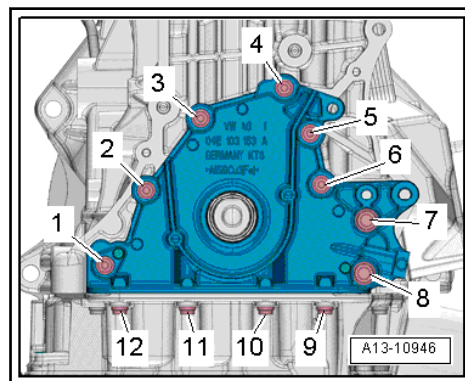
#### 9 - Bolt

- ☐ Renew after removal
- ☐ Specified torque and tightening sequence ➤ [page 127](#)



**Sealing flange at belt pulley end - Prescribed torque and tightening sequence**





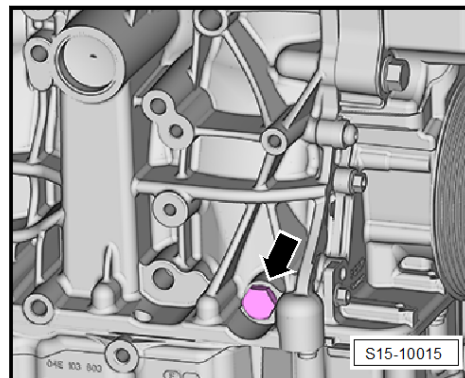
#### Note

*Renew bolts that are tightened with turning further angle.*

– Tighten bolts -1 ... 12- in stages:

Stage	Bolts	Specified torques/angle specifications
1st	-1 ... 12-	Screw onto stop by hand
2nd	-1 ... 12-	8 Nm
3rd	-7, 8-	20 Nm
4th	-1 ... 12-	turn 90° further diagonally

Plug for “TDC” drilling in cylinder block at rear – specified torque



#### Note

- ♦ *Plug with integrated seal -arrow-*
- ♦ *Renew if damaged*

Bolt	Specified torque
-Arrow-	30 Nm





## 1.3 Removing and installing poly-V belt

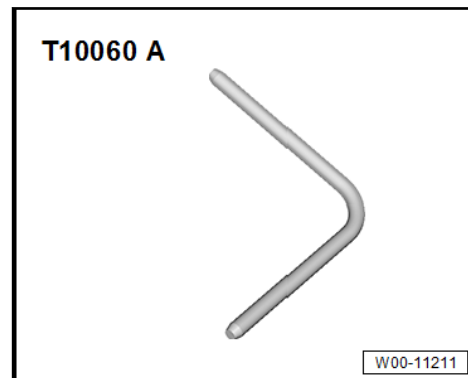
⇒ [a1.3.1 nd installing poly V-belt, vehicles without air conditioner compressor", page 129](#)

⇒ [a1.3.2 nd installing poly V-belt, vehicles with air conditioner compressor", page 131](#)

### 1.3.1 Removing and installing poly V-belt, vehicles without air conditioner compressor

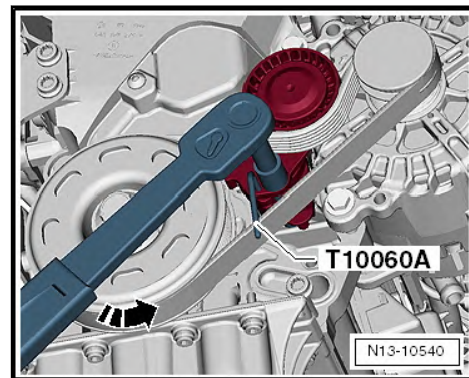
Special tools and workshop equipment required

- ◆ Locking pin -T10060 A-



#### Removing

- To slacken poly V-belt, turn tensioner anti-clockwise in -direction of arrow-.



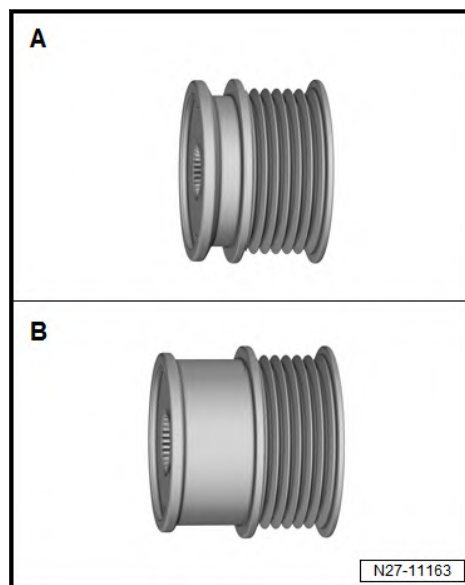
- Lock tensioning device in place with locking pin -T10060 A-.
- If poly V-belt is to be reinstalled, mark direction of rotation on belt using chalk or felt tip pen before removing.
- Remove poly V-belt.

#### Installing

Install in reverse order of removal, observing the following:

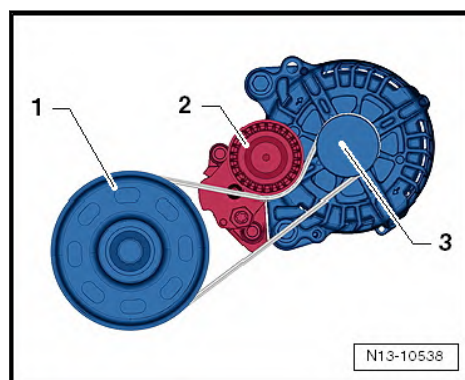
Various versions of the overrunning alternator pulley, -A- or -B-, may be fitted depending on the type and version of alternator.



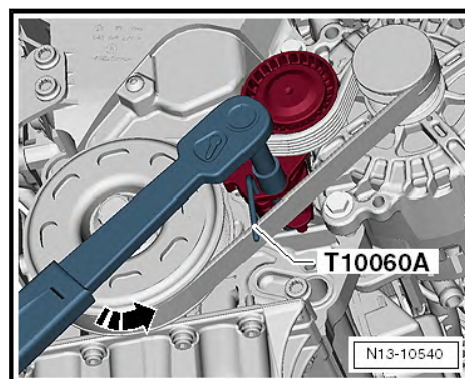


For allocation, refer to ⇒ Electronic parts catalogue

- Fit poly V-belt as shown in illustration.



- 1 - Vibration damper
- 2 - Tensioning device for poly V-belt
- 3 - Alternator
- Turn tensioning device in -direction of arrow-, and pull out locking pin -T10060 A-.



- Release tensioner.
- Check that poly V-belt is properly seated.
- Start engine and check that poly V-belt runs properly.

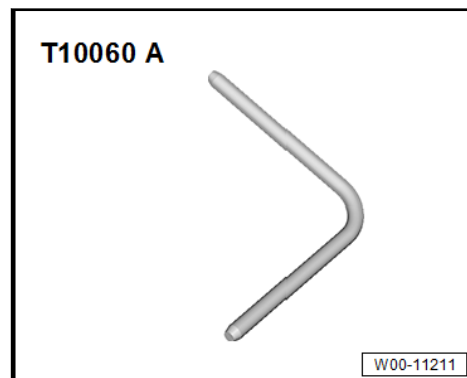




### 1.3.2 Removing and installing poly V-belt, vehicles with air conditioner compressor

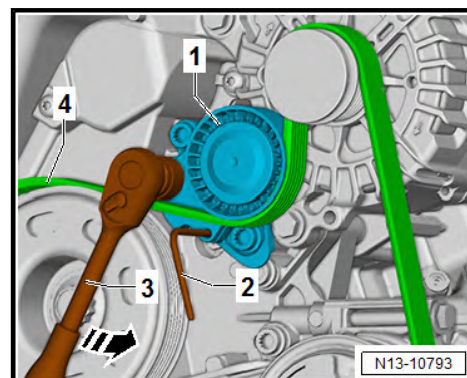
#### Special tools and workshop equipment required

- ◆ Locking pin -T10060 A-



#### Removing

- If poly V-belt is to be reinstalled, mark direction of rotation on belt using chalk or felt tip pen before removing.
- Fit tool -3- onto hexagon of tensioner -1-.



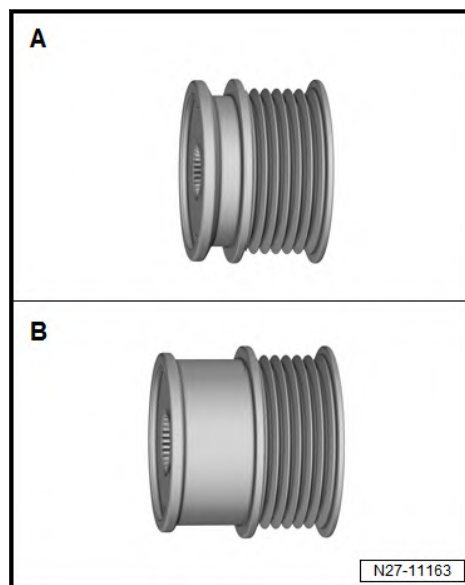
- To slacken poly V-belt push tool -3- in -direction of arrow-.
- Lock tensioner -1- in place with locking pin -T10060 A- -2-.
- Remove poly V-belt -4-.

#### Installing

Install in reverse order of removal, observing the following:

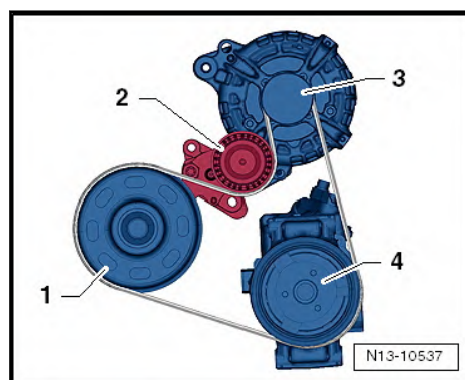
Various versions of the overrunning alternator pulley, -A- or -B-, may be fitted depending on the type and version of alternator.



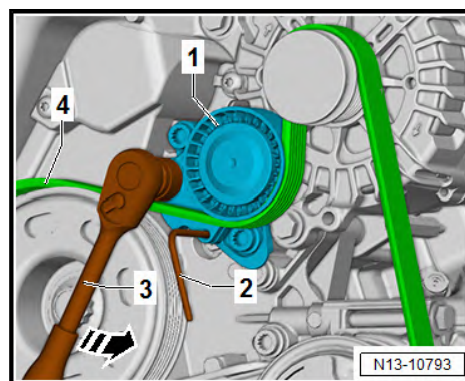


For allocation, refer to ⇒ Electronic parts catalogue

- Fit poly V-belt as shown in illustration.



- 1 - Vibration damper
- 2 - Tensioning device for poly V-belt
- 3 - Alternator
- 4 - Air conditioner compressor
- Push tool -3- in -direction of arrow-, and pull out locking pin -T10060 A- -2-.



- Release tension from tensioner -1-.
- Check that poly V-belt -4- is properly seated.





- Start engine and check that poly V-belt runs properly.

## 1.4 Removing and installing tensioner for poly V-belt

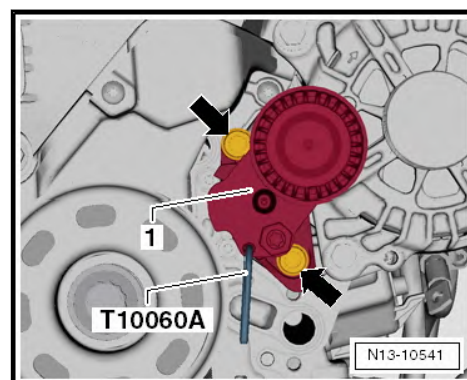
⇒ [a1.4.1 nd installing tensioner for poly V-belt, vehicles without air conditioner compressor](#), page 133

⇒ [a1.4.2 nd installing tensioner for poly V-belt, vehicles with air conditioner compressor](#), page 133

### 1.4.1 Removing and installing tensioner for poly V-belt, vehicles without air conditioner compressor

#### Removing

- Remove poly V-belt from tensioner ⇒ [a1.3.1 nd installing poly V-belt, vehicles without air conditioner compressor](#), page 129 .
- Remove bolts -arrows- and detach poly V-belt tensioner -1-.



#### Installing

Install in reverse order of removal, observing the following:

- Install poly V-belt ⇒ [a1.3.1 nd installing poly V-belt, vehicles without air conditioner compressor](#), page 129 .

#### Specified torques

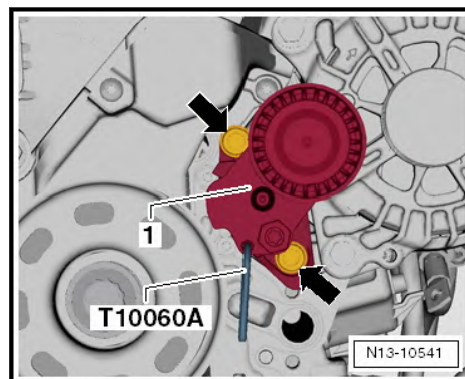
- ◆ ⇒ [o1.1.1 verview - poly V-belt drive, vehicles without air conditioner compressor](#), page 122

### 1.4.2 Removing and installing tensioner for poly V-belt, vehicles with air conditioner compressor

#### Removing

- Remove poly V-belt from tensioner ⇒ [a1.3.2 nd installing poly V-belt, vehicles with air conditioner compressor](#), page 131 .
- Remove bolts -arrows- and detach poly V-belt tensioner -1-.





## Installing

Install in reverse order of removal, observing the following:

- Install poly V-belt ⇒ [a1.3.2 nd installing poly V-belt, vehicles with air conditioner compressor](#), page 131 .

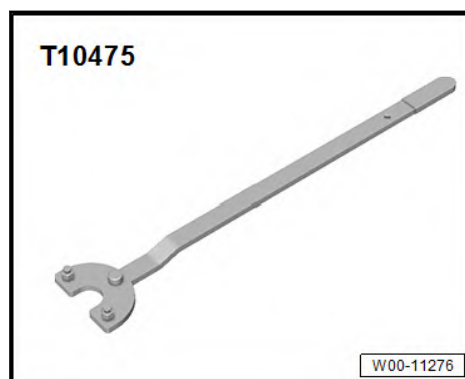
## Specified torques

- ♦ ⇒ [o1.1.2 verview - poly V-belt drive, vehicles with air conditioner compressor](#), page 124

## 1.5 Removing and installing vibration damper

### Special tools and workshop equipment required

- ♦ Counter-hold tool -T10475-



### Preparing counterhold tool -T10475-



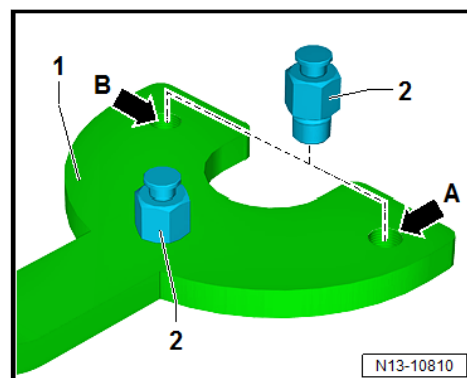
#### Note

- ♦ *Different types of vibration damper can be installed.*
- ♦ *For this reason, the counterhold tool -T10475- must be adapted to the holes of the respective vibration damper.*



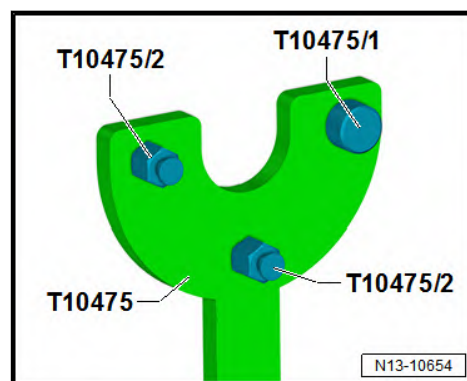


## Version 1



- Convert counterhold tool -T10475- -1- with inserts -T10475/2- -2-.

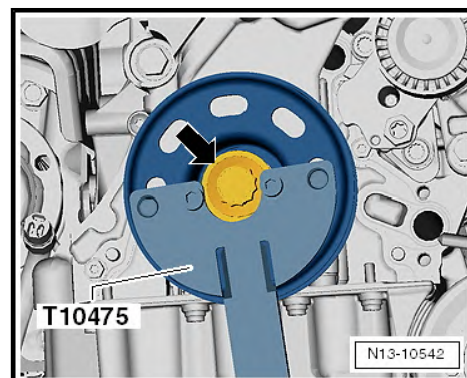
## Version 2



- Convert counterhold tool -T10475- with inserts -T10475/1- and -T10475/2- as shown in illustration.
- To do this, use hole -A- or -B- of counterhold tool -T10475- -1- depending on type of vibration damper.

## Removing

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- Remove poly V-belt ⇒ [a1.3 nd installing poly-V belt”, page 129](#) .
- Set crankshaft to »TDC« of cylinder no. 1. ⇒ [p4.7 iston to TDC position”, page 174](#)
- Loosen bolt -arrow- for vibration damper using counterhold -T10475-.







- Unscrew bolt and remove vibration damper.



#### NOTICE

**Risk of damage to engine caused by incorrect valve timing.**

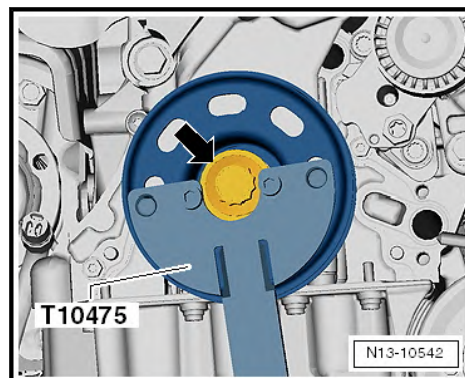
- Do not turn crankshaft out of TDC position.

### Installing



#### Note

- ♦ *Renew bolts that are tightened with turning further angle.*
- ♦ *All contact surfaces between bolt, vibration damper and crankshaft toothed belt pulley must be free of oil and grease.*
- Fit vibration damper, oil threads of bolt for vibration damper and screw it in to stop by hand.



- Tighten bolt -arrow- for vibration damper using counterhold -T10475-.

Continue installation in reverse order of removal. Observe the following when doing this:

- Install poly V-belt ⇒ [a1.3 nd installing poly-V belt”, page 129](#).

### Specified torques

- ♦ ⇒ [o1.1 verview - poly V-belt drive”, page 122](#)

## 1.6 Removing and installing engine support

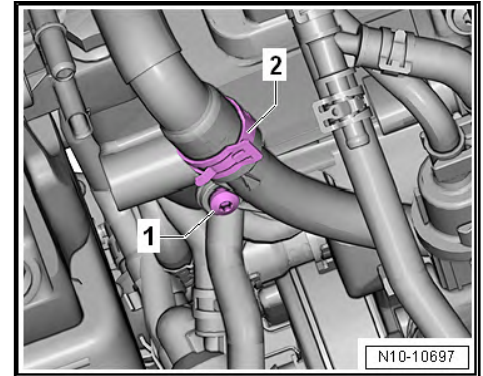
### Removing

- Disconnect battery ⇒ Electrical system; Rep. gr. 27; Battery; Disconnecting and reconnecting battery.
- Remove battery tray ⇒ Electrical system; Rep. gr. 27; Battery; Removing and installing battery tray.
- Remove resonator for intake air ⇒ [a3.4 nd installing resonator for intake air”, page 476](#).
- Remove air filter housing ⇒ [a3.2 nd installing air filter housing”, page 472](#).
- Remove tensioner for poly V-belt ⇒ [a1.4 nd installing tensioner for poly V-belt”, page 133](#).
- Remove upper toothed belt guard. ⇒ [a2.3.1 nd installing upper toothed belt guard”, page 203](#)

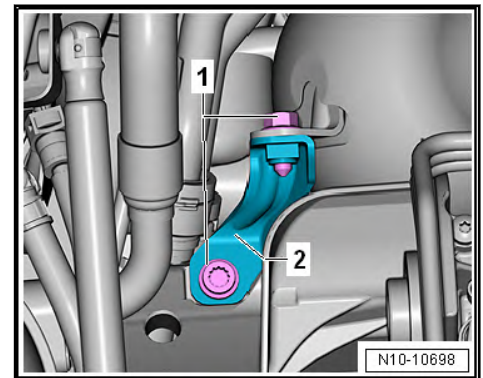




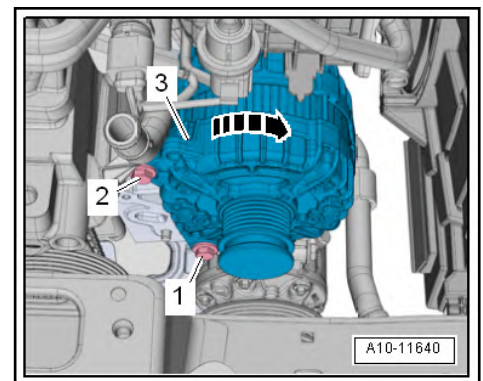
- Drain coolant ⇒ [a1.3 nd adding coolant", page 340](#) .
- Unscrew bolt -1-.



- Loosen hose clip -2- and pull off coolant hose.
- Unscrew bolts -1- and remove bracket -2- for catalytic converter.

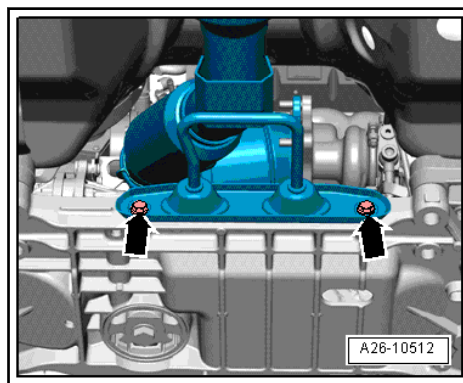


- Removing engine mounting ⇒ [a2.2 nd installing engine mounting", page 80](#) .
- Loosen bolt -1- but do not remove.

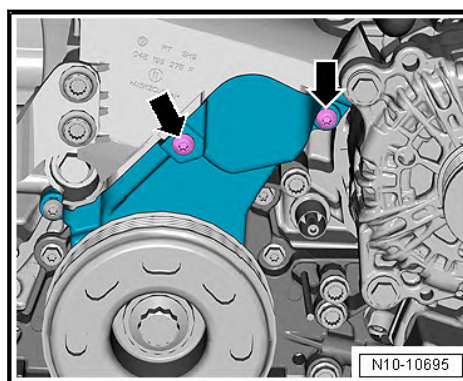


- Unscrew bolt -2-.
- Swivel alternator -3- in -direction of arrow- towards front.
- Unscrew bolts -arrows- from bracket for front exhaust pipe.

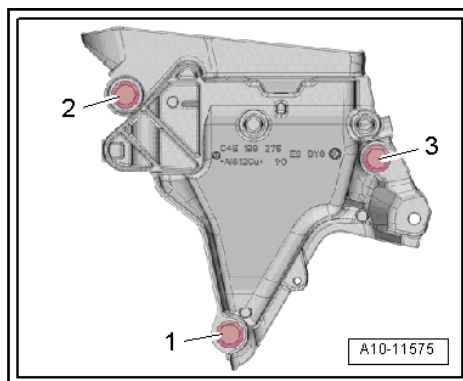




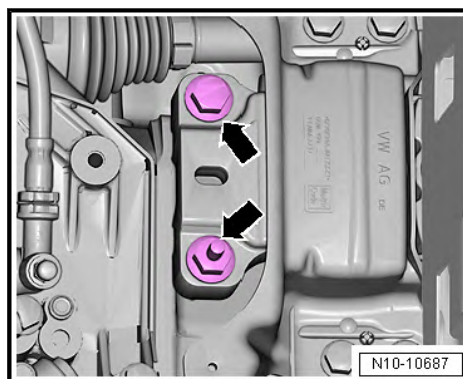
- Remove pendulum support ⇒ [a2.4 nd installing pendulum support](#), [page 87](#) .
- Unscrew bolts -arrows-.



- Unscrew bolts -1, 2, 3-.



- Unscrew bolts -arrows-.







- Push engine/gearbox assembly slightly towards left, and detach engine support.

### Installing

Install in reverse order of removal, observing the following:

- Checking adjustment of assembly mountings ⇒ [a2.6 adjustment of assembly mountings \(engine and gearbox mountings\)](#), page 117 .

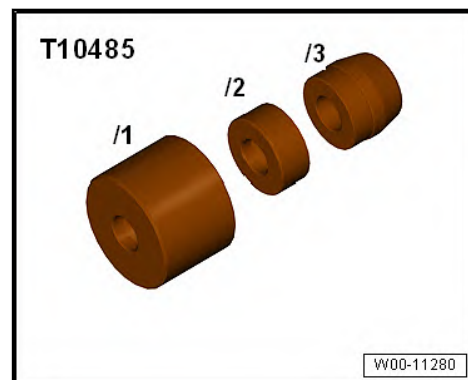
### Specified torques

- ◆ ⇒ [o2.1 overview - assembly mountings](#), page 68
- ◆ ⇒ [o1.1 overview - poly V-belt drive](#), page 122
- ◆ ⇒ [o2.1 overview - toothed belt cover](#), page 198
- ◆ ⇒ [o3.1 overview - coolant pipes](#), page 374
- ◆ ⇒ [o2.1 overview - charge air system](#), page 433
- ◆ ⇒ [o3.1 overview - air filter housing](#), page 470
- ◆ ⇒ [o2.1 overview - emission control](#), page 568
- ◆ ⇒ Electrical system; Rep. gr. 27; Alternator; Assembly overview - alternator
- ◆ ⇒ Electrical system; Rep. gr. 27; Battery; Assembly overview - battery

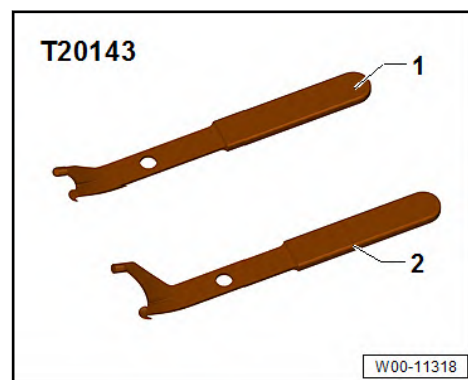
## 1.7 Renewing crankshaft oil seal - belt pulley end

### Special tools and workshop equipment required

- ◆ Assembly tool -T10485A-



- ◆ Press tool -T10485/4- (not illustrated)
- ◆ Extractor hook -T20143-

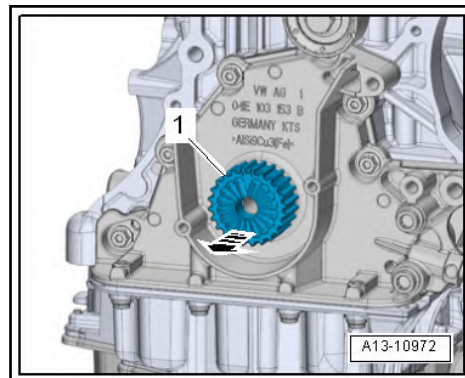






### Sequence of operations

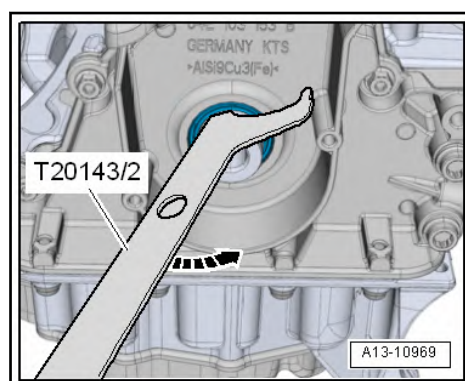
- Remove toothed belt ⇒ [a2.7 nd installing toothed belt", page 227](#).
- Detach crankshaft pulley -1- -arrow-.



### NOTICE

**Risk of damage to engine caused by incorrect valve timing.**

- Do not turn crankshaft out of TDC position.
- Pry out seal using extractor hook -T20143/2- -arrow-.



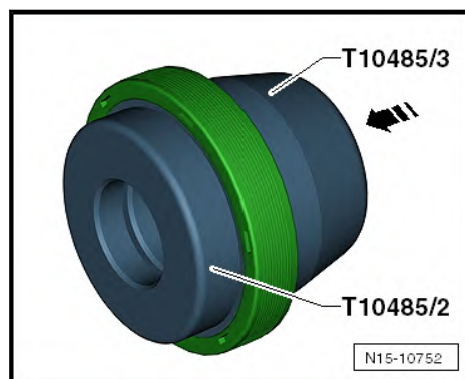
- Clean contact surface and sealing surface.



### Note

*Do not lubricate new seal.*

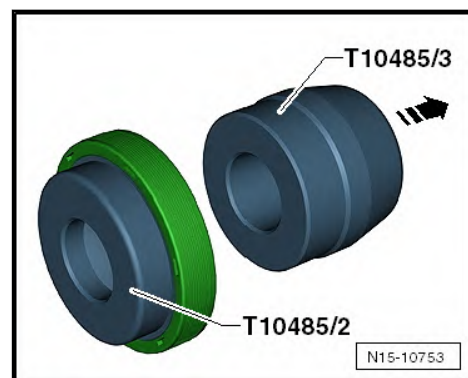
- Fit new seal in -direction of arrow- onto assembly sleeve -T10485/2-.



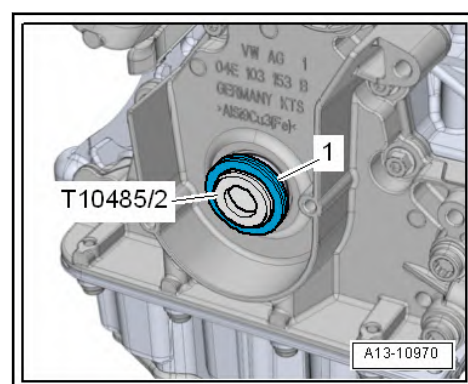




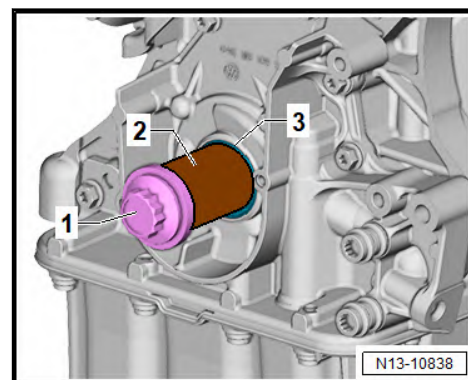
- Pull off assembly sleeve -T10485/3- in -direction of arrow-.



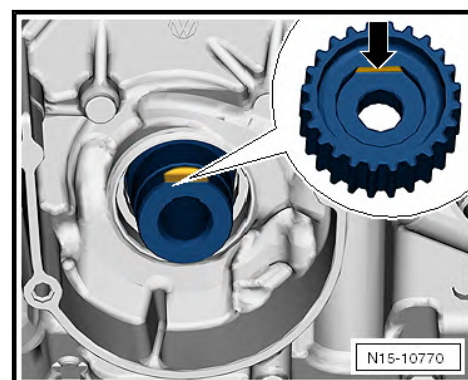
- Installation position: closed end of seal faces fitting sleeve.
- Fit guide sleeve -T10485/2- with oil seal -1- onto crankshaft.



- Use fitting sleeve -T10485/4- -2- and pulley bolt -1- to pull in oil seal -3- onto stop.



- Fit crankshaft sprocket onto crankshaft.







- The contact surface between vibration damper and crankshaft toothed belt pulley must be free of oil and grease.
- The machined surface -arrow- of crankshaft pulley must be positioned over the machined surface of the crankshaft journal.
- Install toothed belt → [a2.7 nd installing toothed belt", page 227](#).

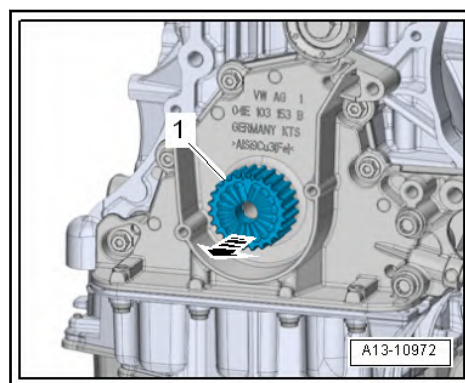
## 1.8 Removing and installing sealing flange on pulley end

### Special tools and workshop equipment required

- ◆ Scraper
- ◆ Sealant → Electronic Parts Catalogue

### Removing

- Remove noise insulation → General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- Remove air conditioner compressor from bracket, and secure it on vehicle → Heating, air conditioning; Rep. gr. 87; Air conditioner compressor; Removing air conditioner compressor from and installing to bracket.
- Remove toothed belt → [a2.7 nd installing toothed belt", page 227](#).
- Detach crankshaft pulley -1- -arrow-.

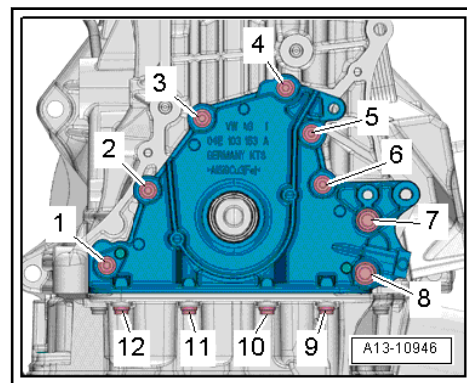


### NOTICE

Risk of damage to engine caused by incorrect valve timing.

- Do not turn crankshaft out of TDC position.
- Unscrew bolts -1 to 12- and carefully remove sealing flange from the glued joint.





- Drive out radial oil seal with sealing flange removed.

### Installing

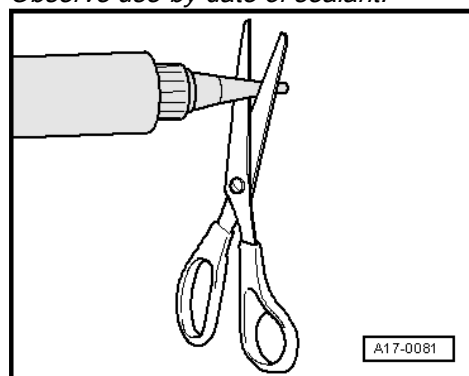
Install in reverse order of removal, observing the following:

- The lubrication system can be soiled by sealant residue.
- Cover open section of sump with clean clothes.
- Remove sealant residue from sealing flange and sump (top section).
- Remove any oil and grease from sealing surfaces.

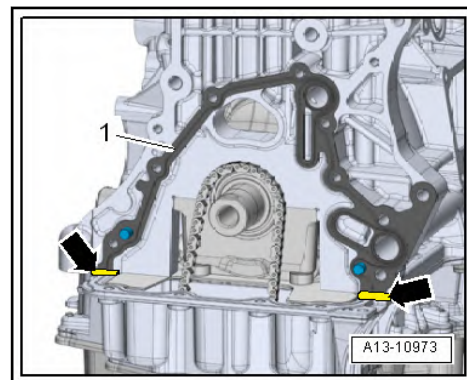


### Note

*Observe use-by date of sealant.*



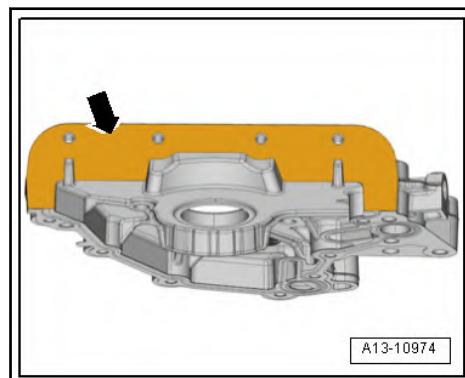
- Cut off nozzle on tube at front marking ( $\varnothing$  of nozzle approx. 2 mm).
- Slide gasket -1- onto dowel pins in cylinder block.







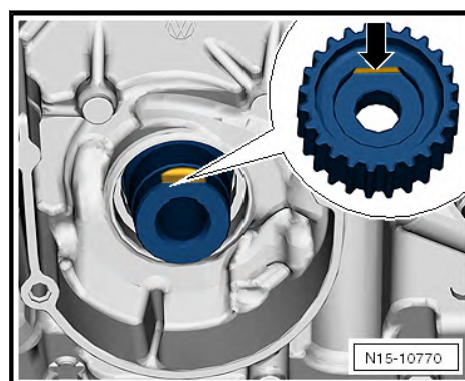
- Apply a thin bead of sealant at the edge of the joint between the cylinder block and the sump -arrows-.
- Thinly coat lower sealing surface -arrow- on sealing flange with sealant.



#### Note

*Install the sealing flange within 5 minutes after the sealant has been applied.*

- Carefully fit gasket sealing flange onto dowel pins on cylinder block.
- Tighten bolts for sealing flange ⇒ [page 127](#) .
- Fit oil seal for crankshaft at belt pulley end ⇒ [c1.7 crankshaft oil seal - belt pulley end](#)”, [page 139](#) .
- Fit crankshaft sprocket onto crankshaft.



- The contact surface between vibration damper and crankshaft toothed belt pulley must be free of oil and grease.
- The machined surface -arrow- of crankshaft pulley must be positioned over the machined surface of the crankshaft journal.
- Install toothed belt ⇒ [a2.7 nd installing toothed belt](#)”, [page 227](#) .
- Install air conditioner compressor ⇒ Heating, air conditioning; Rep. gr. 87; Air conditioner compressor; Removing and installing air conditioner compressor.
- Install noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview – noise insulation.





### Specified torques

- ◆ ⇒ Fig. [“Sealing flange at belt pulley end - Prescribed torque and tightening sequence”](#), page 127
- ◆ ⇒ Electrical system; Rep. gr. 27; Alternator; Assembly over-view - alternator





## 2 Cylinder block, gearbox end

⇒ [o2.1 verview - cylinder block, gearbox end", page 146](#)

⇒ [a2.2 nd installing flywheel", page 147](#)

⇒ [a2.3 nd installing sealing flange on gearbox side", page 148](#)

### 2.1 Assembly overview - cylinder block, gearbox end



#### Note

For assembly work, secure engine to engine and gearbox support ⇒ [e1.3 ngine on engine and gearbox support", page 61](#).

#### 1 - Bolt

- ❑ Renew after removal
- ❑ 60 Nm +90°

#### 2 - Flywheel

- ❑ Removing and installing ⇒ [a2.2 nd installing flywheel", page 147](#)
- ❑ Can only be fitted in one position

#### 3 - Engine speed sender - G28-

- ❑ Removing and installing ⇒ [a1.5 nd installing engine speed sender G28", page 585](#)

#### 4 - Bolt

- ❑ Specified torque ⇒ [o1.1 verview - ignition system", page 578](#)

#### 5 - Dowel pin

- ❑ Qty. 2

#### 6 - Adapter

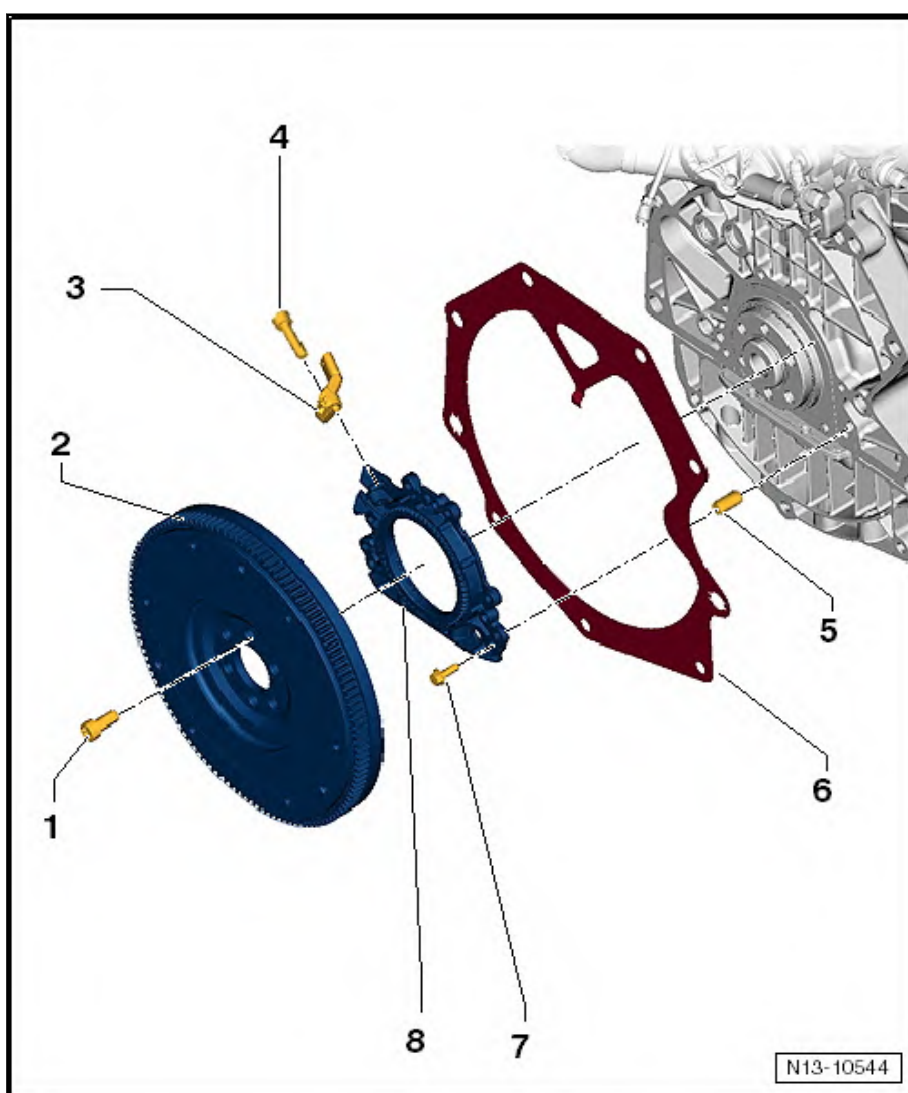
- ❑ Do not damage or bend when assembling.
- ❑ Installing ⇒ [page 147](#)

#### 7 - Bolt

- ❑ Specified torque and tightening sequence ⇒ [page 146](#)

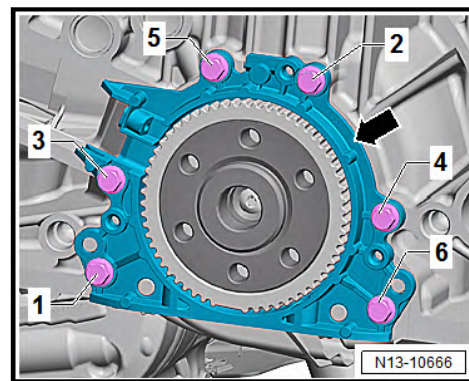
#### 8 - Sealing flange with sender wheel and oil seal

- ❑ Renew sealing flange complete with oil seal and sender wheel only.
- ❑ Removing and installing ⇒ [a2.3 nd installing sealing flange on gearbox side", page 148](#)



Sealing flange on gearbox side - specified torque and tightening sequence

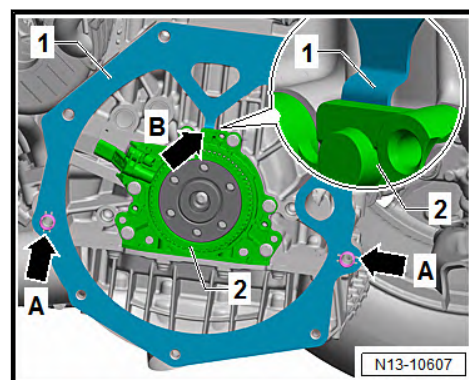




- Tighten bolts -1- to -6- in stages as follows:

Stage	Tightening sequence	Specified torque
1st	-1- to -6-	Screw onto stop by hand
2nd	-1- to -6-	Tighten to 10 Nm

Install intermediate plate.

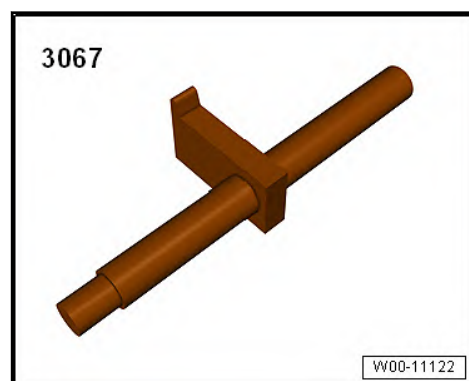


- Attach intermediate plate -1- to sealing flange -2- -arrow B-.
- Slide intermediate plate onto dowel sleeves -arrows A-.

## 2.2 Removing and installing flywheel

Special tools and workshop equipment required

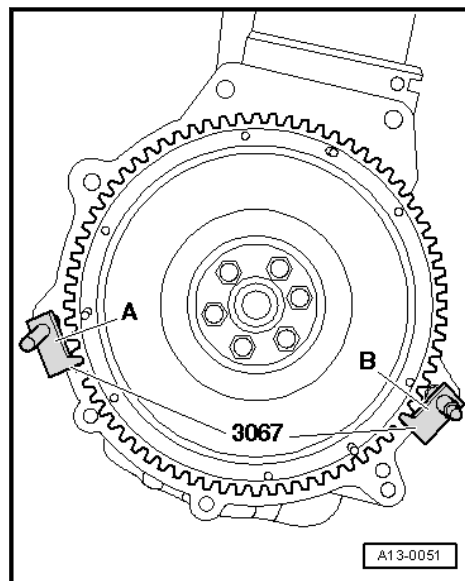
- ◆ Counter-hold tool -3067-



### Removing

- Gearbox removed
- Insert counterhold tool -3067- into hole in cylinder block -item B-.





- Loosen and remove flywheel bolts.

#### Installing

Install in reverse order of removal, observing the following:



#### Note

- ♦ *Renew bolts that are tightened with turning further angle.*
  - ♦ *Flywheel with sender wheel can only be fitted in one position.*
- Insert counterhold -3067- in hole in cylinder block -item A-.

#### Specified torques

- ♦ [⇒ o2.1 verview - cylinder block, gearbox end", page 146](#)

## 2.3 Removing and installing sealing flange on gearbox side

#### Special tools and workshop equipment required

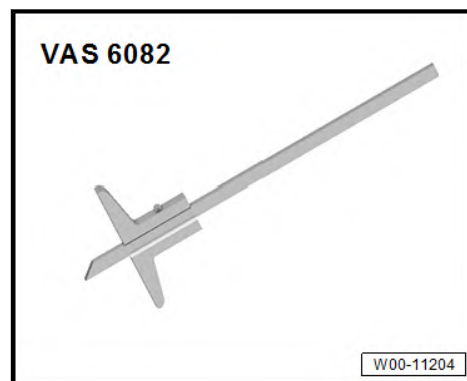
- ♦ Ring spanner insert -V.A.G 1332/11-



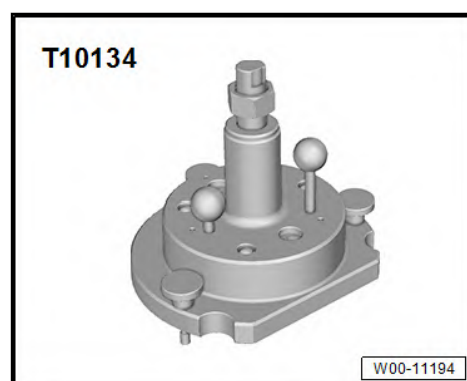




- ◆ Depth gauge -VAS 6082-



- ◆ Assembly tool -T10134-



- ◆ Locating bolt -T10340-



- ◆ Bolt M 6 x 35, qty. 3
- ◆ Spark plug socket, e.g. -3122 B-
- ◆ Screwdriver with a shaft length of at least 250 mm
- ◆ Hexagon key

### Sequence of operations



#### Note

*For reasons of clarity, illustration shows work procedure with engine removed.*

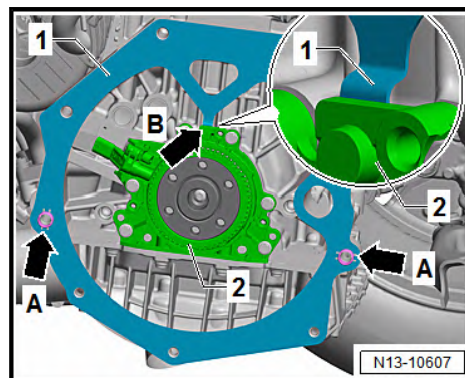
- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- Removing gearbox ⇒ Rep. gr. 34; Removing and installing gearbox.



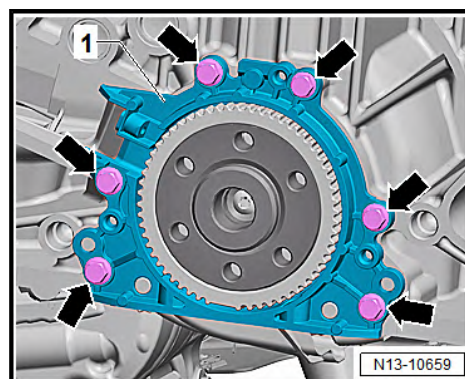


- Remove clutch ⇒ Rep. gr. 30; Removing and installing clutch.
- Remove flywheel ⇒ [a2.2 nd installing flywheel", page 147](#) .

Continued for all vehicles

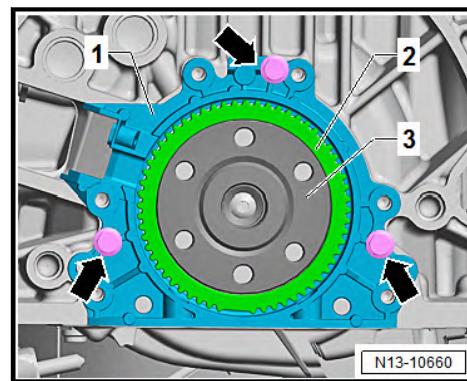


- Remove intermediate plate -1- from dowel sleeves -arrows A-.
- Guide intermediate plate -1- upwards.
- While doing so, pull retaining lug -arrow B- of intermediate plate -1- out of recess behind sealing flange.
- Set crankshaft to "TDC" position ⇒ [p4.7 iston to TDC position", page 174](#) .
- Remove sump (bottom section) ⇒ [a1.3 nd installing lower part of sump", page 302](#) .
- Remove upper part of sump ⇒ [a1.4 nd installing upper part of sump", page 308](#) .
- Remove engine speed sender -G28- ⇒ [a1.5 nd installing engine speed senderG28", page 585](#) .
- Unscrew bolts -arrows- for sealing flange -1-.



- To press off, screw qty. 3 M6 x 35 bolts -arrows- into sealing flange -1-.





**i Note**

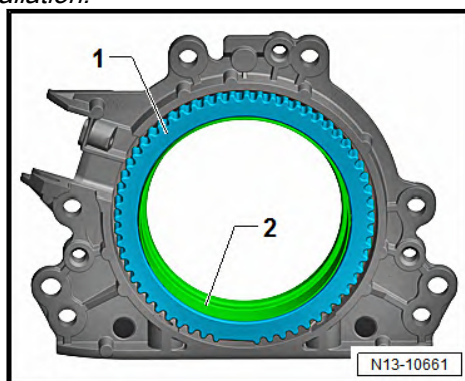
*The sealing flange -1- is pressed off crankshaft -3- together with the sender wheel -2-.*

- Screw bolts alternately into sealing flange not more than 1/2 turn at a time.
- Remove sealing flange -1- together with sender wheel -2-.

**Pressing in sealing flange with sender wheel**

**i Note**

- ◆ *Do not re-use old sealing flange.*
- ◆ *The sealing flange with a PTFE seal is equipped with a sealing lip support ring -2-.*
- ◆ *This support ring serves as a fitting sleeve and must not be removed prior to installation.*

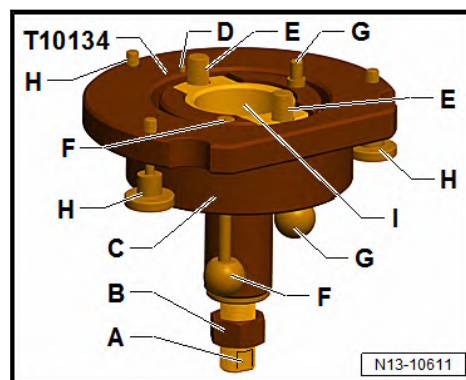


- ◆ *Sealing flange and sender wheel -1- must not be separated after removal from packaging.*
- ◆ *The sender wheel -1- is held in its installation position on the locating pin of the assembly tool -T10134- ➤ [page 152](#).*
- ◆ *Sealing flange and oil seal form one unit and must only be renewed together with the sender wheel.*
- ◆ *The assembly tool -T10134- is held in its position relative to the crankshaft by a guide pin inserted into a hole in the crankshaft ➤ [page 152](#).*



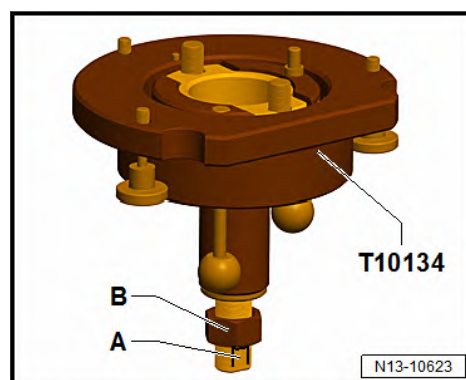


### Set-up of assembly tool -T10134-:



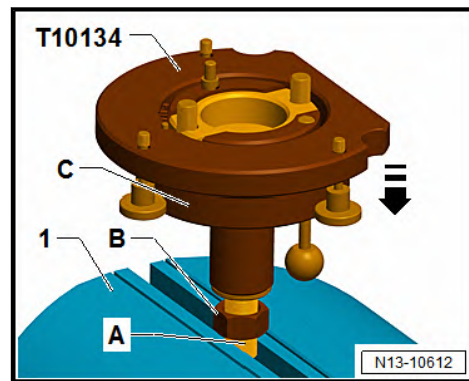
- A - Clamping surface
- B - Nut
- C - Assembly housing
- D -  
Locating pin
- E - Hexagon socket head bolt (qty. 2)
- F -  
Guide pin for petrol engines (red knob)
- G - Guide pin for diesel engines (black knob)
- H - Knurled screws (qty. 3)
- I - Core

### Fitting sealing flange with sender wheel on assembly tool - T10134-:

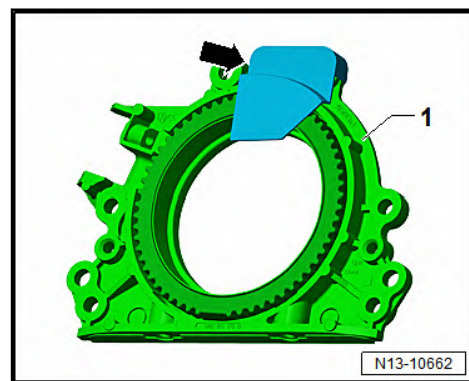


- Screw on nut -B- until just before it touches the clamping surface -A- of the threaded spindle.
- Clamp assembly device -T10134- at clamping surface -A- of threaded spindle in a vice -1-.





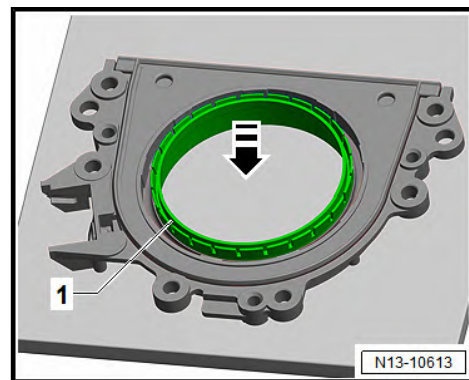
- Press assembly housing -C- downwards until it rests against nut -B-.
- Inner part of assembly tool and assembly housing must be at same height.
- If fitted, remove securing clip -arrow- from new sealing flange.



#### Note

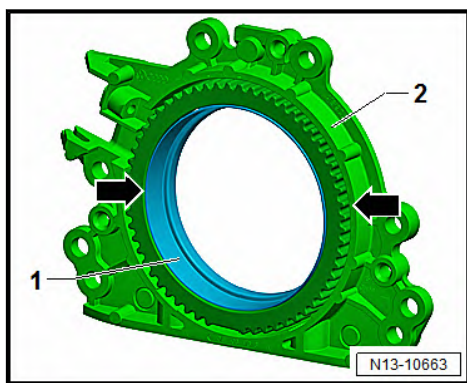
*Do not take the sender wheel out of the sealing flange or rotate it out of position.*

- Place sealing flange -1- with front side facing downwards on a clean level surface.

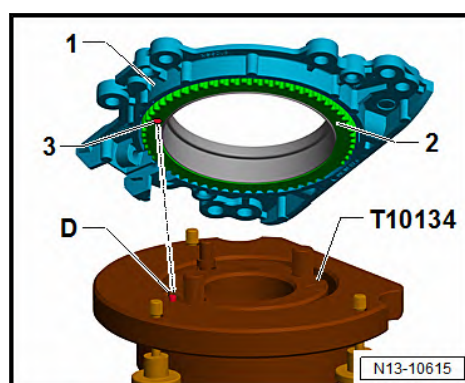


- Push sealing lip support ring -2- downwards in -direction of arrow- until it rests against the flat surface.
- Upper edge of sealing lip support ring -1- and front edge of sealing flange -2- must align -arrows-.



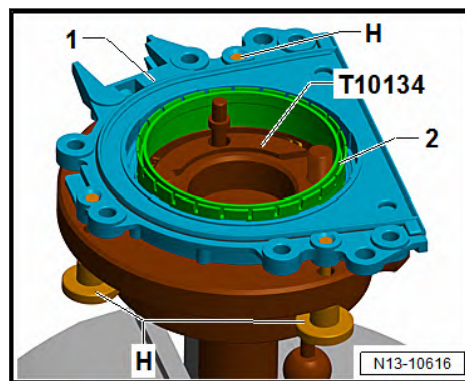


- Place sealing flange -1- with front side facing downwards on to assembly tool -T10134- so that locating pin -D- is seated in hole -3- in sender wheel hole -2-.



#### Note

- ♦ The sealing flange -1- can be supplied in different versions.
  - ♦ In some circumstances, the »TDC position hole« -3- may not be in the correct TDC position.
  - ♦ If the position -3- is not correct in relation to the locating pin -D-, carefully move the sender wheel -2- to the correct position.
- If necessary, rotate sender wheel with support ring so that locating pin and hole align.
  - The sealing flange must rest flat against the assembly tool.
  - Screw knurled screws -H- into sealing flange -1-.

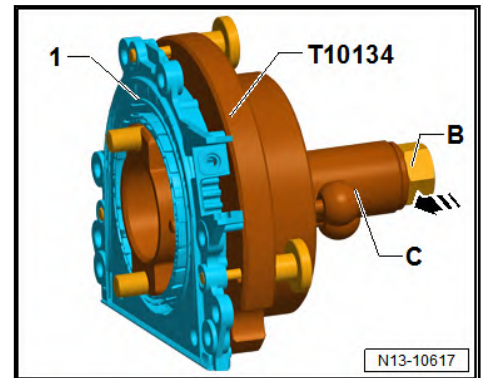




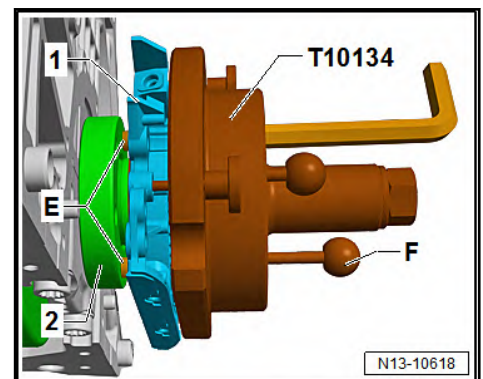


- Press sealing flange -1- and sealing lip support ring -2- against surface of assembly tool -T10134- whilst tightening knurled screws.
- This prevents the locating pin from slipping out of the sender wheel hole.
- When installing sealing flange, ensure that sender wheel remains fixed in assembly tool.

**Mounting assembly tool -T10134- with sealing flange -1- on crankshaft flange:**

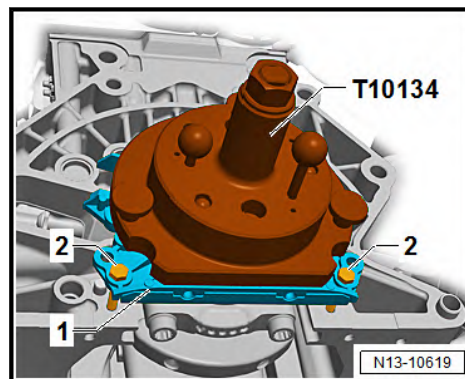


- The crankshaft flange must be free of grease and oil.
- Engine is at "TDC" position.
- Screw on nut -B- until it reaches end of threaded spindle.
- Press threaded spindle of assembly tool -T10134- in -direction of arrow-, until nut -B- rests against assembly housing -C-.
- Align flat side of assembly housing to sealing surface of cylinder block on sump side.
- Attach assembly tool -T10134- together with sealing flange -1- to crankshaft flange -2-.

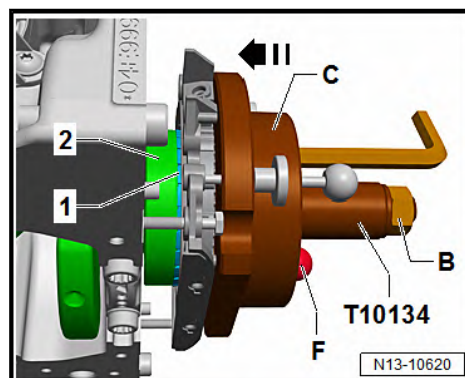


- To do this, screw hexagon socket head bolts -E- into crankshaft flange (approx. 5 full turns) using a hexagon key.
- Push guide pin for petrol engines (red knob) -F- into crankshaft flange.
- To guide sealing flange -1-, screw two M6 × 35 mm bolts -2- into cylinder block.





**Bolting assembly tool -T10134- onto crankshaft flange:**



- Push assembly housing -C- by hand in -direction of arrow- until sealing lip support ring -1- rests against crankshaft flange -2-.
- Make sure that guide pin for petrol engines (red knob) -F- is properly seated in hole in crankshaft. This ensures that the sender wheel reaches its final installation position.

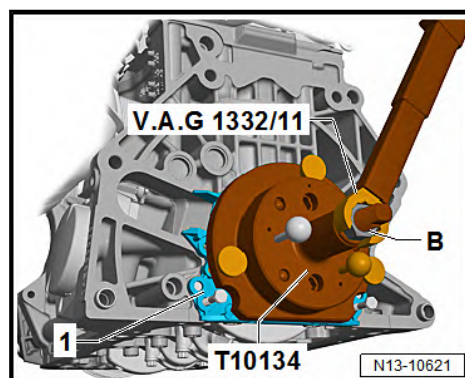


**Note**

*The guide pin for diesel engines (black knob) must not be inserted in threaded hole of crankshaft.*

- Tighten the two hexagon socket head bolts of assembly tool hand-tight.
- Screw nut -B- by hand onto threaded spindle until it rests against assembly housing -C-.

**Pressing sender wheel onto crankshaft flange using assembly tool -T10134-:**

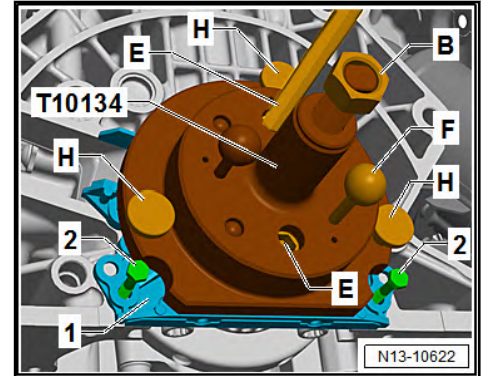




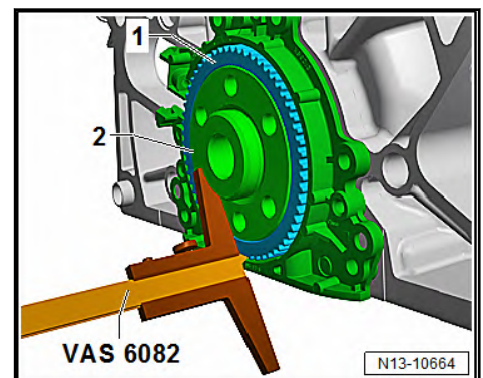


- Tighten nut -B- of assembly tool -T10134- to 35 Nm.
- After nut has been tightened to 35 Nm, a small air gap must still be present between cylinder block -2- and sealing flange -1-.

#### Checking sender wheel installation position on crankshaft:

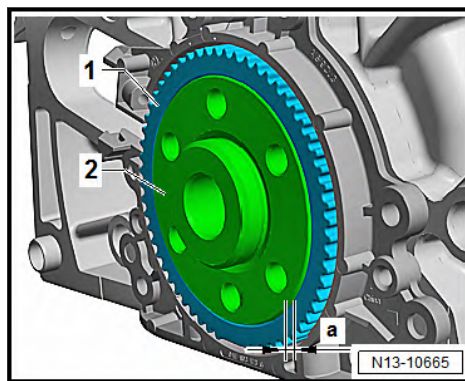


- Screw on nut -B- until it reaches end of threaded spindle.
- Unscrew the two bolts -2- from cylinder block.
- Pull guide pin for petrol engines (red knob) -F- out of crankshaft flange.
- Unscrew knurled screws -H- from sealing flange -1-.
- Unbolt assembly tool -T10134- from crankshaft flange, unscrewing hexagon socket head bolts -E- from crankshaft flange.
- Remove sealing lip support ring.
- Position depth gauge -VAS 6082- on crankshaft flange -2-.



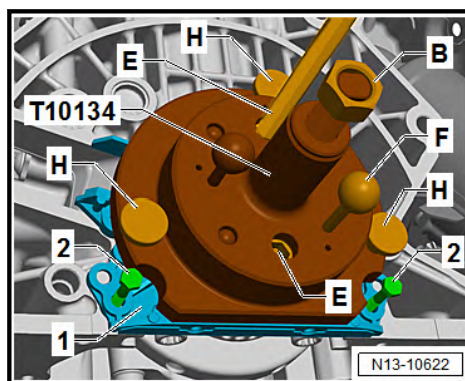
- Measure distance between crankshaft flange -2- and sender wheel -1-.
- Measure distance -a- between crankshaft flange -2- and sender wheel -1-.





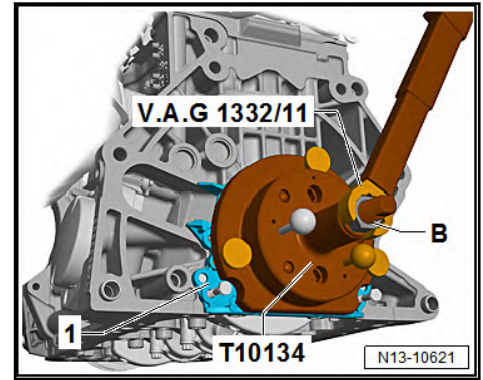
- Specification: dimension -a- = 0.5 mm
- If specification is not achieved, press sender wheel further in ➔ [page 158](#).
- If specification is achieved, proceed with subsequent work steps ➔ [page 159](#).

#### Re-pressing sender wheel:



- Secure assembly tool -T10134- on crankshaft flange -2-.
- Make sure that locating pin of assembly tool -T10134- is properly seated in sender wheel hole.
- Tighten hexagon socket head bolts -E- by hand.
- Push assembly tool -T10134- by hand against sealing flange -1-.
- Screw nut -B- by hand onto threaded spindle until it rests against assembly tool -T10134-.
- Push guide pin for petrol engines (red knob) -F- into crankshaft flange.
- Screw knurled screws -H- into sealing flange -1-.
- Screw two M6 × 35 mm bolts -2- into cylinder block to guide sealing flange.
- Tighten nut -B- of assembly tool -T10134- to 40 Nm.





- Check sender wheel installation position on the crankshaft again ⇒ [page 157](#) .
- If the specification is not achieved, tighten nut of assembly tool -T10134- to 45 Nm.
- Check sender wheel installation position on the crankshaft again ⇒ [page 157](#) .

#### Installing

- Tighten bolts for sealing flange ⇒ [page 146](#) .
- Install upper part of sump ⇒ [a1.4 nd installing upper part of sump](#), [page 308](#) .
- Install bottom section of sump ⇒ [a1.3 nd installing lower part of sump](#), [page 302](#) .
- Install intermediate plate ⇒ [page 147](#) .
- Install flywheel ⇒ [a2.2 nd installing flywheel](#), [page 147](#) .

#### Specified torques

- ◆ Sealing flange on gearbox side - specified torque and tightening sequence ⇒ [Fig. “Sealing flange on gearbox side - specified torque and tightening sequence”](#), [page 146](#)
- ◆ ⇒ [o2.1 verview - cylinder block, gearbox end](#), [page 146](#)
- ◆ ⇒ [o1.1 verview - ignition system](#), [page 578](#)
- ◆ ⇒ [o1.1 verview - sump/oil pump](#), [page 298](#)
- ◆ ⇒ [Fig. “Plug for TDC drilling in cylinder block at rear – specified torque”](#), [page 128](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation
- ◆ ⇒ Rep. gr. 34; Removing and installing gearbox; Specified torques for gearbox





### 3 Crankshaft

⇒ [n3.1 eedle bearing in crankshaft", page 160](#)

⇒ [d3.2 imensions", page 163](#)

⇒ [a3.3 xial clearance of crankshaft", page 163](#)

#### 3.1 Renewing needle bearing in crankshaft

Only vehicles with a dual clutch gearbox



##### Note

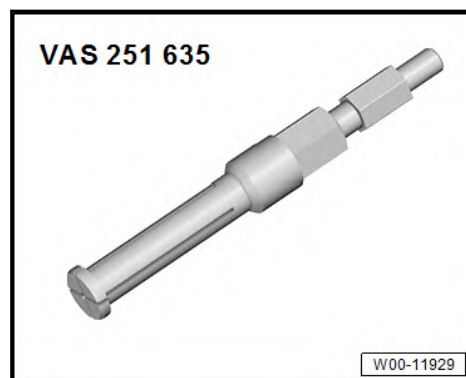
- ◆ *For vehicles with manual gearbox, no needle bearing must be installed in the crankshaft.*
- ◆ *On vehicles with dual clutch gearbox, a needle bearing must be installed in the crankshaft ⇒ Electronic Parts Catalogue.*

##### Special tools and workshop equipment required

- ◆ Counter support, e.g. KUKKO 22-1 -VAS 251 621-



- ◆ Internal puller -VAS 251 635-



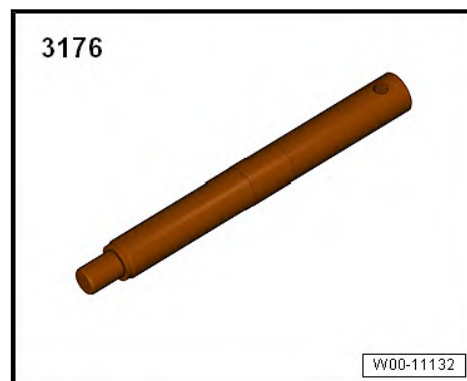
- ◆ Pin -VW 207 C-



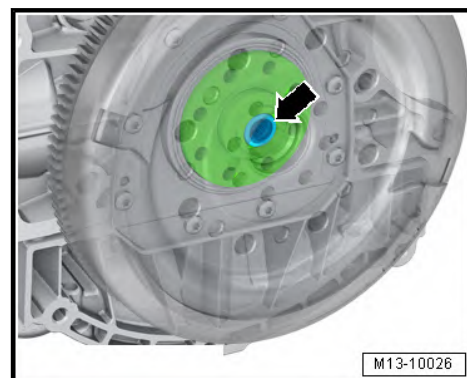




◆ Centring mandrel -3176-

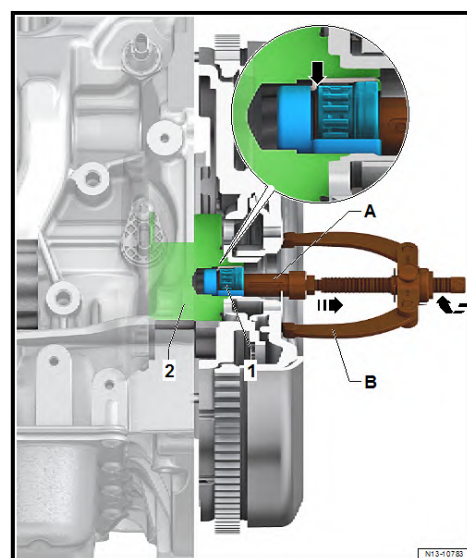


**Condition:**



- Gearbox is removed ⇒ Rep. gr. 34; Removing and installing gearbox; Removing gearbox.
- Always renew needle bearing -arrow- after separating engine and gearbox.
- The front edges of the inner puller must be free of chips.

**Pulling out needle roller bearing**

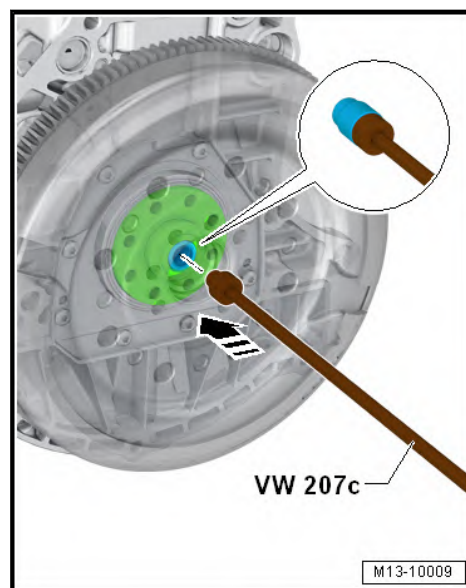


- Pull out needle bearing -1- with internal puller -VAS 251 635- -A- and counter support, e.g. KUKKO 22-1 -VAS 251 621- -B- from crankshaft -2-.
- The internal puller must be positioned behind the needle-and-cage assembly -arrow-.





## Installing



- Clean bearing seat in crankshaft and apply as thin coating of grease.

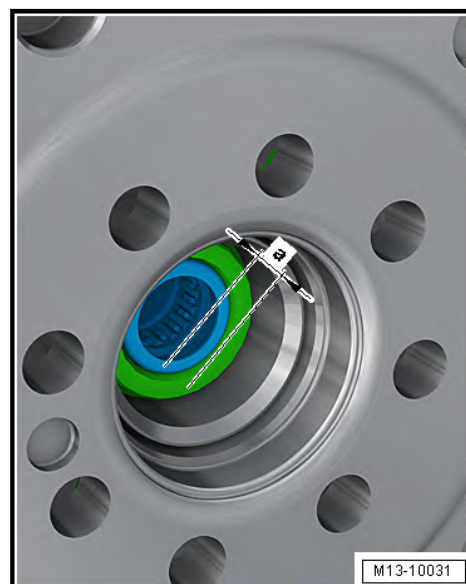


### Note

*The lettering on the needle bearing must be visible when installed.*

- Using drift -VW 207 C-, drive needle bearing into crankshaft as far as installation depth -a-.

**Installation depth: dimension -a- = 0.0 mm**



### Note

*If the needle bearing has been driven in too far, it must be renewed because it will be damaged when it is pulled out.*





- Install gearbox ⇒ Rep. gr. 34; Removing and installing gearbox; Installing gearbox.

## 3.2 Crankshaft dimensions

### ! NOTICE

Risk of damage to bearing pedestals when the crankshaft is removed.

If the bolts of the crankshaft bearing cap are loosened, the bearing pedestals of the cylinder block will be deformed, and damage to the bearings will result.

- Never remove the crankshaft.

Measuring the main bearing clearance is not possible with normal workshop equipment.

Honing dimension	Conrod bearing journal diameter mm
Basic dimension	48.00 -0.022 -0.042

## 3.3 Measuring axial clearance of crankshaft

### ! NOTICE

Risk of damage to bearing pedestals when the crankshaft is removed.

If the bolts of the crankshaft bearing cap are loosened, the bearing pedestals of the cylinder block will be deformed, and damage to the bearings will result.

- Never remove the crankshaft.

Special tools and workshop equipment required

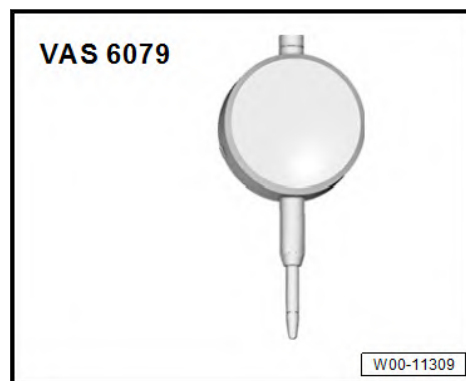
- ◆ Universal dial gauge holder -VW 387-



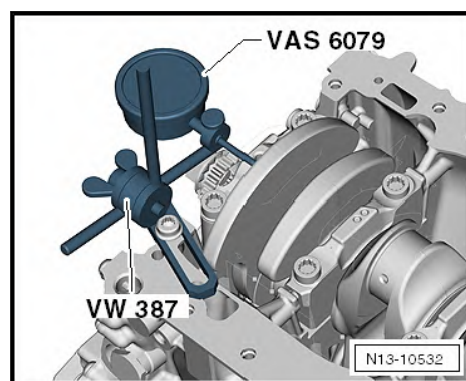




◆ Dial gauge -VAS 6079-



Sequence of operations



- Screw dial gauge -VAS 6079- with universal dial gauge bracket -VW 387- to cylinder block as shown in the illustration.
- Position dial gauge against crank web.
- Press crankshaft against dial gauge by hand and set gauge to "0".
- Push crankshaft away from dial gauge and read off measured value.
- Axial clearance: 0.066 to 0.233 mm





## 4 Pistons and conrods

⇒ [o4.1 verview - pistons and conrods", page 165](#)

⇒ [a4.2 nd installing pistons", page 168](#)

⇒ [a4.3 nd installing oil spray jets", page 169](#)

⇒ [p4.4 istons and cylinder bores", page 170](#)

⇒ [r4.5 adial clearance of conrods", page 173](#)

⇒ [n4.6 ew conrod", page 173](#)

⇒ [p4.7 iston to TDC position", page 174](#)

### 4.1 Assembly overview - pistons and conrods





## 1 - Bolts

- ☐ Renew after removal
- ☐ Oil threads and contact surface
- ☐ 30 Nm +90°

## 2 - Conrod bearing cap

- ☐ The conrod bearing cap only fits in one position and only on the appropriate conrod due to the breaking procedure (cracking) separating the cap from the conrod.
- ☐ Mark allocation to cylinder and conrod in colour -B-.
- ☐ Installation position: Lug -A- on conrod bearing cap faces towards pulley end

## 3 - Bearing bushes

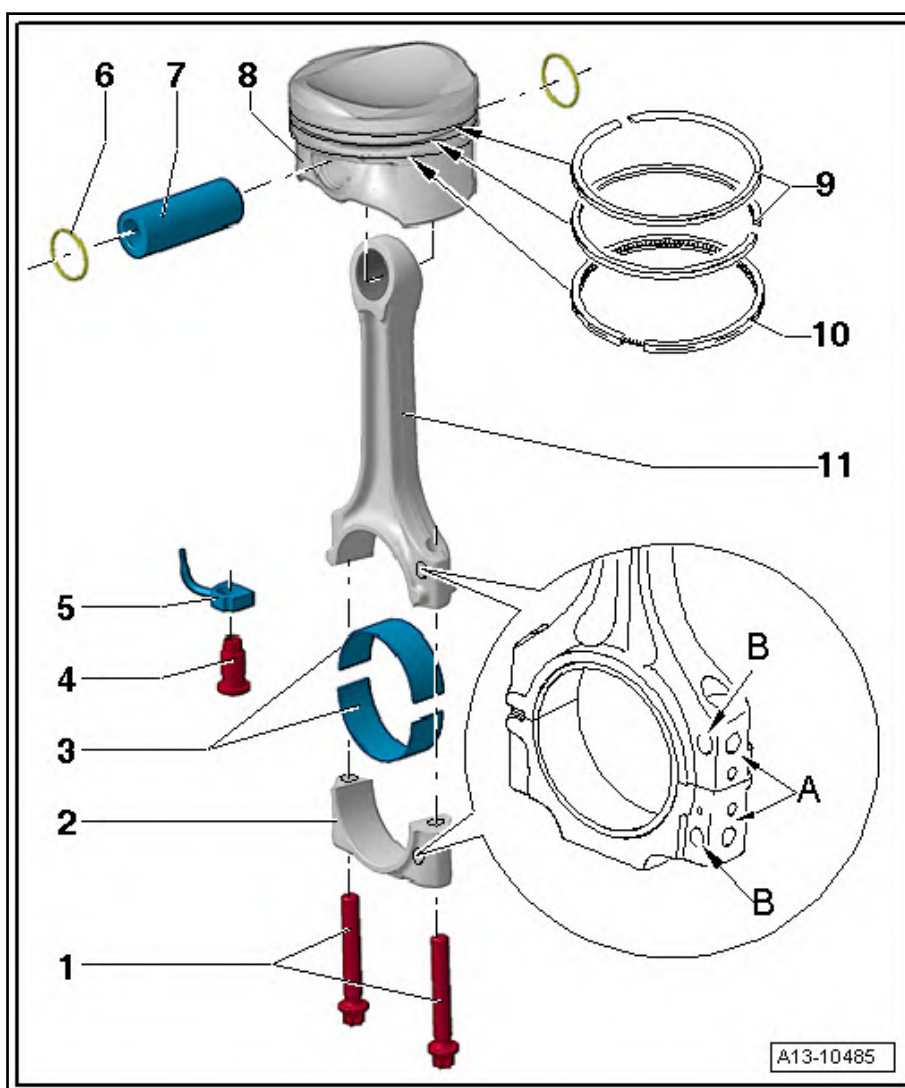
- ☐ Fitting position ⇒ [page 167](#)
- ☐ Renew worn bearing shells
- ☐ Ensure firm seating

## 4 - Pressure relief valve

- ☐ 27 Nm

## 5 - Oil spray jet

- ☐ For piston cooling
- ☐ Removing and installing ⇒ [a4.3 nd installing oil spray jets](#), [page 169](#)



## 6 - Locking ring

- ☐ Qty. 2
- ☐ Renew after removal

## 7 - Piston pin

- ☐ Removing and installing ⇒ [a4.2 nd installing pistons](#), [page 168](#)

## 8 - Piston

- ☐ Mark installation position and cylinder number ⇒ [page 167](#).
- ☐ Removing and installing ⇒ [a4.2 nd installing pistons](#), [page 168](#)
- ☐ Checking piston and cylinder bore ⇒ [p4.4 istons and cylinder bores](#), [page 170](#)

## 9 - Piston rings

- ☐ Compression rings
- ☐ Measuring ring gap ⇒ [page 171](#)
- ☐ Measuring ring-to-groove clearance ⇒ [page 171](#)
- ☐ Use commercially available piston ring pliers to remove and install.
- ☐ Installation position: marking "TOP" or side with lettering towards piston crown
- ☐ Offset gaps by 120°

## 10 - Piston ring



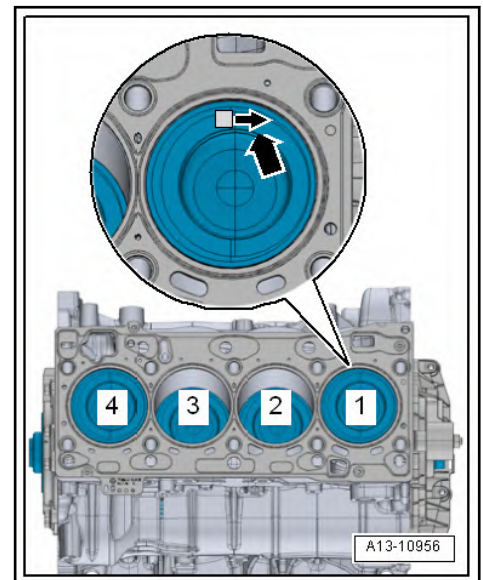


- ☐ Oil scraper ring
- ☐ Measuring ring gap ⇒ [page 171](#)
- ☐ Measuring ring-to-groove clearance ⇒ [page 171](#)
- ☐ Use piston ring pliers to remove and install.
- ☐ Installation position: marking "TOP" or side with lettering towards piston crown
- ☐ Offset gap 120° relative to lower compression ring

#### 11 - Connecting rod

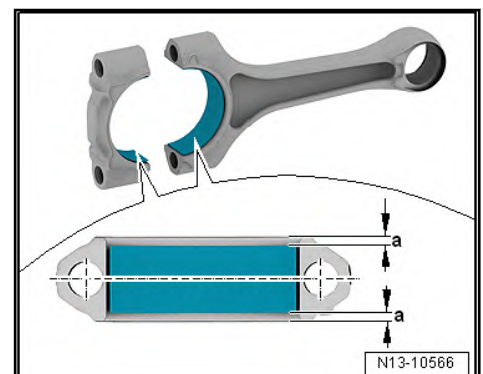
- ☐ With industrially cracked conrod bearing cap
- ☐ Renew as set only.
- ☐ Mark allocation to cylinder and conrod bearing cap in colour -B-.
- ☐ Measuring radial clearance ⇒ [r4.5 adial clearance of conrods", page 173](#)
- ☐ Separate new conrod ⇒ [n4.6 ew conrod", page 173](#) .
- ☐ Installation position: Lug -A- on conrod bearing cap faces towards pulley end

#### Installation position and allocation of piston to cylinder



- If worn pistons are to be reinstalled, mark their allocation to the cylinder on the piston crown.
- Use paint for this.
- Do not use indentation, scratches, notches, or similar to mark piston crown.
- Arrow on piston crown points to pulley end -arrow-.

#### Bearing shells - installation position





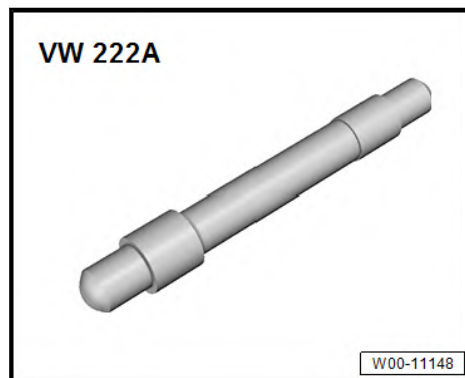


- Ensure that crankshaft bearing shell is correctly positioned in conrod and conrod bearing cap.
- Dimension -a- must be the same as dimension -a-.

## 4.2 Removing and installing pistons

### Special tools and workshop equipment required

- ◆ Pin -VW 222 A-



- ◆ Piston ring clamp, commercially available

### Removing

- Remove cylinder head ⇒ [a1.3 nd installing cylinder head", page 185](#) .
- Remove upper part of sump ⇒ [a1.4 nd installing upper part of sump", page 308](#) .
- Mark piston installation position and corresponding cylinder number.
- Mark installation position and matching of cylinder and conrod bearing cap to conrod ⇒ [Item 11 \(page 167\)](#) .
- Remove conrod bearing cap and withdraw piston and conrod upwards.



### Note

*If the piston pin is difficult to move, heat the piston to approx. 60°C.*

- Remove retaining ring from piston pin eye.
- Drive out piston pin using drift -VW 222 A-.

### Installing

Install in reverse order of removal, observing the following:



### Note

*Renew bolts that are tightened with turning further angle.*

- Oil running surfaces of bearing shells.
- Install piston with commercially available piston ring clamp, noting installation position ⇒ [page 167](#) .
- Install conrod bearing cap, noting installation position ⇒ [Item 2 \(page 166\)](#) .





- Install cylinder head ⇒ [a1.3 nd installing cylinder head", page 185](#) .
- Install upper part of sump ⇒ [a1.4 nd installing upper part of sump", page 308](#) .

#### Specified torques

- ◆ ⇒ [o4.1 verview - pistons and conrods", page 165](#)

### 4.3 Removing and installing oil spray jets

#### Special tools and workshop equipment required

- ◆ Hexagon key -T10545-



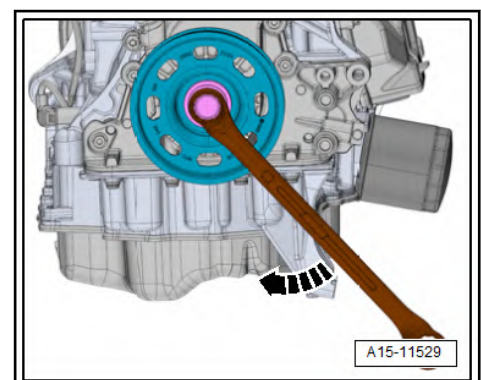
#### Removing

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- Remove upper part of sump ⇒ [a1.4 nd installing upper part of sump", page 308](#) .



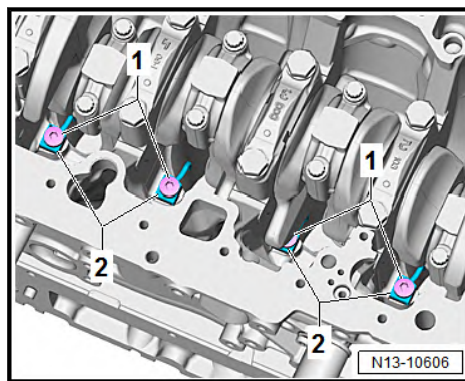
#### Note

- ◆ *The crank web of the respective cylinder must be positioned so that the socket -T10545- can be inserted vertically in the pressure relief valve.*
- ◆ *Furthermore, the corners of the socket -T10545- and of the pressure relief valve must engage well.*
- Turn crankshaft via vibration damper securing bolt in direction of engine rotation until the respective bolt is accessible.



- Unscrew pressure relief valve -1- using TORX bit -T10545-.





- Remove oil spray jets -2-.

#### Installing



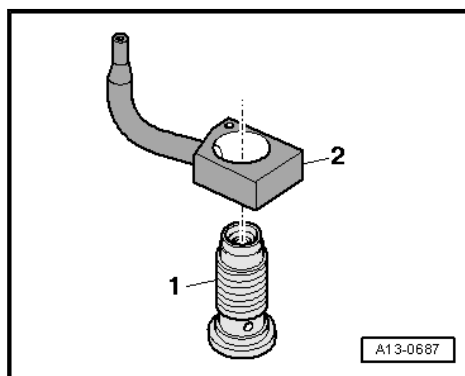
#### NOTICE

**Risk of damage to oil spray jets caused by deformation.**

- Do not bend oil spray jets.

Install in reverse order of removal. The following should be observed:

- Installation position: align leading edge of oil spray jet arrow with machined surface of cylinder block.
- Check clearance of oil jets after reinstallation of pistons.



- Bent oil spray jets must be renewed.
- 1 - Pressure relief valve - 27 Nm ⇒ [Item 4 \(page 166\)](#)
- 2 - Oil spray jet
- Install upper part of sump ⇒ [a1.4 nd installing upper part of sump", page 308](#) .
- Install noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview – noise insulation.

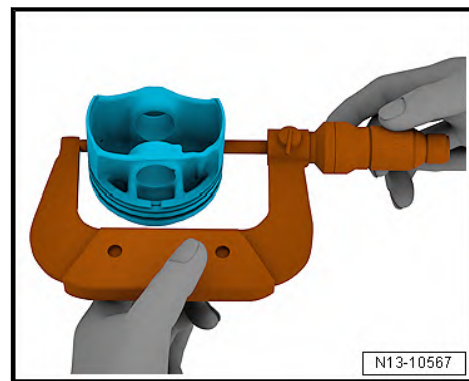
## 4.4 Checking pistons and cylinder bores

### Special tools and workshop equipment required

- ◆ External micrometer 50-75 mm -VAS 6070-

### Checking piston

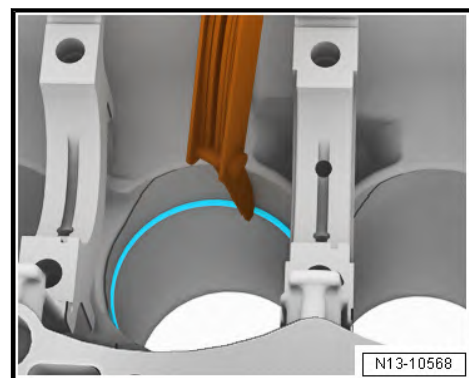




- Using an external micrometre, measure approx. 10 mm from lower edge, offset 90° from piston pin axis.
- Maximum deviation from nominal dimension: 0.04 mm.

Piston diameter, mm	
Specification	74.42 <sup>1)</sup>
<ul style="list-style-type: none"> <li>• <sup>1)</sup> Dimensions without coating</li> <li>• Piston manufacturer Federal Mogul (thickness of 0.018 mm per side)</li> <li>• Piston manufacturer Mahle (thickness of 0.015 mm per side)</li> </ul>	

#### Measuring piston ring gap

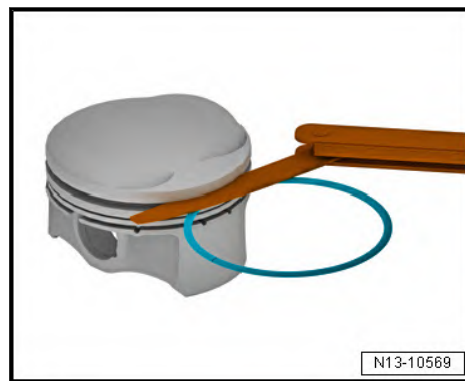


- Push in piston ring at right angles to cylinder wall.
- Push piston ring from below into cylinder bore as far as approx. 15 mm from bottom end of cylinder.
- Push in using a piston without piston rings.

Piston ring	New mm	Wear limit mm
compression ring	0.20 <sup>+0.15</sup>	0.7
Oil scraper ring (2 parts)	0.20 <sup>+0.20</sup>	1.0
Oil scraper ring (3 parts)	0.50 <sup>+/-0.25</sup>	1.2

#### Measuring ring-to-groove clearance

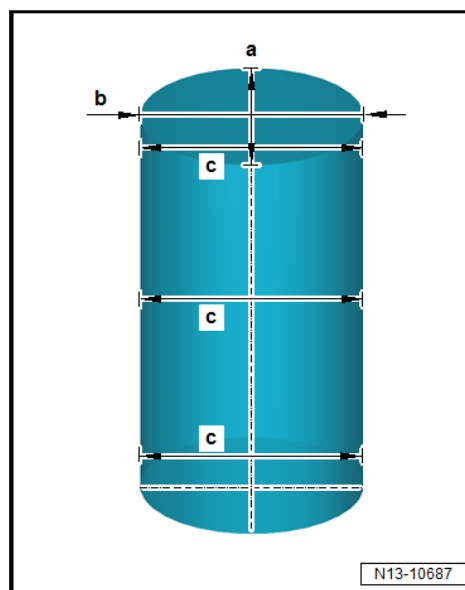




- Clean annular groove of piston before check.

Piston ring	New mm	Wear limit mm
1st compression ring (piston ring manufacturer Federal Mogul)	0.050 ... 0.090	0.15
1st compression ring (piston ring manufacturer Mahle)	0.035 ... 0.085	0.15
2nd compression ring	0.030 ... 0.070	0.15
Oil scraper rings (3 parts)	Cannot be measured	
Oil scraper rings (2 parts)	0.04 ... 0.08	

#### Measuring cylinder bore



#### NOTICE

**Risk of damage to the surface of the cylinder bore caused by incorrect machining.**

- Do not machine cylinder bore (reboring, honing, grinding) with workshop equipment.
- Using cylinder gauge -VAS 6078-, take measurements at 3 positions: diagonally, in lateral direction -a- and longitudinal direction -b-.
- Maximum deviation from nominal dimension: 0.08 mm.





Cylinder bore diameter, mm	
Specification	74.5 + 0.015 +0.005



#### Note

*Do not measure cylinder bores when cylinder block is mounted on engine and gearbox support -VAS 6095-, as measurements may be incorrect.*

## 4.5 Checking radial clearance of conrods

### Special tools and workshop equipment required

- ◆ Plastigage

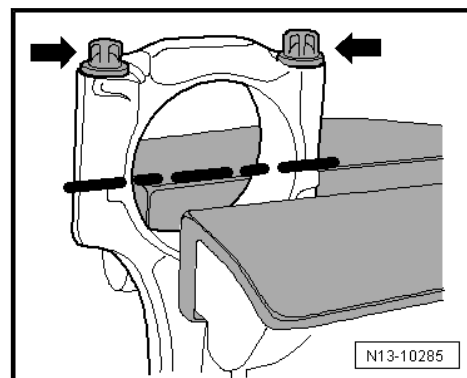
### Sequence of operations

- Remove conrod bearing cap.
- Clean bearing cap and bearing journal.
- Place a Plastigage corresponding to the width of the bearing on the journal or into the bearing shells.
- Fit conrod bearing cap and tighten to 30 Nm (without turning further angle).
- Do not rotate crankshaft while doing so.
- Remove conrod bearing cap again.
- Compare width of Plastigage with the measurement scale.
- Radial clearance: 0.028 to 0.065 mm.
- Renew conrod bolts.

## 4.6 Separating new conrod

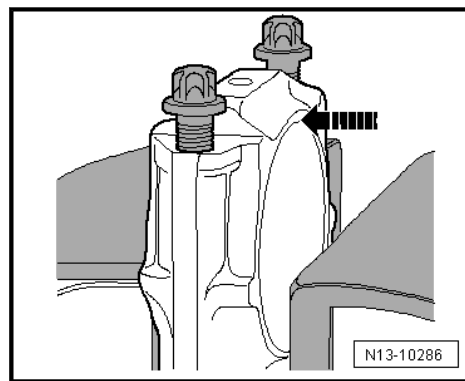
On a new conrod, it is possible that the breaking point has not fully separated. Proceed as follows if the conrod bearing cap cannot be removed by hand:

- Mark the cylinder to which the conrod belongs ⇒ [Item 11 \(page 167\)](#).



- To avoid damage, gently clamp conrod in a vice with protection jaws, as shown in illustration.
- Clamp conrod below dashed line.
- Unscrew bolts -arrows- around 5 turns.





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

## 4.7 Setting piston to TDC position

### Sequence of operations

Setting piston from cylinder no. 1 to TDC position ⇒ [page 174](#)

Setting piston from cylinder no. 1 to TDC position for repair work on toothed belt drive and for setting valve timing ⇒ [page 176](#)

### Setting piston from cylinder no. 1 to TDC position

Rotate crankshaft to “TDC” as follows:

- Remove ignition coil 1 with output stage -N70- and the spark plug cylinder 1 ⇒ [a1.2 nd installing ignition coils with output stage”, page 580](#) .



### Note

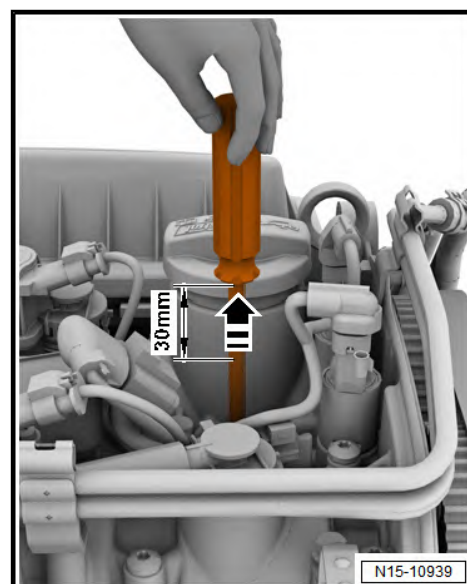
- ♦ *Risk of damage to engine!*
- ♦ *Locking pin -T10340- can be inserted to stop at 2 positions.*
- ♦ *It is essential that the “TDC” position is checked as described.*
- Carefully insert a screwdriver with a shaft length of at least 250 mm into spark plug hole so that it contacts piston crown.
- Turn crankshaft in direction of engine rotation until piston in cylinder 1 is at “BDC”.

The screwdriver moves in the -direction of the arrow-.

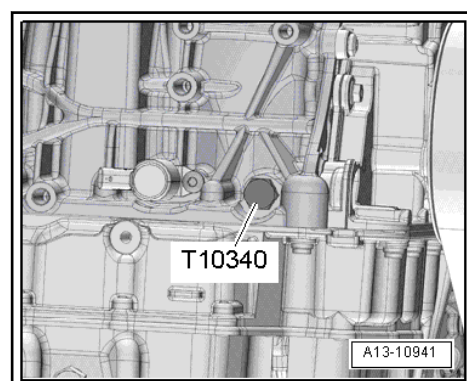




- Turn crankshaft further in direction of engine rotation until screwdriver has moved -30 mm- in -direction of arrow-.



- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- Unscrew plug for “TDC” hole in cylinder block.







- Screw locking pin -T10340- into cylinder block as far as stop and tighten to 30 Nm.
- Rotate crankshaft in normal direction of rotation as far as stop.
- The locking pin now rests against the crank web.

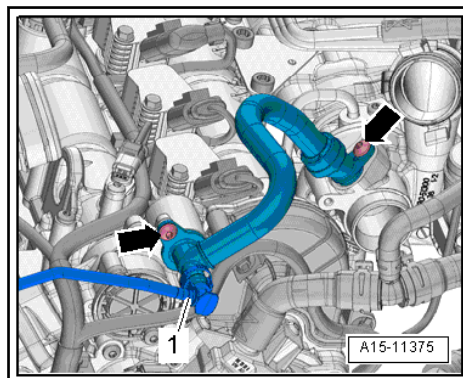


#### Note

*Locking pin -T10340- locks crankshaft in direction of engine rotation only.*

#### Setting piston from cylinder no. 1 to TDC position for repair work on toothed belt drive and for setting valve timing

- Remove resonator for intake air ⇒ [a3.4 nd installing resonator for intake air](#), page 476 .
- Remove air intake pipe ⇒ [a2.5 nd installing air pipe](#), page 441 .
- Press release tabs and disconnect hose -1- for activated charcoal filter.



- Unscrew bolts -arrows- and pull off crankcase breather hose.

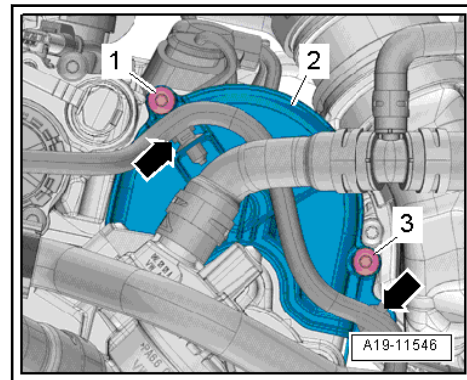


#### Note

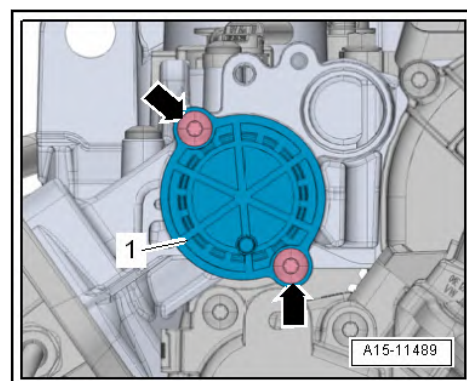
*Risk of chemical damage to the coolant pump gasket caused by oil entering between the coolant pump and the cylinder head.*

- Cover coolant pump with a cloth.
- Remove connection for turbocharger ⇒ [a1.4 nd installing connection for turbocharger](#), page 429 .
- Lay wiring harness to one side -arrows-.

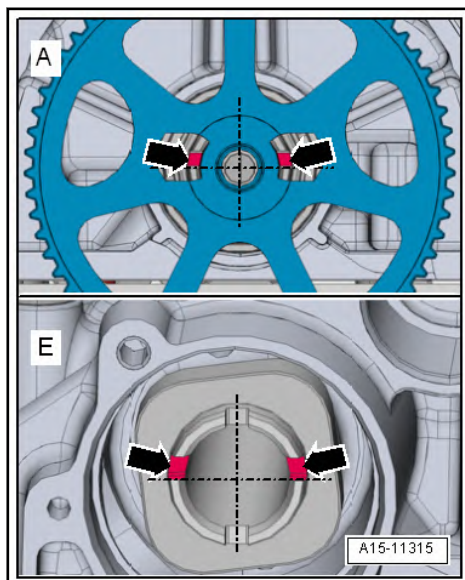




- Unscrew bolts -1, 3- and remove cover -2- for toothed belt for coolant pump.
- Unscrew bolts -arrows- and detach sealing cap -1-.



- The asymmetrically positioned grooves on gearbox end of both camshafts -top arrows- must now be above the horizontal centre line.



- Grooves -arrows- on exhaust camshaft -A- can be accessed through recesses in drive wheel for coolant pump.
- On inlet camshaft -E-, grooves -arrows- are above horizontal camshaft centre line.

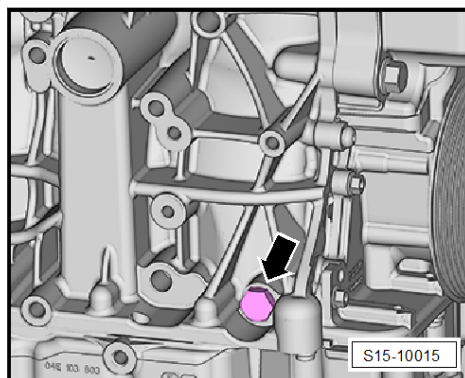
A - Exhaust camshaft

E - Inlet camshaft





### Plug for "TDC" drilling in cylinder block - specified torque



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

### Specified torques

- ◆ ⇒ [o1.1 verview - turbocharger", page 416](#)
- ◆ ⇒ [o2.1 verview - charge air system", page 433](#)
- ◆ ⇒ [o1.1 verview - ignition system", page 578](#)
- ◆ ⇒ [o2.1 verview - coolant pump, thermostat", page 348](#)
- ◆ ⇒ [o3.1 verview - air filter housing", page 470](#)
- ◆ ⇒ [o1.2 verview - camshaft housing", page 181](#)





## 15 – Cylinder head, valve gear

### 1 Cylinder head

⇒ [o1.1 verview - cylinder head", page 179](#)

⇒ [o1.2 verview - camshaft housing", page 181](#)

⇒ [a1.3 nd installing cylinder head", page 185](#)

⇒ [a1.4 nd installing camshaft housing", page 190](#)

⇒ [c1.5 ompression", page 196](#)

#### 1.1 Assembly overview - cylinder head



##### Note

- ◆ *The camshafts must not be removed individually.*
- ◆ *In the event of repair, the camshaft housing must be renewed completely.*





### 1 - Cylinder head gasket

- ☐ Renew after removal ⇒ [a1.3 nd installing cylinder head", page 185](#)
- ☐ Observe installation position: Part number to cylinder head

### 2 - Dowel sleeve

- ☐ Qty. 2

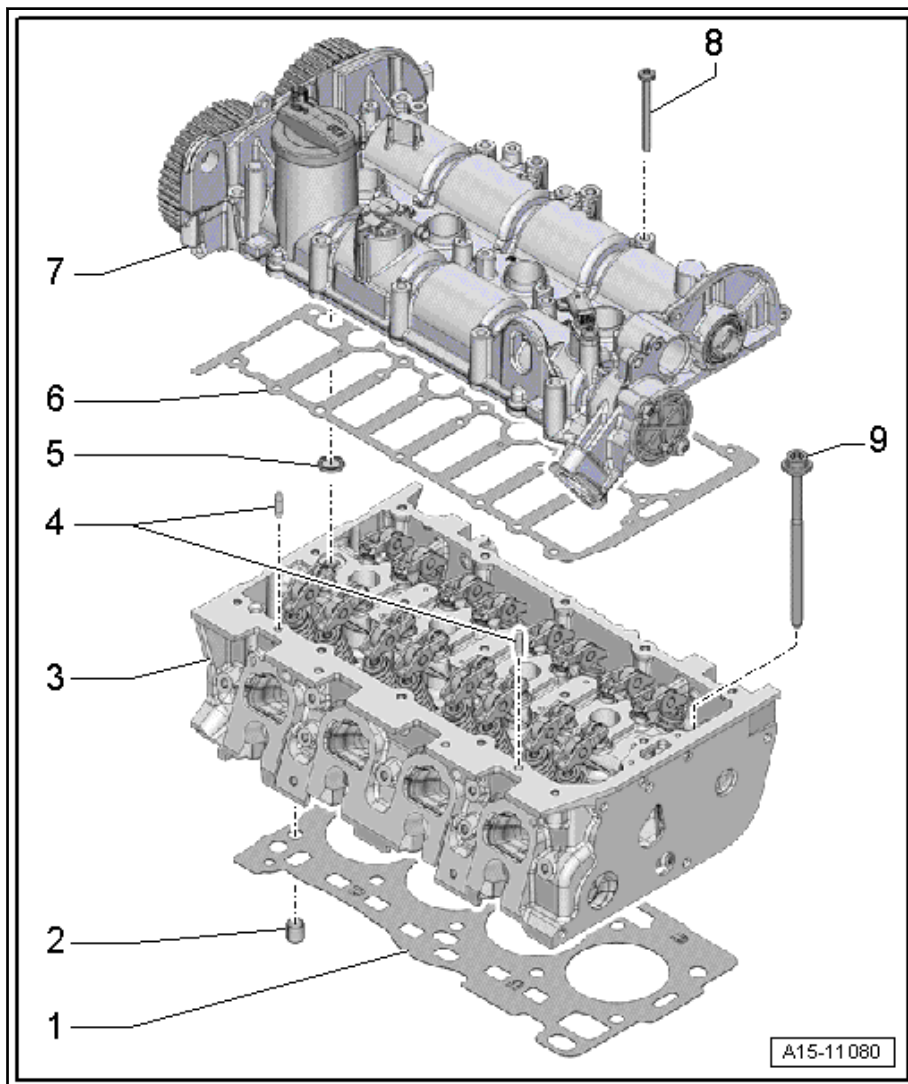
### 3 - Cylinder head

- ☐ Removing and installing ⇒ [a1.3 nd installing cylinder head", page 185](#)
- ☐ Check for distortion ⇒ [page 181](#) .

### 4 - Dowel pins

### 5 - Seal

- ☐ With oil strainer
- ☐ Inserted into cylinder head



### Note

- ◆ *The oil strainer is fitted only if the cylinder head has the appropriate recess.*
- ◆ *Cylinder heads without recess do not require an oil strainer.*

### 6 - Seal

- ☐ Renew after removal

### 7 - Camshaft case

- ☐ Removing and installing ⇒ [a1.4 nd installing camshaft housing", page 190](#)

### 8 - Bolt

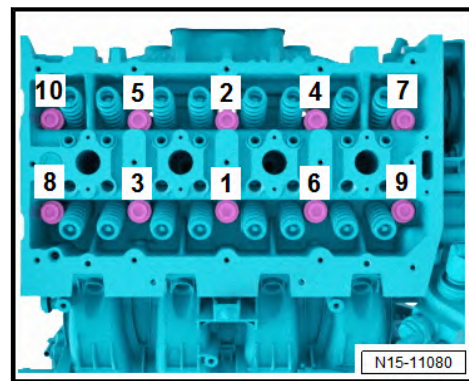
- ☐ Specified torque and tightening sequence ⇒ [page 185](#)

### 9 - Bolt

- ☐ Sequence when loosening ⇒ [page 188](#) .
- ☐ Renew after removal
- ☐ Specified torque and tightening sequence ⇒ [page 180](#)

### Cylinder head - specified torque and sequence





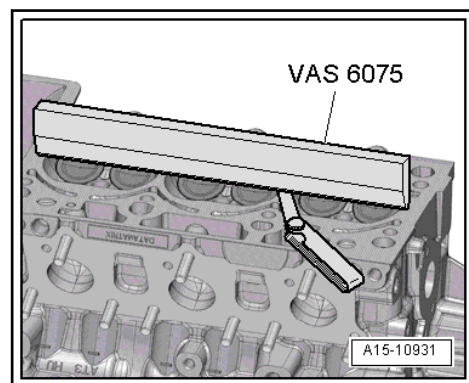
#### Note

*Renew bolts that are tightened with turning further angle.*

- Tighten bolts in stages in the sequence shown.

Stage	Bolts	Specified torque/turning further angle
1st	-1 ... 10-	40 Nm
2nd	-1 ... 10-	Turn 90° further
3rd	-1 ... 10-	Turn 90° further
4th	-1 ... 10-	Turn 90° further

#### Checking cylinder head for distortion



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

## 1.2 Assembly overview - camshaft housing

⇒ [o1.2.1 verview - camshaft housing, exhaust side with toothed belt pulley](#), page 181

⇒ [o1.2.2 verview - camshaft housing, exhaust side with camshaft adjuster](#), page 183

### 1.2.1 Assembly overview - camshaft housing, exhaust side with toothed belt pulley



# 1 - Bolt

- ☐ Specified torque and tightening sequence ⇒ [page 183](#)

# 2 - Inlet camshaft control valve 1-N205-

- ☐ Removing and installing ⇒ [a3.5 nd installing camshaft control valve 1N205](#), [page 282](#)

# 3 - Bolt

- ☐ 8 Nm

# 4 - Camshaft case

- ☐ Removing and installing ⇒ [a1.4 nd installing camshaft housing](#), [page 190](#)

# 5 - Hall sender -G40-

- ☐ Removing and installing ⇒ [a1.4.1 nd installing Hall senderG40](#), [page 584](#)

# 6 - Bolt

- ☐ 8 Nm

# 7 - Seal

- ☐ For exhaust camshaft, gearbox end
- ☐ Renewing ⇒ [a3.2.5 nd installing camshaft oil seal, exhaust camshaft, gearbox end](#), [page 254](#)

# 8 - Crankshaft

- ☐ For coolant pump
- ☐ Removing and installing ⇒ [a2.7 nd installing toothed belt pulley for coolant pump](#), [page 366](#)

# 9 - Bolt

- ☐ Specified torque ⇒ [Item 8 \(page 349\)](#)

# 10 - Bolt

- ☐ 8 Nm

# 11 - Cap

# 12 - O-ring

- ☐ Renew

# 13 - Seal

- ☐ Renew

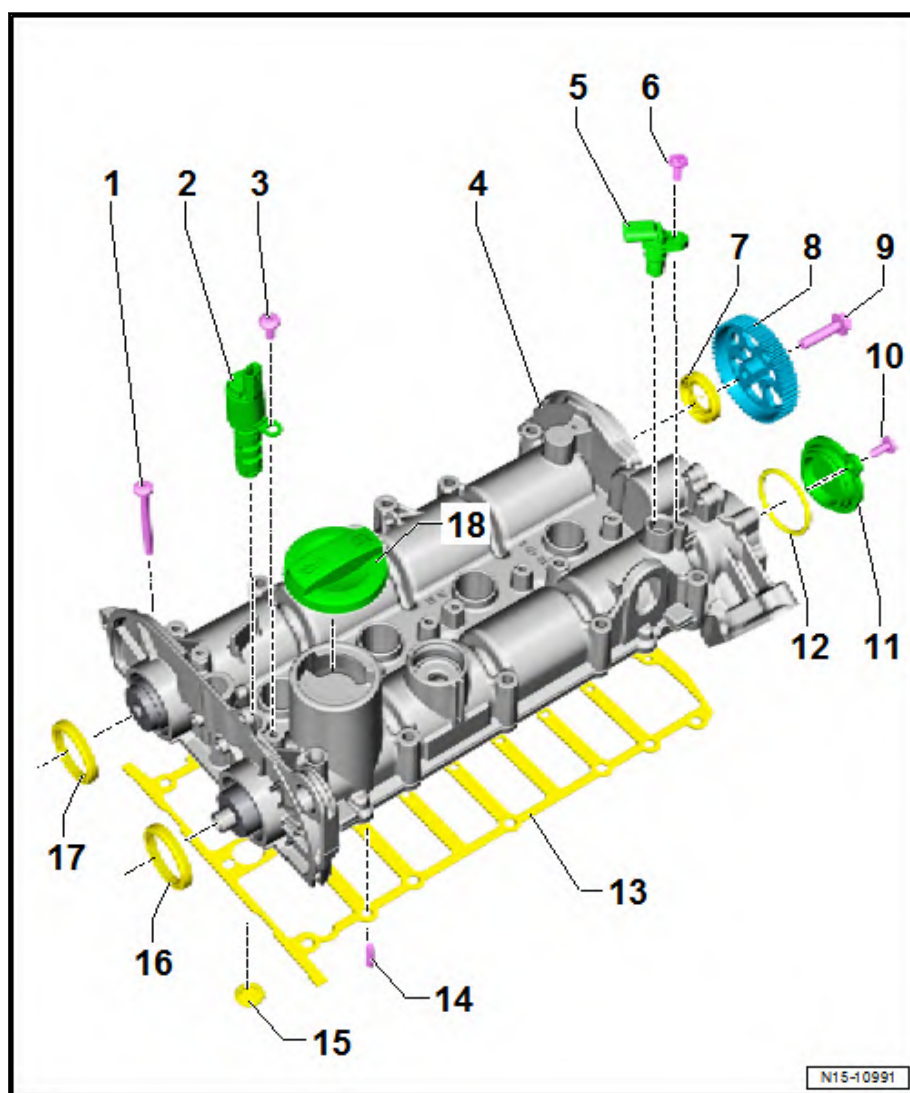
# 14 - Dowel pin

# 15 - Seal

- ☐ With oil strainer
- ☐ Inserted into cylinder head



Note







- ◆ *The oil strainer is fitted only if the cylinder head has the appropriate recess.*
- ◆ *Cylinder heads without recess do not require an oil strainer.*

#### 16 - Seal

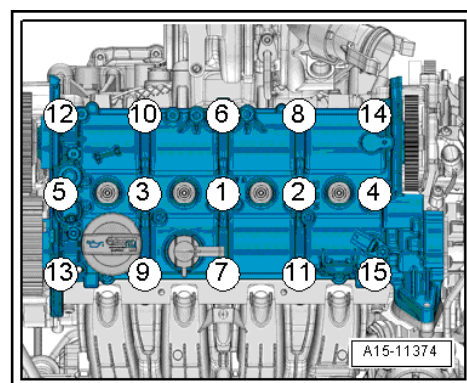
- ☐ For inlet camshaft
- ☐ Renewing ⇒ [a3.2.2 nd installing camshaft oil seal, for inlet camshaft on belt pulley side, exhaust side with camshaft adjuster](#), page 246

#### 17 - Seal

- ☐ For exhaust camshaft (pulley end)
- ☐ Renewing ⇒ [a3.2.4 nd installing camshaft oil seal, for exhaust camshaft on belt pulley side, exhaust side with camshaft adjuster](#), page 251

#### 18 - Cap

Camshaft housing - specified torque and tightening sequence



#### Note

*Renew bolts that are tightened with turning further angle.*

- Tighten bolts in stages in the sequence shown.

Stage	Bolts	Specified torque/turning further angle
1st	-1 ... 15-	10 Nm
2nd	-1 ... 15-	Turn 180° further

### 1.2.2 Assembly overview - camshaft housing, exhaust side with camshaft adjuster





**1 - Exhaust camshaft control valve 1 -N318-**

- ❑ Removing and installing ⇒ [a3.6 nd installing exhaust camshaft control valve 1N318](#), page 283

**2 - Bolt**

- ❑ 8 Nm

**3 - Inlet camshaft control valve 1 -N205-**

- ❑ Removing and installing ⇒ [a3.5 nd installing camshaft control valve 1N205](#), page 282

**4 - Camshaft case**

- ❑ Removing and installing ⇒ [a1.4 nd installing camshaft housing](#), page 190

**5 - Hall sender 3 -G300-**

- ❑ Removing and installing ⇒ [a1.4.2 nd installing Hall sender 3G300](#), page 584

**6 - Bolt**

- ❑ 8 Nm

**7 - Hall sender -G40-**

- ❑ Removing and installing ⇒ [a1.4.1 nd installing Hall sender G40](#), page 584

**8 - Seal**

- ❑ For exhaust camshaft, gearbox end
- ❑ Renewing ⇒ [a3.2.5 nd installing camshaft oil seal, exhaust camshaft, gearbox end](#), page 254

**9 - Crankshaft**

- ❑ For coolant pump
- ❑ Removing and installing ⇒ [a2.7 nd installing toothed belt pulley for coolant pump](#), page 366

**10 - Bolt**

- ❑ Specified torque ⇒ [Item 8 \(page 349\)](#)

**11 - Bolt**

- ❑ 8 Nm

**12 - Cap**

**13 - O-ring**

- ❑ Renew

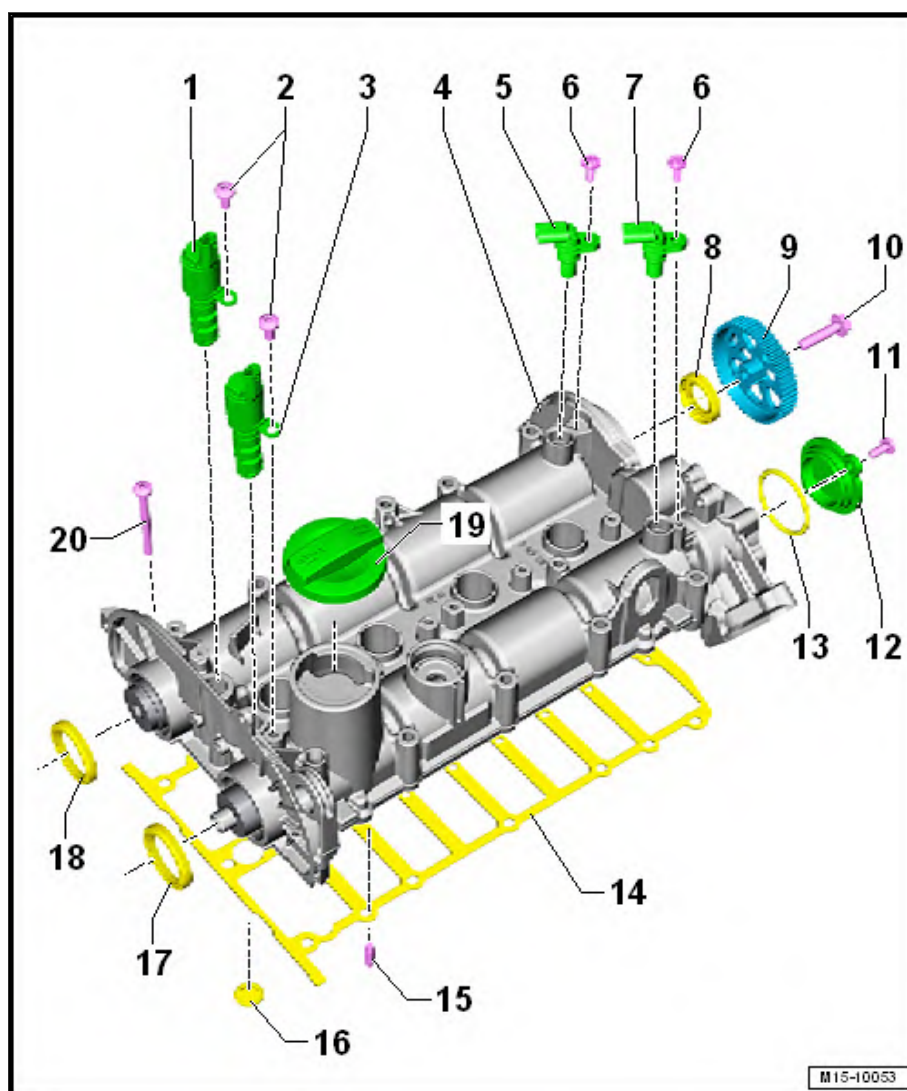
**14 - Seal**

- ❑ Renew

**15 - Dowel pin**

**16 - Seal**

- ❑ With oil strainer
- ❑ Inserted into cylinder head







#### Note

- ◆ *The oil strainer is fitted only if the cylinder head has the appropriate recess.*
- ◆ *Cylinder heads without recess do not require an oil strainer.*

#### 17 - Seal

- ☐ For inlet camshaft
- ☐ Renewing ⇒ [a3.2.2 nd installing camshaft oil seal, for inlet camshaft on belt pulley side, exhaust side with camshaft adjuster](#), page 246

#### 18 - Seal

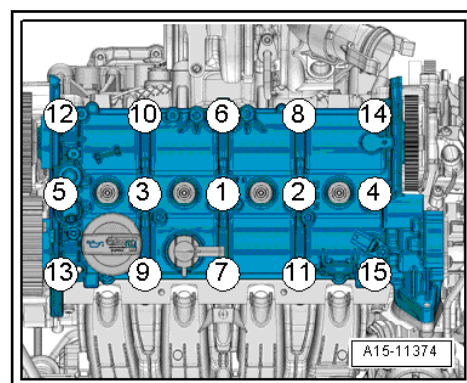
- ☐ For exhaust camshaft (pulley end)
- ☐ Renewing ⇒ [a3.2.4 nd installing camshaft oil seal, for exhaust camshaft on belt pulley side, exhaust side with camshaft adjuster](#), page 251

#### 19 - Cap

#### 20 - Bolt

- ☐ Specified torque and tightening sequence ⇒ [page 185](#)

#### Camshaft housing - specified torque and tightening sequence



#### Note

*Renew bolts that are tightened with turning further angle.*

- Tighten bolts in stages in the sequence shown.

Stage	Bolts	Specified torque/turning further angle
1st	-1 ... 15-	10 Nm
2nd	-1 ... 15-	Turn 180° further

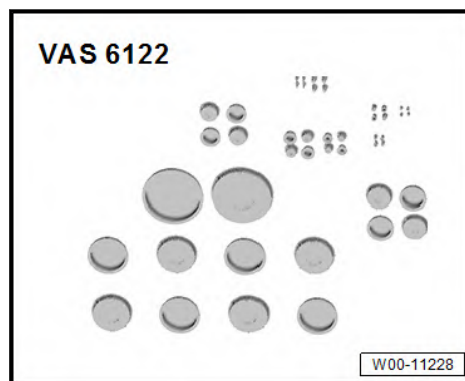
### 1.3 Removing and installing cylinder head

Special tools and workshop equipment required





♦ Engine bung set -VAS 6122-



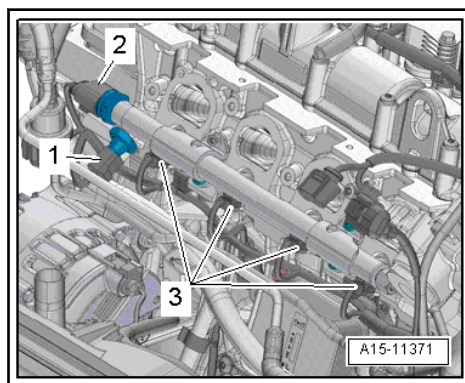
- ♦ Commercially available razor blade scraper (blade width: 40 mm)

### Removing



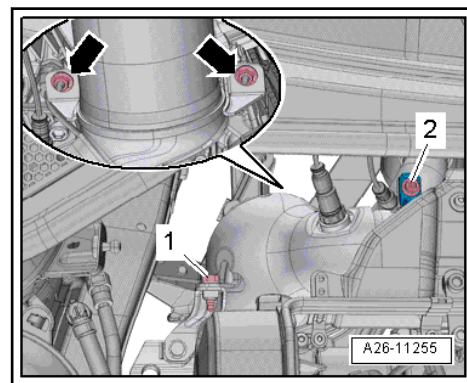
#### Note

- ♦ Seal open channels of intake and exhaust system with suitable plugs from engine bung set -VAS 6122-.
- ♦ Cover the openings in the gearbox with a cloth to prevent any coolant or other liquids from getting into the clutch housing.
- ♦ Fit the cable ties in the original position when installing.
- ♦ Fit all heat shield sleeves in the same place when installing.
- Remove camshaft housing ⇒ [a1.4 nd installing camshaft housing](#), page 190 .
- Remove intake manifold ⇒ [a4.2 nd installing intake manifold](#), page 481 .
- Disconnect connectors:

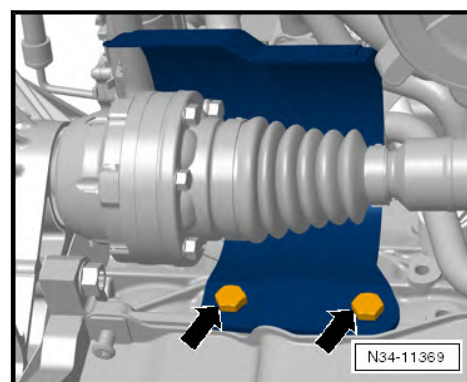


- 1 - On oil pressure switch for reduced oil pressure -F378-
- 2 - On fuel pressure sender -G247-
- 3 - At injectors
- Unscrew bolt -2- and remove screw-type clip.

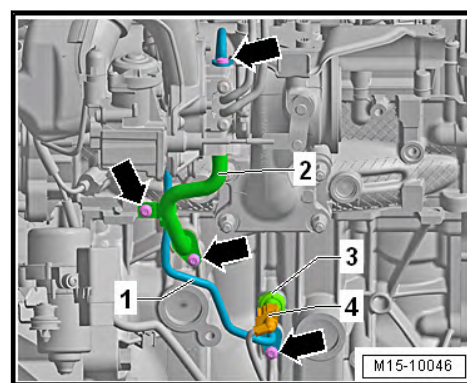




- Unscrew bolt -1- and nuts -arrows-, and secure catalytic converter to vehicle.
- Unscrew bolts -arrows- and remove heat shield for right drive shaft.

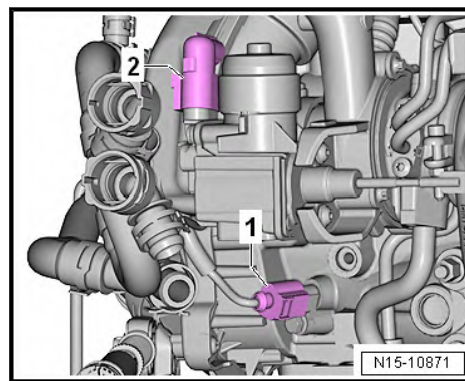


- Separate electrical connector -4- on oil pressure switch -F1- -3-.
- Remove bolts -arrows- and detach oil supply line -1- and oil return line -2-.

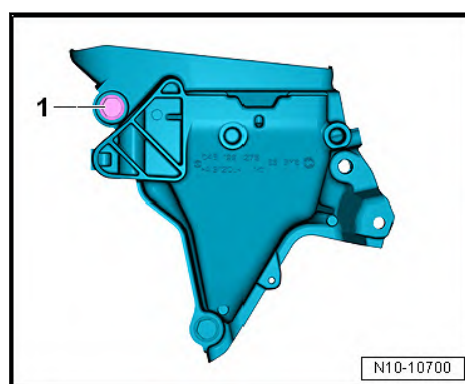


- Disconnect connectors -1- and -2-:

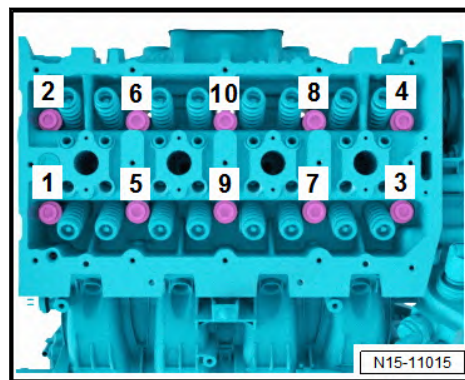




- 1 - For coolant temperature sender -G62-
- 2 - For charge pressure positioner -V465-
- Unscrew bolt -1- from engine support.



- Loosen cylinder head bolts in the sequence -1 to 10- and unscrew.



- Take off cylinder head and set it down on a soft surface (foam plastic).





## Installing



### Note

- ◆ *Using unauthorised sanding or abrasive media may lead to secondary damage such as, for example, damage to the turbocharger or the conrod bearings.*
- ◆ *Do not use sandpaper, grinding wheels, abrasive or scour pads or any other sanding or abrasive media.*
- ◆ *When removing the sealant residue, make sure no loose particles get into the open channels of the engine.*



### Note

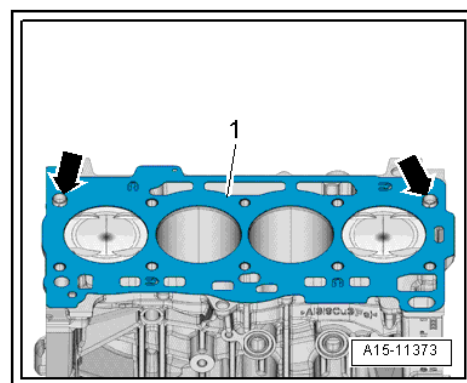
- ◆ *Do not use any other means rather than a standard blade scraper to remove the sealant residue from the cylinder head and cylinder block. Take care not to damage the sealing surfaces.*
- ◆ *Remove any loose remains using a lint-free cloth.*
- ◆ *Remove oil or coolant from blind holes of cylinder head bolts.*
- ◆ *Do not remove new cylinder head gasket from packaging until it is ready to be fitted.*
- ◆ *Make sure to prevent damage to the silicone coating or the indented area of the gasket.*



### Note

- ◆ *Renew bolts that are tightened with turning further angle.*
- ◆ *Renew self-locking nuts as well as gaskets, seals and O-rings.*
- ◆ *When installing a replacement cylinder head, the contact surfaces between hydraulic compensation elements, roller rocker fingers and cams must be oiled before installing the camshaft housing.*
- ◆ *Secure all hose connections with hose clips corresponding to production standard ⇒ Electronic parts catalogue.*
- ◆ *Do not reuse coolant which has been drained off.*

- Fit cylinder head gasket -1-.







- ◆ Note centring pins in cylinder block -arrows-.
- ◆ Check installation position of cylinder head gasket. Characteristic: the part number should be legible from the inlet side.
- If the crankshaft has been turned in the meantime, set piston of no. 1 cylinder to TDC.
- Turn crankshaft back slightly.
- Fit cylinder head.
- Insert cylinder head bolts, and tighten them by hand.
- Tighten bolts for cylinder head ⇒ [page 180](#) .



#### Note

*After repair work it is not necessary to retighten the cylinder head bolts.*

Continue installation in reverse order of removal. Observe the following when doing this:

- Install camshaft housing ⇒ [a1.4 nd installing camshaft housing", page 190](#) .
- Install intake manifold ⇒ [a4.2 nd installing intake manifold", page 481](#) .
- Change engine oil ⇒ Maintenance; Booklet .
- Add coolant ⇒ [a1.3 nd adding coolant", page 340](#) .

#### Specified torques

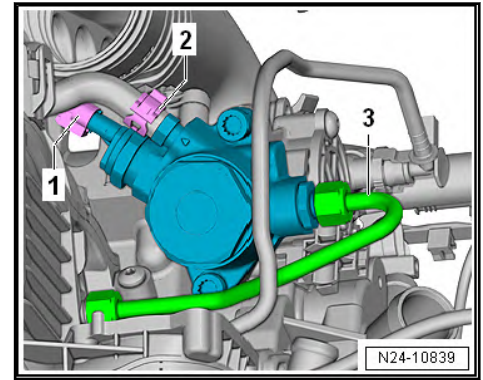
- ◆ ⇒ [Fig. "Engine support - specified torque and installation sequence", page 70](#)
- ◆ ⇒ [o1.1 verview - cylinder head", page 179](#)
- ◆ ⇒ [o1.1 verview - turbocharger", page 416](#)
- ◆ ⇒ [o4.1 verview - intake manifold", page 478](#)
- ◆ ⇒ [Fig. "Installing catalytic converter - specified torque and sequence", page 570](#)
- ◆ ⇒ Running gear, axles, steering; Rep. gr. 40; Drive shaft; Assembly overview - drive shaft

## 1.4 Removing and installing camshaft housing

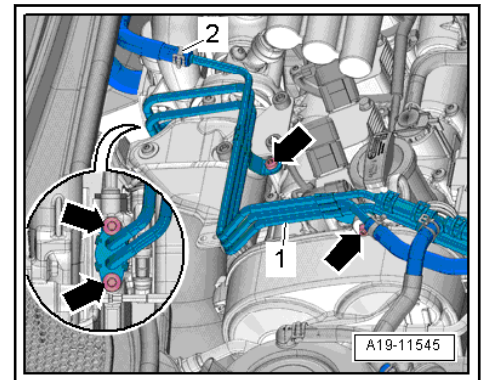
### Removing

- Remove coolant pump ⇒ [a2.5 nd installing coolant pump", page 356](#) .
- Remove air filter housing ⇒ [a3.2 nd installing air filter housing", page 472](#) .
- Remove ignition coils ⇒ [a1.2 nd installing ignition coils with output stage", page 580](#) .
- Remove toothed belt from camshafts ⇒ [t2.8 oothed belt from camshaft", page 234](#) .
- Disconnect electrical connector -1-.

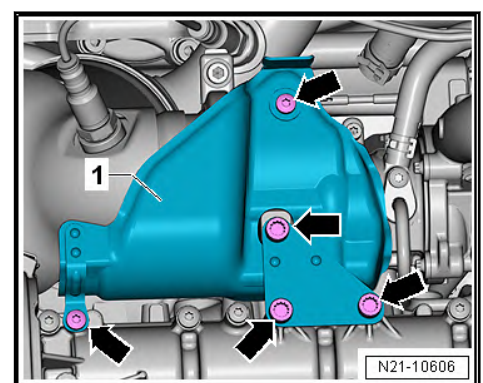




- Detach hose clip -2- and pull off hose.
- Remove high-pressure pipe -3- ➔ [a7.3 nd installing high-pressure pipe](#), page 527 .
- Remove connection for turbocharger ➔ [a1.4 nd installing connection for turbocharger](#), page 429 .
- Release hose clip -2- and detach coolant hose.

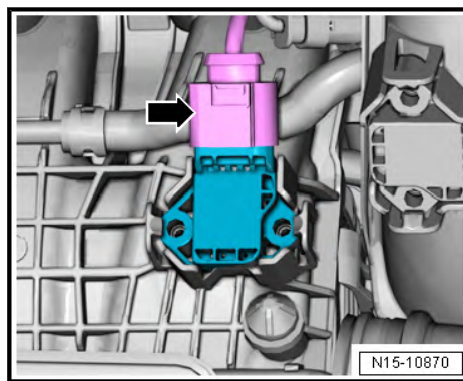


- Remove bolts -arrows- and pivot coolant lines -1- to right side.
- Unscrew bolts -arrows-, and remove heat shield -1-.

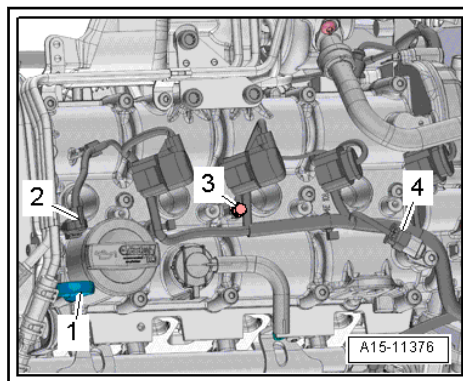


- Disconnect connector -arrow- from intake manifold sender -GX9-.



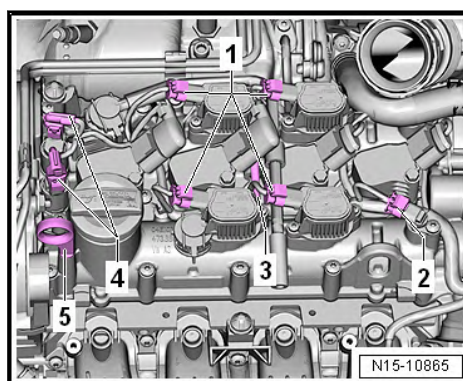


#### Vehicles without variable valve timing on exhaust side



- Disconnect connectors:
  - 2 - For camshaft adjuster valve 1 -N205-
  - 4 - for Hall sender -G40-
- Remove bolt -3-, move wiring harness clear and place to left side.
- Pull out dipstick -1-.

#### Vehicles with variable valve timing on exhaust side



#### Note

*The number of electrical connectors varies depending on the engine code.*

- Disconnect connectors:
  - 1 - Only for vehicles with Active Cylinder Management (ACT)





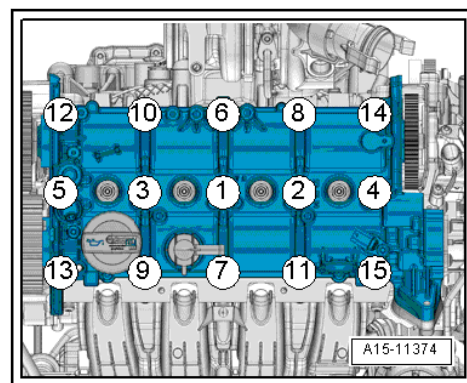
2 - For Hall sender -G40- and Hall sender 3 -G300-

4 - For camshaft control valve 1 -N205- and exhaust camshaft control valve 1 -N318-

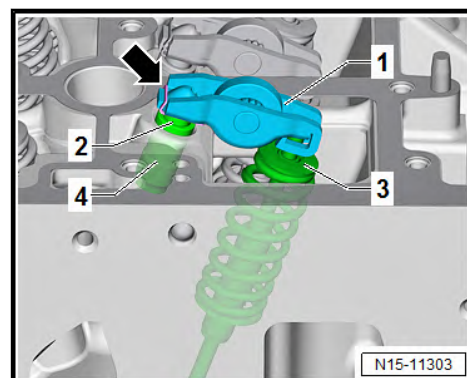
- Unscrew bolt -3- and lay wiring harness to one side.
- Pull out dipstick -5-.

#### Continued for all vehicles

- Loosen bolts for camshaft housing in the sequence -15 to 1- and unscrew.



- Carefully detach camshaft housing from adhesive bond and remove it.



- Mark allocation of roller rocker fingers -1-, hydraulic compensation element -4- and valves -3- for reinstallation.
- Remove roller rocker fingers together with compensation elements and place them on a clean surface.

#### Installing

Install in reverse order of removal. The following should be observed:



#### Note

- ◆ *Renew bolts that are tightened with turning further angle.*
- ◆ *Renew gasket and seal with oil strainer.*

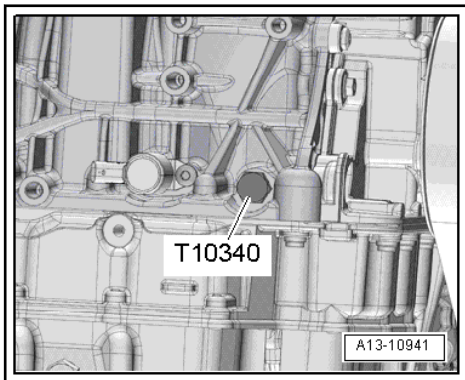




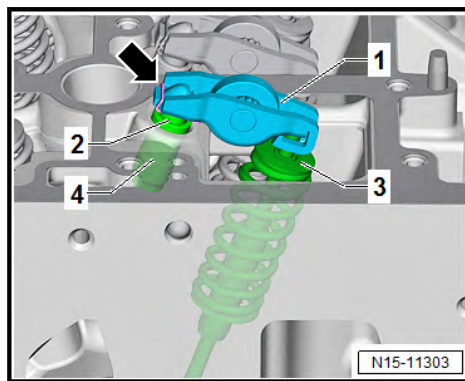
**NOTICE**

**Risk of damage to valve gear caused by axial movement of the camshafts.**

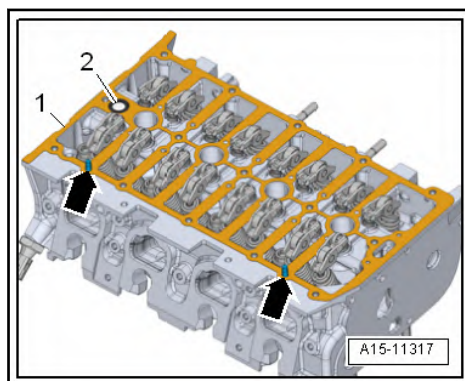
- **Never move camshafts in axial direction when turning them.**
- Locking pin -T10340- screwed into cylinder block as far as stop and tightened to 30 Nm.



- Crankshaft has been turned in direction of engine rotation until it rests against locking pin -T10340- = "TDC" position ➔ [page 174](#) .
- Make sure that all roller rocker fingers -1- rest properly against end of valve stem -3-.



- Make sure that all roller rocker fingers -1- are clipped into the respective hydraulic compensation element -4-.
- Make sure that camshafts are set to »TDC« position for piston of cylinder no. 1 ➔ [page 176](#) .
- Fit seal with oil strainer -2- into cylinder head -1-.

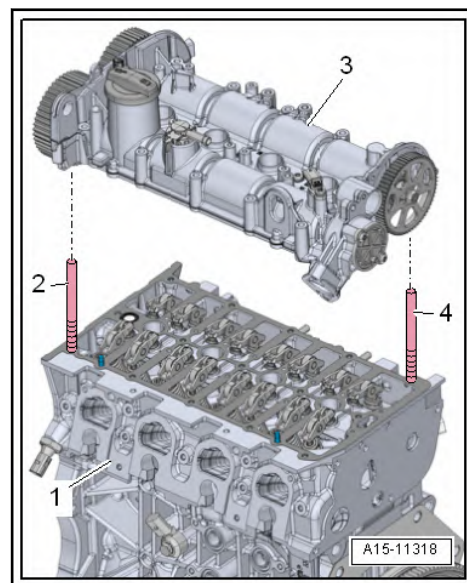






#### Note

- ◆ *The oil strainer is fitted only if the cylinder head has the appropriate recess.*
- ◆ *Cylinder heads without recess do not require an oil strainer.*
- Fit gasket onto dowel pins -arrows-.
- Screw 2 studs -items 2, 4- (e.g. -T10288/4-) into cylinder head.



- Carefully lower camshaft housing -3- vertically onto studs in cylinder head.



#### Note

*Ensure that camshaft housing is not canted.*

- Tighten bolts for camshaft housing.

Continue installation in reverse order of removal. The following should be observed:

- Install high-pressure pipe ⇒ [a7.3 nd installing high-pressure pipe”, page 527](#) .
- Install toothed belt (adjust valve timing) ⇒ [t2.8 oothed belt from camshaft”, page 234](#) .
- Install ignition coils ⇒ [a1.2 nd installing ignition coils with output stage”, page 580](#) .
- Install coolant pump ⇒ [a2.5 nd installing coolant pump”, page 356](#) .
- Electrical connections and routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

#### Risk of damage to engine

Avoid damage to valves and piston crowns after working on valve gear.





- ◆ Turn the engine carefully at least 2 rotations to ensure that none of the valves make contact when the starter is operated.

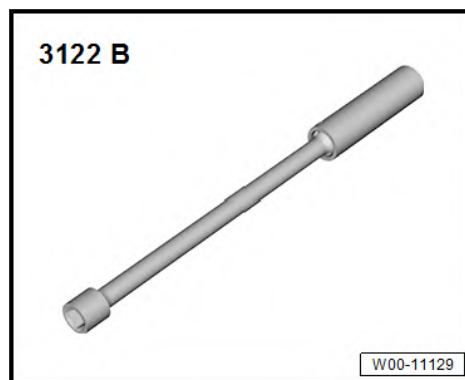
### Specified torques

- ◆ ⇒ [Fig. “Camshaft housing - specified torque and tightening sequence”](#), page 185
- ◆ ⇒ [o1.2.2 verview - camshaft housing, exhaust side with camshaft adjuster](#), page 183
- ◆ ⇒ [o1.1 verview - turbocharger](#), page 416
- ◆ ⇒ [o3.1 verview - air filter housing](#), page 470

## 1.5 Checking compression

### Special tools and workshop equipment required

- ◆ Spark plug socket -3122 B-
- ◆ Compression tester -V.A.G 1763-



### Sequence of operations

- Engine oil temperature at least 30°C.
- Battery voltage at least 12.5 V.
- Remove fuse for fuel pump control unit from fuse holder.  
Fuse assignment ⇒ Current flow diagrams, Electrical fault finding and Fitting locations



### Note

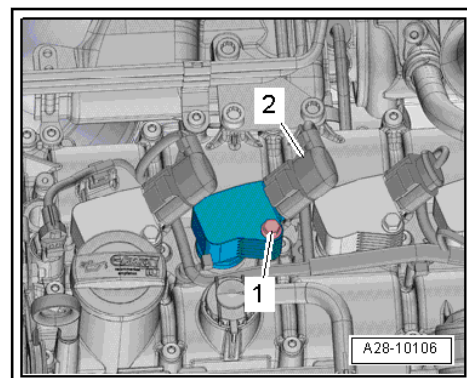
*Removing fuse interrupts voltage supply for fuel pump control unit.*

- Start engine and run it until it turns off.
- Switch off ignition.





- Remove resonator for intake air. ⇒ [a3.4 nd installing resonator for intake air”, page 476](#)
- Pull off connector -2- and unscrew bolt -1-.



- Pull out ignition coils with output stages.
- Unscrew spark plugs using spark plug socket and extension -3122 B-.
- Check compression pressure using compression tester - V.A.G 1763-; refer to ⇒ Operating instructions.
- Have a second mechanic press down accelerator completely and simultaneously operate starter until pressure no longer increases on tester display.
- Repeat procedure on each cylinder.

Compression pressures	bar
New	10.0 ... 15.0
Wear limit	7.0
Maximum difference between cylinders	3.0

### Installing

Assembly is carried out in reverse sequence; note the following:

- Install spark plugs.
- Install ignition coils with output stages ⇒ [a1.2 nd installing ignition coils with output stage”, page 580](#) .
- Entries are stored in the event memory of the engine control unit because electrical connectors were disconnected and the engine was started: Generate readiness code in Guided functions ⇒ Vehicle diagnostic tester.

### Specified torques

- ◆ ⇒ [o1.1 verview - ignition system”, page 578](#)





## 2 Toothed belt drive

⇒ [o2.1 verview - toothed belt cover", page 198](#)

⇒ [o2.2 verview - toothed belt", page 199](#)

⇒ [a2.3 nd installing toothed belt guard", page 203](#)

⇒ [a2.4 nd installing valve timing tool", page 205](#)

⇒ [v2.5 alve timing", page 213](#)

⇒ [v2.6 alve timing", page 216](#)

⇒ [a2.7 nd installing toothed belt", page 227](#)

⇒ [t2.8 oothed belt from camshaft", page 234](#)

### 2.1 Assembly overview - toothed belt cover

#### 1 - Lower toothed belt guard

- ❑ Removing and installing ⇒ [a2.3.2 nd installing lower toothed belt guard", page 204](#)

#### 2 - Bolt

- ❑ 8 Nm

#### 3 - Engine support

- ❑ Specified torque and tightening sequence (Golf Cabriolet, Scirocco, CC) ⇒ [page 70](#)
- ❑ Specified torque and tightening sequence (Sharan, Tiguan) ⇒ [page 73](#)
- ❑ Specified torque and tightening sequence (T-Roc) ⇒ [page 76](#)

#### 4 - Bolt

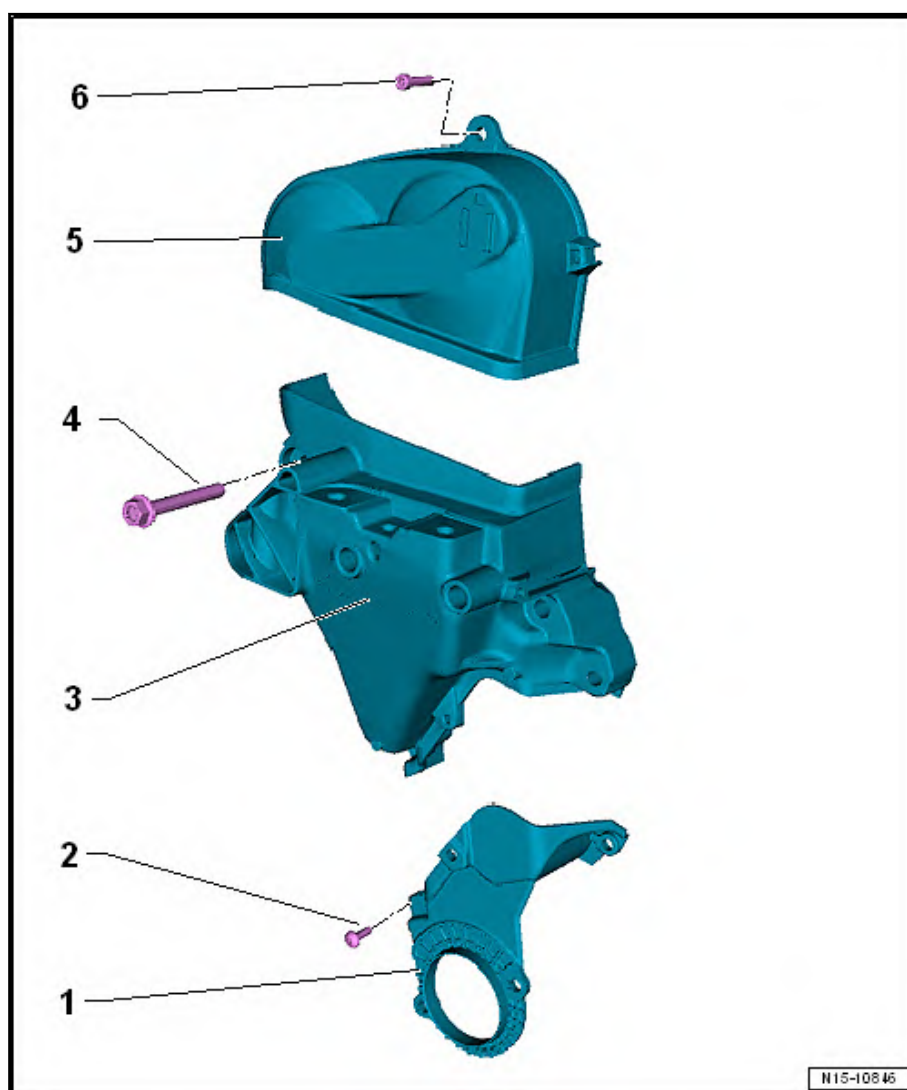
- ❑ Specified torque and tightening sequence (Golf Cabriolet, Scirocco, CC) ⇒ [page 70](#)
- ❑ Specified torque and tightening sequence (Sharan, Tiguan) ⇒ [page 73](#)
- ❑ Specified torque and tightening sequence (T-Roc) ⇒ [page 76](#)

#### 5 - Upper toothed belt guard

- ❑ Removing and installing ⇒ [a2.3.1 nd installing upper toothed belt guard", page 203](#)

#### 6 - Bolt

- ❑ 8 Nm







## **2.2 Assembly overview - toothed belt**

⇒ [o2.2.1 verview - toothed belt, exhaust side with toothed belt pulley](#), page 199

⇒ [o2.2.2 verview - toothed belt, exhaust side with camshaft adjuster](#), page 201

### **2.2.1 Assembly overview - toothed belt, exhaust side with toothed belt pulley**





### 1 - Toothed belt

- ☐ Before removing, mark direction of rotation with chalk or felt-tipped marker pen.
- ☐ Check for wear
- ☐ Removing and installing ⇒ [a2.7 nd installing toothed belt", page 227](#)
- ☐ Do not bend excessively ⇒ [page 230](#)

### 2 - Bolt

- ☐ 25 Nm

### 3 - Tensioning pulley

- ☐ Removal and installation involve removing engine support ⇒ [a1.6 nd installing engine support", page 136](#).

### 4 - Bolt

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

### 5 - Exhaust camshaft toothed belt pulley

- ☐ Removing and installing ⇒ [a3.4 nd installing toothed belt pulley", page 277](#)

### 6 - Inlet camshaft toothed belt pulley

- ☐ With camshaft adjuster
- ☐ Removing and installing camshaft adjuster ⇒ [a3.3 nd installing camshaft adjuster", page 256](#)

### 7 - Guide bush

### 8 - Bolt

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

### 9 - O-ring

- ☐ Renew if damaged

### 10 - Plug

- ☐ 20 Nm

### 11 - O-ring

- ☐ Captive, supplied with "item 13".
- ☐ Renew after removal

### 12 - Spacer sleeve

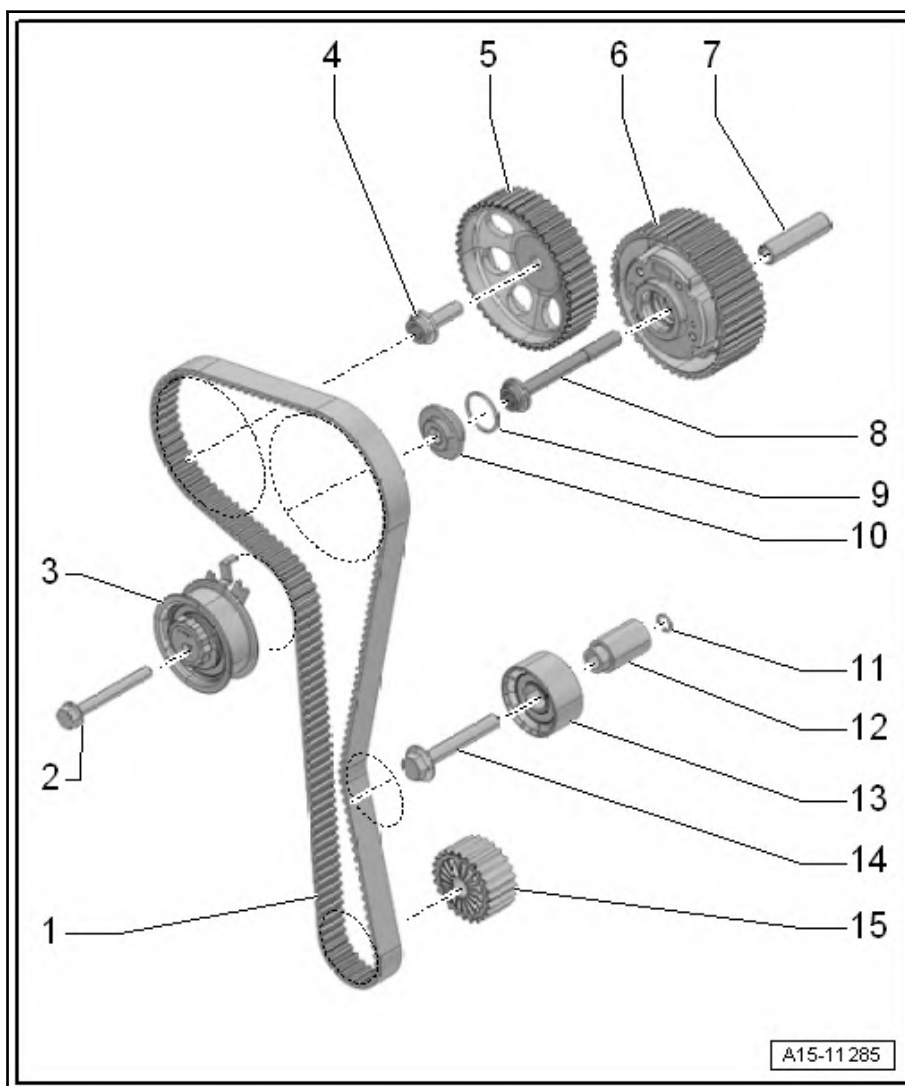
- ☐ Supplied with item "13".

### 13 - Idler roller

### 14 - Bolt

- ☐ 40 Nm

### 15 - Crankshaft pulley

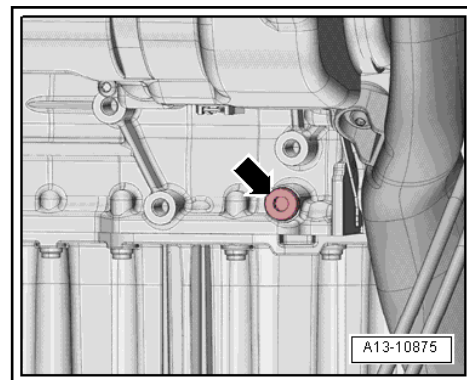






- ☐ Contact surface between toothed belt pulley and crankshaft must be free from oil
- ☐ Can only be fitted in one position

**Plug for "TDC" drilling in cylinder block - specified torque**



**Note**

*Renew O-ring if damaged.*

Bolt	Specified torque
Bolt -arrow-	30 Nm

## 2.2.2 Assembly overview - toothed belt, exhaust side with camshaft adjuster





#### 1 - Toothed belt

- ☐ Before removing, mark direction of rotation with chalk or felt-tipped marker pen.
- ☐ Check for wear
- ☐ Removing and installing ⇒ [a2.7 nd installing toothed belt", page 227](#)
- ☐ Do not bend excessively ⇒ [page 230](#)

#### 2 - Bolt

- ☐ 25 Nm

#### 3 - Tensioning pulley

- ☐ Removal and installation involve removing engine support ⇒ [a1.6 nd installing engine support", page 136](#).

#### 4 - Bolt

- ☐ Renew if damaged
- ☐ 8 Nm
- ☐ Tightening and loosen the bolts diagonally and evenly

#### 5 - Cap

#### 6 - Bolt

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

#### 7 - Exhaust camshaft toothed belt pulley

- ☐ With camshaft adjuster
- ☐ Removing and installing camshaft adjuster ⇒ [a3.3 nd installing camshaft adjuster", page 256](#)

#### 8 - Guide bush

#### 9 - Inlet camshaft toothed belt pulley

- ☐ With camshaft adjuster
- ☐ Removing and installing camshaft adjuster ⇒ [a3.3 nd installing camshaft adjuster", page 256](#)

#### 10 - Bolt

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

#### 11 - O-ring

- ☐ Renew if damaged

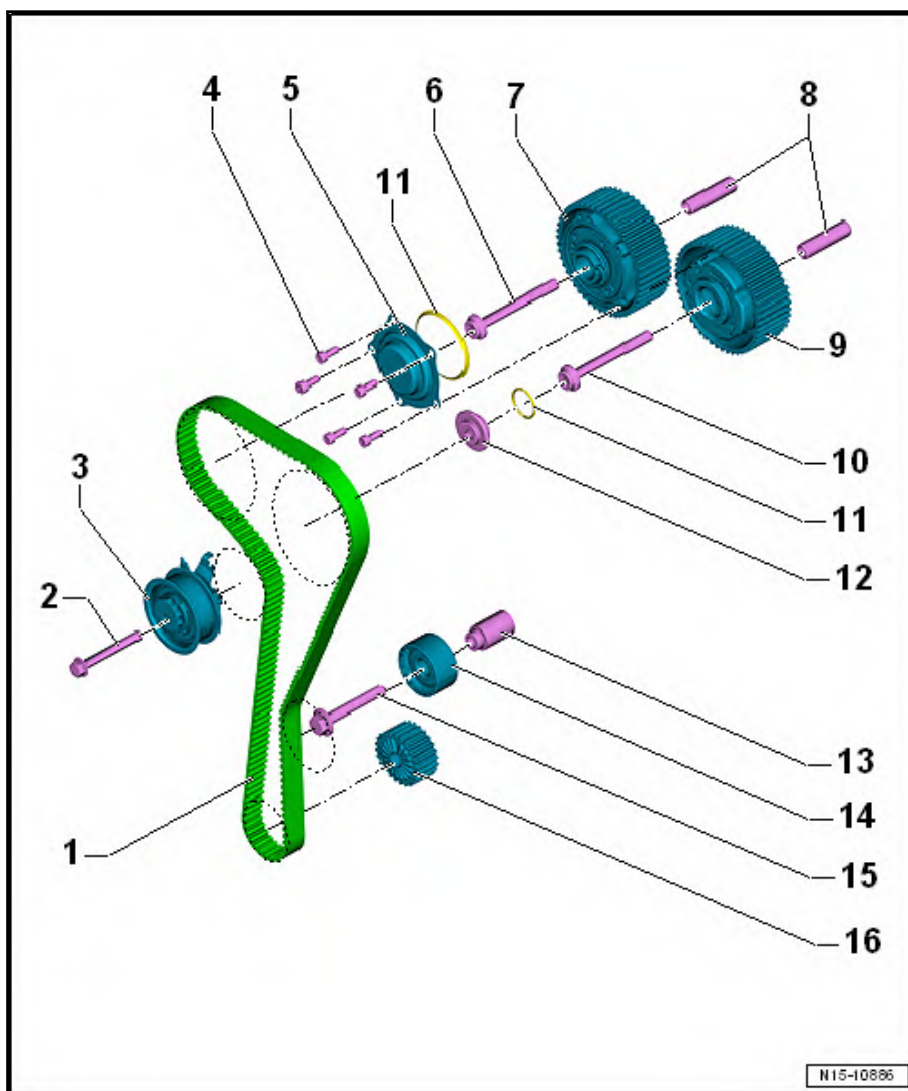
#### 12 - Plug

- ☐ 20 Nm

#### 13 - Spacer sleeve

- ☐ With O-ring
- ☐ Renew O-ring
- ☐ Supplied with item "14".

#### 14 - Idler roller







## 15 - Bolt

- ☐ 40 Nm

## 16 - Crankshaft pulley

- ☐ Contact surface between toothed belt pulley and crankshaft must be free from oil
- ☐ Can only be fitted in one position

## 2.3 Removing and installing toothed belt guard

⇒ [a2.3.1 nd installing upper toothed belt guard", page 203](#)

⇒ [a2.3.2 nd installing lower toothed belt guard", page 204](#)

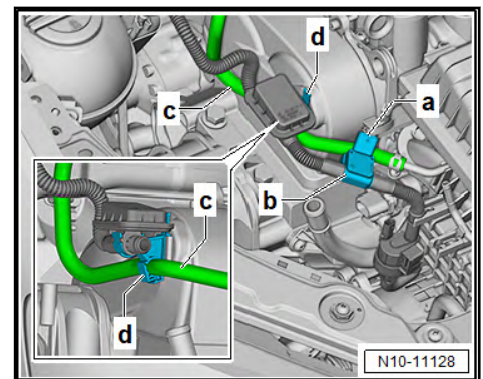
### 2.3.1 Removing and installing upper toothed belt guard

#### Removing

- Separate plug-in connectors from fuel hose and from hose to activated charcoal filter ⇒ Rep. gr. 20; plug-in connectors; Separating plug-in connectors.

#### Sharan with petrol particulate filter

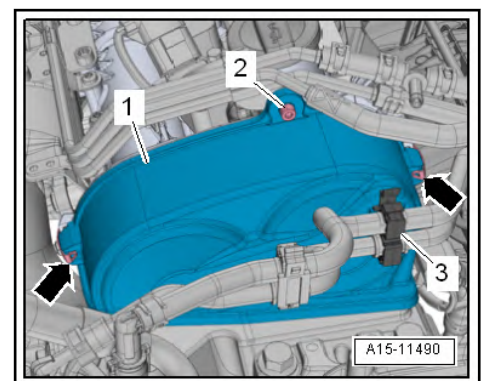
- Pull off connector -a- from activated charcoal filter line -b-.



- Unclip activated charcoal filter line -b- and fuel line -c- from bracket -d-.
- Place activated charcoal filter lines -b- and fuel line -c- aside.

#### Continued for all vehicles:

- Detach hoses from retainer -3-.



- Unscrew bolt -2-.





- Release clips -arrows- and remove upper toothed belt guard -1-.

### Installing

Further assembly is carried out in the reverse order of removal.

### Specified torques

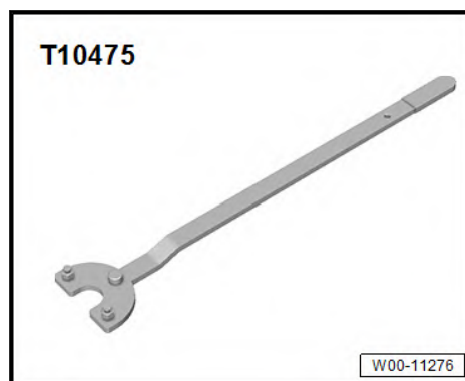
- ♦ ⇒ [o2.1 verview - toothed belt cover", page 198](#)

## 2.3.2 Removing and installing lower toothed belt guard

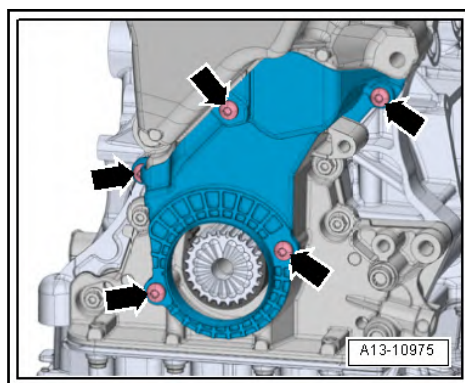
### Removing

#### Special tools and workshop equipment required

- ♦ Counter-hold tool -T10475-



- Remove vibration damper ⇒ [a1.5 nd installing vibration damper", page 134](#) .
- Unscrew bolts -arrows- and remove toothed belt guard.



### NOTICE

Risk of damage to engine caused by incorrect valve timing.

- Do not turn crankshaft out of TDC position.

### Installing

Continue installation in reverse order of removal. Observe the following when doing this:

### Specified torques

- ♦ ⇒ [o2.1 verview - toothed belt cover", page 198](#)
- ♦ ⇒ [o1.1 verview - poly V-belt drive", page 122](#)





## 2.4 Preassembling and installing valve timing tool

⇒ [t2.4.1 est toolVAS 611 007", page 205](#)

⇒ [t2.4.2 est toolVAS 611 007", page 208](#)

⇒ [t2.4.3 est toolVAS 611 007 electronically and performing basic setting", page 211](#)

### 2.4.1 Preassembling test tool -VAS 611 007-

Special tools and workshop equipment required

- ◆ Tester for checking elongation of chain links -VAS 611 007-



Sequence of operations

Test tool -VAS 611 007-





**A - Angle sensor -VAS 611 007/1-**

- ❑ Specified torque brake:  
11 Nm

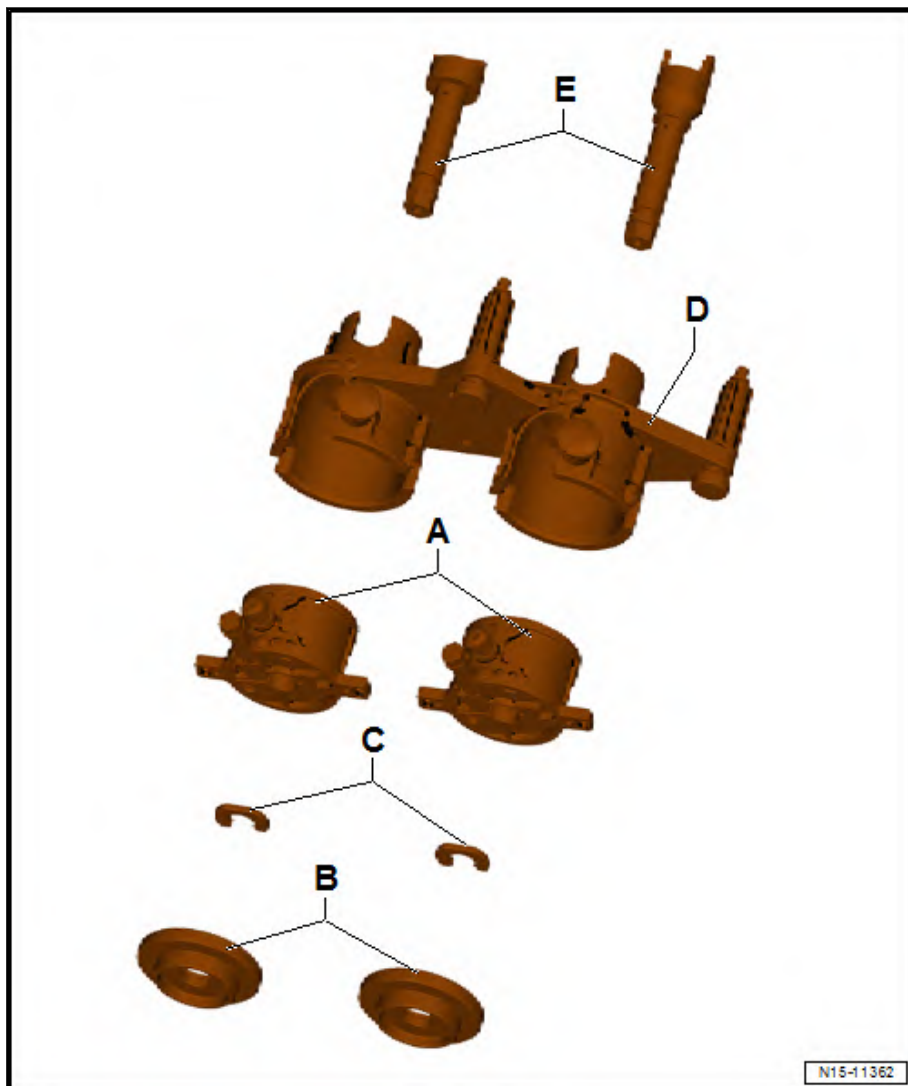
**B - Lock ring -VAS 611 007/2-**

**C - Clamping ring -VAS 611 007/3-**

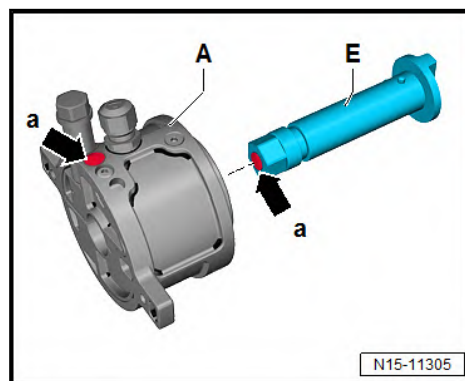
**D - Adapter for camshaft housing -VAS 611 007/8-**

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

- ❑ Adapter for angle sensor -VAS 611 007/9- blue, for inlet camshaft
- ❑ Adapter for angle sensor -VAS 611 007/10- red, for exhaust camshaft

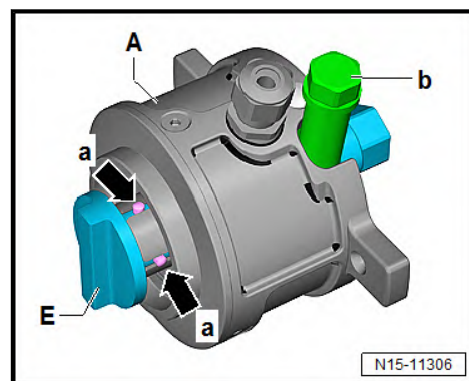


**Preassembling test tool -VAS 611 007-**

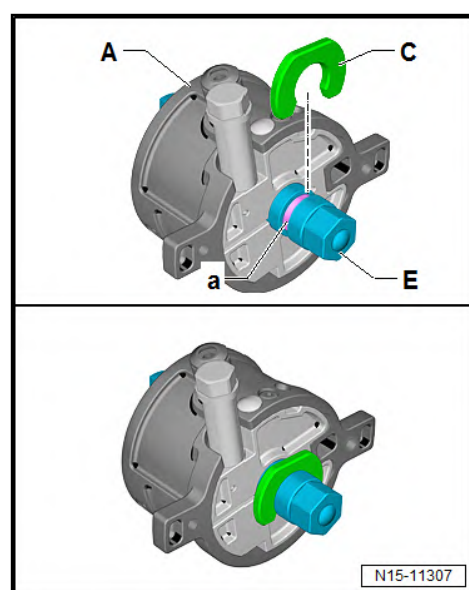


- Before installing the adapters for angle sensor -E- in angle sensors -A-, check correct assignment by means of the colour coding -a-.
- Insert corresponding adapter for angle sensor -E- in relevant angle sensors -A-.
- Note position of dowel pins -a- when installing.
- Adapters for angle sensors -E- can only be fitted in one position.

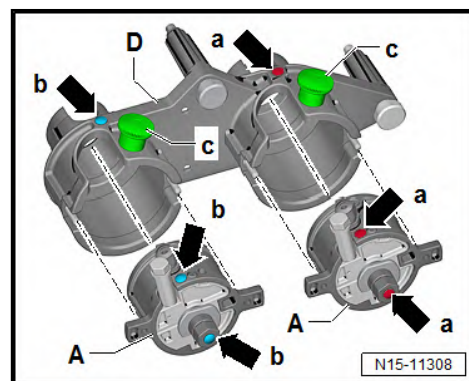




- Make sure that brake -b- is released. Do not apply force.
- Insert adapter for angle sensors -E- in angle sensors -A- as far as stop.



- Secure clamp rings -C- in groove -a- of respective adapter for angle sensors -E-.
- Insert angle sensor -A- colour coded red on red marked side -arrows a- of camshaft housing adapter -D-. To do this, release locking pin -c- by pulling it upwards.

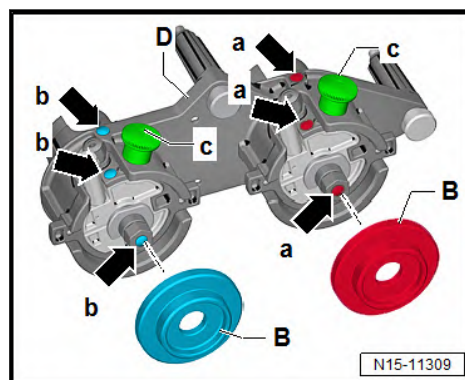


- Insert angle sensor -A- colour coded red and push in until locking pin -c- can be heard to engage.
- Repeat procedure with angle sensor -A- colour coded blue.
- To do this, observe colour coding -arrows b-.



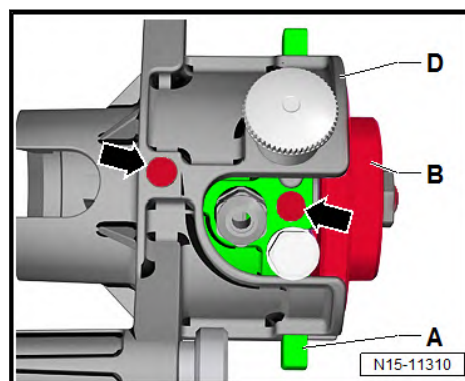


- Screw in red and blue lock ring -B- approx. 2 turns. Note colour coding -arrows a- and -arrows b- when doing this.



#### Note

- ♦ *Screw in securing rings -VAS 611 007/2- -B- max. 2 turns by hand.*
- ♦ *If the lock rings are turned too tightly -B-, the angle sensors -VAS 611 007/1- could become damaged.*



- Check for freedom of movement of the adapters for angle sensors.
- It should be possible to turn adapters for angle sensors with ease.

## 2.4.2 Installing test tool -VAS 611 007-

### Special tools and workshop equipment required

- ♦ Tester for checking elongation of chain links -VAS 611 007-







## Sequence of operations

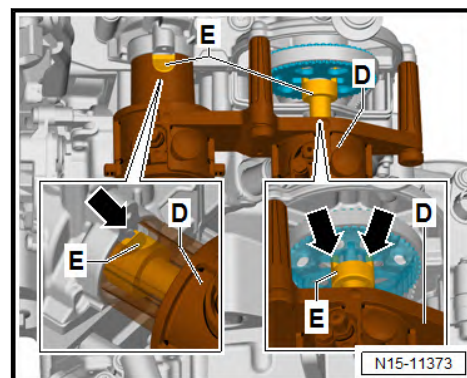
- Preassembly test tool -VAS 611 007- ➔ [t2.4.1 est tool VAS 611 007", page 205](#) .
- Teach-in test tool -VAS 611 007- electronically and perform basic setting ➔ [t2.4.3 est tool VAS 611 007 electronically and performing basic setting", page 211](#) .
- Turn adapter for angle sensor -VAS 611 007/9- and adapter for angle sensor -VAS 611 007/10- until display is set to approx. 0°.
- Perform the preliminary work for checking the valve timing ➔ [v2.5 alve timing", page 213](#) .
- Make sure that the piston in cylinder no. 1 is at TDC position ➔ [p4.7 iston to TDC position", page 174](#) .
- Make sure that brakes on angle sensor -VAS 611 007/1- are released on both sides ➔ [page 207](#) .



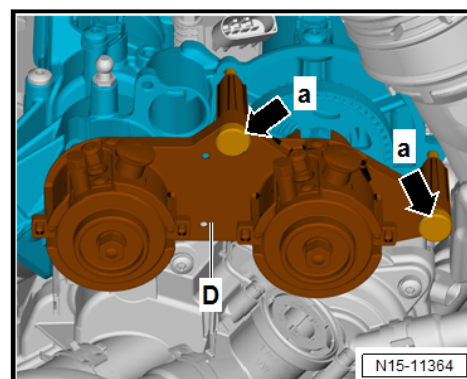
### Note

*Before positioning the test tool -VAS 611 007- against the camshaft housing, the grooves of the camshafts must be checked for damage.*

- Align adapter for angle sensor -E- by hand with grooves of camshafts -arrows-.



- Check proper alignment through recess, and adapt position by turning.
- Fit adapter for camshaft housing -VAS 611 007/8- -D- to camshaft housing, and slide it on.



- Tighten knurled screws -arrows a- alternately by hand.



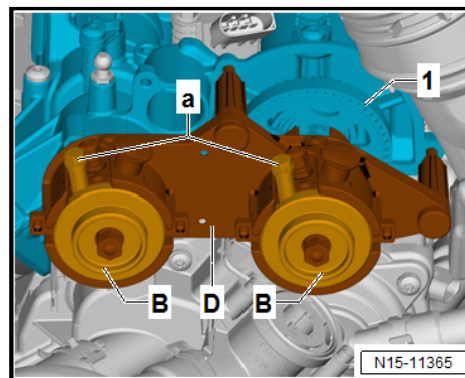


- Make sure that adapter for camshaft housing -VAS 611 007/8- -D- is properly seated.

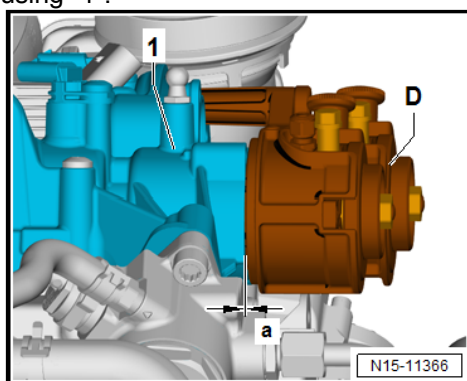


#### Note

- ♦ If camshaft housing adapter -VAS 611 007/8- -D- touches the housing of the coolant pump, the basic setting of the coolant pump is incorrect.
- ♦ In this case, correct adjustment or testing of the valve timing is not possible.
- ♦ The coolant pump must be removed and readjusted ⇒ [a2.5 nd installing coolant pump", page 356](#) .
- Test tool -VAS 611 007- must rest flush against camshaft housing.
- Make sure that brakes on angle sensor -VAS 611 007/1- are released on both sides ⇒ [page 207](#) .
- Tighten locking ring -VAS 611 007/2- -B- on both sides evenly by hand. When doing this, ensure that camshaft housing adapter -VAS 611 007/8- -D- always lies flat against camshaft housing -1-.



- Camshaft housing adapter -VAS 611 007/8- -D- should not lift off of camshaft housing -1-.

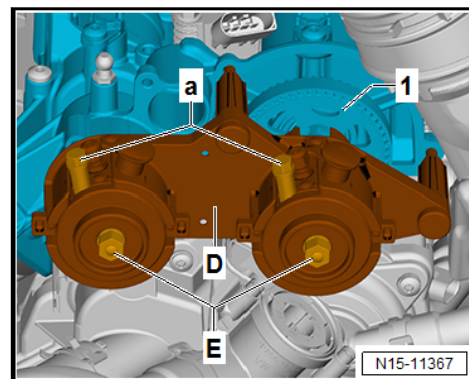


#### Note

The correct preload is achieved when the camshaft housing adapter -VAS 611 007/8- lies flat -a- against the camshaft housing.

- Make sure that brakes -a- are released on both sides.





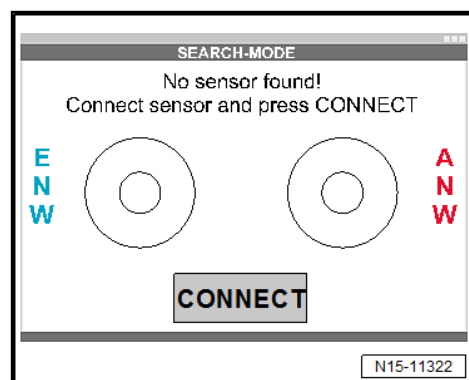
### 2.4.3 Teaching-in test tool -VAS 611 007- electronically and performing basic setting

#### Special tools and workshop equipment required

- ◆ Tester for checking elongation of chain links -VAS 611 007-



#### Sequence of operations



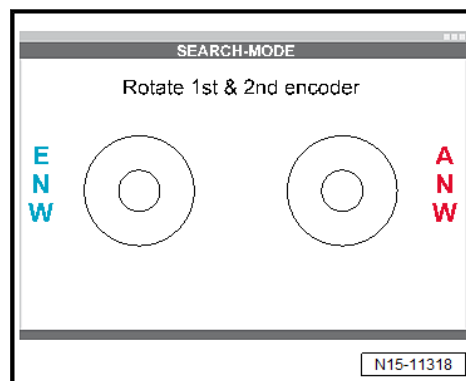
- Connect electronic measuring equipment of test tool -VAS 611 007- ⇒ Operating manual.
- Perform software installation of test tool -VAS 611 007- ⇒ Operating manual.
- Start test program ⇒ Operating manual.

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

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

If test tool -VAS 611 007- is connected, display is as shown:

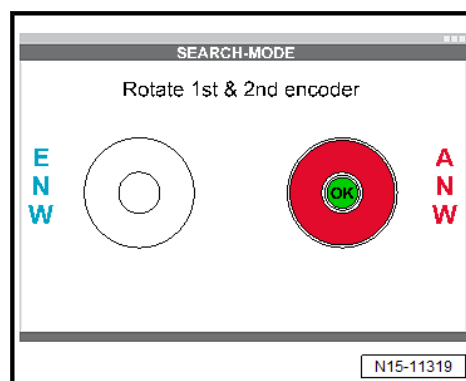




ANW - Exhaust camshaft, red

ENW - Inlet camshaft, blue

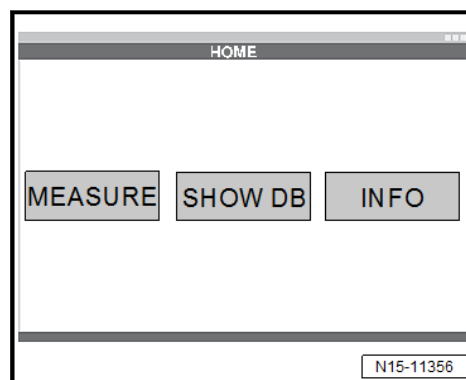
- Turn adapter for angle sensor -VAS 611 007/10- red -E- for exhaust camshaft.



If »OK« is displayed, teach-in of exhaust camshaft is successful.

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

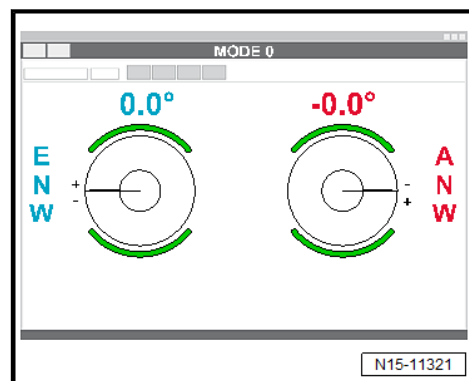
If display is as shown in illustration, exhaust camshaft has been taught-in.



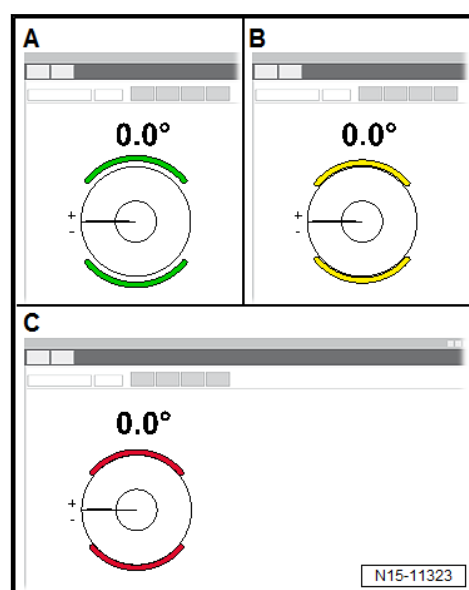
- Select function **MEASURE**.

If display is as follows:





- Check valve timing ⇒ [v2.5 alve timing](#), page 213 .
- Make sure that brake indicator on display is green.



- It must not be yellow or red.
- A - Green, brake is released  
B - Yellow, brake is applied  
C - Red, brake has been tightened to torque

## 2.5 Checking valve timing

### Special tools and workshop equipment required

- ◆ Tester for checking elongation of chain links -VAS 611 007-

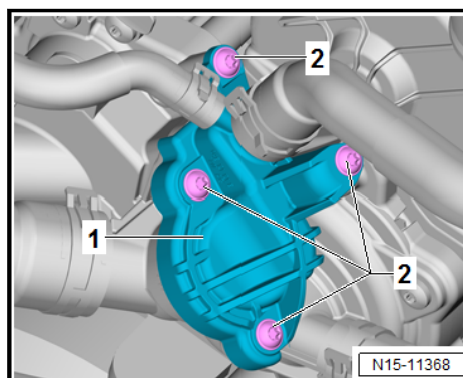




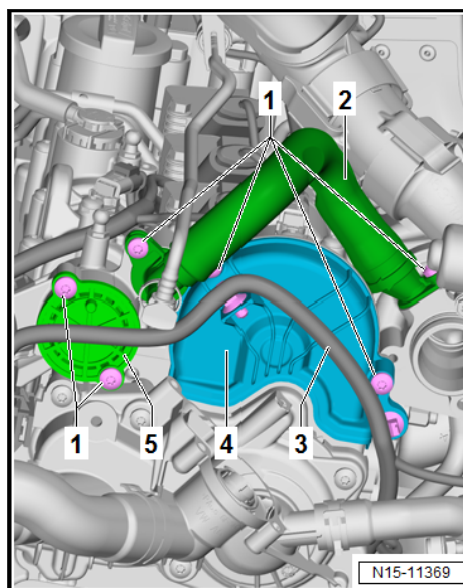


## Sequence of operations

- Remove resonator for intake air ⇒ [a3.4 nd installing resonator for intake air](#), page 476 .
- Remove air pipe ⇒ [a2.5 nd installing air pipe](#), page 441 .
- Remove connection for turbocharger ⇒ [a1.4 nd installing connection for turbocharger](#), page 429 .
- Set piston for cylinder no. 1 to TDC position ⇒ [p4.7 iston to TDC position](#), page 174 .
- Drain coolant ⇒ [a1.3 nd adding coolant](#), page 340 .
- Unscrew bolts -2-.



- Remove cover for thermostat housing -1-.
- Unclip wiring harness -3- and place to one side.

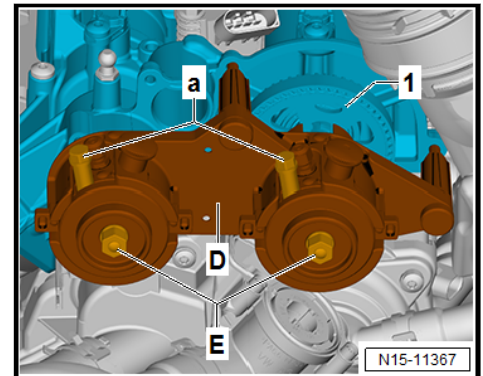


- Unscrew bolts -1-.
- Place a cloth underneath to catch any oil which may drain out.
- Take off cap -5-.
- Pull off pipe -2-.
- Remove toothed belt cover -4-.
- Preassemble test tool -VAS 611 007- ⇒ [t2.4.1 est toolVAS 611 007](#), page 205 .

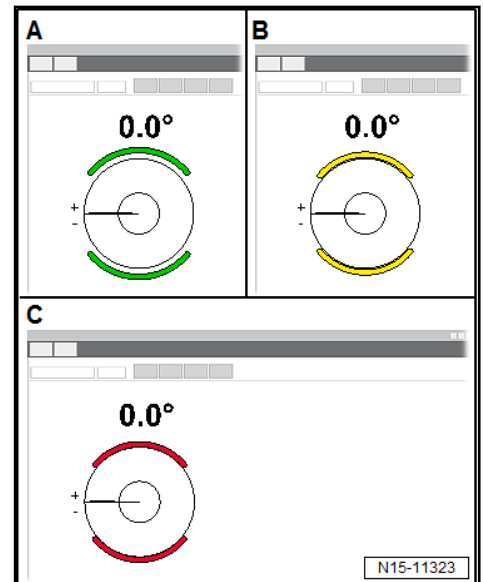




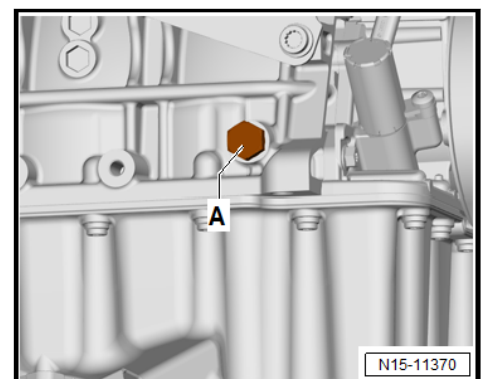
- Install test tool -VAS 611 007- ➔ [t2.4.2 est tool VAS 611 007](#), [page 208](#) .
- Make sure that brakes -a- are released on both sides.



- Make sure that brake indicator on display is green -A-.



- It must not be yellow or red.
- Unscrew locking pin -T10340- -A-.

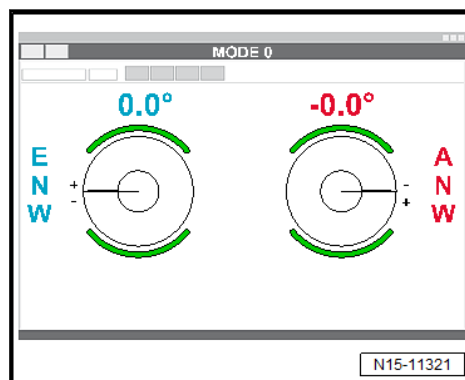


- Turn crankshaft 2 turns in direction of rotation of engine.
- Screw in locking pin -T10340- -A-.
- Set piston for cylinder no. 1 to TDC position ➔ [p4.7 iston to TDC position](#), [page 174](#) .





- Read valve timing angles on display, and compare values with specifications.



#### Specified values

Inlet camshaft	Exhaust camshaft
$-0.5^{\circ} \pm 1.5^{\circ}$	$+1.5^{\circ} \pm 1.5^{\circ}$



#### Note

- ♦ *Adjust valve timing as precisely as possible. The settings must be as close to the specifications as possible.*
- ♦ *The valve timing must not be outside the tolerance limits.*

- If necessary, adjust timing ⇒ [v2.6 alve timing](#)”, page 216 .

Assembly is carried out in reverse sequence; note the following:

- Add coolant ⇒ [a1.3 nd adding coolant](#)”, page 340 .

#### Specified torques

- ♦ ⇒ [o2.1 verview - coolant pump, thermostat](#)”, page 348
- ♦ ⇒ [o3.1 verview - air filter housing](#)”, page 470
- ♦ ⇒ Brake system; Rep. gr. 45; Control unit and hydraulic unit; Assembly overview - control unit and hydraulic unit

Component	Specified torque
Bolt for TDC hole in cylinder block	30 Nm

## 2.6 Adjusting valve timing

Special tools and workshop equipment required

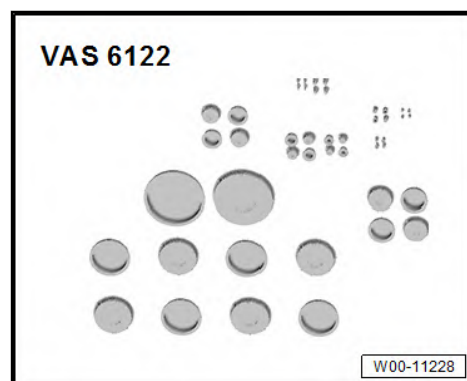




◆ Locating bolt -T10340-



◆ Engine bung set -VAS 6122-



### Sequence of operations

- Toothed belt installed.
- Check valve timing ⇒ [v2.5 alve timing](#), [page 213](#) .
- Set piston for cylinder no. 1 to TDC position ⇒ [p4.7 iston to TDC position](#), [page 174](#) .
- Do not relieve tension from toothed belt, and do not remove toothed belt from camshafts when adjusting valve timing. Only loosen camshaft adjuster or toothed belt sprocket.
- Loosen camshaft adjuster on inlet side ⇒ [page 258](#) .

### Exhaust side with toothed belt sprocket

- Loosen toothed belt sprocket on exhaust side ⇒ [page 278](#) .

### Exhaust side with camshaft adjuster

- Loosen camshaft adjuster on exhaust side ⇒ [page 273](#) .

### Continuation for all vehicles



#### Risk of damage to engine caused by incorrect valve timing.

- Do not turn crankshaft out of TDC position.
- Place a cloth under the camshaft adjusters and over tensioning roller to catch the engine oil which runs out.
- The contact points between the toothed belt and components - such as camshaft pulleys, tensioning roller and idler pulley - must be kept free of oil.
- Catch any engine oil which runs out immediately, and remove it.
- Remove engine oil at camshaft adjusters.

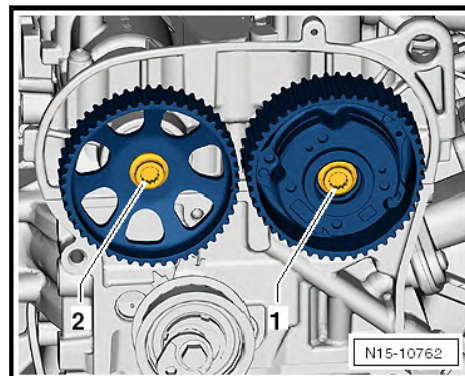




- Make sure that the piston in cylinder no. 1 is at TDC position  
⇒ [p4.7 piston to TDC position", page 174](#) .

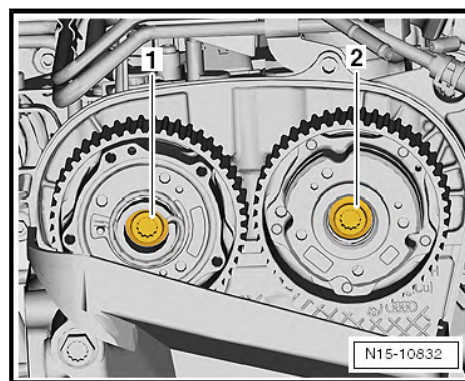
#### Exhaust side with toothed belt sprocket

- Renew bolt -2- and screw in loosely.
- Renew bolt -1- and screw in loosely.



#### Exhaust side with camshaft adjuster

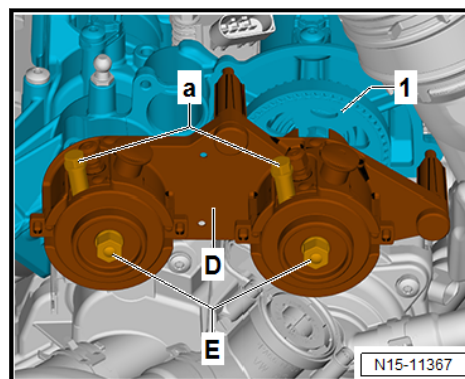
- Renew bolt -2- and screw in loosely.
- Renew bolt -1- and screw in loosely.



#### Continued for all vehicles

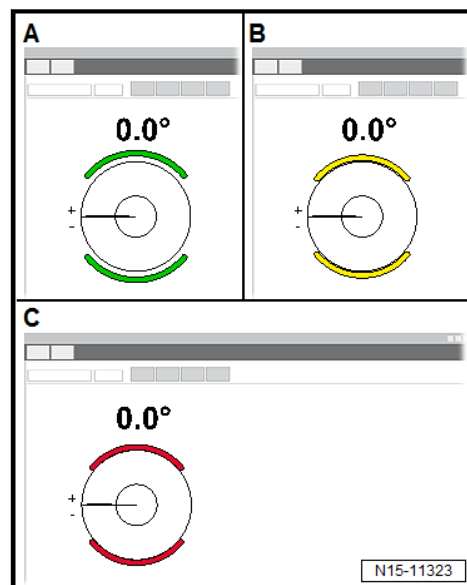
- It should still be possible to turn the camshaft adjuster and toothed belt sprocket on the camshafts.

#### Setting camshafts to »0°«:

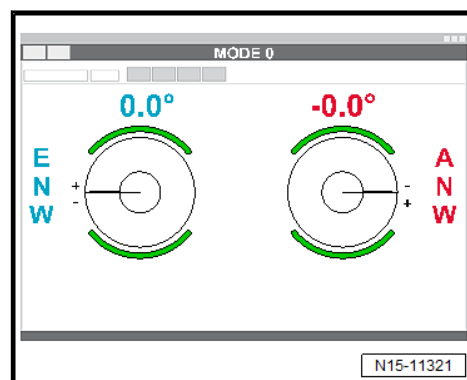


- Make sure that bolts -a- for brakes are released on both sides.
- Make sure that the brake indicator on the display is »green« -A-.

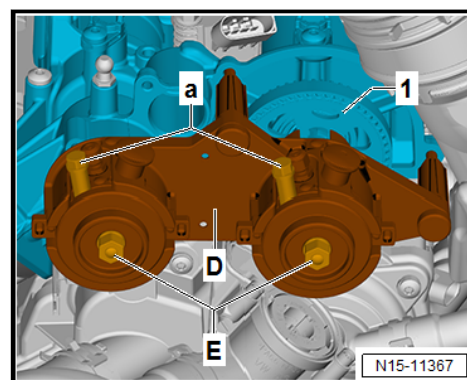




- Display must not be »yellow« or »red«.
- Set both camshafts to »0.0°«.



- To do this, turn camshafts with adapter for angle sensor -VAS 611 007/5- -E-.



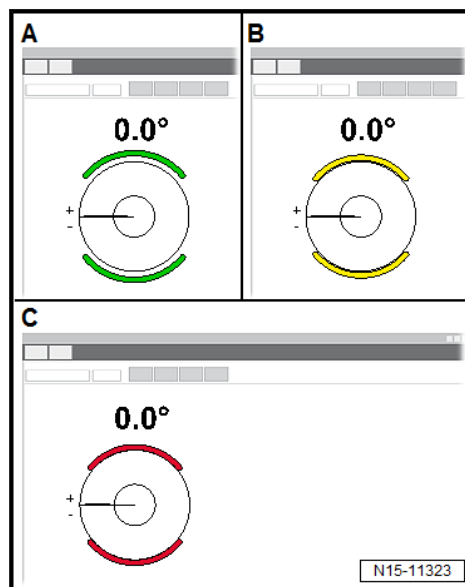
- Hold camshafts via adapter for angle sensor -VAS 611 007/9- and adapter for angle sensor -VAS 611 007/10- -E- in »0.0°« position with a wrench.



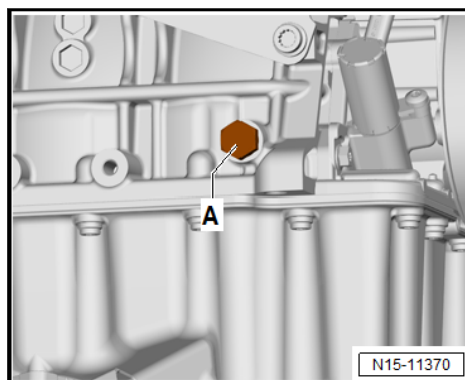


#### Note

- ◆ *The camshafts tend to turn.*
- ◆ *Use a hexagon key to hold the camshafts in 0.0° position.*
- ◆ *Always remove the hexagon key after the camshafts have been tightened.*
- Tighten brakes after adjustment has been completed.
- Tighten bolts -a- for brakes to 11 Nm on both sides.
- Make sure that the brake indicator on the display is »red« -C-.



- Display must not be »yellow« or »green«.
- Unscrew locking pin -T10340- -A-.

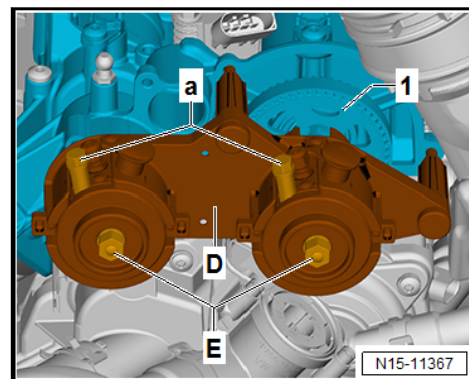


- Tighten camshaft adjuster on inlet camshaft to specified initial torque ⇒ [Fig. "A", page 260](#) .

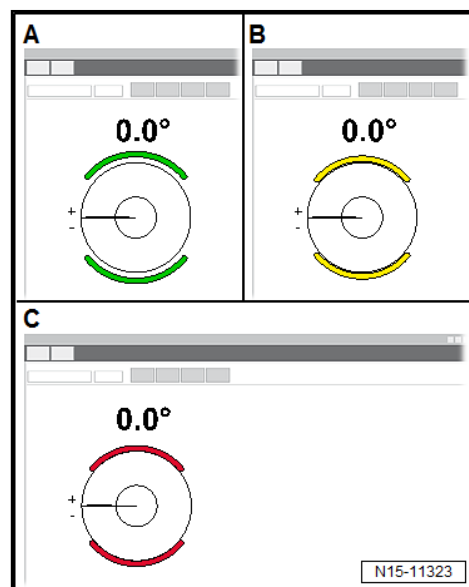
#### Continued for all vehicles

- Make sure that bolts -a- for brakes are released on both sides.

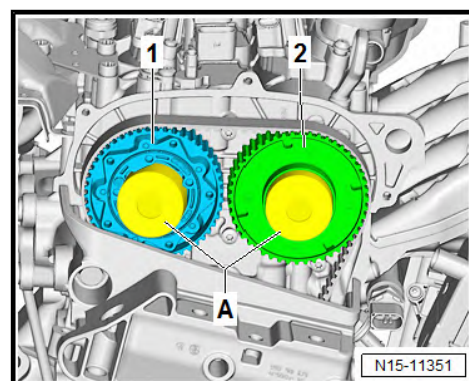




- Make sure that the brake indicator on the display is »green« -A-.



- Display must not be »yellow« or »red«.
- Seal camshaft adjuster -2- using suitable plugs -A- from engine bung set -VAS 6122-.



- Fit a piece of paper -A- into plugs to catch the engine oil.
- Insert plugs into camshaft adjusters with the open side facing towards front, as shown in illustration.
- Turn crankshaft 2 turns in direction of rotation of engine.

#### Determining correction angle

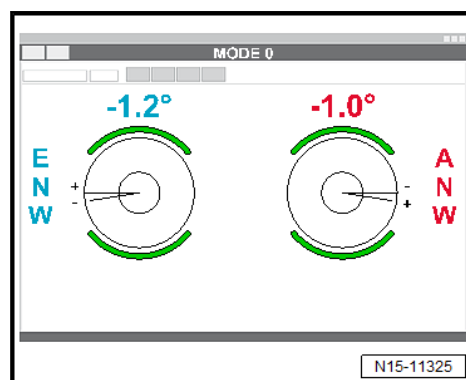
- Screw in locking pin -T10340-.





- Set piston for cylinder no. 1 to TDC position ⇒ [p4.7 iston to TDC position](#), [page 174](#) .
- Read valve timing on display and write down values.

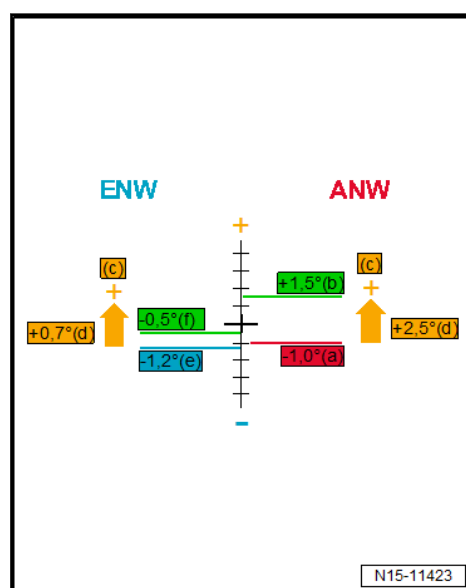
#### 1. measurement example: value reading on display



#### Note

- ◆ The correction angle is determined for each individual vehicle.
- ◆ The value read after the engine has been cranked is used for determining the correction angle.
- ◆ Note the algebraic signs of the values.
- ◆ The correction angle results from the difference between the specification and the value which has been read after the crankshaft has been cranked twice.
- ◆ The correction angle is used to adjust the valve timing.
- ◆ The difference between the actual value (read after 2 full revolutions of the engine) and the specification is calculated.
- ◆ The result is the correction angle to be set, with the corresponding algebraic sign/direction of rotation.

#### Example







Index	Explanation
e	Inlet camshaft - actual value (after 2 full revolutions of the engine)
f	Inlet camshaft - specification (+/- tolerance)
c	Direction of correction (+/-)
d	Correction value - correction angle
a	Exhaust camshaft - actual value (after 2 full revolutions of the engine)
b	Exhaust camshaft - specification (+/- tolerance)

Angle in °	Inlet camshaft	Exhaust camshaft
Specified angle	$-0.5^{\circ} \pm 1.5^{\circ}$	$+1.5^{\circ} \pm 1.5^{\circ}$

- Set determined correction angle for camshafts.

#### Setting valve timing with correction angle

- Place a cloth underneath camshaft adjuster to catch any engine oil which runs out.
- Remove plug taken from engine bung set -VAS 6122- from camshaft adjuster.
- Remove paper from plugs and camshaft adjusters.
- Clean camshaft adjusters with a cleaning cloth and remove as much engine oil as possible.
- Loosen camshaft adjuster on inlet side ➔ [page 258](#) .

#### Exhaust side with toothed belt sprocket

- Loosen toothed belt sprocket on exhaust side ➔ [page 278](#) .

#### Exhaust side with camshaft adjuster

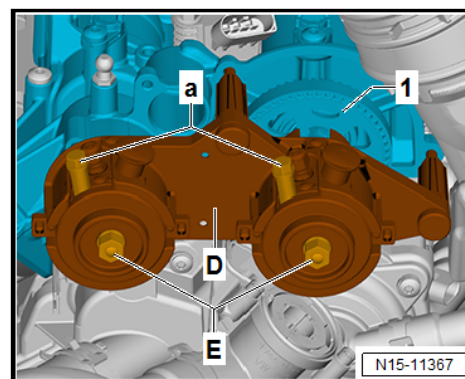
- Loosen camshaft adjuster on exhaust side ➔ [page 273](#) .

#### Continuation for all vehicles

#### ! NOTICE

**Risk of damage to engine caused by incorrect valve timing.**

- Do not turn crankshaft out of TDC position.
- Make sure that the piston in cylinder no. 1 is at TDC position ➔ [p4.7 iston to TDC position", page 174](#) .

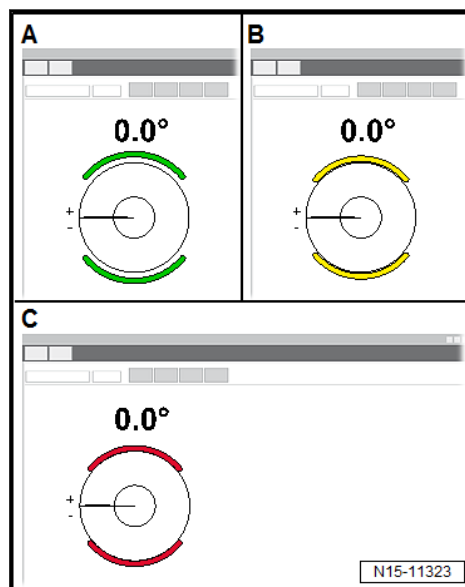


- Make sure that bolts -a- for brakes on test tool -VAS 611 007- are released on both sides.

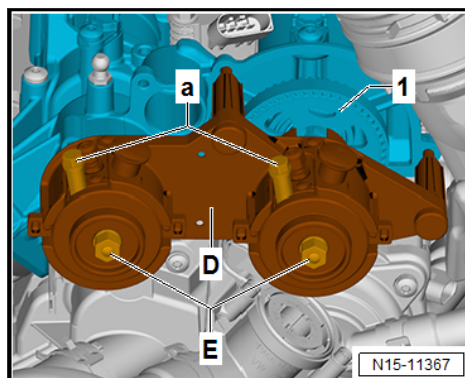




- Make sure that the brake indicator on the display is »green« -A-.

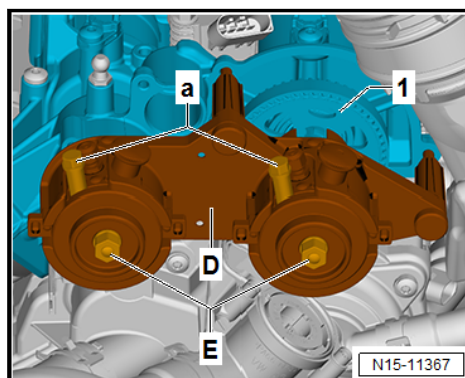


- Display must not be »yellow« or »red«.
- Set the two camshafts to the determined correction angle ➤ [page 221](#) .



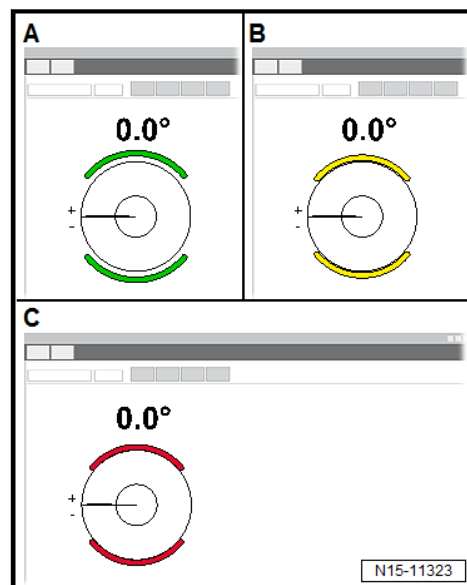
- To do this, turn camshafts with adapter for angle sensor -VAS 611 007/9- and adapter for angle sensor -VAS 611 007/10- -E-.

**If the valve timing has been set:**

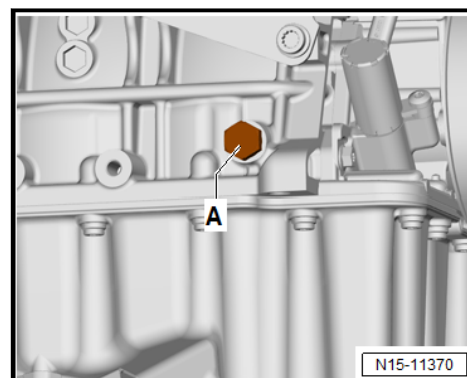


- Tighten bolts -a- for brakes on test tool -VAS 611 007- to 11 Nm on both sides.
- Make sure that brake indicator on display is red -C-.





- Display must not be »yellow« or »green«.
- Unscrew locking pin -T10340- -A-.



- Tighten camshaft adjuster on inlet camshaft to specified initial torque ➤ [Fig. "A", page 260](#).

#### Exhaust side with toothed belt sprocket

- Tighten toothed belt sprocket of exhaust camshaft to specified initial torque ➤ [page 280](#).

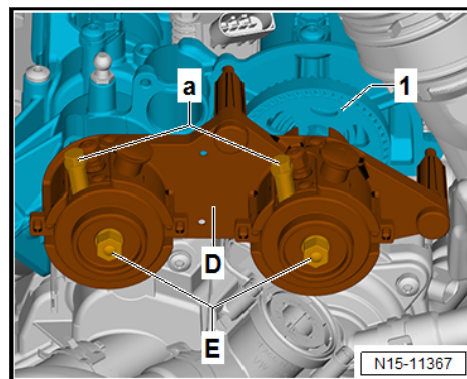
#### Exhaust side with camshaft adjuster

- Tighten camshaft adjuster of exhaust camshaft to specified initial torque ➤ [page 280](#).

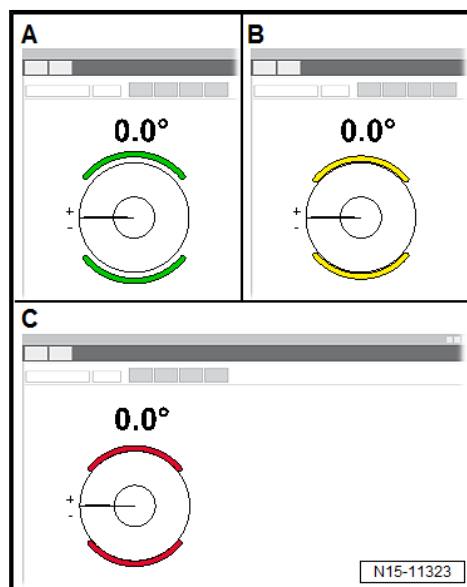
#### Continued for all vehicles

- Release brakes -a- on both sides.

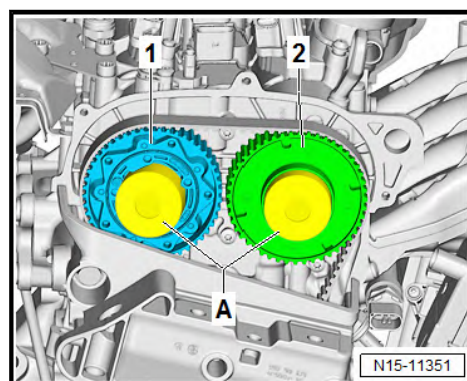




- Make sure that the brake indicator on the display is »green« -A-.



- Display must not be »yellow« or »red«.
- Seal camshaft adjusters -1- and -2- using suitable plugs -A- from engine bung set -VAS 6122-.



- Fit a new piece of paper into plugs -A- to catch the engine oil.
- The plug for the camshaft adjuster -1- on exhaust side must be pushed in slightly.
- Turn crankshaft 2 turns in direction of rotation of engine.
- Screw in locking pin -T10340-.





- Set piston for cylinder no. 1 to TDC position ⇒ [p4.7 iston to TDC position](#), [page 174](#) .



#### Note

- ◆ *Adjust valve timing as precisely as possible. The settings must be as close to the specifications as possible.*
- ◆ *The valve timing must not be outside the tolerance limits.*
- Read valve timing, and compare it with specifications.

#### Specified angle in °

Inlet camshaft	Exhaust camshaft
$-1.5^{\circ} \pm 1.5^{\circ}$	$+1.0^{\circ} \pm 1.5^{\circ}$

- If the valve timing is not OK, adjust valve timing again ⇒ [v2.6 alve timing](#), [page 216](#) .

Assembly is carried out in reverse sequence; note the following:

- Unscrew locking pin -T10340-.
- Make sure that brakes on test tool -VAS 611 007- are released on both sides.
- Tighten camshaft adjuster on inlet camshaft to specified final torque ⇒ [Fig. "“", page 261](#) .

#### Exhaust side with toothed belt sprocket

- Tighten toothed belt sprocket of exhaust camshaft to specified final torque ⇒ [page 280](#) .

#### Exhaust side with camshaft adjuster

- Tighten exhaust camshaft adjuster to specified final torque ⇒ [page 268](#) .

#### Specified torques

- ◆ ⇒ [o2.2 verview - toothed belt](#), [page 199](#)
- ◆ ⇒ [o2.1 verview - coolant pump, thermostat](#), [page 348](#)
- ◆ ⇒ [o3.1 verview - air filter housing](#), [page 470](#)

## 2.7 Removing and installing toothed belt

#### Special tools and workshop equipment required

- ◆ Torque wrench -VAS 6583A-







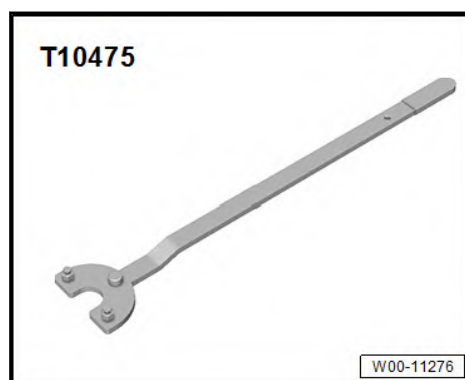
- ◆ Counter-hold tool -T10172A-



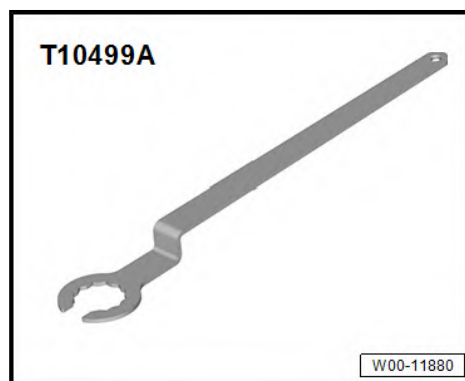
- ◆ Locating bolt -T10340-



- ◆ A
- ◆ Counter-hold tool -T10475-



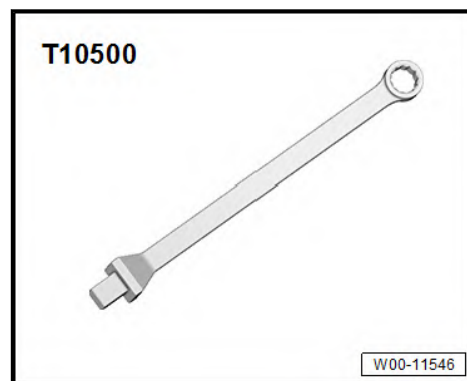
- ◆ Ring spanner -T10499A-



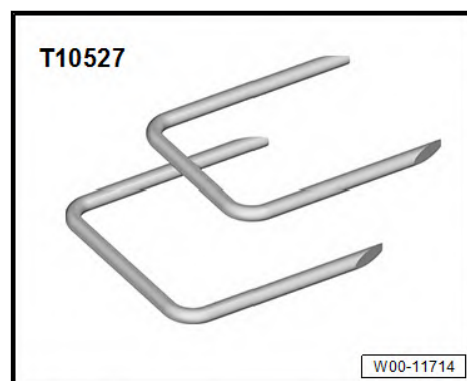




◆ Insert tool -T10500-



◆ Release tool -T10527-



◆ Release tool -T10527/1-

### Removing

- Set piston of no. 1 cylinder to "TDC" position. ⇒ [p4.7 iston to TDC position](#), [page 174](#)
- Remove upper part of toothed belt guard ⇒ [a2.3.1 nd installing upper toothed belt guard](#), [page 203](#) .
- Remove lower toothed belt guard ⇒ [a2.3.2 nd installing lower toothed belt guard](#), [page 204](#) .
- Loosen plug and securing bolt for camshaft adjuster on inlet side ⇒ [a3.3 nd installing camshaft adjuster](#), [page 256](#) .

### Exhaust side with toothed belt sprocket

- Loosen securing bolt of toothed belt pulley on exhaust side by approx. one turn ⇒ [page 278](#) .

### Exhaust side with camshaft adjuster

- Loosen securing bolt of camshaft adjuster on exhaust side by approx. one turn ⇒ [page 273](#) .

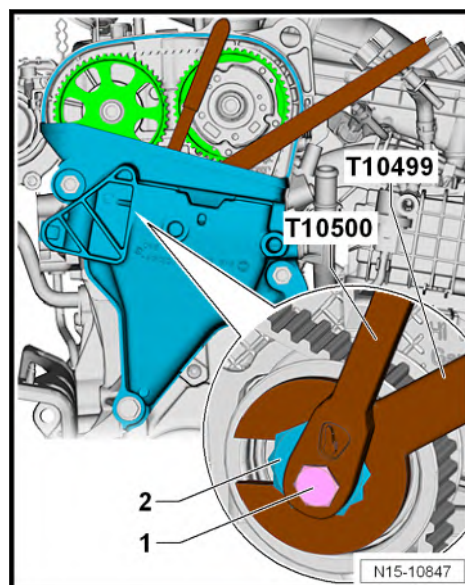
### Continuation for all vehicles



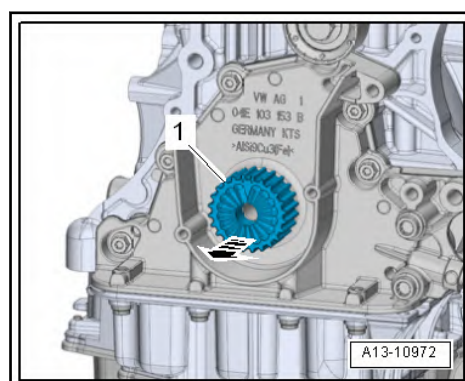
#### Note

- ◆ *If a used toothed belt runs in the opposite direction when it is refitted, it may break.*
- ◆ *Before removing, mark direction of rotation of toothed belt with chalk or felt-tipped pen for re-installation.*
- Loosen securing bolt of tensioning roller -1- using insert tool, 13 mm -T10500-.

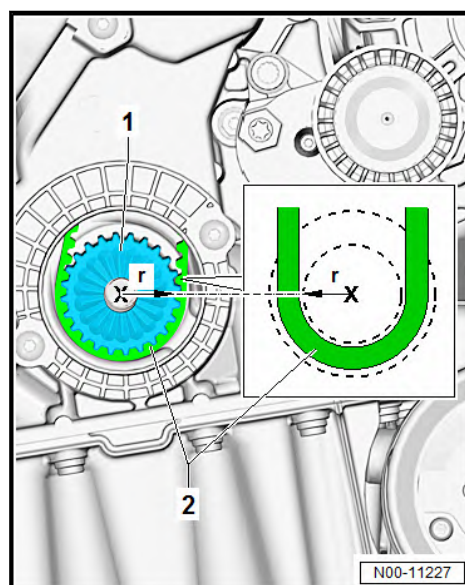




- Release tension on tensioning roller at eccentric -2- using wrench -T10499A-.
- Remove toothed belt.
- Detach crankshaft pulley -1- -arrow-.



**Bend radius of toothed belt**





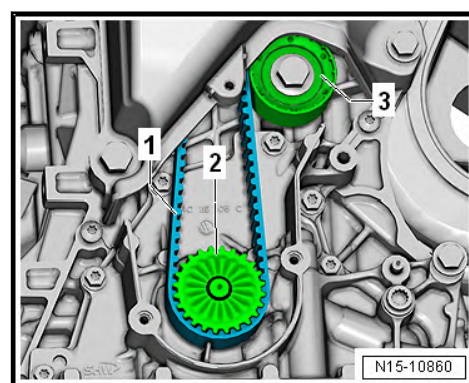


#### Note

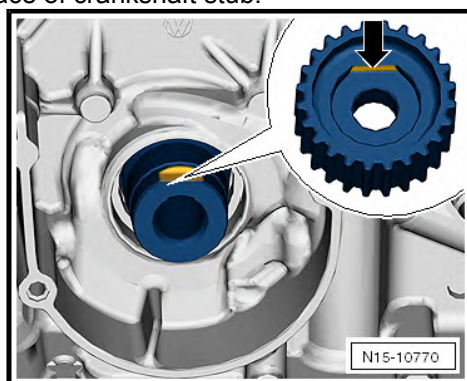
- ◆ If the radius/diameter is not reached, the toothed belt could become damaged.
- ◆ The toothed belt is made of glass fibre fabric.
- ◆ Never kink toothed belt!
- ◆ The bend radius -r- of the toothed belt -2- may therefore never exceed 25 mm. Approx. half of pulley diameter -1- on crankshaft ⇒ Fig. *“Bend radius of toothed belt”*, page 230.

#### Installing

- Fit toothed belt -1- together with crankshaft pulley -2- onto crankshaft journal.



- Milled surface of crankshaft sprocket -arrow- must be positioned on milled surface of crankshaft stub.

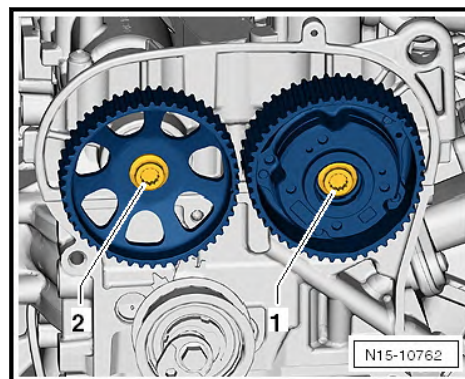


- Contact surface between poly V-belt pulley and crankshaft toothed belt pulley must be free of oil and grease.

#### Exhaust side with toothed belt sprocket

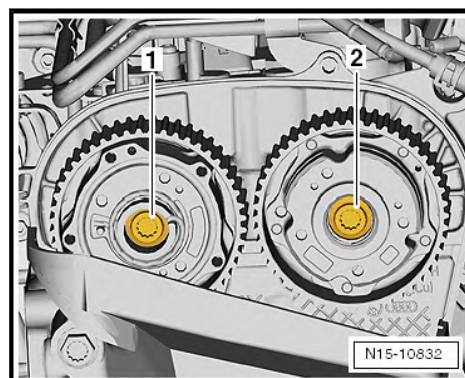
- Renew bolt -2- and screw in loosely.
- Renew bolt -1- and screw in loosely.





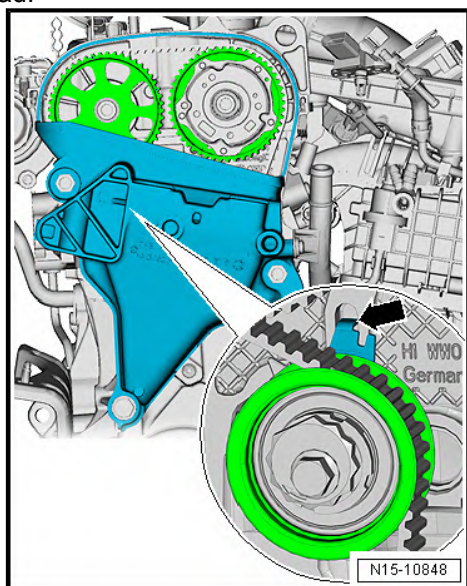
#### Exhaust side with camshaft adjuster

- Renew bolt -2- and screw in loosely.
- Renew bolt -1- and screw in loosely.



#### Continued for all vehicles

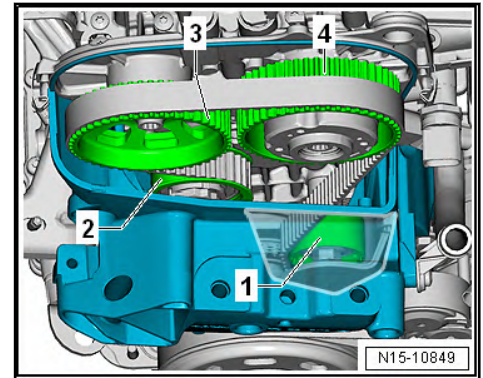
- It should just be possible to turn camshaft pulleys on camshafts but no rocking is permissible.
- Retaining lug -arrow- of tensioning roller must engage in recess in cylinder head.



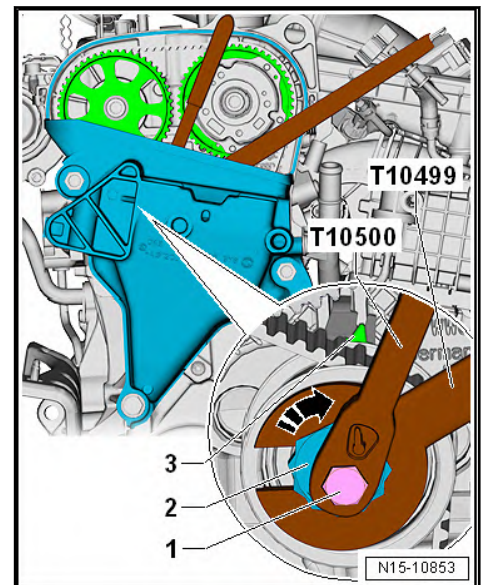




Fit toothed belt in prescribed sequence:



- Pull toothed belt upwards and fit on idler pulley -1-, tensioning roller -2- and camshaft toothed belt pulleys -3- and -4-.
- Rotate eccentric -2- of tensioning roller using special wrench -T10499A- in -direction of arrow- until adjustment pointer -3- is located approx. 10 mm to the right from adjustment window.



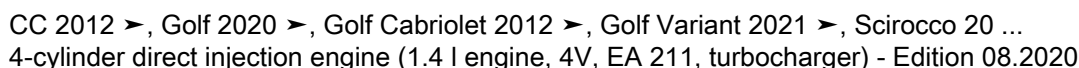
- Turn eccentric adjuster back until adjustment indicator is positioned exactly in adjustment window.



#### Note

- ◆ *Torque wrench -VAS 6583A- must be used for tightening.*
- ◆ *When setting specified torque on torque wrench -VAS 6583A-, length must be entered in torque wrench.*
- Hold eccentric in that position and tighten bolt -1- to 25 Nm using insert tool -T10500- with torque wrench -VAS 6583A-.





- Install lower part of toothed belt guard ⇒ a2.3.2 nd installing lower toothed belt guard, page 204 .
- Tighten camshaft adjuster on inlet camshaft to specified initial torque ⇒ Fig. “””, page 260 .

- Tighten toothed belt sprocket of exhaust camshaft to specified initial torque ⇒ **page 280** .

- Tighten camshaft adjuster of exhaust camshaft to specified initial torque  $\Rightarrow$  **page 280**.

- Check valve timing ⇒ [v2.5 alve timing”, page 213](#) .
- Adjust valve timing ⇒ [v2.6 alve timing”, page 216](#) .
- Tighten camshaft adjuster on inlet camshaft to specified final torque ⇒ [Fig. “44974”, page 261](#) .

- Tighten toothed belt sprocket of exhaust camshaft to specified final torque ⇒ **page 280** .

- Tighten exhaust camshaft adjuster to specified final torque.  
⇒ page 275

**Specified torques:**

- ⇒ o1.1 view - poly V-belt drive”, page 122
- ⇒ o2.1 view - toothed belt cover”, page 198
- ⇒ o2.2 view - toothed belt”, page 199
- ⇒ Fig. “Plug for TDC drilling in cylinder block at rear – specified torque”<sup>4</sup>, page 128
- ⇒ o1.2 view - camshaft housing”, page 181
- ⇒ o3.1 view - crankcase breather system”, page 317
- ⇒ o2.1 view - coolant pump, thermostat”, page 348
- ⇒ o1.1 view - turbocharger”, page 416
- ⇒ o2.1 view - charge air system”, page 433
- ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation

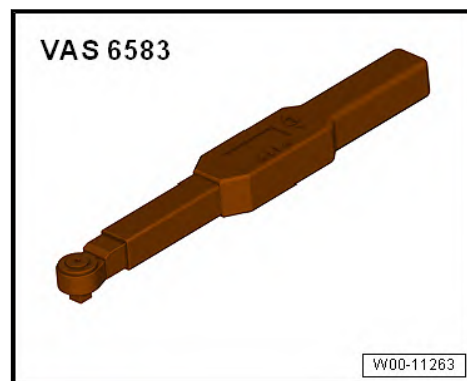
## 2.8 Removing toothed belt from camshaft

### Special tools and workshop equipment required





- ◆ Torque wrench -VAS 6583A-



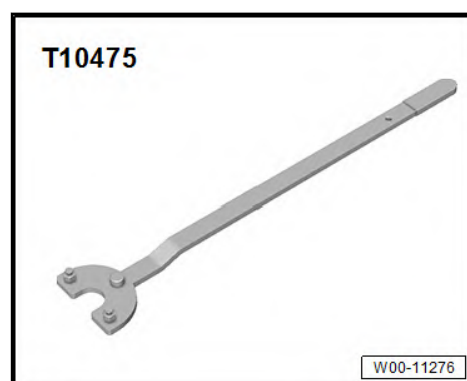
- ◆ Counter-hold tool -T10172A-



- ◆ Locating bolt -T10340-



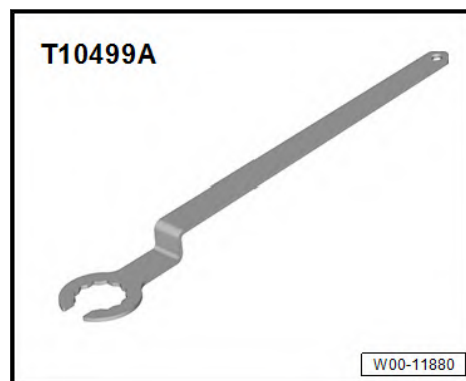
- ◆ Counter-hold tool -T10475-



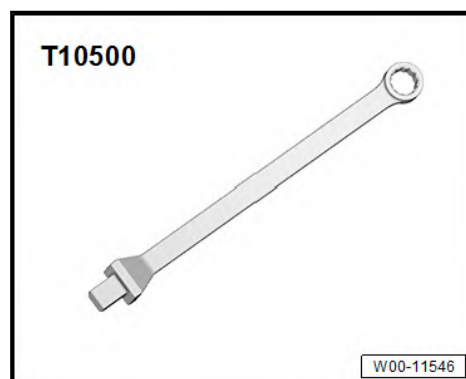




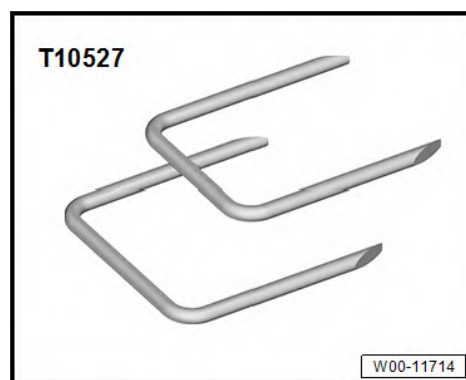
◆ Ring spanner -T10499A-



◆ Insert tool -T10500-



◆ Release tool -T10527-



◆ Release tool -T10527/1-

**Sequence of operations**

- Set piston in cylinder no. 1 to TDC position ⇒ [p4.7 iston to TDC position”, page 174](#) .
- Remove upper part of toothed belt guard ⇒ [a2.3.1 nd installing upper toothed belt guard”, page 203](#) .
- Loosen securing bolt of camshaft adjuster on inlet side by approx. one turn ⇒ [a3.3 nd installing camshaft adjuster”, page 256](#) .

**Exhaust side with toothed belt sprocket**

- Loosen securing bolt of toothed belt pulley on exhaust side by approx. one turn ⇒ [page 278](#) .

**Exhaust side with camshaft adjuster**

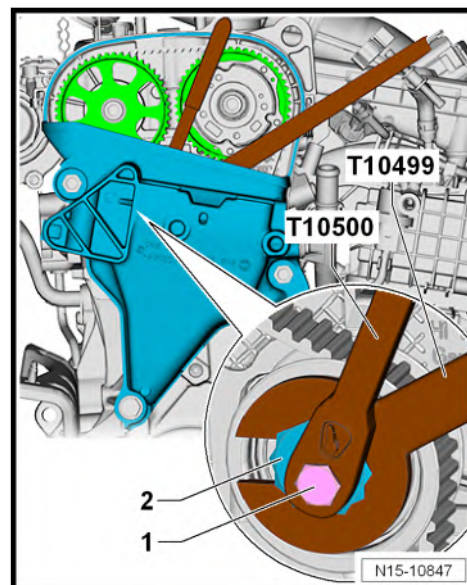
- Loosen securing bolt of camshaft adjuster on exhaust side by approx. one turn ⇒ [page 273](#) .





### Continuation for all vehicles

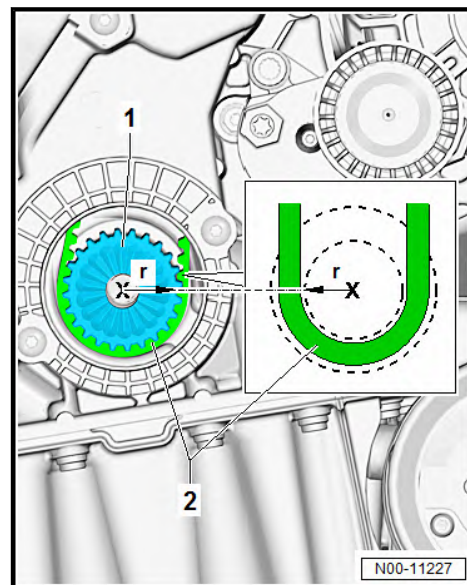
- Loosen securing bolt of tensioning roller -1- using insert tool, 13 mm -T10500-.



- Release tension on tensioner at eccentric -2- using wrench -T10499A-.
- Remove toothed belt from camshaft pulleys.

### Installing

#### Bend radius of toothed belt







#### Note

- ◆ If the radius/diameter is not reached, the toothed belt could become damaged.
- ◆ The toothed belt is made of glass fibre fabric.
- ◆ Never kink any toothed belts, regardless of whether they are used or new.
- ◆ The bend radius -r- of the toothed belt -2- may therefore never exceed 25 mm. Approx. half of pulley diameter -1- on crankshaft ➔ [page 237](#).

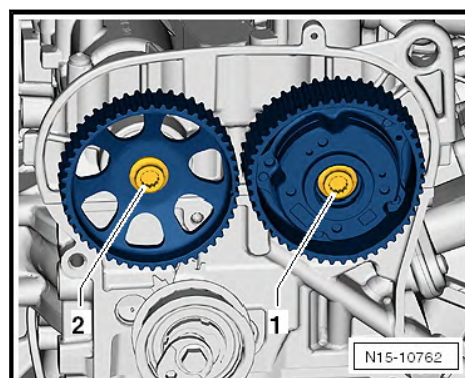


#### Note

- ◆ Renew bolts that are tightened with turning further angle.
- ◆ Renew O-ring or plug if damaged ➔ *Electronic parts catalogue*.

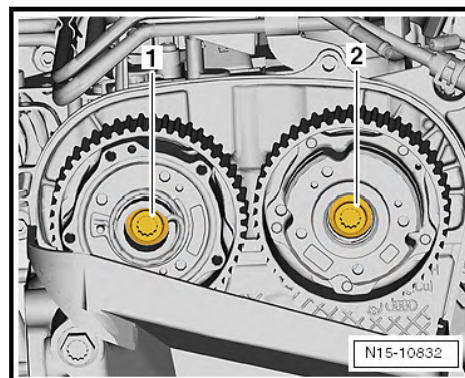
#### Exhaust side with toothed belt sprocket

- Renew bolt -2- and screw in loosely.
- Renew bolt -1- and screw in loosely.



#### Exhaust side with camshaft adjuster

- Renew bolt -2- and screw in loosely.
- Renew bolt -1- and screw in loosely.

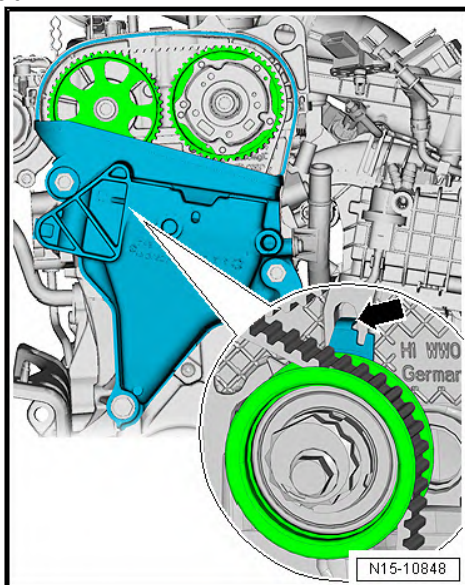


#### Continued for all vehicles

- It should just be possible to turn camshaft pulleys on camshafts but no rocking is permissible.

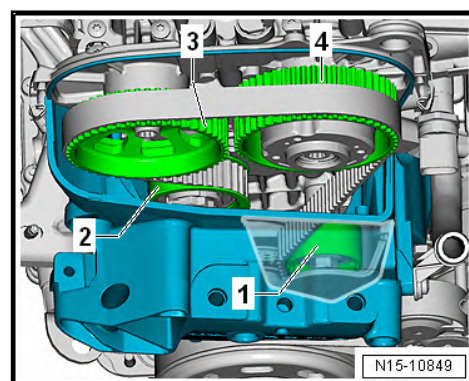


- Retaining lug -arrow- of tensioning roller must engage in recess in cylinder head.



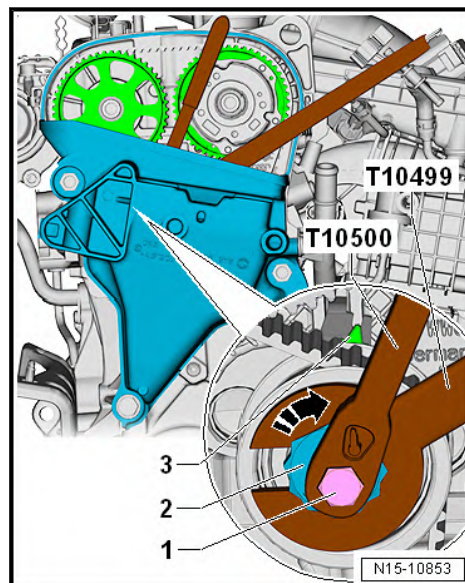
**Fit toothed belt in prescribed sequence:**

- Pull toothed belt upwards and fit on idler pulley -1-, tensioning roller -2- and camshaft toothed belt pulleys -3- and -4-.



- Using special wrench 30 mm -T10499A-, turn eccentric adjuster -2- of tensioning roller in direction of -arrow- until adjustment indicator -3- is positioned approx. 10 mm to the right of adjustment window.





- Turn eccentric adjuster back until adjustment indicator is positioned exactly in adjustment window.



#### Note

- ♦ Torque wrench -VAS 6583A- must be used for tightening.
- ♦ When setting specified torque on torque wrench -VAS 6583A-, length must be entered in torque wrench.
- Hold eccentric in that position and tighten bolt -1- to 25 Nm. To do this, use insert tool, 13 mm -T10500- with torque wrench -VAS 6583A- ➔ [o2.2 verview - toothed belt", page 199](#) .



#### Note

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

- Tighten camshaft adjuster on inlet camshaft to specified initial torque ➔ [Fig. "\\*\\*\\*\\*", page 260](#) .

#### Exhaust side with toothed belt sprocket

- Tighten toothed belt sprocket of exhaust camshaft to specified initial torque ➔ [page 280](#) .

#### Exhaust side with camshaft adjuster

- Tighten camshaft adjuster of exhaust camshaft to specified initial torque ➔ [page 280](#) .

#### Continued for all vehicles

- Check valve timing ➔ [v2.5 alve timing", page 213](#) .
- Adjust valve timing ➔ [v2.6 alve timing", page 216](#) .
- Tighten camshaft adjuster on inlet camshaft to specified final torque ➔ [Fig. "\\*\\*\\*\\*", page 261](#) .





#### **Exhaust side with toothed belt sprocket**

- Tighten toothed belt sprocket of exhaust camshaft to specified final torque [⇒ page 280](#) .

#### **Exhaust side with camshaft adjuster**

- Tighten exhaust camshaft adjuster to specified final torque.  
[⇒ page 275](#)

Further assembly is carried out in the reverse order of removal.

#### **Specified torques**

- ◆ [⇒ o2.2 verview - toothed belt", page 199](#)
- ◆ [⇒ o2.1 verview - toothed belt cover", page 198](#)
- ◆ [⇒ o1.1 verview - turbocharger", page 416](#)
- ◆ [⇒ o2.1 verview - coolant pump, thermostat", page 348](#)
- ◆ [⇒ o2.1 verview - charge air system", page 433](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation





### 3 Valve gear

⇒ [o3.1 verview - valve gear", page 242](#)

⇒ [a3.2 nd installing camshaft oil seal", page 244](#)

⇒ [a3.3 nd installing camshaft adjuster", page 256](#)

⇒ [a3.4 nd installing toothed belt pulley", page 277](#)

⇒ [a3.5 nd installing camshaft control valve 1N205", page 282](#)

⇒ [a3.6 nd installing exhaust camshaft control valve 1N318",  
page 283](#)

⇒ [a3.7 nd installing valve stem seals", page 284](#)

#### 3.1 Assembly overview - valve gear





### 1 - Inlet valve

- ☐ Do not rework. Only lapping in is permitted.
- ☐ Valve dimensions  $\Rightarrow$  [d4.3 imensions", page 297](#)
- ☐ Checking valve guides  $\Rightarrow$  [v4.1 alve guides", page 296](#)

### 2 - Outlet valve

- ☐ Do not rework. Only lapping in is permitted.
- ☐ Valve dimensions  $\Rightarrow$  [d4.3 imensions", page 297](#)
- ☐ Checking valve guides  $\Rightarrow$  [v4.1 alve guides", page 296](#)

### 3 - Cylinder head

### 4 - Valve stem seal

- ☐ Renewing  $\Rightarrow$  [a3.7 nd installing valve stem seals", page 284](#)

### 5 - Valve springs

- ☐ Fitting position  $\Rightarrow$  [page 243](#)

### 6 - Valve spring plate

### 7 - Valve cotters

### 8 - Roller rocker fingers

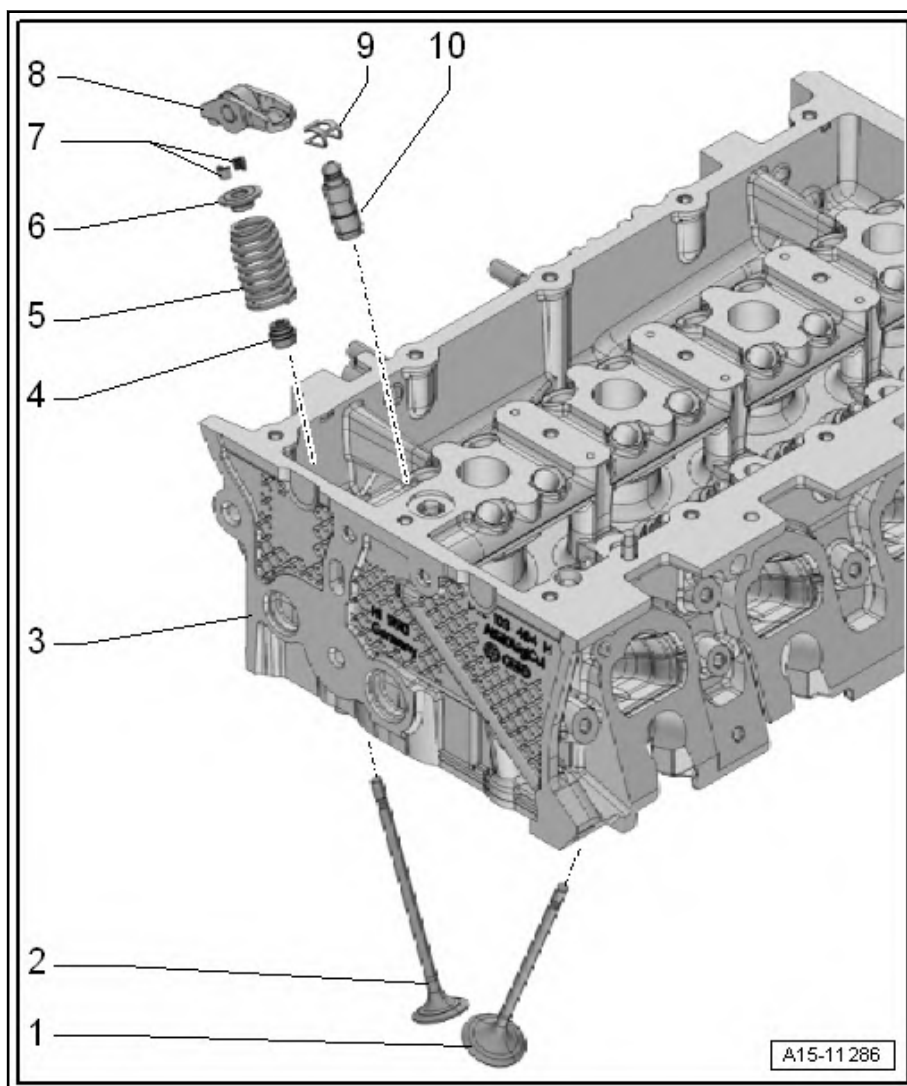
- ☐ Removing and installing  $\Rightarrow$  [a1.4 nd installing camshaft housing", page 190](#)
- ☐ Mark installation position for re-installation.
- ☐ Check roller bearing for ease of movement.
- ☐ Lubricate contact surfaces before installing.

### 9 - Retaining clip

- ☐ For hydraulic compensation element.

### 10 - Hydraulic compensation element

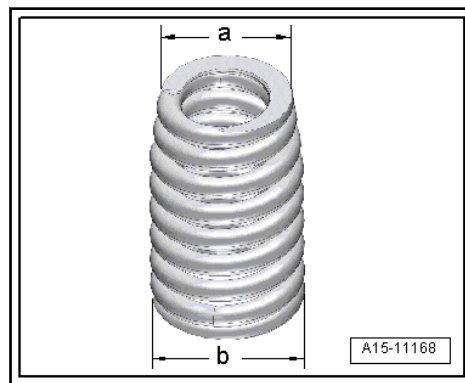
- ☐ Do not interchange
- ☐ Oil contact surface



A15-11 286

### Installation position of valve spring





- The end with smaller diameter -a- must face towards valve spring plate.
- The end with larger diameter -b- must face towards cylinder head.

### 3.2 Removing and installing camshaft oil seal

⇒ [a3.2.1 nd installing camshaft oil seal, for inlet camshaft on belt pulley side, exhaust side with toothed belt sprocket", page 244](#)

⇒ [a3.2.2 nd installing camshaft oil seal, for inlet camshaft on belt pulley side, exhaust side with camshaft adjuster", page 246](#)

⇒ [a3.2.3 nd installing camshaft oil seal, for exhaust camshaft on belt pulley side, exhaust side with toothed belt sprocket", page 249](#)

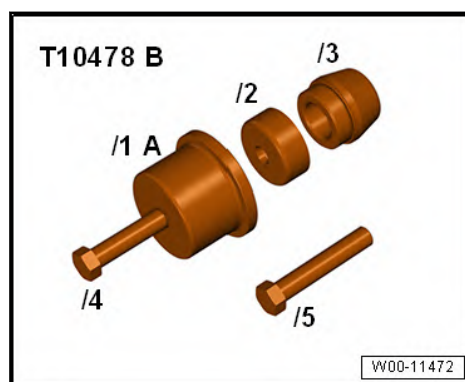
⇒ [a3.2.4 nd installing camshaft oil seal, for exhaust camshaft on belt pulley side, exhaust side with camshaft adjuster", page 251](#)

⇒ [a3.2.5 nd installing camshaft oil seal, exhaust camshaft, gear-box end ", page 254](#)

#### 3.2.1 Removing and installing camshaft oil seal, for inlet camshaft on belt pulley side, exhaust side with toothed belt sprocket

Special tools and workshop equipment required

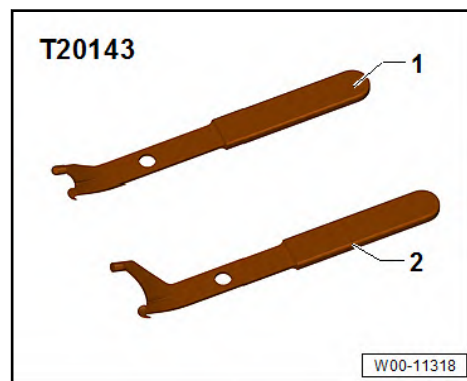
- ◆ Assembly tool -T10478 B-





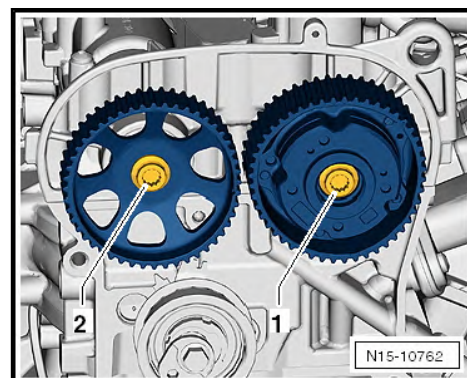


◆ Extractor hook -T20143-

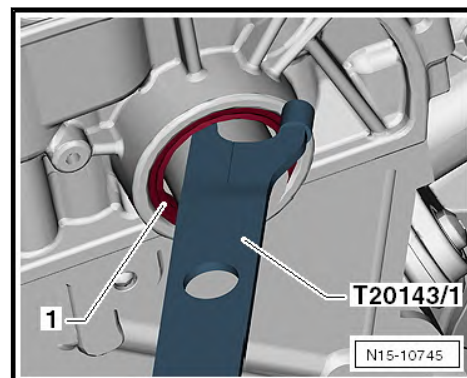


### Removing

- Remove toothed belt from camshafts ⇒ [t2.8 oothed belt from camshaft](#), [page 234](#) .
- Unscrew bolt -1- and remove camshaft toothed belt pulley.



- Remove seal -1- using extractor hook -T20143/1-.



### Installing

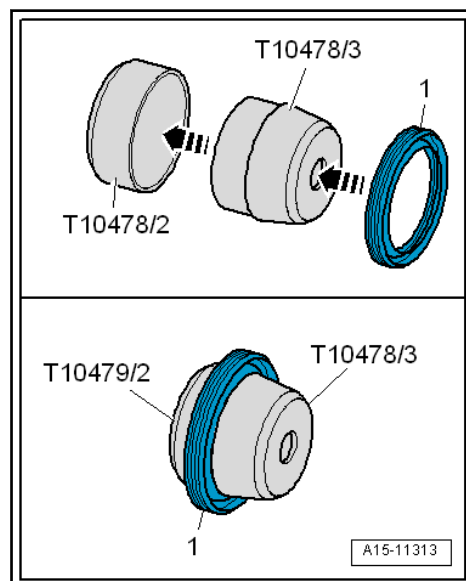


#### Note

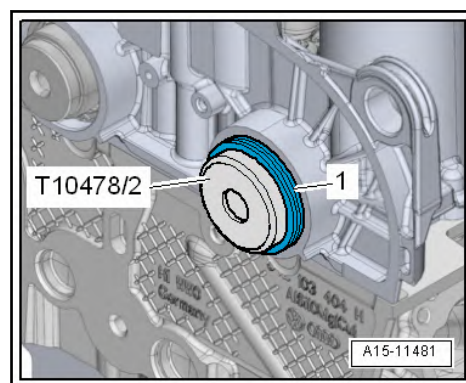
*Do not lubricate new seal.*

- Fit seal -1- over fitting sleeve -T10478/3- onto guide sleeve -T10478/2-.

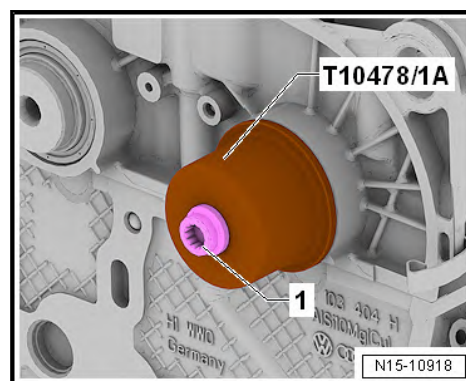




- Installation position: closed end of seal faces fitting sleeve.
- Separate fitting sleeve and guide sleeve.
- Fit guide sleeve -T10478/2- with oil seal -1- onto camshaft.



- Draw in seal to stop using thrust piece -T10478/1A- and bolt -1- for camshaft pulley.



- Install toothed belt (adjust valve timing) ⇒ [page 237](#) .

### 3.2.2 Removing and installing camshaft oil seal, for inlet camshaft on belt pulley

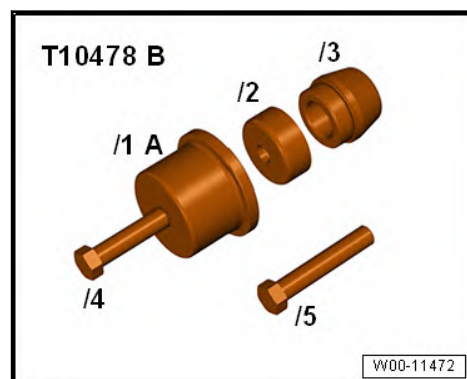




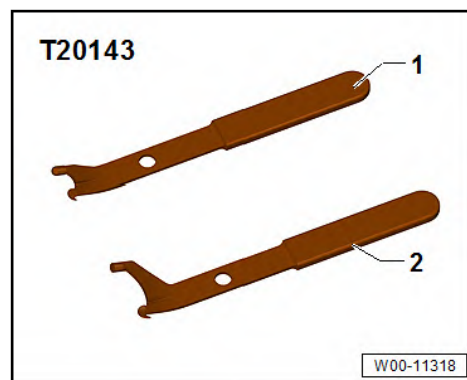
## side, exhaust side with camshaft adjuster

### Special tools and workshop equipment required

- ◆ Assembly tool -T10478 B-

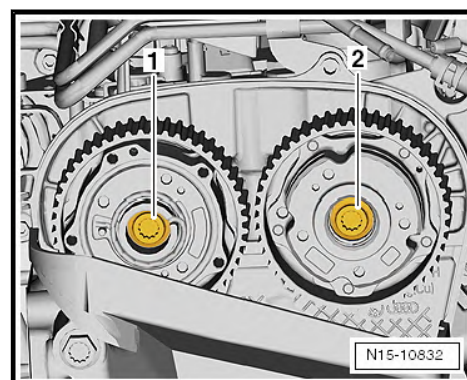


- ◆ Extractor hook -T20143-



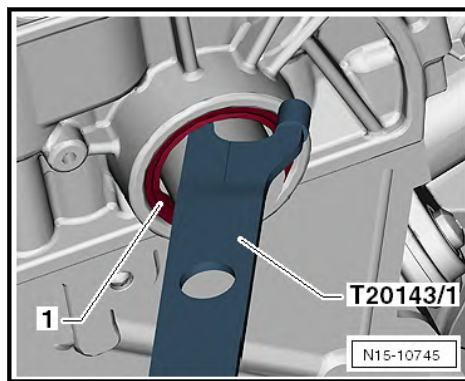
### Removing

- Remove toothed belt from camshafts ⇒ [t2.8 oothed belt from camshaft", page 234](#) .
- Unscrew bolt -2- and remove camshaft toothed belt pulley.



- Remove seal -1- using extractor hook -T20143/1-.





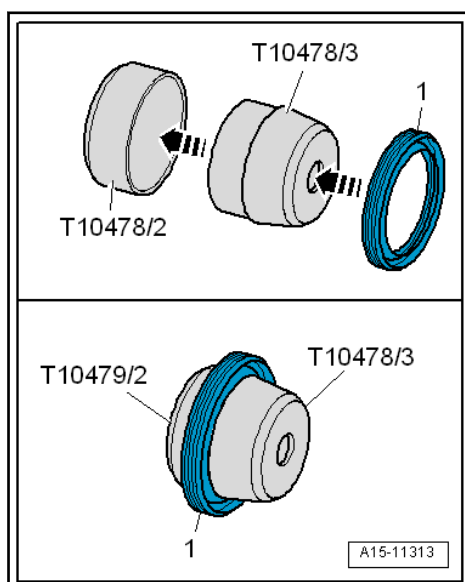
## Installing



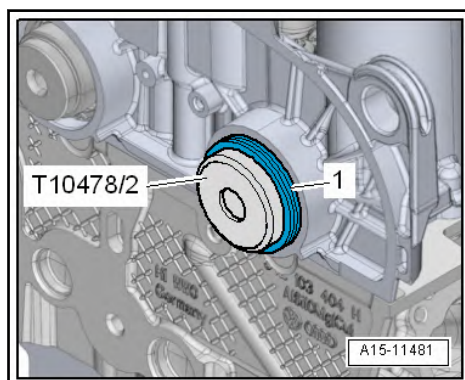
### Note

*Do not lubricate new seal.*

- Fit seal -1- over fitting sleeve -T10478/3- onto guide sleeve -T10478/2-.



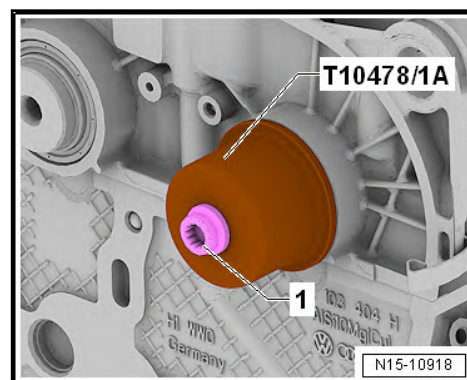
- Installation position: closed end of seal faces fitting sleeve.
- Separate fitting sleeve and guide sleeve.
- Fit guide sleeve -T10478/2- with oil seal -1- onto camshaft.







- Draw in seal to stop using thrust piece -T10478/1A- and bolt -1- for camshaft pulley.

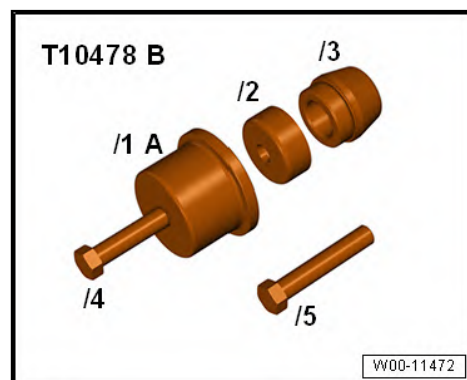


- Install toothed belt (adjust valve timing) ➤ [page 237](#) .

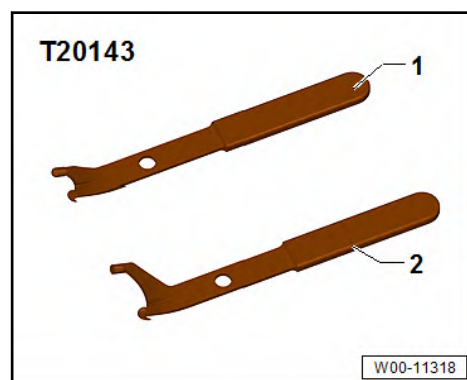
### 3.2.3 Removing and installing camshaft oil seal, for exhaust camshaft on belt pulley side, exhaust side with toothed belt sprocket

Special tools and workshop equipment required

- ◆ Assembly tool -T10478 B-



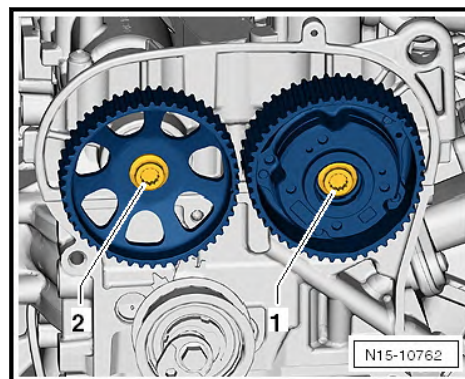
- ◆ Extractor hook -T20143-



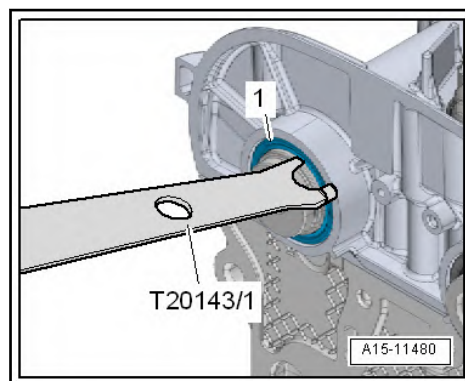
### Removing

- Remove toothed belt from camshafts ➤ [t2.8 oothed belt from camshaft", page 234](#) .
- Unscrew bolt -2- and remove camshaft toothed belt pulley.





- Remove seal -1- using extractor hook -T20143/1-.



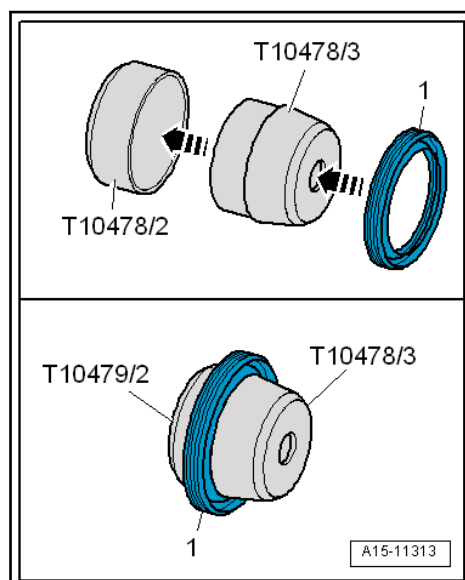
## Installing



### Note

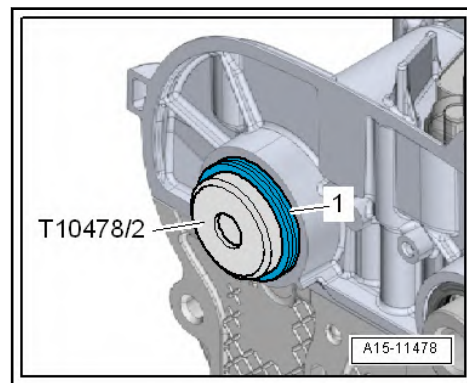
*Do not lubricate new seal.*

- Fit seal -1- over fitting sleeve -T10478/3- onto guide sleeve -T10478/2-.

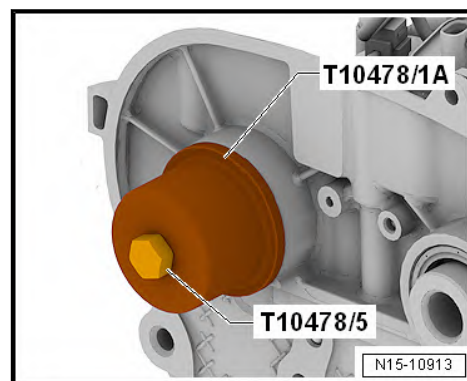


- Installation position: closed end of seal faces fitting sleeve.
- Separate fitting sleeve and guide sleeve.
- Fit guide sleeve -T10478/2- with oil seal -1- to camshaft.





- Pull in thrust piece -T10478/1A- with bolt -T10478/5- as far as stop.

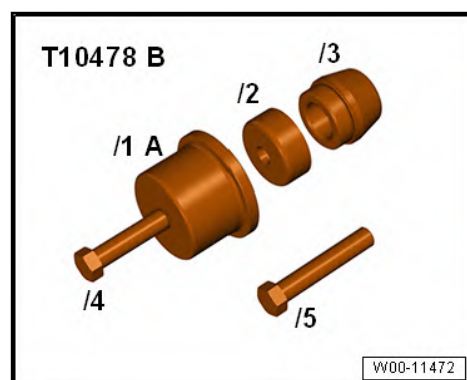


- Install toothed belt (adjust valve timing) ➤ [page 237](#) .

### 3.2.4 Removing and installing camshaft oil seal, for exhaust camshaft on belt pulley side, exhaust side with camshaft adjuster

Special tools and workshop equipment required

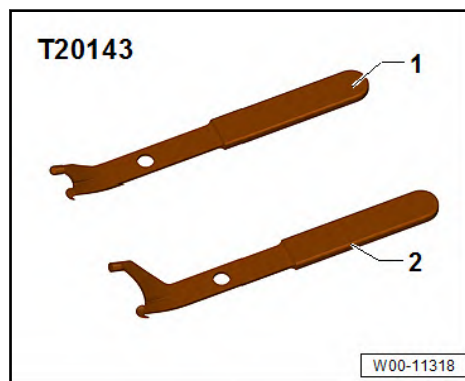
- ◆ Assembly tool -T10478 B-





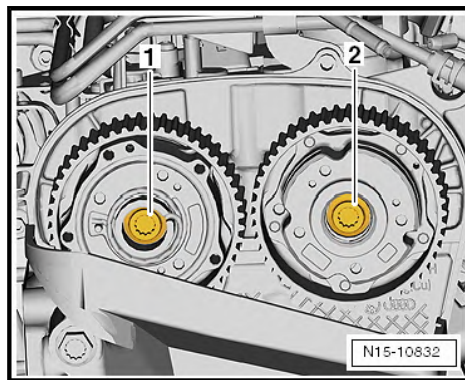


♦ Extractor hook -T20143-

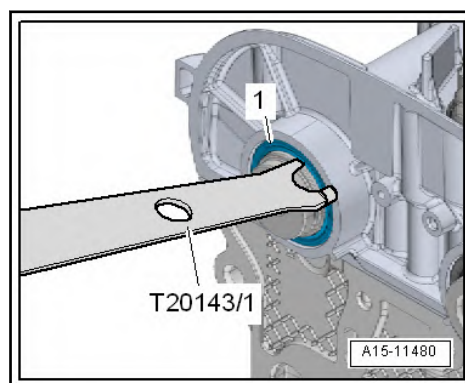


### Removing

- Remove engine support ⇒ [a1.6 nd installing engine support", page 136](#) .
- Remove toothed belt from camshafts ⇒ [t2.8 oothed belt from camshaft", page 234](#) .
- Unscrew bolt -1- and remove camshaft toothed belt pulley.



- Remove seal -1- using extractor hook -T20143/1-.



### Installing

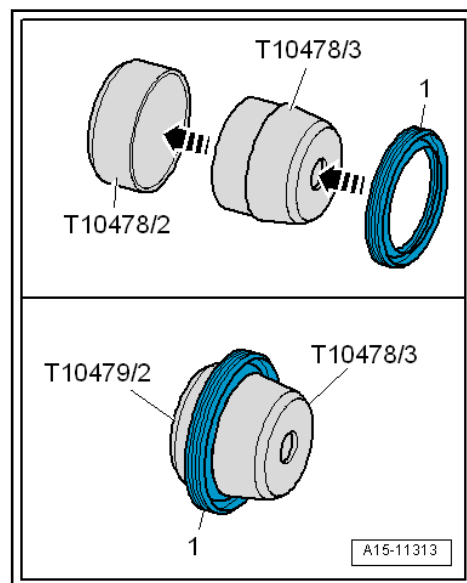


#### Note

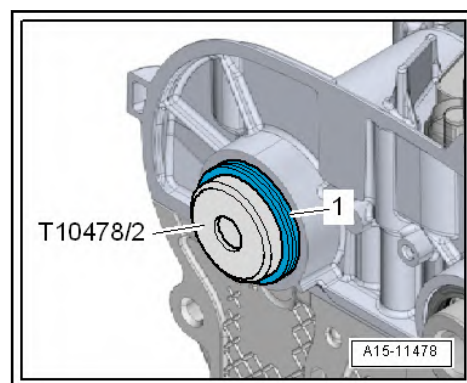
*Do not lubricate new seal.*

- Fit seal -1- over fitting sleeve -T10478/3- onto guide sleeve -T10478/2-.

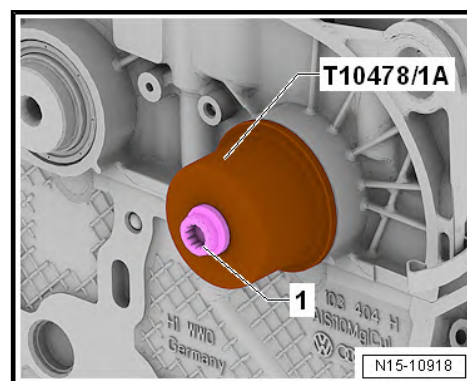




- Installation position: closed end of seal faces fitting sleeve.
- Separate fitting sleeve and guide sleeve.
- Fit guide sleeve -T10478/2- with oil seal -1- to camshaft.



- Draw in thrust piece -T10478/1A- to stop using bolt -1- for camshaft pulley.



- Install toothed belt (adjust valve timing) ➤ [page 237](#) .
- Installing engine support ➤ [a1.6 nd installing engine support](#), [page 136](#) .

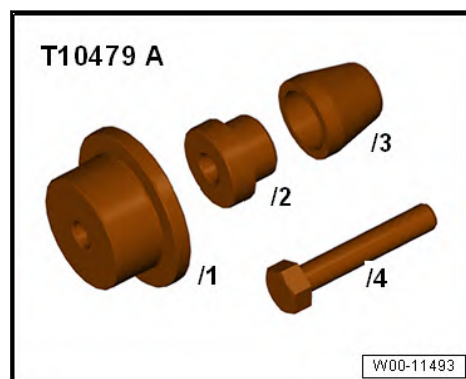




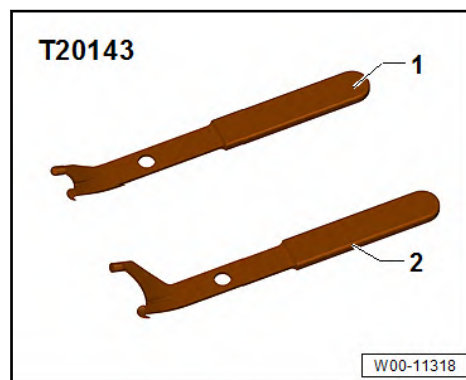
### 3.2.5 Removing and installing camshaft oil seal, exhaust camshaft, gearbox end

Special tools and workshop equipment required

- ◆ Assembly tool -T10479B-

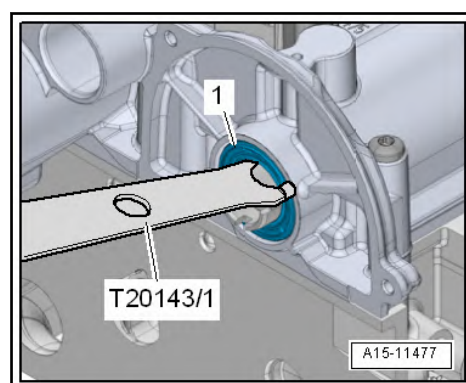


- ◆ Extractor hook -T20143-



#### Removing

- Remove toothed belt pulley for coolant pump ➔ [a2.7 nd installing toothed belt pulley for coolant pump", page 366](#) .
- Carefully fit extractor hook -T20143/1- between camshaft and seal -1-.

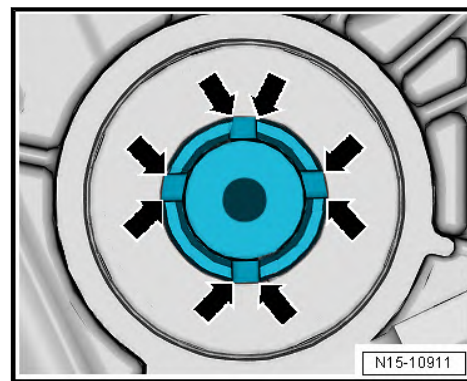


- Lever out seal.

#### Installing

- Remove any burrs in the outer area of the grooves in the exhaust camshaft -arrows- using fine sandpaper (220–1000 P).

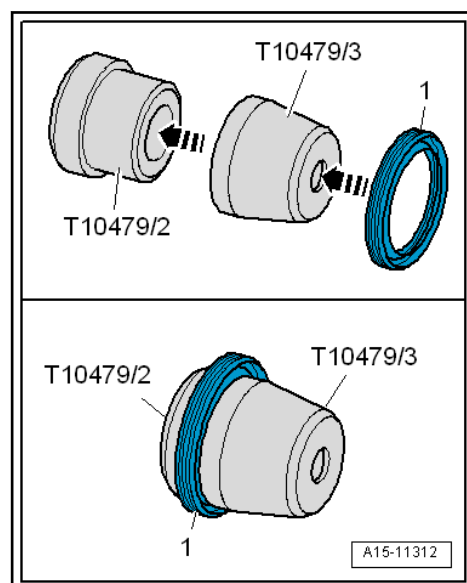




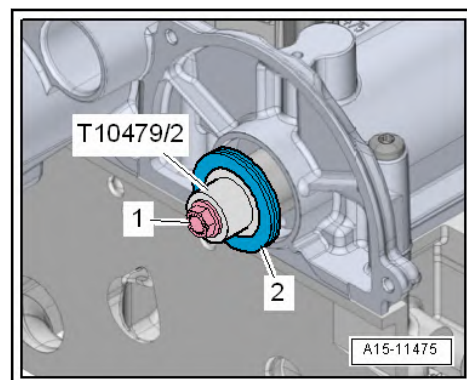
#### Note

*Do not lubricate new seal.*

- Fit seal -1- over fitting sleeve -T10479/3- onto guide sleeve -T10479/2-.



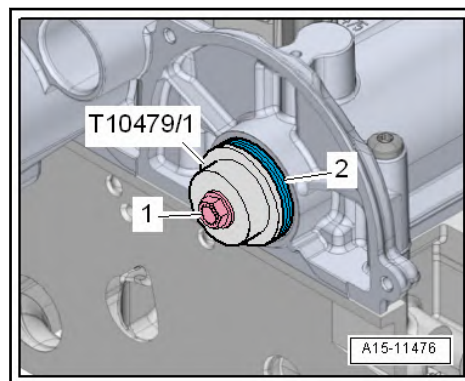
- Installation position: closed end of seal faces fitting sleeve.
- Separate fitting sleeve and guide sleeve.
- Fit guide sleeve -T10479/2- with oil seal -2- centrally to cam-shaft.







- Secure guide sleeve onto camshaft using bolt -1- for coolant pump drive sprocket.
- Push seal onto camshaft and unbolt guide sleeve.
- Draw in seal -2- to stop using thrust piece -T10479/1- and bolt -1- for toothed belt pulley for coolant pump.



- Install toothed belt pulley for coolant pump ⇒ [a2.7 nd installing toothed belt pulley for coolant pump](#), page 366 .

### 3.3 Removing and installing camshaft adjuster

⇒ [a3.3.1 nd installing inlet side camshaft adjuster, exhaust side with toothed belt sprocket](#), page 256

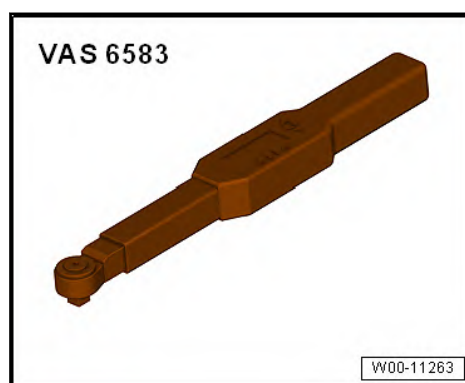
⇒ [a3.3.2 nd installing inlet side camshaft adjuster, exhaust side with camshaft adjuster](#), page 263

⇒ [a3.3.3 nd installing camshaft adjuster, exhaust side](#), page 269

#### 3.3.1 Removing and installing inlet side camshaft adjuster, exhaust side with toothed belt sprocket

Special tools and workshop equipment required

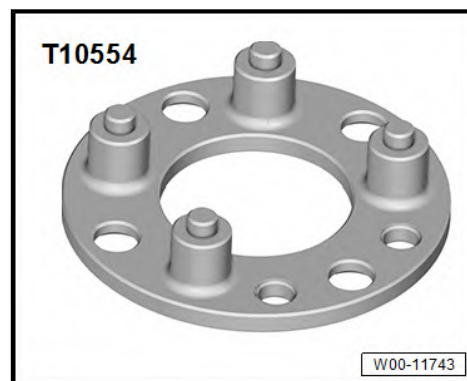
- ◆ Torque wrench -VAS 6583A-







- ◆ Counter-hold tool -T10554/1-

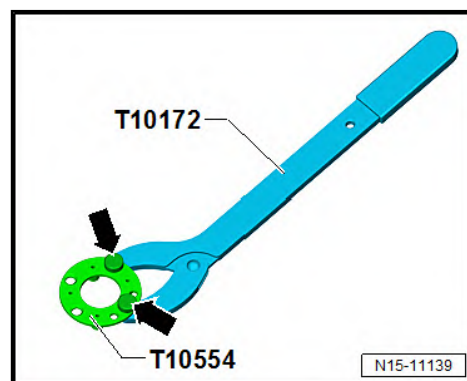


- ◆ Knurled screws -T10554/2- (not illustrated)
- ◆ Counter-hold tool -T10172A-



### Preparing tools

- Bolt on counter-hold tool -T10172A- and counter-hold tool -T10554/1- using knurled screws -T10554/2- -arrows-.



### Sequence of operations

#### Removing



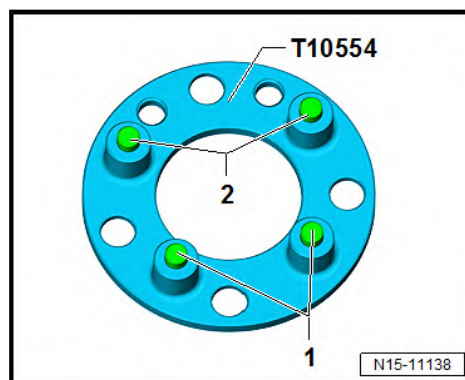
#### Note

- ◆ Place a cloth under the camshaft adjuster and tensioning roller to catch the engine oil which runs out.
- ◆ The contact points between the toothed belt and components - such as camshaft pulleys, tensioning roller and idler pulley - must be kept free of oil.



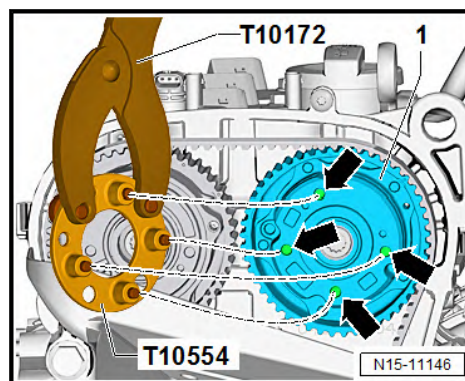


### Fitting counter-hold tool -T10554-

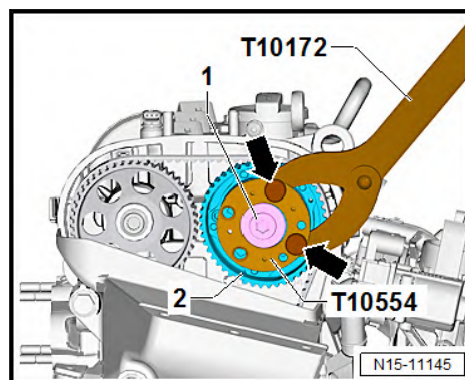


- The contours of pins -1- and -2- of counter-hold tool -T10554/1- are not distributed evenly on the bolt circle.
- They correspond to the contour of the bolt circle in the camshaft adjuster.

### Loosening camshaft adjuster on inlet side:



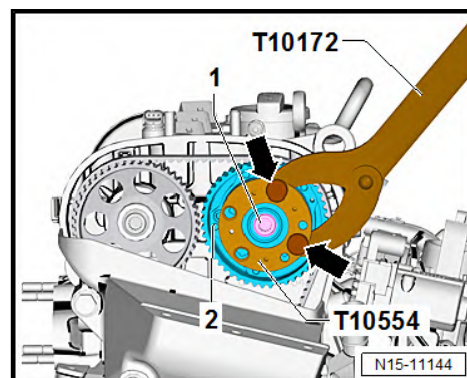
- Set piston in cylinder no. 1 to TDC position ⇒ [p4.7 iston to TDC position", page 174](#) .
- Fit counter-hold tool -T10554- with counter-hold tool -T10172A- to camshaft pulley -1- as shown in illustration.
- The pins must be inserted properly into holes -arrows-.
- Fit counter-hold tool -T10554- so that it rests flat against camshaft adjuster -1-.
- Hold inlet camshaft in position using counter-hold tool -T10554- and counter-hold tool -T10172A-.
- Loosen plug -1-, and unscrew it.







- Fit counter-hold tool -T10554- with counter-hold tool - T10172A- again, to loosen securing bolt -1- of camshaft adjuster.



- Loosen bolt -1- of camshaft adjuster -2-.
- Loosen securing bolt of toothed belt pulley on exhaust side  
⇒ [a3.4 nd installing toothed belt pulley”, page 277](#) .



#### Note

*Do not relieve tension from toothed belt, and do not remove toothed belt from camshafts when adjusting valve timing. Only loosen camshaft adjuster.*

#### Removing camshaft adjuster of inlet camshaft:

- Detach toothed belt from camshafts.
- Unscrew securing bolt -1- of camshaft adjuster, and remove camshaft adjuster -2-.
- Use a cleaning cloth to remove engine oil from camshaft and camshaft housing.

#### Installing

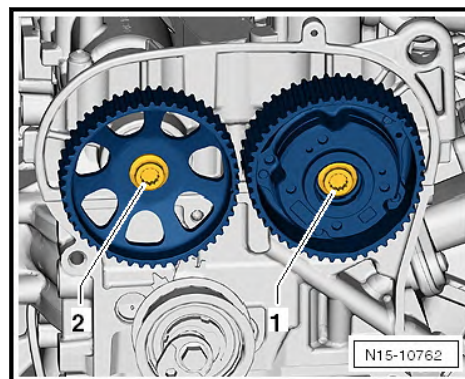
- Camshafts are located in “TDC” position.
- Camshaft pulleys are properly aligned.
- Crankshaft is in “TDC position”.



#### Note

- ◆ *Before installing the camshaft adjuster, ensure that the guide sleeve is inserted in the camshaft.*
- ◆ *Renew bolts that are tightened with turning further angle.*
- ◆ *Renew O-ring of plug if damaged.*
- Renew bolt -1- for camshaft adjuster on inlet side, and screw it in to stop by hand.





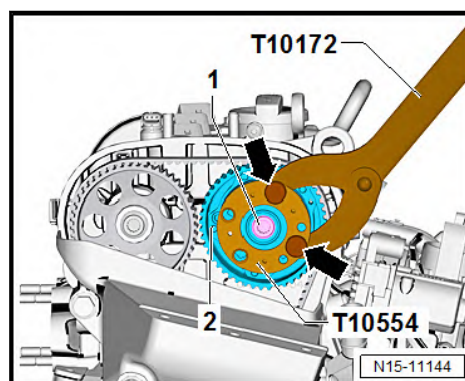
- Renew bolt -2- for toothed belt pulley on exhaust side, and screw it in to stop by hand.
- It should just be possible to turn camshaft pulleys on camshafts but no rocking is permissible.
- Fit toothed belt onto camshafts ⇒ [page 237](#) .
- Adjust valve timing ⇒ [v2.6 alve timing](#)”, [page 216](#) .

**Tightening camshaft adjuster of inlet camshaft to specified initial torque**



**Note**

- ◆ *If the camshafts are turned when pre-tightening with the crankshaft fixed in place using the locking pin -T10340-, the valve timing will be changed.*
- ◆ *If the crankshaft is not locked in place, the deviations that occur when counter holding will be transferred to the crankshaft via the toothed belt.*
- ◆ *The valve timing will not be affected in this case.*
- Before pre-tightening, unscrew locking pin -T10340-.
- Hold inlet camshaft in position using counter-hold tool -T10554- and counter-hold tool -T10172A-.
- Pre-tighten bolt -1- to specified pre-tightening torque in two stages.

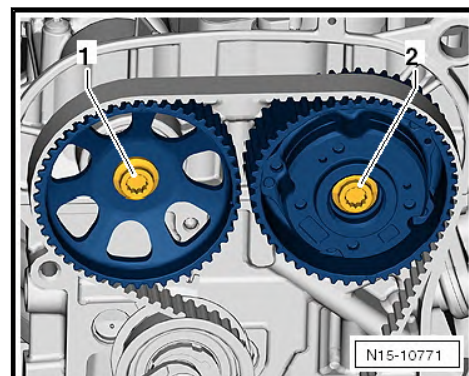


Stage	Securing bolt for camshaft adjuster	Specified torque
1st	-1-	18 Nm
2nd	-1-	50 Nm





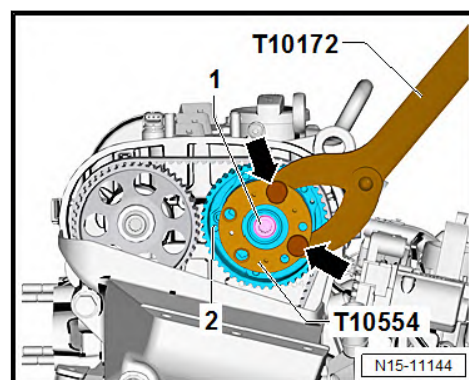
- Hold inlet camshaft in position using counter-hold tool - T10172A- and adapter -T10172/1-.
- Pre-tighten bolt -1- to specified pre-tightening torque in two stages.



Stage	Securing bolt for toothed belt pulley	Specified torque
1st	-1-	18 Nm
2nd	-1-	50 Nm

#### Tightening camshaft adjuster of inlet camshaft to specified final torque

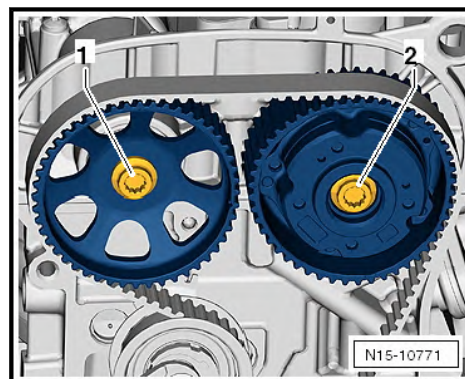
- Screw locking pin -T10340- back in.
- Tighten bolt -1- for camshaft adjuster to final torque.



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

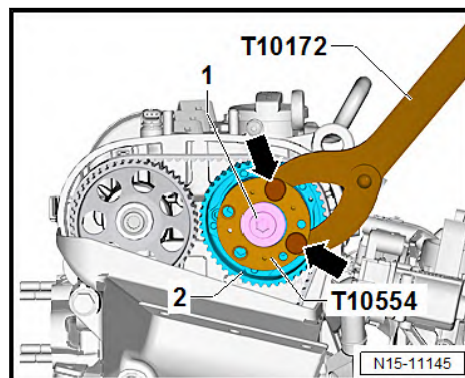
- Tighten securing bolt for toothed belt pulley on exhaust side to final specified torque.





Stage	Securing bolt for toothed belt pulley	Angle to turn bolts
1st	-1-	90°

- Screw in plug -1-, and tighten it to specified torque.



- Hold inlet camshaft in position using counter-hold tool - T10172A- and counter-hold tool -T10554-.

Stage	Plug for camshaft adjuster	Specified torque
1st	-1-	20 Nm

### Installing

Assembly is carried out in reverse sequence; note the following:



### Note

*Make sure to remove the camshaft clamp and the crankshaft locking pin before cranking the engine.*

### Specified torques

- ♦ ⇒ [o2.1 verview - toothed belt cover", page 198](#)
- ♦ ⇒ [o2.2 verview - toothed belt", page 199](#)
- ♦ ⇒ [o1.2 verview - camshaft housing", page 181](#)
- ♦ ⇒ [o3.1 verview - crankcase breather system", page 317](#)
- ♦ ⇒ [o2.1 verview - assembly mountings", page 68](#)
- ♦ ⇒ [a2.6 djustment of assembly mountings \(engine and gear-box mountings\)", page 117](#)
- ♦ ⇒ [o1.1 verview - poly V-belt drive", page 122](#)





- ◆ ⇒ Electrical system; Rep. gr. 27; Alternator; Assembly overview - alternator
- ◆ ⇒ [o3.1 overview - coolant pipes", page 374](#)
- ◆ ⇒ [o2.1 overview - coolant pump, thermostat", page 348](#)
- ◆ ⇒ [o2.1 overview - charge air system", page 433](#)

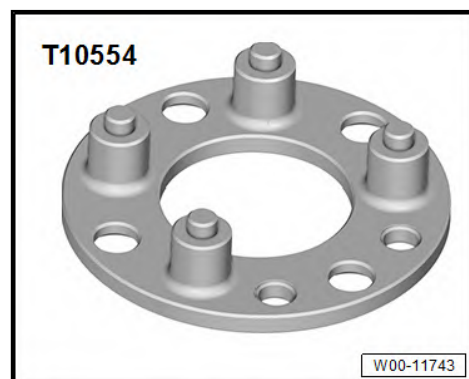
### 3.3.2 Removing and installing inlet side camshaft adjuster, exhaust side with camshaft adjuster

#### Special tools and workshop equipment required

- ◆ Torque wrench -VAS 6583A-



- ◆ Counter-hold tool -T10554/1-



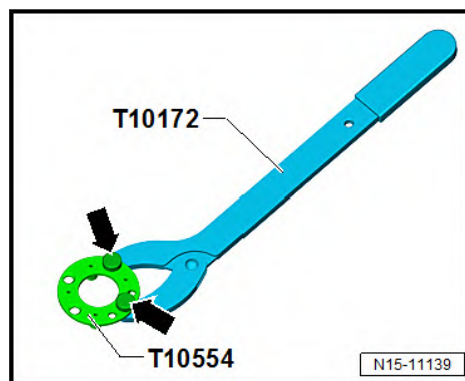
- ◆ Knurled screws -T10554/2- (not illustrated)
- ◆ Counter-hold tool -T10172A-



#### Preparing tools

- Bolt on counter-hold tool -T10172A- and counter-hold tool -T10554/1- using knurled screws -T10554/2- -arrows-.





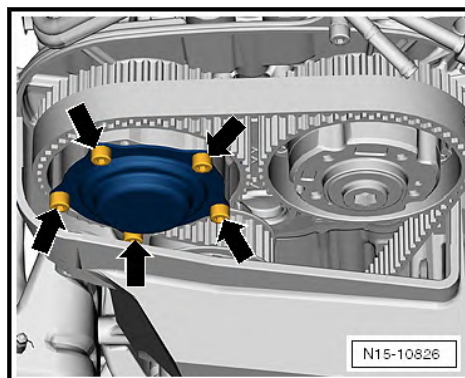
## Sequence of operations

### Removing

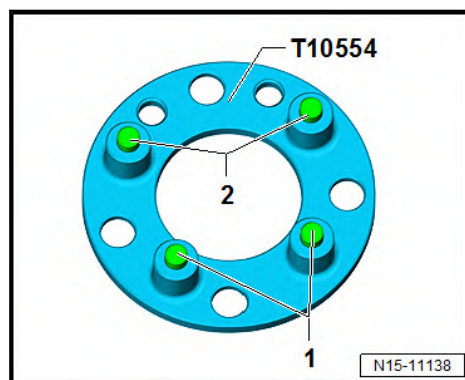


#### Note

- ◆ Place a cloth under the camshaft adjuster and tensioning roller to catch the engine oil which runs out.
- ◆ The contact points between the toothed belt and components - such as camshaft pulleys, tensioning roller and idler pulley - must be kept free of oil.
- Unscrew bolts -arrows- and remove cover from camshaft adjuster for exhaust camshaft.



### Fitting counter-hold tool -T10554-



- The contours of pins -1- and -2- of counter-hold tool - T10554/1- are not distributed evenly on the bolt circle.
- They correspond to the contour of the bolt circle in the camshaft adjuster.



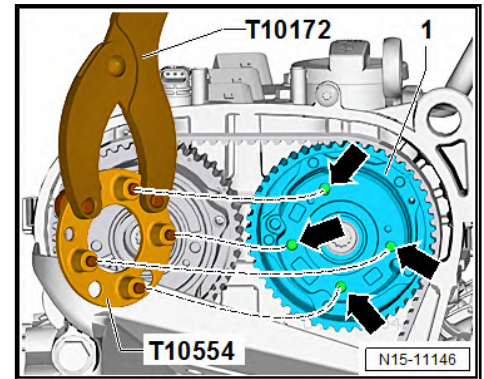


**NOTICE**

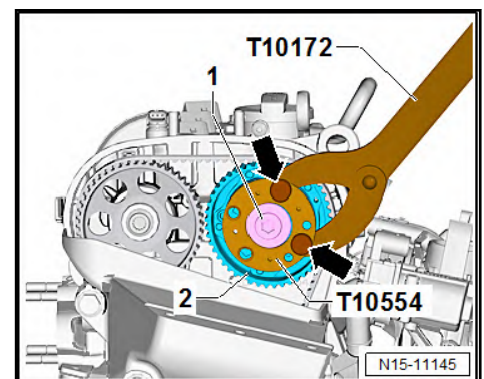
**Risk of damage to camshaft caused by improper handling.**

- **Never use the camshaft clamp for counter holding.**

Loosening camshaft adjuster on inlet side:

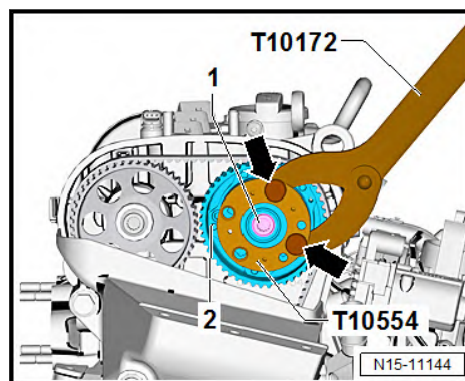


- Set piston in cylinder no. 1 to TDC position ⇒ [p4.7 piston to TDC position](#), [page 174](#) .
- Fit counter-hold tool -T10554- with counter-hold tool -T10172A- to camshaft pulley -1- as shown in illustration.
- The pins must be inserted properly into holes -arrows-.
- Fit counter-hold tool -T10554- so that it rests flat against camshaft adjuster -1-.
- Hold camshaft in position using counterhold tool -T10554- and counterhold tool -T10172A-.
- Loosen plug -1-, and unscrew it.



- Fit counter-hold tool -T10554- with counter-hold tool -T10172A- again, to loosen securing bolt -1- of camshaft adjuster.





- Loosen bolt -1- of camshaft adjuster -2-.
- Loosen securing bolt of camshaft adjuster on exhaust side  
⇒ [a3.3.3 nd installing camshaft adjuster, exhaust side](#), page 269.



#### Note

*Do not relieve tension from toothed belt, and do not remove toothed belt from camshafts when adjusting valve timing. Only loosen camshaft adjuster.*

#### Removing camshaft adjuster of inlet camshaft:

- Detach toothed belt from camshafts.
- Unscrew securing bolt -1- of camshaft adjuster, and remove camshaft adjuster -2-.

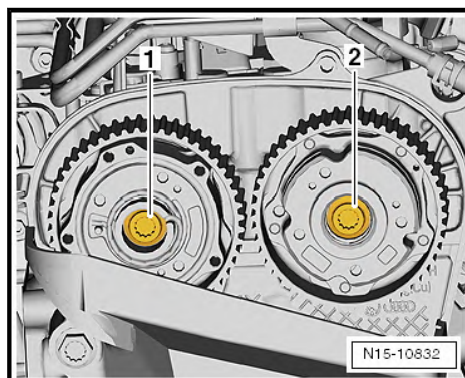
#### Installing

- Camshafts are located in “TDC” position.
- The camshaft pulleys are properly aligned with each other.
- Crankshaft is in “TDC position”.



#### Note

- ◆ *Before installing the camshaft adjuster, ensure that the guide sleeve is inserted in the camshaft.*
- ◆ *Renew bolts that are tightened with turning further angle.*
- ◆ *Renew O-ring of plug if damaged.*
- Renew bolts -1- and -2- for both camshaft adjusters and screw them in onto stop.







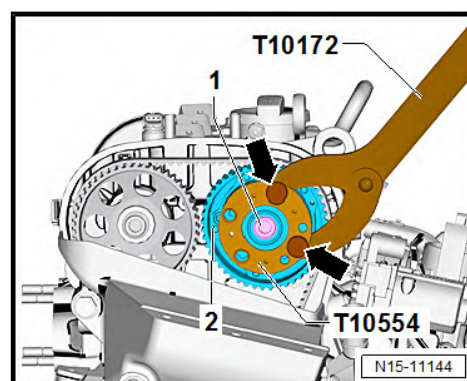
- It should just be possible to turn camshaft pulleys on camshafts but no rocking is permissible.
- Fit toothed belt onto camshafts ➔ [page 237](#) .
- Adjust valve timing ➔ [v2.6 alve timing", page 216](#) .

#### Tightening camshaft adjuster of inlet camshaft to specified initial torque



#### Note

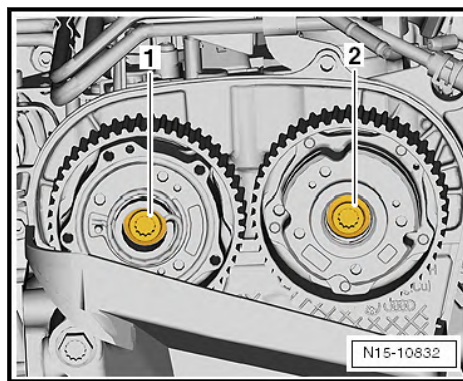
- ◆ *If the camshafts are turned when pre-tightening with the crankshaft fixed in place using the locking pin -T10340-, the valve timing will be changed.*
- ◆ *If the crankshaft is not locked in place, the deviations that occur when counter holding will be transferred to the crankshaft via the toothed belt.*
- ◆ *The valve timing will not be affected in this case.*
- Before pre-tightening, unscrew locking pin -T10340-.
- Hold inlet camshaft in position using counter-hold tool -T10554- and counter-hold tool -T10172A-.
- Pre-tighten bolt -1- to specified pre-tightening torque in two stages.



Stage	Securing bolt for camshaft adjuster, inlet side	Specified torque
1st	-1-	18 Nm
2nd	-1-	50 Nm

- Hold exhaust camshaft in position using counterhold tool -T10554- and counterhold tool -T10172A-.
- Pre-tighten bolt -1- to specified pre-tightening torque in two stages.

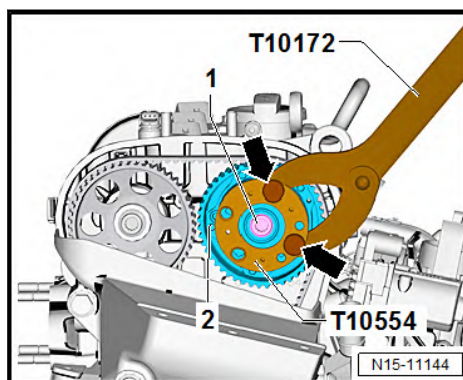




Stage	Securing bolt for camshaft adjuster, exhaust side	Specified torque
1st	-1-	18 Nm
2nd	-1-	50 Nm

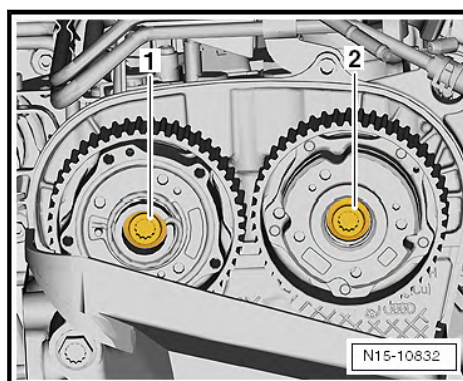
#### Tightening camshaft adjuster to specified final torque

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



Stage	Securing bolt for camshaft adjuster, inlet side	Angle to turn bolts
1st	-1-	135°

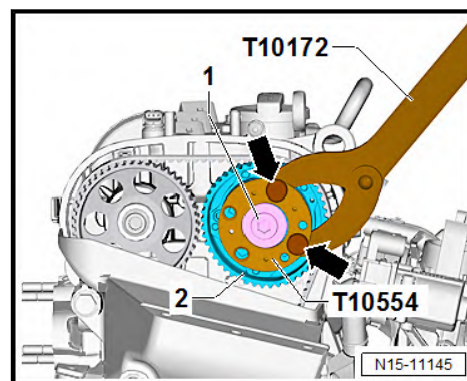
- Tighten securing bolt for camshaft adjuster on exhaust side -1- to final torque setting.



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

- Screw in plug -1-, and tighten it to specified torque.





- Hold inlet camshaft in position using counter-hold tool - T10554- and counter-hold tool -T10172A-.

Stage	Plug for camshaft adjuster	Specified torque
1st	-1-	20 Nm

### Installing

Assembly is carried out in reverse sequence; note the following:



*Make sure to remove the camshaft clamp and the crankshaft locking pin before cranking the engine.*

### Specified torques

- ◆ [⇒ o2.2 verview - toothed belt", page 199](#)
- ◆ [⇒ page 128](#)
- ◆ [⇒ o1.2 verview - camshaft housing", page 181](#)
- ◆ [⇒ o3.1 verview - crankcase breather system", page 317](#)
- ◆ [⇒ o2.1 verview - charge air system", page 433](#)
- ◆ [⇒ o3.1 verview - valve gear", page 242](#)
- ◆ [⇒ o1.1 verview - turbocharger", page 416](#)
- ◆ [⇒ o2.1 verview - toothed belt cover", page 198](#)

### 3.3.3 Removing and installing camshaft adjuster, exhaust side

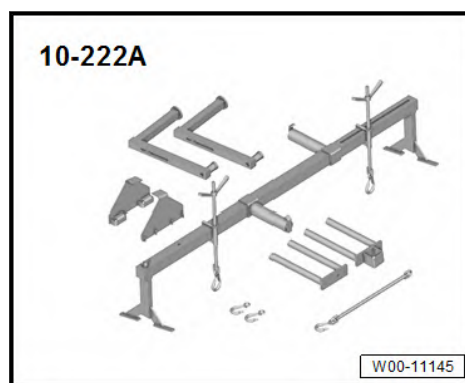
Special tools for removing and installing the camshaft adjuster of exhaust camshaft

Special tools and workshop equipment required

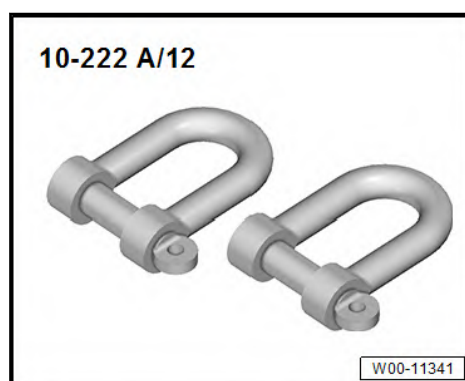




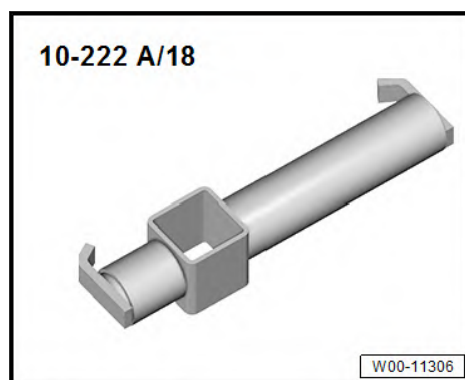
◆ Support bracket -10 - 222 A-



◆ Shackle -10 - 222 A /12-



◆ Adapter -10 - 222 A /18-



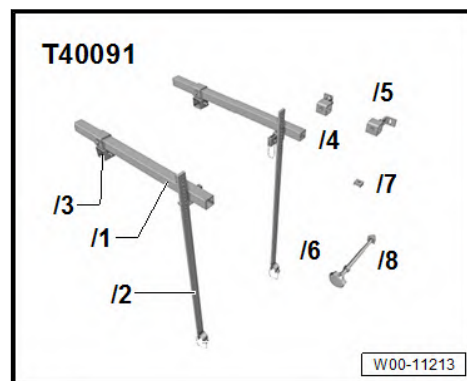
◆ Adapter -10 - 222 A /29-







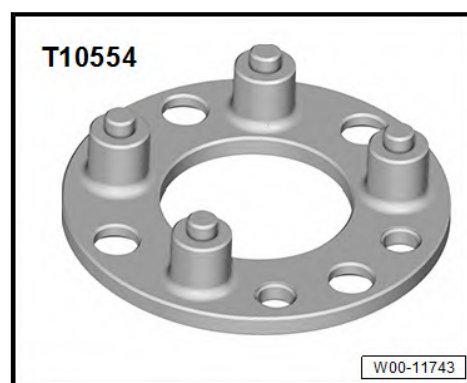
- ◆ Adapter -T40091/1-



- ◆ Adapter -T40091/3-
- ◆ Adapter -T40093/3-
- ◆ Adapter -T40093/3-6-
- ◆ Torque wrench -VAS 6583A-



- ◆ Counter-hold tool -T10554/1-



- ◆ Knurled screws -T10554/2- (not illustrated)
- ◆ Counter-hold tool -T10172A-

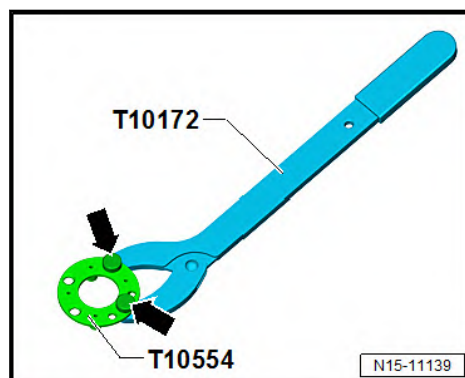






## Preparing tools

- Bolt on counter-hold tool -T10172A- and counter-hold tool -T10554/1- using knurled screws -T10554/2- -arrows-.

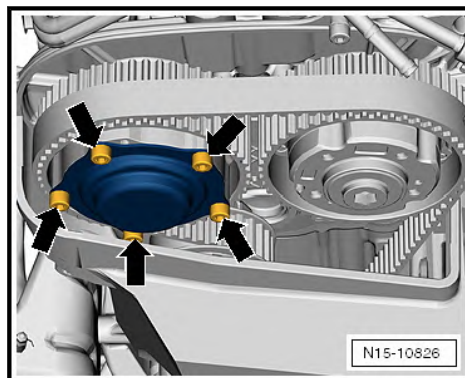


## Sequence of operations

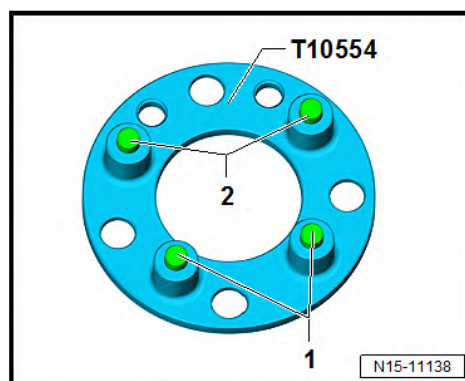


### Note

- ◆ Place a cloth under the camshaft adjuster and tensioning roller to catch the engine oil which runs out.
- ◆ The contact points between the toothed belt and components - such as camshaft pulleys, tensioning roller and idler pulley - must be kept free of oil.
- Unscrew bolts -arrows- and remove cover from camshaft adjuster for exhaust camshaft.



## Fitting counter-hold tool -T10554-



- The contours of pins -1- and -2- of counter-hold tool -T10554/1- are not distributed evenly on the bolt circle.





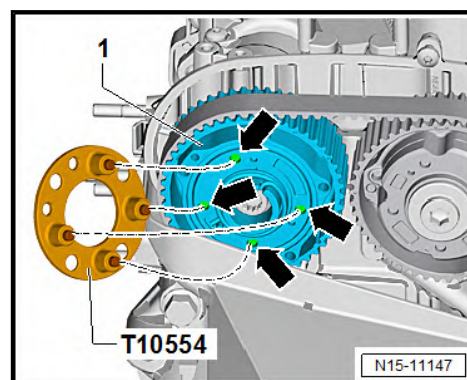
- They correspond to the contour of the bolt circle in the camshaft adjuster.

#### To adjust valve timing:

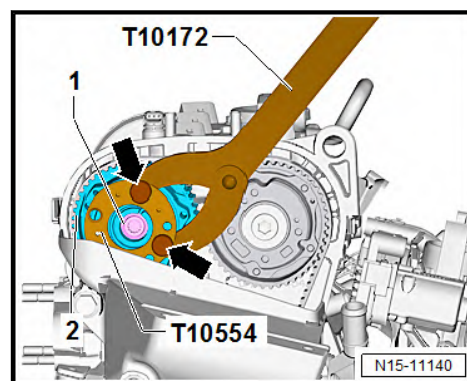
- Set piston in cylinder no. 1 to TDC position ➤ [p4.7 piston to TDC position](#), [page 174](#) .

#### Detaching camshaft adjuster on exhaust side:

- Insert counterhold -T10554- with counterhold -T10172A- in holes -arrows-.



- Fit counter-hold tool -T10554- so that it rests flat against camshaft adjuster -1-.
- Hold camshaft pulley -2- in place using counterhold -T10554- and counterhold -T10172A-.



- Loosen bolt -1- one turn.
- Loosen securing bolt for camshaft adjuster on inlet side ➤ [page 258](#) .



#### Note

*Do not relieve tension from toothed belt, and do not remove toothed belt from camshafts when adjusting valve timing. Only loosen camshaft adjuster.*

#### Removing camshaft adjuster of exhaust camshaft:

- Remove engine bracket. ➤ [a1.6 nd installing engine support](#), [page 136](#)
- Detach toothed belt from camshafts ➤ [t2.8 oothed belt from camshaft](#), [page 234](#) .
- Unscrew securing bolt -1- of camshaft adjuster, and remove camshaft adjuster -2-.





- Use a cleaning cloth to remove engine oil from camshaft and camshaft housing.

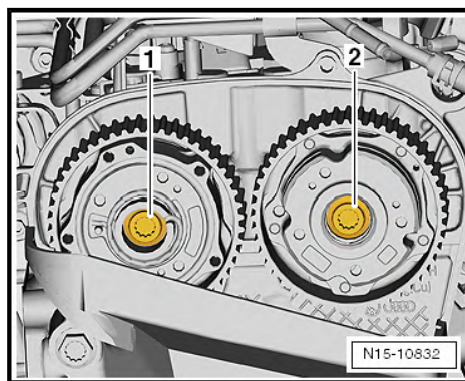
### Installing

- Camshafts are located in “TDC” position.
- The camshaft pulleys are properly aligned with each other.
- Crankshaft is in “TDC position”.



### Note

- ◆ *Before installing the camshaft adjuster, ensure that the guide sleeve is inserted in the camshaft.*
- ◆ *Renew bolts that are tightened with turning further angle.*
- ◆ *Renew O-ring of plug if damaged.*
- Renew bolts -1- and -2- for both camshaft adjusters and screw them in onto stop.



- It should just be possible to turn camshaft pulleys on camshafts but no rocking is permissible.
- Fit toothed belt onto camshafts ⇒ [page 237](#) .
- Adjust valve timing ⇒ [v2.6 alve timing](#)”, [page 216](#) .

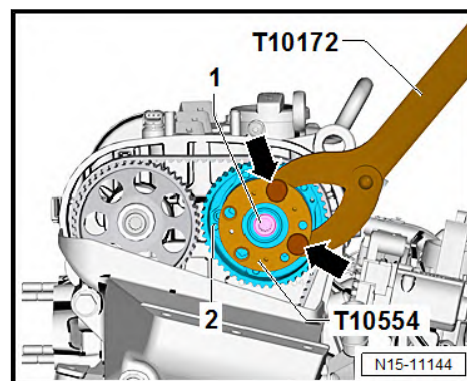
### Camshaft adjuster specified final torque



### Note

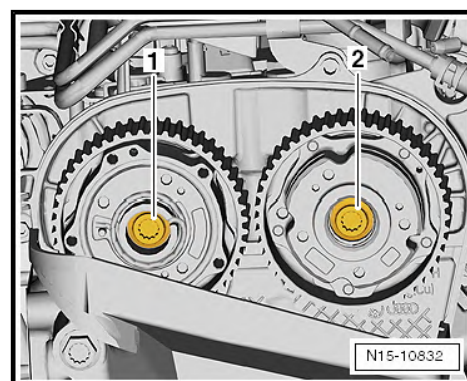
- ◆ *If the camshafts are turned when pre-tightening with the crankshaft fixed in place using the locking pin -T10340-, the valve timing will be changed.*
- ◆ *If the crankshaft is not locked in place, the deviations that occur when counter holding will be transferred to the crankshaft via the toothed belt.*
- ◆ *The valve timing will not be affected in this case.*
- Before pre-tightening, unscrew locking pin -T10340-.
- Hold inlet camshaft in position using counter-hold tool -T10554- and counter-hold tool -T10172A-.
- Pre-tighten bolt -1- to specified pre-tightening torque in two stages.





Stage	Securing bolt for camshaft adjuster, inlet side	Specified torque
1st	-1-	18 Nm
2nd	-1-	50 Nm

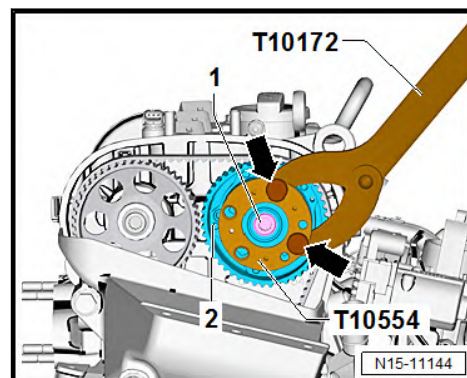
- Hold exhaust camshaft in position using counterhold tool -T10554- and counterhold tool -T10172A-.
- Pre-tighten bolt -1- to specified pre-tightening torque in two stages.



Stage	Securing bolt for camshaft adjuster, exhaust side	Specified torque
1st	-1-	18 Nm
2nd	-1-	50 Nm

#### Tightening camshaft adjuster to specified final torque

- Screw locking pin -T10340- back in.
- Tighten bolt -1- for camshaft adjuster to final torque.

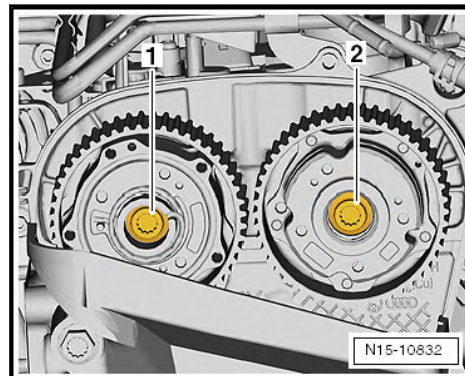






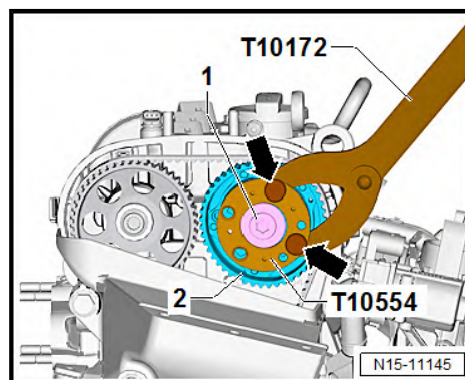
Stage	Securing bolt for camshaft adjuster, inlet side	Angle to turn bolts
1st	-1-	135°

- Tighten securing bolt for camshaft adjuster on exhaust side -1- to final torque setting.



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

- Hold inlet camshaft in position using counter-hold tool -T10554- and counter-hold tool -T10172A-.
- Screw in plug -1-, and tighten it to specified torque.



Stage	Plug for camshaft adjuster	Specified torque
1st	-1-	20 Nm

### Installing

Install in reverse order of removal, observing the following:



### Note

*Make sure to remove the camshaft clamp and the crankshaft locking pin before cranking the engine.*

### Specified torques

- ♦ ⇒ [o2.2 verview - toothed belt", page 199](#)
- ♦ ⇒ [o1.1 verview - poly V-belt drive", page 122](#)
- ♦ ⇒ [o2.1 verview - toothed belt cover", page 198](#)
- ♦ ⇒ [o3.1 verview - coolant pipes", page 374](#)



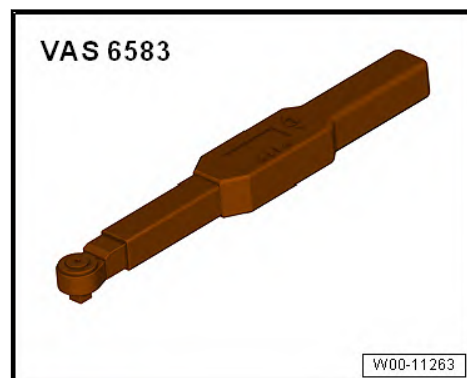


- ◆ ⇒ Electrical system; Rep. gr. 27; Alternator; Assembly over-view - alternator

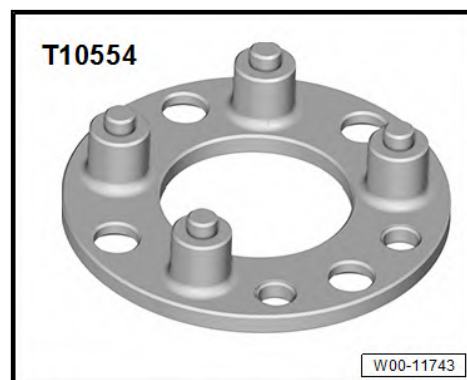
### 3.4 Removing and installing toothed belt pulley

#### Special tools and workshop equipment required

- ◆ Torque wrench -VAS 6583A-



- ◆ Counter-hold tool -T10554/1-



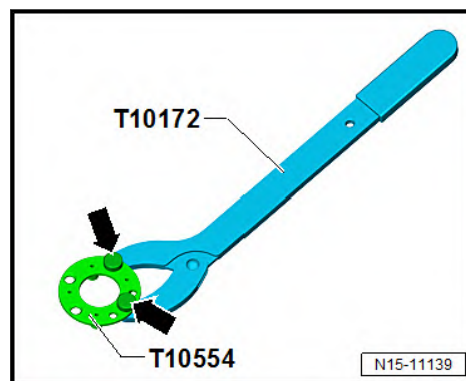
- ◆ Knurled screws -T10554/2- (not illustrated)
- ◆ Counter-hold tool -T10172A-



#### Preparing tools

- Bolt on counter-hold tool -T10172A- and counter-hold tool -T10554/1- using knurled screws -T10554/2- -arrows-.





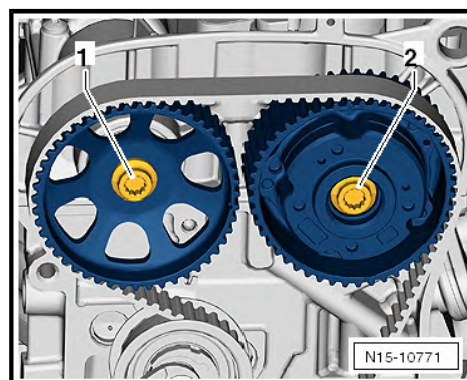
## Sequence of operations



### Note

- ◆ Place a cloth under the camshaft adjuster and tensioning roller to catch the engine oil which runs out.
- ◆ The contact points between the toothed belt and components - such as camshaft pulleys, tensioning roller and idler pulley - must be kept free of oil.
- ◆ Do not relieve tension from toothed belt, and do not remove toothed belt from camshafts when adjusting valve timing. Only loosen camshaft adjuster.

## Loosen toothed belt pulley for exhaust camshaft

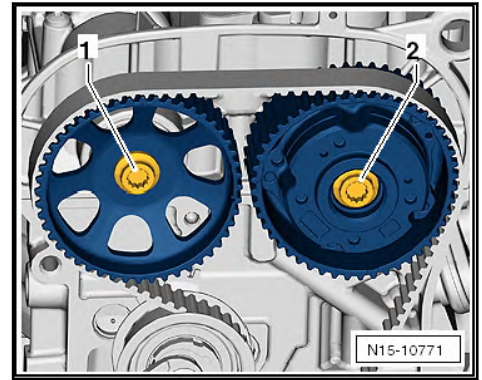


- Removing upper part of toothed belt guard ⇒ [a2.3.1 nd installing upper toothed belt guard](#), page 203 .
- Set piston in cylinder no. 1 to TDC position ⇒ [p4.7 iston to TDC position](#), page 174 .
- Loosen bolt -1- approx. one turn using counter-hold tool -T10172A- with adapter -T10172/2- and -T10172/1-.

## Remove toothed belt pulley for exhaust camshaft:

- Loosen camshaft adjuster -2- of inlet camshaft ⇒ [Fig. ""Loosening camshaft adjuster on inlet side:"" , page 258](#) .





- Hold inlet camshaft in position using counter-hold tool - T10172A- and adapter -T10172/1-.
- Loosen bolt -1-.
- Detach toothed belt from camshafts. ⇒ [t2.8 oothed belt from camshaft](#), [page 234](#)
- Unscrew securing bolt -1- of toothed belt pulley, and remove toothed belt pulley.

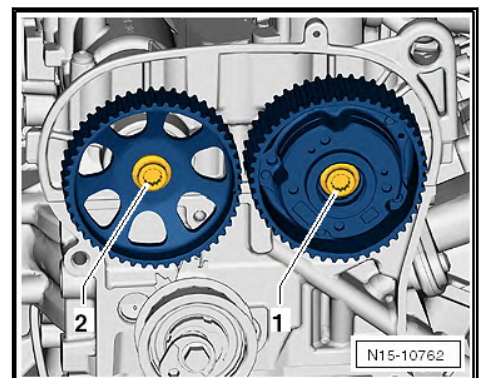
#### Installing

- Camshafts are located in “TDC” position.
- The camshaft pulleys are properly aligned with each other.
- Crankshaft is in “TDC position”.



#### Note

- ◆ *Before installing the camshaft adjuster, ensure that the guide sleeve is inserted in the camshaft.*
- ◆ *Renew bolts that are tightened with turning further angle.*
- ◆ *Renew O-ring of plug if damaged.*
- Renew bolt -1- for camshaft adjuster on inlet side, and screw it in to stop by hand.



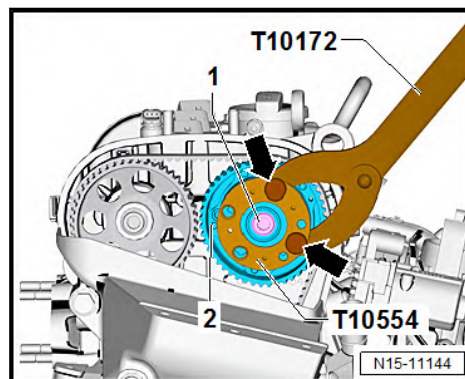
- Renew bolt -2- for toothed belt pulley on exhaust side, and screw it in to stop by hand.
- It should just be possible to turn camshaft pulleys on camshafts but no rocking is permissible.
- Fit toothed belt in position and adjust valve timing ⇒ [page 237](#).





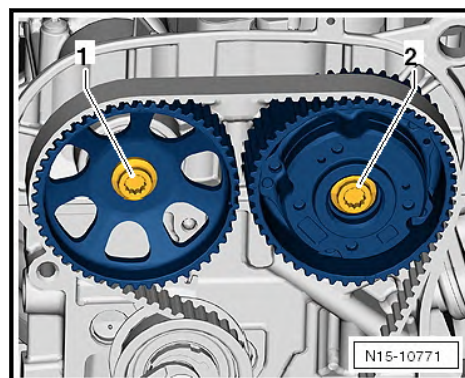
### Pre-tightening

- Hold inlet camshaft in position using counter-hold tool - T10554- and counter-hold tool -T10172A-.
- Pre-tighten bolt -1- to specified pre-tightening torque in two stages.



Stage	Securing bolt for camshaft adjuster	Specified torque
1st	-1-	15 Nm
2nd	-1-	50 Nm

- Hold inlet camshaft in position using counter-hold tool - T10172A- and adapter -T10172/1-.
- Pre-tighten bolt -1- to specified pre-tightening torque in two stages.

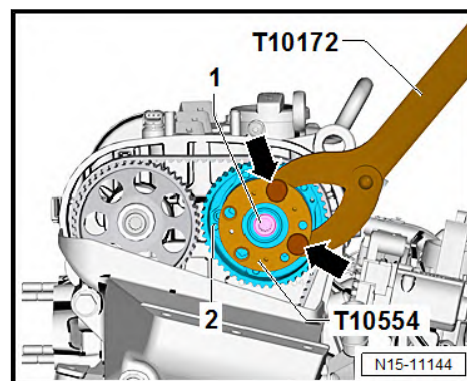


Stage	Securing bolt for toothed belt pulley	Specified torque
1st	-1-	15 Nm
2nd	-1-	50 Nm

### Tightening to final specified torque

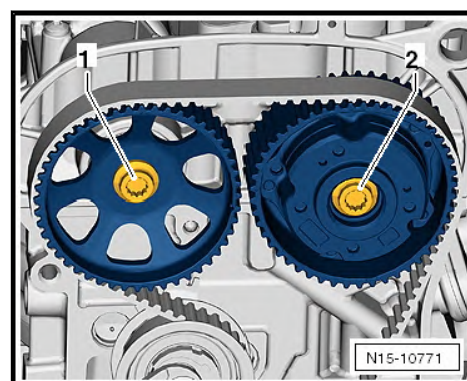
- Tighten bolt -1- for camshaft adjuster to final torque.





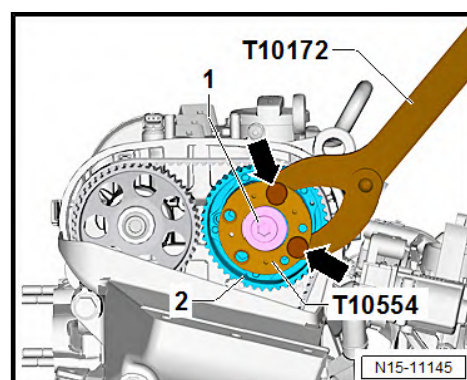
Stage	Securing bolt for camshaft adjuster	Angle to turn bolts
1st	-1-	135°

- Tighten securing bolt for toothed belt pulley on exhaust side to final specified torque.



Stage	Securing bolt for toothed belt pulley	Angle to turn bolts
1st	-1-	90°

- Screw in plug -1-, and tighten it to specified torque.



- Hold inlet camshaft in position using counter-hold tool - T10172A- and counter-hold tool -T10554-.

Stage	Plug for camshaft adjuster	Specified torque
1st	-1-	20 Nm

### Installing

Further assembly is performed in the reverse order of removal.





#### Note

*Make sure to remove the camshaft clamp and the crankshaft locking pin before cranking the engine.*

#### Specified torques:

- ⇒ [o2.1 verview - toothed belt cover", page 198](#)
- ⇒ [o2.2 verview - toothed belt", page 199](#)
- ⇒ [o3.1 verview - crankcase breather system", page 317](#)
- ⇒ [o2.1 verview - charge air system", page 433](#)

### 3.5 Removing and installing camshaft control valve 1 -N205-

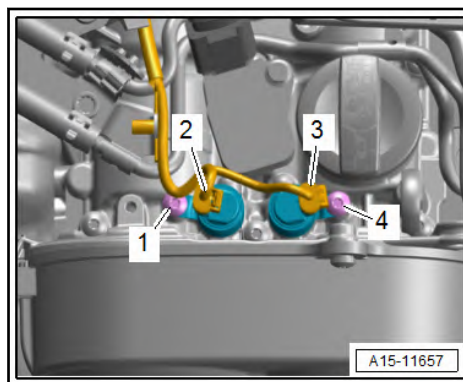
⇒ [a3.5.1 nd installing camshaft control valve 1N205, exhaust side with camshaft adjuster", page 282](#)

⇒ [a3.5.2 nd installing camshaft control valve 1N205, exhaust side with toothed belt pulley", page 283](#)

#### 3.5.1 Removing and installing camshaft control valve 1 -N205-, exhaust side with camshaft adjuster

##### Removing

- Release and pull off electrical connector -3-.



- Unscrew bolt -4- and remove camshaft control valve 1 -N205-.

##### Installing

Install in reverse order of removal, observing the following:



#### Note

- ◆ Check O-ring for damage.
- ◆ If it is damaged, renew it together with camshaft control valve 1 -N205-.
- ◆ The O-ring cannot be renewed individually.

#### Specified torques

- ◆ ⇒ [o1.2.2 verview - camshaft housing, exhaust side with camshaft adjuster", page 183](#)

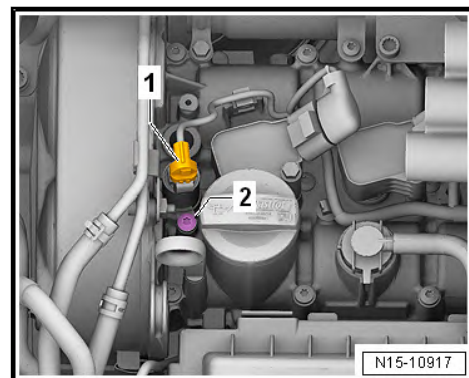




### 3.5.2 Removing and installing camshaft control valve 1 -N205-, exhaust side with toothed belt pulley

#### Removing

- Disconnect electrical connector -1-.



- Unscrew bolt -2- and remove camshaft control valve 1 - N205-.

#### Installing

Install in reverse order of removal, observing the following:



#### Note

*Renew O-ring.*

#### Specified torques

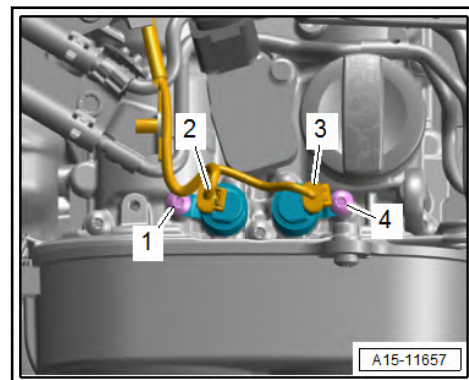
⇒ [01.2.1 overview - camshaft housing, exhaust side with toothed belt pulley](#), page 181

### 3.6 Removing and installing exhaust camshaft control valve 1 -N318-

Installed in vehicles with adjustable exhaust camshaft only.

#### Removing

- Release and pull off electrical connector -2-.



- Unscrew bolt -1- and remove exhaust camshaft control valve 1 -N318-.





## Installing

Install in reverse order of removal, observing the following:



### Note

*Renew O-ring.*

## Specified torques

- ◆ ⇒ [01.2.2 verview - camshaft housing, exhaust side with camshaft adjuster", page 183](#)

## 3.7 Removing and installing valve stem seals

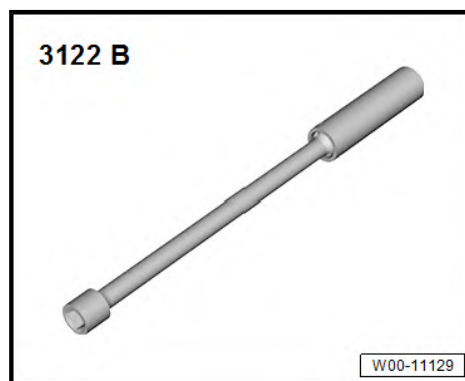
⇒ [a3.7.1 nd installing valve stem seals \(cylinder head installed\)", page 284](#)

⇒ [a3.7.2 nd installing valve stem seals \(cylinder head removed\)", page 290](#)

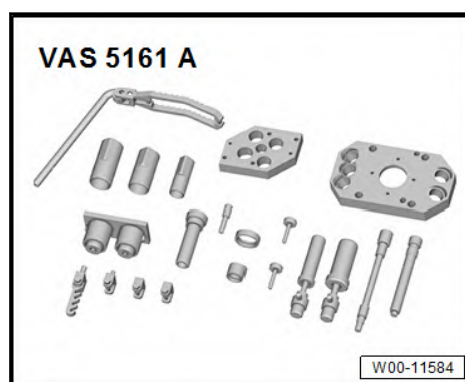
### 3.7.1 Removing and installing valve stem seals (cylinder head installed)

#### Special tools and workshop equipment required

- ◆ Spark plug socket -3122 B-



- ◆ Removal and installation device for valve cotters -VAS 5161A- with guide plate -VAS 5161A/32-32-.



- ◆ Compressed air adapter -VAS 5161 A/35- (not illustrated)

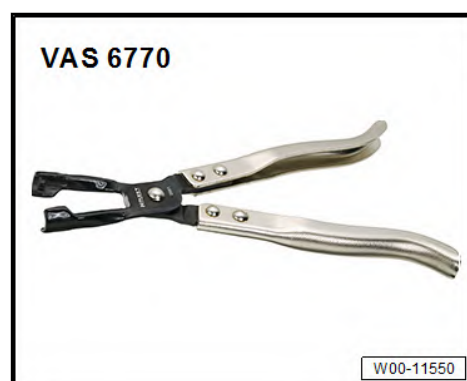




- ◆ Valve stem seal fitting tool -3365-

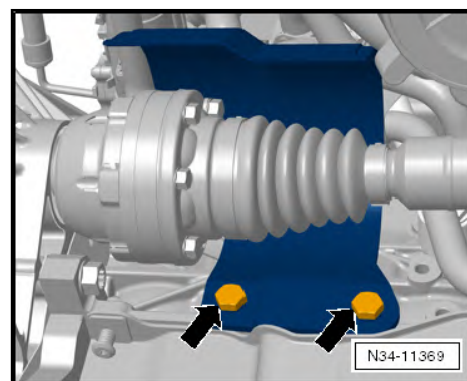


- ◆ Valve stem pliers -VAS 6770-



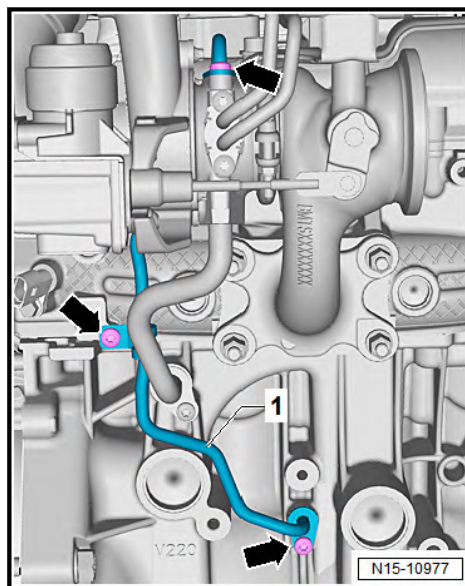
### Sequence of operations

- Remove plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50; Plenum chamber bulkhead; Removing and installing plenum chamber cover.
- Remove plenum chamber bulkhead ⇒ General body repairs, exterior; Rep. gr. 50; Bulkhead; Assembly overview - bulkhead.

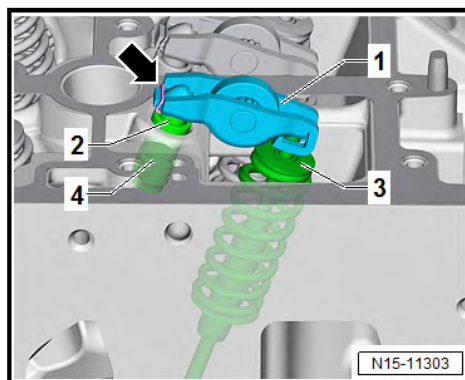


- Unscrew bolts -arrows-. Remove heat shield for right drive shaft.
- Unscrew bolts -arrows-, and remove oil supply line -1-.

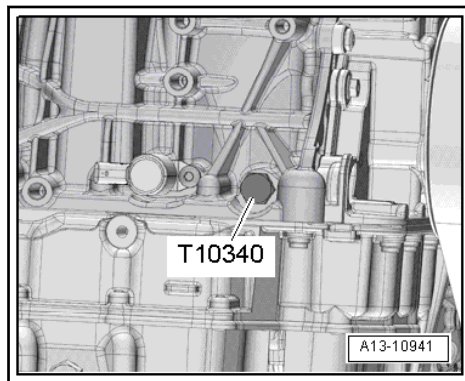




- Remove camshaft housing ⇒ [a1.4 nd installing camshaft housing](#), page 190 .
- Mark allocation of roller rocker fingers -1-, hydraulic compensation element -4- and valves -3- for reinstallation.

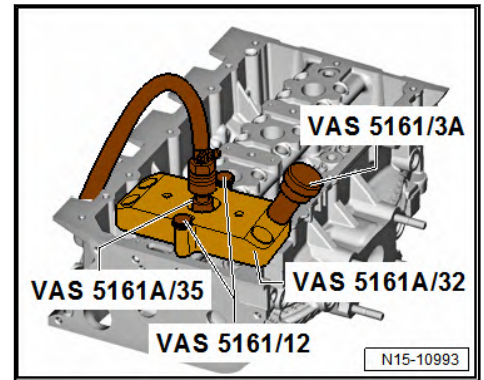


- Remove roller rocker fingers together with compensation elements and place them on a clean surface.
- Unscrew spark plugs with spark plug socket -3122 B-.
- Unscrew locking pin -T10340-.

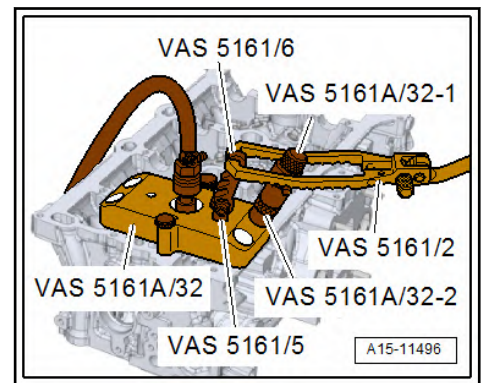


- Set piston of respective cylinder to “bottom dead centre”.
- Fit guide plate -VAS 5161A/32- onto cylinder head and secure with knurled screws -VAS 5161/12-.



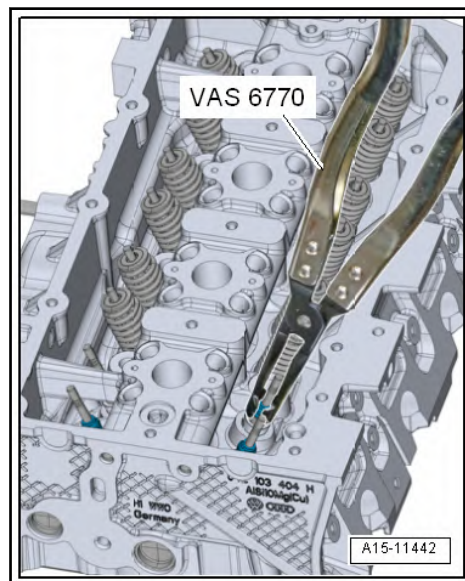


- Screw compressed air adapter -VAS 5161 A/35- into the respective park plug thread hand-tight.
- Connect adapter to compressed air supply using a commercially available union and apply pressure continuously.
  - Minimum pressure: 6 bar.
- Insert punch -VAS 5161/3A- into guide plate.



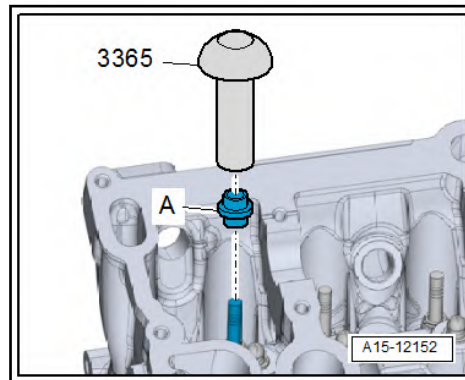
- Use a plastic hammer to knock loose the firmly seated valve cotters.
- Screw toothed piece -VAS 5161/6- with hooking fork -VAS 5161/5- into guide plate.
- Slide sleeve -VAS 5161A/32-1- onto assembly cartridge and insert cartridge into guide plate -VAS 5161A/32-2-.
- Attach pressure fork -VAS 5161/2- to toothed piece and press assembly cartridge down.
- At the same time, turn knurled screw of assembly cartridge clockwise until tips engage in valve cotters.
- Move knurled screw back and forth to press apart valve cotters and capture them in assembly cartridge.
- Release pressure fork.
- Remove installation cartridge.
- Unbolt guide plate and move to side.
  - The compressed air hose remains connected.
- Remove valve spring and valve spring plate.
- Pull off valve stem seal using valve stem pliers -VAS 6770-.





#### Note

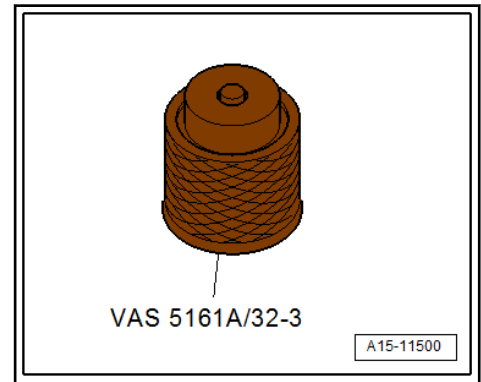
- ◆ Risk of damage when installing valve stem seals.
- ◆ Slowly push valve stem seals as far as stop.
- ◆ Seal oil passages of cylinder head with a lint-free cloth.
- Lightly oil sealing lip of valve stem seal -A-.



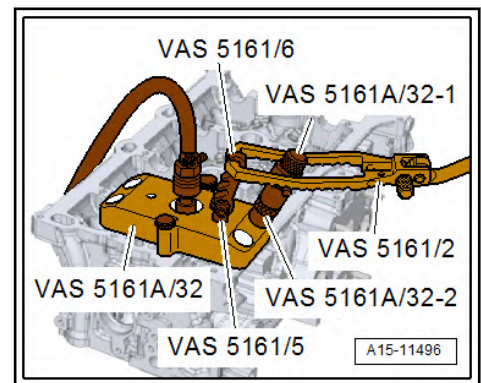
- Carefully press valve stem oil seal -A- onto valve guide using valve stem seal fitting tool -3365-.

If the valve cotters have been removed from the assembly cartridge, they must first be inserted into the insert tool -VAS 5161A/32-3-.





- Larger diameter of valve cotters faces upwards.
- Press assembly cartridge onto insertion device from above and pick up valve cotters.
- Insert valve spring and valve spring plate. For installation position of valve spring refer to ➔ [page 243](#).
- Bolt guide plate -VAS 5161A/32- onto cylinder head again.



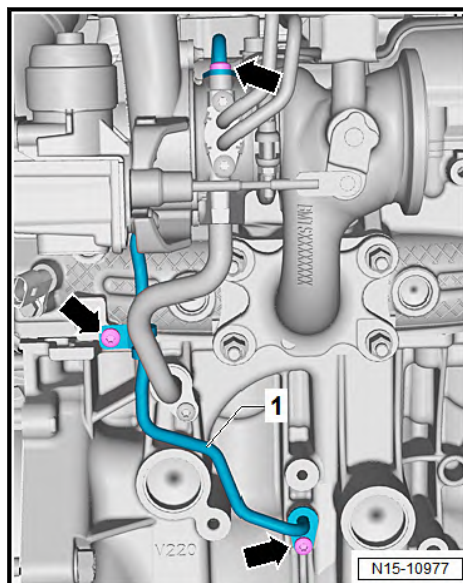
- Insert assembly cartridge -VAS 5161A/32-1- with sleeve -VAS 5161A/32-2- into guide plate.
- Press pressure fork downwards and pull knurled screw upwards, turning it clockwise and anticlockwise. This inserts the valve cotters.
- Reduce pressure on pressure fork whilst pulling on knurled screw.
- Repeat procedure on each valve.

### Installing

Assemble in reverse order of dismantling. The following should be observed:

- Install oil supply line -1-, and tighten bolts -arrows- to 9 Nm.





- Install plenum chamber bulkhead ⇒ General body repairs, exterior; Rep. gr. 50; Bulkhead; Assembly overview - bulkhead.
- Install plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50; Plenum chamber bulkhead; Removing and installing plenum chamber cover.
- Install spark plugs ⇒ Maintenance; Booklet .
- Install camshaft housing ⇒ [a1.4 nd installing camshaft housing”, page 190](#) .

#### Specified torques

⇒ Running gear, axles, steering; Rep. gr. 40; Drive shaft; Assembly overview - drive shaft

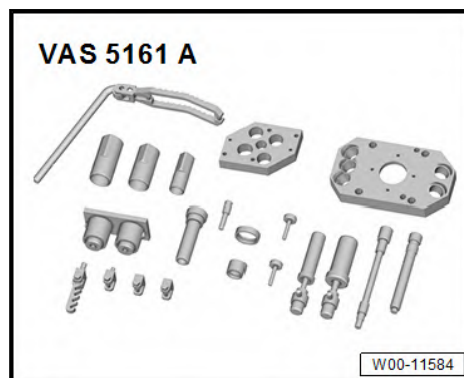
⇒ General body repairs, exterior; Rep. gr. 50; Plenum chamber bulkhead; Removing and installing plenum chamber cover

⇒ General body repairs, exterior; Rep. gr. 50; Bulkhead; Assembly overview - bulkhead.

### 3.7.2 Removing and installing valve stem seals (cylinder head removed)

#### Special tools and workshop equipment required

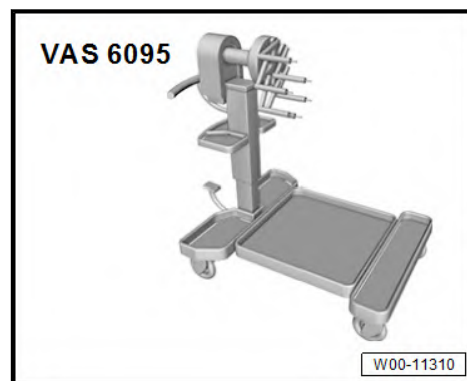
- ♦ Removal and installation device for valve cotters -VAS 5161A- with guide plate -VAS 5161A/32-32-.



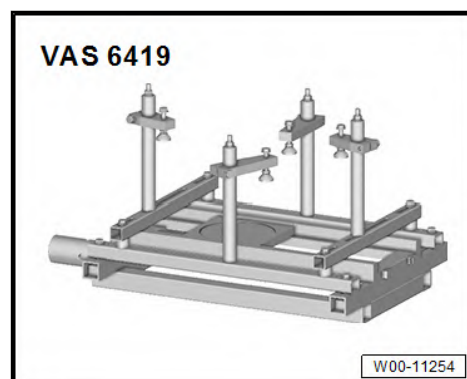




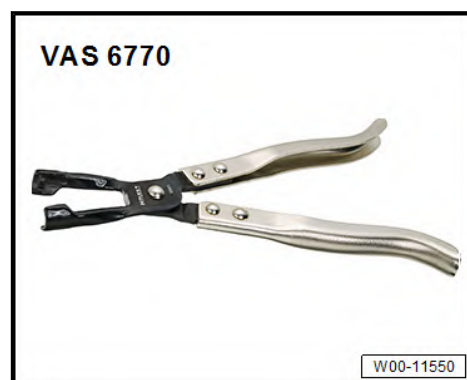
- ◆ Engine and gearbox support -VAS 6095-



- ◆ Cylinder head tensioning device -VAS 6419-



- ◆ Valve stem pliers -VAS 6770-



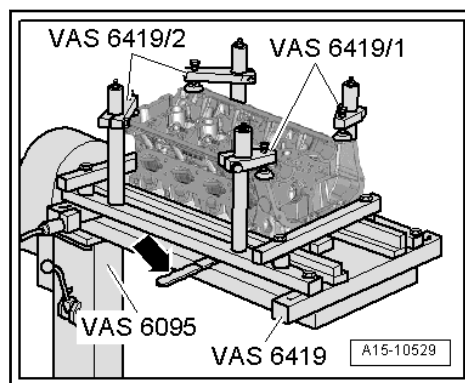
- ◆ Valve stem seal fitting tool -3365-



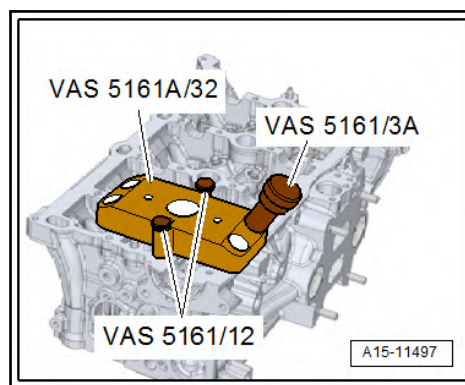




## Sequence of operations

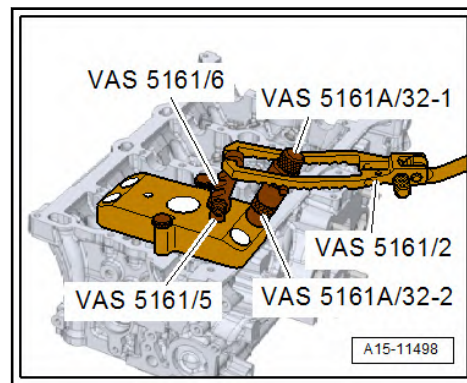


- Remove cylinder head ➔ [a1.3 nd installing cylinder head”, page 185](#).
- Insert cylinder head tensioning device -VAS 6419- into engine and gearbox support -VAS 6095-.
- Tension cylinder head on cylinder head tensioning device as shown in illustration.
- Connect cylinder head tensioning device to compressed air.
- Use lever -arrow- to slide air cushion under combustion chamber from which valve stem seals are to be removed.
- Allow compressed air to flow into air cushion until it lies against valve disc.
- Fit guide plate -VAS 5161A/32- onto cylinder head and secure with knurled screws -VAS 5161/12-.

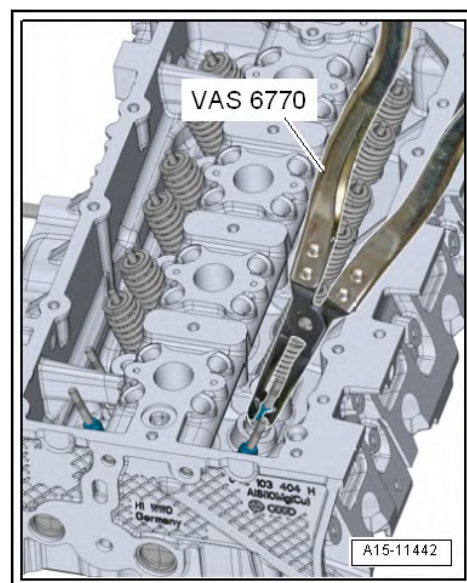


- Insert punch -VAS 5161/3A- into guide plate.
- Use a plastic hammer to knock loose the firmly seated valve cotteners.
- Screw toothed piece -VAS 5161/6- with hooking fork -VAS 5161/5- into guide plate.





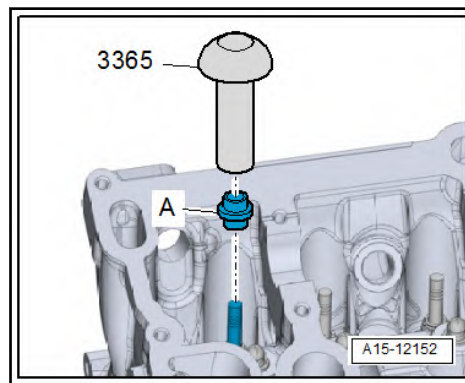
- Slide sleeve -VAS 5161A/32-1- onto assembly cartridge and insert cartridge into guide plate -VAS 5161A/32-2-.
- Attach pressure fork -VAS 5161/2- to toothed piece and press assembly cartridge down.
- At the same time, turn knurled screw of assembly cartridge clockwise until tips engage in valve cotters.
- Move knurled screw back and forth to press apart valve cotters and capture them in assembly cartridge.
- Release pressure fork.
- Remove installation cartridge.
- Unbolt guide plate and move to side.
- Remove valve spring and valve spring plate.
- Pull off valve stem seal using valve stem pliers -VAS 6770-.



#### Note

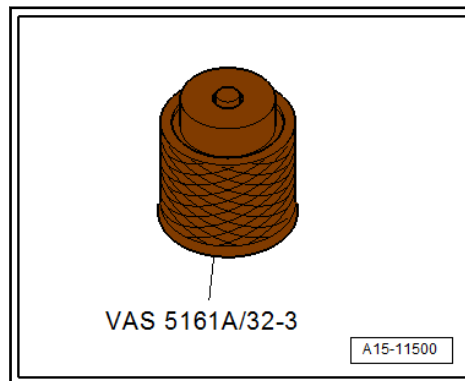
- ◆ Risk of damage when installing valve stem seals.
- ◆ Slowly push valve stem seals as far as stop.
- ◆ Seal oil passages of cylinder head with a lint-free cloth.
- Lightly oil sealing lip of valve stem seal -A-.



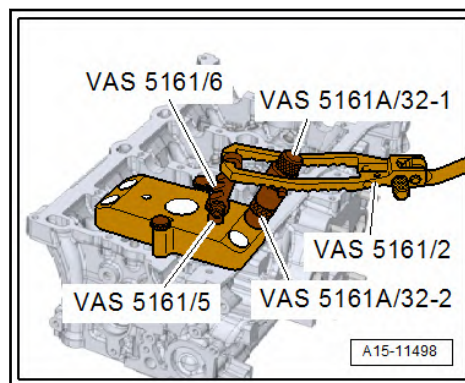


- Carefully press valve stem oil seal -A- onto valve guide using valve stem seal fitting tool -3365-.

If the valve cotters have been removed from the assembly cartridge, they must first be inserted into the insert tool -VAS 5161A/32-3-.



- Larger diameter of valve cotters faces upwards.
- Press assembly cartridge onto insertion device from above and pick up valve cotters.
- Insert valve spring and valve spring plate. For installation position of valve spring refer to ➔ [page 243](#) .
- Bolt guide plate -VAS 5161A/32- onto cylinder head again.



- Insert assembly cartridge -VAS 5161A/32-1- with sleeve -VAS 5161A/32-2- into guide plate.
- Press pressure fork downwards and pull knurled screw upwards, turning it clockwise and anticlockwise. This inserts the valve cotters.
- Reduce pressure on pressure fork whilst pulling on knurled screw.





- Repeat procedure on each valve.
- Install cylinder head ⇒ [a1.3 nd installing cylinder head", page 185](#) .





## 4 Inlet and exhaust valves

⇒ [v4.1 alve guides", page 296](#)

⇒ [v4.2 alves", page 297](#)

⇒ [d4.3 imensions", page 297](#)

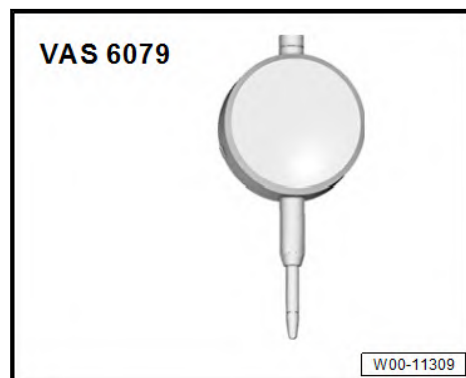
### 4.1 Checking valve guides

Special tools and workshop equipment required

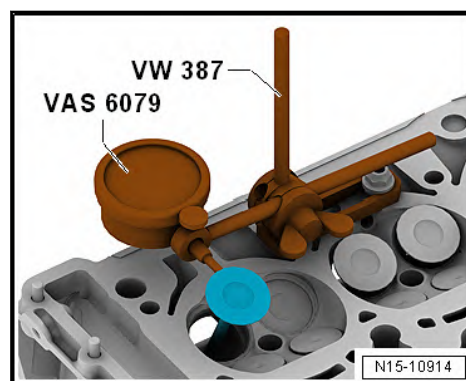
◆ Universal dial gauge bracket -VW 387-



◆ Dial gauge -VAS 6079-



### Test procedure



- Insert valve in guide. Valve stem end must be flush with guide. On account of differing stem diameters, only use inlet valve in inlet valve guide and exhaust valve in exhaust valve guide.
- Determine rock.
- Wear limit: 0.5 mm.





- If the wear limit is exceeded, repeat the measurement with new valves.
- Renew cylinder head if wear limit is still exceeded.

**i** Note

*Valve guides cannot be exchanged.*

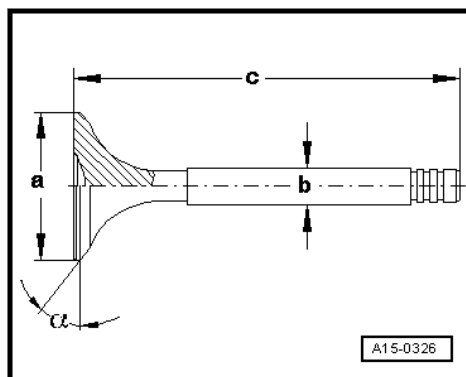
## 4.2 Checking valves

- Check for scoring on valve stems and valve seat surfaces.
- Exchange valve if significant scoring can be seen.

## 4.3 Valve dimensions

**i** Note

*Never rework the inlet and exhaust valves. Only lapping-in is permitted.*



Dimension		Inlet valve	Outlet valve
Ø a	mm	28.5	25.0
Ø b	mm	4.973	4.963
c	mm	110.25	110.09
α	°	45	30





## 17 – Lubrication

### 1 Sump, oil pump

⇒ [o1.1 verview - sump/oil pump", page 298](#)

⇒ [o1.2 il:", page 302](#)

⇒ [a1.3 nd installing lower part of sump", page 302](#)

⇒ [a1.4 nd installing upper part of sump", page 308](#)

⇒ [a1.5 nd installing oil pump", page 312](#)

⇒ [a1.6 nd installing oil level and oil temperature senderG266", page 314](#)

#### 1.1 Assembly overview - sump/oil pump



#### Note

- ◆ *Metal shavings or a large quantity of small metal particles found during engine repair could indicate that the crankshaft bearings or conrod bearings are damaged. To avoid any subsequent damage, the following work must be carried out following the repair: Carefully clean oil channels and renew oil spray jets, engine oil cooler and oil filter.*
- ◆ *Removing and installing oil spray jets ⇒ [a4.3 nd installing oil spray jets", page 169](#) .*



- ☐ 9 Nm

**2 - Oil level and oil temperature sender -G266-**

- ❑ Removing and installing ⇒ a1.6 nd installing oil level and oil temperature senderG266, page 314

### 3 - Seal

- ☐
- Renew after removal

**4 - Oil drain plug**

- ☐ With captive seal on new vehicles
- ☐ To be renewed on 1st oil change
- ☐ Oil drain plug with non-captive seal installed on first oil change is to be reused
- ☐ 30 Nm

## 5 - Seal

- ❑ For oil drain plug installed on 1st oil change
- ❑ Renew after removal

### 6 - Lower part of sump

- ❑ Removing and installing  $\Rightarrow$  a1.3 nd installing lower part of sump", page 302

## 7 - Bolt

- ☐ Renew after removal
- ☐ 5 Nm +90°

**8 - Dowel sleeve**

- Qty. 2

**9 - Cover**

-  For oil pump chain sprocket

## 10 - Drive chain

- ☐ For oil pump.
- ☐ Before removing, mark running direction with paint

## 11 - Bolt

- ☐ Renew after removal
- ☐ Specified torque and tightening sequence ⇒ page 301

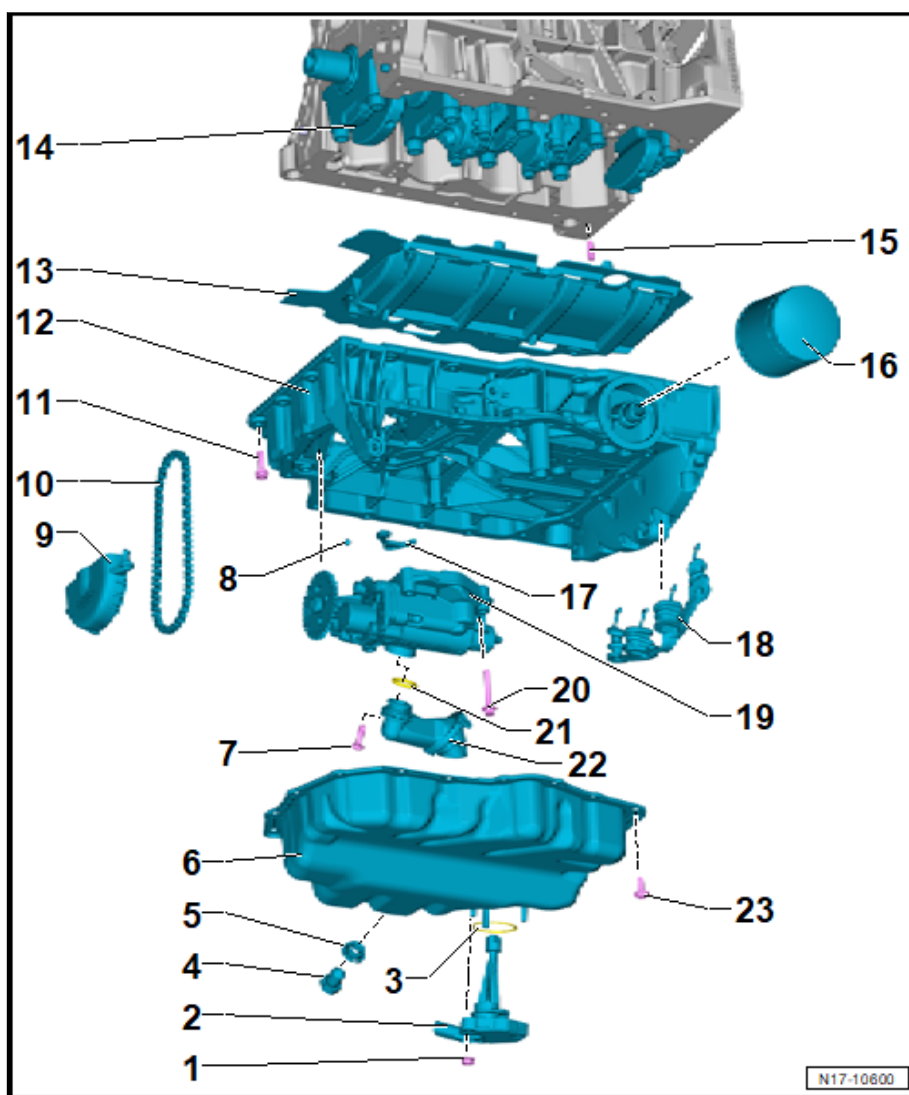
## 12 - Upper part of sump

- ❑ Removing and installing ⇒ a1.4 nd installing upper part of sump”, page 308
- ❑ Tighten loosened connecting union for oil filter ⇒ Fig. “Tightening connecting union for oil filter”“, page 300

### 13 - Baffle plate

## 14 - Sprocket

- ☐ For oil pump drive.



Volkswagen Technical Site: <https://vwts.ru>





## 15 - Dowel pin

## 16 - Oil filter

- ☐ Remove and install with oil filter tool -3417-
- ☐ Before installing, lightly coat seal with clean engine oil.
- ☐ Connecting union for oil filter ⇒ [Fig. “Tightening connecting union for oil filter”](#), page 300
- ☐ 20 Nm

## 17 - Seal

- ☐ With oil strainer

## 18 - Sealing plug chain

## 19 - Oil pump

- ☐ Removing and installing ⇒ [a1.5 nd installing oil pump](#)”, page 312

## 20 - Bolt

- ☐ 10 Nm

## 21 - O-ring

- ☐ Renew after removal

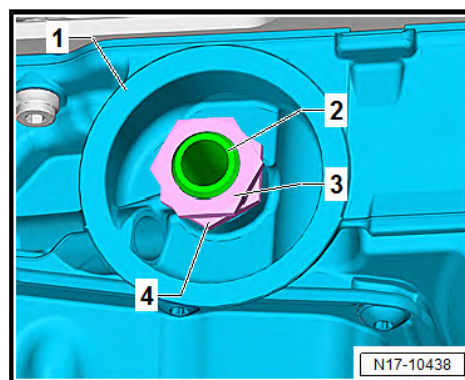
## 22 - Oil intake tube

- ☐ Clean strainer if soiled

## 23 - Bolt

- ☐ Renew after removal
- ☐ Tightening sequence ⇒ [page 301](#)

### Tightening connecting union for oil filter



- If the connecting union -2- in the top section of sump -1- is loose, retighten it as described below.

#### Use only the two nuts -3 and 4- for this procedure.

- Hexagon nut -068 115 723-, qty. 2, ⇒ Electronic Parts Catalogue
- Screw nuts -3- and -4- onto connecting union -2-, and counterlock them.
- Tighten connecting union -2- using nut -3-.
- Loosen the two nuts and remove them, taking care not to loosen the connecting union.

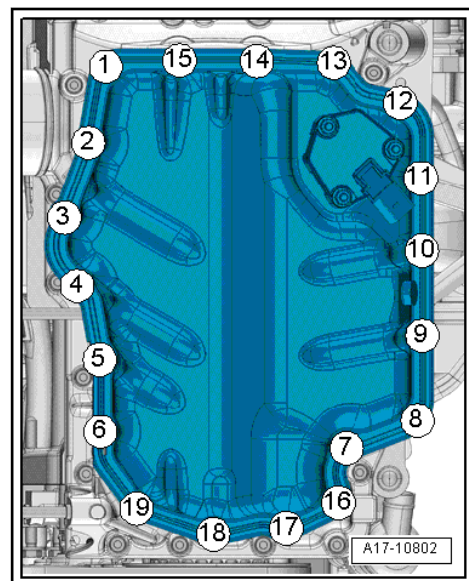
#### Specified torques

Connecting union	Specified torque
-2-	50 Nm





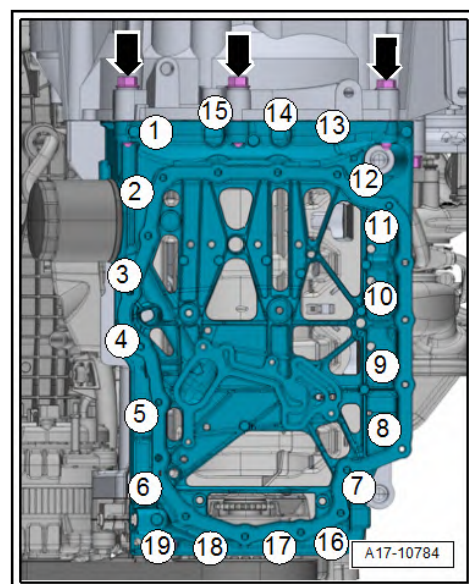
## Lower part of sump - specified torque and tightening sequence



- Tighten bolts in stages in the sequence shown.

Stage	Bolts	Specified torque
1st	-1 ... 19-	Screw onto stop by hand
2nd	-1 ... 19-	12 Nm

## Upper part of sump - specified torque and tightening sequence



### Note

*Renew bolts that are tightened with turning further angle.*

- Tighten bolts in stages in the sequence shown.

Stage	Bolts	Specified torque/turning further angle
1st	-1 ... 19-	Screw onto stop by hand
2nd	-Arrows-	Screw onto stop by hand
3rd	-1 ... 19-	8 Nm





Stage	Bolts	Specified torque/turning further angle
4th	-1 ... 19-	Turn 90° further
5th	-Arrows-	Specified torque ⇒ Rep. gr. 34; Removing and installing gearbox; Specified torques for gearbox.

## 1.2 Engine oil:



### Note

*Oil level must not be above "max." mark.*

Capacities and specifications ⇒ Maintenance; Booklet ; Engine oil: Capacities and specifications.

Check engine oil level ⇒ Maintenance; Booklet ; Engine oil level: Checking.

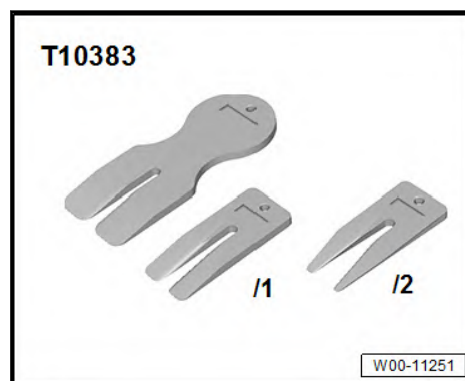
## 1.3 Removing and installing lower part of sump

Special tools and workshop equipment required

◆ Hexagon key -T10058-



◆ Wedge -T10383/2-







◆ Cutting tool -T10561-

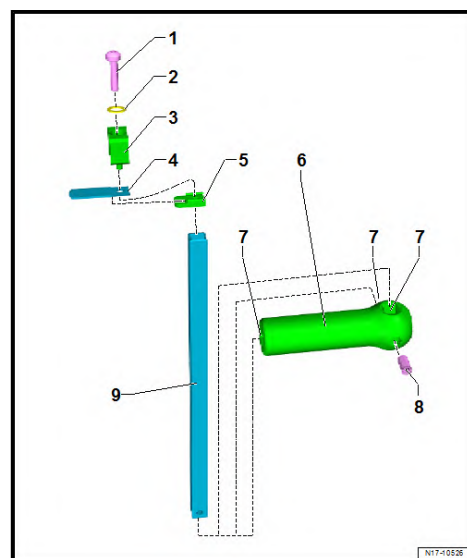


◆ Applicator gun -VAS 6966-



- ◆ Protective mat -VAS 531003-
- ◆ Scraper
- ◆ Commercially available scraper
- ◆ Sealant remover
- ◆ Hand drill with plastic brush
- ◆ Safety glasses
- ◆ Sealant ⇒ Electronic Parts Catalogue

Cutting tool -T10561-



- 1 - Bolt
- 2 - Washer

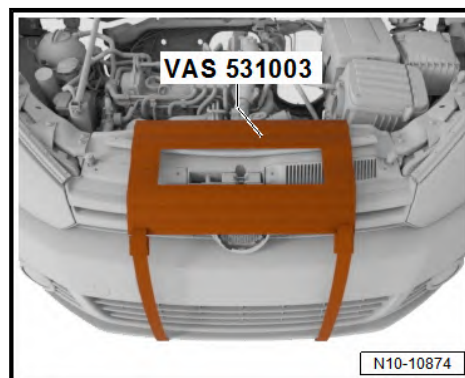




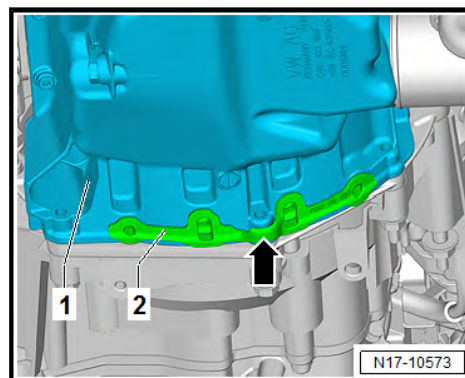
- 3 - Bracket
- 4 - Knife
- 5 - Guide
- 6 - Handle
- 7 - Inserts for support (rod) for conversion of handle
- 8 - Bolt
- 9 - Support

### Removing

- Drain engine oil.
- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- Remove front right wheel housing liners ⇒ General body repairs, exterior; Rep. gr. 66; Wheel housing liner; Assembly overview - front wheel housing liner.
- After radiator cowl has been removed, fit protective mat -VAS 531003- to vehicle as shown in illustration.

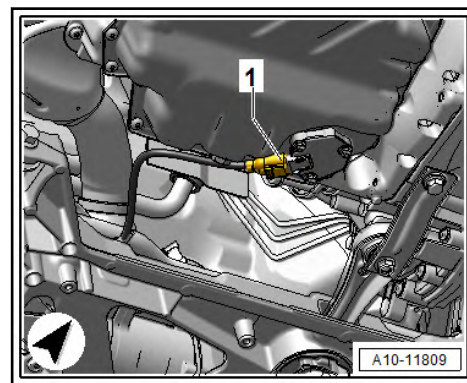


- Remove sealing plug chain -2- from sump -1-.

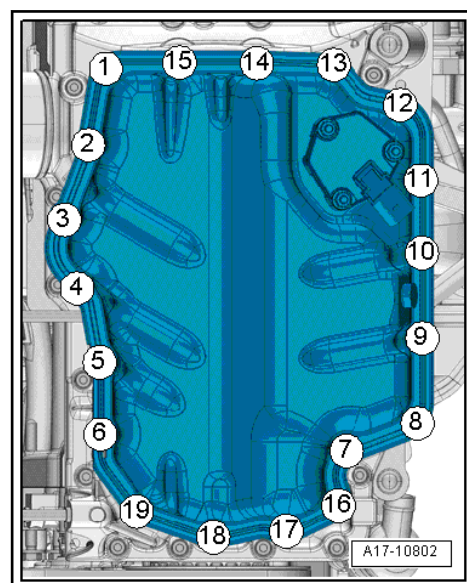


- Disconnect electrical connector -1- on oil level and oil temperature sender -G266-.

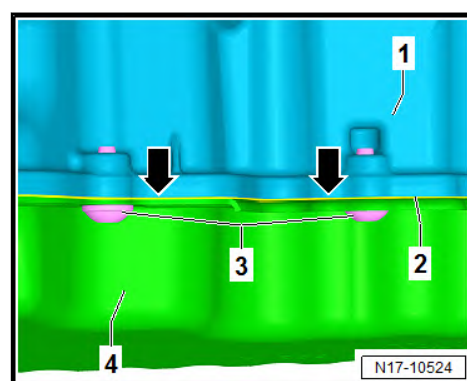




- Loosen and unscrew bolts in the sequence -19 to 1-.



- Loosen 2 bolts on oil sump, but do not unscrew completely.
- Cut through seal between oil sump -4- and engine -1-.



- Use cutting tool -T10561- to do this.



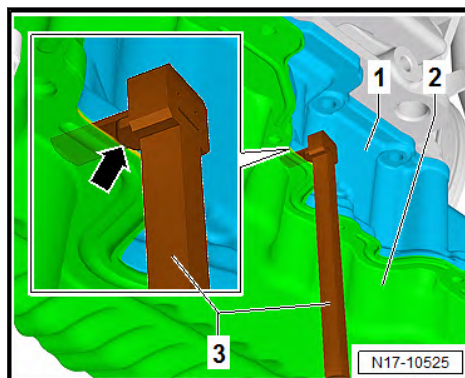
#### Note

- ◆ *The sump is sealed with liquid sealant -2- → Electronic parts catalogue.*
- ◆ *When hardened, the sealant has a high adhesive strength.*
- Separation is made centrally between bolts -3-.

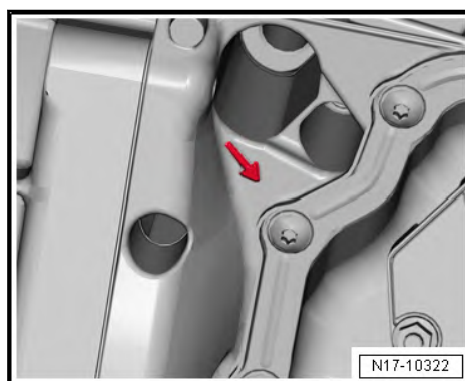




- Position cutting tool -T10561- on seal -arrows- without it canting.
- Drive in cutting tool -T10561- -3- using a hammer as far as it will go -arrow-.



- Do not cant cutting tool -T10561- when doing this.
- Do not cutting tool -T10561- sideways.
- Do not lever with cutting tool -T10561-.
- Perform procedure at other points as described until sump is detached.
- Use wedge -T10383/2- to further loosen detached positions.
- Using a plastic hammer carefully drive in wedge.
- Drive in wedge -T10383/2- only to same depth as sealing surface.
- Carefully detach sump (bottom section) from adhesive bond.
- Fit wedge -T10383/2- at another position and detach the bonded joint in the same way.
- Carefully detach lower part of sump from adhesive bond using a commercially available scraper.
- Insert suitable screwdriver or assembly lever at position marked -arrow-.



- Separate oil sump from crankcase.





## Installing



### Note

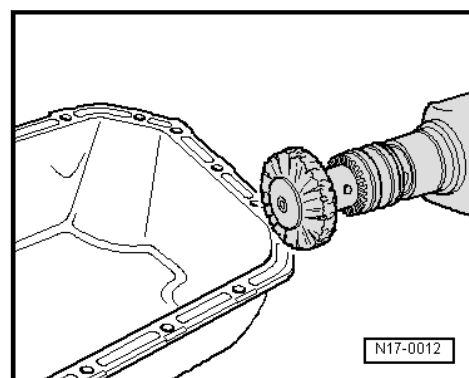
- ◆ *Danger of soiling lubrication system.*
- ◆ *Cover open parts of engine.*
- Spray sealing surface with sealant remover and leave to act.
- Remove sealant residues from sump upper part with a flat scraper.



### CAUTION

**Risk of eye injury caused by sealant residue.**

- **Wear protective goggles.**
- Remove sealant residue from sump (bottom section) using a rotating plastic brush, for example.

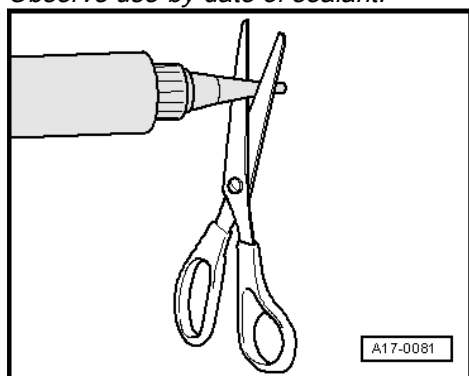


- Remove any oil and grease from sealing surfaces.



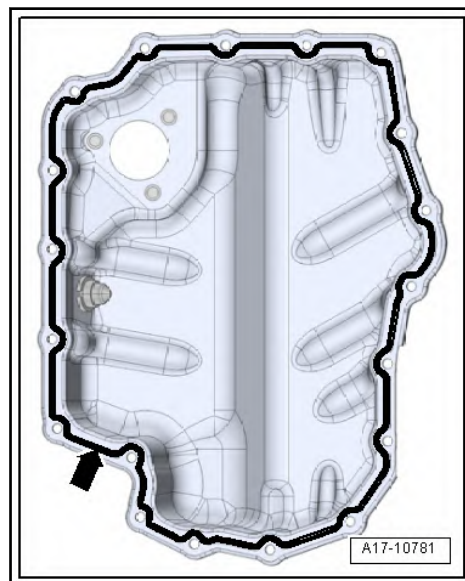
### Note

*Observe use-by date of sealant.*



- Cut off nozzle on tube at front marking ( $\varnothing$  of nozzle approx. 2 mm).





- Apply sealant in a bead -arrow- to clean sealing surface of bottom section of sump using applicator gun -VAS 6966-.
- Thickness of sealant bead: 2 to 3 mm.



#### Note

- ♦ *Danger of blocking lubrication system with excess sealant.*
- ♦ *Take particular care when applying sealant bead in area of the sealing flange.*
- ♦ *Do not apply sealant bead thicker than specified.*
- ♦ *Lower part of oil sump must be installed within 5 minutes after sealant has been applied.*
- Position bottom section of sump and tighten bolts ➔ [page 301](#).
- Install oil level and oil temperature sender -G266- ➔ [a1.6 nd installing oil level and oil temperature sender G266](#), [page 314](#).



#### Note

*Allow sealant to cure for approx. 30 minutes after installing lower part of sump. Only then fill with engine oil.*

- Replenish engine oil, and check oil level ➔ Maintenance; Booklet.

#### Specified torques

- ♦ ➔ [Fig. “Lower part of sump - specified torque and tightening sequence”](#), [page 301](#)

## 1.4 Removing and installing upper part of sump

Special tools and workshop equipment required



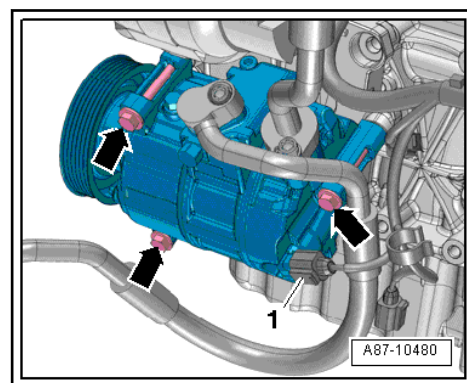


- ◆ Hexagon key -T10058-

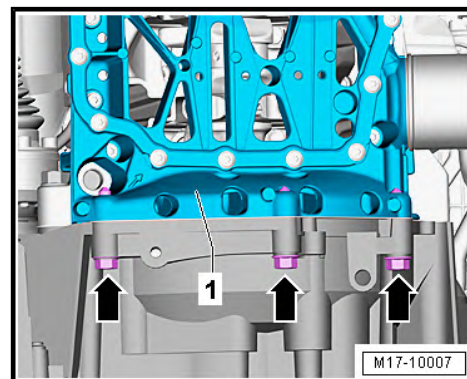


- ◆ Hand drill with plastic brush
- ◆ Safety glasses
- ◆ Sealant → Electronic Parts Catalogue

### Removing

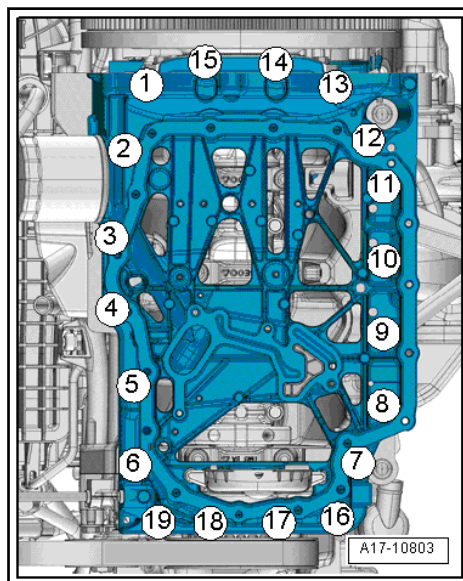


- Remove air conditioner compressor from bracket, and secure it on vehicle ⇒ Heating, air conditioning; Rep. gr. 87; Air conditioner compressor; Removing air conditioner compressor from and installing to bracket.
- Remove sump (bottom section) ⇒ [a1.3 nd installing lower part of sump", page 302](#) .
- Remove oil pump ⇒ [a1.5 nd installing oil pump", page 312](#) .
- Unscrew securing bolts -arrows- for gearbox to upper section of sump -1-.



- Loosen and unscrew bolts in the sequence -19 to 1-.





- Carefully detach upper part of sump from adhesive bond.
- Remove baffle plate.

#### Installing



#### Note

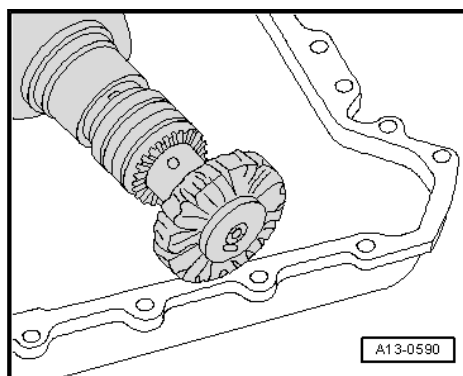
- ◆ *Renew bolts that are tightened with turning further angle.*
  - ◆ *Renew gaskets, oil seals and self-locking nuts.*
  - ◆ *Danger of soiling lubrication system.*
  - ◆ *Cover open parts of engine.*
- Remove sealant residues from cylinder block with a flat scraper.



#### CAUTION

Risk of eye injury caused by sealant residue.

- Wear protective goggles.
- 
- Remove sealant residue from upper part of sump, e.g. with rotating plastic brush.



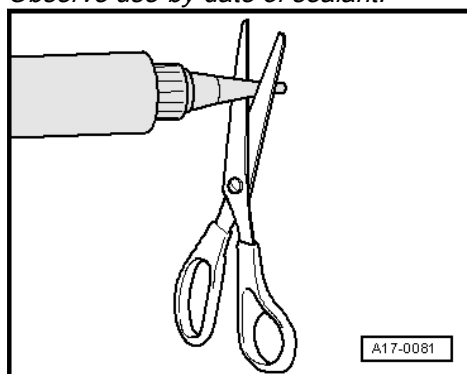
- Check oil galleries in upper part of sump and cylinder block for soiling.
- Remove any oil and grease from sealing surfaces.



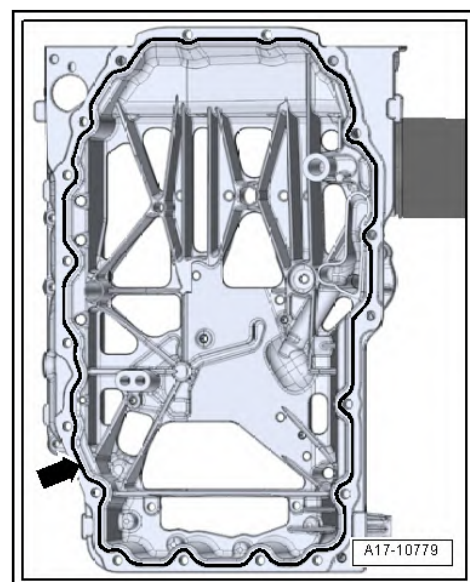


**i** Note

*Observe use-by date of sealant.*



- Cut off nozzle on tube at front marking ( $\varnothing$  of nozzle approx. 2 mm).

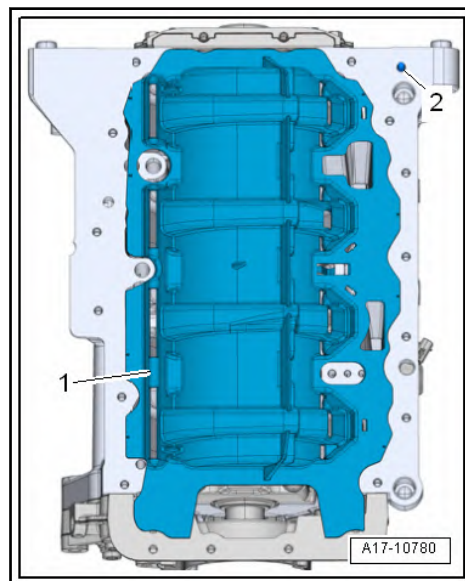


- Apply sealant in a bead -arrow- to clean sealing surface of bottom section of sump using applicator gun -VAS 6966-.
- Thickness of sealant bead: 2 to 3 mm.

**i** Note

- ◆ *Danger of blocking lubrication system with excess sealant.*
- ◆ *Upper part of oil sump must be installed within 5 minutes after sealant has been applied.*
- ◆ *Do not apply sealant bead thicker than specified.*
- Check that dowel pin -2- is securely seated in cylinder block.





- Attach baffle plate -1- to cylinder block.
- Position top section of sump and tighten bolts ⇒ [page 301](#) .

Continue installation in reverse order of removal. Observe the following when doing this:

- Install oil pump ⇒ [a1.5 nd installing oil pump](#)”, [page 312](#) .
- Install air conditioner compressor ⇒ Heating, air conditioning; Rep. gr. 87; Air conditioner compressor; Removing and installing air conditioner compressor from and to bracket.
- Replenish engine oil, and check oil level ⇒ Maintenance; Booklet .

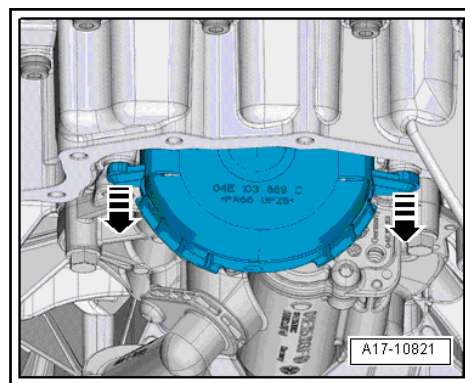
#### Specified torques

- ♦ ⇒ [o1.1 verview - sump/oil pump](#)”, [page 298](#)
- ♦ Securing gearbox to engine ⇒ Rep. gr. 34; Removing and installing gearbox; Installing gearbox

## 1.5 Removing and installing oil pump

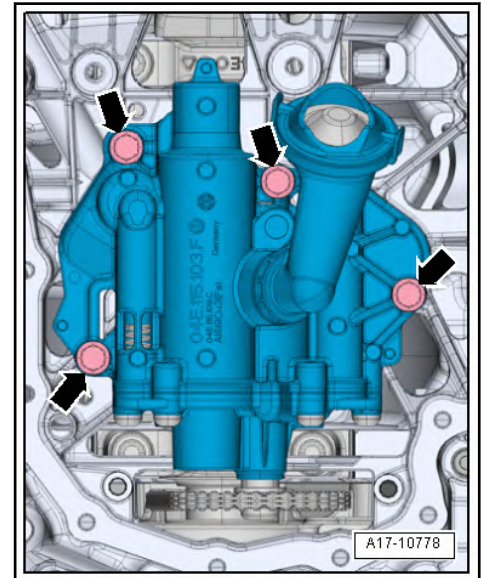
### Removing

- Remove sump (bottom section) ⇒ [a1.3 nd installing lower part of sump](#)”, [page 302](#) .
- Unclip cover for oil pump chain sprocket -arrows-.



- Unscrew bolts -arrows-.

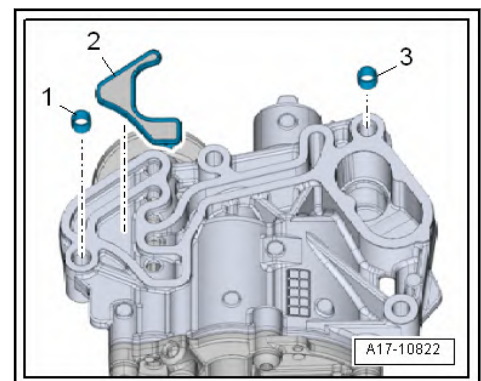




- Guide out oil pump with chain sprocket under drive chain.

#### Installing

- Check that dowel sleeves -1, 3- are fitted in oil pump.
- Fit seal with strainer -2- in oil pump.



Install in reverse order of removal, observing the following:

- Turn oil pump chain sprocket by hand to check oil pump for ease of movement.



#### Note

*Renew sluggish oil pump.*

- Fit oil pump with chain sprocket into drive chain and secure.
- Install bottom section of sump ⇒ [a1.3 nd installing lower part of sump”, page 302](#) .
- Replenish engine oil, and check oil level ⇒ Maintenance; Booklet .

#### Specified torques

- ◆ ⇒ [o1.1 verview - sump/oil pump”, page 298](#)

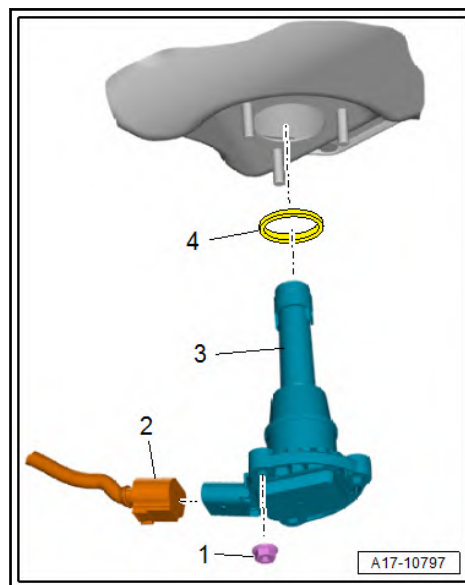




## 1.6 Removing and installing oil level and oil temperature sender -G266-

### Removing

- Drain engine oil.
- Disconnect electrical connector -2-.



- Undo nuts -1- and remove oil level and oil temperature sender -G266- -item 3-.

### Installing

Install in reverse order of removal, observing the following:



#### Note

*Renew oil seal -4-.*

- Replenish engine oil, and check oil level ⇒ Maintenance; Booklet .

### Specified torques

- ♦ ⇒ [o1.1 verview - sump/oil pump”, page 298](#)





## 2 Engine oil cooler

⇒ [o2.1 verview - engine oil cooler", page 315](#)

⇒ [a2.2 nd installing engine oil cooler", page 315](#)

### 2.1 Assembly overview - engine oil cooler

#### 1 - Engine oil cooler

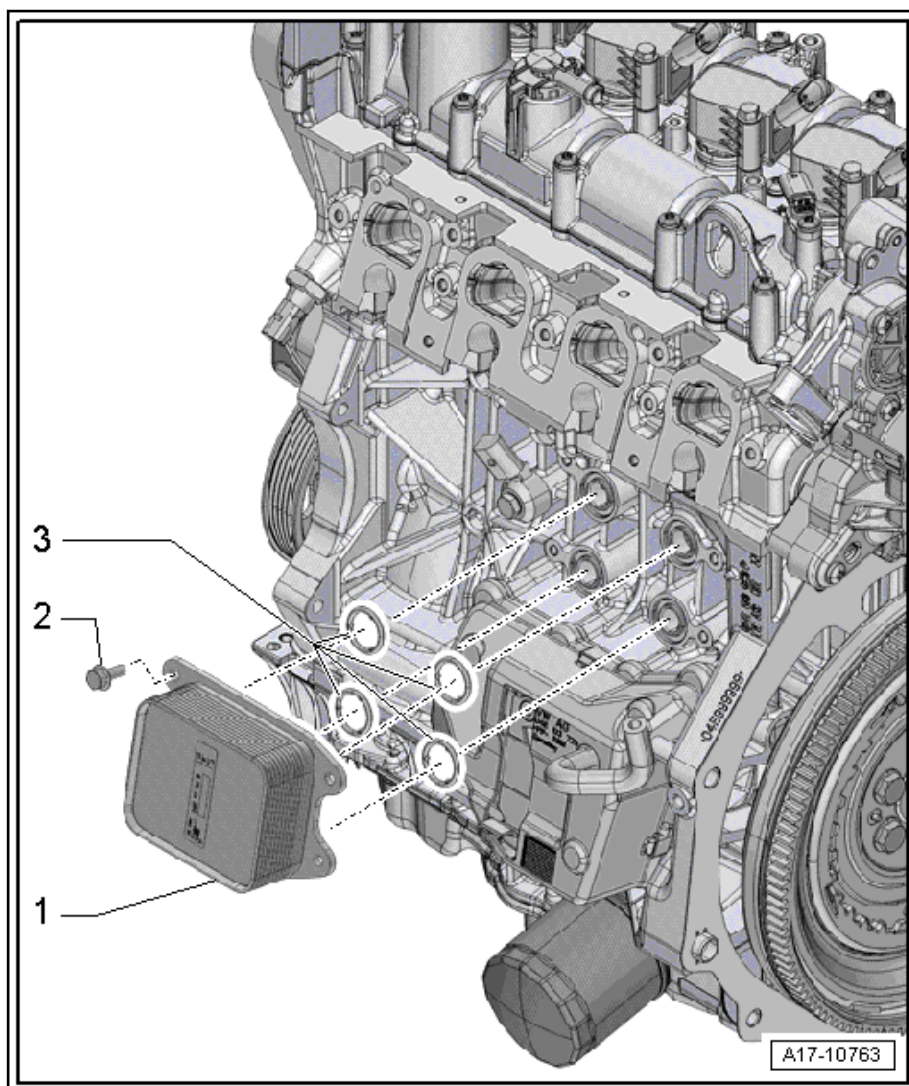
- ☐ Observe notes ⇒ [o1 il pump", page 298](#)
- ☐ Removing and installing ⇒ [a2.2 nd installing engine oil cooler", page 315](#)
- ☐ Renew coolant after replacing

#### 2 - Bolt

- ☐ Renew after removal
- ☐ 8 Nm +90°

#### 3 - Oil seals

- ☐ Renew after removal

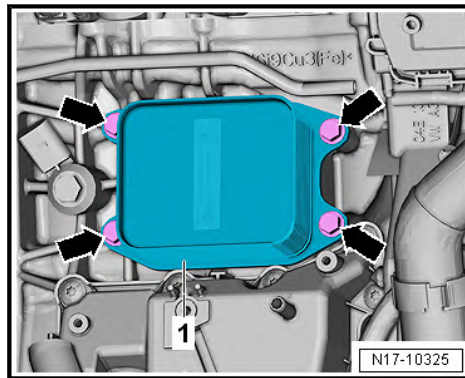


### 2.2 Removing and installing engine oil cooler

#### Removing

- Drain coolant ⇒ [a1.3 nd adding coolant", page 340](#) .
- Remove intake manifold ⇒ [a4.2 nd installing intake manifold", page 481](#) .
- Unscrew bolts -arrows- and detach engine oil cooler -1-.





### Installing

- Insert new O-rings.

Install in reverse order of removal, observing the following:

- Install intake manifold ⇒ [a4.2 nd installing intake manifold", page 481](#) .
- Add coolant ⇒ [page 347](#) .

### Specified torques

- ◆ ⇒ [o2.1 verview - engine oil cooler", page 315](#)
- ◆ ⇒ [o1.1 verview - ignition system", page 578](#)





### 3 Crankcase ventilation

⇒ [o3.1 verview - crankcase breather system", page 317](#)

⇒ [a3.2 nd installing oil separator", page 318](#)

#### 3.1 Assembly overview - crankcase breather system

##### 1 - Hose

- ☐ For crankcase ventilation.

##### 2 - Cover

- ☐ For oil separator

##### 3 - Oil separator

- ☐ Removing and installing ⇒ [a3.2 nd installing oil separator", page 318](#)
- ☐ Renew if damaged

##### 4 - O-ring

- ☐ Renew after removal

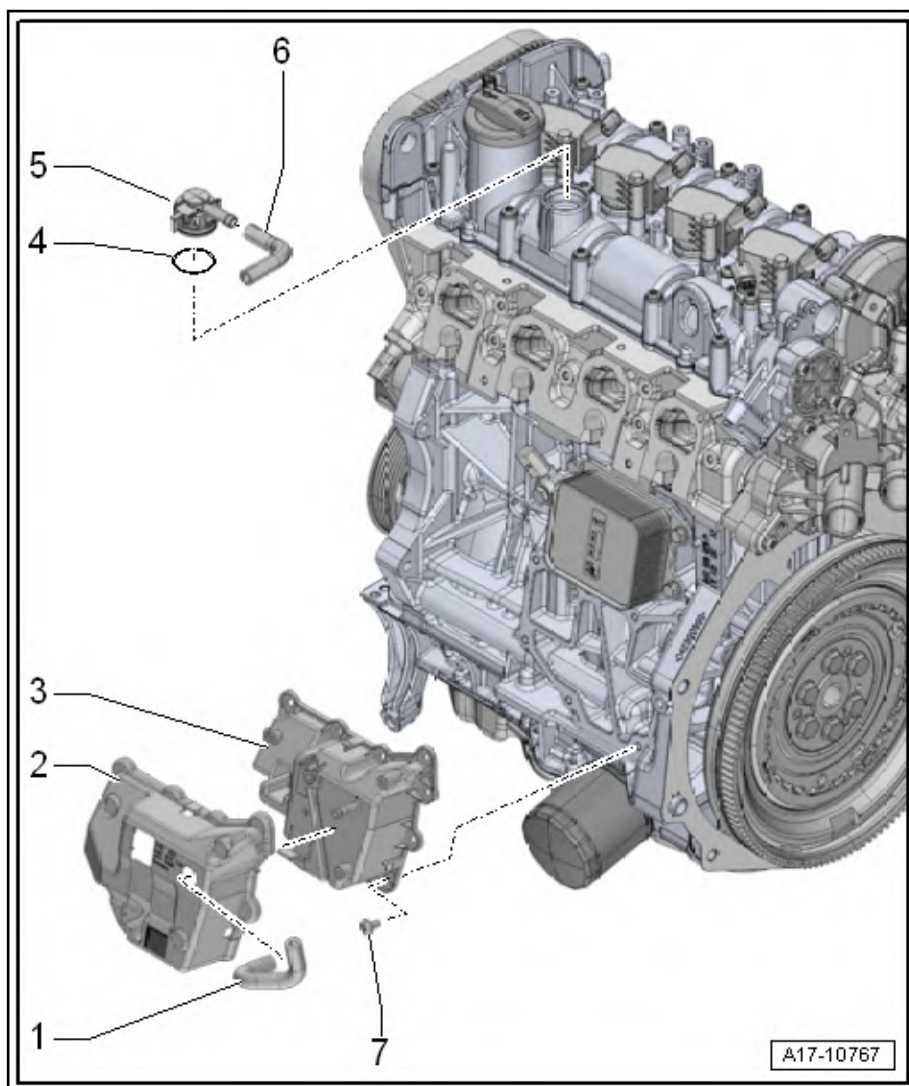
##### 5 - Union

##### 6 - Hose

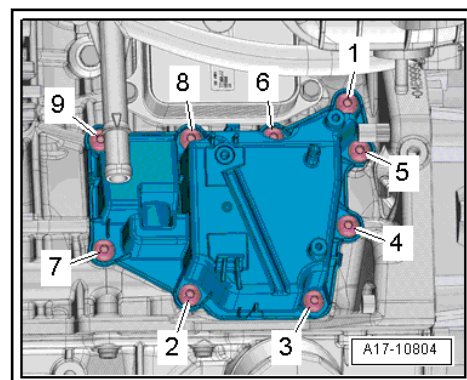
- ☐ For crankcase ventilation.

##### 7 - Bolt

- ☐ Self-locking
- ☐ Renew after removal
- ☐ Specified torque and tightening sequence: ⇒ [page 317](#)



#### Oil separator - specified torque and sequence







- Tighten bolts in the sequence -1 ... 9-.

Component	Specified torque
Tighten bolts in the sequence -1 ... 9-.	9 Nm

## 3.2 Removing and installing oil separator

### Special tools and workshop equipment required

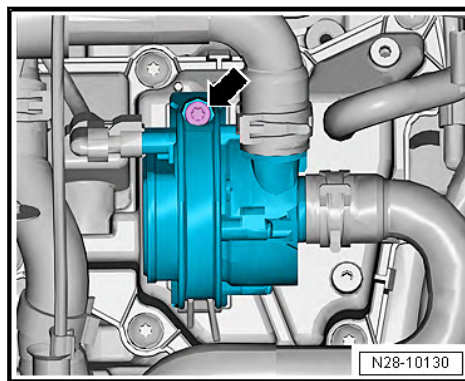
- ◆ Applicator gun -VAS 6966-



- ◆ Scraper
- ◆ Commercially available studs, M6x20 mm, qty. 2
- ◆ Sealant remover
- ◆ Sealant ⇒ Electronic Parts Catalogue

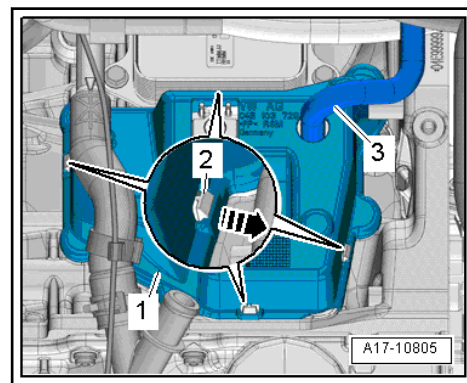
### Removing

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- Unscrew bolts -arrow- and push charge air cooling pump -V188- to one side.

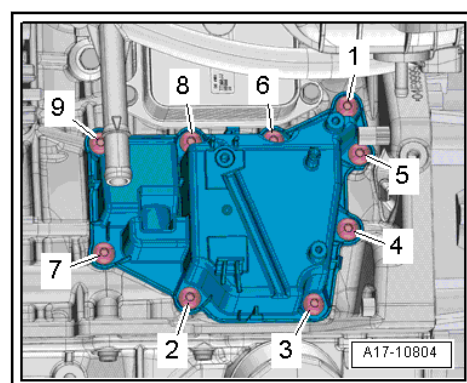


- Pull off crankcase breather hose -3-.





- Release fasteners -2- -arrow- on cover -1- for oil separator and detach cover.
- Loosen and unscrew bolts in the sequence -9 to 1-.



- Carefully release oil separator from bonded joint.

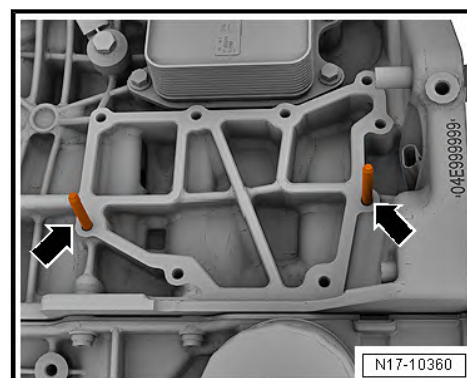
### Installing

Install in reverse order of removal, observing the following:



#### Note

- ◆ *Danger of soiling lubrication system.*
- ◆ *Cover open parts of engine.*
- Remove sealant residues from cylinder block with a flat scraper.
- Remove any oil and grease from sealing surfaces.
- Screw 2 M6x20 mm studs a few turns into holes -arrows-.

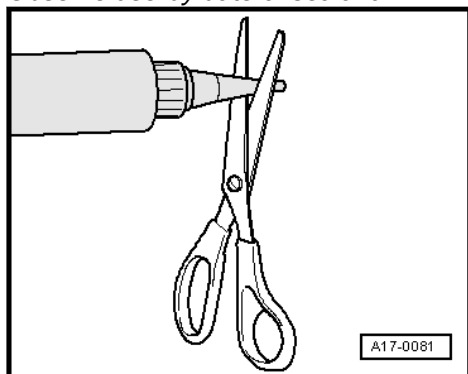




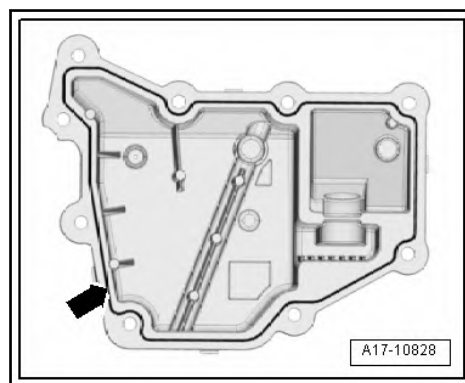


#### Note

*Observe use-by date of sealant.*



- Cut off nozzle on tube at front marking ( $\varnothing$  of nozzle approx. 2.0 mm).



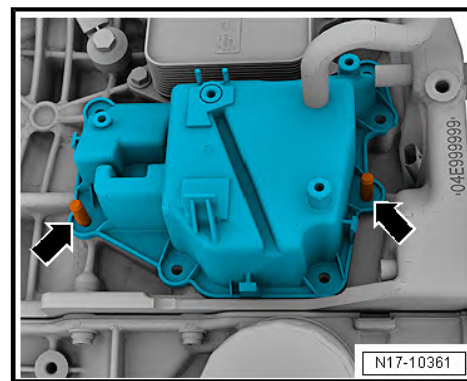
#### Note

- ♦ *Danger of blocking lubrication system with excess sealant.*
- ♦ *Do not apply sealant bead thicker than specified.*
- Apply bead of sealant -arrow- onto clean sealing surface of oil separator using applicator gun -VAS 6966- as illustrated.
- Width of sealant bead: 2.0 mm.

The oil separator must be installed within 5 minutes after applying the sealant.

- Fit oil separator onto studs -arrows- and push onto crankcase.





- Start securing bolts.
- Unscrew studs.
- Install oil separator ⇒ [page 317](#) .

Continue installation in reverse order of removal. Observe the following when doing this:

- Install noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview – noise insulation.

#### Specified torques

- ◆ ⇒ [Fig. ““Oil separator - specified torque and sequence””, page 317](#)
- ◆ ⇒ [o2.2 verview - electric coolant pump”, page 351](#)





## 4 Oil filter, oil pressure switch

⇒ [o4.1 verview - oil filter/oil pressure switch", page 322](#)

⇒ [a4.2 nd installing oil pressure switchF1", page 324](#)

⇒ [a4.3 nd installing oil pressure switch for reduced oil pressur-eF378", page 325](#)

⇒ [o4.4 il pressure", page 326](#)

⇒ [a4.5 nd installing oil pressure regulating valveN428", page 328](#)

### 4.1 Assembly overview - oil filter/oil pressure switch



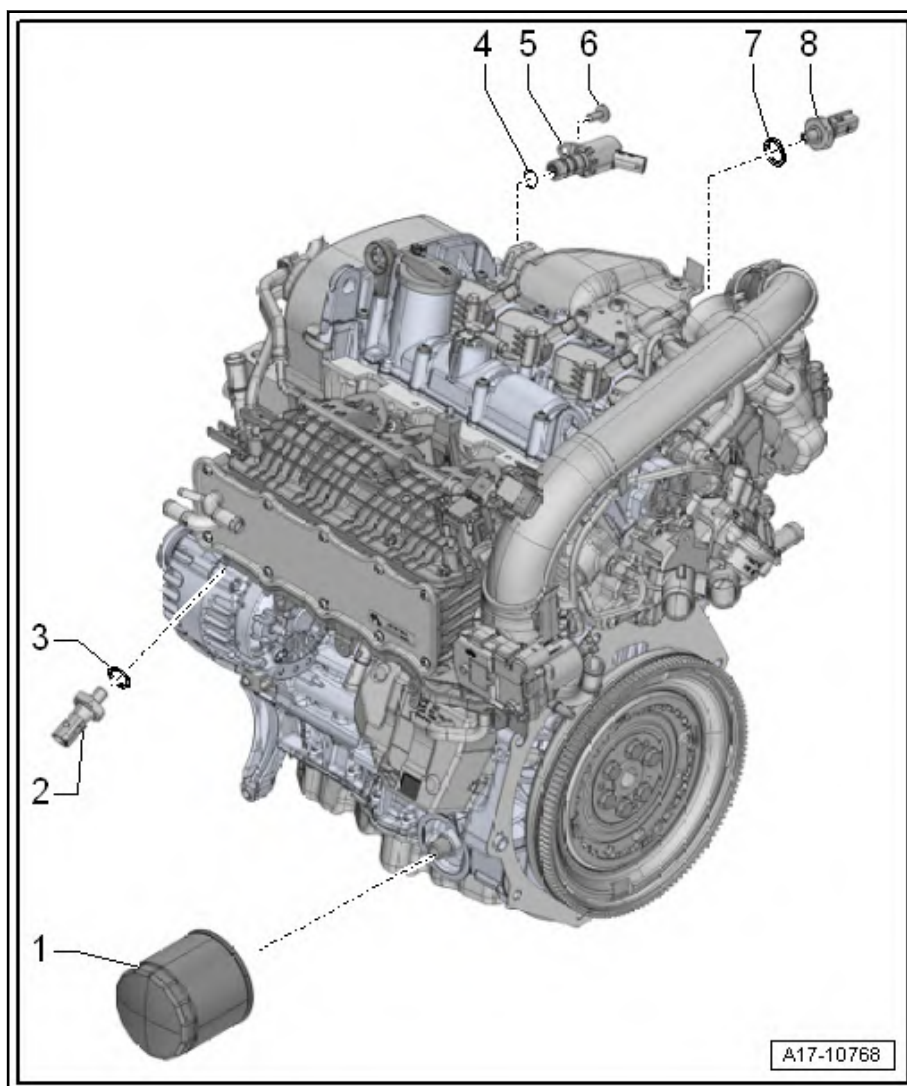


### 1 - Oil filter

- ☐ Remove and install with oil filter tool -3417-
- ☐ Before installing, lightly coat seal with clean engine oil.
- ☐ Tighten loosened connecting union for oil filter ⇒ [Fig. "Tightening connecting union for oil filter", page 300](#)
- ☐ Observe notes ⇒ [page 298](#)
- ☐ 20 Nm

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

- ☐ Switch pressure 0.3 to 0.6 bar
- ☐ Checking ⇒ [o4.4 il pressure", page 326](#)
- ☐ Removing and installing ⇒ [a4.3 nd installing oil pressure switch for reduced oil pressure-F378", page 325](#)
- ☐ 20 Nm



### Note

- ◆ The oil pressure switch is fitted with a captive seal.
- ◆ The seal is not designed for repeated use.

### 3 - Seal

- ☐ Renew after removal

### 4 - O-ring

- ☐ Renew after removal

### 5 - Valve for oil pressure control -N428-

- ☐ Removing and installing ⇒ [a4.5 nd installing oil pressure regulating valveN428", page 328](#)

### 6 - Bolt

- ☐ 8 Nm

### 7 - Seal

- ☐ Renew after removal

### 8 - Oil pressure switch -F1-

- ☐ Switch pressure 2.15 to 2.95 bar





- ❑ Checking ⇒ [o4.4 il pressure", page 326](#)
- ❑ Removing and installing ⇒ [a4.2 nd installing oil pressure switchF1", page 324](#)
- ❑ 20 Nm



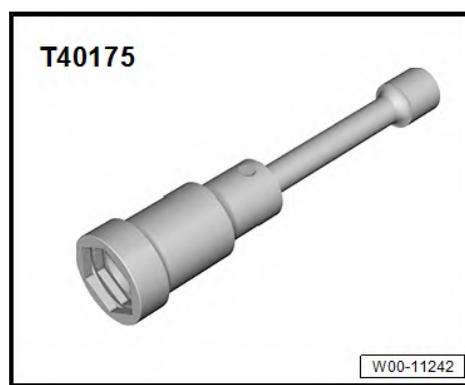
#### Note

- ◆ *The oil pressure switch is fitted with a captive seal.*
- ◆ *The seal is not designed for repeated use.*

## 4.2 Removing and installing oil pressure switch -F1-

### Special tools and workshop equipment required

- ◆ T-bar and socket, 24 mm -T40175-



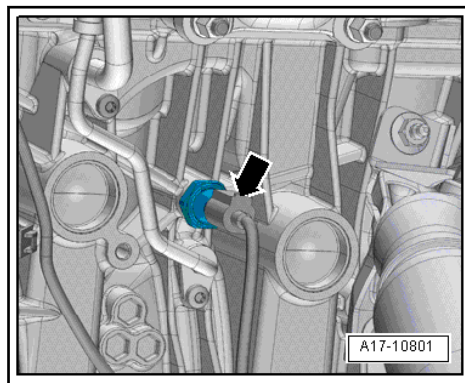
### Removing



#### Note

*Fit all heat shield sleeves in the same place when installing.*

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- Remove heat shield for right drive shaft ⇒ Running gear, axles, steering; Rep. gr. 40; Drive shaft; Removing and installing drive shaft heat shield.
- Separate electrical connector -arrow-.



- Place a cloth underneath to catch escaping engine oil.





- Remove oil pressure switch -F1-.

### Installing

Install in reverse order of removal, observing the following:



#### Note

- ◆ *Renew oil seal after removing.*
- ◆ *Screw in new oil pressure switch -F1- immediately in hole to avoid loss of oil.*
- Renew oil seal for oil pressure switch after removal. For allocation, refer to ⇒ Electronic Parts Catalogue
- Cut old oil seal open to remove it.
- Check oil level ⇒ Maintenance; Booklet .

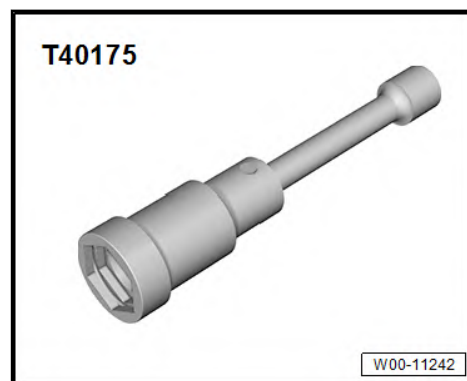
### Specified torques

- ◆ ⇒ [o4.1 verview - oil filter/oil pressure switch", page 322](#)
- ◆ ⇒ Running gear, axles, steering; Rep. gr. 40; Drive shaft; Assembly overview - drive shaft

## 4.3 Removing and installing oil pressure switch for reduced oil pressure -F378-

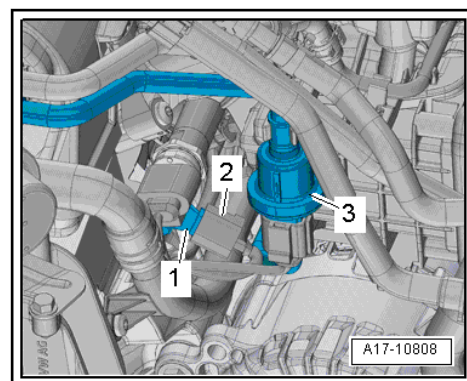
### Special tools and workshop equipment required

- ◆ T-bar and socket, 24 mm -T40175-



### Removing

- Pull activated charcoal filter solenoid valve 1 -N80- -3- off intake manifold and push it downwards slightly.
- Disconnect electrical connector -2-.







#### Note

*Place a cloth underneath to catch escaping engine oil.*

- Unscrew oil pressure switch for reduced oil pressure -F378-1-.

#### Installing

Install in reverse order of removal, observing the following:



#### Note

- ♦ *Oil seal must always be renewed after removing.*
- ♦ *To avoid loss of oil, Insert new oil pressure switch for reduced oil pressure -F378- immediately into bore.*
- Renew oil seal for oil pressure switch after removal. For allocation, refer to ⇒ Electronic Parts Catalogue
- Cut off seal to replace.
- Check oil level ⇒ Maintenance; Booklet .

#### Specified torques

- ♦ ⇒ [o4.1 verview - oil filter/oil pressure switch", page 322](#)

## 4.4 Checking oil pressure

#### Special tools and workshop equipment required

- ♦ Oil pressure tester -V.A.G 1342-



#### Sequence of operations

- Oil level OK. Checking ⇒ Maintenance; Booklet .
- Engine oil temperature at least 80°C (radiator fan must have run once)
- Remove oil pressure switch for reduced oil pressure -F378-  
⇒ [a4.3 nd installing oil pressure switch for reduced oil pressureF378", page 325](#) .
- Screw oil pressure tester -V.A.G 1342- into hole for oil pressure switch.
- Screw oil pressure switch for reduced oil pressure -F378- into hole in oil pressure tester -V.A.G 1342- to seal it.
- Start the engine.





### Checking oil pressure at idling speed and at 2000 rpm

- Oil pressure at idling speed: at least 0.6 bar.
- Oil pressure at 2000 rpm: at least 1.5 bar.
- Switch off engine.

### Check oil pressure at 3,800 rpm

- Remove electrical connection from oil pressure control valve -N428- ➔ [page 329](#).
- Start the engine.
- Increase engine speed to 3800 rpm.
- Read oil pressure on oil pressure tester -V.A.G 1342-.
- Oil pressure at 3800 rpm: at least 2.8 bar.

If specification is not attained:

- Connect electrical connection to oil pressure control valve -N428- ➔ [page 329](#).
- Interrogate the engine control unit event memory and delete all event entries ➔ Vehicle diagnostic tester.
- Check valve for oil pressure control -N428- with ➔ vehicle diagnostic tester.



#### Note

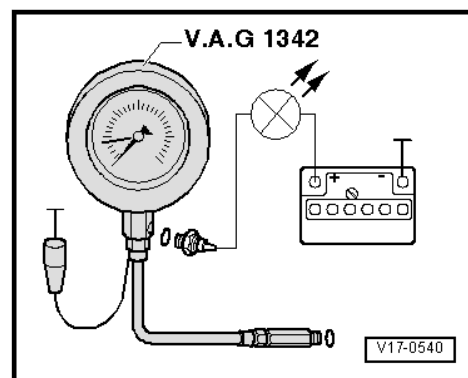
*Mechanical damage, e.g. to bearings, could also be the cause for oil pressure being too low.*

If no fault is found:

- Renew oil pump ➔ [a1.5 nd installing oil pump", page 312](#).

### Check oil pressure switch for reduced oil pressure -F378- (brown):

- Switch off ignition.
- Connect brown wire of tester to earth (-).



- Connect voltage tester -V.A.G 1527B- to battery positive (+) and oil pressure switch for reduced oil pressure -F378- (brown) using cables from auxiliary test set -V.A.G 1594C-.
- LED must not light up.
- If LED lights up, renew oil pressure switch for reduced oil pressure -F378-.

If LED does not light up:





- Start engine: At 0.3 to 0.6 bar the LED must light up, otherwise renew oil pressure switch.

#### Checking oil pressure switch -F1- (blue):

- Switch off engine.
- Connect voltage tester -V.A.G 1527B- to battery positive (+) and oil pressure switch -F1- (blue) using cables from auxiliary test set -V.A.G 1594C-.
- LED must not light up.
- If LED lights up, renew oil pressure switch oil pressure switch -F1-.

If LED does not light up:

- Remove electrical connection from oil pressure control valve -N428- ➔ [page 329](#) .
- Start engine and increase rpm: At pressure of 2.15 to 2.95 bar LED must light up, otherwise renew oil pressure switch.
- Connect electrical connection to oil pressure control valve -N428- ➔ [page 329](#) .
- Install oil pressure switch for reduced oil pressure -F378- ➔ [a4.3 nd installing oil pressure switch for reduced oil pressure -F378", page 325](#) .
- Interrogate the engine control unit event memory and delete all event entries ➔ Vehicle diagnostic tester.

#### Specified torques

- ♦ ➔ [o4.1 verview - oil filter/oil pressure switch", page 322](#)

## 4.5 Removing and installing oil pressure regulating valve -N428-

### Removing



#### Note

*Attach all heat-shielding sleeves in the same places when installing.*

- Remove noise insulation ➔ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.

#### Vehicles with all-wheel drive:

- Remove right drive shaft from gearbox, raise and tie ➔ Running gear, axles, steering; Rep. gr. 40; Drive shaft; Removing and installing drive shaft.

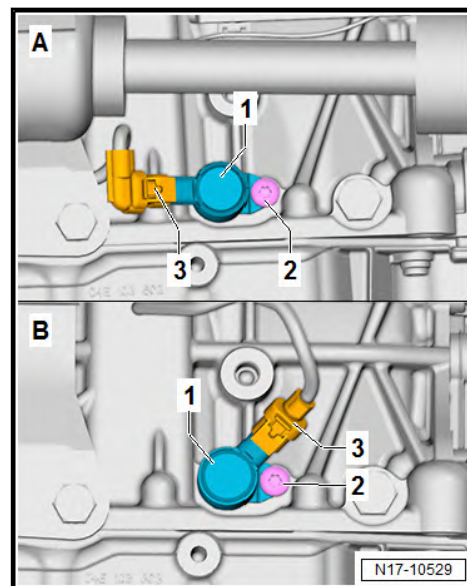
#### Vehicles with front-wheel drive:

- Detach heat-shield sleeve from electrical connector -3-.





Continued for all vehicles:



A - Vehicles with front-wheel drive

B - Vehicles with all-wheel drive

- Release and pull off electrical connector -3-.
- Place a cloth underneath to catch escaping engine oil.
- Unscrew bolt -2-, and pull off valve for oil pressure control -N428- -1-.

### Installing

Install in reverse order of removal, observing the following:

- Observe allocation and installation position of valve for oil pressure control -N428-.
- Renew O-ring.
- Install noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview – noise insulation.

### Specified torques

- ◆ ⇒ [o4.1 verview - oil filter/oil pressure switch", page 322](#)
- ◆ ⇒ Running gear, axles, steering; Rep. gr. 40; Drive shaft; Assembly overview - drive shaft





## 19 – Cooling

### 1 Cooling system/coolant

⇒ [d1.1 iagram - coolant hoses", page 330](#)

⇒ [c1.2 ooling system for leaks", page 332](#)

⇒ [a1.3 nd adding coolant", page 340](#)

#### 1.1 Connection diagram - coolant hoses

⇒ [d1.1.1 iagram – coolant hoses, CC, Golf Cabriolet, Scirocco, Sharan and Tiguan", page 330](#)

⇒ [d1.1.2 iagram - coolant hoses, T-Roc 2018, Golf 2020, Golf Estate 2021", page 331](#)

##### 1.1.1 Connection diagram – coolant hoses, CC, Golf Cabriolet, Scirocco, Sharan and Tiguan



#### Note

- ◆ *The arrows point in the direction of coolant flow.*
- ◆ *The arrows on the coolant pipes and on the ends of the hoses must be aligned with each other.*





**1 - Coolant expansion tank**

**2 - Cap**

- ☐ For coolant expansion tank
- ☐ Check pressure relief valve ⇒ [page 336](#)

**3 - Cylinder head/cylinder block**

- ☐ Renew coolant after replacing

**4 - Engine preheating element -Z97-**

- ☐ Depending on vehicle

**5 - Turbocharger**

**6 - Integrated exhaust manifold**

**7 - Heat exchanger for heater**

- ☐ Renew coolant after replacing

**8 - Radiator outlet coolant - G62-**

**9 - Coolant pump**

- ☐ With thermostat housing

**10 - Engine oil cooler**

**11 - Radiator outlet coolant temperature sender -G83-**

**12 - Radiator for engine coolant**

- ☐ Renew coolant after replacing

**13 - Charge air cooling pump -V188-**

**14 - Radiator for charge air cooling circuit**

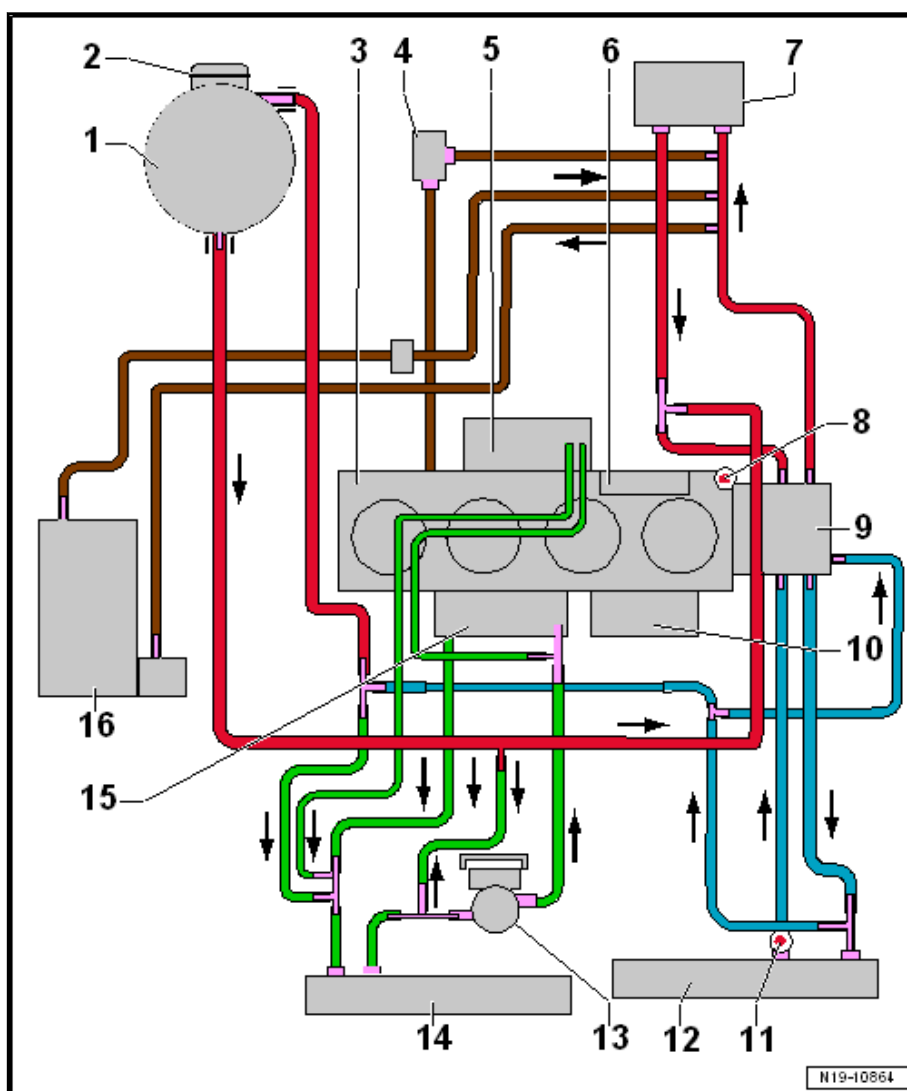
- ☐ Renew coolant after replacing

**15 - Charge air cooler in intake manifold**

- ☐ Renew coolant after replacing

**16 - Auxiliary heater**

- ☐ Optional equipment



## 1.1.2 Connection diagram - coolant hoses, T-Roc 2018, Golf 2020, Golf Estate 2021



**Note**

- ◆ The arrows point in the direction of coolant flow.
- ◆ The arrows on the coolant pipes and on the ends of the hoses must be aligned with each other.





**1 - Coolant expansion tank**

**2 - Cap**

- ☐ For coolant expansion tank
- ☐ Check pressure relief valve ➤ [page 339](#)

**3 - Cylinder head/cylinder block**

- ☐ Renew coolant after replacing

**4 - Turbocharger**

**5 - Integrated exhaust manifold**

**6 - Heat exchanger for heater**

- ☐ Renew coolant after replacing

**7 - ATF cooler**

**8 - Radiator outlet coolant - G62-**

**9 - Coolant pump**

- ☐ With thermostat housing

**10 - Engine oil cooler**

**11 - Radiator outlet coolant temperature sender -G83-**

**12 - Radiator for engine coolant**

- ☐ Renew coolant after replacing

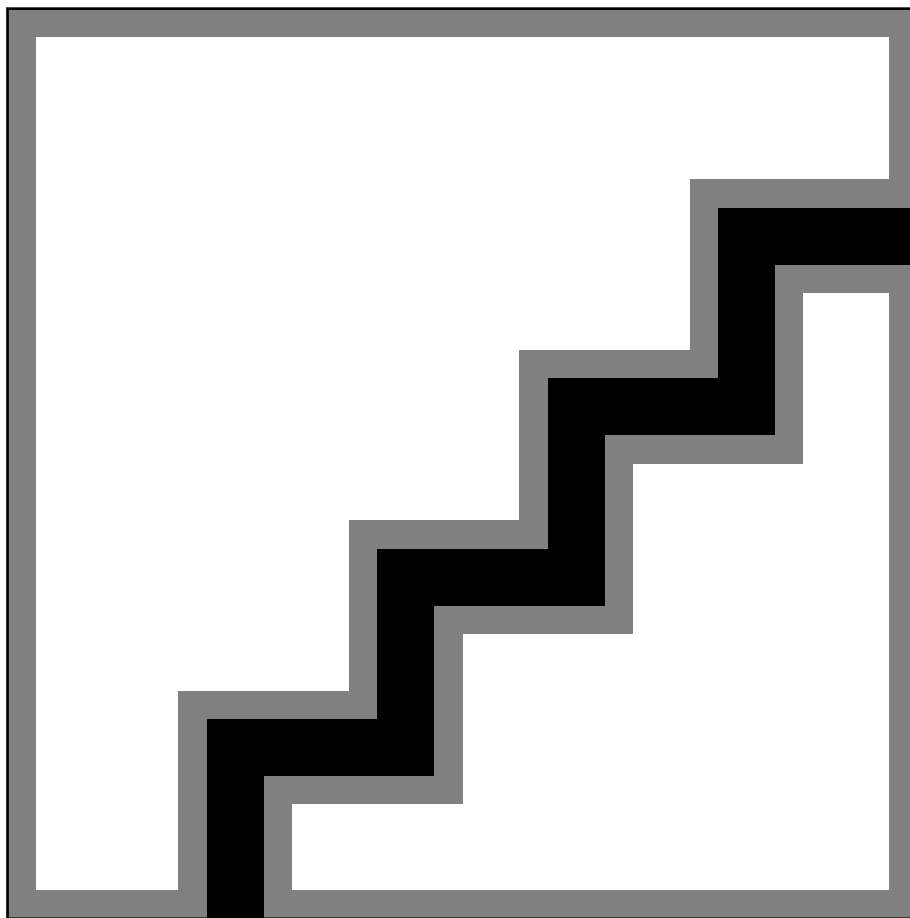
**13 - Charge air cooling pump -V188-**

**14 - Radiator for charge air cooling circuit**

- ☐ Renew coolant after replacing

**15 - Charge air cooler in intake manifold**

- ☐ Renew coolant after replacing



## 1.2 Checking cooling system for leaks

➤ [c1.2.1 ooling system for leaks, Golf Cabriolet 2012 ➤, CC 2012 ➤, Tiguan 2008 ➤, Scirocco 2015 ➤, Sharan 2016 ➤](#), page 332

➤ [c1.2.2 ooling system for leaks, Golf 2020 ➤, Golf Estate 2021 ➤, T-Roc 2018 ➤](#), page 336

### 1.2.1 Checking cooling system for leaks, Golf Cabriolet 2012 ➤, CC 2012 ➤, Tiguan 2008 ➤, Scirocco 2015 ➤, Sharan 2016 ➤

Special tools and workshop equipment required





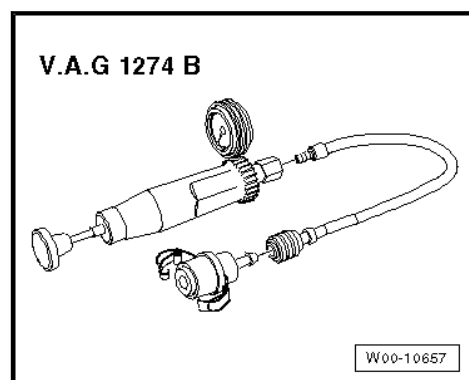
- ◆ Adapter for cooling system tester -V.A.G 1274/8-



- ◆ Adapter for cooling system tester -V.A.G 1274/9-



- ◆ Cooling system tester -V.A.G 1274 B-



## Sequence of operations



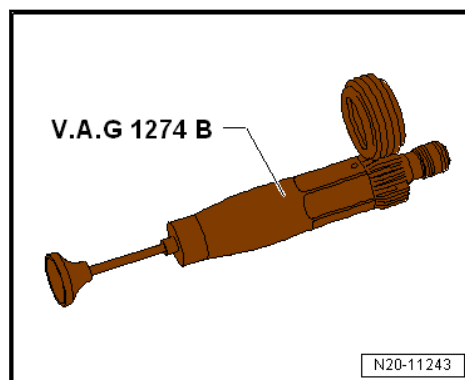
### Note

*To perform the leakage test correctly, first run a self-test on the cooling system tester -V.A.G 1274 B-.*

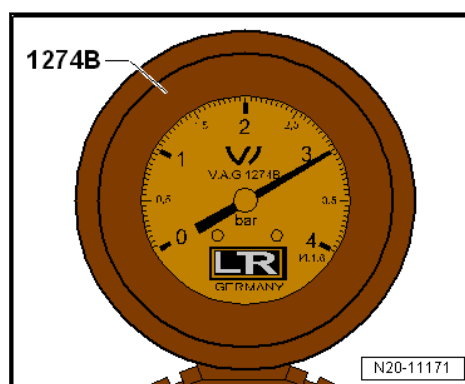




### Self-test of cooling system tester -V.A.G 1274 B-



- Operate cooling system tester -V.A.G 1274 B- several times.
- Build up a pressure of 3.0 bar on cooling system tester.



- Observe pressure on pressure gauge of cooling system tester for 30 seconds.

**If no pressure builds up or if the pressure drops again:**

The cooling system tester -V.A.G 1274 B- is leaking and should not be used.

### Checking cooling system for leaks

#### **CAUTION**

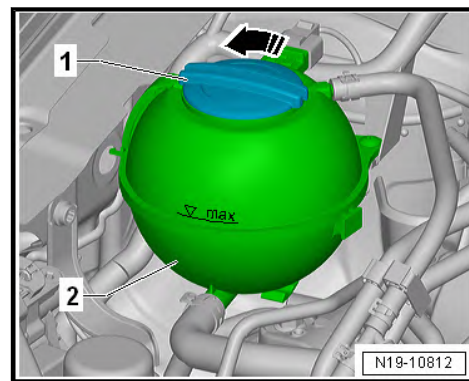
When the motor is hot, the cooling system is under high pressure. Danger of scalding by steam and hot coolant.

Skin and other parts of the body may be scalded.

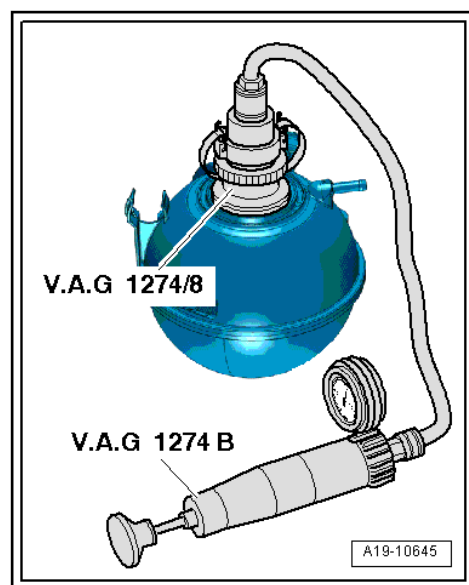
- Wear protective gloves.
- Wear protective goggles.
- Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.

- Open cap -1- on coolant expansion tank.





- Engine at operating temperature.
- Fit cooling system tester -V.A.G 1274 B- with adapter - V.A.G 1274/8- to coolant expansion tank.



- Using hand pump, build up a pressure of approx. 1.5 bar.
- The pressure must not drop by more than 0.2 bar within 10 minutes.
- If pressure drops by more than 0.2 bar, locate leaks and rectify faults.



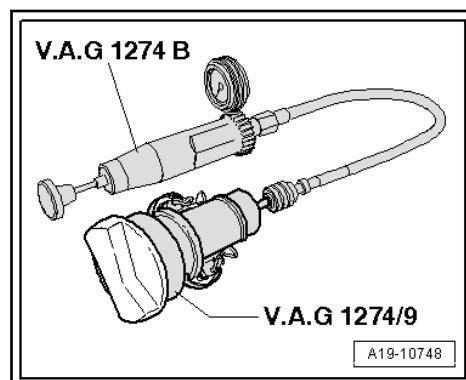
#### Note

- ◆ *A pressure drop of 0.2 bar within 10 minutes is caused by the coolant cooling down.*
- ◆ *The colder the engine, the lower the pressure loss.*
- ◆ *If necessary, repeat the check while the engine is cold.*





**Check pressure relief valve in cap.**



- Fit cooling system tester -V.A.G 1274 B- with adapter - V.A.G 1274/9- onto coolant filler cap.
- Build up pressure using hand pump of cooling system tester.
- ◆ The pressure relief valve must open at a pressure of 1.6 to 1.8 bar.

### 1.2.2 Checking cooling system for leaks, Golf 2020 ➤, Golf Estate 2021 ➤, T-Roc 2018 ➤

**Special tools and workshop equipment required**

- ◆ Cooling system tester -V.A.G 1274 B-



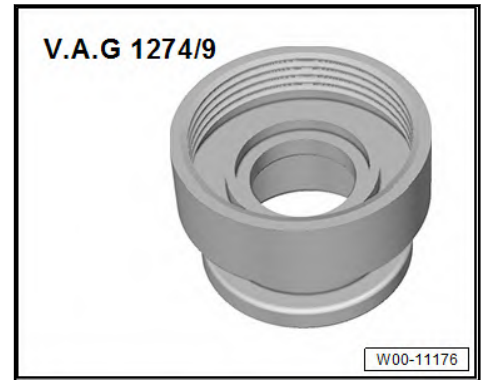
- ◆ Adapter for cooling system tester -V.A.G 1274/8-







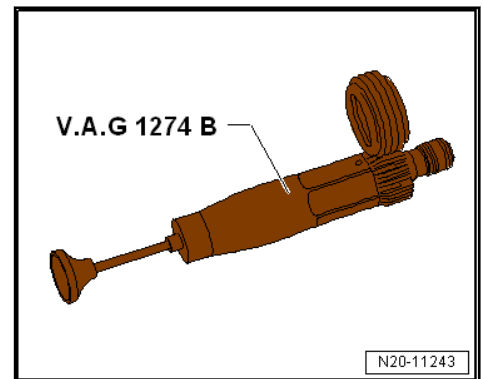
◆ Adapter for cooling system tester -V.A.G 1274/9-



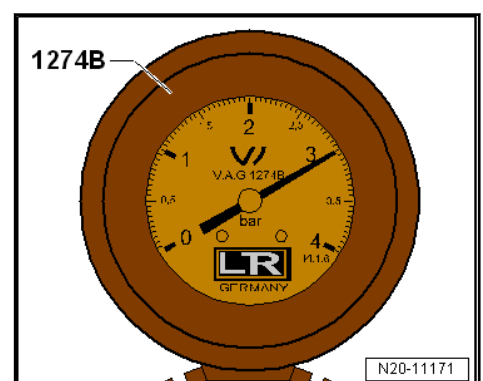
**Note**

*To perform the leakage test correctly, first run a self-test on the cooling system tester -V.A.G 1274 B-.*

**Self-test of cooling system tester -V.A.G 1274 B-**



- Operate cooling system tester -V.A.G 1274 B- several times.
- Build up a pressure of 3.0 bar on cooling system tester.



- Observe pressure on pressure gauge of cooling system tester for 30 seconds.

**If no pressure builds up or if the pressure drops again:**

The cooling system tester -V.A.G 1274 B- is leaking and should not be used.

**Prerequisites for check**

- Engine at operating temperature.





**Test sequence:**

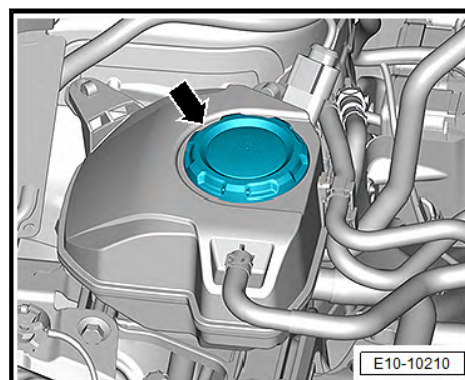
**⚠ CAUTION**

When the motor is hot, the cooling system is under high pressure. Danger of scalding by steam and hot coolant.

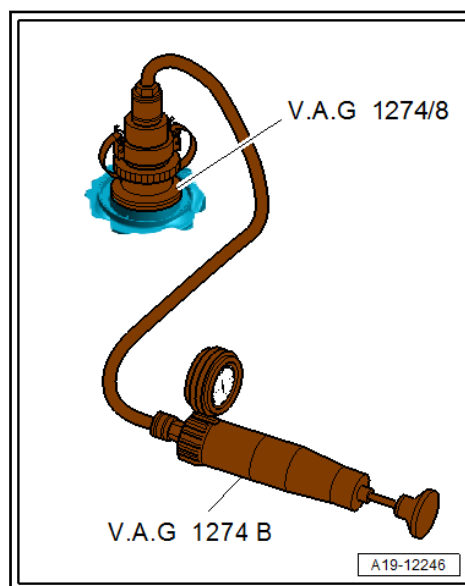
Skin and other parts of the body may be scalded.

- Wear protective gloves.
- Wear protective goggles.
- Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.

- Carefully open filler cap -arrow- of coolant expansion tank.



- Fit cooling system tester -V.A.G 1274 B- with adapter -V.A.G 1274/8- to coolant expansion tank.



- Using hand pump on tester, build up a pressure of approx. 1.5 bar.
- The pressure must not drop by more than 0.2 bar within 10 minutes.
- If pressure drops by more than 0.2 bar, locate leaks and rectify faults.





**i Note**

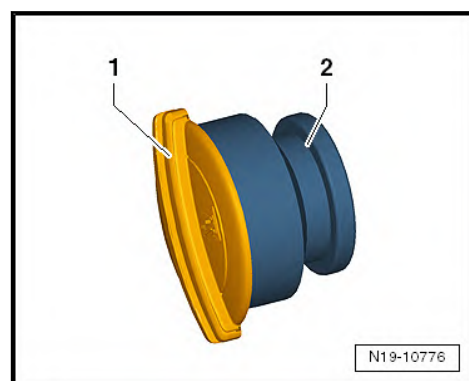
- ◆ A pressure drop of 0.2 bar within 10 minutes is caused by the coolant cooling down.
- ◆ The colder the engine, the lower the pressure loss.
- ◆ If necessary, repeat the check while the engine is cold.

**Check pressure relief valve in cap.**

**i Note**

*The cap may have a different shape depending on the model year.*

- Screw cap -1- into adapter for cooling system tester -V.A.G 1274/9- -2-.



- Connect adapter for cooling system tester -V.A.G 1274/9- to cooling system tester -V.A.G 1274 B- using connecting hose supplied.
- Build up pressure using hand pump of cooling system tester.

**Blue cap**

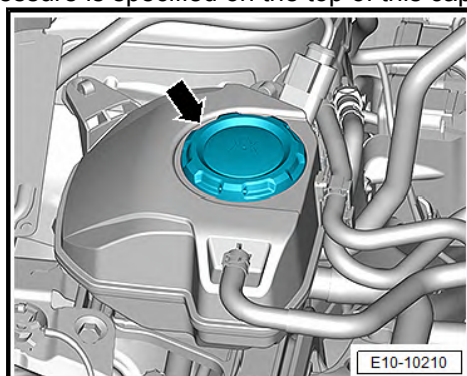
- ◆ The pressure relief valve must open at a pressure of 1.4 bar.

**Black cap**

- ◆ The pressure relief valve must open at a pressure of 1.6 to 1.8 bar.

**Cap with indication of overpressure**

- The opening pressure is specified on the top of this cap







	Overpressure in kPa	bar	Tolerance
1st ex- am- ple	1 kPa	0.01 bar	---
2nd ex- am- ple	140 kPa	1.4 bar	0.2 bar
3rd ex- am- ple	160 kPa	1.6 bar	0.2 bar

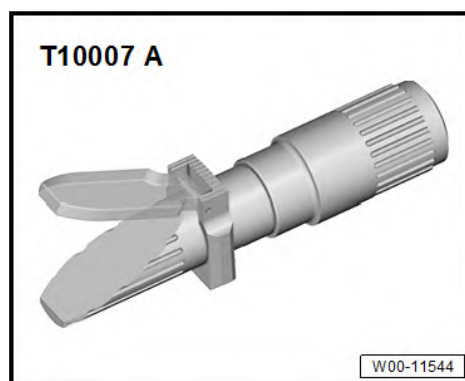
#### Continued for all versions

- If the pressure relief valve opens prematurely:
  - Renew cap.

### 1.3 Draining and adding coolant

#### Special tools and workshop equipment required

- ◆ Refractometer -T10007B-



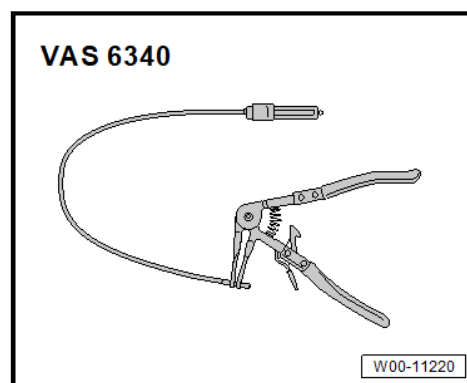
- ◆ Drip tray for workshop hoist -VAS 6208-



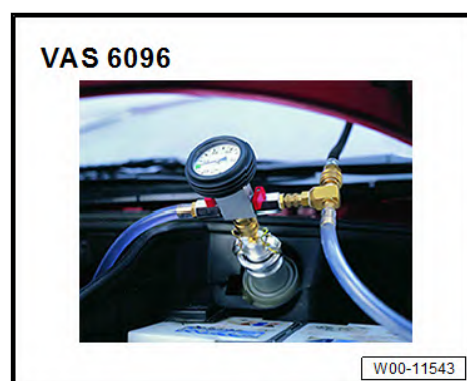




- ◆ Hose clamp pliers -VAS 6340-



- ◆ Cooling system charge unit -VAS 6096-



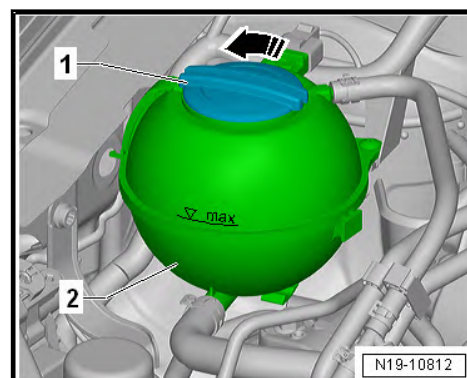
- ◆ Adapter for cooling system tester -V.A.G 1274/8-



- ◆ Safety glasses
- ◆ Safety gloves

#### Draining

- Open filler cap -arrow- for coolant expansion tank.
- Open cap -1- on coolant expansion tank.





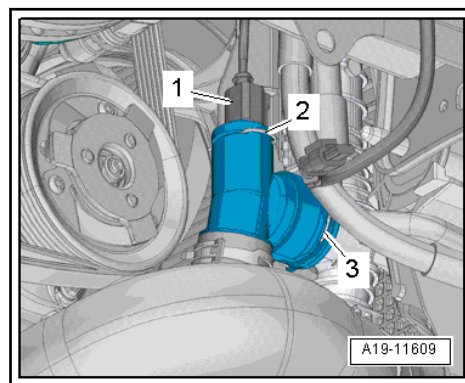


**CAUTION**

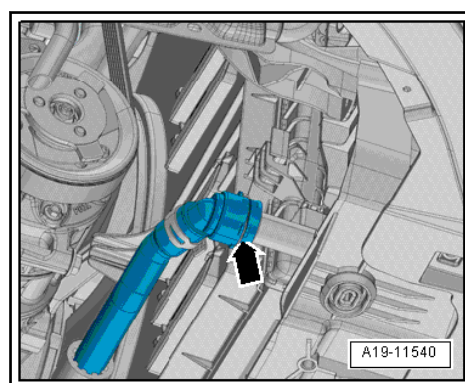
When the motor is hot, the cooling system is under high pressure. Danger of scalding by steam and hot coolant.

Skin and other parts of the body may be scalded.

- Wear protective gloves.
  - Wear protective goggles.
  - Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.
- 
- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
  - Place drip tray for workshop hoist -VAS 6208- underneath.
  - Disconnect connector -2- on radiator outlet coolant temperature sender -G83-.



- Pull out retaining clip -3-, and remove lower right coolant hose from radiator.
- Drain coolant.
- Lift retaining clip -arrow-, and disconnect lower right coolant hose from radiator for charge air cooling circuit.



- Drain remaining coolant.





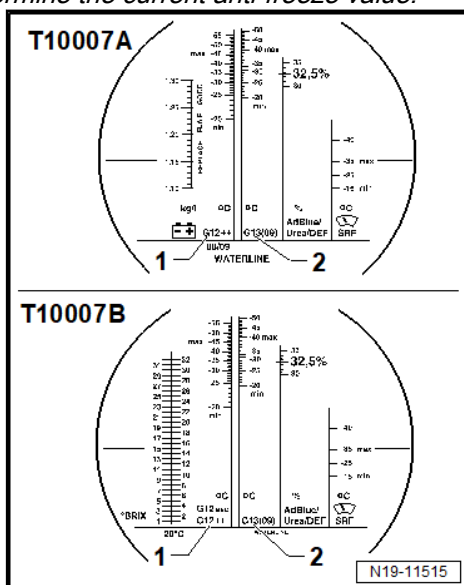
## Filling





## Note

- ♦ The water used for mixing has a major influence on the effectiveness of the coolant. Because the water quality differs from country to country and even from region to region, the quality of the water to be used in the cooling system has been specified by Volkswagen. Distilled water fulfils all requirements. Therefore, only ever use distilled water when mixing coolant for topping up or renewing coolant.
- ♦ Use only coolant additives which conform with the ⇒ Electronic parts catalogue (ETKA). Other coolant additives may reduce corrosion protection substantially. The resulting damage could lead to loss of coolant and subsequent severe damage to the engine.
- ♦ Mixed in the proper proportions, coolant inhibits frost and corrosion damage as well as scaling. Such additives also raise the boiling point of the coolant. For this reason, the cooling system must be filled all-year-round with coolant additives.
- ♦ Because of its high boiling point, the coolant improves engine reliability under heavy loads, particularly in countries with tropical climates.
- ♦ The refractometer -T10007A- or refractometer -T10007B- must be used to determine the current anti-freeze value.



- ♦ The scale -1- of the refractometer is calibrated for the coolant additives G12++ and G12evo.
- ♦ The scale -2- of the refractometer is calibrated for the coolant additive G13.
- ♦ If it is not possible to ensure that the same type of coolant additive is filled: always determine anti-freeze protection using the scale for G13.
- ♦ Frost protection must be guaranteed down to -25°C as a minimum and, in countries with arctic conditions, down to approx. -36°C. Increasing the frost protection is permissible only if climatic conditions require stronger frost protection. It may, however, be increased only to a maximum of -48°C. Otherwise, the cooling effect will be impaired.





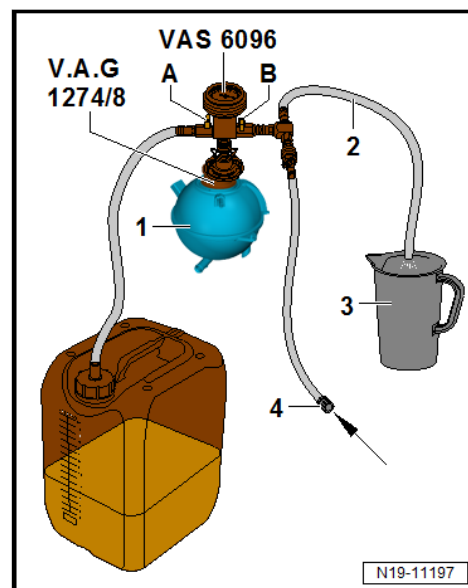
- ◆ *Do not reduce the coolant concentration by adding water even in warmer seasons and in warmer countries. Frost protection must be guaranteed down to at least -25°C.*
- ◆ *The temperature read off the refractometer corresponds to the »ice flocculation point«. Flakes of ice may start forming in the coolant below this temperature.*
- ◆ *Never reuse old coolant.*
- ◆ *Use only a water/coolant additive mixture as a slip agent for coolant hoses.*

#### Coolant mixture ratio

Frost protection to	Coolant additive concentration	Coolant additive <sup>1)</sup>	Distilled water <sup>1)</sup>
-25°C	40%	3.2 l	4.8 l
-36°C	50%	4.0 l	4.0 l

<sup>1)</sup> The quantity of coolant can vary depending on the vehicle equipment.

- Coolant: ⇒ Electronic Parts Catalogue.
- Connect coolant hoses with plug-in connectors to radiator ⇒ [page 388](#).
- Fill spare container for cooling system charge unit -VAS 6096/1- of cooling system charge unit -VAS 6096- with at least 10 litres of pre-mixed coolant.



- Make sure to use correct mixing ratio.
- Screw adapter for cooling system tester -V.A.G 1274/8- onto coolant expansion tank -1-.
- Install cooling system charge unit -VAS 6096- to adapter -V.A.G 1274/8-.
- Feed vent hose -2- into a small container -3-.



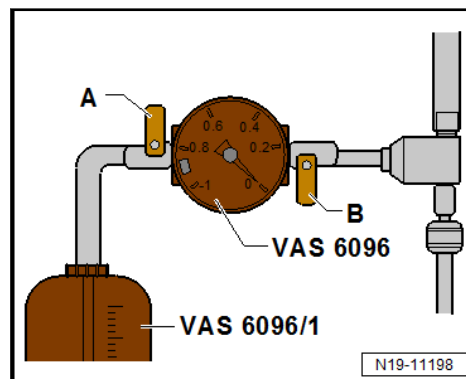
#### Note

*Exhaust air takes a slight quantity of coolant along with it. Collect coolant in the container.*





- Close valves -A- and -B- (turn lever transverse to direction of flow to do this).
- Connect hose -4- to compressed air.
- Pressure: 6 to 10 bar.
- Open valve -B-; turn lever in direction of flow to do this.



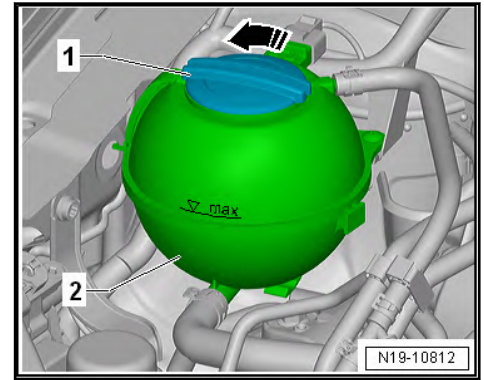
- The suction-jet pump reduces pressure in the cooling system to below atmospheric pressure.
- The needle on the gauge should move into the green zone.
- In addition, briefly open valve -A- (turn lever in direction of flow to do this) so that hose of canister -VAS 6096- fills with coolant.
- Close valve -A- again.
- Leave valve -B- open for a further 2 minutes.
- The suction-jet pump will continue generating a vacuum in the cooling system.
- The needle on the gauge must remain in the green zone.
- Close valve -B-.
- The needle on the gauge must stay in the green zone.
- The low pressure in the cooling system is then sufficient for subsequent filling.



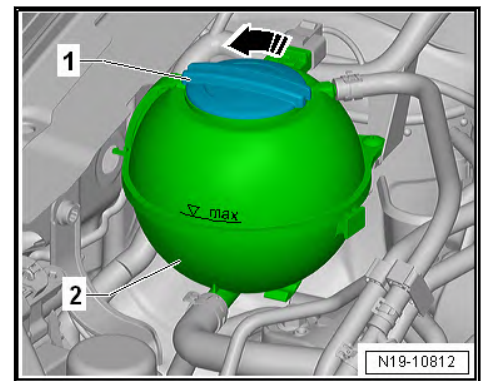
#### Note

- ♦ *If the needle does not reach the green zone, repeat the process.*
- ♦ *If the vacuum drops, the cooling system must be checked for leaks.*
- Pull off compressed air hose.
- Open valve -A-.
- The vacuum in the cooling system causes the coolant to be drawn out of the coolant expansion tank of -VAS 6096-; the cooling system is then filled.
- Remove cooling system charge unit -VAS 6096- from coolant expansion tank.
- Fill coolant up to max. mark.





- Install noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview – noise insulation.
- On vehicles with auxiliary heater, switch on auxiliary heater for about 30 seconds.
- Set temperature regulator to “HI”.
- Switch off air conditioner compressor. To do this, press AC button.
  - LED in the button must not light up.
- Tighten cap of coolant expansion tank until it engages.
- Start engine and run alternately at approx. 1500 rpm to maximum of 2800 rpm until radiator fan starts operating.
- Switch off engine and let it cool off.
- Check coolant level.



- Screw adapter for cooling system tester -V.A.G 1274/8- again onto expansion tank.
- Use cooling system tester -V.A.G 1274 B- to apply a pressure of 1 bar to the cooling system.
- Use tester to relieve pressure and remove cooling system tester -V.A.G 1274 B-.
- With the engine running, fill coolant up to approx. 5 mm above max. mark.
  - When the engine is cold, the coolant level must be between the min. and the max. markings.
  - The coolant level can be at or above the max. mark when the engine is at operating temperature.





## 2 Coolant pump, regulation of cooling system

⇒ [o2.1 verview - coolant pump, thermostat", page 348](#)

⇒ [o2.2 verview - electric coolant pump", page 351](#)

⇒ [o2.3 verview - coolant temperature sender", page 352](#)

⇒ [a2.4 nd installing electric coolant pump", page 354](#)

⇒ [a2.5 nd installing coolant pump", page 356](#)

⇒ [a2.6 nd installing thermostat", page 362](#)

⇒ [a2.7 nd installing toothed belt pulley for coolant pump", page 366](#)

⇒ [a2.8 nd installing coolant temperature senderG62", page 367](#)

⇒ [a2.9 nd installing radiator outlet coolant temperature senderG83", page 370](#)

### 2.1 Assembly overview - coolant pump, thermostat





### 1 - Thermostat housing

- ☐ Removing and installing ⇒ [a2.6 nd installing thermostat", page 362](#)

### 2 - Thermostat

- ☐ For cylinder block coolant circuit
- ☐ Up to 07.2016: Starts to open at approx. 87°C
- ☐ From 07.2016 onwards: Starts to open at approx. 97°C
- ☐ Different versions  
⇒ Electronic parts catalogue
- ☐ Removing and installing ⇒ [a2.6 nd installing thermostat", page 362](#)

### 3 - Seal

- ☐ Renew after removal

### 4 - Coolant pump

- ☐ Removing and installing ⇒ [a2.5 nd installing coolant pump", page 356](#)
- ☐ Renew toothed belt as well when renewing coolant pump

### 5 - Bolt

- ☐ Thread-cutting
- ☐ Fit and screw in bolt by hand to ensure it is screwed into old thread. Then tighten bolt to specified torque
- ☐ Specified torque and tightening sequence ⇒ [page 350](#)

### 6 - Seal

- ☐ Renew after removal
- ☐ Ensure proper seating of seal
- ☐ Lightly coat with coolant before installing.

### 7 - Toothed belt guard

- ☐ For toothed belt for coolant pump

### 8 - Bolt

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

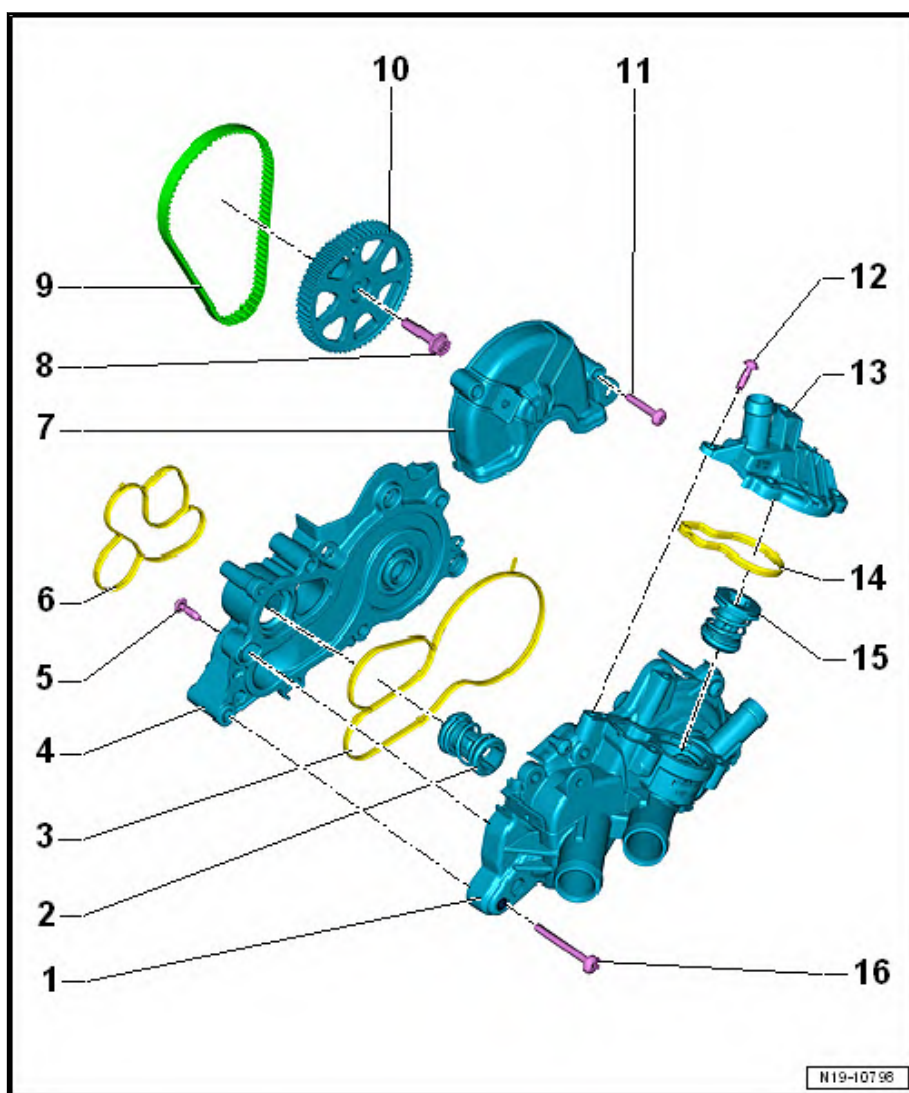
### 9 - Toothed belt

- ☐ For coolant pump
- ☐ Renew after removal

### 10 - Crankshaft

- ☐ For coolant pump
- ☐ Removing and installing ⇒ [a2.7 nd installing toothed belt pulley for coolant pump", page 366](#)

### 11 - Bolt







- ☐ 8 Nm

## 12 - Bolt

- ☐ Thread-cutting
- ☐ Fit and screw in bolt by hand to ensure it is screwed into old thread. Then tighten bolt to specified torque.
- ☐ Specified torque and tightening sequence ➤ [page 351](#)

## 13 - Cover

- ☐ For thermostat

## 14 - Seal

- ☐ Renew after removal

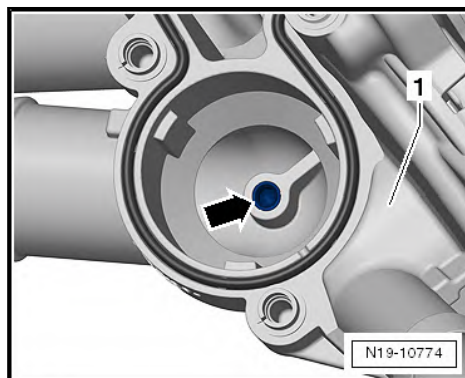
## 15 - Thermostat

- ☐ For main coolant circuit (radiator)
- ☐ Up to 11.2012: Starts to open at approx. 80°C
- ☐ As of 11.2012: Starts to open at approx. 87°C
- ☐ Removing and installing ➤ [a2.6 nd installing thermostat", page 362](#)
- ☐ Fitting position ➤ [page 350](#)

## 16 - Bolt

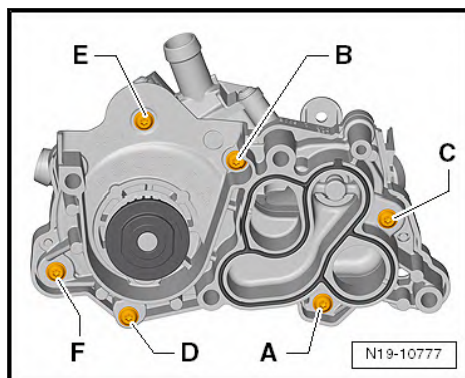
- ☐ Specified torque and tightening sequence ➤ [page 360](#)

### Installation position of thermostat for large cooling circuit



- Must be positioned with centring pin in guide -arrow- in thermostat housing.

### Thermostat housing to coolant pump - specified torque and sequence



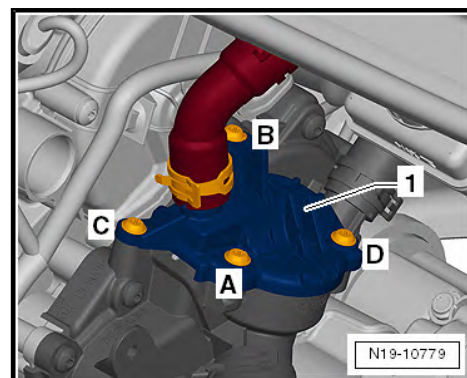
- Tighten bolts in sequence -A ... F-.





Bolts	Specified torque
-A ... F-	8 Nm

Cover for thermostat to thermostat housing - specified torque



- Tighten securing bolts for cover -1- in sequence -A to D-.

Securing bolts for cover -1-	Specified torque
-A ... D-	7 Nm

## 2.2 Assembly overview - electric coolant pump





**1 - Charge air cooling pump  
-V188-**

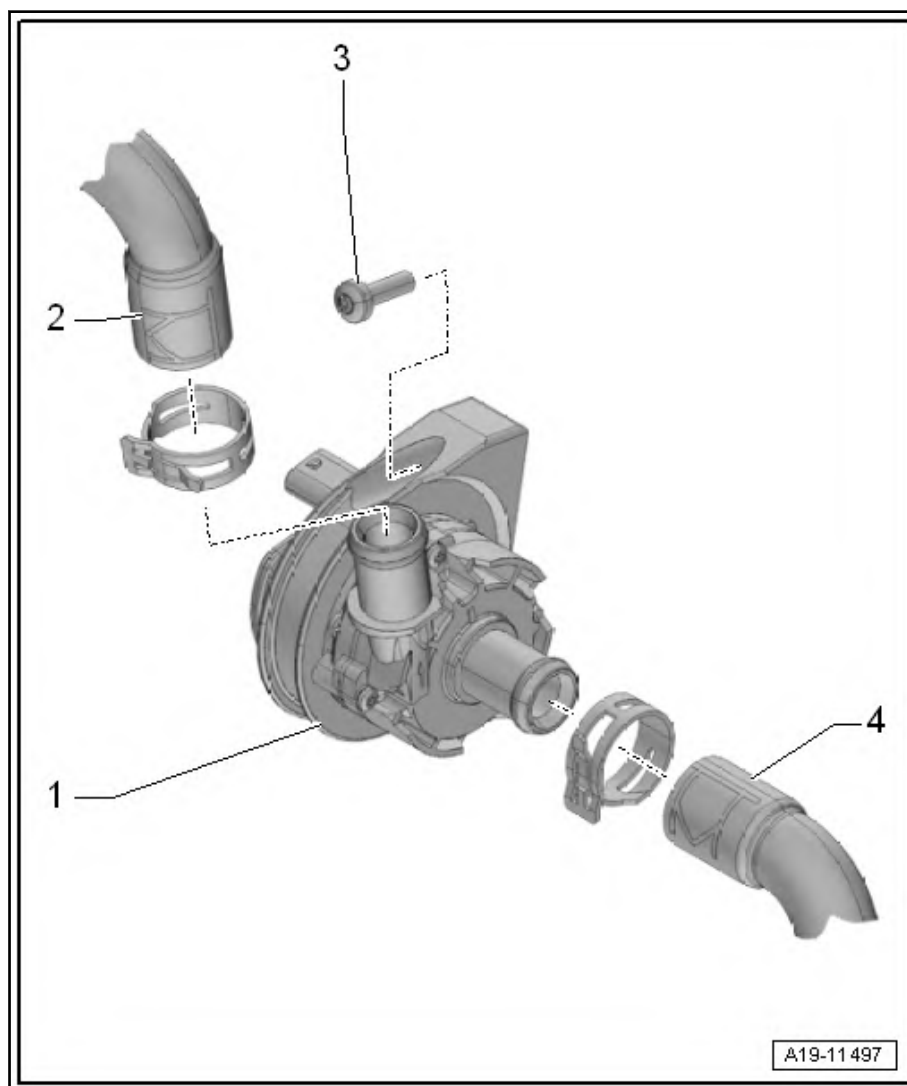
- ☐ with holder
- ☐ Removing and installing ⇒ [a2.4 nd installing electric coolant pump", page 354](#)

**2 - Coolant hose**

**3 - Bolt**

- ☐ 8 Nm

**4 - Coolant hose**



## 2.3 Assembly overview - coolant temperature sender

⇒ [o2.3.1 verview – coolant temperature sender, CC, Golf Cabriolet, Scirocco, Sharan and Tiguan", page 352](#)

⇒ [o2.3.2 verview - coolant temperature sender, T-Roc 2018 ➤, Golf 2020 ➤, Golf Estate 2021 ➤", page 353](#)

### 2.3.1 Assembly overview – coolant temperature sender, CC, Golf Cabriolet, Scirocco, Sharan and Tiguan





**1 - Retaining clip**

- ☐ Check for firm seating

**2 - O-ring**

- ☐ Renew after removal

**3 - Radiator outlet coolant temperature sender -G83-**

- ☐ Removing and installing ➤ [a2.9 nd installing radiator outlet coolant temperature senderG83", page 370](#)

**4 - Electrical connector**

- ☐ For coolant temperature sender -G62-

**5 - Radiator outlet coolant -G62-**

- ☐ Removing and installing ➤ [a2.8 nd installing coolant temperature senderG62", page 367](#)

**6 - O-ring**

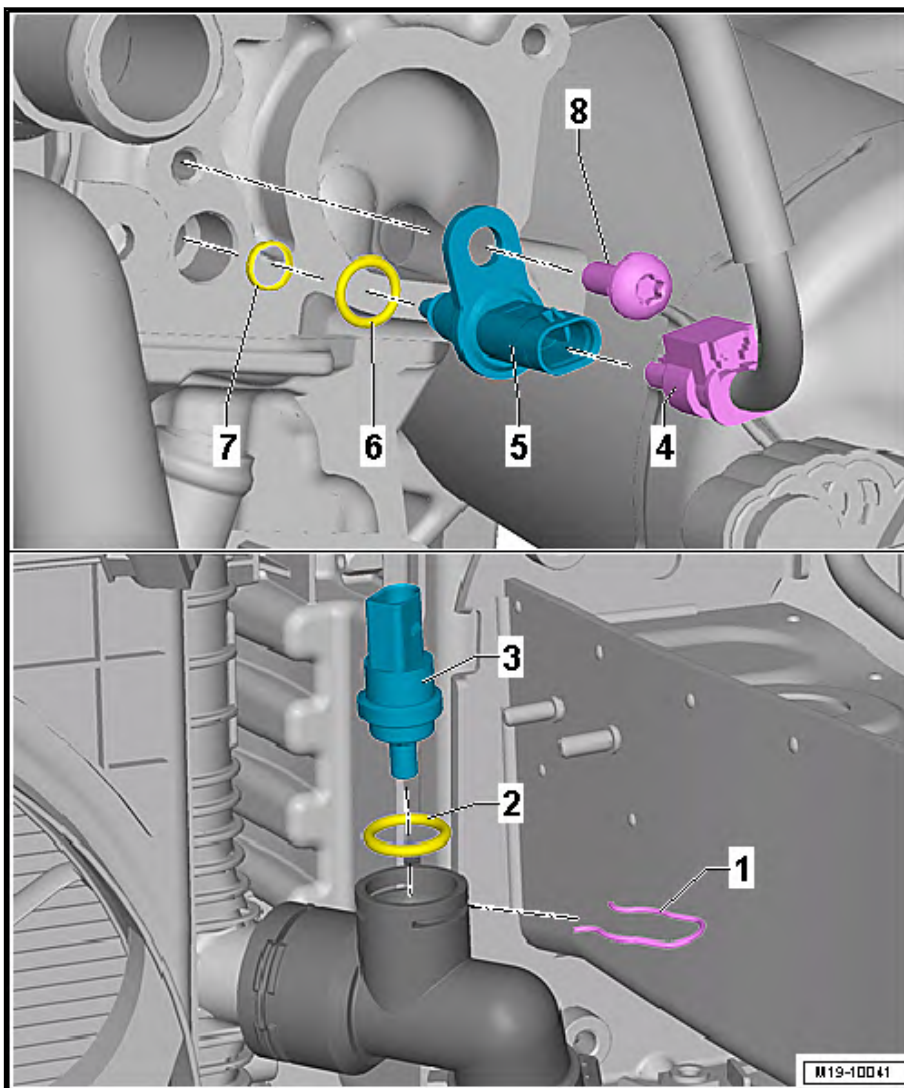
- ☐ Renew after removal
- ☐ Moisten with coolant

**7 - Support ring**

- ☐ Included with coolant temperature sender -G62- ➤ Electronic parts catalogue.
- ☐ Moisten with coolant

**8 - Bolt**

- ☐ Renew after removal
- ☐ 4 Nm +45°



**2.3.2 Assembly overview - coolant temperature sender, T-Roc 2018 ➤, Golf 2020 ➤, Golf Estate 2021 ➤**





**1 - Bolt**

- ☐ 8 Nm

**2 - Radiator outlet coolant - G62-**

- ☐ Removing and installing ⇒ [a2.8 nd installing coolant temperature sender G62", page 367](#)

**3 - O-ring**

- ☐ Renew after removal
- ☐ Moisten with coolant

**4 - Support ring**

- ☐ Included with coolant temperature sender - G62- ⇒ Electronic parts catalogue.
- ☐ Moisten with coolant

**5 - Retaining clip**

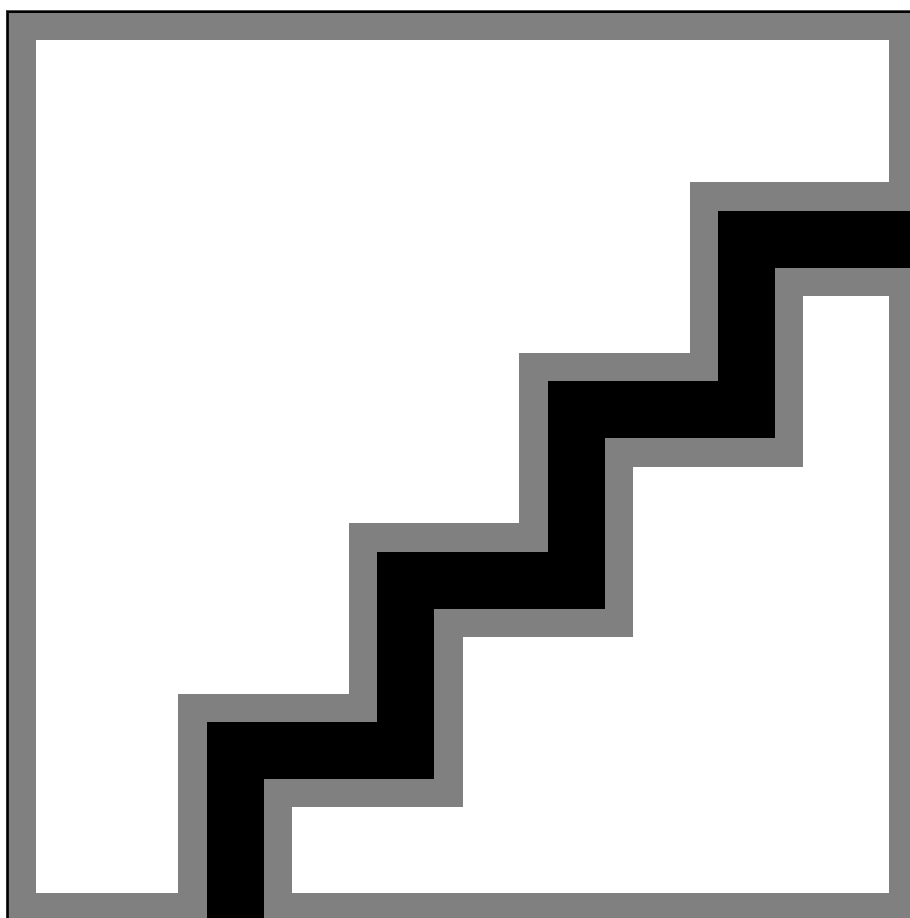
- ☐ Check for firm seating

**6 - O-ring**

- ☐ Renew after removal
- ☐ Moisten with coolant

**7 - Radiator outlet coolant temperature sender -G83-**

- ☐ Removing and installing ⇒ [a2.9 nd installing radiator outlet coolant temperature sender G83", page 370](#)



## 2.4 Removing and installing electric coolant pump

Special tools and workshop equipment required

- ◆ Hose clamps to 25 mm -3094-







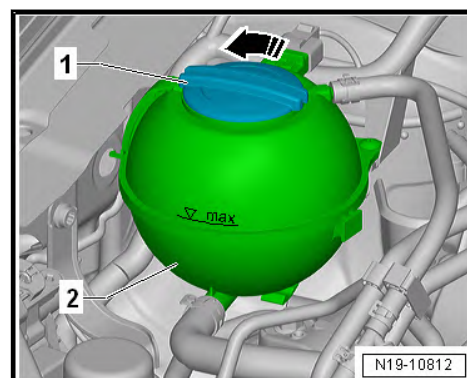
- ◆ Drip tray for workshop hoist -VAS 6208-



- ◆ Spring-type clip pliers -VAS 6362-



## Removing



- Open cap -1- on coolant expansion tank.

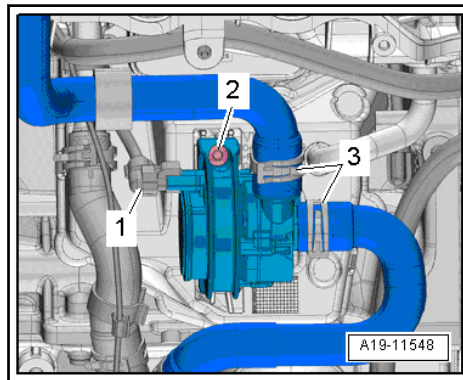
### CAUTION

When the motor is hot, the cooling system is under high pressure. Danger of scalding by steam and hot coolant.

Skin and other parts of the body may be scalded.

- Wear protective gloves.
- Wear protective goggles.
- Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.
- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- Disconnect electrical connector -1-.





- Place drip tray for workshop hoist -VAS 6208- underneath.
- Clamp off coolant hoses on charge air cooling pump -V188- using hose clamps up to 25 mm -3094-.
- Release hose clip -3- and remove coolant hose.
- Unscrew bolt -2- and remove charge air cooling pump - V188-.

### Installing

Install in reverse order of removal, observing the following:



#### Note

*Secure all hose connections with hose clips corresponding to production standard → Electronic parts catalogue.*

- Install noise insulation → General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview – noise insulation.
- Check coolant level ⇒ [page 347](#) .

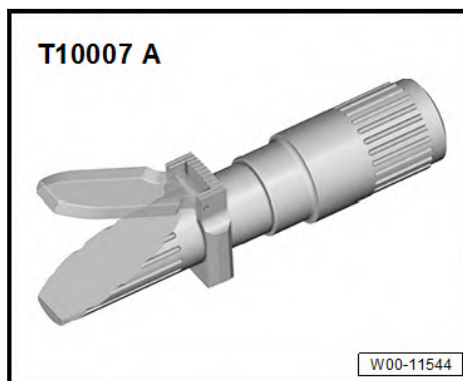
### Specified torques

- ♦ ⇒ [o2.2 verview - electric coolant pump](#)”, [page 351](#)

## 2.5 Removing and installing coolant pump

### Special tools and workshop equipment required

- ♦ Refractometer -T10007B-







- ◆ Drip tray for workshop hoist -VAS 6208-

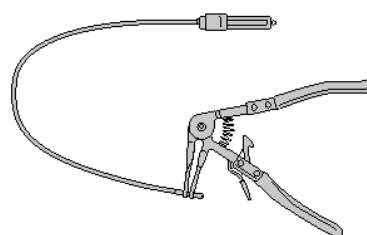
**VAS 6208**



W00-11209

- ◆ Hose clamp pliers -VAS 6340-

**VAS 6340**



W00-11220

- ◆ Cooling system charge unit -VAS 6096-

**VAS 6096**



W00-11543

- ◆ Adapter for cooling system tester -V.A.G 1274/8-

**V.A.G 1274/8**

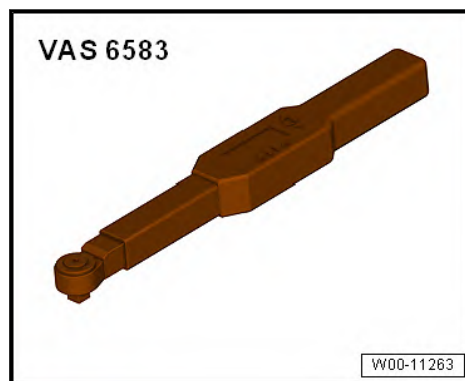


W00-11182





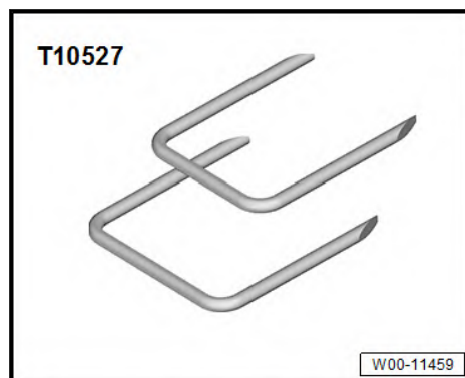
- ◆ Torque wrench -VAS 6583A-



- ◆ Torque wrench -V.A.G 1410-



- ◆ Release tool -T10527-

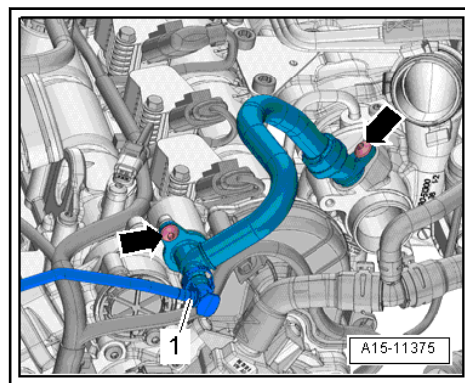


- ◆ Release tool -T10527/1-

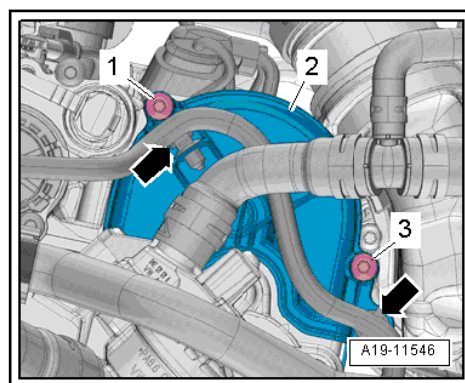
### Removing

- Drain coolant ⇒ [a1.3 nd adding coolant", page 340](#) .
- Remove battery tray ⇒ Electrical system; Rep. gr. 27; Battery; Removing and installing battery tray.
- Remove resonator for intake air ⇒ [a3.4 nd installing resonator for intake air", page 476](#) .
- Remove air pipe ⇒ [a2.5 nd installing air pipe", page 441](#) .
- Press release tabs and disconnect hose -1- for activated charcoal filter.

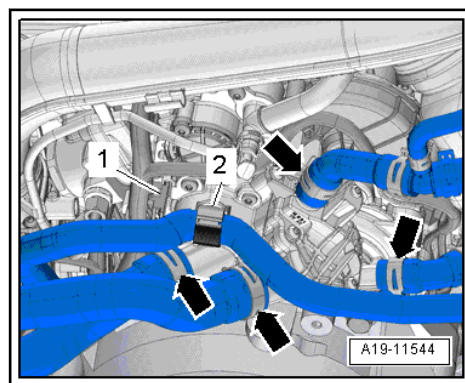




- Unscrew bolts -arrows- and remove crankcase breather hose.
- Lay wiring harness to one side -arrows-.

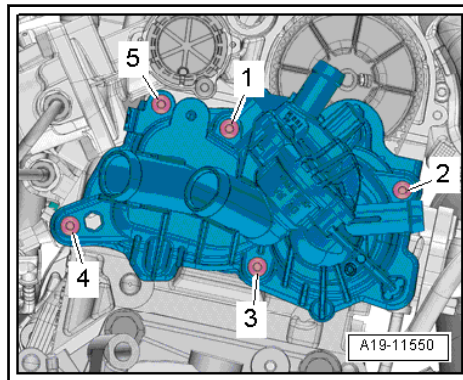


- Unscrew bolts -1, 3- and remove cover -2- for toothed belt for coolant pump.
- Move clear electrical wiring harness -1- and coolant hose -2-.



- Release hose clips -arrows-, and disconnect all coolant hoses from coolant pump.
- Loosen and unscrew bolts in the sequence -5 to 1-.





- Detach coolant pump with toothed belt.
- Remove thermostat housing if coolant pump is being renewed ⇒ [a2.6 nd installing thermostat](#), [page 362](#) .

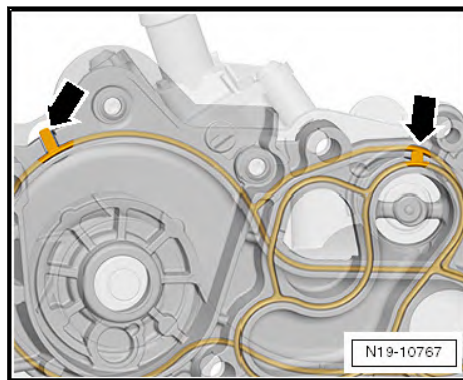
### Installing

Install in reverse order of removal. Observe the following:



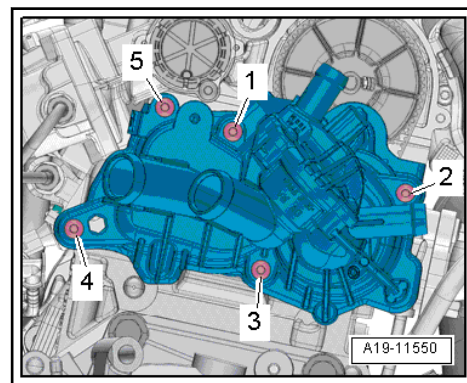
#### Note

- ◆ *Secure hose connections with hose clips meeting production standard ⇒ [Electronic parts catalogue](#).*
  - ◆ *Always adhere to the sequence of work steps given below when installing the coolant pump.*
  - ◆ *This ensures that the toothed belt is correctly tensioned.*
  - ◆ *The following work steps must be carried out with the aid of a 2nd mechanic.*
- Renew gasket for housing -arrows-.



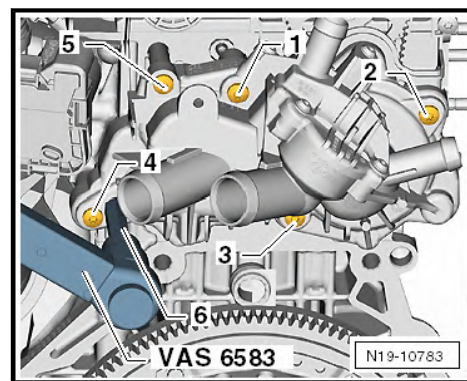
- Ensure proper seating of gaskets -arrows-.
- Renew toothed belt of coolant pump ⇒ [Item 9 \(page 349\)](#) .
- Lubricate seal for coolant pump lightly with coolant.
- Set No. 1 cylinder to TDC ⇒ [v2.5 alve timing](#), [page 213](#) .
- Fit toothed belt so that it is centred and move coolant pump into installation position.
- Mount coolant pump on cylinder head with securing bolts.
- Pre-tighten bolts in the specified sequence:





Stage	Bolts	Specified torque
1st	-1 ... 5-	Screw onto stop by hand
2nd	-1 ... 5-	10 Nm

- Loosen all bolts again by one turn.
- Fit torque wrench -VAS 6583A- with hexagon socket (10 mm) -item 6- to coolant pump.



- Using hexagon on coolant pump, preload coolant pump in clockwise direction to 30 Nm using 10 mm hexagon socket -6-, extension and torque wrench -VAS 6583A-.
- For ease of use, fit torque wrench -VAS 6583A- on vertically.



#### Note

- ◆ *Do not support torque wrench with your other hand.*
- ◆ *To ensure the poly V-belt is not over-tensioned, do not »push the torque wrench again« after the specified torque has been achieved.*
- ◆ *Have a second mechanic tighten securing bolts -2-, -1- and -5-.*
- ◆ *In the meantime, you keep the torque wrench -VAS 6583A- set to specified torque.*
- Pre-load coolant pump.
- While doing so, have a second mechanic pre-tighten coolant pump securing bolts in anti-clockwise direction, starting with bolts -2-, -1- and -5- («stage 3«).
- By tightening securing bolts -2-, -1- and -5- to specified torque, the desired belt tension is reached.





- After securing bolts have been tightened initially, torque wrench -VAS 6583A- can be removed.
- Then tighten securing bolts (»4th stage«).

Stage	Bolts	Specified torque
3rd	-2, 1, 5-	10 Nm
4th	-3, 4, 5, 1, 2-	12 Nm

Continue installation in reverse order of removal. Observe the following when doing this:

Coolant hose schematic diagram ⇒ [d1.1 iagram - coolant hoses](#)", page 330 .

- Add coolant ⇒ [page 343](#) .

#### Specified torques

- ♦ Tightening sequence for coolant pump ⇒ [page 360](#)
- ♦ ⇒ [d1.1 iagram - coolant hoses](#)", page 330 .
- ♦ ⇒ [o2.1 verview - coolant pump, thermostat](#)", page 348
- ♦ ⇒ [o1.1 verview - turbocharger](#)", page 416
- ♦ ⇒ [o2.1 verview - charge air system](#)", page 433
- ♦ ⇒ Electrical system; Rep. gr. 27; Battery; Assembly overview - battery

## 2.6 Removing and installing thermostat

⇒ [a2.6.1 nd installing thermostat for main coolant circuit \(radiator\)](#)", page 362

⇒ [a2.6.2 nd installing thermostat for cylinder block coolant circuit](#)", page 365

### 2.6.1 Removing and installing thermostat for main coolant circuit (radiator)

#### Special tools and workshop equipment required

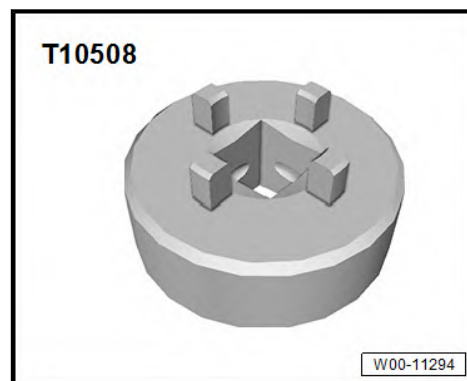
- ♦ Spring-type clip pliers -VAS 6362-



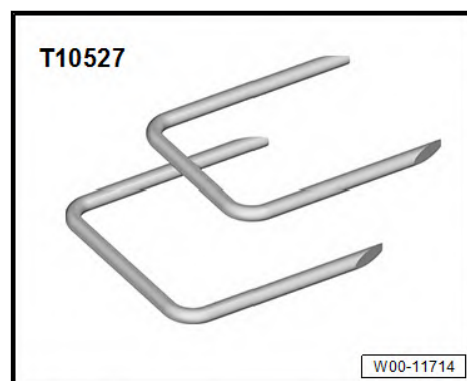




- ◆ Special wrench -T10508-



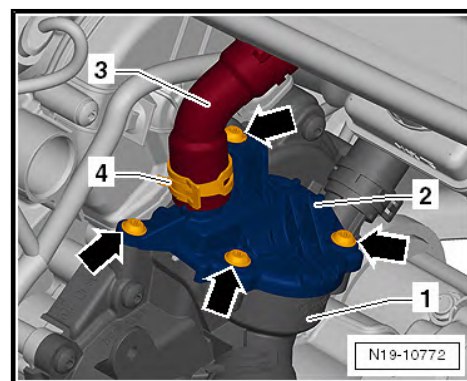
- ◆ Release tool -T10527-



- ◆ Release tool -T10527/1-

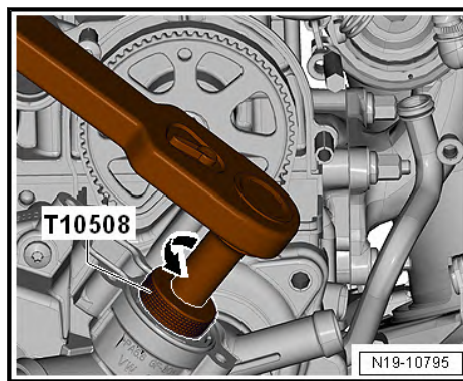
#### Removing

- Drain coolant ➔ [a1.3 nd adding coolant", page 340](#) .
- Remove air pipe ➔ [a2.5 nd installing air pipe", page 441](#) .
- Release hose clip -4- and detach coolant hose -3-.



- Remove bolts -arrows- and detach cover -2- from thermostat housing.
- Remove thermostat using special wrench -T10508-.

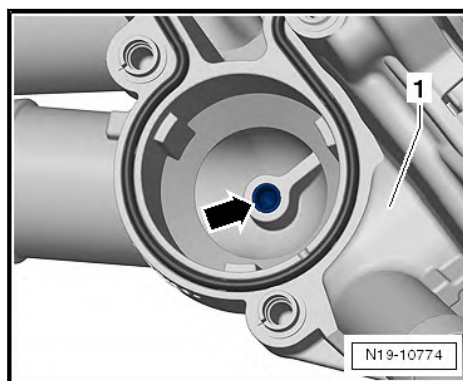




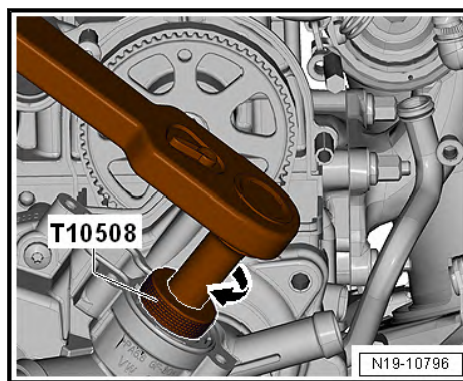
- Slightly push down special wrench -T10508- and turn it in -direction of arrow- while doing so.

#### Installing

- Insert thermostat ensuring that the centring pin of thermostat is seated in guide -arrow-.



- Install thermostat using special wrench -T10508-.



- Slightly push down special wrench -T10508- and turn it to stop in -direction of arrow- while doing so.

Install in reverse order of removal, observing the following:



#### Note

*Renew seals.*

- Moisten gasket with coolant.
- Add coolant ➔ [page 343](#) .





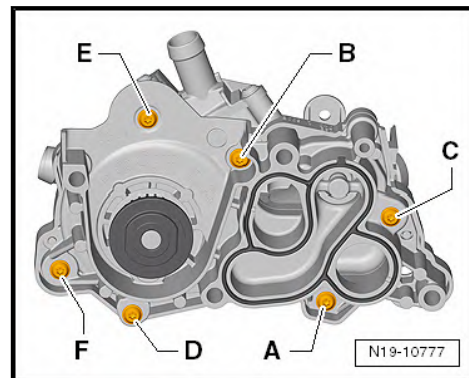
## Specified torques

- ◆ ➔ Fig. [“Cover for thermostat to thermostat housing - specified torque”](#), page 351

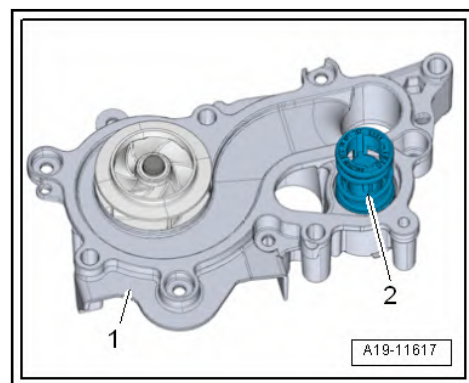
## 2.6.2 Removing and installing thermostat for cylinder block coolant circuit

### Removing

- Remove coolant pump ➔ [a2.5 nd installing coolant pump”](#), page 356 .
- Unscrew bolts in the sequence -F to A-.



- Detach coolant pump from thermostat housing.
- Detach thermostat -2- from coolant pump -1-.



### Installing

Install in reverse order of removal, observing the following:

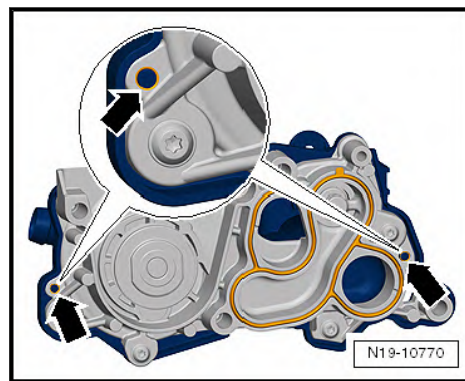


#### Note

*Renew seals.*

- Moisten gasket with coolant.
- Fit thermostat housing onto coolant pump.





- Centring pins on thermostat must be fitted in guides -arrows- on coolant pump.
- Tighten bolts for thermostat housing ⇒ [page 350](#) .
- Install coolant pump ⇒ [a2.5 nd installing coolant pump](#)”, [page 356](#) .
- Add coolant ⇒ [page 343](#) .

#### Specified torques

- ♦ ⇒ [Fig. “Thermostat housing to coolant pump - specified torque and sequence”](#), [page 350](#)

## 2.7 Removing and installing toothed belt pulley for coolant pump

#### Special tools and workshop equipment required

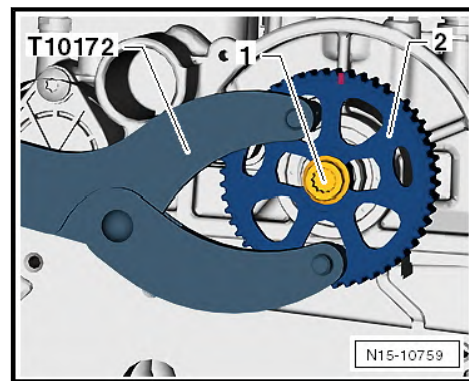
- ♦ Counter-hold tool -T10172A-



#### Removing

- Remove coolant pump ⇒ [a2.5 nd installing coolant pump](#)”, [page 356](#) .
- Loosen bolt -1- using counterhold -T10172A- with adapters -T10172/2-.



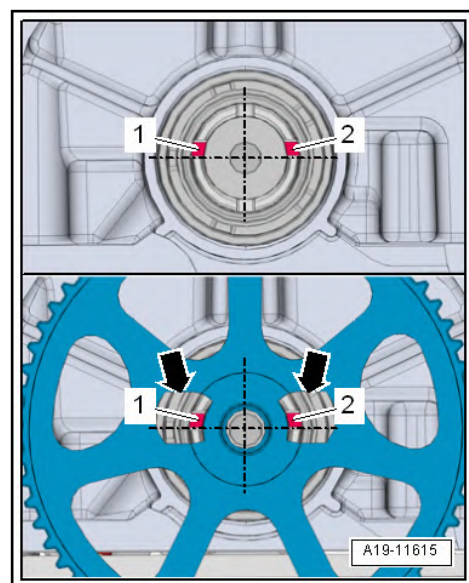


- Unscrew bolt and remove toothed belt pulley -2-.

### Installing

Install in reverse order of removal, observing the following:

- Fit toothed belt pulley:



- The grooves -1- and -2- in the camshaft are arranged asymmetrically.
- Cut-outs -arrows- in toothed belt pulley are also arranged asymmetrically.
- Fit toothed belt pulley onto camshaft so that the asymmetrical notches of the camshaft are fully centred within the cut-outs of the toothed belt pulley.
- Install coolant pump ⇒ [a2.5 nd installing coolant pump", page 356](#).

### Specified torques

- ♦ ⇒ [o2.1 verview - coolant pump, thermostat", page 348](#)

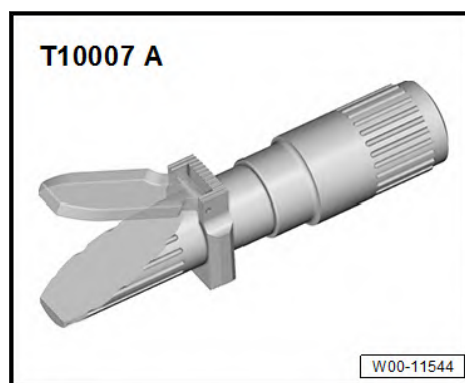
## 2.8 Removing and installing coolant temperature sender -G62-

Special tools and workshop equipment required





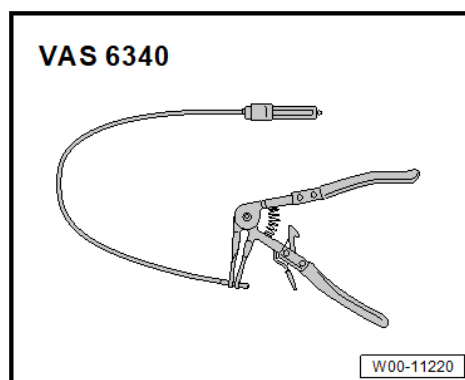
◆ Refractometer -T10007B-



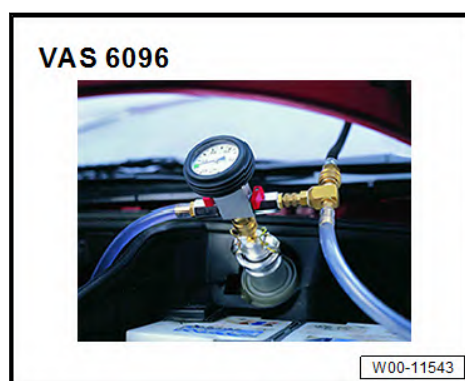
◆ Drip tray for workshop hoist -VAS 6208-



◆ Hose clamp pliers -VAS 6340-



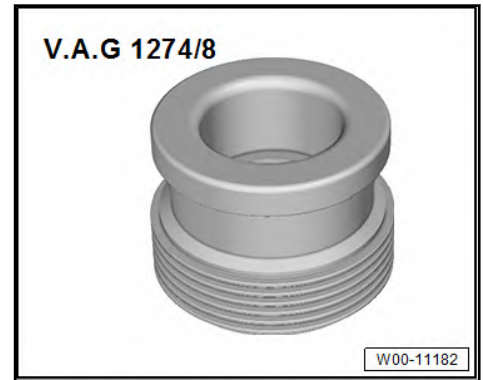
◆ Cooling system charge unit -VAS 6096-





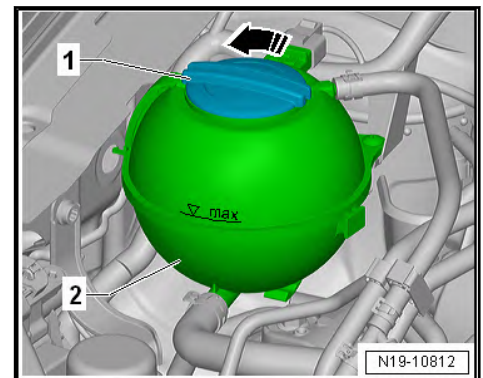


- ◆ Adapter for cooling system tester -V.A.G 1274/8-

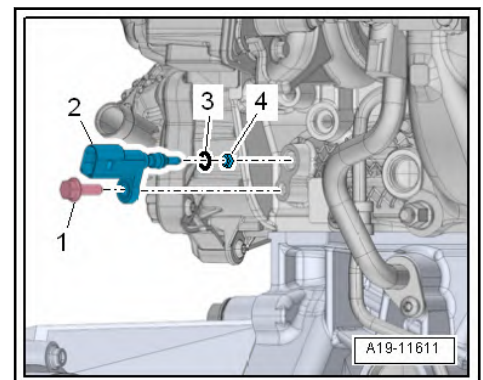


### Removing

- Engine cold.
- To relieve residual pressure in cooling system, open filler cap -1- on coolant expansion tank briefly and then close cap again (it should click into place).



- Release and pull off connector on coolant temperature sender -G62-.



- Place a cloth underneath to catch escaping coolant.
- Unscrew bolt -1-, and pull off coolant temperature sender -G62- -2-.
- If O-ring -3- with support ring -4- remains lodged in cylinder head, lift out O-ring with support ring using a piece of wire.
- Renew O-ring.
- Insert new coolant temperature sender -G62- immediately into cylinder head in order to avoid loss of coolant.
- Check coolant level ➤ [page 347](#) .





## Specified torques

♦ ⇒ [o2.3 verview - coolant temperature sender", page 352](#)

## 2.9 Removing and installing radiator outlet coolant temperature sender -G83-

⇒ [a2.9.1 nd installing radiator outlet coolant temperature senderG83, Sharan, CC and Tiguan", page 370](#)

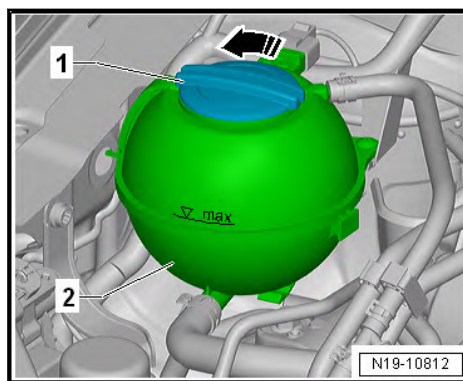
⇒ [a2.9.2 nd installing radiator outlet coolant temperature senderG83, Golf Cabriolet and Scirocco", page 371](#)

⇒ [a2.9.3 nd installing radiator outlet coolant temperature senderG83, T-Roc 2018 >, Golf 2020 >, Golf Estate 2021 >", page 372](#)

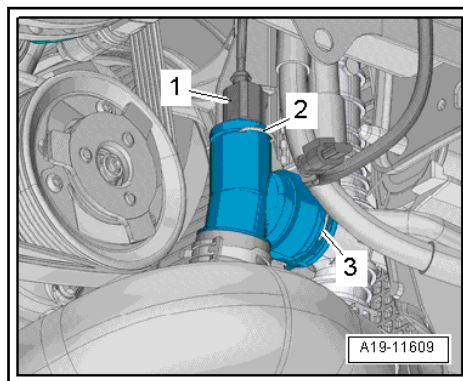
### 2.9.1 Removing and installing radiator outlet coolant temperature sender -G83-, Sharan, CC and Tiguan

#### Removing

- Engine cold.
- To relieve residual pressure in cooling system, open filler cap -1- on coolant expansion tank briefly and then close cap again (it should click into place).



- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- Disconnect electrical connector -1-.



- Pull out retaining clip -2- and remove radiator outlet coolant temperature sender -G83- -3-.
- Place a cloth underneath to catch escaping coolant.
- Renew O-ring.





- Insert new radiator outlet coolant temperature sender -G83- immediately into connection to avoid loss of coolant.
- Install front noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- Check coolant level ⇒ [page 347](#) .

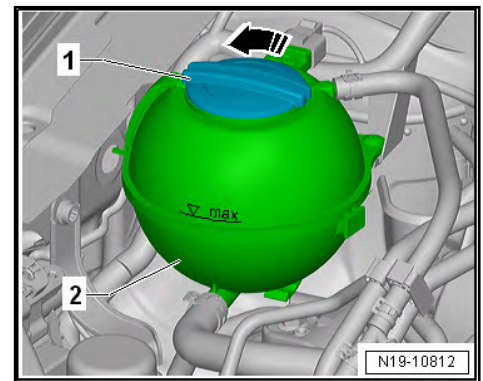
#### Specified torques

- ◆ ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation

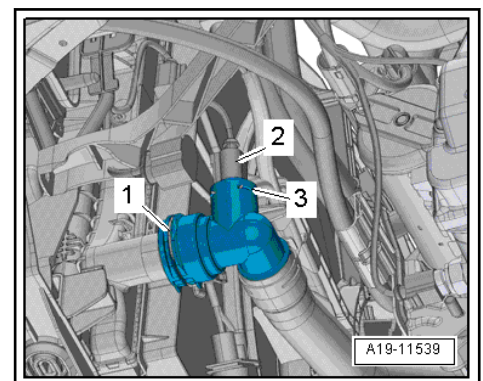
### 2.9.2 Removing and installing radiator outlet coolant temperature sender -G83-, Golf Cabriolet and Scirocco

#### Removing

- Engine cold.
- To relieve residual pressure in cooling system, open filler cap -1- on coolant expansion tank briefly and then close cap again (it should click into place).



- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- Release and pull off electrical connector -2-.



- Pull out retaining clip -3-, and pull off radiator outlet coolant temperature sender -G83-.
- Place a cloth underneath to catch escaping coolant.
- Renew O-ring.
- Insert new radiator outlet coolant temperature sender -G83- immediately into connection to avoid loss of coolant.





- Install front noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- Check coolant level ⇒ [page 347](#) .

#### Specified torques

- ♦ ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation

### 2.9.3 Removing and installing radiator outlet coolant temperature sender -G83-, T-Roc 2018 >, Golf 2020 >, Golf Estate 2021 >

#### Special tools and workshop equipment required

- ♦ Removal tool -T10498-



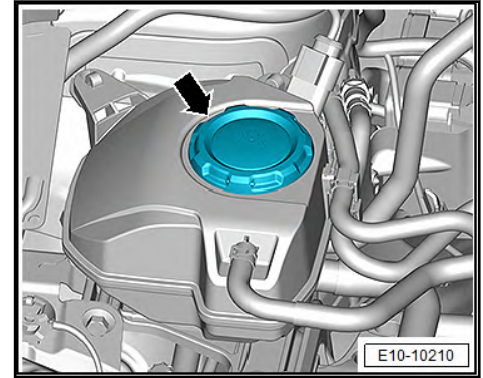
- ♦ Drip tray for workshop hoist -VAS 6208-



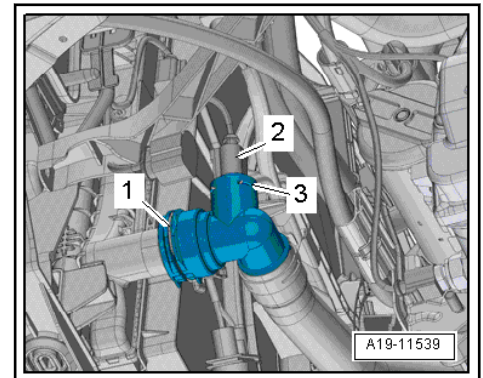
#### Removing

- Engine cold.
- Briefly open cap of coolant expansion tank -arrow- to release residual pressure in cooling system, then tighten again until cap engages.





- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- Disconnect electrical connector -2-.



- Place a cloth underneath to catch any escaping coolant.
- Place drip tray for workshop hoist -VAS 6208- underneath.
- Pull off retaining clip -3- and pull radiator outlet coolant temperature sender -G83- out of connection.

### Installing

Install in reverse order of removal, observing the following:

- Renew O-ring.
- Insert new radiator outlet coolant temperature sender -G83- immediately into connection to avoid loss of coolant.
- Install front noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- Check coolant level ⇒ [page 347](#) .





### 3 Coolant pipes

⇒ [o3.1 verview - coolant pipes", page 374](#)

⇒ [a3.2 nd installing coolant pipes", page 374](#)

#### 3.1 Assembly overview - coolant pipes

1 - Coolant hose

2 - Coolant pipe

- ☐ Clipped onto intake manifold (bottom)
- ☐ To remove, remove intake manifold ⇒ [a4.2 nd installing intake manifold", page 481](#)

3 - Bolt

- ☐ 8 Nm

4 - Coolant hose

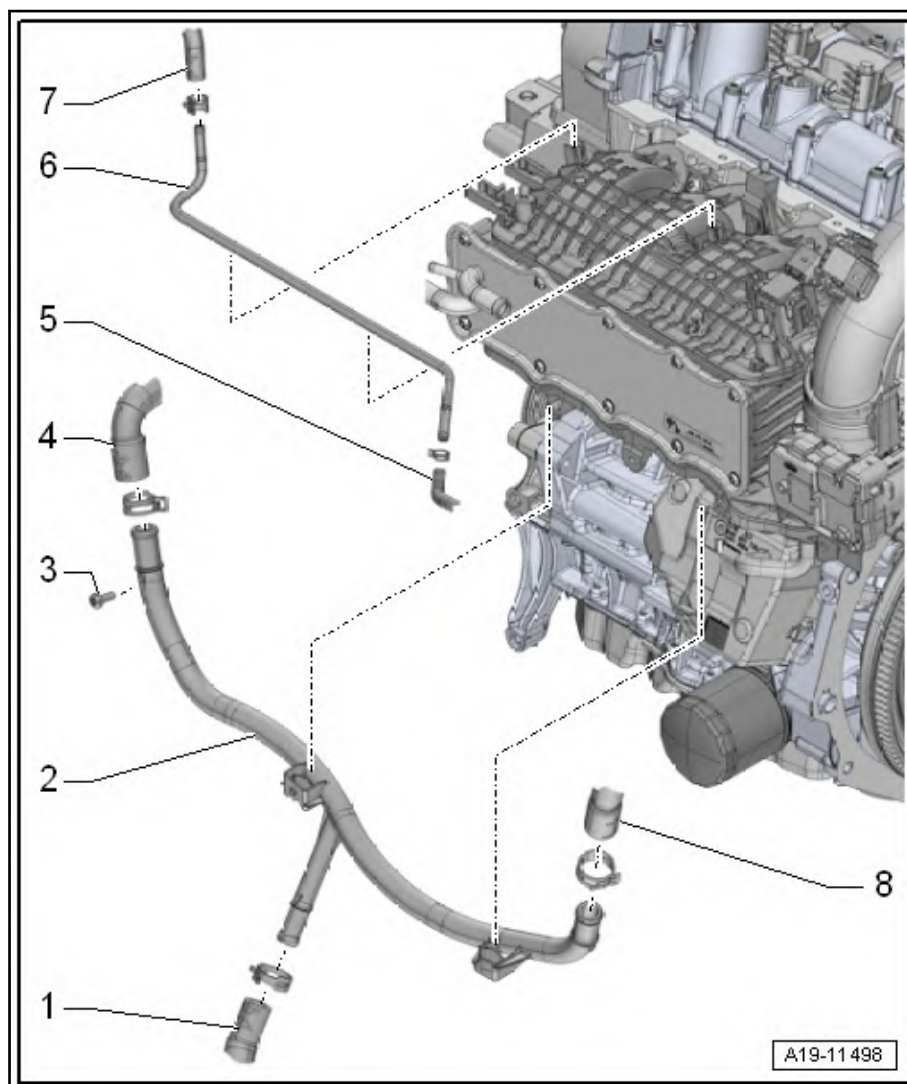
5 - Coolant hose

6 - Coolant line

- ☐ Clipped onto intake manifold (top)

7 - Coolant hose

8 - Coolant hose



#### 3.2 Removing and installing coolant pipes

Special tools and workshop equipment required





- ◆ Hose clamps to 25 mm -3094-



- ◆ Spring-type clip pliers -VAS 6362-



## Removing



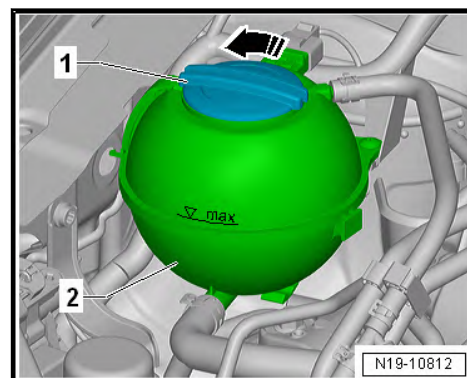
### CAUTION

When the motor is hot, the cooling system is under high pressure. Danger of scalding by steam and hot coolant.

Skin and other parts of the body may be scalded.

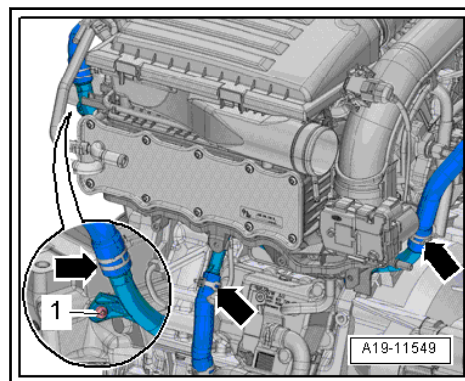
- Wear protective gloves.
- Wear protective goggles.
- Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.

- Open cap -1- on coolant expansion tank.

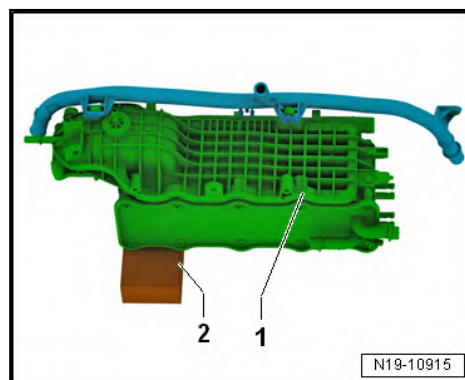


- Clamp off coolant hoses on coolant pipe using hose clamps up to 25 mm -3094-.





- Release hose clips -arrows- and detach coolant hoses.
- Remove intake manifold ⇒ [a4.2 nd installing intake manifold](#), [page 481](#) .
- Lay intake manifold -1- on the workbench as shown.



- Place e.g. a block of wood -2- under the intake manifold as an underlay.

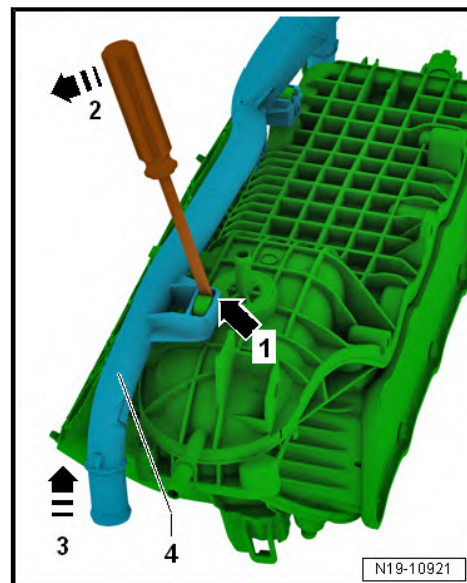


#### Note

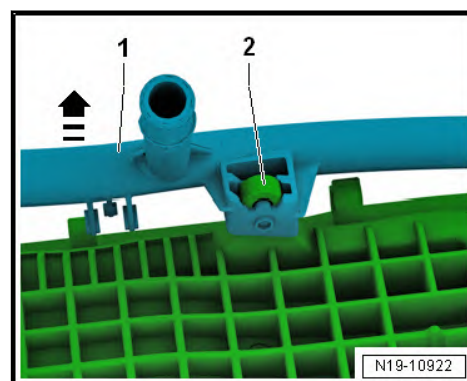
*To avoid damaging the intake manifold and coolant pipe, this procedure must be carried out very carefully!*

- Insert a flat-blade screwdriver into the slot -arrow 1-.



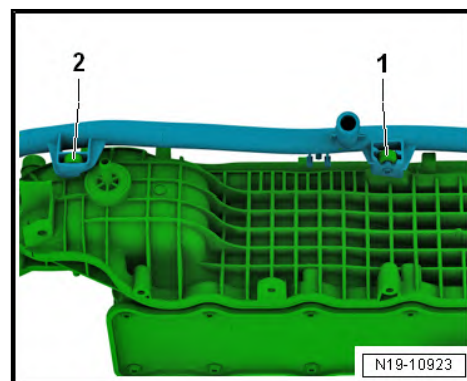


- Carefully push the flat-blade screwdriver in -direction of arrow 2- and lift the coolant pipe -4- in -direction of arrow 3- until it comes free from the retainer.
- Continue to lift the coolant pipe -1- in -direction of arrow- until it comes free of the retainer -2-.



### Installing

- First push the coolant pipe onto the mounting -1- until it engages.



- Then push the coolant pipe onto the mounting -2- until it engages.
- Check that the coolant pipe has properly engaged by pulling on it.





Continue installation in reverse order of removal. Observe the following when doing this:



#### Note

- ◆ *Renew seals and O-rings.*
- ◆ *Secure all hose connections with hose clips corresponding to production standard ⇒ Electronic parts catalogue.*
- Install intake manifold ⇒ [a4.2 nd installing intake manifold", page 481](#) .
- Check coolant level ⇒ [page 347](#) .

#### Specified torques

- ◆ ⇒ [o3.1 verview - coolant pipes", page 374](#)





## 4 Radiator, radiator fan

⇒ [o4.1 verview - radiator/radiator fan", page 379](#)

⇒ [o4.2 verview - radiator cowl and radiator fan", page 388](#)

⇒ [a4.3 nd installing radiator", page 392](#)

⇒ [a4.4 nd installing water radiator for charge air cooling circuit", page 399](#)

⇒ [a4.5 nd installing radiator cowl", page 407](#)

⇒ [a4.6 nd installing radiator fanV7", page 413](#)

### 4.1 Assembly overview - radiator/radiator fan

⇒ [o4.1.1 verview - radiator and radiator fan, Golf Cabriolet, CC and Tiguan", page 379](#)

⇒ [o4.1.2 verview - radiator/radiator fan, Sharan", page 381](#)

⇒ [o4.1.3 verview - radiator/radiator fan, Scirocco", page 384](#)

⇒ [o4.1.4 verview - radiator/radiator fan, T-Roc 2018 ➤, Golf 2020 ➤, Golf Estate 2021 ➤", page 386](#)

#### 4.1.1 Assembly overview - radiator and radiator fan, Golf Cabriolet, CC and Tiguan





#### 1 - Bolts

- ☐ For condenser
- ☐ 5 Nm

#### 2 - Condenser

- ☐ Removing and installing ⇒ Heating, air conditioning; Rep. gr. 87; Refrigerant circuit; Removing and installing condenser

#### 3 - Radiator for charge air cooling circuit

- ☐ Removing and installing ⇒ [a4.4.1 nd installing water radiator for charge air cooling circuit, Golf Cabriolet, CC, Scirocco and Tiguan](#), page 399

#### 4 - Radiator mounting

- ☐ Renew if damaged

#### 5 - Refrigerant line

- ☐ To condenser

#### 6 - O-ring

- ☐ For refrigerant line
- ☐ Renew after removal

#### 7 - Rubber mounting

- ☐ Bottom of radiator in lock carrier

#### 8 - O-ring

- ☐ Connection, radiator for charge air cooling circuit
- ☐ Renew after removal

#### 9 - Retaining clip

- ☐ Connection for coolant hose, charge air cooler

#### 10 - Coolant hose

- ☐ On radiator for charge air cooling circuit
- ☐ Lift retaining clip to remove
- ☐ Connect ⇒ [page 381](#)

#### 11 - Retaining clip

#### 12 - Radiator outlet coolant temperature sender -G83-

- ☐ Removing and installing ⇒ [a2.9 nd installing radiator outlet coolant temperature sender G83](#), page 370

#### 13 - O-ring

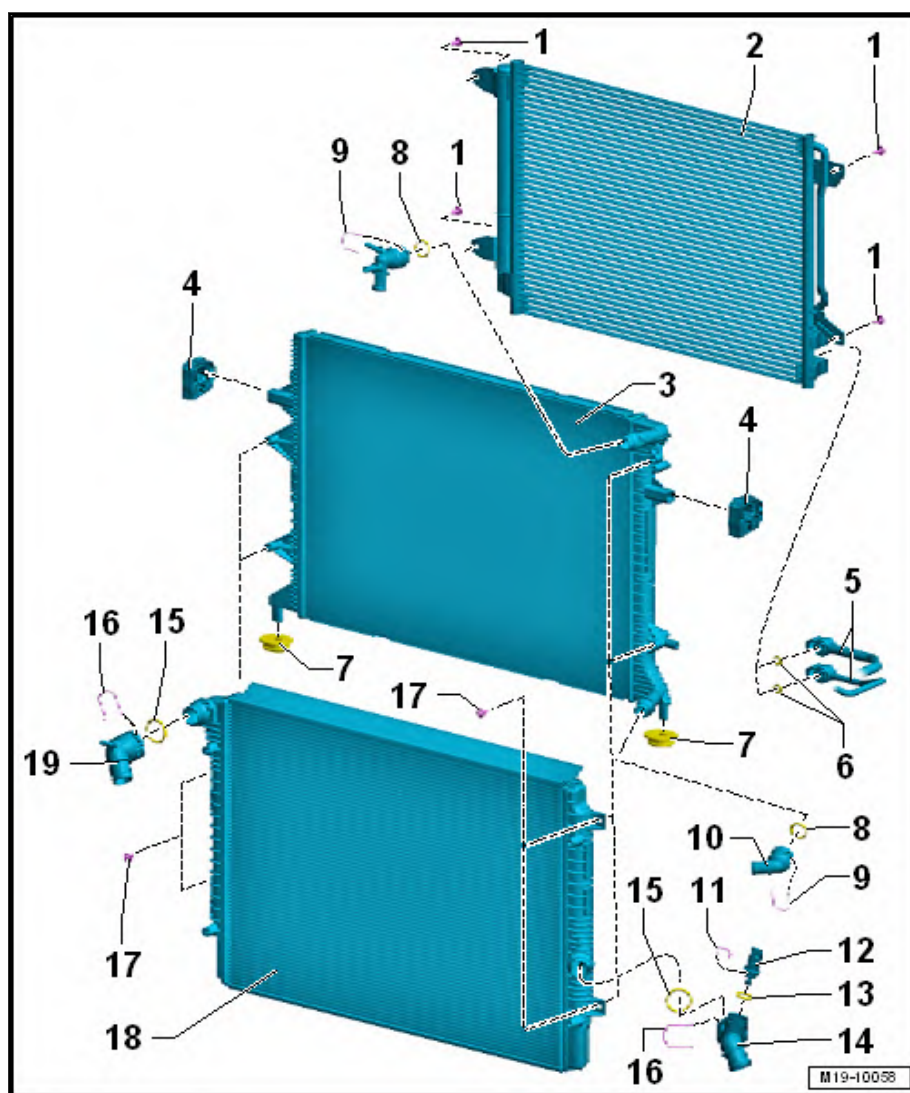
- ☐ Renew after removal

#### 14 - Coolant hose

- ☐ Lift retaining clip to remove
- ☐ Connect ⇒ [page 381](#)

#### 15 - O-ring

- ☐ Connection, radiator







- ☐ Renew after removal

#### 16 - Retaining clip

#### 17 - Bolts

- ☐ 5 Nm

#### 18 - Radiator for engine coolant

- ☐ Removing and installing ➔ [a4.3 nd installing radiator", page 392](#)
- ☐ Renew coolant after replacing

#### 19 - Coolant hose

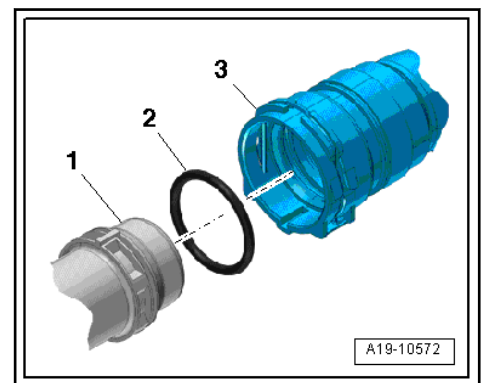
- ☐ Lift retaining clip to remove
- ☐ Connect ➔ [page 381](#)



#### Note

*The arrows on the coolant pipes and on the ends of the hoses must be aligned with each other.*

#### Connecting coolant hose with plug-in connector



- Remove old O-ring -2- in coolant hose -3-.
- Moisten new O-ring with coolant and insert into coolant hose.
- Push coolant hose into connection -1- until it audibly engages.
- Press again on coolant hose and check plug-in connector is engaged correctly by pulling hose back.

### 4.1.2 Assembly overview - radiator/radiator fan, Sharan





**1 - Air duct**

- ☐ Secured to lock carrier.

**2 - Air duct**

- ☐ Attached to radiator ⇒ [page 383](#)

**3 - Condenser**

- ☐ Removing and installing ⇒ Heating, air conditioning; Rep. gr. 87; Refrigerant circuit; Removing and installing condenser

**4 - Bolt**

- ☐ 6 Nm

**5 - Radiator for charge air cooling circuit**

- ☐ Removing and installing ⇒ [a4.4.2 nd installing water radiator for charge air cooling circuit, Sharan](#), [page 402](#)

**6 - Lower radiator mounting**

- ☐ For water radiator for charge air cooling circuit

**7 - Radiator for engine coolant**

- ☐ Removing and installing ⇒ [a4.3.2 nd installing radiator, Sharan](#), [page 394](#)

**8 - Radiator mounting**

- ☐ The radiator mounting will be reused when reinstalling the radiator. It will then be bolted to lock carrier. Bolts ⇒ Electronic Parts Catalogue (ETKA)

**9 - Bolt**

- ☐ Qty. 4
- ☐ 6 Nm

**10 - O-ring**

- ☐ Renew after removal
- ☐ Moisten with coolant

**11 - O-ring**

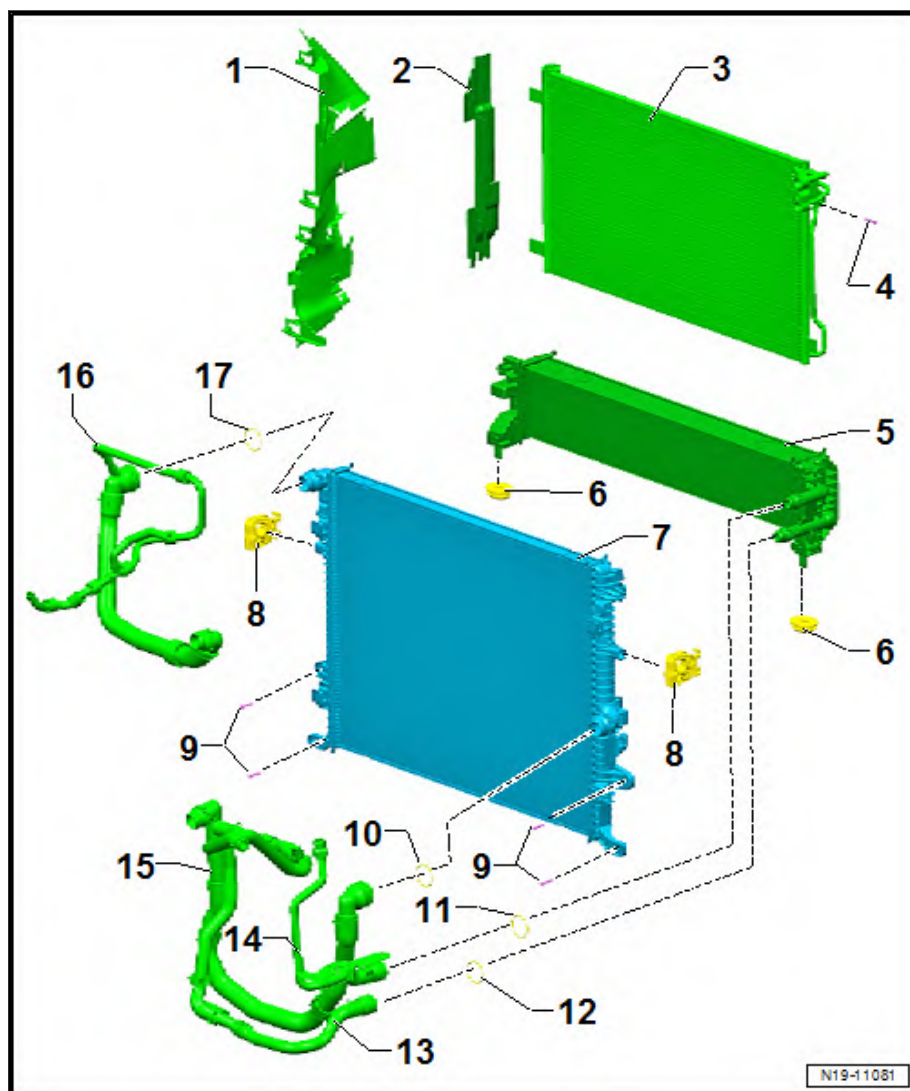
- ☐ Renew after removal
- ☐ Moisten with coolant

**12 - O-ring**

- ☐ Renew after removal
- ☐ Moisten with coolant

**13 - Coolant hose**

- ☐ Connection diagram ⇒ [d1.1 iagram - coolant hoses](#), [page 330](#)
- ☐ To water radiator for charge air cooling circuit
- ☐ Connect ⇒ [page 383](#)







#### 14 - Coolant hose

- ☐ Connection diagram ⇒ [d1.1 iagram - coolant hoses", page 330](#)
- ☐ To water radiator for charge air cooling circuit
- ☐ Connect ⇒ [page 383](#)

#### 15 - Coolant hose

- ☐ Connection diagram ⇒ [d1.1 iagram - coolant hoses", page 330](#)
- ☐ Connect ⇒ [page 383](#)

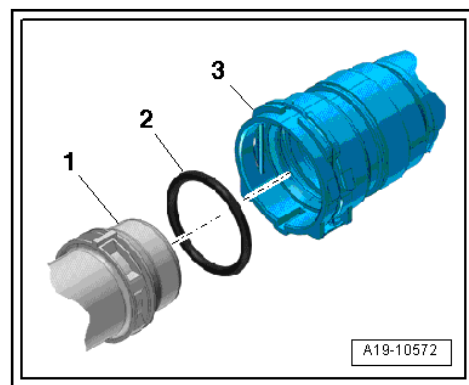
#### 16 - Coolant hose

- ☐ Connection diagram ⇒ [d1.1 iagram - coolant hoses", page 330](#)
- ☐ Connect ⇒ [page 383](#)

#### 17 - O-ring

- ☐ Renew after removal
- ☐ Moisten with coolant

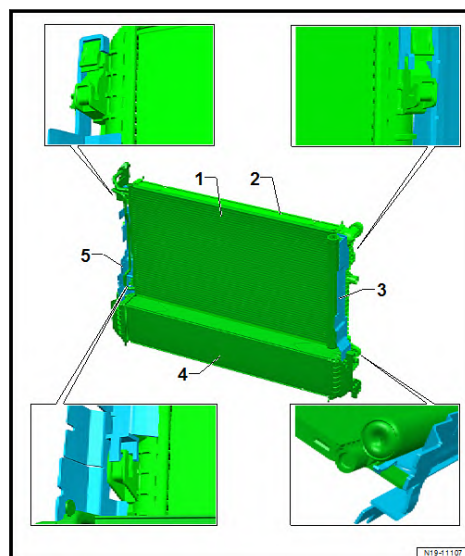
#### Connecting coolant hose with plug-in connector



- Remove old O-ring -2- in coolant hose -3-.
- Moisten new O-ring with coolant and insert into coolant hose.
- Push coolant hose into connection -1- until it audibly engages.
- Press again on coolant hose and check plug-in connector is engaged correctly by pulling hose back.

#### Installation position of air ducts





#### 4.1.3 Assembly overview - radiator/radiator fan, Scirocco





# 1 - Radiator for engine coolant

- ☐ Removing and installing ➔ [a4.3 nd installing radiator", page 392](#)
- ☐ Renew coolant after replacing

## 2 - Coolant connection

- ☐ Pull out retaining clip to remove
- ☐ Connect ➔ [page 386](#)

## 3 - Retaining clip

## 4 - O-ring

- ☐ Renew

## 5 - Radiator outlet coolant temperature sender -G83-

- ☐ Removing and installing ➔ [a2.9 nd installing radiator outlet coolant temperature senderG83", page 370](#)

## 6 - Coolant connection

- ☐ Pull out retaining clip to remove
- ☐ Connect ➔ [page 386](#)

## 7 - O-ring

- ☐ Renew if damaged
- ☐ Moisten with coolant

## 8 - Coolant connection

- ☐ Pull out retaining clip to remove
- ☐ Connect ➔ [page 386](#)

## 9 - Rubber mounting

## 10 - Radiator for charge air cooling circuit

- ☐ Removing and installing ➔ [a4.3 nd installing radiator", page 392](#)

## 11 - Rubber mounting

## 12 - Bolt

- ☐ 5 Nm

## 13 - Bolt

- ☐ 5 Nm

## 14 - Condenser

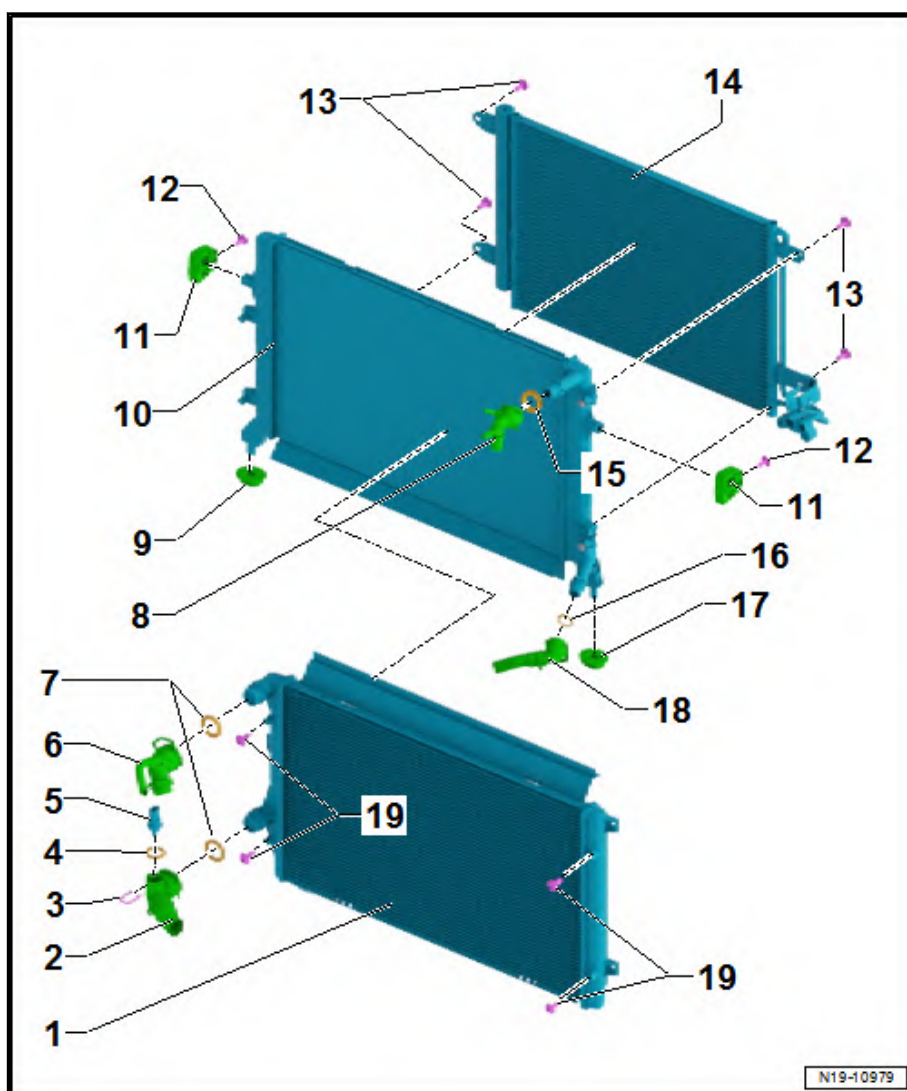
- ☐ Removing and installing ➔ Heating, air conditioning; Rep. gr. 87; Refrigerant circuit; Removing and installing condenser

## 15 - O-ring

- ☐ Renew if damaged
- ☐ Moisten with coolant

## 16 - O-ring

- ☐ Renew if damaged
- ☐ Moisten with coolant







#### 17 - Rubber mounting

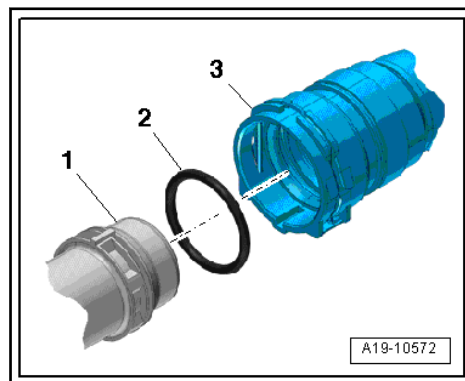
#### 18 - Coolant connection

- ☐ Pull out retaining clip to remove
- ☐ Connect ➔ [page 386](#)

#### 19 - Bolt

- ☐ 5 Nm

#### Connecting coolant hose with plug-in connector



- Check seal -2- for damage, and renew it if necessary.
- Moisten O-ring with coolant, and insert it into coolant hose.
- Push coolant hose into connection -1- until it audibly engages.
- Press again on coolant hose and check plug-in connector is engaged correctly by pulling hose back.

#### 4.1.4 Assembly overview - radiator/radiator fan, T-Roc 2018 ➤, Golf 2020 ➤, Golf Estate 2021 ➤





#### 1 - Radiator for engine coolant

- ☐ Removing and installing ➔ [a4.3 nd installing radiator", page 392](#)
- ☐ Renew coolant after replacing

#### 2 - Coolant hose

- ☐ Pull out retaining clip to remove
- ☐ Connect ➔ [Fig. "Connecting coolant hose with plug-in connector", page 388](#)

#### 3 - Retaining clip

#### 4 - O-ring

- ☐ Renew after removal
- ☐ Moisten with coolant

#### 5 - Radiator outlet coolant temperature sender -G83-

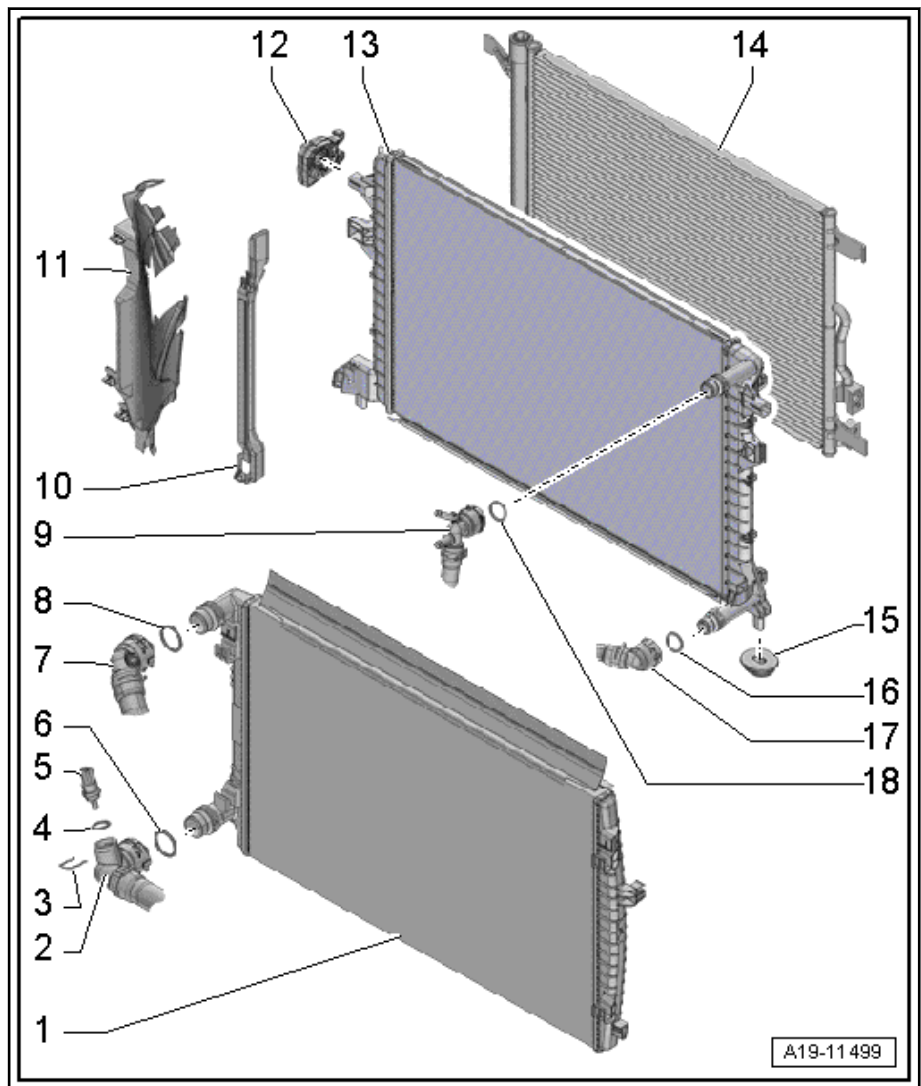
- ☐ Removing and installing ➔ [a2.9 nd installing radiator outlet coolant temperature senderG83", page 370](#)

#### 6 - O-ring

- ☐ Renew if damaged
- ☐ Moisten with coolant

#### 7 - Coolant hose

- ☐ Pull out retaining clip to remove
- ☐ Connect ➔ [Fig. "Connecting coolant hose with plug-in connector", page 388](#)



#### 8 - O-ring

- ☐ Renew if damaged
- ☐ Moisten with coolant

#### 9 - Coolant hose

- ☐ Pull out retaining clip to remove
- ☐ Connect ➔ [Fig. "Connecting coolant hose with plug-in connector", page 388](#)

#### 10 - Air duct

- ☐ Not fitted in all vehicles

#### 11 - Air duct

#### 12 - Rubber mounting

- ☐ For radiator

#### 13 - Radiator for charge air cooling circuit

- ☐ Removing and installing ➔ [a4.3 nd installing radiator", page 392](#)

#### 14 - Condenser

- ☐ Removing and installing ➔ Heating, air conditioning; Rep. gr. 87; Refrigerant circuit; Removing and installing condenser

#### 15 - Rubber mounting





- ☐ For radiator

#### 16 - O-ring

- ☐ Renew if damaged
- ☐ Moisten with coolant

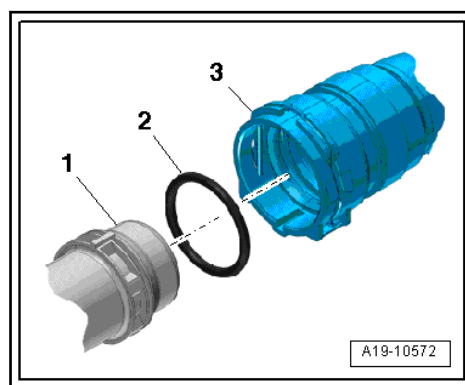
#### 17 - Coolant hose

- ☐ Pull out retaining clip to remove
- ☐ Connect ➔ [Fig. “Connecting coolant hose with plug-in connector”, page 388](#)

#### 18 - O-ring

- ☐ Renew if damaged
- ☐ Moisten with coolant

### Connecting coolant hose with plug-in connector



- Check seal -2- for damage, and renew it if necessary.
- Moisten O-ring with coolant, and insert it into coolant hose.
- Push coolant hose into connection -1- until it audibly engages.
- Press again on coolant hose and check plug-in connector is engaged correctly by pulling hose back.

## 4.2 Assembly overview - radiator cowl and radiator fan

➔ [o4.2.1 overview - radiator cowl and radiator fan, Golf Cabriolet, CC and Tiguan”, page 388](#)

➔ [o4.2.2 overview - radiator cowl and radiator fan, Sharan”, page 389](#)

➔ [o4.2.3 overview - radiator cowl and radiator fan, Scirocco”, page 390](#)

➔ [o4.2.4 overview - radiator cowl and radiator fan, T-Roc 2018 >, Golf 2020 >, Golf Estate 2021 >”, page 392](#)

### 4.2.1 Assembly overview - radiator cowl and radiator fan, Golf Cabriolet, CC and Tiguan



#### 1 - Radiator cowl

- ☐ Removing and installing ⇒ [a4.5 nd installing radiator cowl", page 407](#)

#### 2 - Bolt

- ☐ Radiator cowl to radiator
- ☐ 5 Nm

#### 3 - Bolt

- ☐ Radiator cowl to radiator
- ☐ Specified torque: ⇒ [o4.1 verview - radiator/radiator fan", page 379](#)

#### 4 - Radiator fan 2 -V177-

- ☐ Removing and installing ⇒ [a4.6 nd installing radiator fanV7", page 413](#)

#### 5 - Radiator fan -V7-

- ☐ Removing and installing ⇒ [a4.6 nd installing radiator fanV7", page 413](#)

#### 6 - Bracket

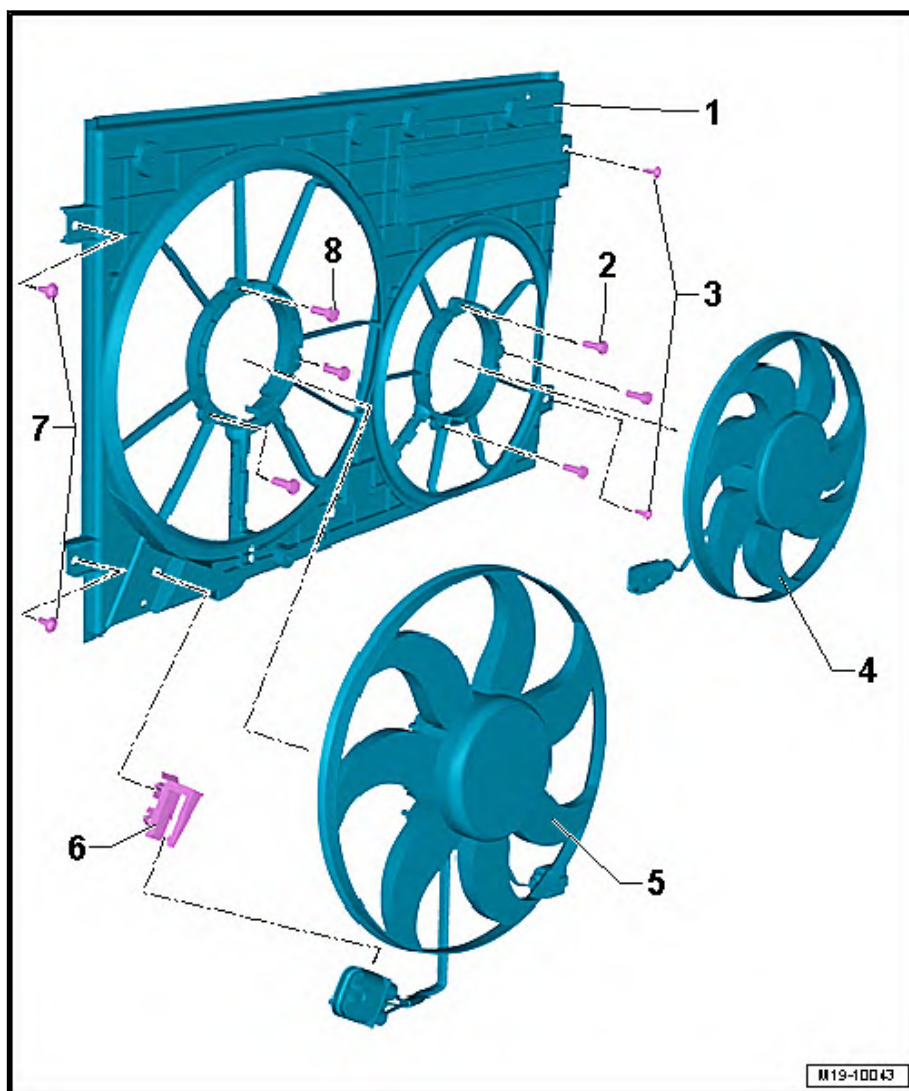
- ☐ Coupling point

#### 7 - Bolt

- ☐ Radiator cowl to radiator
- ☐ Specified torque: ⇒ [o4.1 verview - radiator/radiator fan", page 379](#)

#### 8 - Bolt

- ☐ 5 Nm



### 4.2.2 Assembly overview - radiator cowl and radiator fan, Sharan





**1 - Radiator fan -V7-**

- ❑ Removing and installing ⇒ [a4.6 nd installing radiator fanV7", page 413](#)

**2 - Radiator fan 2 -V177-**

- ❑ Removing and installing ⇒ [a4.6 nd installing radiator fanV7", page 413](#)

**3 - Radiator cowl**

- ❑ Removing and installing ⇒ [a4.5 nd installing radiator cowl", page 407](#)

**4 - Washer**

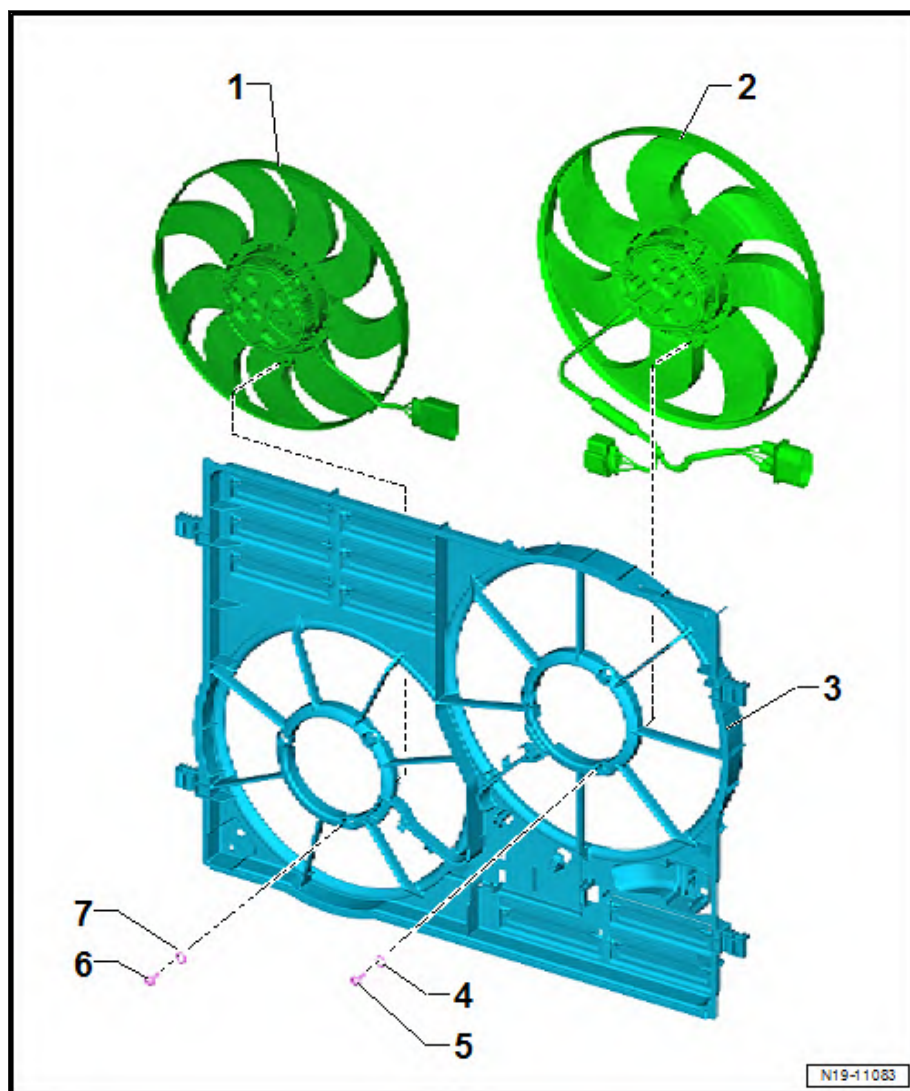
**5 - Bolt**

- ❑ 5 Nm

**6 - Bolt**

- ❑ 5 Nm

**7 - Washer**



**4.2.3 Assembly overview - radiator cowl and radiator fan, Scirocco**





**1 - Coolant hose**

**2 - Coolant hose**

- ☐ Connection diagram for coolant hoses ⇒ [d1.1 iagram - coolant hoses", page 330](#)

**3 - Clip**

**4 - Connector**

- ☐ For coolant shortage indicator sender -G32-.

**5 - Cap**

- ☐ Check using cooling system tester -V.A.G 1274 B- and adapter for cooling system tester - V.A.G 1274/9-
- ☐ Pressure relief valve must open at between 1.4 and 1.6 bar

**6 - Bolt**

- ☐ 5 Nm
- ☐ Qty. 2

**7 - Expansion tank**

**8 - Radiator cowl**

- ☐ Removing and installing ⇒ [a4.5 nd installing radiator cowl", page 407](#)
- ☐ with radiator fan -V7- and radiator fan 2 - V177-

**9 - Bolt**

- ☐ 5 Nm
- ☐ Qty. 4

**10 - Radiator fan -V7-**

- ☐ Removing and installing ⇒ [a4.6.2 nd installing radiator fanV7 and radiator fan 2V177, Scirocco", page 414](#)

**11 - Radiator fan 2 -V177-**

- ☐ Removing and installing ⇒ [a4.6.2 nd installing radiator fanV7 and radiator fan 2V177, Scirocco", page 414](#)

**12 - Lower coolant hose**

- ☐ Connection diagram for coolant hoses ⇒ [d1.1 iagram - coolant hoses", page 330](#)

**13 - Upper coolant hose**

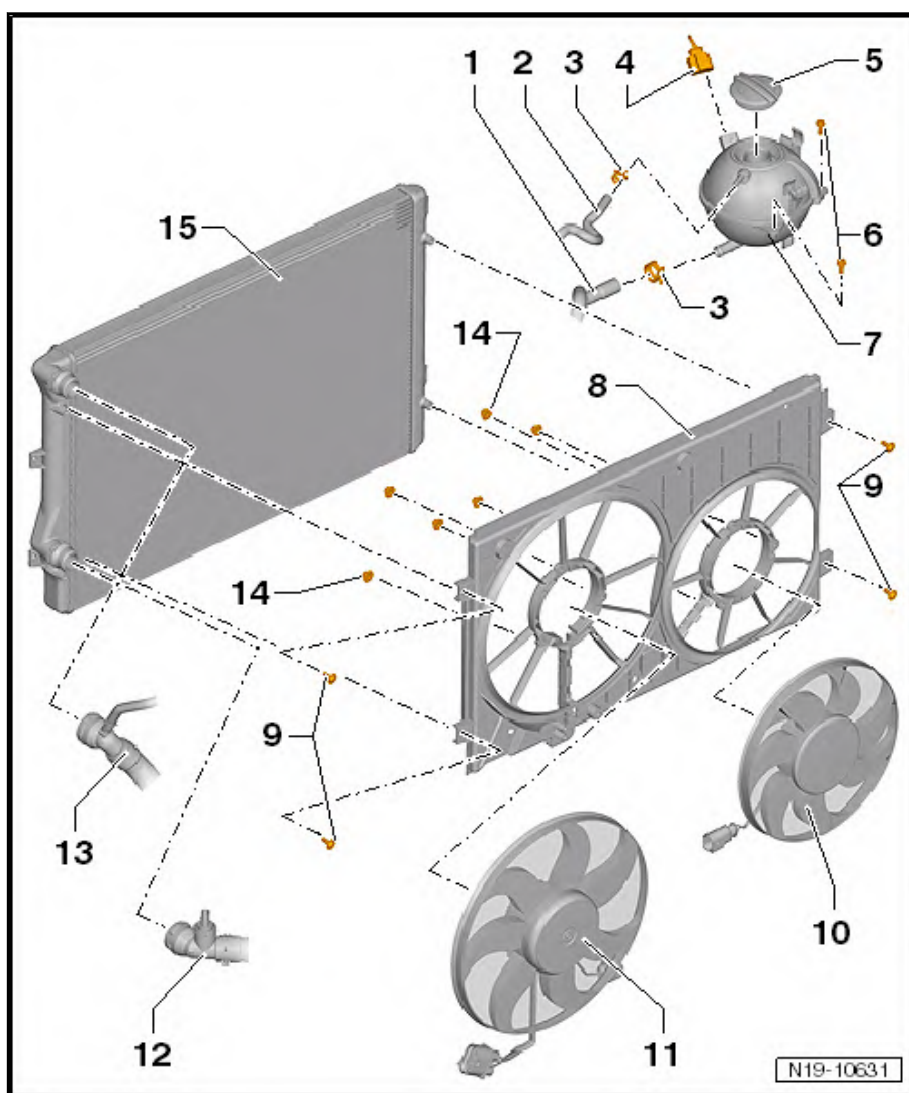
- ☐ Connection diagram for coolant hoses ⇒ [d1.1 iagram - coolant hoses", page 330](#)

**14 - Nut**

- ☐ 10 Nm
- ☐ Qty. 6

**15 - Radiator/cooler**

- ☐ Removing and installing ⇒ [a4.3 nd installing radiator", page 392](#)
- ☐ After renewing, renew entire coolant.







## 4.2.4 Assembly overview - radiator cowl and radiator fan, T-Roc 2018 ➤, Golf 2020 ➤, Golf Estate 2021 ➤

### 1 - Bolt

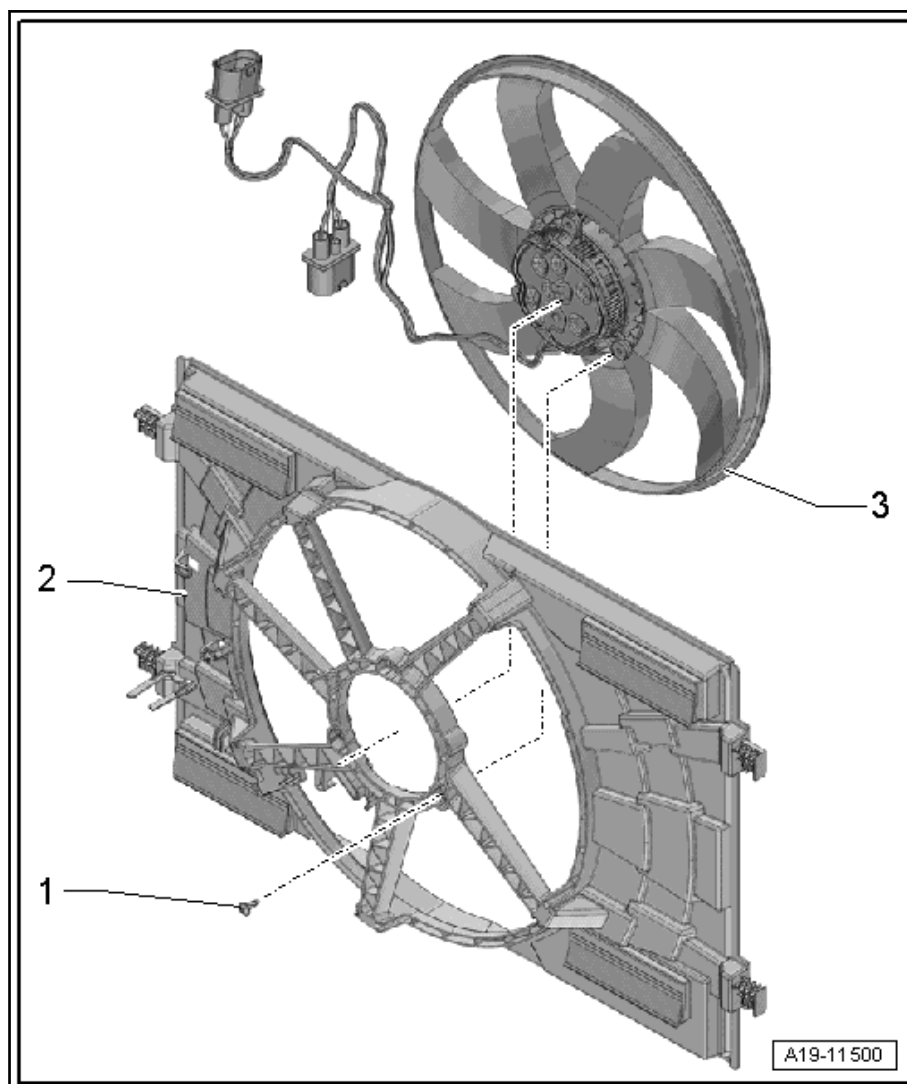
- ❑ 5 Nm

### 2 - Radiator cowl

- ❑ Removing and installing ⇒ [a4.5 nd installing radiator cowl", page 407](#)

### 3 - Radiator fan -V7-

- ❑ Removing and installing ⇒ [a4.6 nd installing radiator fanV7", page 413](#)



## 4.3 Removing and installing radiator

⇒ [a4.3.1 nd installing radiator, Golf Cabriolet, CC, Scirocco and Tiguan", page 392](#)

⇒ [a4.3.2 nd installing radiator, Sharan", page 394](#)

⇒ [a4.3.3 nd installing radiator, T-Roc 2018 ➤, Golf 2020 ➤, Golf Estate 2021 ➤", page 396](#)

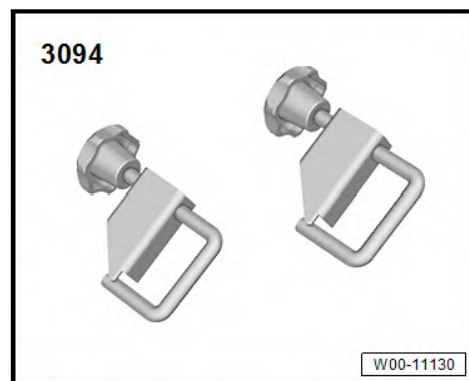
### 4.3.1 Removing and installing radiator, Golf Cabriolet, CC, Scirocco and Tiguan

Special tools and workshop equipment required



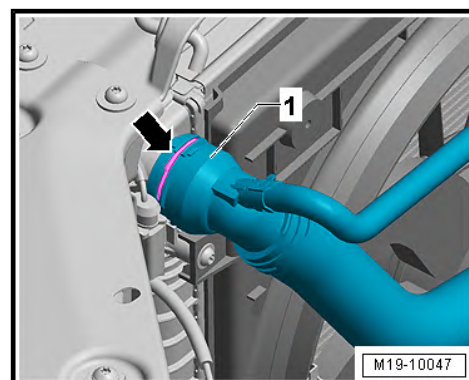


- ◆ Hose clamps to 25 mm -3094-

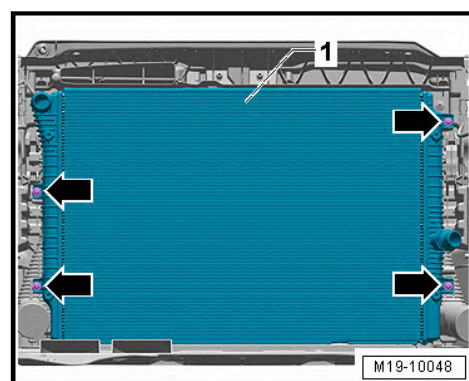


### Removing

- Drain coolant ➔ [a1.3 nd adding coolant](#), page 340 .
- Remove radiator cowl ➔ [a4.5 nd installing radiator cowl](#), page 407 .
- Release retaining clip -arrow-.



- Pull off coolant hose -1- from top of radiator.
- Unscrew radiator securing bolts -arrows- and remove radiator -1- downwards.



### Installing

Install in reverse order of removal. The following should be observed:

- Install radiator cowl ➔ [a4.5 nd installing radiator cowl](#), page 407 .
- Fill with new coolant ➔ [page 347](#) .

### Specified torques

- ◆ ➔ [o4.1 verview - radiator/radiator fan](#), page 379



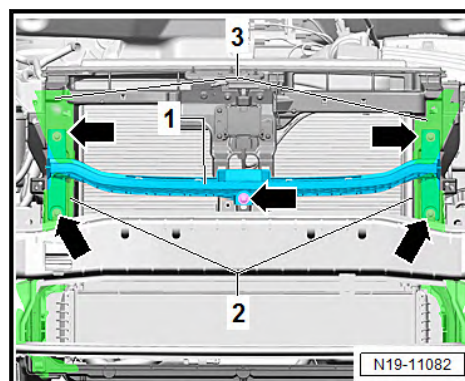


♦ ⇒ [o4.2 overview - radiator cowl and radiator fan](#)", page 388

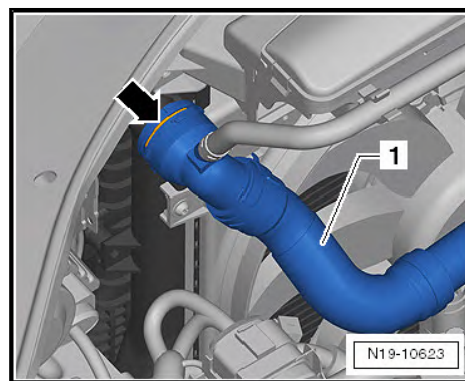
## 4.3.2 Removing and installing radiator, Shar-an

### Removing

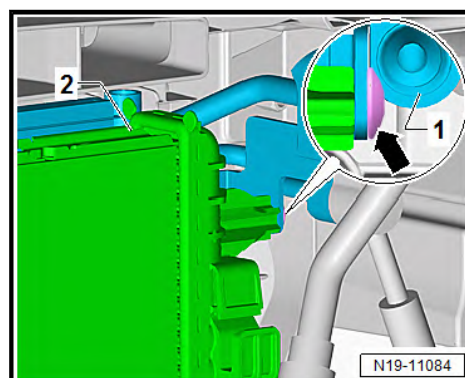
- Drain coolant ⇒ [a1.3 nd adding coolant](#)", page 340 .
- Remove air filter housing ⇒ [a3.2 nd installing air filter housing](#)", page 472 .
- Remove radiator cowl ⇒ [a4.5 nd installing radiator cowl](#)", page 407 .
- Remove guide section -1- on lock carrier -2-. To do this, unscrew bolts -arrows-.



- Detach guide section from air duct -3-.
- Detach top coolant hose from radiator -arrow-.



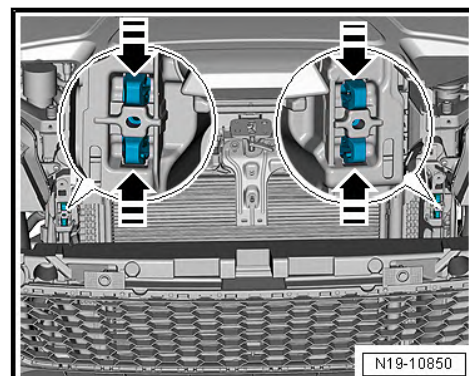
- To do this, release retaining clip -arrow- upwards.
- Unbolt retainer for refrigerant lines at top of radiator.







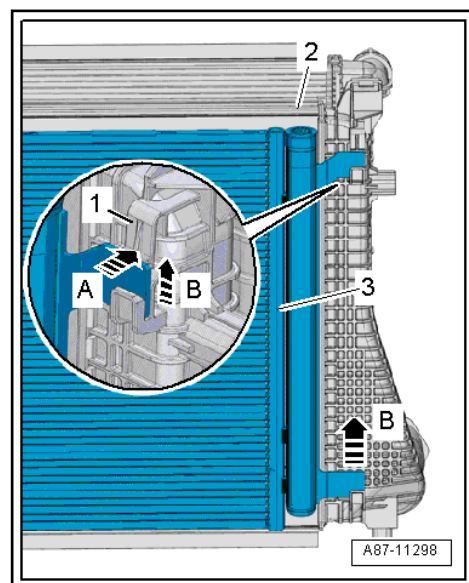
- To do this, unscrew bolt.
- Release catches -arrows- for radiator mountings on left and right, or pinch them off using side cutters.



#### Note

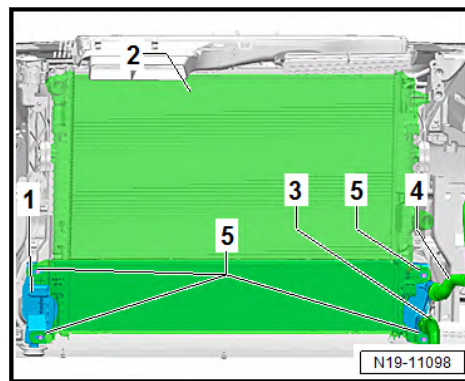
*The radiator mounting will be reused when reinstalling the radiator. It will then be bolted to lock carrier. For bolts, refer to ⇒ Electronic parts catalogue (ETKA).*

- Push radiator at top slightly towards rear.
- Remove air duct on left and right from condenser.



- Press catches -1- on both sides in -direction of arrow A- to release them.
- Pull off condenser upwards in -direction of arrow B-.
- Secure condenser to lock carrier.
- Unbolt radiator -2- from charge air cooler -1-.





- To do this, unscrew bolts -5-.
- Secure charge air cooler to lock carrier.
- Remove radiator downwards.

### Installing

Install in reverse order of removal. Observe the following:

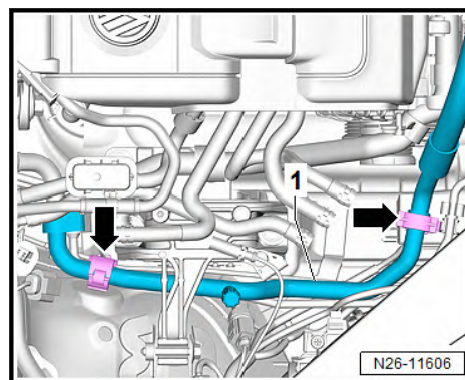
#### Specified torques

- ♦ ⇒ [o4.1 verview - radiator/radiator fan", page 379](#)
- ♦ ⇒ [o3.1 verview - air filter housing", page 470](#)
- ♦ ⇒ [o4.2 verview - radiator cowl and radiator fan", page 388](#)
- ♦ ⇒ General body repairs, exterior; Rep. gr. 63; Front bumper; Assembly overview - bumper cover
- ♦ ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation

### 4.3.3 Removing and installing radiator, T-Roc 2018 ➤, Golf 2020 ➤, Golf Estate 2021 ➤

#### Removing

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- Drain coolant ⇒ [a1.3 nd adding coolant", page 340](#) .
- Remove radiator cowl ⇒ [a4.5 nd installing radiator cowl", page 407](#) .
- Open retainers for refrigerant lines -arrows-.

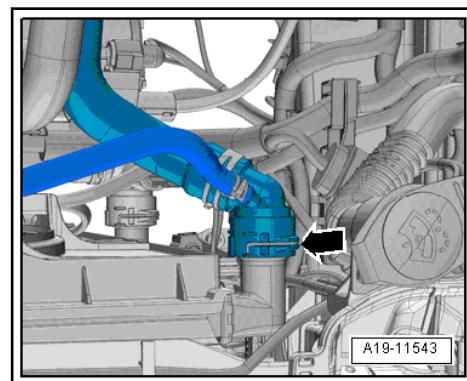


- Push refrigerant lines to one side.

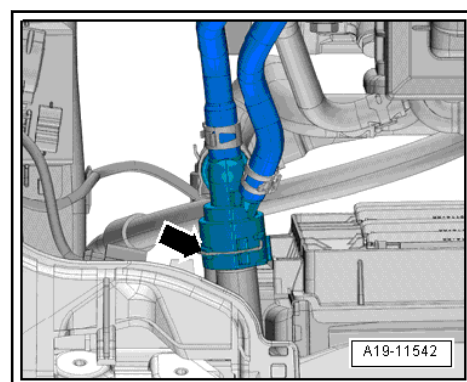




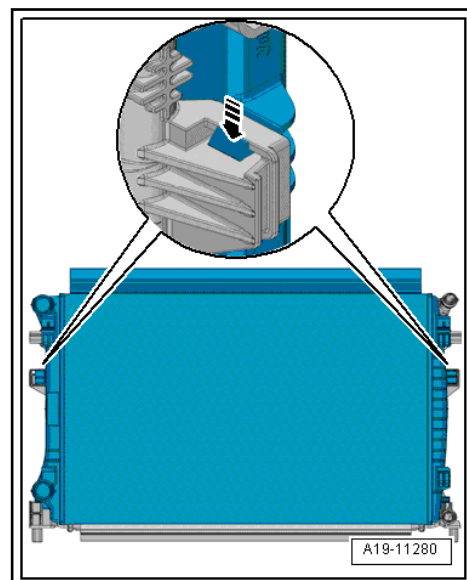
- Lift retaining clip -arrow- and disconnect coolant hose (top left) from radiator.



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

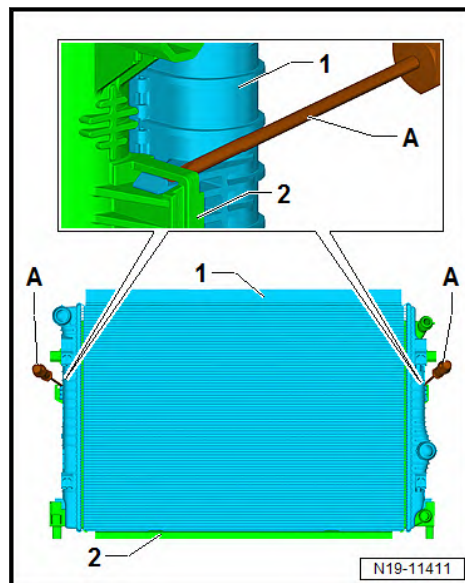


- Release locking tabs -arrow- for radiator on left and right. Then pull top of radiator backwards.



- To release, push a suitable screwdriver -A- from behind between radiator for engine coolant -2- and radiator for charge air cooling circuit -1-.





- Position screwdriver -A- as shown but do not lever when doing so.
- Lift coolant radiator upwards off charge air cooling circuit radiator.
- Pull radiator out of mountings at bottom.
- Remove radiator downwards.

### Installing

Install in reverse order of removal. The following should be observed:



### Note

*If there are minor dents in the fins, refer to respective instructions ⇒ [r3.7 adiotor and condensers](#)", page 7* .

- Check O-rings for damage, and renew them if necessary.
- Insert radiator into mounting at bottom. Engage radiator/cooler with one another. Ensure proper engagement by pulling.
- Install radiator cowl ⇒ [a4.5 nd installing radiator cowl](#)", page 407 .
- Connect coolant hose with plug-in connector ⇒ [Fig. ""Connecting coolant hose with plug-in connector""](#), page 388 .
- Add coolant ⇒ [page 343](#) .

### Specified torques

- ◆ ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation
- ◆ ⇒ [o4.1 verview - radiator/radiator fan](#)", page 379
- ◆ ⇒ [o4.2 verview - radiator cowl and radiator fan](#)", page 388
- ◆ ⇒ [o3.1 verview - air filter housing](#)", page 470





## 4.4 Removing and installing water radiator for charge air cooling circuit

⇒ [a4.4.1 nd installing water radiator for charge air cooling circuit, Golf Cabriolet, CC, Scirocco and Tiguan](#), page 399

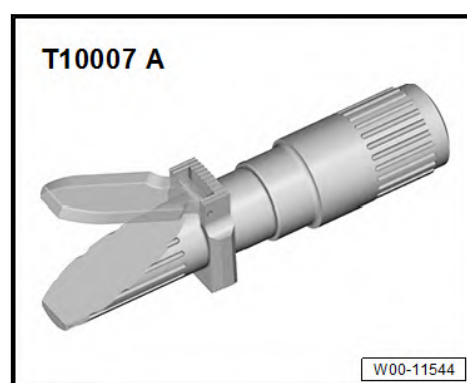
⇒ [a4.4.2 nd installing water radiator for charge air cooling circuit, Sharan](#), page 402

⇒ [a4.4.3 nd installing water radiator for charge air cooling circuit, T-Roc 2018 ➤, Golf 2020 ➤, Golf Estate 2021 ➤](#), page 403

### 4.4.1 Removing and installing water radiator for charge air cooling circuit, Golf Cabriolet, CC, Scirocco and Tiguan

Special tools and workshop equipment required

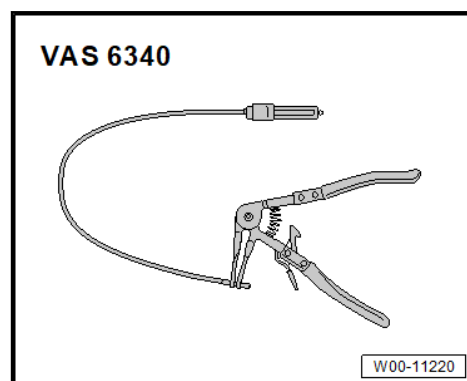
◆ Refractometer -T10007B-



◆ Drip tray for workshop hoist -VAS 6208-



◆ Hose clamp pliers -VAS 6340-







◆ Cooling system charge unit -VAS 6096-



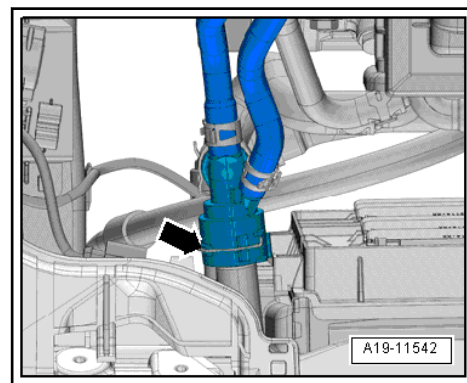
◆ Adapter for cooling system tester -V.A.G 1274/8-



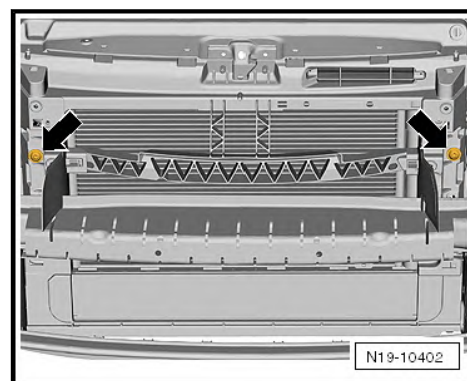
**Note**

- ◆ *Hose connections are secured with spring-type clips. In case of repair, only use spring-type clips.*
- ◆ *Hose clip pliers -VAS 6340- are recommended to install spring-type clips.*
- ◆ *When installing coolant hoses, route tension-free so that they do not come into contact with other components (observe markings on coolant connection and hose).*
- Remove noise insulation or skid plate ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- Drain coolant ⇒ [a1.3 nd adding coolant", page 340](#) .
- Remove radiator cowl with radiator fan ⇒ [a4.5 nd installing radiator cowl", page 407](#) .
- Removing radiator ⇒ [a4.3.1 nd installing radiator, Golf Cabriolet, CC, Scirocco and Tiguan", page 392](#) .
- Remove front bumper cover ⇒ General body repairs, exterior; Rep. gr. 63; Front bumper; Removing and installing bumper cover.
- Lift retaining clip -arrow-, and remove upper right hose from water radiator for charge air cooling circuit.

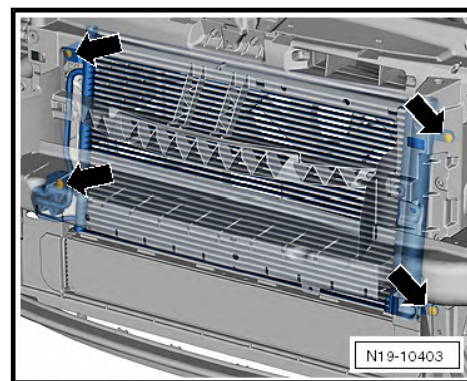




- Undo and remove coolant pump bolts -arrows- of the radiator support.



#### Vehicles with air conditioning system



- Undo and remove condenser bolts -arrows-.
- Secure condenser to lock carrier.

#### Note

*Make sure that the coolant lines/hoses are not excessively stretched, kinked or bent.*

#### Continued for all vehicles

- Pull bottom of radiator for charge air cooling circuit out of mounting.
- Remove radiator for charge air cooling circuit downwards.





## Installing

Install in reverse order of removal. The following should be observed:

- Add coolant ⇒ [a1.3 nd adding coolant", page 340](#) .

## Specified torques

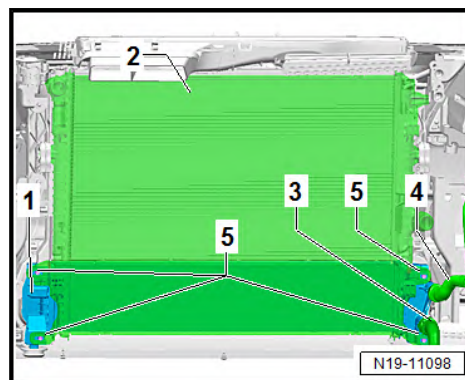
Bolt	Specified torque
Threaded connection on lock carrier	5 Nm

- ♦ ⇒ [o4.1 verview - radiator/radiator fan", page 379](#)
- ♦ ⇒ [o4.2 verview - radiator cowl and radiator fan", page 388](#)
- ♦ ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation
- ♦ ⇒ General body repairs, exterior; Rep. gr. 63; Front bumper; Assembly overview - bumper cover

## 4.4.2 Removing and installing water radiator for charge air cooling circuit, Sharan

### Removing

- Drain coolant ⇒ [a1.3 nd adding coolant", page 340](#) .
- Remove radiator cowl ⇒ [a4.5 nd installing radiator cowl", page 407](#) .
- Remove radiator -2- ⇒ [a4.3.2 nd installing radiator, Sharan", page 394](#) .
- Remove coolant hoses -3- and -4- on charge air cooler -1-.



- To do this, release retaining clips.

Install in reverse order of removal. Observe the following:



### Note

*If there are minor dents in the fins, refer to ⇒ [r3.7 adiutor and condensers", page 7](#) .*

- Renew O-rings after removal.
- Add coolant ⇒ [page 343](#) .

## Specified torques

- ♦ ⇒ [o4.1 verview - radiator/radiator fan", page 379](#)
- ♦ ⇒ [o4.2 verview - radiator cowl and radiator fan", page 388](#)



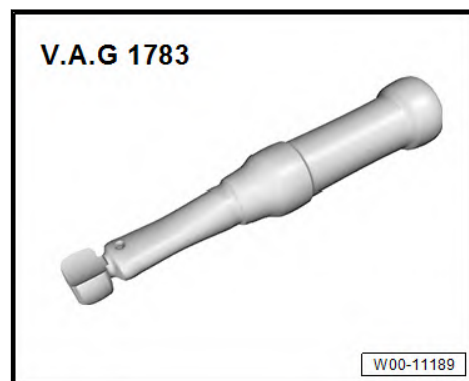


- ◆ ⇒ General body repairs, exterior; Rep. gr. 63; Front bumper; Removing and installing bumper cover
- ◆ ⇒ General body repairs, exterior; Rep. gr. 50; Lock carrier; Assembly overview - lock carrier

#### 4.4.3 Removing and installing water radiator for charge air cooling circuit, T-Roc 2018 >, Golf 2020 >, Golf Estate 2021 >

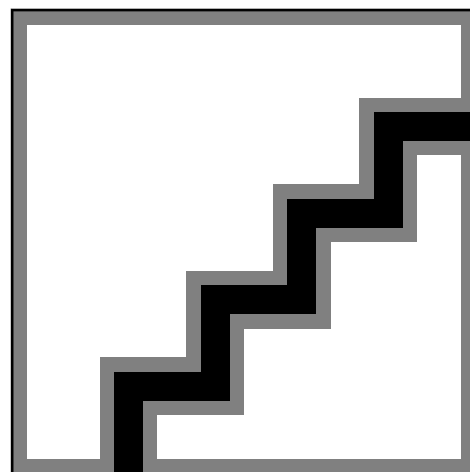
##### Special tools and workshop equipment required

- ◆ Torque wrench -V.A.G 1783-



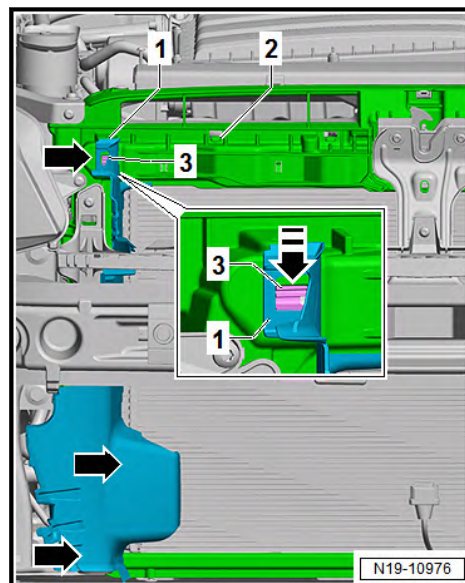
##### Removing

- Drain coolant ⇒ [a1.3 nd adding coolant", page 340](#) .
- Remove radiator cowl ⇒ [a4.5 nd installing radiator cowl", page 407](#) .
- Remove front bumper cover ⇒ General body repairs, exterior; Rep. gr. 63; Front bumper; Removing and installing bumper cover.
- Remove centre guide profile -A- from lock carrier -arrows-.



- Unclip air ducts -1- on both sides from lock carrier -2- -arrows-.

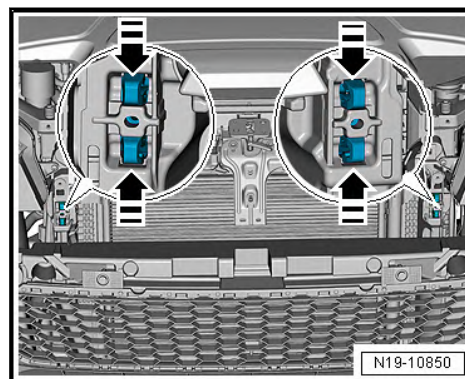




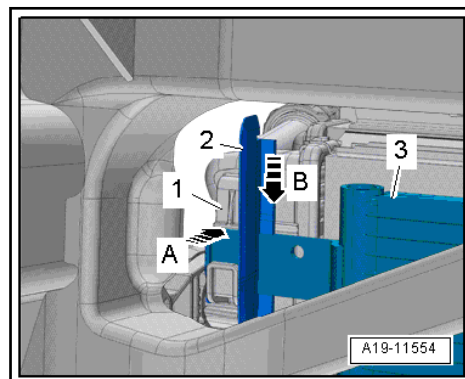
#### Note

*The radiator mounting will be reused when reinstalling the radiator. It will then be bolted to lock carrier. For bolts, refer to ⇒ Electronic parts catalogue (ETKA).*

- Release catches -arrows- of radiator mounting on left and right, or pinch them off using side cutters. Push radiator at top slightly towards engine.



- Unclip air duct -2- on left and right.

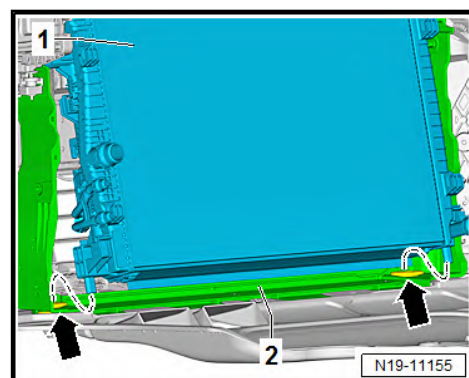


- Release left and right catches -arrow A-, and detach condenser -3- upwards from water radiator for charge air cooling circuit -1-.

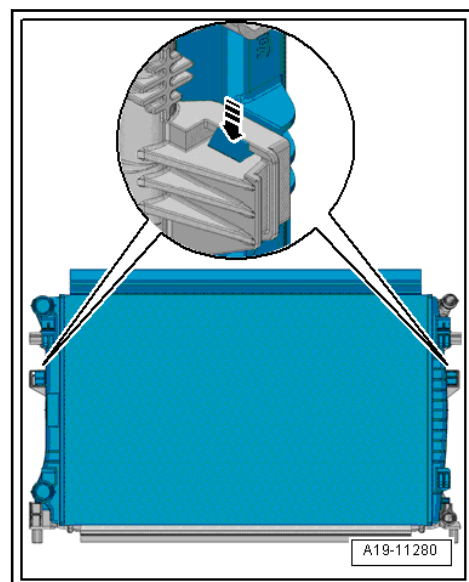




- Tie up condenser on lock carrier.
- Lift water radiator for charge air cooling circuit -1- at bottom out of radiator mountings -arrows-.



- Remove both radiators.
- If necessary, detach radiator from radiator for charge air cooling circuit.



- To do this, release catches -arrow-.

### Installing

Install in reverse order of removal, observing the following:

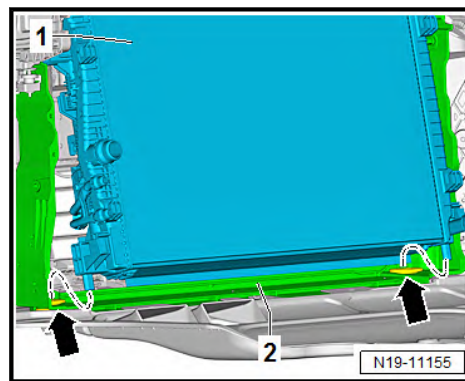


#### Note

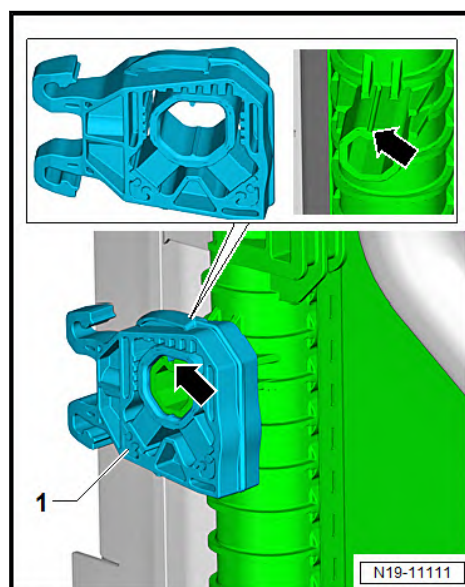
*If there are minor dents in the fins, refer to respective instructions ⇒ [r3.7 adiutor and condensers](#), page 7.*

- Check O-rings for damage, and renew them if necessary.
- Insert radiator for charge air cooling circuit -1- at bottom into radiator mountings -arrows-.

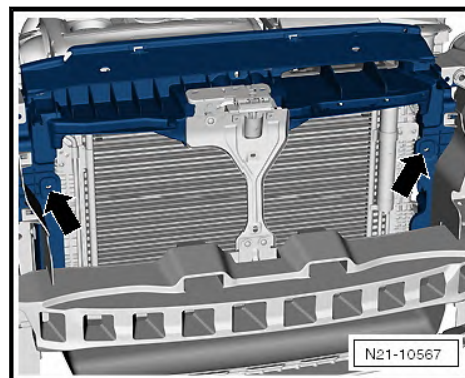




- Attach radiator to radiator for charge air cooling circuit.
- Fit radiator mountings -1- on left and right onto radiator. When doing so, note the installation position -arrow-.



- Swing water radiator for charge air cooling circuit into lock carrier. Ensure proper seating of radiator mountings in lock carrier.
- Use bolts -arrows- to secure radiator mountings, whose catches have been pinched off, to lock carrier. For bolts, refer to ⇒ Electronic parts catalogue (ETKA).



- Specified torque: 5 Nm
- Install front bumper cover ⇒ General body repairs, exterior; Rep. gr. 63; Front bumper; Removing and installing bumper cover.





- Install radiator cowl ⇒ [a4.5 nd installing radiator cowl", page 407](#) .
- Connect coolant hose with plug-in connector ⇒ [Fig. ""Connecting coolant hose with plug-in connector""", page 388](#) .
- Add coolant ⇒ [page 343](#) .

#### Specified torques

- ◆ ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation
- ◆ ⇒ [o4.1 verview - radiator/radiator fan", page 379](#)
- ◆ ⇒ [o4.2 verview - radiator cowl and radiator fan", page 388](#)
- ◆ ⇒ [o3.1 verview - air filter housing", page 470](#)

## 4.5 Removing and installing radiator cowl

⇒ [a4.5.1 nd installing radiator cowl with radiator fan, CC and Tiguan", page 407](#)

⇒ [a4.5.2 nd installing radiator cowl with radiator fan, Golf Cabriolet and Scirocco", page 409](#)

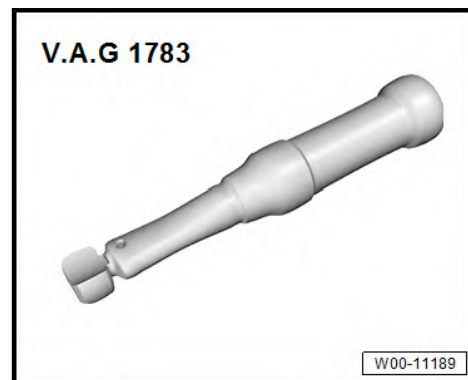
⇒ [a4.5.3 nd installing radiator cowl with radiator fan, Sharan", page 410](#)

⇒ [a4.5.4 nd installing radiator cowl, T-Roc 2018 >, Golf 2020 >, Golf Estate 2021 >", page 411](#)

### 4.5.1 Removing and installing radiator cowl with radiator fan, CC and Tiguan

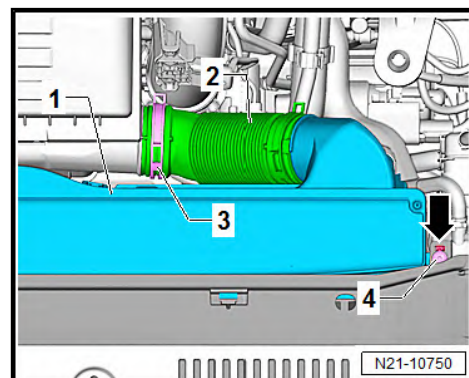
#### Special tools and workshop equipment required

- ◆ Torque wrench -V.A.G 1783-



#### Removing

- Release hose clip -3-, and pull air hose -2- off air filter housing.







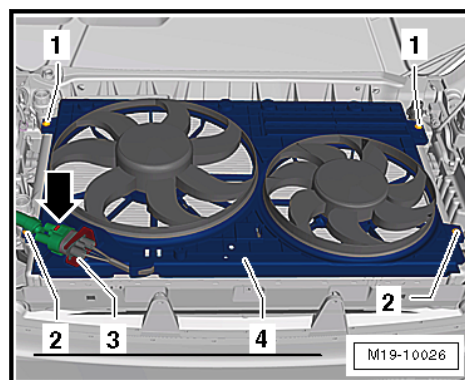
- Unscrew bolts -4- on both sides.
- Unclip air duct -1- from front end by releasing locking lugs -arrows-, and remove it.

**CAUTION**

**Danger of injury; the radiator fans can run at any time.**

- **Separate electrical connectors.**

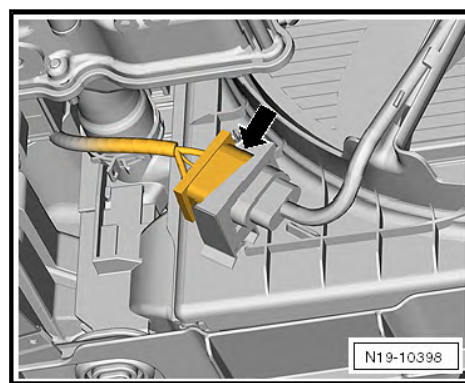
- Remove bolts -1- at top.



**Note**

*The left bolt is located below the coolant union.*

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- If fitted, unclip coolant hoses from retainers.
- Release connector -arrow- and pull off.



- Unscrew bolts -2- from below, and remove radiator cowl downwards.

**Installing**

Install in reverse order of removal.

**Specified torques**

- ♦ ⇒ [o4.2 verview - radiator cowl and radiator fan", page 388](#)
- ♦ ⇒ [o3.1 verview - air filter housing", page 470](#)
- ♦ ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation

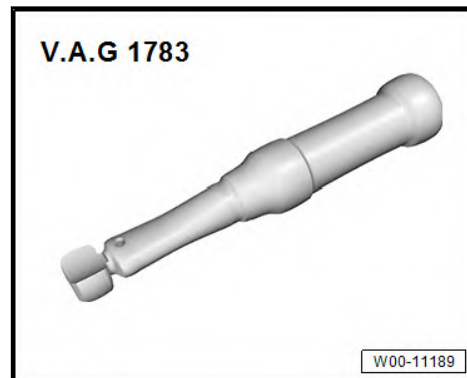




## 4.5.2 Removing and installing radiator cowl with radiator fan, Golf Cabriolet and Scirocco

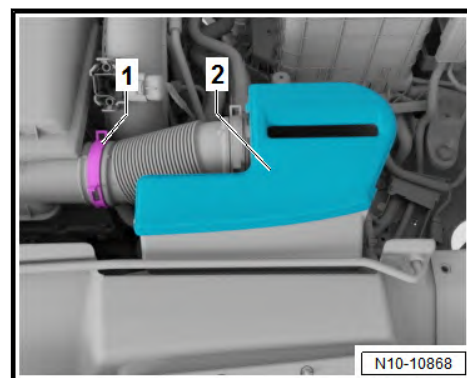
### Special tools and workshop equipment required

- ◆ Torque wrench -V.A.G 1783-



### Removing

- Release hose clip -1- and detach air intake hose.



- Unclip upper part of intake air duct -2-, and remove it.
- Unclip lower part of intake air duct, and remove it.

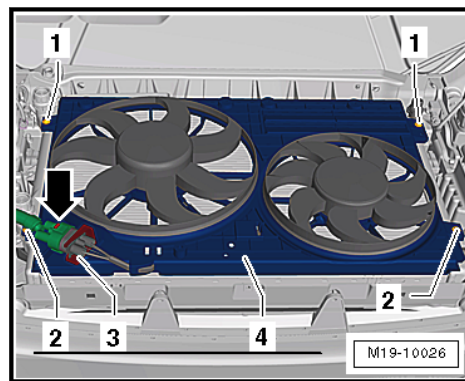
### CAUTION

**Danger of injury; the radiator fans can run at any time.**

- Separate electrical connectors.

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- If fitted, unclip coolant hoses from retainers.
- Remove bolts -1- at top.





- Release connector -arrow- and pull off.
- Unscrew bolts -2- from below, and remove radiator cowl downwards.

### Installing

Install in reverse order of removal.

### Specified torques

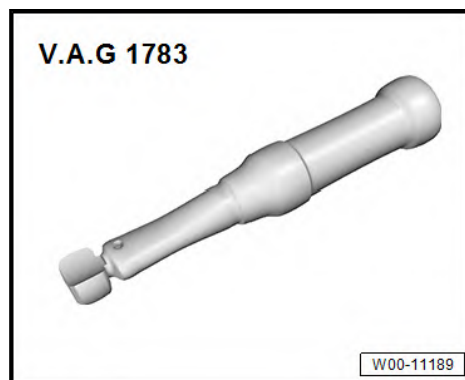
- ♦ ⇒ [o4.2 verview - radiator cowl and radiator fan", page 388](#)
- ♦ ⇒ [o3.1 verview - air filter housing", page 470](#)
- ♦ ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation

## 4.5.3 Removing and installing radiator cowl with radiator fan, Sharan

### Removing

#### Special tools and workshop equipment required

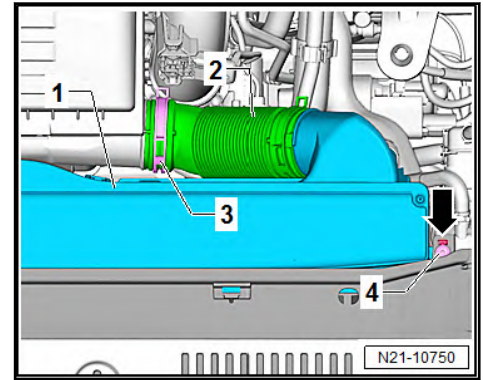
- ♦ Torque wrench -V.A.G 1783-



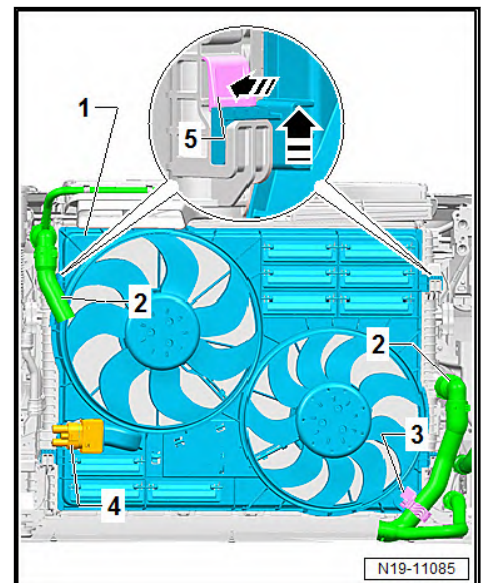
### Removing

- Release hose clip -3-, and pull air hose -2- off air filter housing.





- Unscrew bolts -4- on both sides.
- Unclip air duct -1- from front end by releasing locking lugs -arrows-, and remove it.
- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- Release and pull off connector -4-.



- Open retainer -3-, and detach coolant hose.
- Release locking lugs on top right and left in -direction of arrow-.
- Pull off radiator cowl -1- upwards, and remove it.

#### Installing

Install in reverse order of removal, observing the following:

#### Specified torques

- ◆ ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation

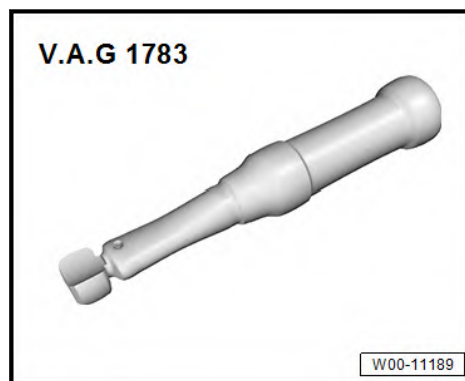
#### 4.5.4 Removing and installing radiator cowl, T-Roc 2018 ➤, Golf 2020 ➤, Golf Estate 2021 ➤

Special tools and workshop equipment required





- ◆ Torque wrench -V.A.G 1783-



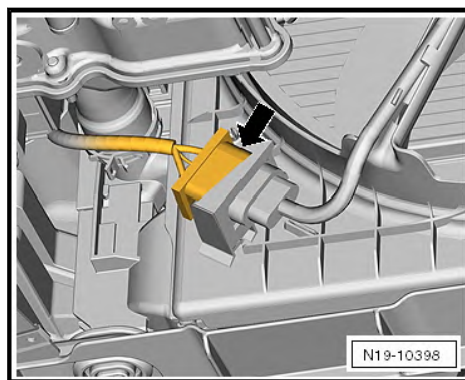
### Removing

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- Remove air duct on lock carrier ⇒ [a3.3 nd installing air guide on lock carrier](#), page 474 .

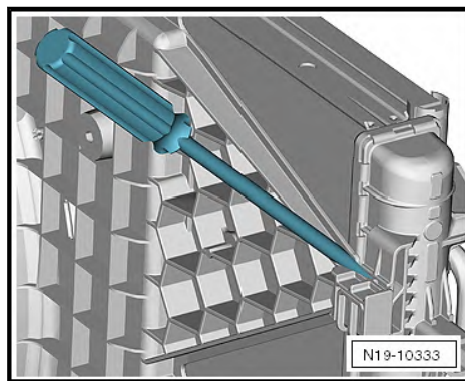
### ⚠ CAUTION

Risk of injury to hands caused radiator fan which may start automatically at any time.

- Do not reach into radiator fan when disconnecting connector.
- Release connector -arrow- and pull off.



- Using a suitable tool, release radiator cowl together with radiator fan from locking device.



- Simultaneously press locking tabs on left and right of radiator cowl.





- Pull radiator cowl together with radiator fan upwards out of mountings, and remove downwards.



#### Note

*If there are minor dents in the fins, refer to [⇒ r3.7 adiutor and condensers](#), page 7.*

#### Installing

Install in reverse order of removal, observing the following:

- Observe electrical connections and routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

#### Specified torques

- ♦ [⇒ o3.1 verview - air filter housing](#), page 470

### 4.6 Removing and installing radiator fan - V7-

[⇒ a4.6.1 nd installing radiator fanV7 and radiator fan 2V177, Golf Cabriolet, Sharan, CC and Tiguan](#), page 413

[⇒ a4.6.2 nd installing radiator fanV7 and radiator fan 2V177, Scirocco](#), page 414

[⇒ a4.6.3 nd installing radiator fanV7, T-Roc 2018 >, Golf 2020 >, Golf Estate 2021 >](#), page 414

#### 4.6.1 Removing and installing radiator fan -V7- and radiator fan 2 -V177-, Golf Cabriolet, Sharan, CC and Tiguan

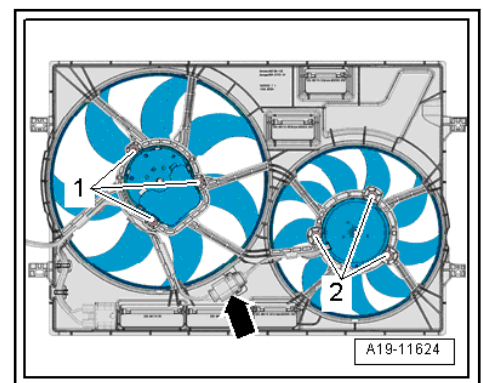
##### Removing



#### CAUTION

Risk of injury to hands caused radiator fan which may start automatically at any time.

- Do not reach into radiator fan when disconnecting connector.
- Remove radiator cowl [⇒ a4.5 nd installing radiator cowl](#), page 407.
- Separate electrical connector -arrow-.



- Unscrew bolts -1-, and remove radiator fan -V7-.
- Unscrew bolts -2-, and remove radiator fan -V177-.





## Installing

Install in reverse order of removal, observing the following:

- Install radiator cowl ➤ [a4.5 nd installing radiator cowl", page 407](#).

## Specified torques

- ♦ ➤ [o4.2 verview - radiator cowl and radiator fan", page 388](#)

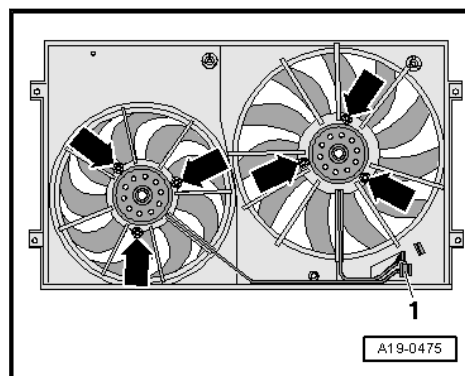
## 4.6.2 Removing and installing radiator fan - V7- and radiator fan 2 -V177-, Scirocco

### Removing

#### CAUTION

Risk of injury to hands caused radiator fan which may start automatically at any time.

- Do not reach into radiator fan when disconnecting connector.
- Remove radiator cowl ➤ [a4.5 nd installing radiator cowl", page 407](#).
- Move clear lines -1-.



- Unscrew nuts -arrows-, and remove fans.

Install in reverse order of removal, observing the following:

- Install radiator cowl ➤ [a4.5 nd installing radiator cowl", page 407](#).

## Specified torques

- ♦ ➤ [o4.2 verview - radiator cowl and radiator fan", page 388](#)

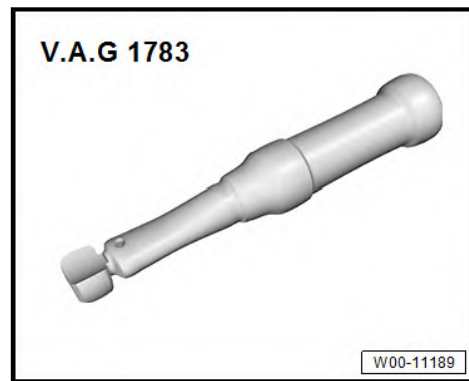
## 4.6.3 Removing and installing radiator fan - V7-, T-Roc 2018 ➤, Golf 2020 ➤, Golf Estate 2021 ➤

Special tools and workshop equipment required





- ◆ Torque wrench -V.A.G 1783-



## Removing



### Note

*Reinstall all cable ties in the same locations when installing.*

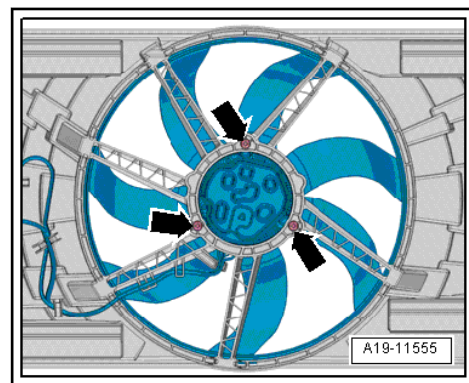
- Remove radiator cowl ⇒ [a4.5 nd installing radiator cowl", page 407](#) .



### CAUTION

**Risk of injury to hands caused radiator fan which may start automatically at any time.**

- Do not reach into radiator fan when disconnecting connector.
- Disconnect electrical connector.



- Unscrew bolts -arrows- and remove radiator fan -V7-.

## Installing

Install in reverse order of removal, observing the following:

- Install radiator cowl ⇒ [a4.5 nd installing radiator cowl", page 407](#) .

## Specified torques

- ◆ ⇒ [o4.2 verview - radiator cowl and radiator fan", page 388](#)





## 21 – Turbocharging/supercharging

### 1 Turbocharger

⇒ [o1.1 verview - turbocharger", page 416](#)

⇒ [a1.2 nd installing turbocharger", page 420](#)

⇒ [a1.3 nd installing charge pressure positionerV465", page 426](#)

⇒ [a1.4 nd installing connection for turbocharger", page 429](#)

#### 1.1 Assembly overview - turbocharger

⇒ [o1.1.1 verview - turbocharger, version 1", page 416](#)

⇒ [o1.1.2 verview - turbocharger, version 2", page 417](#)

⇒ [o1.1.3 verview - lines on turbocharger", page 419](#)

##### 1.1.1 Assembly overview - turbocharger, version 1





## 1 - Turbocharger

- ☐ Removing and installing ⇒ [a1.2 nd installing turbocharger](#), page 420

### 2 - Bolt

- ☐ 8 Nm

### 3 - Connection

### 4 - O-ring

- ☐ Renew after removal

### 5 - Seal

- ☐ Renew after removal

### 6 - Heat shield

### 7 - Bolt

- ☐ 25 Nm

### 8 - Bolt

- ☐ 8 Nm

### 9 - Nut

- ☐ Renew after removal
- ☐ 14 Nm

### 10 - Bolt

- ☐ Renew after removal
- ☐ 9 Nm

### 11 - Retaining clip

- ☐ Renew after removal

### 12 - Operating lever

### 13 - Lock nut

- ☐ Secure with sealing paint
- ☐ 6 Nm

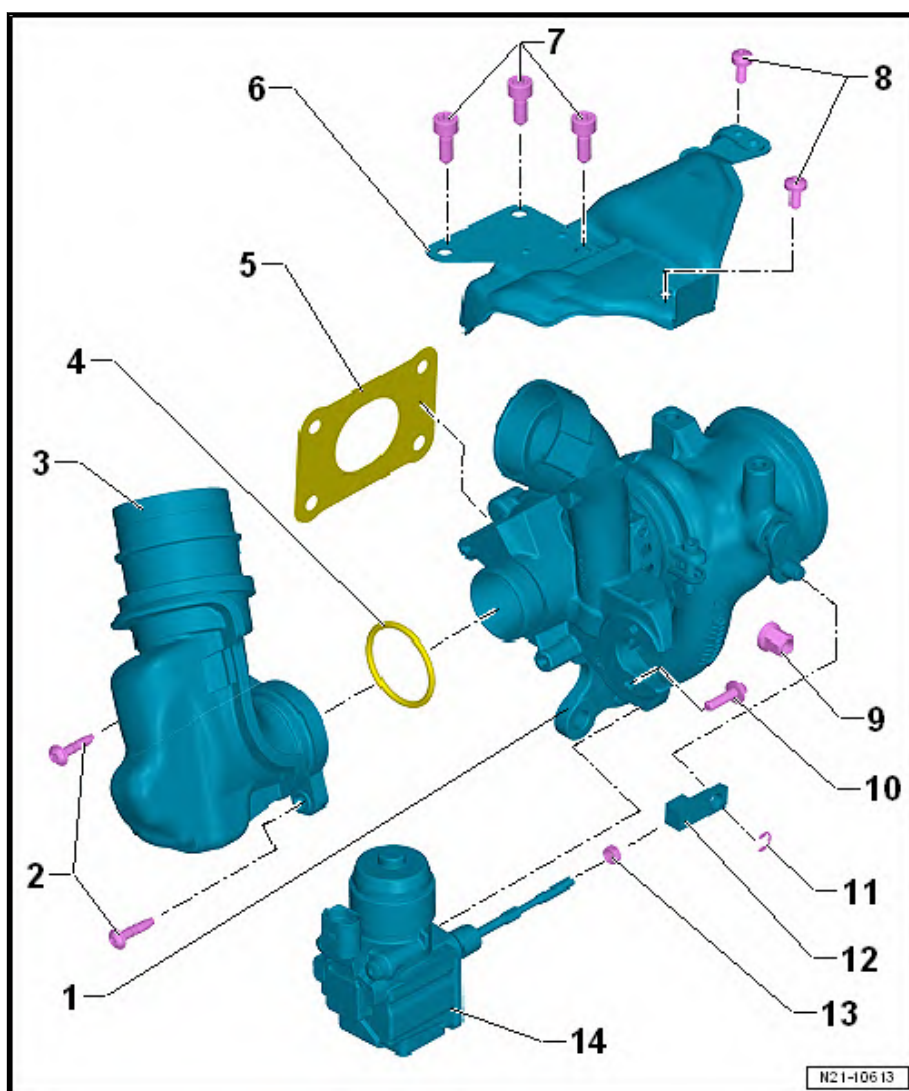
### 14 - Charge air pressure controller -V465-



#### Note

- ◆ *Note the following when installing!*
- ◆ *There may be different types of charge air pressure controllers installed.*

- ☐ Removing and installing ⇒ [a1.3 nd installing charge pressure positionerV465](#), page 426



## 1.1.2 Assembly overview - turbocharger, version 2





**1 - Bolt**

- 25 Nm

**2 - Bolt/nut**

- 8 Nm

**3 - Heat shield**

**4 - Turbocharger**

- Removing and installing ⇒ [a1.2 nd installing turbocharger](#)", page 420

**5 - Nut**

- Renew
- 14 Nm

**6 - Retaining clip**

- Renew

**7 - Operating lever**

**8 - Control rod**

**9 - Lock nut**

- 6 Nm
- Secure with sealing paint

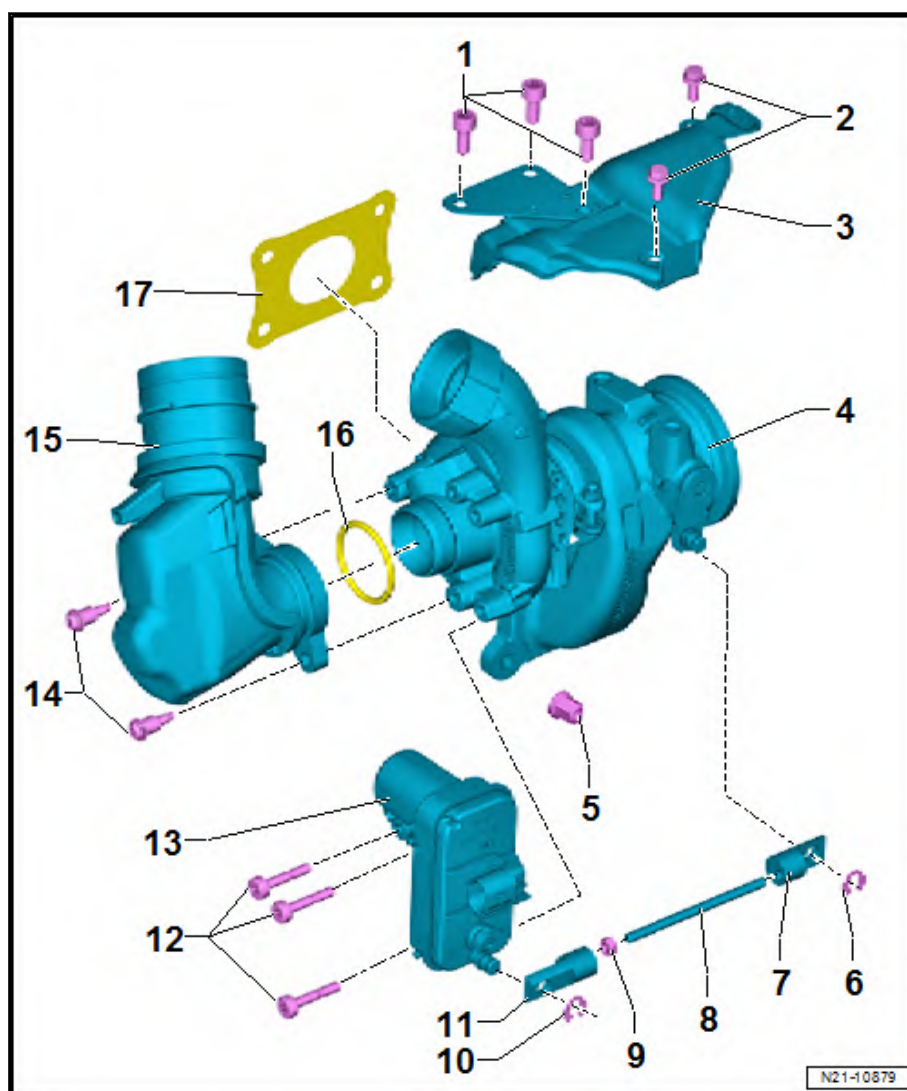
**10 - Retaining clip**

- Renew

**11 - Operating lever**

**12 - Bolt**

- Qty. 3 ⇒ Electronic parts catalogue (ET-KA).
- 8 Nm +45°



**Note**

*If one or more of the bolts are loose, always renew all 3 bolts*

**13 - Charge air pressure controller -V465-**



**Note**

- ◆ *Note the following when installing!*
- ◆ *There may be different types of charge air pressure controllers installed.*

- Removing and installing ⇒ [a1.3 nd installing charge pressure positionerV465](#)", page 426

**14 - Bolt**

- 8 Nm

**15 - Union**

- Removing and installing ⇒ [a1.4 nd installing connection for turbocharger](#)", page 429

**16 - O-ring**





☐ Renew

#### **17 - Seal**

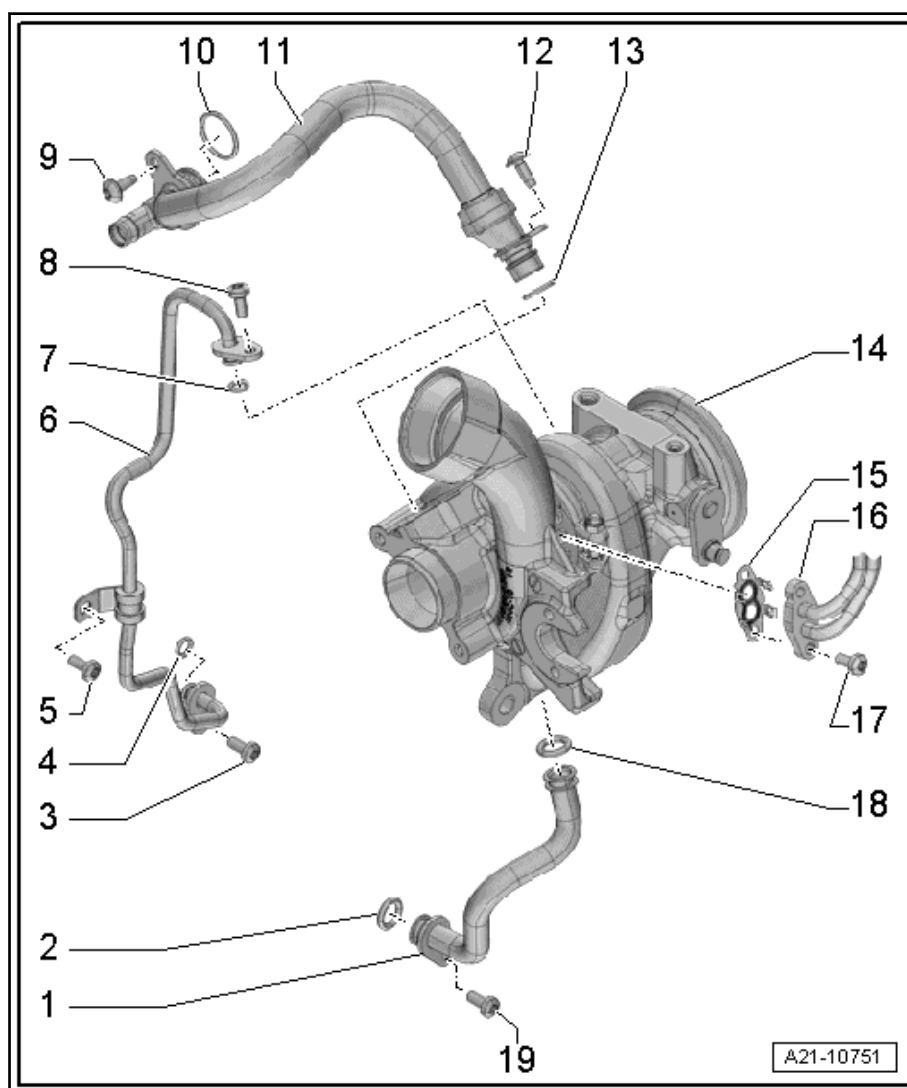
☐ Renew

### **1.1.3 Assembly overview - lines on turbocharger**





- 1 - Oil return line
- 2 - O-ring
  - ☐ Renew after removal
- 3 - Bolt
  - ☐ 9 Nm
- 4 - O-ring
  - ☐ Renew after removal
- 5 - Bolt
  - ☐ 9 Nm
- 6 - Oil supply line
- 7 - O-ring
  - ☐ Renew after removal
- 8 - Bolt
  - ☐ 9 Nm
- 9 - Bolt
  - ☐ Renew after removal
  - ☐ 5 Nm
- 10 - O-ring
  - ☐ If damaged, renew crankcase breather hose ⇒ [Item 11 \(page 420\)](#)
- 11 - Hose
  - ☐ For crankcase ventilation.
- 12 - Bolt
  - ☐ Renew after removal
  - ☐ 5 Nm
- 13 - O-ring
  - ☐ If damaged, renew crankcase breather hose ⇒ [Item 11 \(page 420\)](#)
- 14 - Turbocharger
  - ☐ Removing and installing ⇒ [a1.2 nd installing turbocharger", page 420](#)
- 15 - Seal
  - ☐ Renew after removal
- 16 - Coolant lines
  - ☐ Supply and return
- 17 - Bolt
  - ☐ 8 Nm
- 18 - O-ring
  - ☐ Renew after removal
- 19 - Bolt
  - ☐ 9 Nm



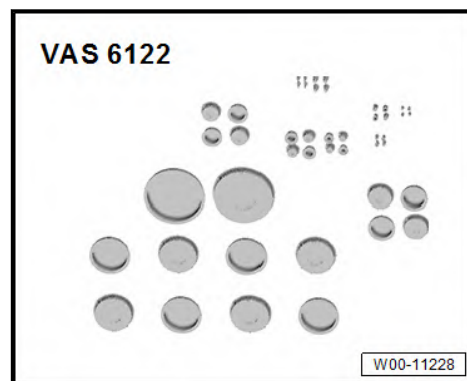
## 1.2 Removing and installing turbocharger

Special tools and workshop equipment required





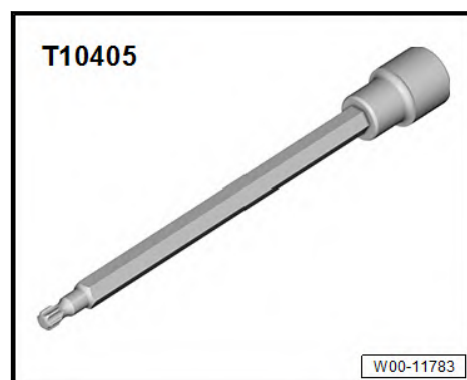
- ◆ Engine bung set -VAS 6122-



- ◆ Spring-type clip pliers -VAS 6362-



- ◆ Socket Torx T 30 -T10405-



#### Vehicles with all-wheel drive:

- ◆ Open jaw socket tool AF13 -V.A.G 1331/14-
- ◆ Torque wrench -V.A.G 1410-



- ◆ Socket/bit set -VAS 6928-



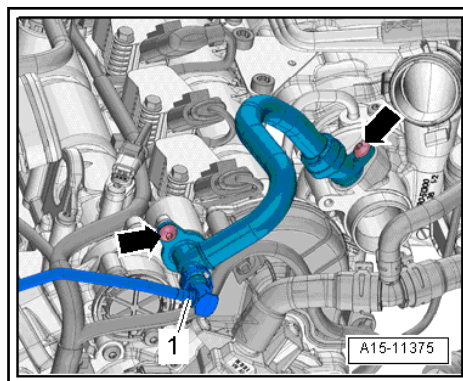


## Removing



### Note

- ◆ *Fit all heat shield sleeves in the same place when installing.*
- ◆ *If a mechanical fault is discovered on the turbocharger (e.g. a destroyed compressor impeller), it is not sufficient to just renew the turbocharger. To avoid any subsequent damage, the following work must be carried out:*
- ◆ *Check air filter housing, air filter element and air inlet hoses for contamination.*
- ◆ *Check the whole charge air path and charge air cooler for foreign objects.*
- ◆ *If foreign objects are discovered in the charge air system, clean the charge air path and, if necessary, renew the charge air cooler.*
- Remove resonator for intake air ⇒ [a3.4 nd installing resonator for intake air](#), page 476 .
- Remove air pipe ⇒ [a2.5 nd installing air pipe](#), page 441 .
- Remove connection for turbocharger ⇒ [a1.4 nd installing connection for turbocharger](#), page 429 .
- Press release tabs and disconnect hose -1- for activated charcoal filter.



- Unscrew bolts -arrows- and remove crankcase breather hose.



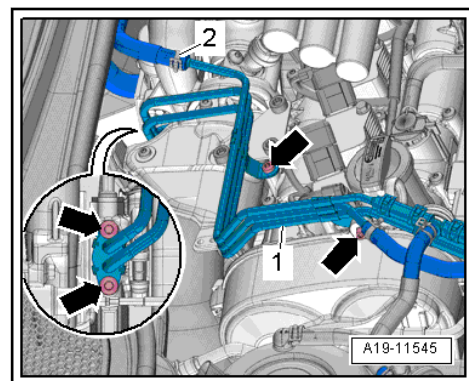
### Note

*Risk of chemical damage to the coolant pump gasket caused by oil entering between the coolant pump and the cylinder head.*

- Cover coolant pump with a cloth.

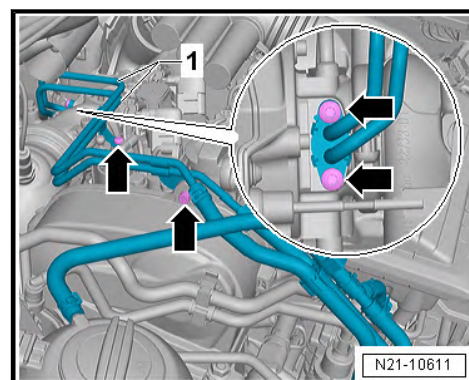


#### Vehicles with 3 coolant lines:



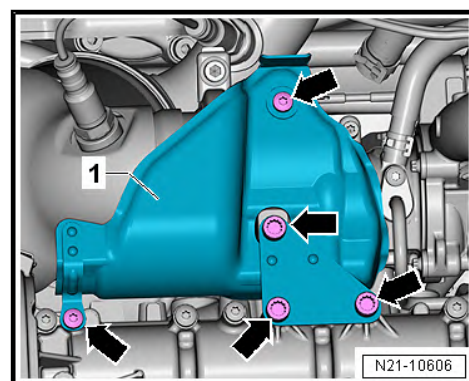
- Release hose clip -2- and detach coolant hose.
- Remove bolts -arrows- and pivot coolant lines -1- to right side.

#### Vehicles with 2 coolant lines:



- Remove bolts -arrows- and pivot coolant lines -1- to right side.

#### Continued for all vehicles:



- Unscrew bolts and nuts -arrows- and remove heat shield -1-.
- Drain coolant ➔ [a1.3 nd adding coolant", page 340](#) .

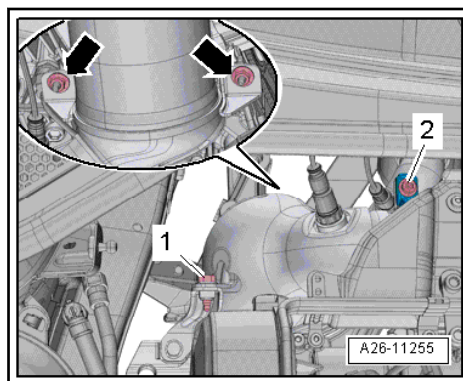
#### Vehicles with front-wheel drive:

- Remove heat shield for drive shaft ➔ Running gear, axles, steering; Rep. gr. 40; Drive shaft; Removing and installing drive shaft heat shield.



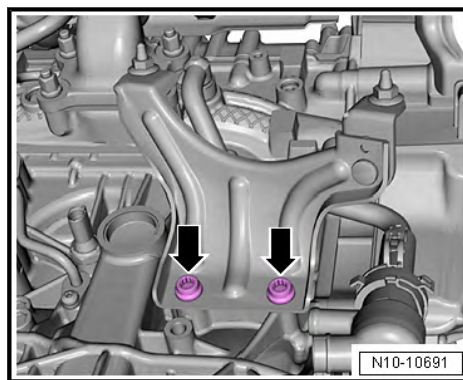


**Continued for all vehicles:**



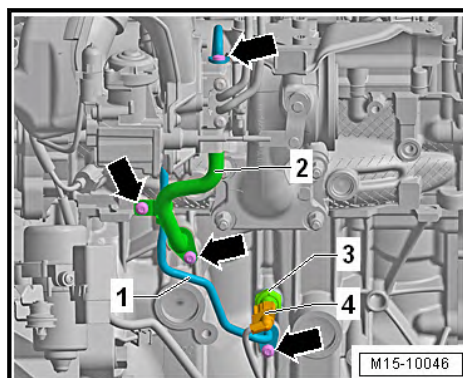
- Unscrew bolt -2- and remove screw-type clip.
- Remove bolt -1- and nuts -arrows- and tie up catalytic converter.

**Vehicles with all-wheel drive:**



- If fitted, remove centre underbody cladding ⇒ General body repairs, exterior; Rep. gr. 66; Underbody cladding; Overview of fitting locations - trims.
- Unscrew bolts -arrows- of bracket.
- Remove bracket.

**Continued for all vehicles:**



- Detach heat-shield sleeve from electrical connector -4-.
- Release and pull off electrical connector -4- on oil pressure switch for reduced oil pressure -F378-.
- Lay cloth around flange of oil lines.





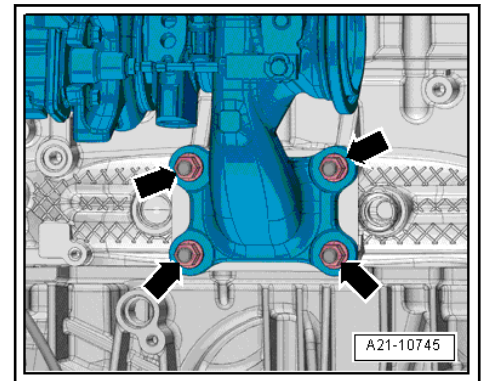
- Remove bolts -arrows- and detach oil supply line -1- and oil return line -2-.

#### Vehicles with all-wheel drive:

- Unscrew lower bolt for oil supply line -1- using T 30 Torx socket -T10405-.

#### Continued for all vehicles:

- Disconnect exhaust system. ➔ [e1.2 exhaust pipes from silencers", page 546](#)

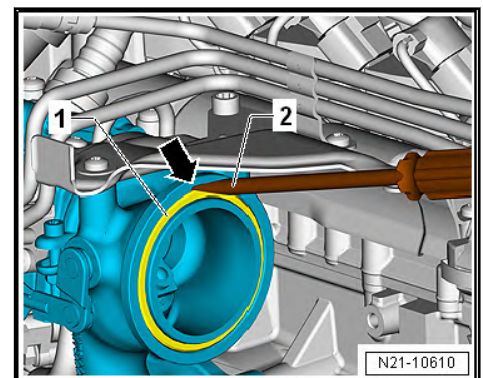


- Unscrew nuts -arrows- and remove turbocharger.

#### Installing

Install in reverse order of removal, observing the following:

- Insert screwdriver -2- in recess -arrow- on turbocharger.



- Lever out seal -1-.
- Renew seals, O-rings and securing nuts of cylinder head.
- Renew clamps for attaching catalytic converter to turbocharger.
- When installing, align screw-type clip on catalytic converter/turbocharger in such a way that the bolt is accessible with a torque wrench.
- Fill turbocharger with engine oil at connection for oil supply line.
- Secure all hose connections with hose clips corresponding to the series equipment ➔ Electronic parts catalogue.
- After installing turbocharger, run engine for about 1 minute at idling speed to ensure that oil is supplied to turbocharger.
- For electrical connections and routing refer to ➔ Current flow diagrams, Electrical fault finding and Fitting locations.





- Add coolant ⇒ [page 347](#) .

If a new turbocharger with charge pressure positioner has been installed:

- Adapt engine control unit -J623- to charge pressure positioner -V465- using ⇒ Vehicle diagnostic tester.
- Select 0001 - Adaption of charge pressure positioner V465.

#### Specified torques

- ♦ ⇒ [o1.1 verview - turbocharger", page 416](#)
- ♦ ⇒ [o2.1 verview - charge air system", page 433](#)
- ♦ ⇒ [Fig. "“Installing catalytic converter - specified torque and sequence”", page 570](#)
- ♦ ⇒ Running gear, axles, steering; Rep. gr. 40; Drive shaft; Assembly overview - drive shaft

### 1.3 Removing and installing charge pressure positioner -V465-

⇒ [a1.3.1 nd installing charge pressure positionerV465, version 1", page 426](#)

⇒ [a1.3.2 nd installing charge pressure positionerV465, version 2", page 428](#)

#### 1.3.1 Removing and installing charge pressure positioner -V465-, version 1



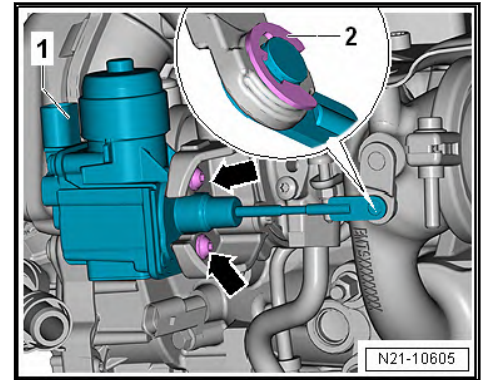
#### Note

- ♦ *Different versions of charge pressure positioner have been installed.*
- ♦ *They have different securing points.*
- ♦ *Before installing, visually check which version applies for the purposes of repair.*

#### Removing

- Switch off ignition.
- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- If fitted, remove heat shield for right drive shaft ⇒ Running gear, axles, steering; Rep. gr. 40; Drive shaft; Removing and installing drive shaft heat shield.
- Disconnect electrical connector -1-.





- Pull off securing clip -2- using locking tool -T40265-.
- Remove bolts -arrows- and detach charge pressure positioner -V465-.

### Installing

Install in reverse order of removal, observing the following:

Always renew securing bolts and the securing clip.



### Note

*There may be different types of charge air pressure controllers installed.*

### Charge air pressure controller without adjustable linkage

- Adapt engine control unit -J623- to charge pressure positioner -V465- using ⇒ Vehicle diagnostic tester; “Guided functions”.
- Switch on ignition and select the following menu options on vehicle diagnostic tester:

◆ **0001 - Adaption charge pressure positioner V465**

### Charge air pressure controller with adjustable linkage

- Fit thread of charge pressure positioner -V465- at central position in joint element.
- Adjust charge pressure positioner -V465- ⇒ Vehicle diagnostic tester.
- Switch on ignition and select the following menu options on vehicle diagnostic tester:

◆ **0001 - Setting charge pressure positioner V465**

- Adjust to specified value by turning linkage. For specified value, see ⇒ Vehicle diagnostic tester.
- Tighten lock nut to 6 Nm and secure with sealing paint.

### Specified torques

- ◆ ⇒ [o1.1 verview - turbocharger”, page 416](#)
- ◆ ⇒ [o2.1 verview - charge air system”, page 433](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation
- ◆ ⇒ Running gear, axles, steering; Rep. gr. 40; Drive shaft; Assembly overview - drive shaft





### 1.3.2 Removing and installing charge pressure positioner -V465-, version 2

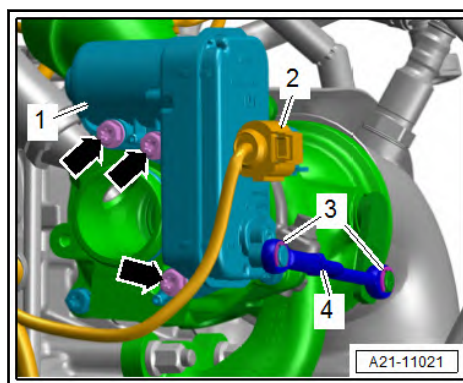


#### Note

- ◆ Different versions of charge pressure positioner have been installed.
- ◆ They have different securing points.
- ◆ Before installing, visually check which version applies for the purposes of repair.

#### Removing

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- If fitted, remove heat shield for right drive shaft ⇒ Running gear, axles, steering; Rep. gr. 40; Drive shaft; Removing and installing drive shaft heat shield.
- Remove resonator for intake air. ⇒ [a3.4 nd installing resonator for intake air](#), page 476
- Remove air pipe ⇒ [a2.5 nd installing air pipe](#), page 441 .
- Remove connection for turbocharger ⇒ [a1.4 nd installing connection for turbocharger](#), page 429 .
- Pull off securing clips -3-, and remove operating lever -4-.



- Unscrew bolts -arrows-.
- Disconnect connector -2-, and remove charge pressure positioner -V465- -1-.

#### Installing

Install in reverse order of removal, observing the following:

Always renew securing bolts and the securing clip.



#### Note

*There may be different types of charge air pressure controllers installed.*





### Charge air pressure controller without adjustable linkage

- Adapt engine control unit -J623- to charge pressure positioner -V465- using ⇒ Vehicle diagnostic tester; “Guided functions”.
- Switch on ignition and select the following menu options on vehicle diagnostic tester:

◆ 0001 - Adaption charge pressure positioner V465

### Charge air pressure controller with adjustable linkage

- Fit thread of charge pressure positioner -V465- at central position in joint element.
- Adjust charge pressure positioner -V465-: ⇒ Vehicle diagnostic tester
- Switch on ignition and select the following menu options on vehicle diagnostic tester:

◆ 0001 - Setting charge pressure positioner V465

- Adjust to specified value by turning linkage. For specified value, see ⇒ Vehicle diagnostic tester.
- Tighten lock nut to 6 Nm and secure with sealing paint.

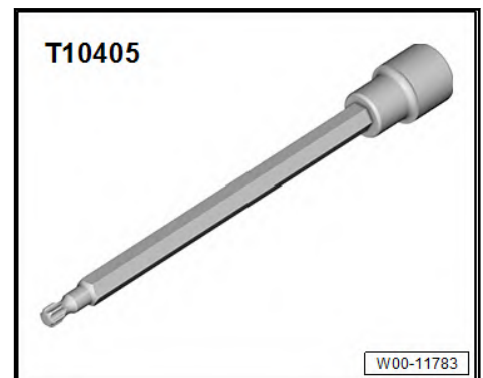
### Specified torques

- ◆ ⇒ [o1.1 verview - turbocharger”, page 416](#)
- ◆ ⇒ [o2.1 verview - charge air system”, page 433](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation
- ◆ ⇒ Running gear, axles, steering; Rep. gr. 40; Drive shaft; Assembly overview - drive shaft

## 1.4 Removing and installing connection for turbocharger

### Special tools and workshop equipment required

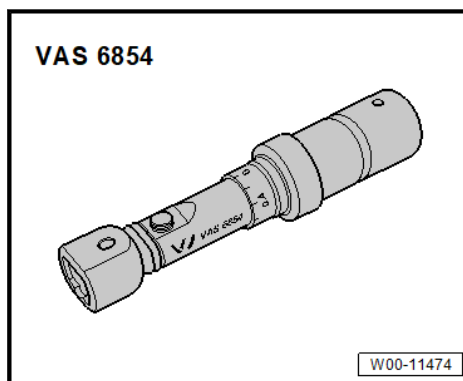
- ◆ Socket Torx T 30 -T10405-



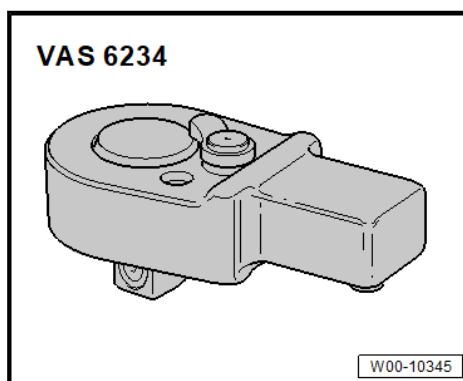




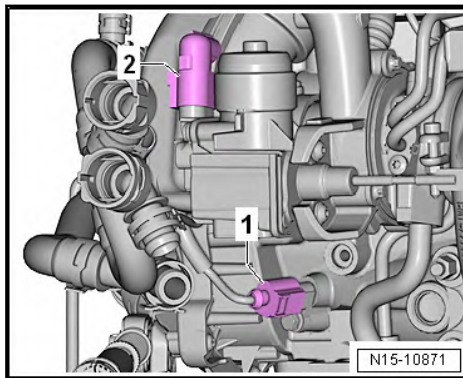
- ◆ Torque wrench -VAS 6854-



- ◆ Ratchet insert 1/4" -VAS 6234-



- Remove resonator for intake air ⇒ [a3.4 nd installing resonator for intake air", page 476](#) .
- Remove air pipe ⇒ [a2.5 nd installing air pipe", page 441](#) .
- Release and pull off electrical connectors -1- on coolant temperature sender -G62-.



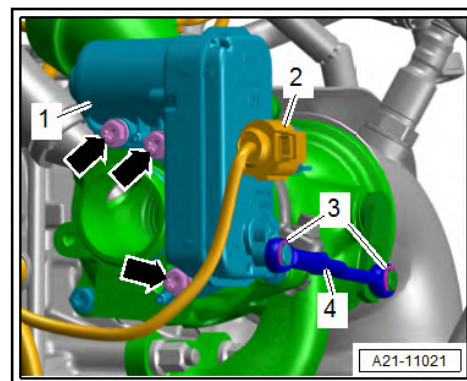
**Vehicles with charge pressure sender -V465-, version 1:**

- Release and pull off connectors -2- on charge pressure sender -V465- .





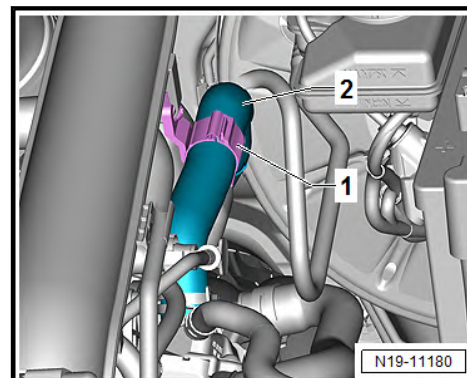
# **Vehicles with charge pressure sender -V465-, version 2:**



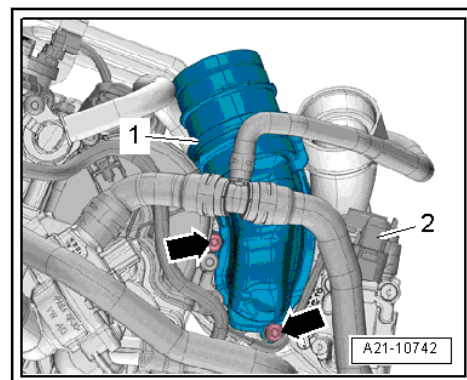
- Release and pull off connectors -2- on charge pressure sender -V465- .

## **Continued for all vehicles:**

- Lay wiring harness to one side.
- Open hose clip -1- and push coolant hose -2- to one side.



- Remove bolts -arrows- and detach connection -1-.



## **Installing:**

Install in reverse order of removal, observing the following:





#### Note

- ◆ *Renew seals, O-rings and securing nuts of cylinder head.*
- ◆ *Before installing, lightly moisten O-rings with clean engine oil.*
- ◆ *Secure all hose connections with hose clips corresponding to the series equipment ⇒ Electronic parts catalogue.*

#### Specified torques

- ◆ [⇒ o1.1 verview - turbocharger", page 416](#)





## 2 Charge air system

⇒ [o2.1 verview - charge air system", page 433](#)

⇒ [a2.2 nd installing charge air cooler", page 435](#)

⇒ [a2.3 nd installing charge pressure senderGX26", page 438](#)

⇒ [c2.4 harge air system for leaks", page 439](#)

⇒ [a2.5 nd installing air pipe", page 441](#)

### 2.1 Assembly overview - charge air system



#### Note

*Before performing any checks or any repair work, make sure that all air pipes, air hoses and vacuum lines are firmly seated and leak-tight.*





#### 1 - O-ring

- ☐ Renew after removal
- ☐ Before installing, lightly moisten O-ring with clean engine oil

#### 2 - Union

#### 3 - O-ring

- ☐ Renew after removal
- ☐ Before installing, lightly moisten O-ring with clean engine oil

#### 4 - Air intake pipe

- ☐ Removing and installing ⇒ [a2.5 nd installing air pipe", page 441](#)

#### 5 - Charge air pressure sender -GX26-

- ☐ Consisting of  
Charge pressure sender -G31-

Intake air temperature sender -G42-

- ☐ Removing and installing ⇒ [a2.3 nd installing charge pressure senderGX26", page 438](#)

#### 6 - O-ring

- ☐ Not available separately
- ☐ If damaged, renew charge pressure sender -GX26-

#### 7 - O-ring

- ☐ Renew after removal
- ☐ Before installing, lightly moisten O-ring with clean engine oil

#### 8 - Bolt

- ☐ Thread-cutting
- ☐ Fit and screw in bolt by hand to ensure it is screwed into old thread. Then tighten bolt to specified torque
- ☐ 7 Nm

#### 9 - Retaining clip

- ☐ For air intake pipe

#### 10 - Throttle valve module -GX3-

- ☐ Consisting of

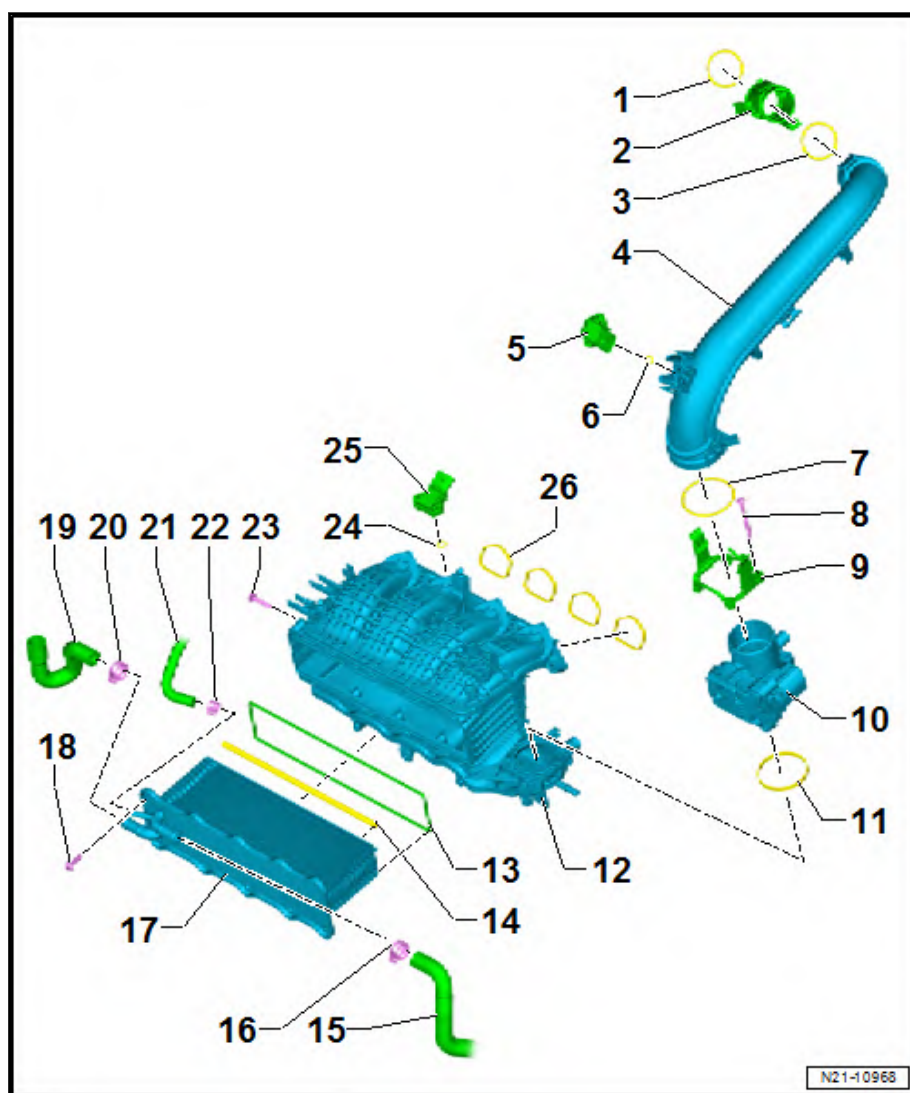
Throttle valve module -J338-

Throttle valve drive for electronic power control -G186-

Throttle valve drive angle sender 1 for electronic power control -G187-

Throttle valve drive angle sender 2 for electronic power control -G188-

- ☐ Removing and installing ⇒ [a4.3 nd installing throttle valve moduleGX3", page 484](#)







#### 11 - Seal

- ☐ Renew after removal

#### 12 - Intake manifold

Removing and installing ⇒ [a4.2 nd installing intake manifold", page 481](#)

#### 13 - Seal

- ☐ Renew

#### 14 - Sealing lip

- ☐ Renew after removal
- ☐ Before installing, moisten lightly with clean engine oil.

#### 15 - Coolant hose

#### 16 - Clip

#### 17 - Charge air cooler

- ☐ Removing and installing ⇒ [a2.2 nd installing charge air cooler", page 435](#)
- ☐ Change coolant after renewing

#### 18 - Bolt

- ☐ Thread-cutting
- ☐ Fit and screw in bolt by hand to ensure it is screwed into old thread. Then tighten bolt to specified torque
- ☐ 15 Nm

#### 19 - Coolant hose

#### 20 - Clip

#### 21 - Coolant hose

#### 22 - Clip

#### 23 - Bolt

- ☐ Specified torque and tightening sequence ⇒ [o4.1 verview - intake manifold", page 478](#)

#### 24 - O-ring

- ☐ Renew

#### 25 - Intake manifold sender -GX9-

- ☐ Consisting of
  - Intake air temperature sender 2 -G299-
  - Intake manifold pressure sender -G71-

- ☐ Removing and installing ⇒ [a5.1 nd installing intake manifold senderGX9", page 487](#)

#### 26 - Seal

- ☐ Qty. 4
- ☐ Renew after removal

## 2.2 Removing and installing charge air cooler

Special tools and workshop equipment required





- ◆ Hose clamps to 25 mm -3094-



- ◆ Drip tray for workshop hoist -VAS 6208-

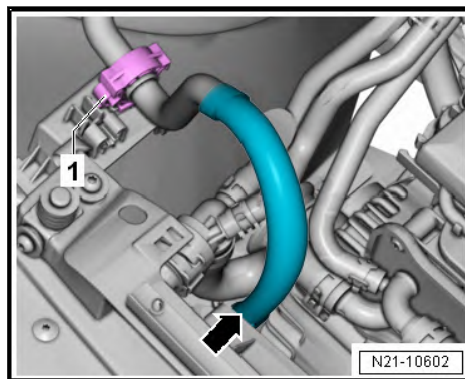


- ◆ Spring-type clip pliers -VAS 6362-



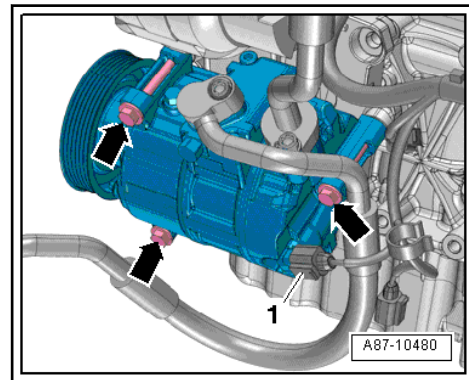
## Removing

- Remove radiator cowl ➔ [a4.5 nd installing radiator cowl", page 407](#).
- Open clip -1- and push hose -arrow- to one side.

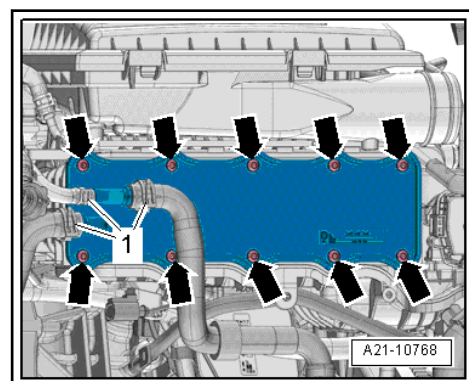


- Disconnect connector -1-.

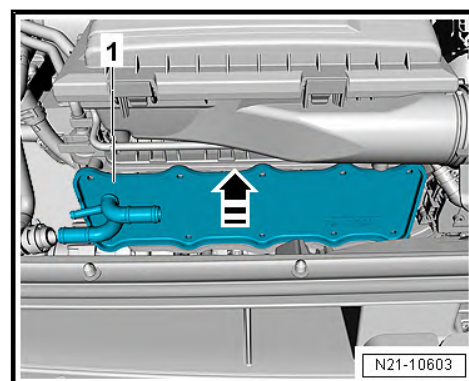




- Remove air conditioner compressor from bracket -arrows-, and secure it on vehicle ⇒ Heating, air conditioning; Rep. gr. 87; Air conditioner compressor; Removing air conditioner compressor from and installing to bracket.
- Place drip tray for workshop hoist -VAS 6208- underneath.
- Clamp off coolant hose on charge air cooler with hose clips, up to 25 mm -VAS 3094-.
- Release hose clip -1- and remove coolant hose.



- Unscrew bolts -arrows-.
- Pull charge air cooler -1- evenly towards front (in -direction of arrow-) out of intake manifold.

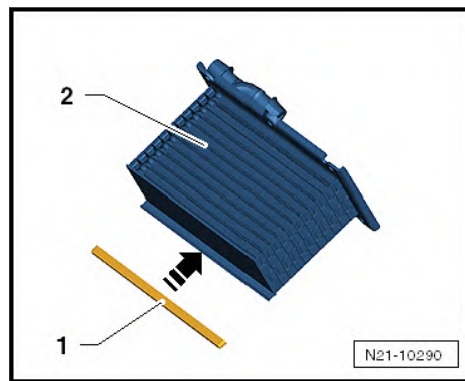


## Installing

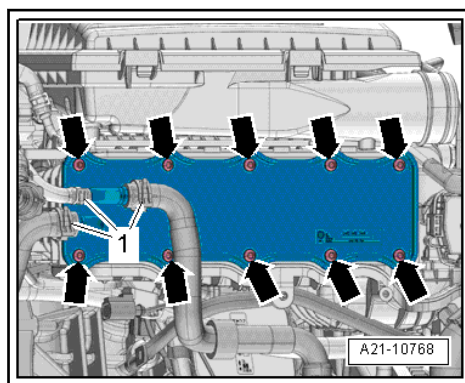
Install in reverse order of removal, observing the following:

- Fit sealing lip -1- in -direction of arrow- onto charge air cooler -2-.





- Insert new gasket into groove on intake manifold.
- Tighten bolts -arrows- alternately and diagonally working from centre outwards.



- Install hose clips -1-.



#### Note

*If there are minor dents in the fins, refer to [⇒ r3.7 adiater and condensers](#), page 7 .*

- Install radiator cowl [⇒ a4.5 nd installing radiator cowl](#), page 407 .
- Check coolant level [⇒ page 347](#) .

#### Specified torques

- ♦ [⇒ o2.1 verview - charge air system](#), page 433
- ♦ [⇒ Heating, air conditioning system; Rep. gr. 87; Air conditioning compressor; Removing and installing air conditioning compressor from bracket](#)

## 2.3 Removing and installing charge pressure sender -GX26-

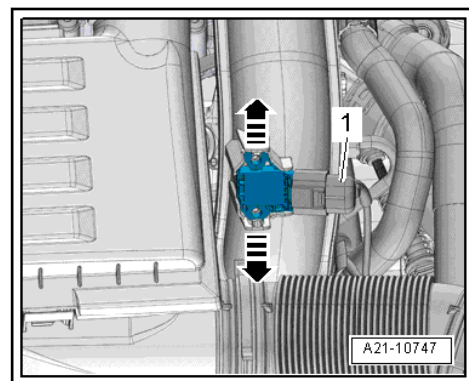
Charge pressure sender -GX26- consists of:

- ♦ Charge pressure sender -G31-
- ♦ Intake air temperature sender -G42-





## Removing



- Disconnect electrical connector -1-.
- Release fasteners -arrows-, and remove charge pressure sender -GX26-.

## Installing

Install in reverse order of removal, observing the following:



### Note

- ◆ *Renew O-ring.*
- ◆ *If the retaining tabs broke off during removal, the sender can be mounted using two securing bolts ⇒ Electronic parts catalogue.*

## Specified torques

Component	Specified torque
Charge pressure sender - GX26-	3 Nm

## 2.4 Checking charge air system for leaks

### Special tools and workshop equipment required

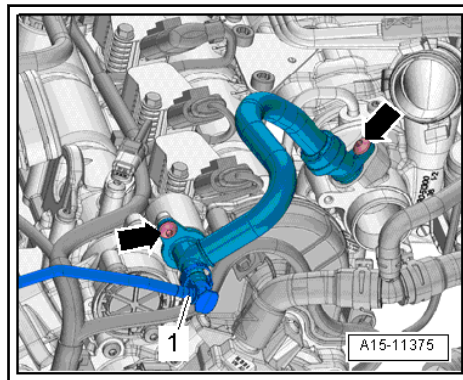
- ◆ Charge air system tester -V.A.G 1687-



### Sequence of operations

- Remove resonator for intake air. ⇒ [a3.4 nd installing resonator for intake air](#), page 476
- Press release tabs and disconnect hose -1- for activated charcoal filter.

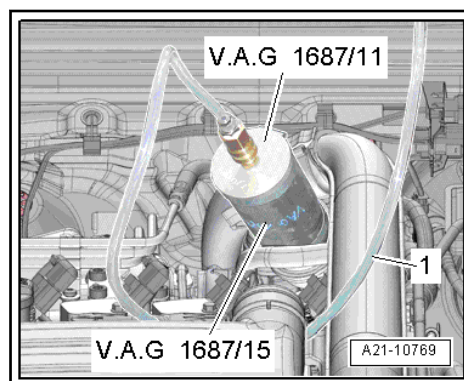




#### Note

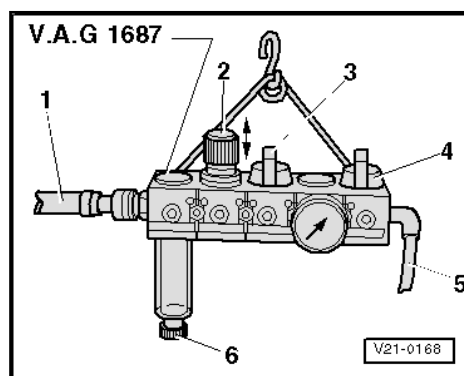
*Risk of chemical damage to coolant pump seal from oil ingress between coolant pump and cylinder head.*

- Unscrew bolts -arrows- and remove crankcase breather hose.
- Seal opening in turbocharger with suitable bung from engine bung set -VAS 6122-.
- Connect adapter -V.A.G 1687/15- with adapter -V.A.G 1687/11- to turbocharger.



- Connect hose -1- of charge air system tester -V.A.G 1687- to adapter.

Prepare charge air system tester -V.A.G 1687- as follows:



- Completely unscrew pressure regulating valve -2-, close valves -3- and -4-.





- To turn pressure regulating valve -2-, rotary knob must be pulled upwards.
- Connect charge air system tester -V.A.G 1687- to compressed air -1- via commercial adapter.



#### Note

*If there is water in inspection glass, drain via drain screw -6-.*

- Open valve -3-.
- Risk of damage because pressure is set too high.
- The pressure must not exceed 0.5 bar.
- Adjust pressure to 0.5 bar with pressure control valve -2-.
- Open valve -4- and wait until test circuit is full. If necessary, adjust pressure to 0.5 bar.
- Check charge air system for leaks.

Methods of testing:

- ◆ listening
- ◆ feeling
- ◆ Leak detection spray
- ◆ Ultrasonic tester -V.A.G 1842S-



#### Note

- ◆ *A small amount of air escapes through the valves and enters the engine. Therefore a holding pressure test is not possible.*
- ◆ *How to use the ultrasonic tester -V.A.G 1842S- ⇒ operating instructions*
- ◆ *Before removing the adapter, release pressure in the test circuit by pulling off hose coupling.*

Assembly is carried out in reverse sequence; note the following:



#### Note

*Renew seal and O-rings.*

#### Specified torques

- ◆ [⇒ o2.1 verview - charge air system", page 433](#)

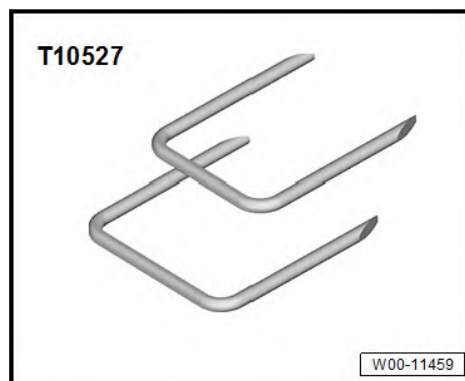
## 2.5 Removing and installing air pipe

Special tools and workshop equipment required



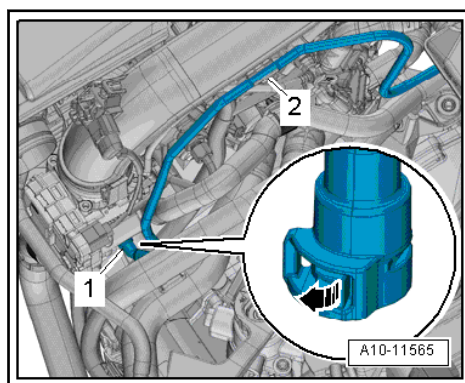


◆ Release tool -T10527-

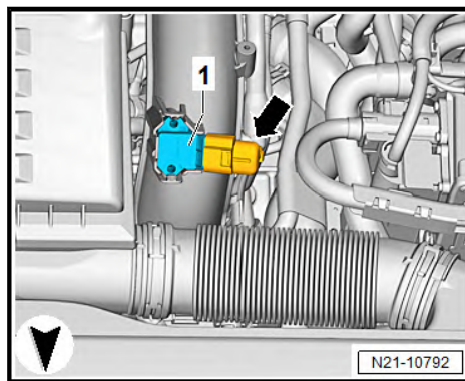


◆ Release tool -T10527/1-

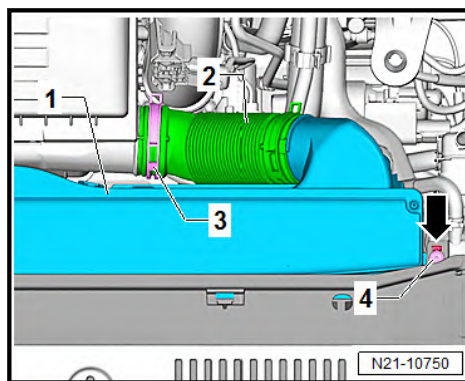
- Release catch -arrow- and disconnect vacuum hose -1-.



- Move clear vacuum hose at air pipe -2-.
- Release and pull off connector -arrow- of charge pressure sender -GX26- -1-.



Sharan, Tiguan and T-Roc:

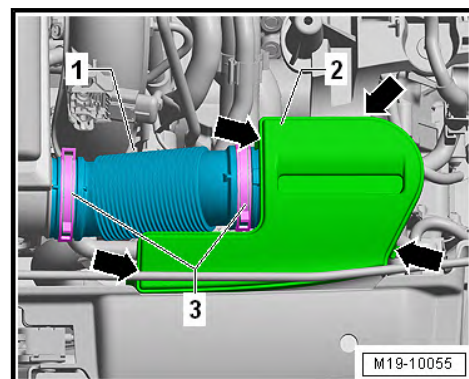






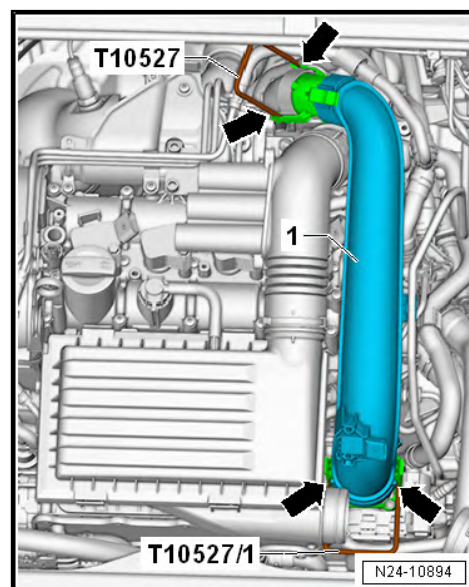
- Release hose clip -3-, and pull air hose -2- off air filter housing.
- Unscrew bolts -4- on both sides.
- Unclip air duct -1- from front end by releasing locking lugs -arrows-, and remove it.

**Golf Cabriolet, Scirocco and CC:**



- Release spring-type clips -3-, and remove intake hose -1-.

**Continued for all vehicles:**



- Release fasteners -arrows- using release tools -T10527- and -T10527/1-.
- Remove air pipe -1-.





## 24 – Mixture preparation - injection

### 1 Injection system

⇒ [o1.1 f fitting locations - injection system", page 444](#)

#### 1.1 Overview of fitting locations - injection system

Overview of fitting locations - engine compartment





#### 1 - Inlet camshaft control valve 1 -N205-

- ❑ Removing and installing ⇒ [a3.5 nd installing camshaft control valve 1N205", page 282](#)

#### 2 - Lambda probe 1 before catalytic converter -GX10-

- ❑ Consisting of
  - Lambda probe -G39-
  - Lambda probe heater - Z19-
- ❑ Removing and installing ⇒ [a8.2.1 nd installing Lambda probe 1 before catalytic converterGX10", page 531](#)

#### 3 - Lambda probe 1 after catalytic converter -GX7-

- ❑ Consisting of
  - Lambda probe after catalytic converter -G130-
  - Lambda probe 1 heater after catalytic converter -Z29-
- ❑ Removing and installing ⇒ [a8.2.2 nd installing Lambda probe 1 after catalytic converterGX7", page 533](#)

#### 4 - Charge air pressure controller -V465-

- ❑ Removing and installing ⇒ [a1.3 nd installing charge pressure positionerV465", page 426](#)

#### 5 - Engine control unit -J623-

- ❑ Fitting location: plenum chamber
- ❑ Removing and installing ⇒ [c6 ontrol unit", page 495](#)

#### 6 - Radiator outlet coolant temperature sender -G83-

- ❑ Removing and installing ⇒ [a2.9 nd installing radiator outlet coolant temperature senderG83", page 370](#)

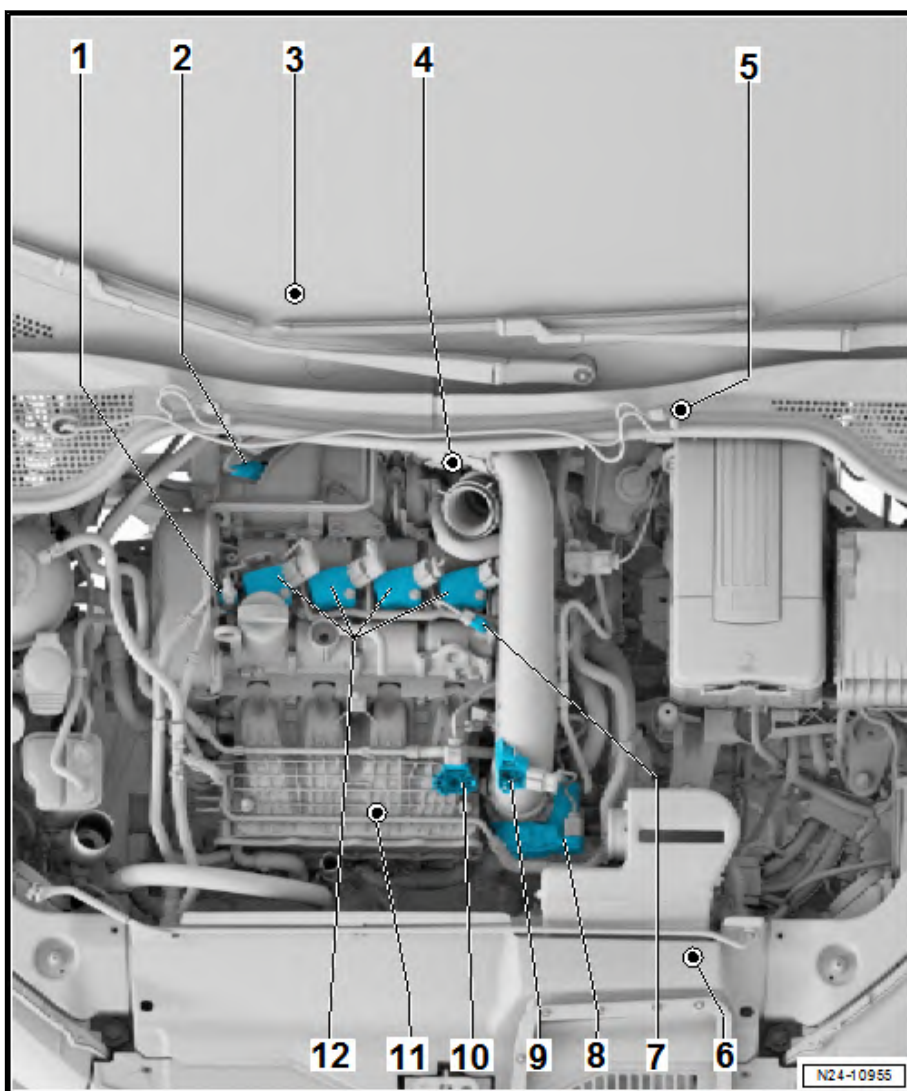
#### 7 - Hall sender -G40-

⇒ [Item 7 \(page 445\)](#)

- ❑ Removing and installing ⇒ [a1.4.1 nd installing Hall senderG40", page 584](#)

#### 8 - Throttle valve module -GX3-

- ❑ Consisting of
  - Throttle valve module -J338-
  - Throttle valve drive for electronic power control -G186-
  - Throttle valve drive angle sender 1 for electronic power control -G187-
  - Throttle valve drive angle sender 2 for electronic power control -G188-
- ❑ Removing and installing ⇒ [a4.3 nd installing throttle valve moduleGX3", page 484](#)







## 9 - Charge air pressure sender -GX26-

- ❑ Consisting of

Charge pressure sender -G31-

Intake air temperature sender -G42-

- ❑ Removing and installing ⇒ [a2.3 nd installing charge pressure senderGX26", page 438](#)

## 10 - Intake manifold sender -GX9-

- ❑ Consisting of

Intake air temperature sender 2 -G299-

Intake manifold pressure sender -G71-

- ❑ Removing and installing ⇒ [a5.1 nd installing intake manifold senderGX9", page 487](#)

## 11 - Charge air cooling pump -V188-

- ❑ Removing and installing ⇒ [a2.4 nd installing electric coolant pump", page 354](#)

## 12 - Ignition coils with output stages

◆ 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 ⇒ [a1.2 nd installing ignition coils with output stage", page 580](#)

Overview of fitting locations – engine, intake side





#### 1 - Knock sensor 1 -G61-

- ❑ Assembly overview ⇒ [o1.1 verview - ignition system", page 578](#)

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

- ❑ Assembly overview ⇒ [a4.3 nd installing oil pressure switch for reduced oil pressur-eF378", page 325](#)

#### 3 - Fuel pressure sender - G247-

- ❑ Assembly overview ⇒ [o2.1 verview - fuel rail with injectors", page 449](#)

#### 4 - Activated charcoal filter solenoid valve 1 -N80-

#### 5 - Injectors

- ◆ Injector, cylinder 1 -N30-
- ◆ Injector, cylinder 2 -N31-
- ◆ Injector, cylinder 3 -N32-
- ◆ Injector, cylinder 4 -N33-

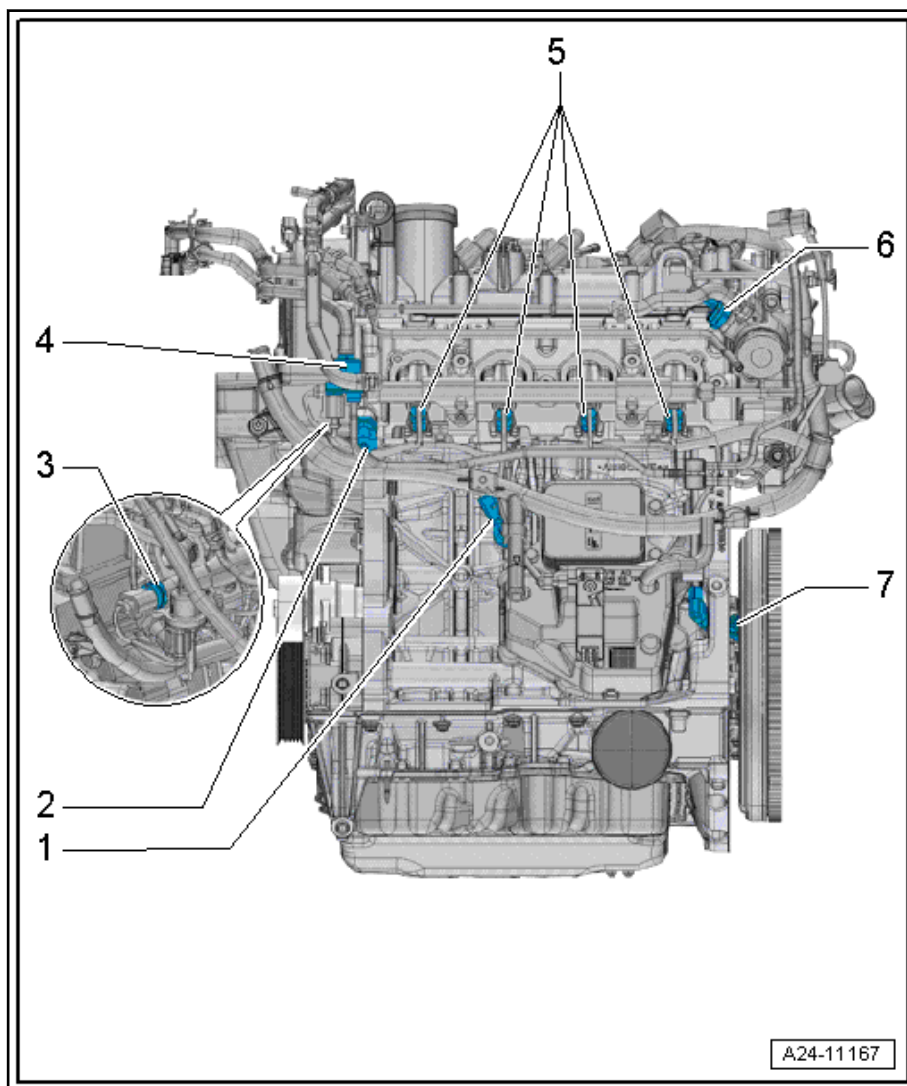
- ❑ Assembly overview ⇒ [o2.1 verview - fuel rail with injectors", page 449](#)

#### 6 - Fuel pressure regulating valve -N276-

- ❑ On high-pressure pump
- ❑ Assembly overview ⇒ [o7.1 verview - high-pressure pump", page 519](#)

#### 7 - Engine speed sender -G28-

- ❑ Assembly overview ⇒ [o1.1 verview - ignition system", page 578](#)



Overview of fitting locations - engine, exhaust side





#### 1 - Charge air pressure controller -V465-

- ❑ Assembly overview ⇒ [o1.1 verview - turbo-charger", page 416](#)
- ❑ Removing and installing ⇒ [a1.3 nd installing charge pressure positionerV465", page 426](#)

#### 2 - Lambda probe 1 before catalytic converter -GX10-

- ❑ Assembly overview ⇒ [o8.1 verview - Lambda probe", page 530](#)
- ❑ Removing and installing ⇒ [a8.2 nd installing Lambda probe", page 531](#)

#### 3 - Oil pressure switch -F1-

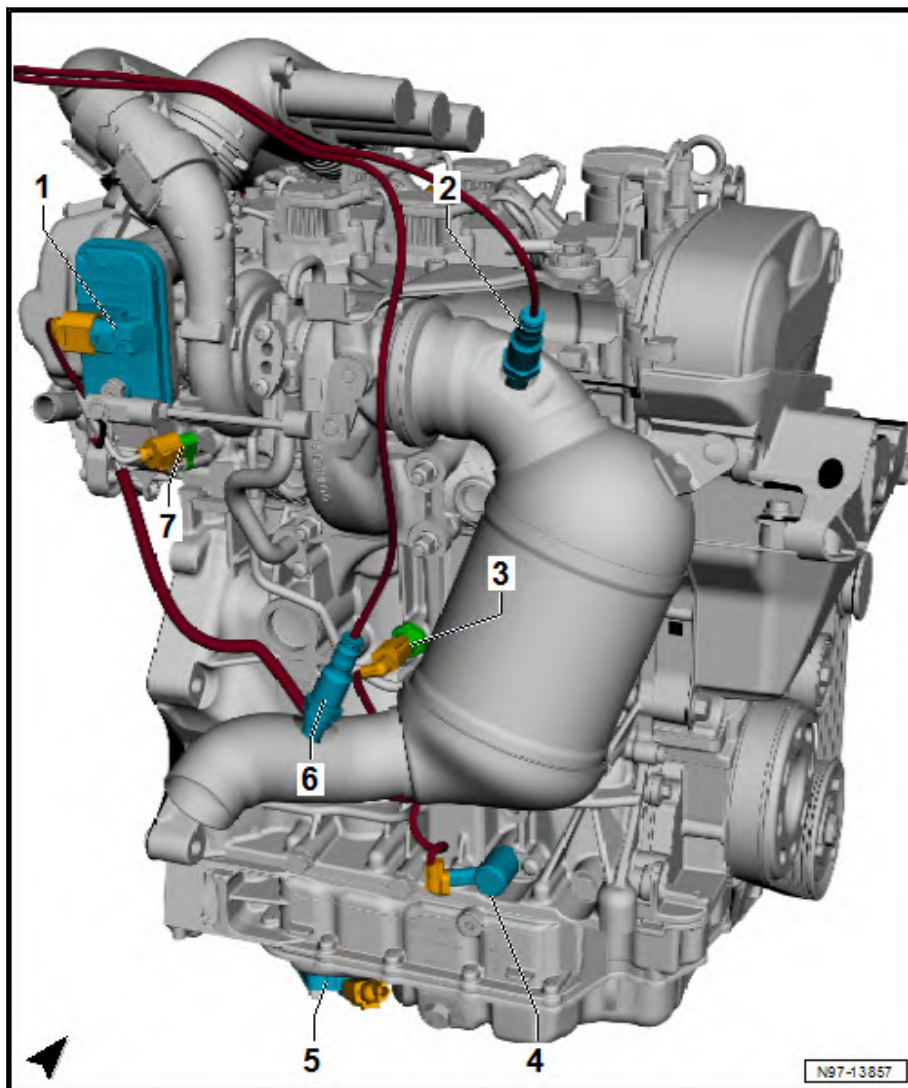
- ❑ Removing and installing ⇒ [a4.2 nd installing oil pressure switchF1", page 324](#)

#### 4 - Valve for oil pressure control -N428-

- ❑ Removing and installing ⇒ [a4.5 nd installing oil pressure regulating valveN428", page 328](#)

#### 5 - Oil level and oil temperature sender -G266-

- ❑ Removing and installing ⇒ [a1.6 nd installing oil level and oil temperature senderG266", page 314](#)



#### 6 - Lambda probe 1 after catalytic converter -GX7-

- ❑ Assembly overview ⇒ [o8.1 verview - Lambda probe", page 530](#)
- ❑ Removing and installing ⇒ [a8.2 nd installing Lambda probe", page 531](#)

#### 7 - Radiator outlet coolant -G62-

- ❑ Removing and installing ⇒ [a2.8 nd installing coolant temperature senderG62", page 367](#)





## 2 Injectors

⇒ [o2.1 verview - fuel rail with injectors", page 449](#)

⇒ [a2.2 nd installing fuel rail", page 453](#)

⇒ [a2.3 nd installing injectors", page 454](#)

⇒ [i2.4 njectors", page 468](#)

### 2.1 Assembly overview - fuel rail with injectors

⇒ [o2.1.1 verview - fuel rail with injectors, vehicles without particulate filter", page 449](#)

⇒ [o2.1.2 verview - fuel rail with injectors, vehicles with particulate filter", page 451](#)

#### 2.1.1 Assembly overview - fuel rail with injectors, vehicles without particulate filter





#### 1 - Fuel pressure sender - G247-

- ☐ Checking ⇒ [f5.3 uel pressure senderG247", page 489](#)
- ☐ Removing and installing ⇒ [a5.2 nd installing fuel pressure senderG247", page 487](#)
- ☐ Moisten taper and thread with clean engine oil
- ☐ 22 Nm

#### 2 - Fuel distributor

- ☐ Removing and installing ⇒ [a2.2 nd installing fuel rail", page 453](#)

#### 3 - High-pressure pipe

- ☐ Does not need to be renewed after removal
- ☐ Unions must be free of damage
- ☐ Do not alter shape.
- ☐ Removing and installing ⇒ [a7.3 nd installing high-pressure pipe", page 527](#)
- ☐ Lubricate thread of union nuts with clean engine oil
- ☐ 16 Nm +45°

#### 4 - Bolt

- ☐ Removing and installing ⇒ [a2.2 nd installing fuel rail", page 453](#)
- ☐ Renew after removal
- ☐ 8 Nm +90°

#### 5 - Support ring

- ☐ Renew after removal
- ☐ Fuel rail exerts force which secures injector in cylinder head via this support ring
- ☐ Shape may vary depending on whether vehicle is fitted with or without particulate filter
- ☐ Clipped to -item 8-

#### 6 - O-ring

- ☐ Renew after removal
- ☐ Lubricate with clean engine oil

#### 7 - Spacer ring

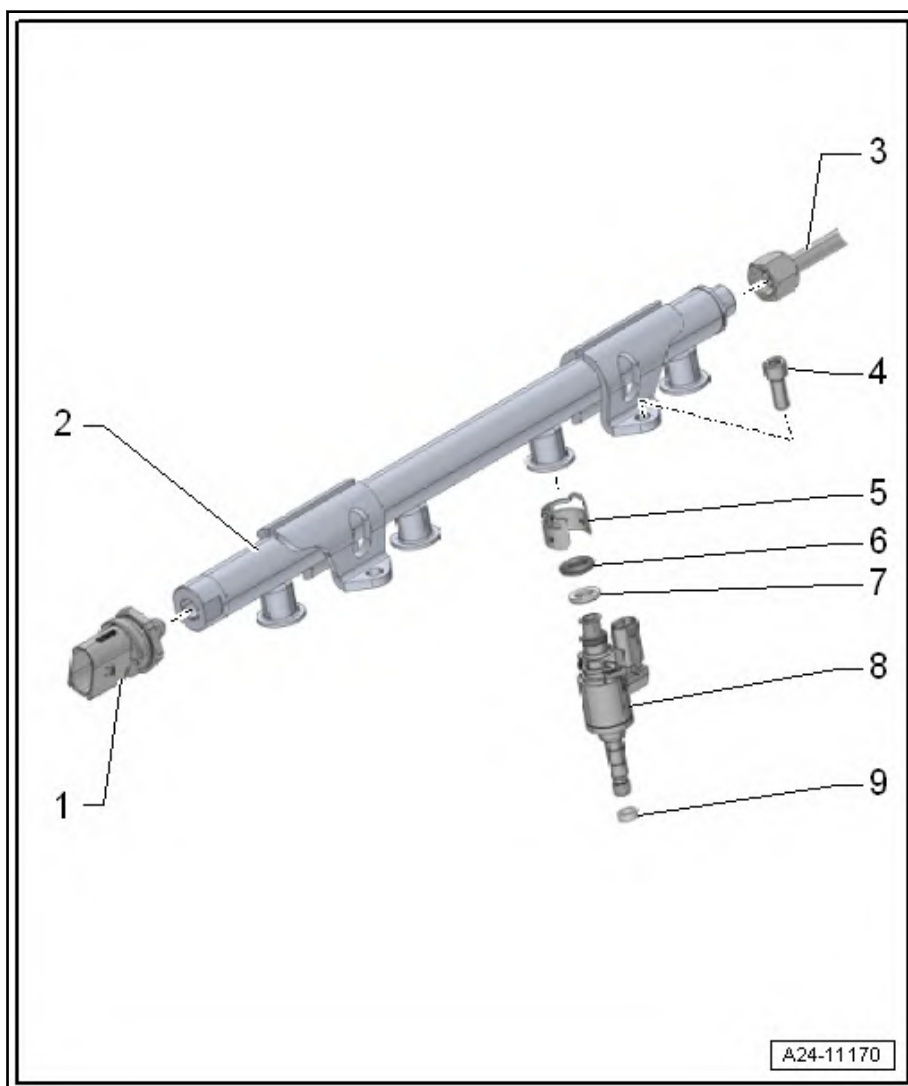
- ☐ Renew if damaged

#### 8 - Injector

- ☐ Removing and installing ⇒ [a2.3 nd installing injectors", page 454](#)

#### 9 - Combustion chamber seal

- ☐ Do not treat with grease or other lubricant.
- ☐ Renewing ⇒ [a2.3 nd installing injectors", page 454](#)







## **2.1.2 Assembly overview - fuel rail with injectors, vehicles with particulate filter**





#### 1 - Fuel distributor

- ❑ Removing and installing ⇒ [a2.2 nd installing fuel rail", page 453](#)

#### 2 - Bolt

- ❑ Renew after removal
- ❑ M6 × 30
- ❑ Qty. 4
- ❑ 8 Nm +90°

#### 3 - Fuel pressure sender - G247-

- ❑ Renew after removal
- ❑ Checking ⇒ [f5.3 uel pressure senderG247", page 489](#)
- ❑ Removing and installing ⇒ [a5.2 nd installing fuel pressure senderG247", page 487](#)
- ❑ Moisten taper and thread with clean engine oil
- ❑ 22 Nm +10°

#### 4 - Injector

- ❑ Removing and installing ⇒ [a2.3 nd installing injectors", page 454](#)

#### 5 - O-ring

- ❑ Renew
- ❑ Coat lightly with clean engine oil when installing.

#### 6 - Spacer ring

- ❑ Renew

#### 7 - Spacer ring

- ❑ Renew

#### 8 - Support ring

- ❑ Renew
- ❑ Fuel rail exerts force which secures injector in cylinder head via this support ring
- ❑ Clipped to -item 4-

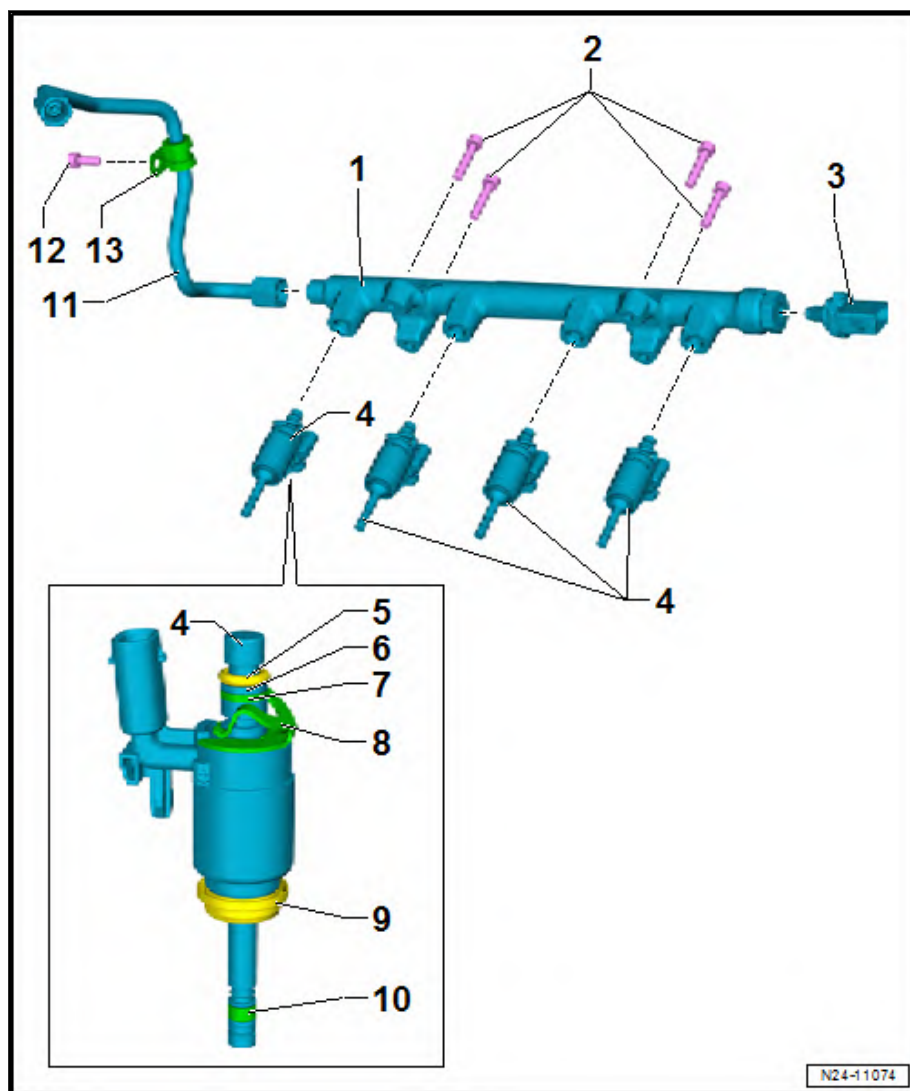
#### 9 - Taper seal

#### 10 - Combustion chamber seal

- ❑ Do not treat with grease or other lubricant.
- ❑ Renewing ⇒ [a2.3 nd installing injectors", page 454](#)

#### 11 - High-pressure pipe

- ❑ Does not need to be renewed after disassembly
- ❑ Unions must be free of damage
- ❑ Do not alter shape.
- ❑ Removing and installing ⇒ [a7.3 nd installing high-pressure pipe", page 527](#)
- ❑ Lubricate thread of union nuts with clean engine oil
- ❑ 16 Nm +45°







### 12 - Bolt

- ☐ Can be reused
- ☐ M6 × 14
- ☐ 8 Nm +90°

### 13 - Clip

## 2.2 Removing and installing fuel rail

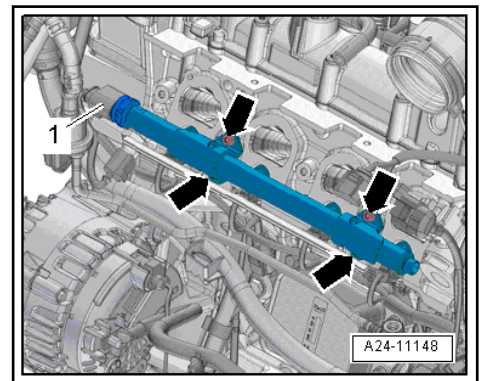
### Removing

#### Risk of injury from highly pressurised fuel.

The fuel system is pressurised. Injury from fuel spray possible.

Before opening the fuel system:

- Wear protective goggles.
- Wear protective gloves.
- To release pressure, wrap a clean cloth around the connection and carefully loosen the connection.
- Remove intake manifold ⇒ [a4.2 nd installing intake manifold", page 481](#) .
- Remove high-pressure pipe ⇒ [a7.3 nd installing high-pressure pipe", page 527](#) .
- Disconnect electrical connector -1-.



- Place a cloth underneath to catch escaping fuel.
- Remove bolts -arrows- and pull fuel rail off injectors.

### Installing

Install in reverse order of removal, observing the following:





#### Note

- ◆ *Renew O-rings.*
  - ◆ *Before installing, lightly moisten O-rings with clean engine oil.*
  - ◆ *Visually inspect fuel rail and remove any foreign bodies or old O-rings as necessary.*
  - ◆ *If there is still an O-ring in the fuel rail, carefully lever out the O-ring using removal wedge -3409-.*
  - ◆ *The sealing surfaces in the fuel rail must be free of scoring or scratches. Otherwise the component must be renewed.*
- Apply mountings on fuel rail onto injectors.
  - Press fuel rail onto injectors as far as stop (first on right side, then on left side).
  - Firmly press down fuel rail in area of bracket and screw in bolts by two full turns.
  - Tighten bolts evenly and diagonally.
  - Install high-pressure pipe ⇒ [a7.3 nd installing high-pressure pipe", page 527](#) .
  - Install intake manifold ⇒ [a4.2 nd installing intake manifold", page 481](#) .

#### Specified torques

- ◆ ⇒ [o2.1 verview - fuel rail with injectors", page 449](#)

## 2.3 Removing and installing injectors

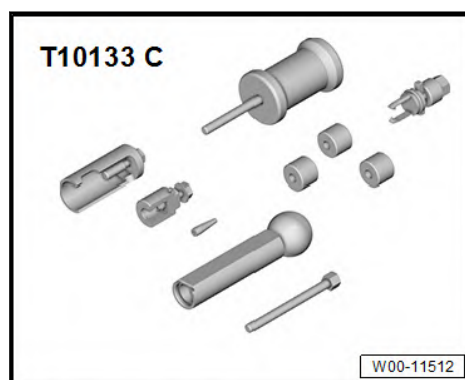
⇒ [a2.3.1 nd installing injectors, vehicles without particulate filter", page 454](#)

⇒ [a2.3.2 nd installing injectors, vehicles with particulate filter", page 461](#)

### 2.3.1 Removing and installing injectors, vehicles without particulate filter

#### Special tools and workshop equipment required

- ◆ Tool set for FSI engines -T10133 C- with -T10133/16 A- and -T10133/19-







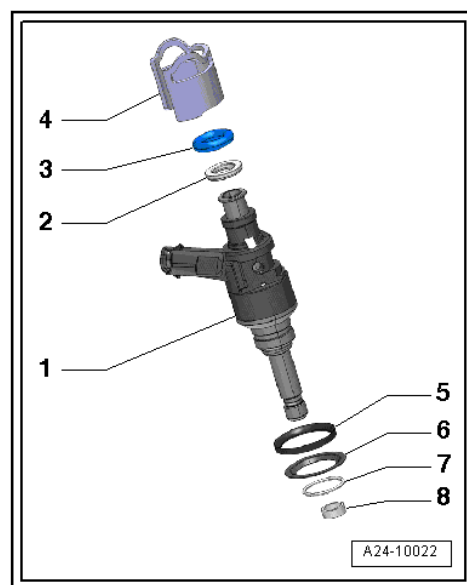
## Removing



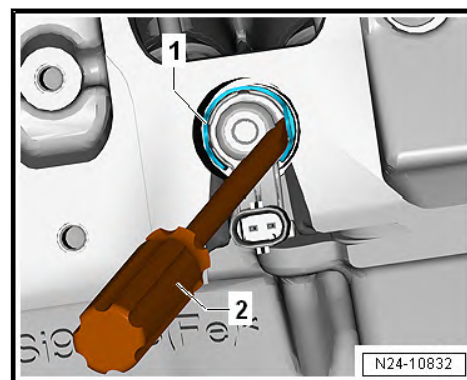
### Note

*Injectors must only be removed when the engine is cold.*

- Remove intake manifold ➔ [a4.2 nd installing intake manifold", page 481](#) .
- Removing fuel rail ➔ [a2.2 nd installing fuel rail", page 453](#) .

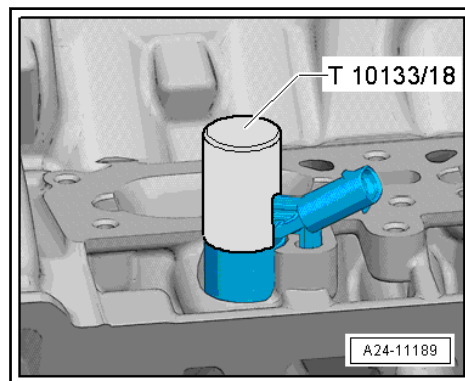


- Remove O-ring -3- from injector -1-.
- Unplug electrical connector from corresponding injector.
- Lever support ring -1- off injector using a screwdriver -2-.

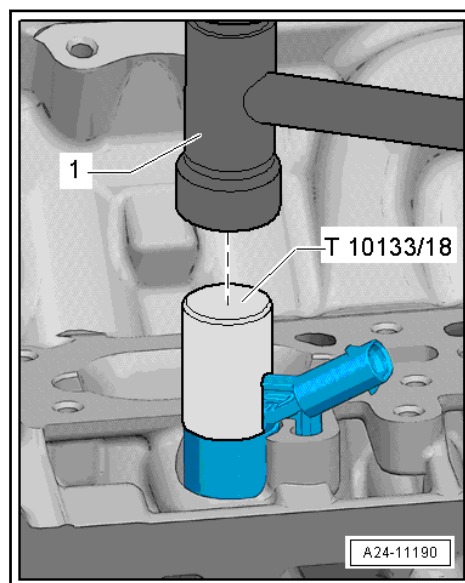


- Fit impact sleeve -T10133/18A- over injector.





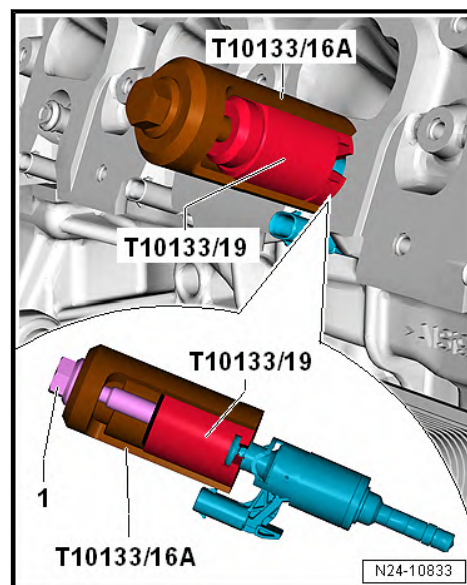
- Carefully loosen injector with light blows onto impact sleeve.



#### Note

- ◆ Use a torque wrench to pull out the injector.
- ◆ Set the torque wrench to 5 Nm.
- Fit puller -T10133/19- to groove on injector.





- Fit removing tool -T10133/16 A- to puller.
- Pull out injector by screwing in bolt -1-.
- If the torque limit of »5 Nm« has been reached and it is still not possible to loosen the injector, withdraw the puller, and start anew.
- Repeat the procedure on each injector.

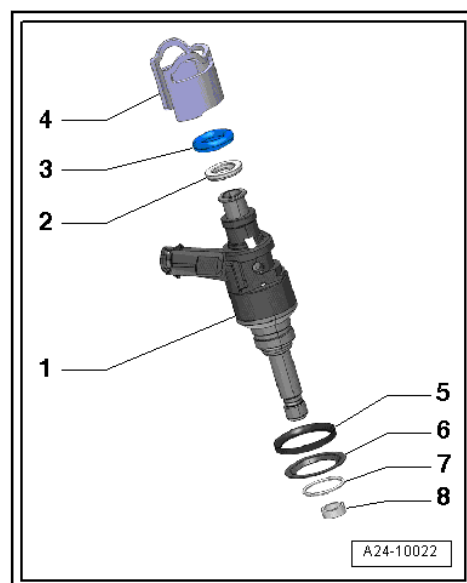


#### Note

- ◆ *If the torque limit is exceeded, the injector may become damaged.*
- ◆ *Always renew the combustion chamber seal prior to reinstalling the injector.*

- Remove gasket for lower part of intake manifold.

#### Dismantling injectors:



- Pull support ring -4- and spacer ring -2- off injector -1-.





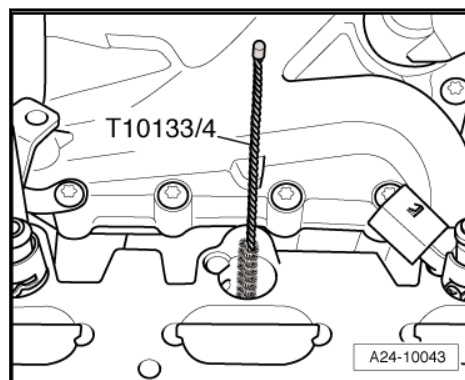
- Remove retaining ring -7-, upper sealing washer -5- and lower sealing washer -6-.
- Carefully remove old combustion chamber seal -8-.
- To do this, cut seal open with a knife, or use a small screwdriver to spread ring, and pull it off towards front.



#### Note

*Take care not to damage the groove of injector. The injector must be renewed if the groove is damaged.*

#### Installing

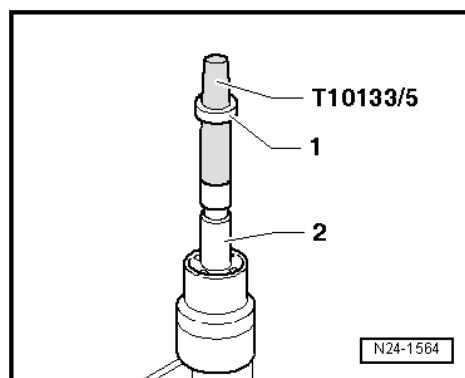


- Clean hole in cylinder head using nylon brush -T10133/4-.



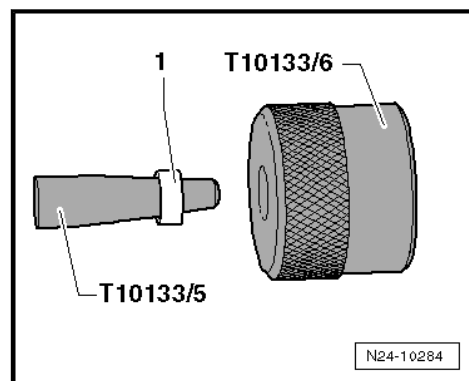
#### Note

- ◆ *Renew combustion chamber seal and O-ring.*
- ◆ *Renew spacer ring if damaged.*
- When reinstalling the injector, remove any combustion residue from groove for combustion chamber ring seal and from injector shaft using a clean cloth.
- Fit assembly cone -T10133/5- with a new combustion chamber seal -1- on injector -2-.

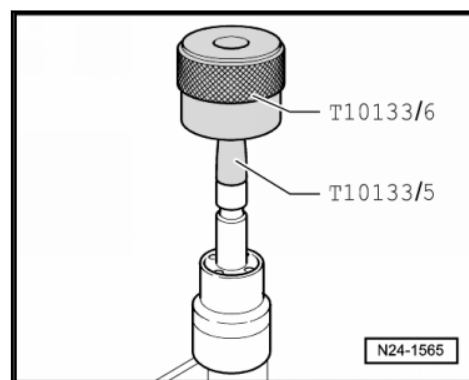


- Slide combustion chamber seal with assembly sleeve -T10133/6- onto assembly cone -T10133/5- as far as it will go.



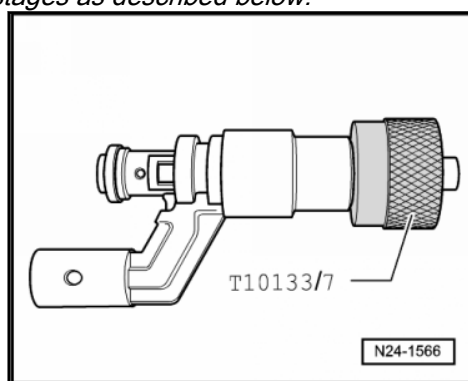


- Turn assembly sleeve -T10133/6- around and push combustion chamber ring seal into the respective groove.



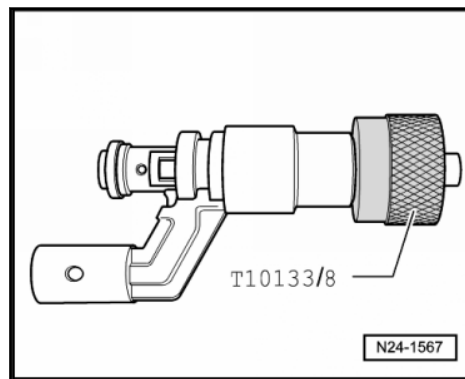
#### Note

*The combustion chamber ring seal is widened when it is pushed onto the injector. It must be compressed again after sliding on and this is done in two stages as described below.*

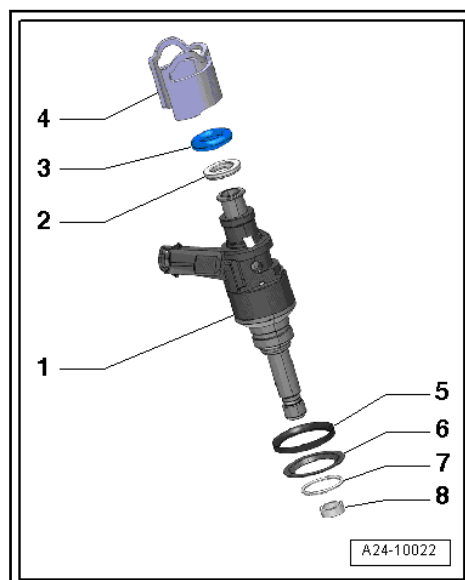


- Push calibration sleeve -T10133/7- onto injector as far as stop and simultaneously turn it slightly (approx. 180°).
- Pull calibration sleeve -T10133/7- off again, turning in opposite direction.
- Push calibration sleeve -T10133/8- onto injector as far as stop and simultaneously turn it slightly (approx.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





- Pull calibration sleeve -T10133/8- off again, turning in opposite direction.
- Fit support ring -4- and spacer ring -2- onto injector -1-.
- Before installing injector -1- moisten new O-ring -3- with clean engine oil.



#### Note

*The combustion chamber seal -8- must not be lubricated.*

- Push injectors by hand as far as they will go into the hole of the cylinder head (must be free of oil and grease). Ensure injectors are positioned correctly in cylinder head.



#### Note

- ♦ *The injectors must insert easily. If necessary, wait until the combustion chamber ring seal has contracted sufficiently.*
- ♦ *Ensure injectors are correctly seated and positioned in cylinder head.*
- Electrical connector of injector must engage in respective recess in cylinder head.
- Installing fuel rail ➔ [a2.2 nd installing fuel rail", page 453](#) .





- Install intake manifold ➔ [a4.2 nd installing intake manifold", page 481](#) .
- Switch on ignition and select the following menu options on vehicle diagnostic tester:

◆ `0001 - Clear adaption values for injectors`

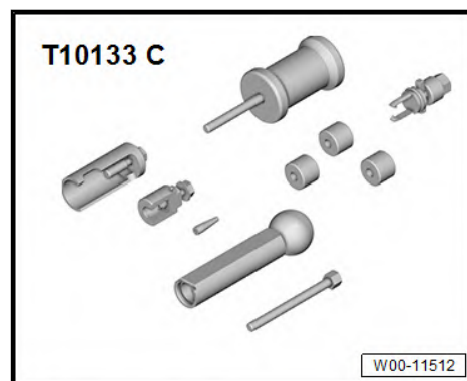
## 2.3.2 Removing and installing injectors, vehicles with particulate filter

Special tools and workshop equipment required

- ◆ Removal tool -T10498-



- ◆ Removal tool -T10133/16A- from tool set for FSI engines -T10133 C-



- ◆ Set of tools for high-pressure injector -T10581-

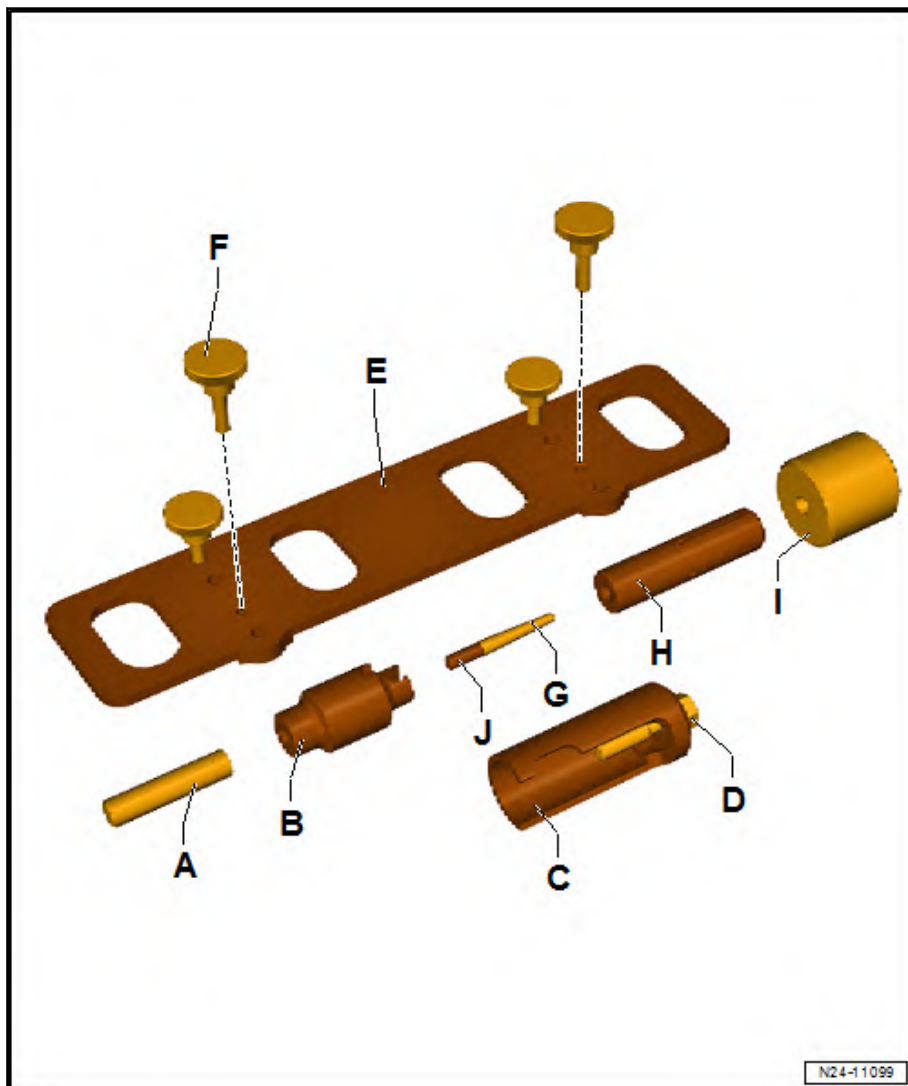


Set of tools for high-pressure injector -T10581-:





- A - Press tool -T10581/3-
- B - Puller -T10581/4-
- C - Removal tool -  
T10133/16A-
- D - Bolt from removal tool -  
T10133/16A-
- E - Base plate -T10581/1-
- F - Knurled screw -T10581/2-
- G - Assembly cone -  
T10581/5-
- H - Assembly sleeve -  
T10581/6-
- I - Calibration sleeve -  
T10581/7-
- J - Cylinder pin for protecting  
assembly cone -T10581/5-



## Procedure

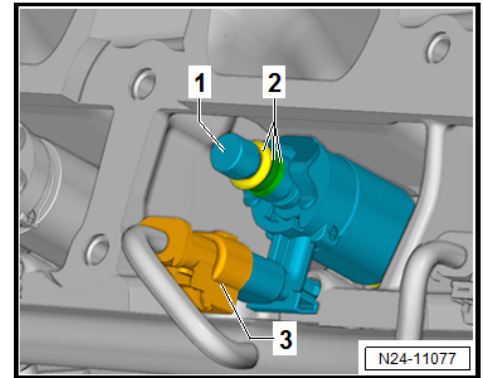


### Note

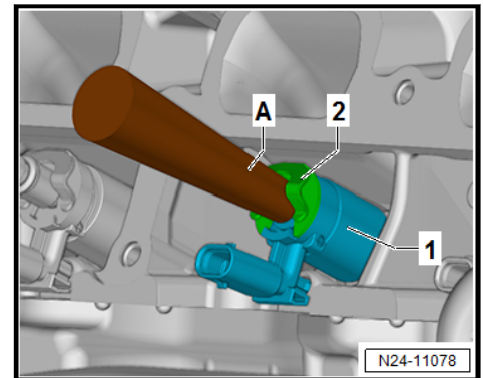
- ◆ *Injectors must only be removed when the engine is cold.*
- ◆ *When pulling off the fuel rail, injectors may be released from the cylinder head or the fuel rail.*
- ◆ *Due to the fuel pressure, all seals on the injector must be renewed after the removal.*
- ◆ *In this case, the injectors must be pulled out of the fuel rail.*
- Remove intake manifold ⇒ [a4.2 nd installing intake manifold", page 481](#) .
- Place a cloth underneath to catch escaping fuel.
- Remove high-pressure pipe ⇒ [a7.3 nd installing high-pressure pipe", page 527](#) .
- Removing fuel rail ⇒ [a2.2 nd installing fuel rail", page 453](#) .



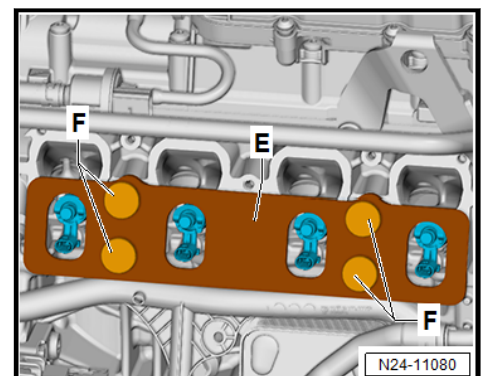
## Removing injectors on cylinder head:



- Release and pull off electrical connector -3- on injector -1-.
- Carefully remove seal and spacer rings -2- using removal tool -T10498-.
- The two spacer rings have slots.
- Slide thrust piece -T10581/3- -A- over injector -1-.

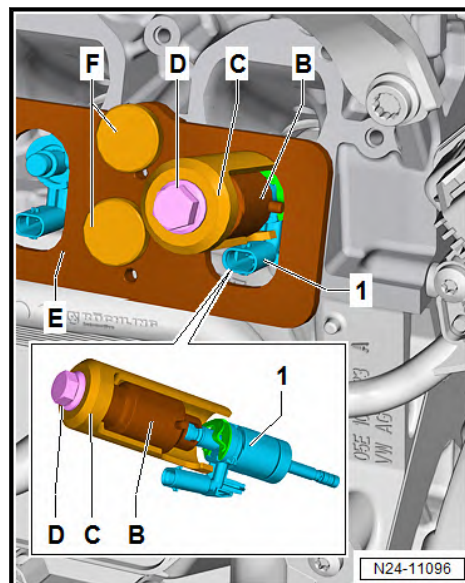


- The thrust piece -T10581/3- -A- must not contact support ring -2-.
- Carefully loosen injector with light blows onto thrust piece.
- Fit base plate -T10581/1- -E- with knurled screw -T10581/2- -F-, as shown in illustration.



- Use holes for fuel rail to bolt base plate to cylinder head.
- Fit puller -T10581/4- -B- to groove on injector -1-.





- Insert mounting of puller -T10581/4- in groove of support rings.
- Unscrew bolt -D- from removal tool -T10133/16A- -C- a few turns.
- Slide removal tool -T10133/16A- -C- over puller -T10581/4- -B-.
- Screw bolt -D- of removal tool -T10133/16A- into puller -T10581/4- -B-.
- Align removal tool -T10133/16A-, and fit it onto base plate -T10581/1- -E-.
- Turn removal tool -T10133/16A- -C- in such a way that the contact surface with base plate -T10581/1- -E- is as large as possible.
- Tighten bolt -D- slightly by hand. Removal tool -T10133/16A- must be supported on base plate -T10581/1-.
- Use a torque wrench to pull out the injector.
- Set the torque wrench to 5 Nm.
- Pull out injector by screwing in bolt -D-.
- If the torque limit of »5 Nm« has been reached and the injector still can't be pulled out, remove the puller. Use the impact sleeve again to loosen the injector.
- Repeat the procedure on each injector.



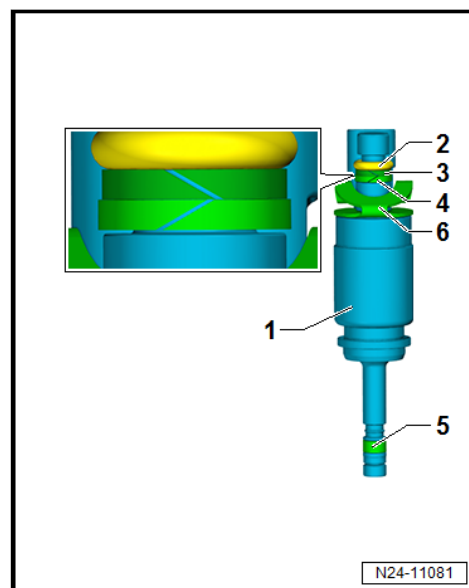
#### Note

*If the torque limit is exceeded, the injector may become damaged.*





## Dismantling injectors:

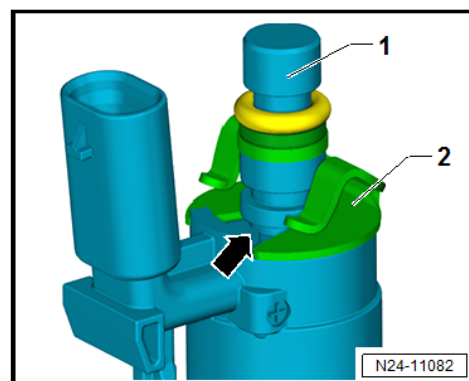


- 1 - Injector
- 2 - Seal
- 3 - Spacer ring (white)
- 4 - Spacer ring (red)
- 5 - Combustion chamber seal
- 6 - Support ring

## Renewing spacer rings and seals:

- Renew seal -2- and spacer rings -3- and -4- after removal.
- Carefully remove seal -2- using removal tool -T10498-.
- Carefully remove spacer rings -3- and -4- using removal tool -T10498-. The spacer rings have slots.
- Clean injector shaft using a clean cloth to remove any deposits from combustion.
- Install seal and spacer rings in the specified sequence.
- Before installing injector moisten new seal -2- with clean engine oil.

## Renewing support ring:



- Use a suitable screwdriver to carefully pull old support ring off injector.

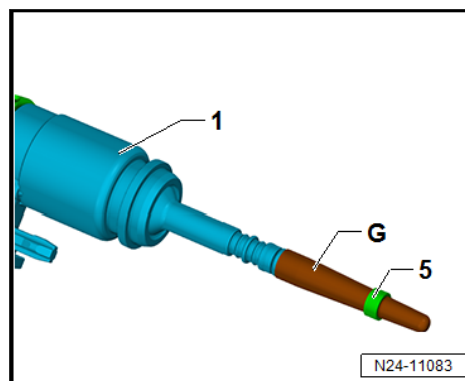




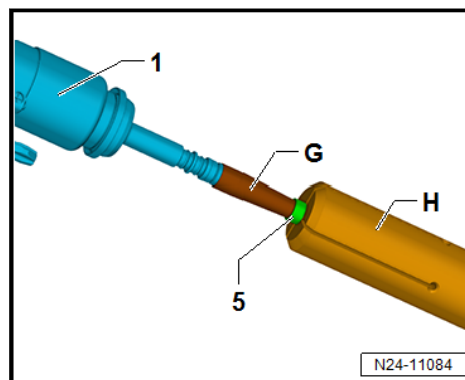
- Fit new support ring to groove -arrow-, and slide it on.
- The opening of the support ring must face toward electrical connection.

#### Renewing combustion chamber seal:

- Carefully remove combustion chamber seal using removal tool -T10498-.
- Take care not to damage the groove of injector. The injector must be renewed if the groove is damaged.
- When re-installing an injector, clean groove for combustion chamber seal using a clean cloth to remove any deposits from combustion.
- Slide assembly cone -T10581/5- -G- to stop onto injector -1-.



- Slide combustion chamber seal -5- to assembly cone -T10581/5-, as shown in illustration.
- Slide assembly sleeve -T10581/6- -H- onto assembly cone -T10581/5- -G- until it contacts combustion chamber seal -5-.



- Use assembly sleeve -T10581/6- to slide combustion chamber seal as far as possible onto assembly cone -T10581/5-.
- Use assembly sleeve -T10581/6- to slide on combustion chamber seal until it is seated in the first groove of the seal  
⇒ [page 465](#) .
- Pull assembly sleeve -T10581/6- off injector -1-.



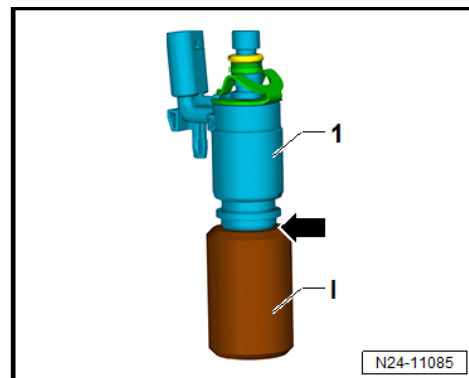
#### Note

*The combustion chamber ring seal is widened when it is pushed onto the injector. It must be compressed again after sliding on. This is done in two stages as described below.*



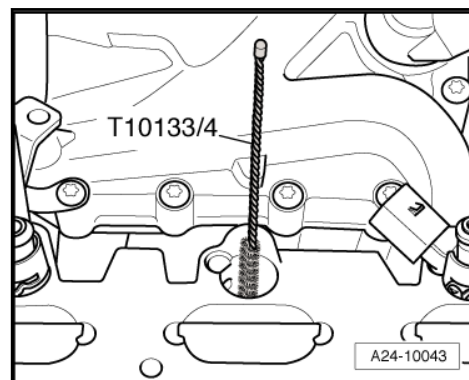


- Push calibration sleeve -T10581/7- -I- to stop onto injector -1-, and at the same time turn it slightly (approx. 180°) -arrow-.



- Pull calibration sleeve -T10581/7- off again, turning in opposite direction.
- Push calibration sleeve -T10581/7- to stop onto injector, and simultaneously turn it slightly (approx. 180°).
- Pull calibration sleeve -T10581/7- off again, turning in opposite direction.

### Installing



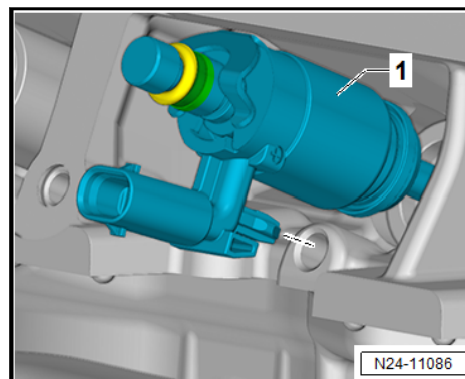
- Clean hole in cylinder head using nylon brush -T10133/4-.



### Note

- ◆ *The combustion chamber seal must not be lubricated.*
- ◆ *Renew combustion chamber seal, spacer ring and seal.*
- ◆ *The injectors must insert easily. If necessary, wait until the combustion chamber ring seal has contracted sufficiently.*
- Push injectors -1- by hand to stop into the hole of cylinder head (must be free of oil and grease). Ensure injectors are positioned correctly in cylinder head.





- Electrical connector of injector must engage in respective recess in cylinder head.
- Moisten new seals with clean engine oil.
- Installing fuel rail ➔ [a2.2 nd installing fuel rail", page 453](#) .
- Install intake manifold ➔ [a4.2 nd installing intake manifold", page 481](#) .

**If injectors have been cleaned:**

- Connect ➔ Vehicle diagnostic tester.
- Carry out function 0001 - Reset learnt injector values.

**If injectors have been renewed:**

- Connect ➔ Vehicle diagnostic tester.
- Carry out function 0001 - Reset learnt injector values.

## 2.4 Cleaning injectors

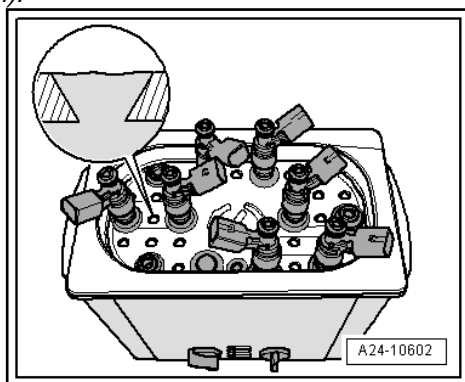
### Special tools and workshop equipment required

- ♦ Ultrasonic cleaning device -VAS 6418-
- ♦ Mounting plate for injection modules -VAS 6418/1-
- ♦ Cleaning fluid ➔ Electronic Parts Catalogue



**Note**

*The ultrasonic unit must be filled with cleaning agent to upper edge of holes (see detail).*

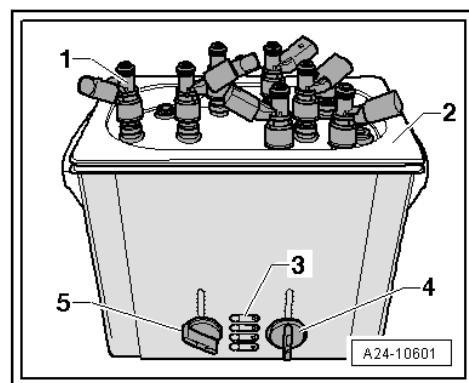


*Observe ultrasonic unit safety regulations and operating instructions.*





## Cleaning



- Remove injectors ⇒ [a2.3 nd installing injectors", page 454](#) .
- Insert injectors -1- all the way into mounting plate for injection modules -VAS 6418/1- -item 2-.
- Immerse injectors together with mounting plate for injection modules -VAS 6418/1- into cleaning fluid -VAS 6418/2-.
- Set rotary knob -4- to a temperature of 50°C.
- Set a cleaning time of 30 minutes with the rotating knob -5-.
- Switch on ultrasonic unit with button -3-.



### Note

*The time set starts to elapse as soon as a cleaning temperature of 50°C has been attained.*

- After cleaning, renew combustion chamber ring seal for each injector ⇒ [a2.3 nd installing injectors", page 454](#) .





### **3 Air filter**

[⇒ o3.1 verview - air filter housing", page 470](#)

[⇒ a3.2 nd installing air filter housing", page 472](#)

[⇒ a3.4 nd installing resonator for intake air", page 476](#)

#### **3.1 Assembly overview - air filter housing**

[⇒ o3.1.1 verview - air filter housing, Sharan 2016 >, Tiguan 2008 >, CC 2012 >, T-Roc 2018 >, Golf 2020 >, Golf Estate 2021 >", page 470](#)

[⇒ o3.1.2 verview - air filter housing, Golf Cabriolet and Scirocco", page 471](#)

##### **3.1.1 Assembly overview - air filter housing, Sharan 2016 >, Tiguan 2008 >, CC 2012 >, T-Roc 2018 >, Golf 2020 >, Golf Estate 2021 >**





**1 - Air filter lower part**

- ☐ Remove dirt, leaves and salt residues

**2 - Air duct**

- ☐ On lock carrier
- ☐ Removing and installing (T-Roc) ⇒ [a3.3 nd installing air guide on lock carrier](#), page 474

**3 - Bolt**

- ☐ 2 Nm

**4 - Cover**

- ☐ For air duct

**5 - Bolt**

- ☐ 1.5 Nm

**6 - Air intake hose**

**7 - Clip**

**8 - Hose**

- ☐ For crankcase ventilation.

**9 - Air filter upper part**

- ☐ Remove dirt, leaves and salt residues

**10 - Air duct (bottom section)**

- ☐ On lock carrier

**11 - Air filter element**

- ☐ Use only genuine air filter elements ⇒ Electronic Parts Catalogue
- ☐ For change intervals refer to ⇒ Maintenance tables
- ☐ Removing and installing ⇒ Maintenance; Booklet

**12 - Air intake hose**

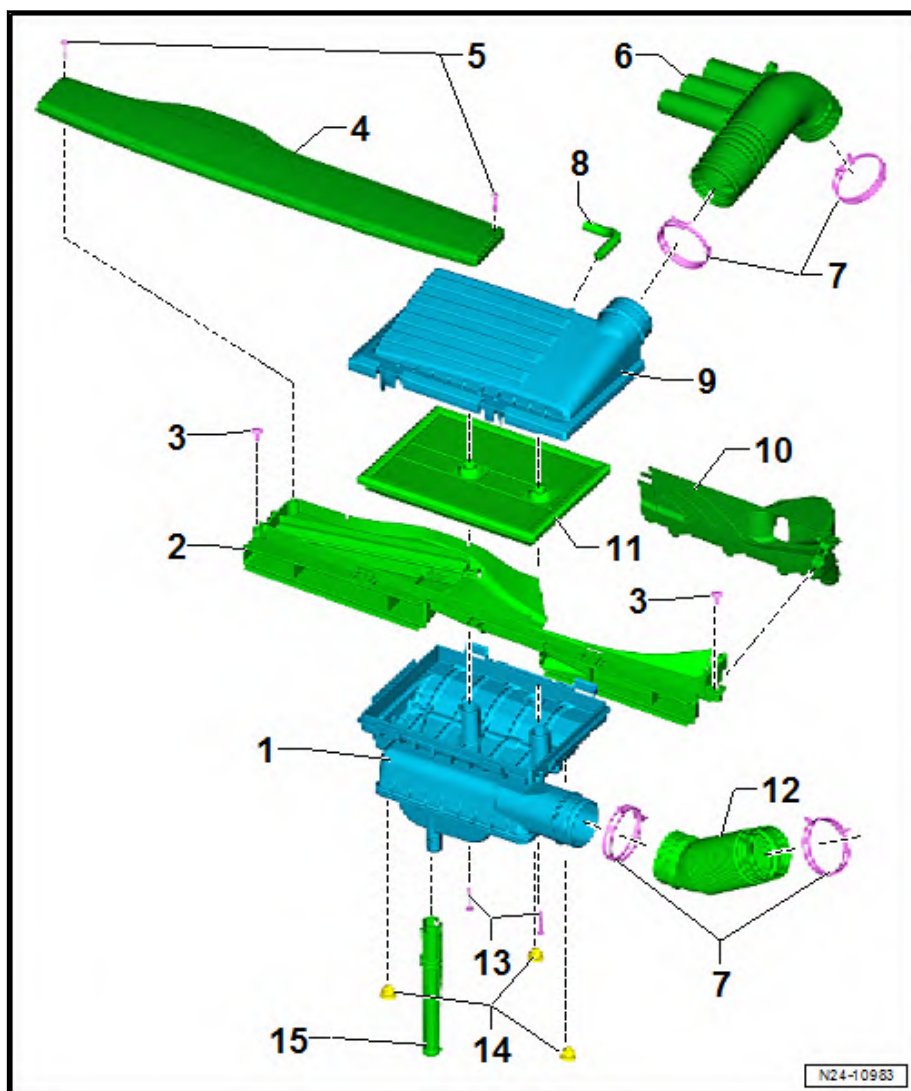
**13 - Bolt**

- ☐ 2 Nm

**14 - Rubber buffer**

**15 - Water drain hose**

- ☐ Cleaning



### 3.1.2 Assembly overview - air filter housing, Golf Cabriolet and Scirocco





**1 - Rubber buffer**

**2 - Water drain hose**

- ☐ Cleaning

**3 - Bolt**

- ☐ 1.5 Nm

**4 - Air filter lower part**

- ☐ Remove dirt, leaves and salt residues

**5 - Air filter element**

- ☐ Use only genuine air filter elements ⇒ Electronic Parts Catalogue
- ☐ For change intervals refer to ⇒ Maintenance tables
- ☐ Removing and installing ⇒ Maintenance; Booklet

**6 - Air filter upper part**

- ☐ Remove dirt, leaves and salt residues

**7 - Hose**

- ☐ For crankcase ventilation.

**8 - Air intake hose**

**9 - Clip**

**10 - Air intake hose**

**11 - Cover**

- ☐ For air duct

**12 - Air duct (bottom section)**

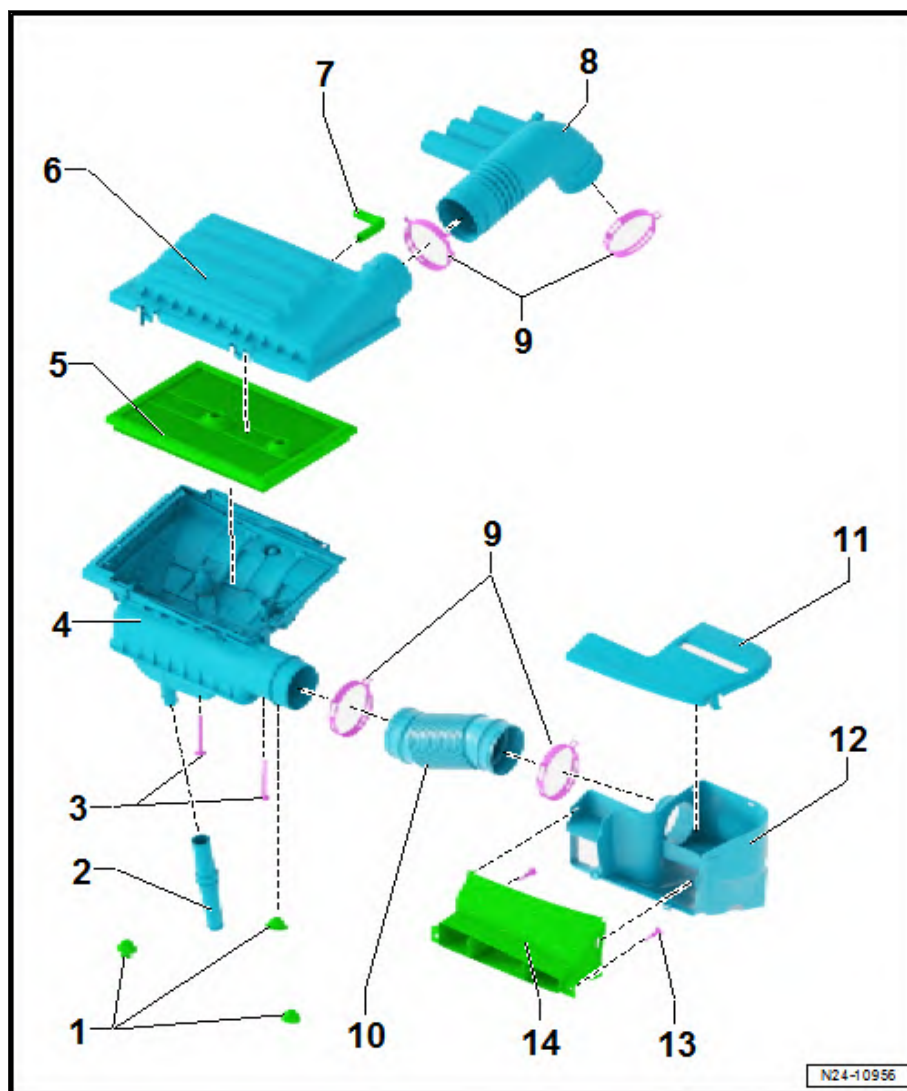
- ☐ On lock carrier

**13 - Bolt**

- ☐ 2 Nm

**14 - Air duct**

- ☐ On lock carrier

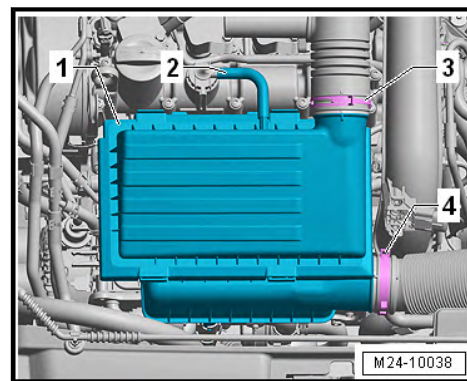


## 3.2 Removing and installing air filter housing

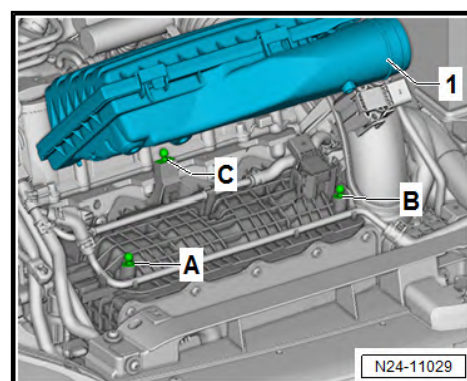
### Removing

- Pull vacuum hose -2- off air filter housing -1-.





- Release spring-type clips -3- and -4-, and remove intake hoses.
- Lift air filter housing -1- off ball studs in the following sequence.
- First pull air filter housing off ball stud -C-.



- Then, and only then, pull air filter housing off ball studs -B- and -A-.

### Installing

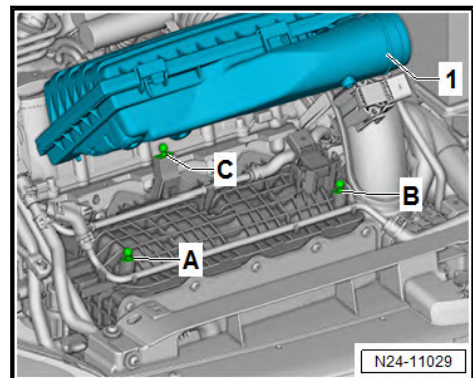
Install in reverse order of removal, observing the following:





#### Note

- ◆ *If the air filter element is very dirty or wet, particles of dirt or water may reach the components and falsify the measured air mass value. This would lead to loss of power, since a smaller injection quantity is calculated.*
- ◆ *Always use Genuine part for air filter element.*
- ◆ *A clean air filter housing is essential.*
- ◆ *Before fitting the air filter housing, the ball pins on the intake manifold must be moistened with water without additives.*
- ◆ *Hose unions and air intake pipes and hoses must be free of oil and grease before installation.*
- ◆ *Use a silicone-free lubricant to install the air hoses.*
- ◆ *Secure all hose connections with the hose clips corresponding to original equipment → Electronic Parts Catalogue.*
- ◆ *Avoid malfunctions. When blowing out air filter housing with compressed air, cover critical components through which air flows.*
- ◆ *Use a clean cloth to do this.*
- ◆ *Observe relevant disposal regulations.*
- Remove salt residues, dirt and leaves from top and bottom part of air filter housing using a vacuum cleaner.
- Blow out water drain with compressed air.
- Keep to the sequence during assembly.
- Press air filter housing -1- on ball studs -A- and -B-.



- Finally, press air filter housing on ball stud -C-.

#### Specified torques

- ◆ ⇒ [o3.1 verview - air filter housing", page 470](#)

### 3.3 Removing and installing air guide on lock carrier

Special tools and workshop equipment required





- ◆ Torque wrench -VAS 6253A-

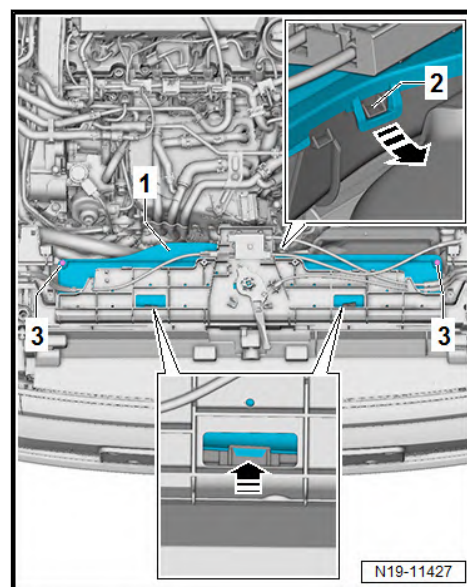


- ◆ Spring-type clip pliers -VAS 6362-



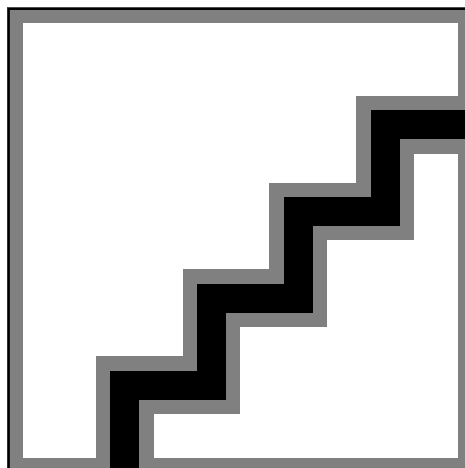
### Removing

- Remove radiator grille ⇒ General body repairs, exterior; Rep. gr. 63; Front bumper; Assembly overview - bumper cover.
- Unscrew bolts -3- from cover -1-.

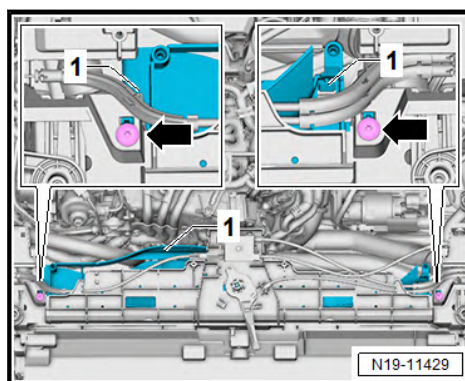


- Release rear fastener -2- -arrow-.
- Release front fastener -arrow- and remove cover -1-.
- Loosen hose clip -2-, and pull air intake hose off bottom section of air duct -1-.





- Release fastener -arrow-, and detach bottom section of air duct -1-.
- Unscrew bolts -arrows-, and remove air duct -1-.



### Installing

Install in reverse order of removal, observing the following:



#### Note

*Reinstall hose clips in their original positions.*

### Specified torques

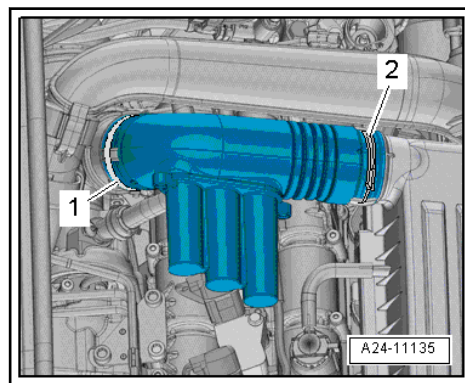
- ♦ ⇒ [o3.1.1 verview - air filter housing, Sharan 2016 ➤, Tiguan 2008 ➤, CC 2012 ➤, T-Roc 2018 ➤, Golf 2020 ➤, Golf Estate 2021 ➤](#), page 470

## 3.4 Removing and installing resonator for intake air

### Removing

- Loosen hose clips -1- and -2-.





- Remove resonator for intake air.

### Installing

Install in reverse order of removal, observing the following:



#### Note

*Reinstall hose clips in their original positions.*





## 4 Intake manifold

⇒ [o4.1 verview - intake manifold", page 478](#)

⇒ [a4.2 nd installing intake manifold", page 481](#)

⇒ [a4.3 nd installing throttle valve moduleGX3", page 484](#)

⇒ [t4.4 hrottle valve moduleGX3", page 485](#)

### 4.1 Assembly overview - intake manifold





### 1 - Coolant pipe

- ☐ Clipped onto intake manifold.
- ☐ Removing and installing coolant pipe ⇒ [a3.2 nd installing coolant pipes", page 374](#)

### 2 - Intake manifold

- ☐ Combined with charge air cooler
- ☐ Removing and installing ⇒ [a4.2 nd installing intake manifold", page 481](#)

### 3 - Coolant pipe

- ☐ Clipped onto intake manifold.

### 4 - Bolt

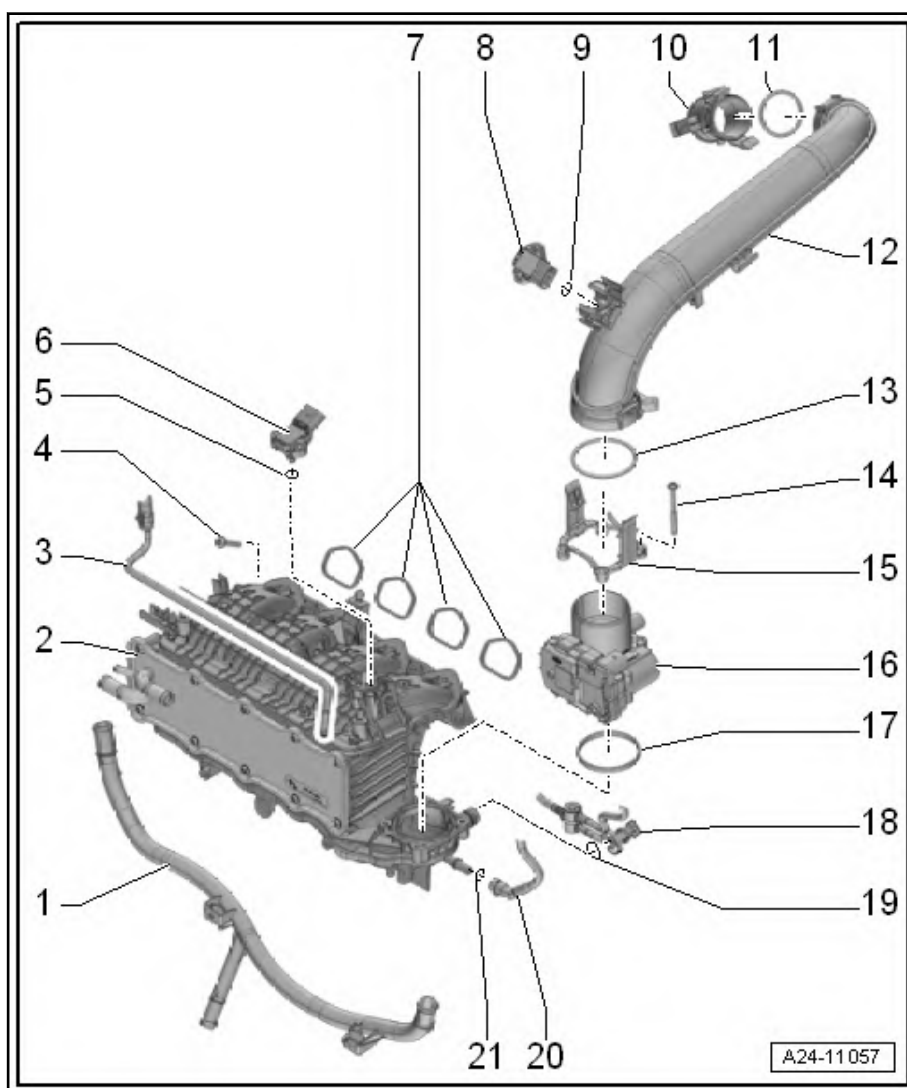
- ☐ Specified torque and tightening sequence ⇒ [page 480](#)

### 5 - O-ring

- ☐ Renew after removal

### 6 - Intake manifold sender - GX9-

- ☐ Consisting of  
Intake air temperature sender 2 -G299-  
Intake manifold pressure sender -G71-
- ☐ Removing and installing ⇒ [a5.1 nd installing intake manifold senderGX9", page 487](#)



### 7 - Seals

- ☐ Renew after removal

### 8 - Charge air pressure sender -GX26-

- ☐ Consisting of  
Charge pressure sender -G31-  
Intake air temperature sender -G42-
- ☐ Removing and installing ⇒ [a2.3 nd installing charge pressure senderGX26", page 438](#)

### 9 - O-ring

- ☐ Renew after removal

### 10 - Union

### 11 - O-ring

- ☐ Renew after removal
- ☐ Before installing, lightly moisten O-ring with clean engine oil

### 12 - Air intake pipe

- ☐ For removal, use release tools -T10527- and -T10527/1-

### 13 - O-ring





- ☐ Renew after removal
- ☐ Before installing, lightly moisten O-ring with clean engine oil

#### 14 - Bolt

- ☐ Thread-cutting
- ☐ Fit and screw in bolt by hand to ensure it is screwed into old thread. Then tighten bolt to specified torque.
- ☐ 7 Nm

#### 15 - Retaining clip

- ☐ For air intake pipe

#### 16 - Throttle valve module -GX3-

- ☐ Consisting of

Throttle valve module -J338-

Throttle valve drive for electronic power control -G186-

Throttle valve drive angle sender 1 for electronic power control -G187-

Throttle valve drive angle sender 2 for electronic power control -G188-

- ☐ Removing and installing ⇒ [a4.3 nd installing throttle valve moduleGX3", page 484](#)
- ☐ Cleaning ⇒ [t4.4 hrottle valve moduleGX3", page 485](#)
- ☐ After throttle valve control module -GX3- has been replaced, it must be re-adapted to engine control unit -J623-. Use vehicle diagnostic tester for this.

#### 17 - Seal

- ☐ Renew after removal

#### 18 - Vacuum line

#### 19 - O-ring

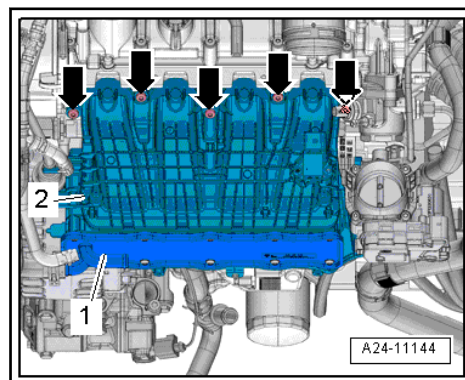
- ☐ In event of damage to O-ring, renew vacuum line ⇒ [Item 18 \(page 480\)](#)

#### 20 - Vacuum line

#### 21 - O-ring

- ☐ In event of damage to O-ring, renew vacuum line ⇒ [Item 20 \(page 480\)](#)

### Intake manifold - specified torque and tightening sequence



– Tighten bolts -arrows- in stages as follows:

Stage	Bolts	Specified torque
1st	-Arrows-	Starting in centre, screw in bolts alternately by hand until they make contact
2nd	-Arrows-	Starting in centre, screw in bolts alternately to 8 Nm





## 4.2 Removing and installing intake manifold

### Special tools and workshop equipment required

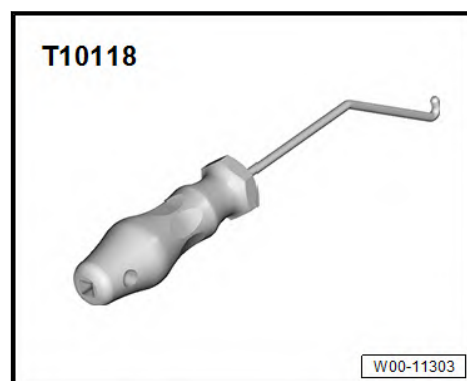
- ◆ Hose clamps to 25 mm -3094-



- ◆ Spring-type clip pliers -VAS 6362-



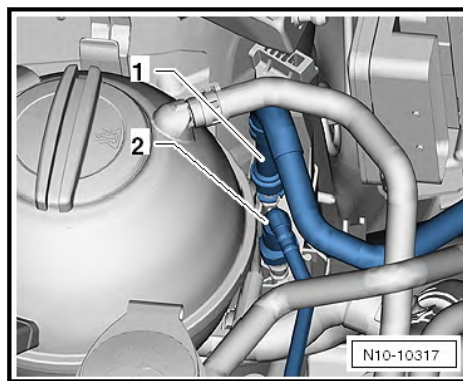
- ◆ Assembly tool -T10118-



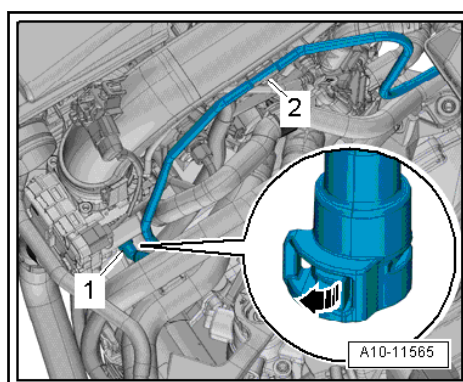
### Removing

- Remove air filter housing ⇒ [a3.2 nd installing air filter housing", page 472](#) .
- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- Place drip tray for workshop hoist -VAS 6208- underneath.
- Drain coolant ⇒ [a1.3 nd adding coolant", page 340](#) .
- Release and separate plug-in connector -2-. Disconnect plug-in connectors ⇒ Rep. gr. 20; Plug-in connectors; Disconnecting plug-in connectors.

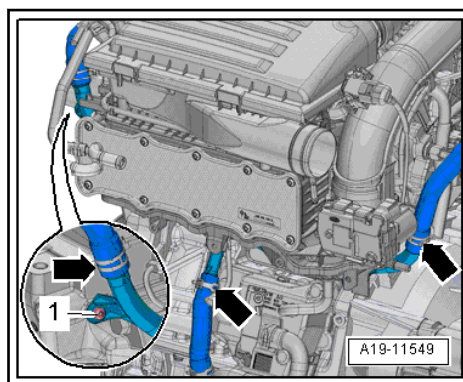




- Move lines to one side.
- Release catch -arrow- and disconnect vacuum hose -1-.

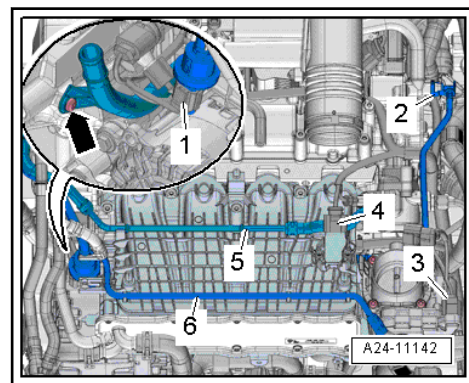


- Move clear vacuum hose at air pipe -2-.
- Remove air intake pipe ⇒ [a2.5 nd installing air pipe", page 441](#).
- Unscrew bolt -1-, and release clamps -arrows-.

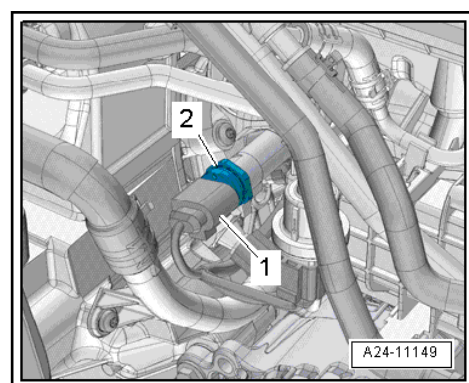


- Pull off coolant hoses.
- Disconnect connectors:

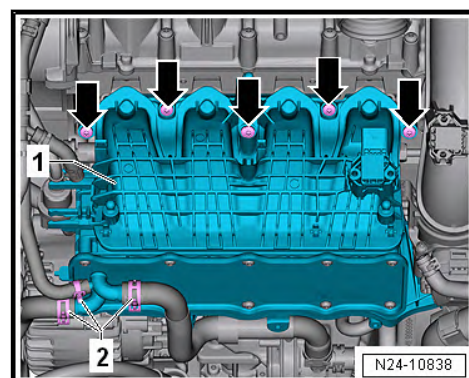




- 1 - For activated charcoal filter system solenoid valve 1 -N80-
- 3 - For throttle valve module -GX3-
- 4 - For intake manifold sender -GX9-.
- The -arrow- in the illustration can be disregarded.
- Press release buttons and pull off hose -2- for activated charcoal filter.
- Unclip fuel supply line -5- and coolant line -6- from intake manifold and push them to one side.
- Disconnect connector -1- from fuel pressure sender -G247-.



- Also disconnect connector from oil pressure switch.
- Loosen hose clips -2- and pull off coolant hoses.



- Unscrew bolts -arrows-.
- Remove intake manifold -1-.

### Installing

Install in reverse order of removal, observing the following:





## Note

*Renew seals and O-rings.*

- Install noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview – noise insulation.
- Install air filter housing ⇒ [a3.2 nd installing air filter housing”, page 472](#) .
- Add coolant ⇒ [a1.3 nd adding coolant”, page 340](#) .

## Specified torques

- ♦ ⇒ [o4.1 verview - intake manifold”, page 478](#)

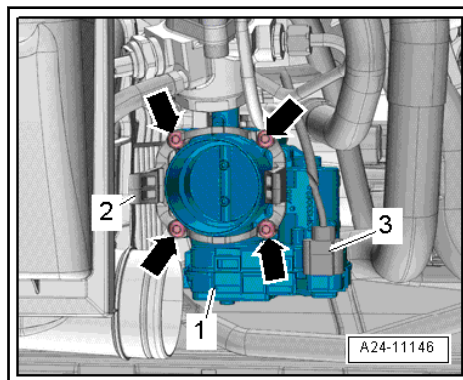
## 4.3 Removing and installing throttle valve module -GX3-

Throttle valve module -GX3- consists of

- ♦ Throttle valve module -J338-
- ♦ Throttle valve drive for electronic power control -G186-
- ♦ Throttle valve drive angle sender 1 for electronic power control -G187-
- ♦ Throttle valve drive angle sender 2 for electronic power control -G188-

### Removing

- Remove air intake pipe ⇒ [a2.5 nd installing air pipe”, page 441](#) .
- Disconnect electrical connector -3-.



- Unscrew bolts -arrows- and remove throttle valve module -GX3- -1- with adapter -2-.

### Installing

Install in reverse order of removal, observing the following:

- After throttle valve control module -GX3- has been replaced, it must be re-adapted to engine control unit -J623-.
- Switch on ignition and select the following menu options on vehicle diagnostic tester:
  - ♦ `0001 - Adaption throttle valve module J338`

## Specified torques

- ♦ ⇒ [o4.1 verview - intake manifold”, page 478](#)





## 4.4 Cleaning throttle valve module -GX3-



### Note

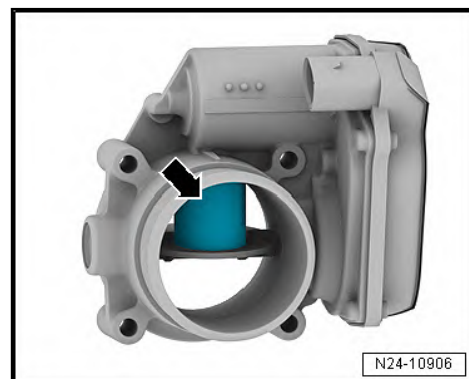
- ◆ If a new engine control unit -J623- is installed the throttle valve module must be adjusted.
- ◆ Contamination and coking in end stop can result in incorrect adaptation values.
- ◆ When cleaning the throttle valve housing, take care not to scratch it.

### Special tools and workshop equipment required

- ◆ Acetone (commercially available)
- ◆ Brush

### Sequence of operations

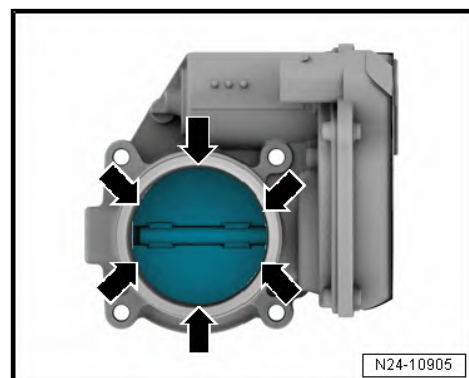
- Remove throttle valve module -GX3- ➔ [a4.3 nd installing throttle valve moduleGX3", page 484](#) .
- Open throttle valve by hand and lock it in open position with a wedge (plastic or wood) -arrow-.



### CAUTION

Risk of injury caused by acetone. Acetone is highly flammable and may cause eye and skin irritation.

- Wear protective goggles.
  - Wear protective gloves.
- 
- Clean throttle valve housing thoroughly, especially around the points -arrows- where the throttle valve closes, using commercially available acetone and a small brush.







- Wipe the inside of the throttle valve housing with a lint-free cloth.
- Allow acetone to dry off completely.
- Install throttle valve module -GX3- ➔ [a4.3 nd installing throttle valve moduleGX3", page 484](#) .
- Delete learnt values and adapt engine control unit -J623- to throttle valve module -J338-.
- Switch on ignition and select the following menu options on vehicle diagnostic tester:
  - ◆ 0001 - Clear adaption values for injectors





## 5 Senders and sensors

⇒ [a5.1 nd installing intake manifold senderGX9", page 487](#)

⇒ [a5.2 nd installing fuel pressure senderG247", page 487](#)

⇒ [f5.3 uel pressure senderG247", page 489](#)

⇒ [a5.4 nd installing exhaust gas pressure sensor 1G450", page 493](#)

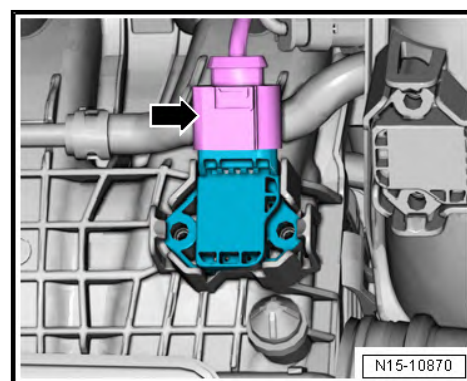
### 5.1 Removing and installing intake manifold sender -GX9-

Intake manifold sender -GX9- consists of:

- ◆ Intake air temperature sender 2 -G299-
- ◆ Intake manifold pressure sender -G71-

#### Removing

- Remove air filter housing ⇒ [a3.2 nd installing air filter housing", page 472](#) .
- Separate electrical connector -arrow-.



- Release fasteners, and remove intake manifold sender -GX9-.

#### Installing

Install in reverse order of removal, observing the following:



#### Note

- ◆ *Renew O-ring.*
- ◆ *If the retaining tabs broke off during removal, the sender can be mounted using two securing bolts ⇒ Electronic parts catalogue.*
- Install air filter housing ⇒ [a3.2 nd installing air filter housing", page 472](#) .

#### Specified torques

Component	Specified torque
Intake manifold sender -GX9-	3 Nm

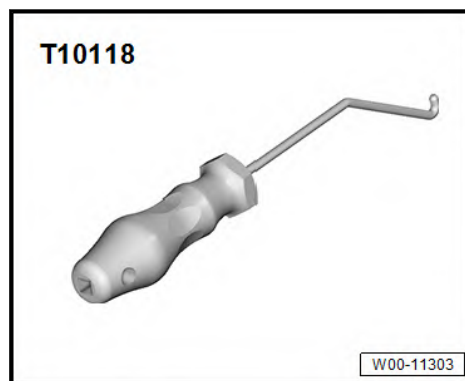
### 5.2 Removing and installing fuel pressure sender -G247-

Special tools and workshop equipment required

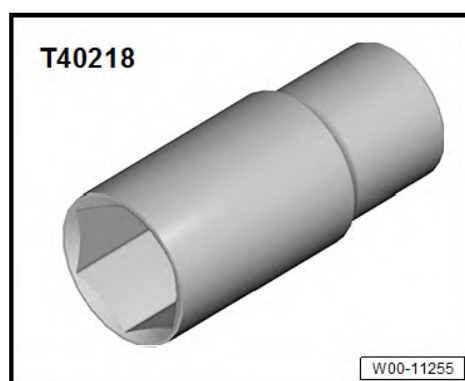




- ◆ Assembly tool -T10118-

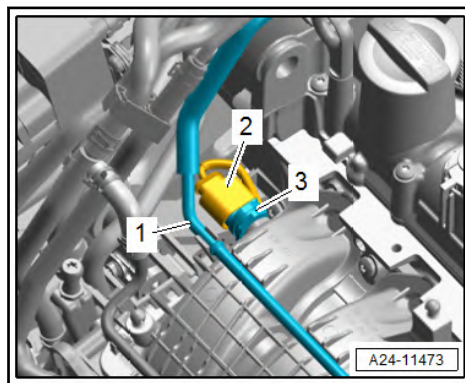


- ◆ Socket 27 mm -T40218- or commercially available 27 mm hexagon socket insert



## Removing

- Remove air filter housing ➔ [a3.2 nd installing air filter housing](#), page 472 .



- Unclip fuel supply line -1- from intake manifold, and push it to one side.
- Disconnect electrical connector -2-.

## ⚠ CAUTION

The fuel system is pressurised.

Danger of injury through fuel spray.

- Wear protective goggles.
  - Wear protective gloves.
  - To release pressure, wrap a clean cloth around the connection and carefully loosen the connection.
- Unscrew fuel pressure sender -G247- -3- using socket 27 mm -T40218-.





## Installing

Install in reverse order of removal, observing the following:

- Lubricate cone and thread of fuel pressure sender with clean engine oil.

## Specified torques

- ◆ ⇒ [o2.1 overview - fuel rail with injectors", page 449](#)

## 5.3 Checking fuel pressure sender -G247-

⇒ [f5.3.1 fuel pressure sender G247, using pressure sensor tester VAS 6394 and vehicle diagnostic tester", page 489](#)

⇒ [f5.3.2 fuel pressure sender G247, using vehicle diagnostic tester", page 491](#)

### 5.3.1 Checking fuel pressure sender -G247-, using pressure sensor tester -VAS 6394- and vehicle diagnostic tester

#### Special tools and workshop equipment required

- ◆ ⇒ Vehicle diagnostic tester
- ◆ Pressure sensor tester -VAS 6394-



- ◆ Test instrument adapter/DSO (3-pin) -VAS 5570-
- ◆ Socket 27 mm long, commercially available

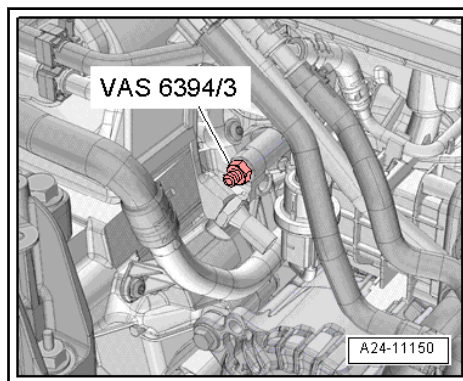
#### Sequence of operations

#### CAUTION

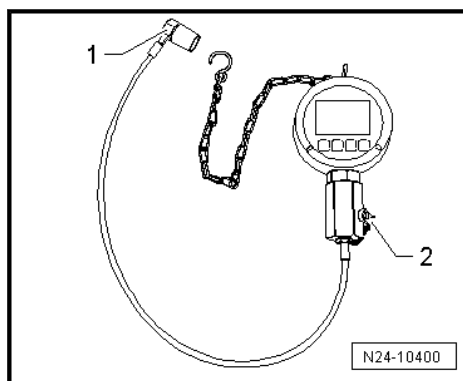
The fuel system is pressurised.  
Danger of injury through fuel spray.  
– Release high pressure.

- Remove fuel pressure sender - G247- ⇒ [a5.2 and installing fuel pressure sender G247", page 487](#) .
- Lubricate taper seal of adapter -VAS 6394/3- with clean engine oil and screw into fuel rail (22 Nm).

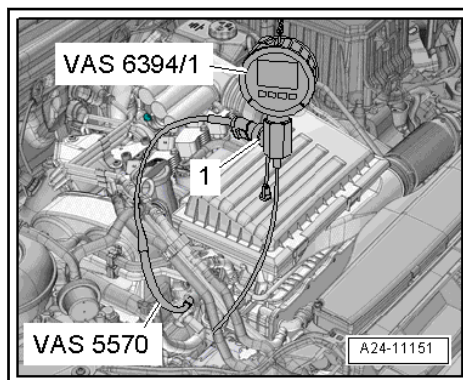




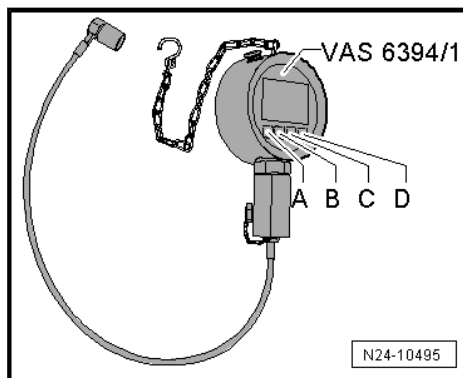
- Unscrew plug -2- and screw fuel pressure sender - G247- into tester -VAS 6394/1-.



- Connect pressure line -1- of tester to adapter -VAS 6394/3-.
- Connect vehicle and fuel pressure sender - G247- electrical-ly using test instrument adapter/DSO (3-pin) -VAS 5570-.



- Switch on tester -VAS 6394/1- by pressing button -A- once briefly.







## Note

- ◆ When button -A- is pressed for 2 seconds, the illumination is switched on for 20 seconds.
- ◆ If tester -VAS 6394/1- does not indicate 0 bar, zero the tester ⇒ Operating instructions.
- Connect a ⇒ Vehicle diagnostic tester.
- Start engine and run it at idling speed.
- Select **0001 - Read measured values** in self-diagnosis.
- Select **Fuel pressure** from the list.
- Compare pressure from tester -VAS 6394/1- with actual value displayed on ⇒ Vehicle diagnostic tester.
- Watch the fuel pressure on the vehicle diagnostic tester.
  - A maximum pressure deviation of 5 bar is permissible.
- If the deviation is greater than 5 bar, renew fuel pressure sender - G247-.
- Repeat test with new fuel pressure sender - G247- and compare both measured values.
- If measured values are now the same, install new fuel pressure sender - G247-.
- If measured values are not the same again, check electrical connection between fuel pressure sender - G247- and engine control unit -J623- ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

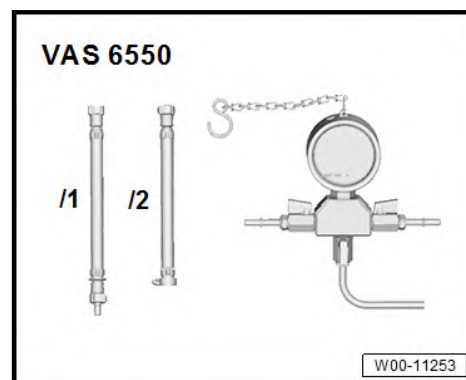
## Specified torques

- ◆ ⇒ [o2.1 verview - fuel rail with injectors", page 449](#)

## 5.3.2 Checking fuel pressure sender -G247-, using vehicle diagnostic tester

### Special tools and workshop equipment required

- ◆ Pressure gauge -VAS 6550-

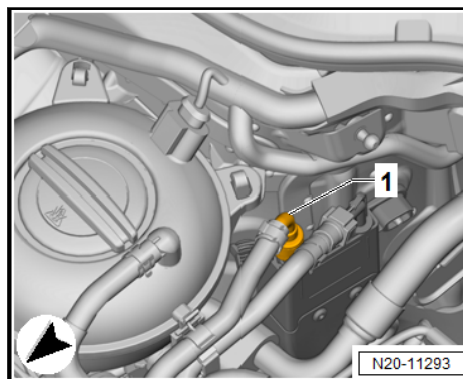


- ◆ ⇒ Vehicle diagnostic tester

### Condition:

- $\frac{1}{4}$  of fuel tank filled with fuel.
- Pull off supply line -1-. Separate plug-in connectors ⇒ Fuel supply system - petrol engines; Rep. gr. 20; Plug-in connectors; Separating plug-in connectors.





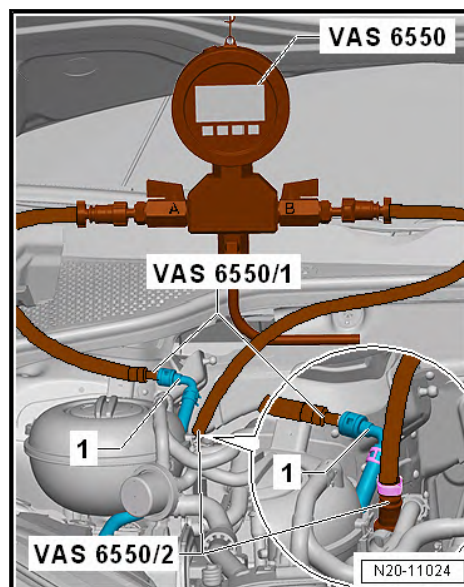
**CAUTION**

The fuel system is pressurised.

Danger of injury through fuel spray.

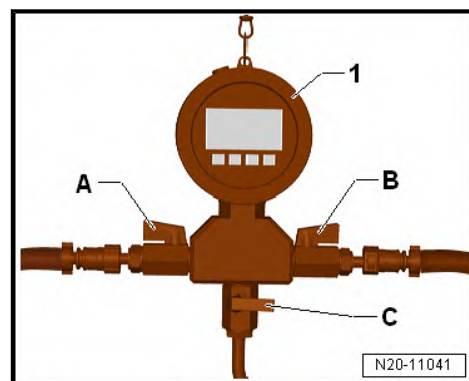
- Wear protective goggles.
- Wear protective gloves.
- To release pressure, wrap a clean cloth around the connection and carefully loosen the connection.

- Collect escaping fuel with a cleaning cloth.
- Connect hose -VAS 6550/1- to connection -A- of pressure tester -VAS 6550-.



- Connect hose -VAS 6550/1- to fuel supply line -1- leading to engine.
- Connect hose -VAS 6550/2- to connection -B- of pressure tester -VAS 6550-.
- Use hose -VAS 6550- to connect fuel line leading to fuel tank with pressure tester -VAS 6550/2-.
- Ensure plug-in connectors are secure properly by pulling.
- Ensure that drain tap -C- on pressure tester -1- is closed.





- Shut-off valves -A- and -B- on pressure tester -1- are open.
- Use ⇒ Vehicle diagnostic tester to check fuel pressure sender -G247-. To do this, select following function:
  - ◆ Diagnosis-compatible systems
  - ◆ 0001 - Engine electronics
  - ◆ 0001 - Repair groups
  - ◆ 24 - Mixture preparation/injection
  - ◆ G247 - Check fuel pressure sender

## 5.4 Removing and installing exhaust gas pressure sensor 1 -G450-

Special tools and workshop equipment required

- ◆ Socket 24 mm -T40284-



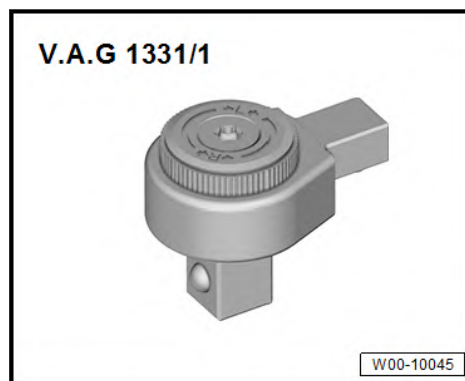
- ◆ Torque wrench -V.A.G 1331-





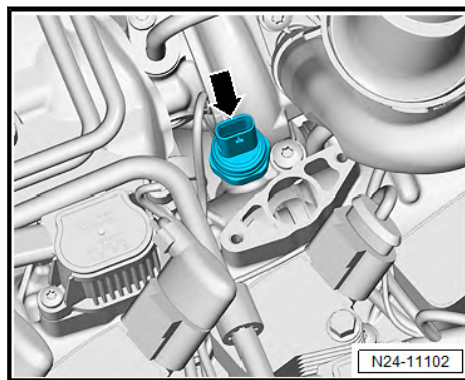


- ◆ Ratchet wrench -V.A.G 1331/1-



### Removing

- Remove resonator for intake air ⇒ [a3.4 nd installing resonator for intake air](#), page 476 .
- Release and pull off connector -2-.
- Use socket, 24 mm -T40284- to unscrew exhaust gas pressure sensor 1 -G450- -arrow-.



### Installing

Install in reverse order of removal, observing the following:



#### Note

- ◆ *Renew exhaust gas pressure sensor 1 -G450- after removal.*
- ◆ *Before installing the exhaust gas pressure sensor 1 -G450-, check hole in camshaft housing for soiling.*
- Tighten exhaust gas pressure sensor 1 -G450- to specified torque.

#### Specified torques:

- ◆ 25 Nm









## 6.2 Removing and installing engine control unit -J623-

⇒ [a6.2.1 nd installing engine control unitJ623, Sharan and Tiguan](#), page 496

⇒ [a6.2.2 nd installing engine control unitJ623, Golf Cabriolet, Scirocco and CC](#), page 498

⇒ [a6.2.3 nd installing engine control unitJ623, Golf 2020 >, Golf Estate 2021 >](#), page 501

### 6.2.1 Removing and installing engine control unit -J623-, Sharan and Tiguan



#### Note

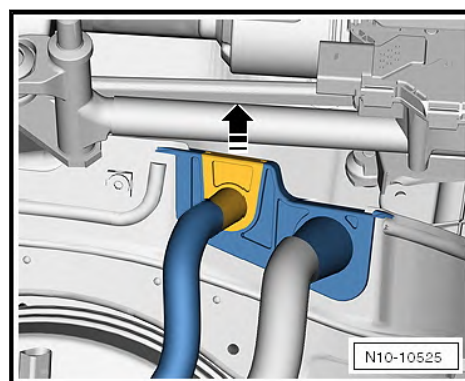
*Removing and installing anti-theft engine control unit ⇒  
[a6.3.1 nd installing engine control unitJ623 with protective housing, Sharan and Tiguan](#), page 502 .*

#### Removing

- If the engine control unit is to be renewed, switch on ignition, and select the following menu option on⇒ Vehicle diagnostic tester:

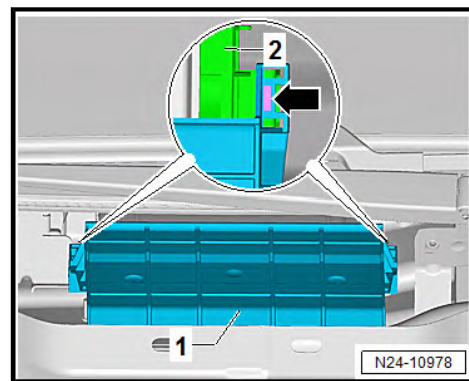
◆ 0001 - Renew engine control unit

- Switch off ignition and remove key from ignition lock.
- Remove windscreen wiper arms: ⇒ Electrical system; Rep. gr. 92; Windscreen wiper system; Removing and installing windscreen wiper arms.
- Remove plenum chamber bulkhead ⇒ General body repairs, exterior; Rep. gr. 50; Bulkhead; Assembly overview - bulkhead.
- If fitted, pull connector off heated windscreen control unit -J505-.
- Pull seal together with engine wiring harness upwards in -direction of arrow- out of cable guide.

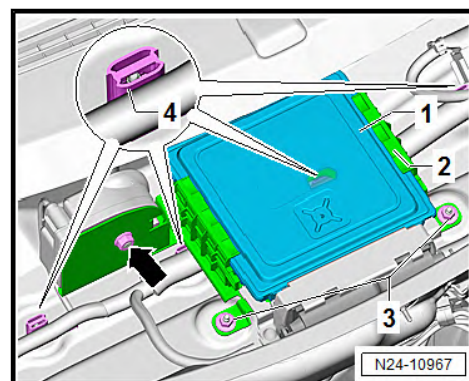


- If fitted, unclip cover -1- at sides from mountings -2- -arrows-, and remove it.

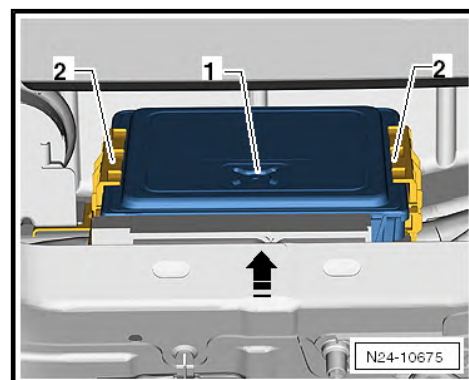




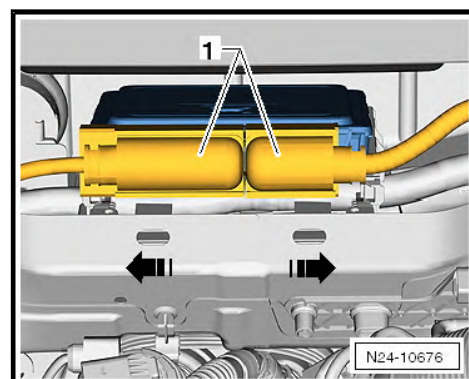
- Remove nut -3-.



- Raise engine control unit -1- in front area in -direction of arrow-.



- Pull engine control unit forwards out of the side guides -2-.
- Slide connector locking devices -1- on engine control unit in -direction of arrow- and pull off both connectors.

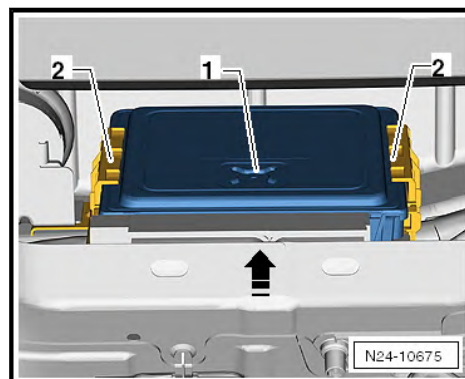






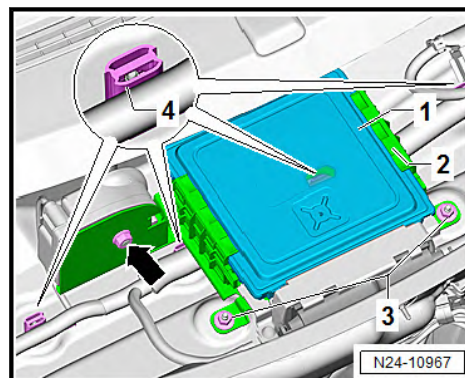
## Installing

- Attach connectors to engine control unit and slide locking devices inwards until they engage.
- Push engine control unit -1- into side guides -2- in the -direction of arrow-.



- Install plenum chamber bulkhead ⇒ General body repairs, exterior; Rep. gr. 50; Plenum chamber bulkhead.
- Install plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50; Plenum chamber cover.
- Wiper arms ⇒ Electrical system; Rep. gr. 92; Windscreen wiper system; Removing and installing wiper arms.

## Specified torque for securing nuts of retaining frame



Nuts	Specified torque
Nuts -3- for bracket of engine control unit	6 Nm

## 6.2.2 Removing and installing engine control unit -J623-, Golf Cabriolet, Scirocco and CC

### Removing

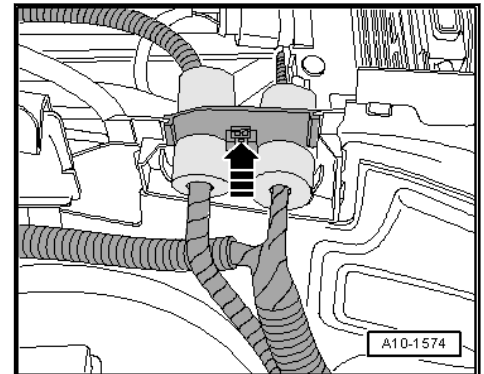
- If the engine control unit is to be renewed, switch on ignition, and select the following menu option on⇒ Vehicle diagnostic tester:
  - ◆ 0001 - Renew engine control unit
- Switch off ignition and remove key from ignition lock.
- Remove windscreen wiper arms: ⇒ Electrical system; Rep. gr. 92; Windscreen wiper system; Removing and installing windscreen wiper arms.





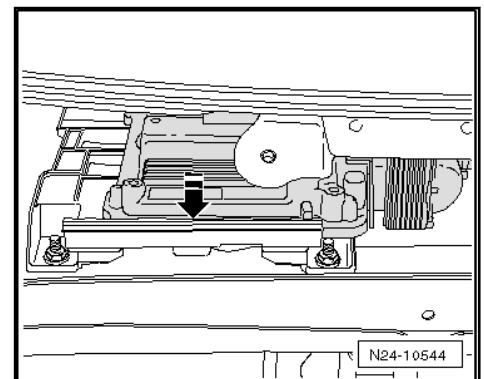
- Remove plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50; Bulkhead; Assembly overview - plenum chamber cover.

#### Golf Cabriolet



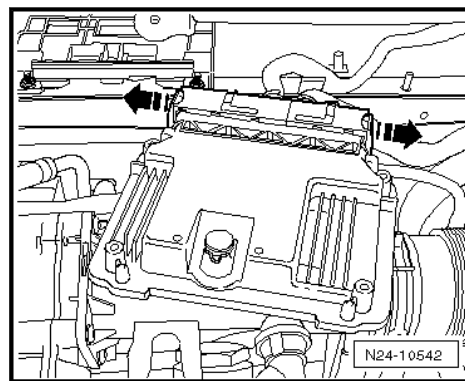
- Detach wiring harness for engine control unit from inner side of plenum chamber bulkhead.
- Remove plenum chamber bulkhead ⇒ General body repairs, exterior; Rep. gr. 50; Plenum chamber; Assembly overview - plenum chamber cover.
- Release feed-through for wiring harness -arrow-, and pull it off upwards.
- Detach wiring harness for engine control unit.
- Release and pull off connector on wiper motor ⇒ Electrical system; Rep. gr. 92; Windscreen wiper system; Removing and installing windscreen wiper system.
- Pull engine control unit as far as possible towards front right wheel housing.
- Detach engine control unit from plenum chamber.

#### Continued for all vehicles

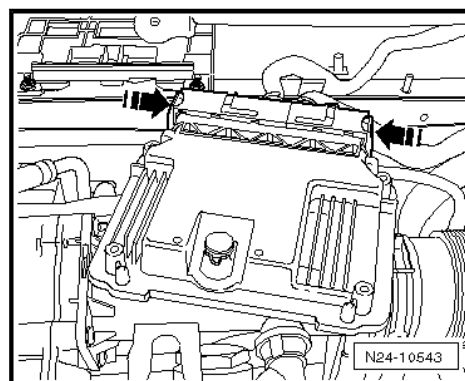


- Push down retaining frame in direction of -arrow- and remove engine control unit.
- Push locking devices of connectors in -direction of arrow- and pull off connectors.

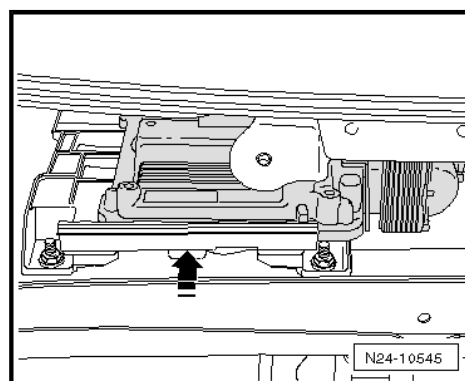




## Installing



- Fit connectors to engine control unit and slide locking devices onto stop in -direction of arrow-.
- Insert engine control unit into retaining frame and push retaining frame upwards in direction of -arrow-.



## Specified torques

- ◆ ⇒ Electrical system; Rep. gr. 92; Removing and installing wiper arms
- ◆ ⇒ General body repairs, exterior; Rep. gr. 50; Plenum chamber cover
- ◆ ⇒ Electrical system; Rep. gr. 92; Windscreen wiper system; Removing and installing windscreen wiper system
- ◆ ⇒ General body repairs, exterior; Rep. gr. 50; Plenum chamber bulkhead





## 6.2.3 Removing and installing engine control unit -J623-, Golf 2020 ➤, Golf Estate 2021 ➤

### Special tools and workshop equipment required

- ◆ ⇒ Vehicle diagnostic tester

### Removing

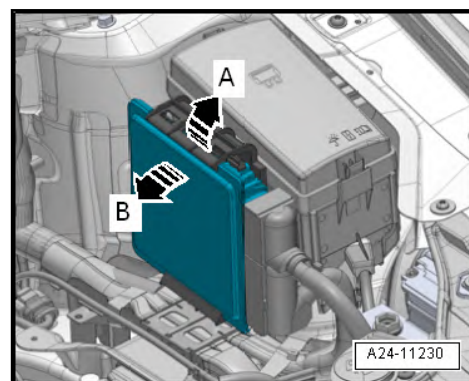
- When renewing engine control unit, connect ⇒ Vehicle diagnostic tester.
- Select `0001 - Renew engine control unit` function.



### Note

*If the engine (motor) control unit comes into contact with the positive battery terminal, permanent damage to the engine (motor) control unit will be the consequence.*

- Disconnect battery ⇒ Electrical system; Rep. gr. 27; Battery; Disconnecting and connecting battery.
- Release catch -arrow A-, and remove engine control unit -J623- -arrow B-.

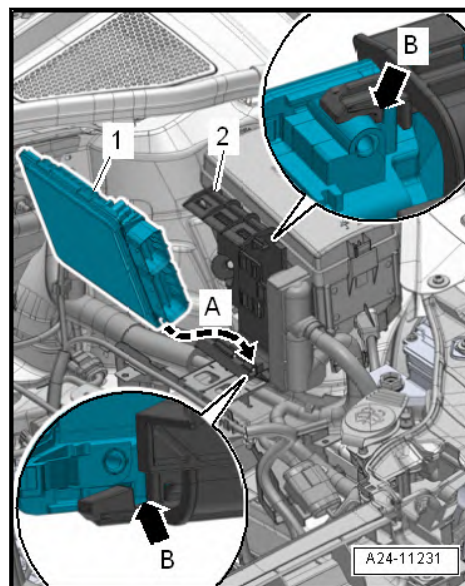


- Release and pull off connectors for engine (motor) control unit -J623-.





## Installing



Install in reverse order of removal, observing the following:

- Insert lower edge of engine control unit -J623- into bracket -arrow A-, and engage engine control unit in bracket at upper edge.
- When doing this, ensure that lugs of engine control unit engage in notches at top and bottom of bracket -arrows B-.
- Connect battery ⇒ Electrical system; Rep. gr. 27; Battery; Disconnecting and connecting battery.

### 6.3 Removing and installing engine (motor) control unit -J623- with protective housing

⇒ [a6.3.1 nd installing engine control unitJ623 with protective housing, Sharan and Tiguan](#), page 502

⇒ [a6.3.2 nd installing engine control unitJ623 with protective housing, Golf Cabriolet, Scirocco and CC](#), page 506

⇒ [a6.3.3 nd installing engine control unitJ623 with protective housing, T-Roc](#), page 512

⇒ [a6.3.4 nd installing engine control unitJ623 with protective housing, Golf 2020 ➤, Golf Estate 2021 ➤](#), page 515

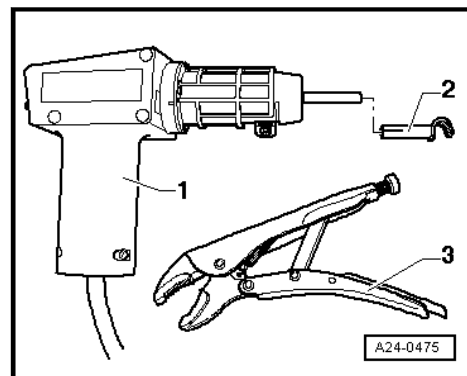
#### 6.3.1 Removing and installing engine control unit -J623- with protective housing, Sharan and Tiguan

Special tools and workshop equipment required





- ◆ Hot air blower -VAS 1978/14A- -item 1- with nozzle -2- from wiring harness repair set -VAS 1978 B-



- ◆ Vehicle diagnostic tester



#### Note

- ◆ *If the engine control unit is to be replaced, connect the vehicle diagnostic tester and carry out the guided function "Renewing engine control unit".*
- ◆ *The shear-head bolt threads may be coated with locking compound. To simplify removal, the shear-head bolts can be heated using hot air blower -VAS 1978/14A-. When doing this, make sure not to damage adjacent cables, connectors or other components.*



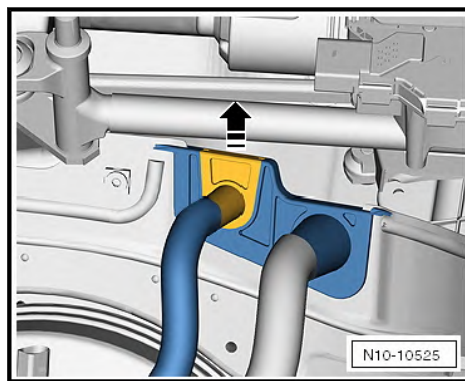
#### Note

*Removing and installing anti-theft engine control unit ⇒  
a6.3.1 nd installing engine control unit J623 with protective housing, Sharan and Tiguan", page 502.*

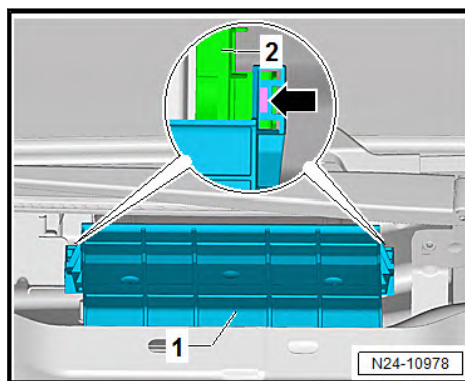
### Removing

- If the engine control unit is to be renewed, switch on ignition, and select the following menu options on vehicle diagnostic tester:
  - ◆ 0001 - Renew engine control unit
- Switch off ignition and remove key from ignition lock.
- Remove windscreen wiper arms: ⇒ Electrical system; Rep. gr. 92; Windscreen wiper system; Removing and installing windscreen wiper arms.
- Remove plenum chamber bulkhead ⇒ General body repairs, exterior; Rep. gr. 50; Bulkhead; Assembly overview - bulkhead.
- If fitted, pull connector off heated windscreen control unit -J505-.
- Pull seal together with engine wiring harness upwards in -direction of arrow- out of cable guide.

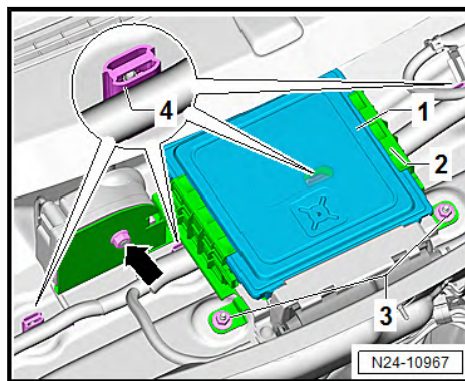




- If fitted, unclip cover -1- at sides from mountings -2- -arrows-, and remove it.



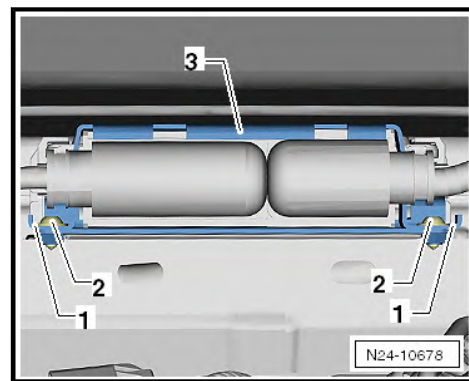
- If fitted, unscrew nut -arrow- from alarm horn -H12-.



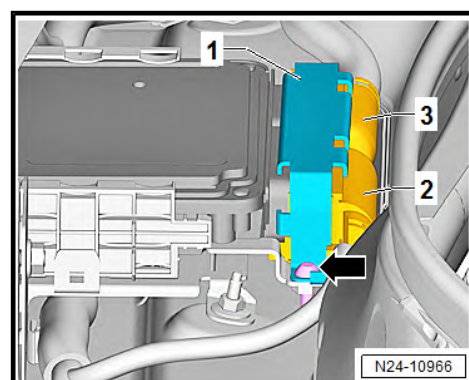
The alarm horn -H12- remains in its installation position.

- Unscrew nuts -3-, and remove engine control unit -J623- -1- upwards.
- Unclip retainer -4- from pins, and remove wiring harness with engine control unit -J623- connected as far as possible.
- Bend upwardly projecting tabs -1- of locking bar outwards.





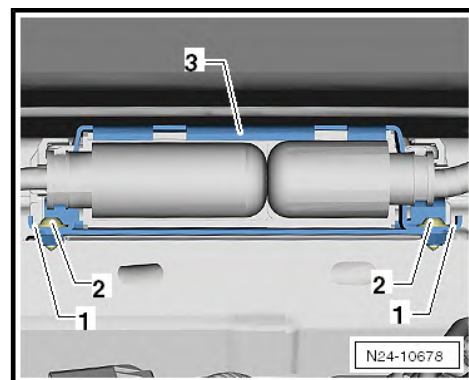
- Loosen shear bolts -2- using mole grips.
- Unscrew shear bolts -arrow-, and remove locking bracket -1-.



- Open connector locks on engine control unit, and pull off connectors -2 and 3-.

#### Installing

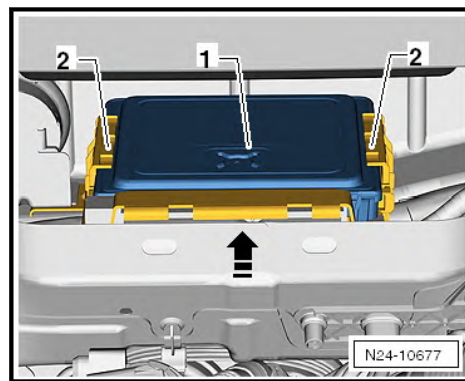
- Attach connectors to engine control unit and slide locking devices inwards until they engage.
- Screw on a new locking bar -3- with new shear-head bolts -2- and tighten bolts uniformly until just before heads shear off.



Disregard item -1-.

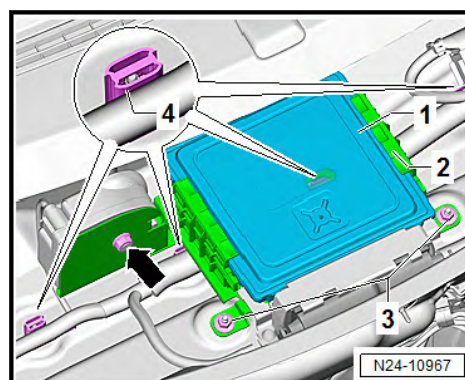
- Push engine control unit -1- into side guides -2- in the -direction of arrow-.





- Install plenum chamber bulkhead ⇒ General body repairs, exterior; Rep. gr. 50; Bulkhead; Assembly overview - bulkhead.
- Install plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50; Plenum chamber bulkhead; Assembly overview - plenum chamber cover.
- Wiper arms ⇒ Electrical system; Rep. gr. 92; Windscreen wiper system; Removing and installing wiper arms.

#### Specified torque for securing nuts of retaining frame



Nuts	Specified torque
Nut -arrow- for alarm horn - H12-	20 Nm
Nuts -3- for bracket of engine control unit	6 Nm

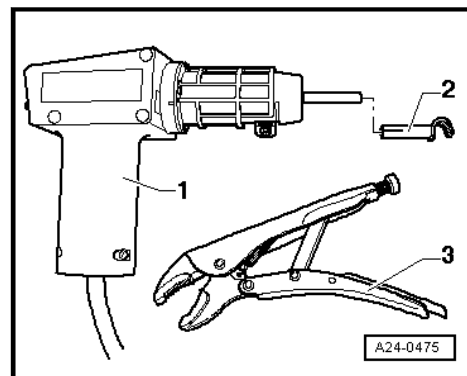
### 6.3.2 Removing and installing engine control unit -J623- with protective housing, Golf Cabriolet, Scirocco and CC

Special tools and workshop equipment required





- ◆ Hot air blower -VAS 1978/14A- -item 1- with nozzle -2- from wiring harness repair set -VAS 1978 B-



- ◆ Small grinder (commercially available)
- ◆ Vehicle diagnostic tester



#### Note

- ◆ *If the engine control unit is to be replaced, connect the vehicle diagnostic tester and carry out the guided function "Renewing engine control unit".*
- ◆ *The shear-head bolt threads may be coated with locking compound. To simplify removal, the shear-head bolts can be heated using hot air blower -VAS 1978/14-. When doing this, make sure not to damage adjacent cables, connectors or other components.*

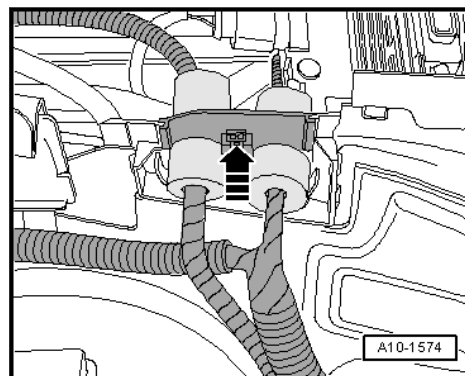
#### Removing

- If the engine control unit is to be renewed, switch on ignition, and select the following menu options on vehicle diagnostic tester:
- ◆ 0001 - Renew engine control unit
- Switch off ignition and remove key from ignition lock.
- Remove wiper arms ⇒ Electrical system; Rep. gr. 92; Removing and installing wiper arms.
- Removing plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50; Plenum chamber cover.

#### Golf Cabriolet

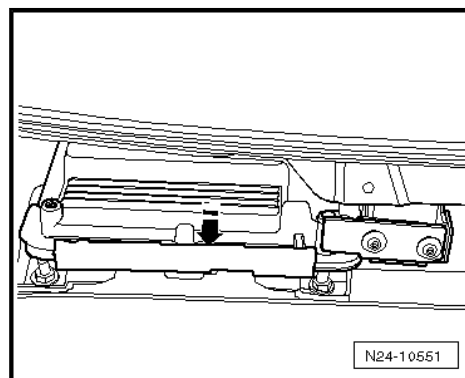
- Detach wiring harness for engine control unit from inner side of plenum chamber bulkhead.
- Remove plenum chamber bulkhead ⇒ General body repairs, exterior; Rep. gr. 50; Plenum chamber bulkhead.
- Release feed-through for wiring harness -arrow-, and pull it off upwards.



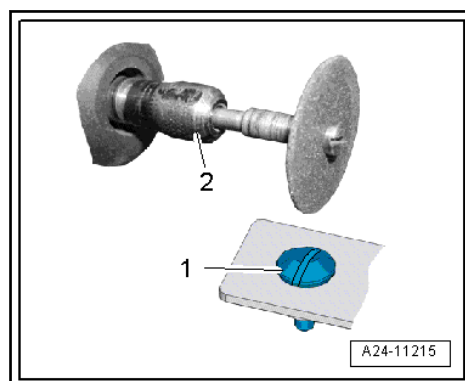


- Detach wiring harness for engine control unit.
- Release and pull off connector on wiper motor ⇒ Electrical system; Rep. gr. 92; Windscreen wiper system; Removing and installing windscreen wiper system.
- Pull engine control unit as far as possible towards front right wheel housing.
- Detach engine control unit from plenum chamber.

**Continued for all vehicles**



- Push down retaining frame in direction of -arrow- and remove engine control unit.
- Make groove (for a screwdriver) in head of shear bolt -1- using a small grinder -2-.

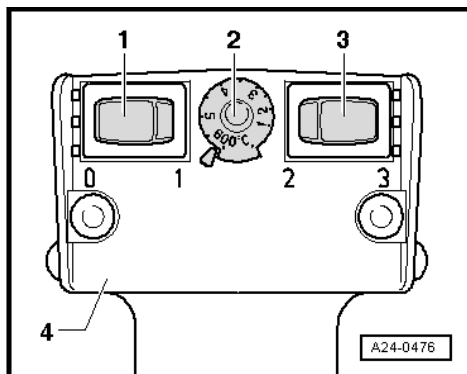






## Note

The threads of the shear bolts are secured with locking fluid. To unscrew these bolts, the threads must therefore be heated with the hot air blower.



Set hot air blower as shown in illustration.

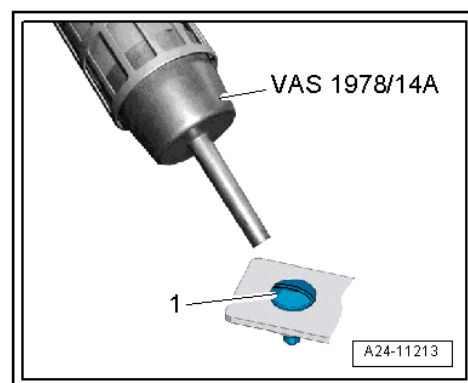
- Turn potentiometer for temperature adjustment -2- to maximum heater output
- Two-stage switch for air flow rate -3- set to position 3.



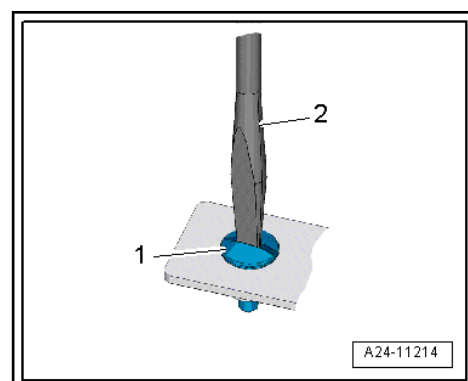
## NOTICE

**Risk of damage to adjacent components caused by hot air blower. Risk of overheating.**

- If necessary, cover adjacent components.
- Heat head of shear bolt -1- for approx. 20 to 30 seconds.



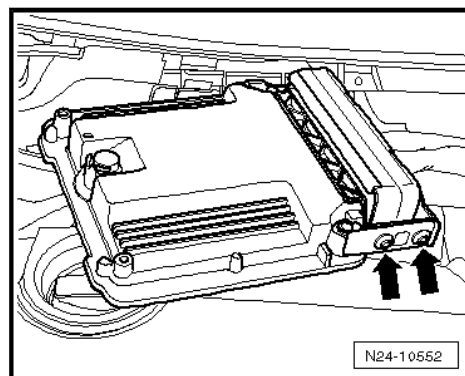
- Unscrew shear bolt -1- with screwdriver -2-.



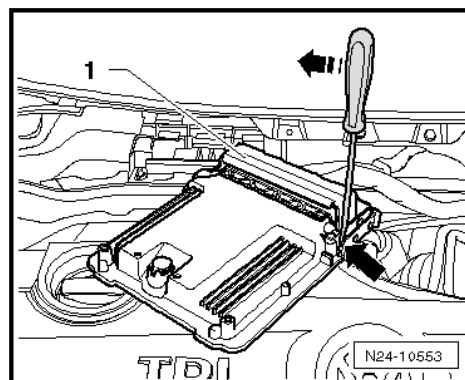




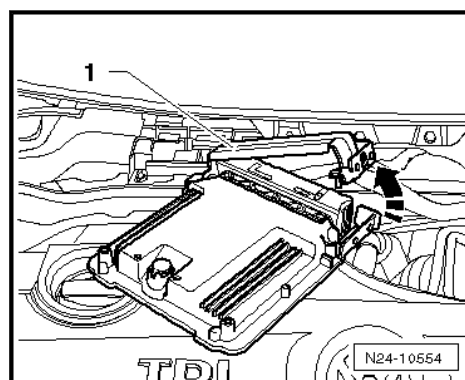
- Remove protective housing from engine (motor) control unit -J623-.
- Unscrew shear-head bolts -arrows- using a pair of pliers.



- Insert screwdriver between both locking plates -arrow-.

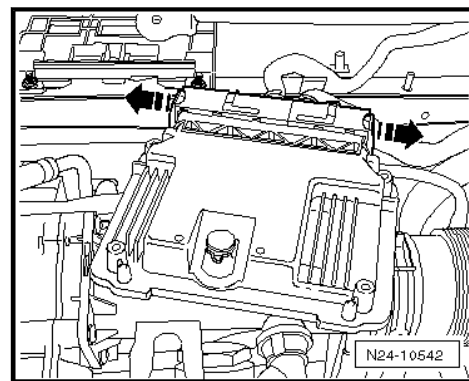


- Carefully press screwdriver in direction of -arrow- while simultaneously bending locking bar -1- upwards.
- Bend locking bar -1- in -direction of arrow- until it can be pulled off connector.



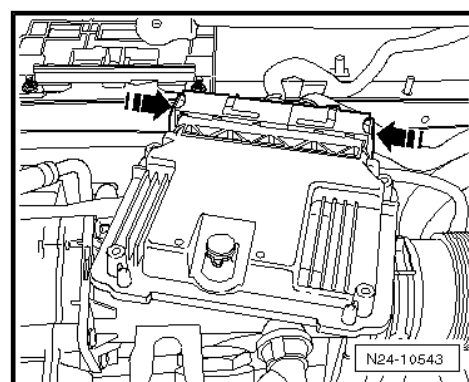
- Push locking devices of connectors in -direction of arrow- and pull off connectors.



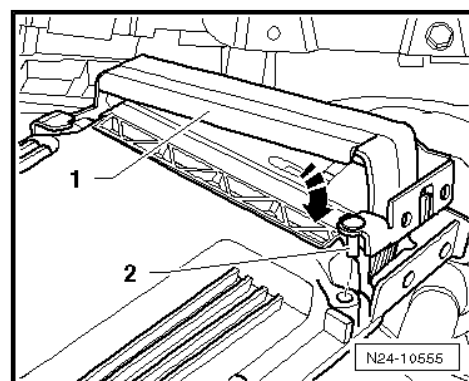


### Installing

- Fit connectors to engine control unit and slide locking devices onto stop in -direction of arrow-.

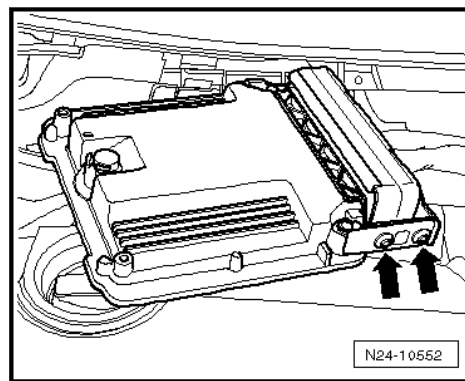


- Fit retaining bar -1- onto connectors and press it in direction of -arrow-.

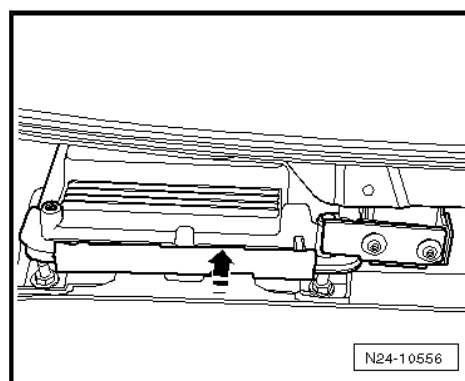


- Guide pin -2- to stop into hole on engine control unit.
- Use new shear-head bolts -arrows- to secure locking bar on engine control unit.





- Evenly tighten shear-head bolts until bolt heads shear off -arrows-.
- Insert engine control unit into retaining frame and push retaining frame upwards in direction of -arrow-.



#### Golf Cabriolet

- Install plenum chamber bulkhead, plenum chamber cover and wiper arms ⇒ General body repairs, exterior; Rep. gr. 50; Plenum chamber bulkhead.

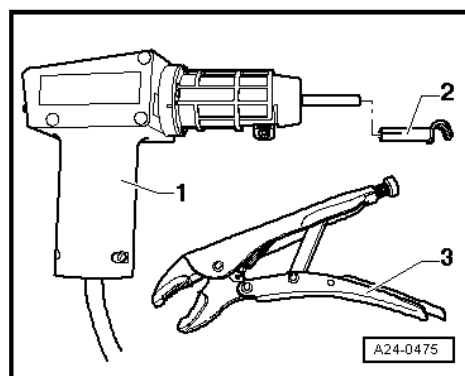
#### CC

- Install wiper arms and plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50; Bulkhead; Removing and installing plenum chamber cover.

### 6.3.3 Removing and installing engine control unit -J623- with protective housing, T-Roc

#### Special tools and workshop equipment required

- ♦ Hot air blower -VAS 1978/14A- -item 1- with nozzle -2- from wiring harness repair set -VAS 1978 B-



- ♦ Small grinder (commercially available)





◆ ⇒ Vehicle diagnostic tester

### Removing

- If engine control unit is replaced, switch on ignition and connect ⇒ Vehicle diagnostic tester.
- Select function `0001 - Renew engine control unit`.

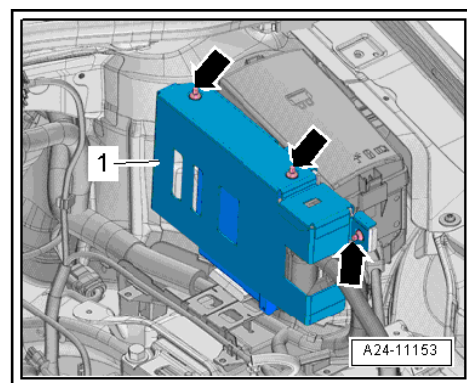


### Note

*If the engine (motor) control unit comes into contact with the positive battery terminal, permanent damage to the engine (motor) control unit will be the consequence.*

- Disconnect battery ⇒ Electrical system; Rep. gr. 27; Battery; Disconnecting and connecting battery.

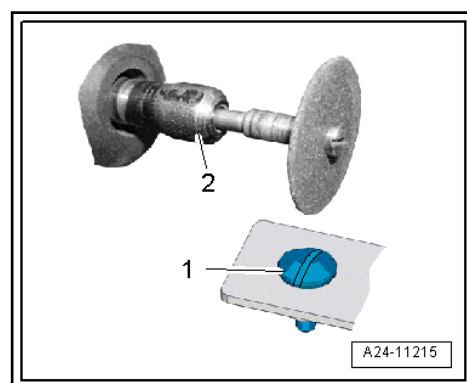
To remove protective housing -1-, unscrew shear bolts -arrows- as follows:



### Note

*Cover the area around the engine control unit, and protect it from flying sparks.*

- Make groove (for a screwdriver) in head of shear bolt -1- using a small grinder -2-.

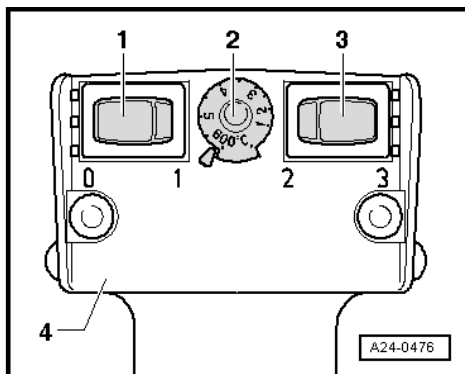






## Note

*The threads of the shear bolts are secured with locking fluid. To unscrew these bolts, the threads must therefore be heated with the hot air blower.*



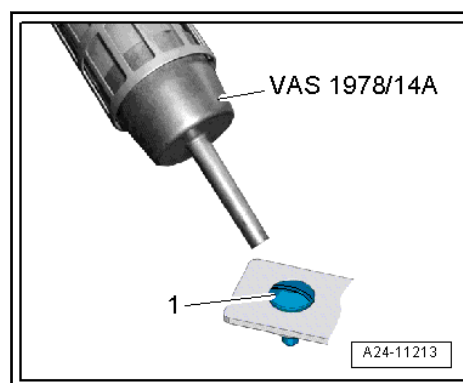
- Set hot air blower as shown in illustration. Set potentiometer for temperature regulation -2- to maximum heating output and 2-stage switch for air volume -3- to position 3.



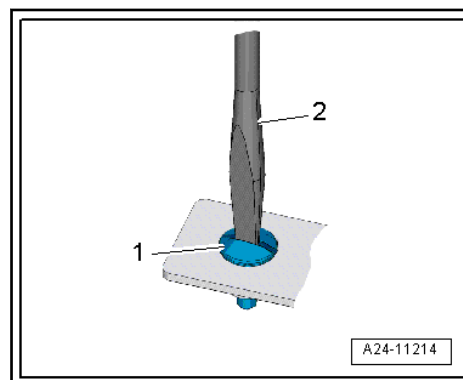
## NOTICE

**Risk of damage to adjacent components caused by hot air blower. Risk of overheating.**

- If necessary, cover adjacent components.
- Apply heat to head of shear bolt -1- for approx. 20 to 30 seconds.

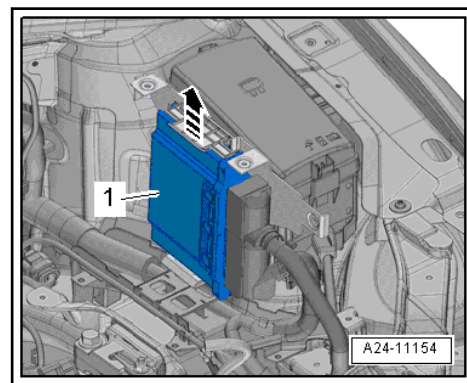


- Unscrew shear bolt -1- with screwdriver -2-.



- Release catch -arrow-, and remove engine control unit -1-.





- Release and pull off connectors for engine (motor) control unit -J623-.

### Installing

Install in reverse order of removal, observing the following:

- It is essential that the engine (motor) control unit -J623- be provided with the protective housing again.
- Clean threaded holes for shear-head bolts from locking fluid residue. A thread chaser is suitable for cleaning.
- Use new shear-head bolts.

## 6.3.4 Removing and installing engine control unit -J623- with protective housing, Golf 2020 ➤, Golf Estate 2021 ➤

### Special tools and workshop equipment required

- ◆ Wiring harness repair set -VAS 1978 B-



- ◆ Hot air blower -VAS 1978/14A-



- ◆ Small grinder (commercially available)
- ◆ ⇒ Vehicle diagnostic tester





## Removing

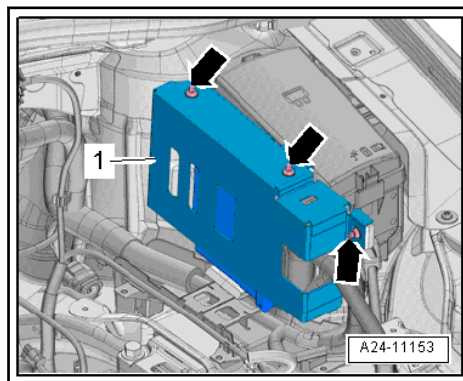
- If engine control unit is renewed, select 0001 - Renew engine control unit function in ⇒ Vehicle diagnostic tester.
- Store the vehicle key and other entry and start authorisation systems outside the vehicle to prevent the vehicle from being switched on unintentionally.



### Note

- ♦ *If the engine (motor) control unit comes into contact with the positive battery terminal, permanent damage to the engine (motor) control unit will be the consequence.*
- ♦ *Therefore, make sure to disconnect the battery before removing the engine control unit.*
- Disconnect battery ⇒ Electrical system; Rep. gr. 27; Battery; Disconnecting and connecting battery.

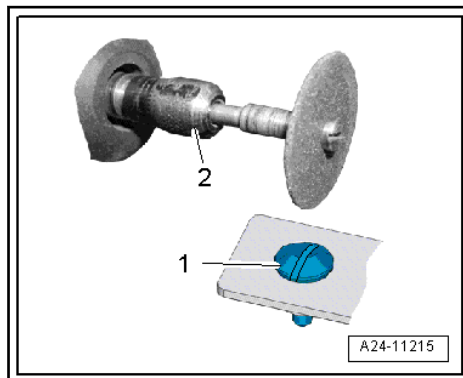
To remove protective housing -1-, unscrew shear bolts -arrows- as follows:



### Note

*Cover the area around the engine control unit, and protect it from flying sparks.*

- Make groove (for a screwdriver) in head of shear bolt -1- using a small grinder -2-.

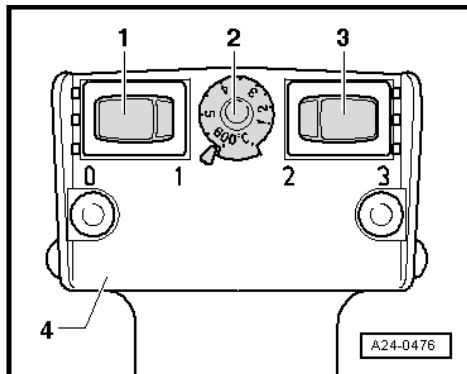






**i Note**

*The threads of the shear bolts are secured with locking fluid. To unscrew these bolts, the threads must therefore be heated with the hot air blower.*

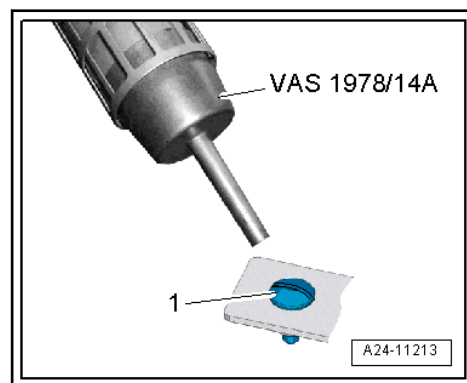


- Set the hot air blower as shown in illustration. Meaning potentiometer for temperature regulation -2- set to maximum heating power and 2-stage switch for air volume -3- set to position 3.

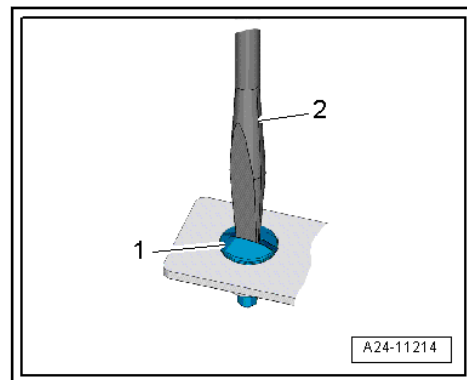
**! NOTICE**

**Risk of damage to adjacent components caused by hot air blower. Risk of overheating.**

- If necessary, cover adjacent components.
- Heat head of shear bolt -1- for approx. 20 to 30 seconds.

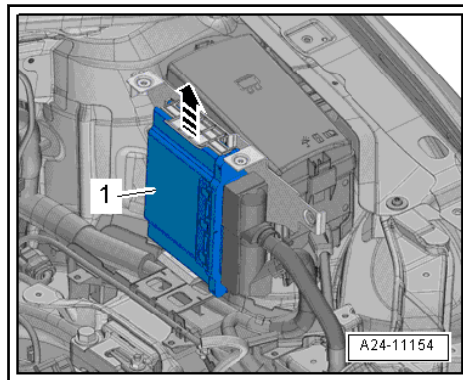


- Unscrew shear bolt -1- with screwdriver -2-.



- Release fastener -arrow- and detach engine control unit -1-.





- Release and pull off connectors for engine (motor) control unit -J623-.

### Installing

Install in reverse order of removal, observing the following:

- It is essential that the engine (motor) control unit -J623- be provided with the protective housing again.
- Clean the threaded holes for the shear-head bolts of locking compound residues. A thread chaser is suitable for cleaning.
- Use new shear-head bolts.

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

- Connect ⇒ Vehicle diagnostic tester.
- Restore operational readiness then select and execute the following menu option on ⇒ Vehicle diagnostic tester:

◆ 0001 - Renew engine control unit





## **7 High-pressure pump**

⇒ [o7.1 verview - high-pressure pump", page 519](#)

⇒ [a7.2 nd installing high-pressure pump", page 525](#)

⇒ [a7.3 nd installing high-pressure pipe", page 527](#)

### **7.1 Assembly overview - high-pressure pump**

⇒ [o7.1.1 verview - high-pressure pump, version 1", page 519](#)

⇒ [o7.1.2 verview - high-pressure pump, version 2", page 521](#)

⇒ [o7.1.3 verview - high-pressure pump, version 3", page 523](#)

#### **7.1.1 Assembly overview - high-pressure pump, version 1**





#### 1 - Roller tappet

- ☐ When installing lubricate lightly with clean engine oil

#### 2 - O-ring

- ☐ Renew
- ☐ Coat lightly with clean engine oil when installing.

#### 3 - High-pressure pump

- ☐ With fuel pressure regulating valve -N276-.
- ☐ Do not dismantle.
- ☐ Removing and installing ⇒ [a7.2 nd installing high-pressure pump](#), page 525

#### 4 - High-pressure pipe

- ☐ Does not need to be renewed after removal
- ☐ Unions must be free of damage
- ☐ Do not alter shape.
- ☐ Removing and installing ⇒ [a7.3 nd installing high-pressure pipe](#), page 527
- ☐ Lubricate thread of union nuts with clean engine oil
- ☐ 16 Nm +45°

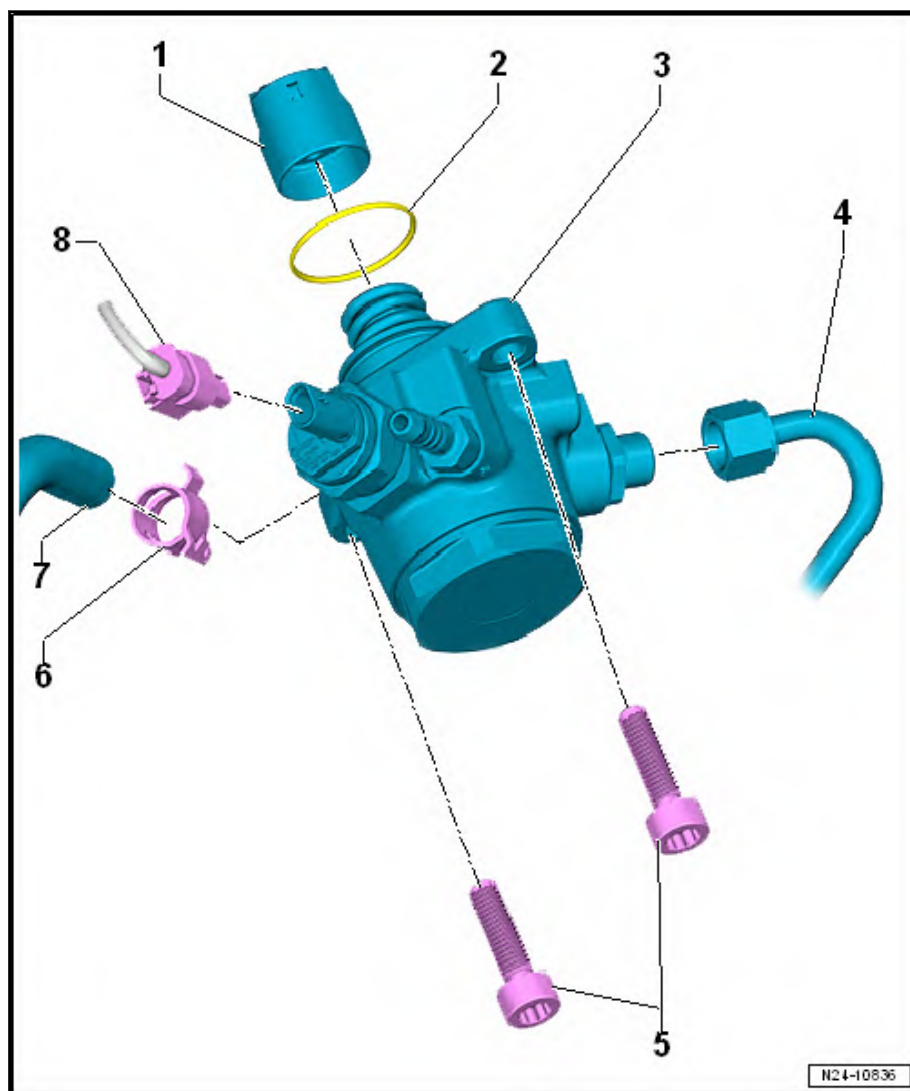
#### 5 - Bolt

- ☐ M8x32
- ☐ Renew
- ☐ Specified torque and tightening sequence ⇒ [page 520](#)

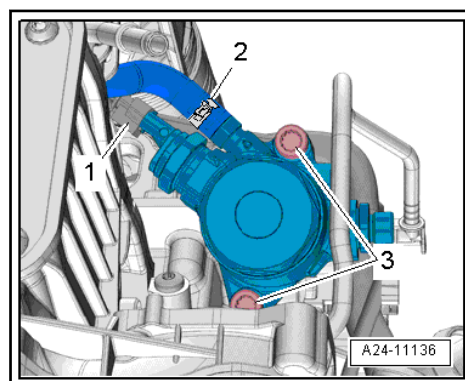
#### 6 - Hose clamp

#### 7 - Fuel supply line

#### 8 - Electrical connector



#### High-pressure pump - specified torque and tightening sequence







#### Note

- ◆ *High-pressure pumps from different manufacturers have been installed.*
- ◆ *Bear in mind the different torque specifications for bolts!*

To prevent flange of high-pressure pump from being deformed during installation, install high-pressure pump as follows:

- Tighten new bolt in stages as follows:

Stage	M8 bolts	Specified torque/turning further angle
1st	-3-	Screw onto stop by hand
2nd	-3-	Tighten one turn alternately until flange of high-pressure pump makes contact with camshaft housing
3rd	-3-	20 Nm
4th	-3-	Turn 90° further

### 7.1.2 Assembly overview - high-pressure pump, version 2





#### 1 - Roller tappet

- ☐ When installing lubricate lightly with clean engine oil

#### 2 - O-ring

- ☐ Renew
- ☐ When installing lubricate lightly with clean engine oil

#### 3 - High-pressure pump

- ☐ With fuel pressure regulating valve -N276-.
- ☐ Do not dismantle.
- ☐ Removing and installing ⇒ [a7.2 nd installing high-pressure pump](#), page 525

#### 4 - High-pressure pipe

- ☐ Does not need to be renewed after removal
- ☐ Removing and installing ⇒ [a7.3 nd installing high-pressure pipe](#), page 527
- ☐ Do not alter shape.
- ☐ Unions must be free of damage
- ☐ Lubricate thread of union nuts with clean engine oil
- ☐ 16 Nm +45°

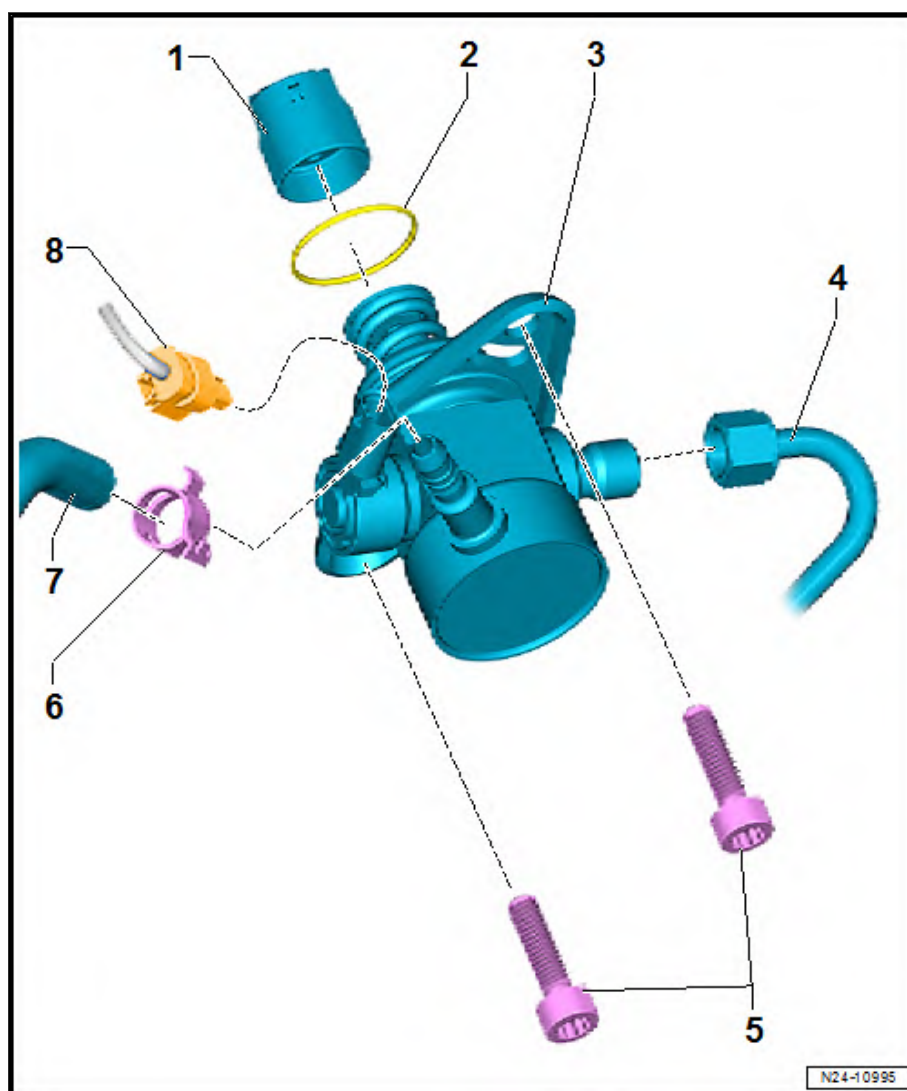
#### 5 - Bolt

- ☐ M8x25
- ☐ Renew
- ☐ Specified torque and tightening sequence ⇒ [page 522](#)

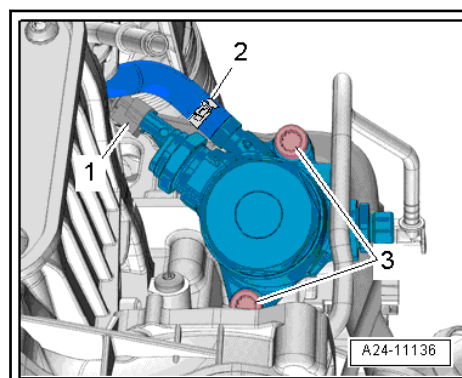
#### 6 - Hose clamp

#### 7 - Fuel supply line

#### 8 - Electrical connector



#### High-pressure pump - specified torque and tightening sequence







#### Note

- ◆ *High-pressure pumps from different manufacturers have been installed.*
- ◆ *Bear in mind the different torque specifications for bolts!*

To prevent flange of high-pressure pump from being deformed during installation, install high-pressure pump as follows:

- Tighten new bolt in stages as follows:

Stage	M8 bolts	Specified torque/turning further angle
1st	-3-	Screw onto stop by hand
2nd	-3-	Tighten one turn alternately until flange of high-pressure pump makes contact with camshaft housing
3rd	-3-	20 Nm
4th	-3-	Turn 90° further

### 7.1.3 Assembly overview - high-pressure pump, version 3





#### 1 - Roller tappet

- ☐ When installing lubricate lightly with clean engine oil

#### 2 - O-ring

- ☐ Renew
- ☐ Coat lightly with clean engine oil when installing.

#### 3 - High-pressure pump

- ☐ With fuel pressure regulating valve -N276-.
- ☐ Do not dismantle.
- ☐ Removing and installing ⇒ [a7.2 nd installing high-pressure pump](#), page 525

#### 4 - High-pressure pipe

- ☐ Does not need to be renewed after removal
- ☐ Unions must be free of damage
- ☐ Do not alter shape.
- ☐ Removing and installing ⇒ [a7.3 nd installing high-pressure pipe](#), page 527
- ☐ Lubricate thread of union nuts with clean engine oil
- ☐ 16 Nm +45°

#### 5 - Bolt

- ☐ M6×22 (1st version)
- ☐ M6×26 (2nd version)
- ☐ Renew
- ☐ Specified torque and tightening sequence ⇒ [page 524](#)

#### 6 - Clip

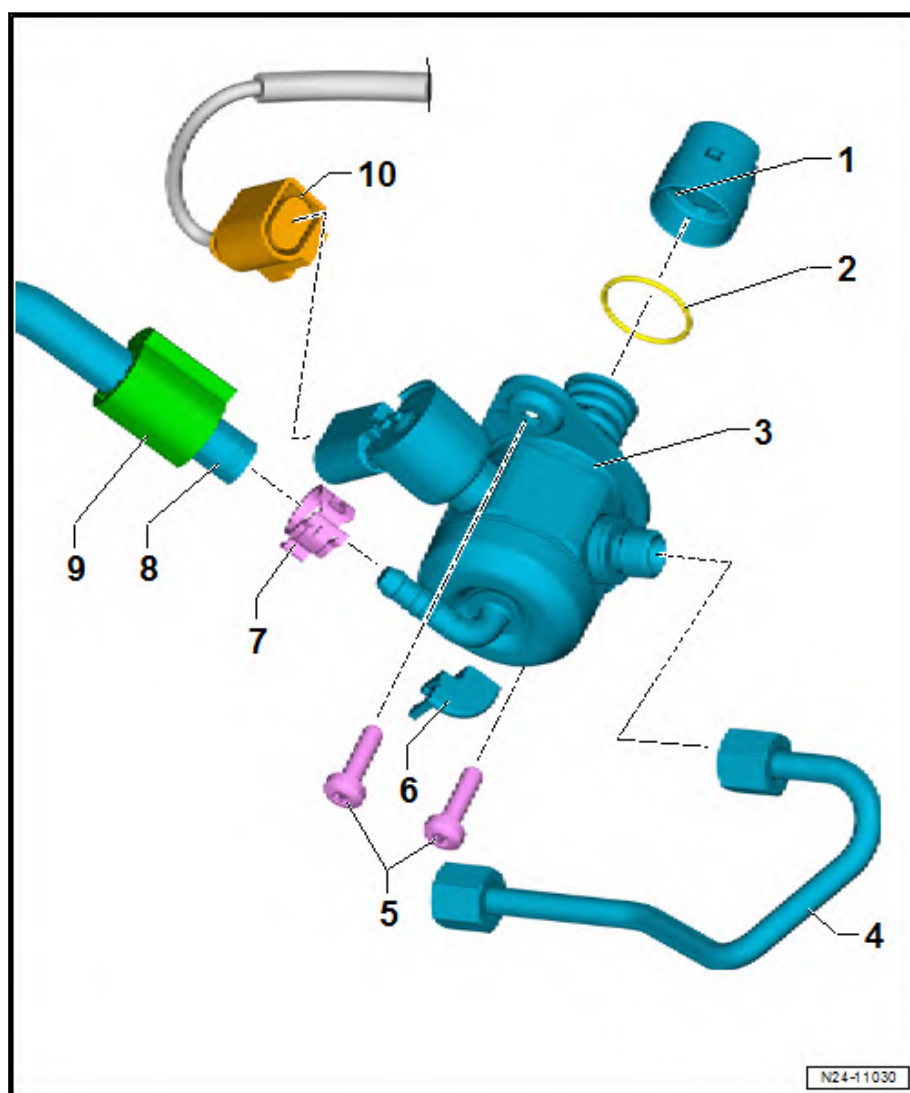
#### 7 - Hose clamp

#### 8 - Fuel supply line

#### 9 - Serrated washer

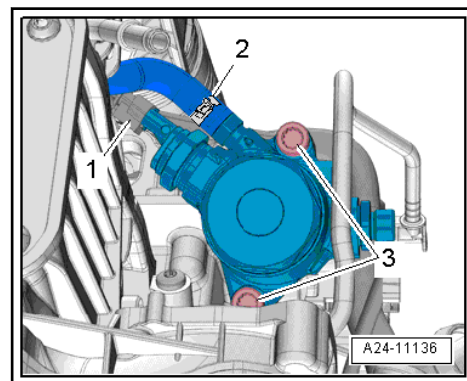
- ☐ Fit directly behind spring-type clip
- ☐ As shown in illustration, cap points in direction of fuel pressure regulating valve -N276-

#### 10 - Electrical connector



#### High-pressure pump - specified torque and tightening sequence





#### Note

- ◆ *High-pressure pumps from different manufacturers have been installed.*
- ◆ *Bear in mind the different torque specifications for bolts!*

To prevent flange of high-pressure pump from being deformed during installation, install high-pressure pump as follows:

- Tighten new bolt in stages as follows:

Stage	M6 bolts	Specified torque/turning further angle
1st	-3-	Screw onto stop by hand
2nd	-3-	Tighten one turn alternately until flange of high-pressure pump makes contact with camshaft housing
3rd	-3-	8 Nm
4th	-3-	Turn 90° further

## 7.2 Removing and installing high-pressure pump

### Special tools and workshop equipment required

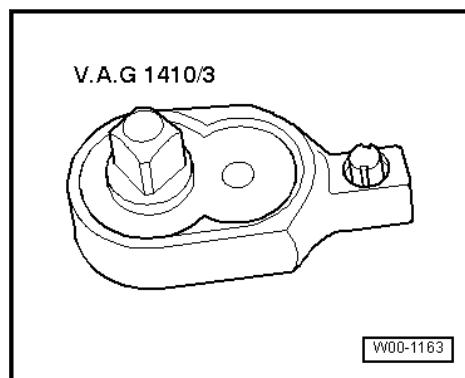
- ◆ Torque wrench -V.A.G 1410-



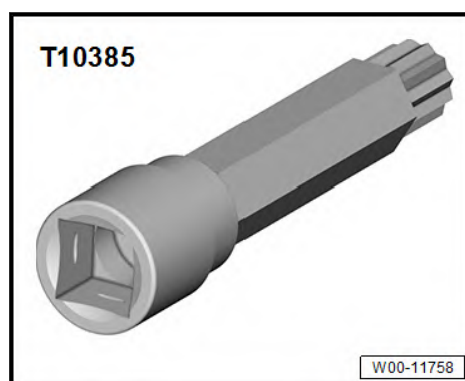




- ◆ Ratchet attachment -V.A.G 1410/3-

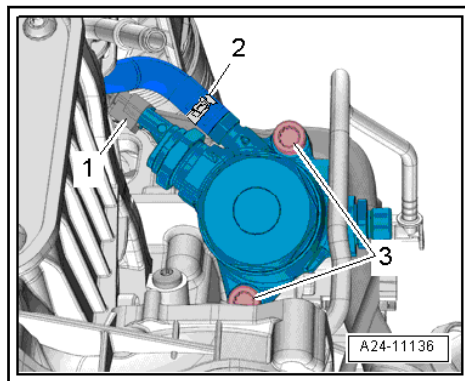


- ◆ Bit XZN 10 -T10385-



### Removing

- Engine cold.
- Remove high-pressure pipe ➔ [a7.3 nd installing high-pressure pipe](#), [page 527](#) .
- Disconnect electrical connector -1-.

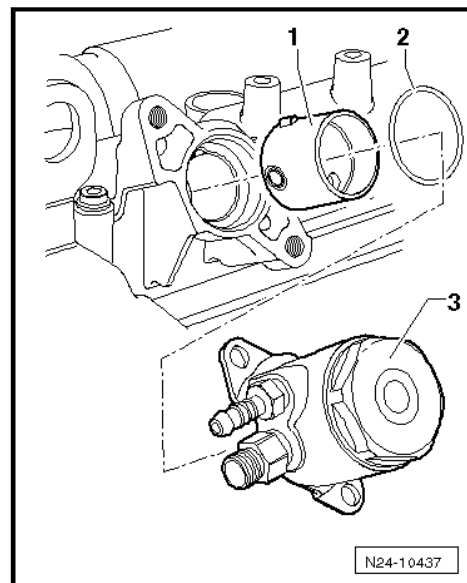


- Place a cloth underneath to catch escaping fuel.
- Release hose clip -2- and detach fuel supply hose.
- Unscrew bolts -3- and detach high-pressure pump with roller tappet.

### Installing

- Check roller tappet for damage and renew if necessary.
- Moisten roller tappet -1- with clean engine oil.
- Insert oiled roller tappet -1- into camshaft housing.





#### Note

*Renew O-ring.*

- Turn crankshaft in direction of engine rotation until roller tappet is at bottom dead centre.
- Insert new, lubricated O-ring -2- in groove of high-pressure pump -3-.
- Tighten bolts by hand.
- Tighten bolts in diagonal sequence to specified torque ⇒ [Fig. “High-pressure pump - specified torque and tightening sequence”, page 520](#).
- Install high-pressure pipe ⇒ [a7.3 nd installing high-pressure pipe”, page 527](#).
- Check fuel system for leaks.
- Note that there are different types of high-pressure pump ⇒ [o7.1 verview - high-pressure pump”, page 519](#).

#### Specified torques

- ◆ ⇒ [o7.1.1 verview - high-pressure pump, version 1”, page 519](#)
- ◆ ⇒ [o7.1.2 verview - high-pressure pump, version 2”, page 521](#)
- ◆ ⇒ [o7.1.3 verview - high-pressure pump, version 3”, page 523](#)

## 7.3 Removing and installing high-pressure pipe

Special tools and workshop equipment required

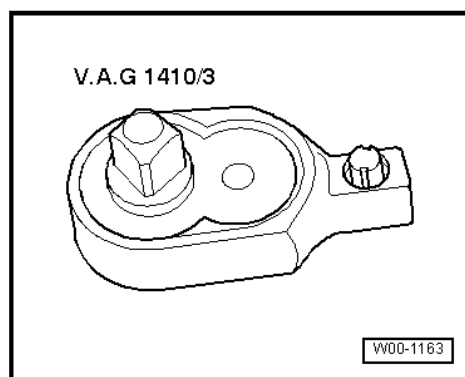




- ◆ Torque wrench -V.A.G 1331-



- ◆ Ratchet attachment -V.A.G 1410/3-



- ◆ Tool set -T10395B-



## Removing

- Remove throttle valve module -GX3- ➔ [a4.3 nd installing throttle valve moduleGX3", page 484](#) .

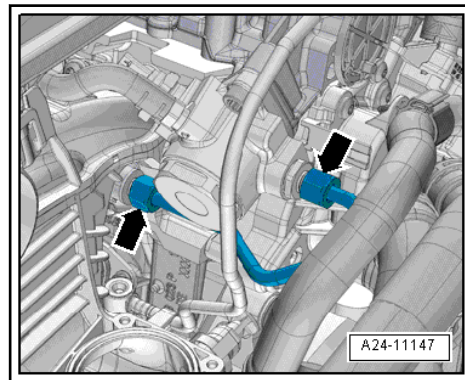
### CAUTION

The fuel system is pressurised.

Danger of injury through fuel spray.

- Wear protective goggles.
  - Wear protective gloves.
  - To release pressure, wrap a clean cloth around the connection and carefully loosen the connection.
- Unscrew union nuts -arrows- and detach high-pressure pipe.





## Installing

Install in reverse order of removal, observing the following:



### Note

*The high-pressure pipe does not need to be renewed after disassembly.*

- Lubricate thread of union nuts with clean engine oil.
- Hand-tighten union nuts for high-pressure pipe (make sure that pipe is not under stress).



### Note

*Use an open-end wrench to counterhold at the hexagon on the high-pressure pump when tightening to the final specified torque.*

- Tighten union nuts using torque wrench -V.A.G 1331- and suitable insert from tool set -T10395B-.
- Install throttle valve module -GX3- ➔ [a4.3 nd installing throttle valve moduleGX3", page 484](#) .

## Specified torques

- ◆ ➔ [o7.1 verview - high-pressure pump", page 519](#)





## 8 Lambda probe

⇒ [o8.1 verview - Lambda probe", page 530](#)

⇒ [a8.2 nd installing Lambda probe", page 531](#)

### 8.1 Assembly overview - Lambda probe



#### Note

- ◆ *New lambda probes are coated with an assembly paste. This paste must not get into the slots on the Lambda probe body.*
- ◆ *In the case of a used Lambda probe, grease only the thread with high-temperature paste. This paste must not get into the slots on the Lambda probe body. High-temperature paste ⇒ Electronic parts catalogue.*
- ◆ *During installation, it is essential that wiring of lambda probe is reattached in same positions. The wire must be prevented from touching the exhaust pipe.*





#### 1 - Lambda probe 1 after catalytic converter -GX7-

- ❑ Consisting of:

Lambda probe after catalytic converter -G130-

Lambda probe 1 heater after catalytic converter -Z29-

- ❑ Removing and installing ⇒ [a8.2.2 nd installing Lambda probe 1 after catalytic converterGX7", page 533](#)

- ❑ 55 Nm

#### 2 - Electrical connector

- ❑ For Lambda probe 1 after catalytic converter -GX7-.

#### 3 - Electrical connector

- ❑ For Lambda probe 1 before catalytic converter -GX10-.

#### 4 - Lambda probe 1 before catalytic converter -GX10-

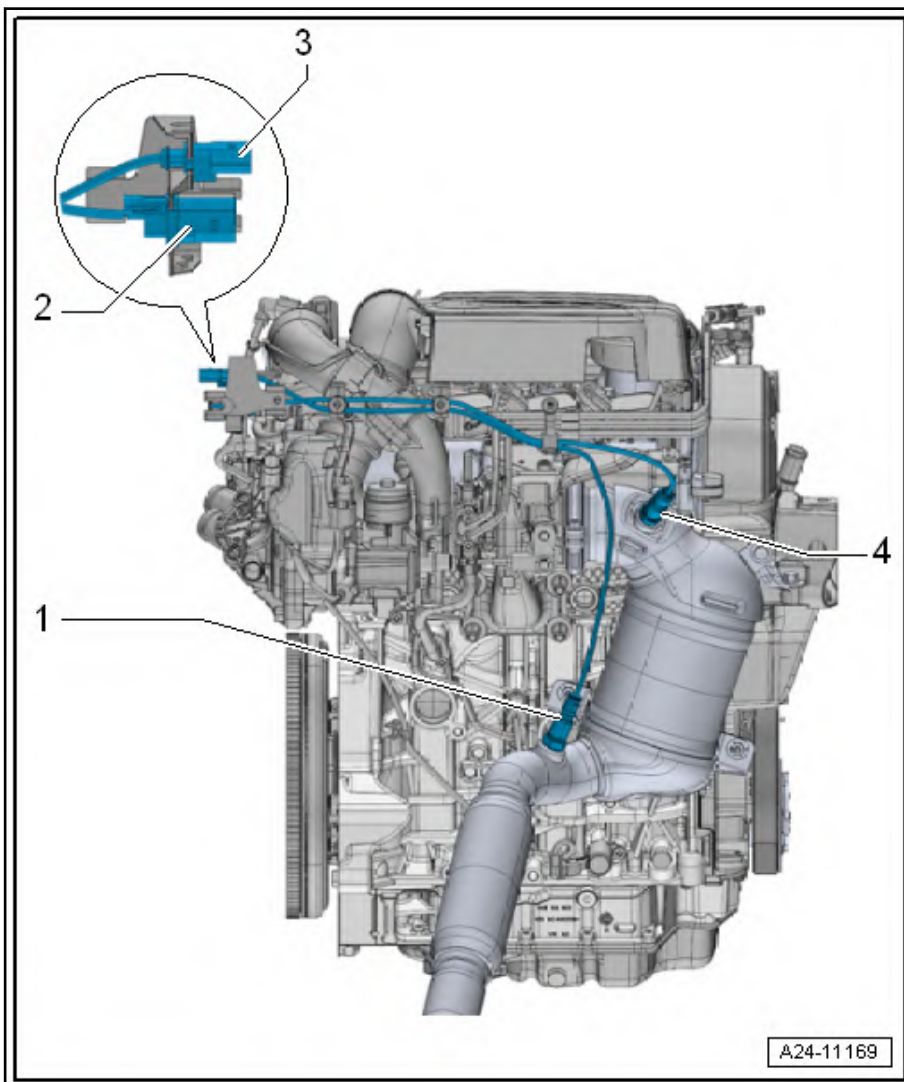
- ❑ Consisting of:

Lambda probe -G39-

Lambda probe heater -Z19-

- ❑ Removing and installing ⇒ [a8.2.1 nd installing Lambda probe 1 before catalytic converterGX10", page 531](#)

- ❑ 55 Nm



## 8.2 Removing and installing Lambda probe

⇒ [a8.2.1 nd installing Lambda probe 1 before catalytic converterGX10", page 531](#)

⇒ [a8.2.2 nd installing Lambda probe 1 after catalytic converterGX7", page 533](#)

### 8.2.1 Removing and installing Lambda probe 1 before catalytic converter -GX10-

Lambda probe 1 before catalytic converter -GX10- consists of

- ◆ Lambda probe -G39-
- ◆ Lambda probe heater -Z19-

Special tools and workshop equipment required

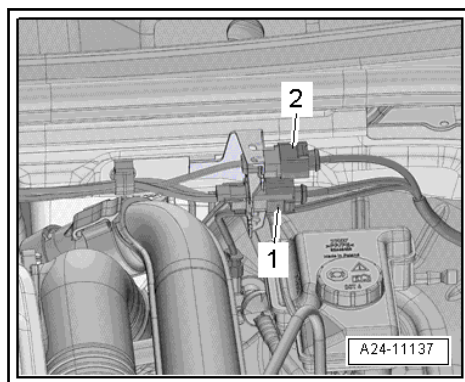




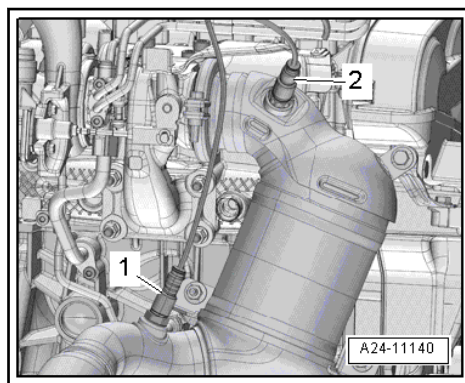
◆ Lambda probe open ring spanner set -3337-



## Removing



- Disconnect connector -2- for Lambda probe 1 before catalytic converter -GX10-.
- Unscrew Lambda probe 1 before catalytic converter -GX10-2- using tool from Lambda probe open ring spanner set -3337-.



## Installing

Install in reverse order of removal, observing the following:





#### Note

- ◆ *New lambda probes are coated with an assembly paste. This paste must not get into the slots on the Lambda probe body.*
- ◆ *In the case of a used Lambda probe, grease only the thread with high-temperature paste. This paste must not get into the slots on the Lambda probe body. High-temperature paste ⇒ Electronic parts catalogue.*
- ◆ *During installation, it is essential that wiring of lambda probe is reattached in same positions. The wire must be prevented from touching the exhaust pipe.*

#### Vehicles as of July 2015

- The following function should only be performed if it is present in the vehicle diagnostic tester.
- If the function is not available, adaption need not be carried out.
- If lambda probe has been renewed, erase learnt values and adapt lambda probe to engine control unit using ⇒ vehicle diagnostic tester.
- Switch on ignition and select the following menu options on vehicle diagnostic tester:

- ◆ 0001 - Lambda probe adaption

#### Continued for all vehicles

#### Specified torques

- ◆ ⇒ [o8.1 verview - Lambda probe", page 530](#)

### 8.2.2 Removing and installing Lambda probe 1 after catalytic converter -GX7-

Lambda probe 1 after catalytic converter -GX7- consists of

- ◆ Lambda probe after catalytic converter -G130-
- ◆ Lambda probe 1 heater after catalytic converter -Z29-

#### Special tools and workshop equipment required

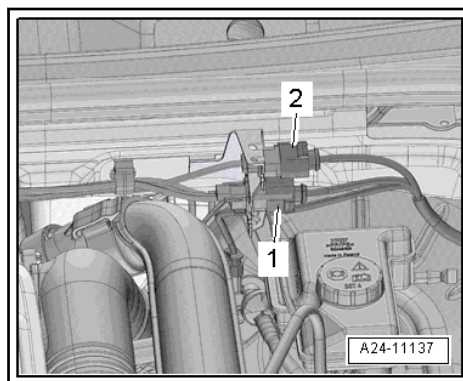
- ◆ Lambda probe open ring spanner set -3337-



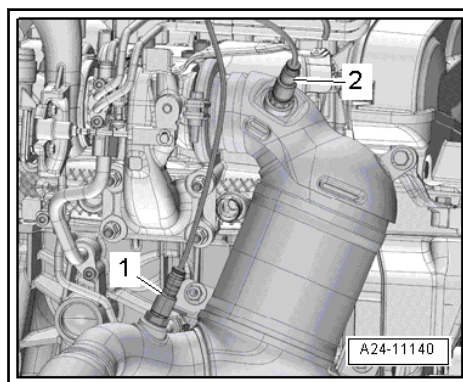




## Removing



- Disconnect connector -1- for Lambda probe 1 after catalytic converter -GX7-.
- Unscrew lambda probe 1 after catalytic converter -GX7- -1- using a suitable tool from lambda probe open ring spanner set -3337-.



## Installing

Install in reverse order of removal, observing the following:



### Note

- ♦ *New lambda probes are coated with an assembly paste. This paste must not get into the slots on the Lambda probe body.*
- ♦ *In the case of a used Lambda probe, grease only the thread with high-temperature paste. This paste must not get into the slots on the Lambda probe body. High-temperature paste ⇒ Electronic parts catalogue.*
- ♦ *During installation, it is essential that wiring of lambda probe is reattached in same positions. The wire must be prevented from touching the exhaust pipe.*

## Vehicles as of July 2015

- The following function should only be performed if it is present in the vehicle diagnostic tester.
- If the function is not available, adaption need not be carried out.
- If lambda probe has been renewed, erase learnt values and adapt lambda probe to engine control unit using ⇒ vehicle diagnostic tester.





- Switch on ignition and select the following menu options on vehicle diagnostic tester:

- ◆ 0001 - Lambda probe adaption

**Continued for all vehicles**

**Specified torques**

- ◆ [⇒ o8.1 verview - Lambda probe", page 530](#)





## 26 – Exhaust system

### 1 Exhaust pipes and silencers

⇒ [o1.1 verview - silencers", page 536](#)

⇒ [e1.2 xhaust pipes from silencers", page 546](#)

⇒ [a1.3 nd installing silencer", page 550](#)

⇒ [p1.4 osition of clamp", page 559](#)

⇒ [e1.5 xhaust system free of stress", page 560](#)

⇒ [e1.6 xhaust system for leaks", page 567](#)

#### 1.1 Assembly overview - silencers

⇒ [o1.1.1 verview - silencers, Golf Cabriolet and Scirocco", page 536](#)

⇒ [o1.1.2 verview - silencer, CC", page 538](#)

⇒ [o1.1.3 verview - silencers, Sharan", page 540](#)

⇒ [o1.1.4 verview - silencers, Tiguan", page 542](#)

⇒ [o1.1.5 verview - silencer, T-Roc 2018, Golf 2020, Golf Estate 2021", page 544](#)

##### 1.1.1 Assembly overview - silencers, Golf Cabriolet and Scirocco





## 1 - Rear silencer

- ☐ In initial equipment, component with centre silencer. Can be renewed individually for repair purposes.
- ☐ Removing and installing ⇒ [a1.3 nd installing silencer", page 550](#)
- ☐ Separating exhaust pipes from silencers ⇒ [e1.2 xhaust pipes from silencers", page 546](#)
- ☐ Aligning exhaust system free of tension ⇒ [e1.5 xhaust system free of stress", page 560](#).

## 2 - Mounting

- ☐ Renew if damaged

## 3 - Bolt

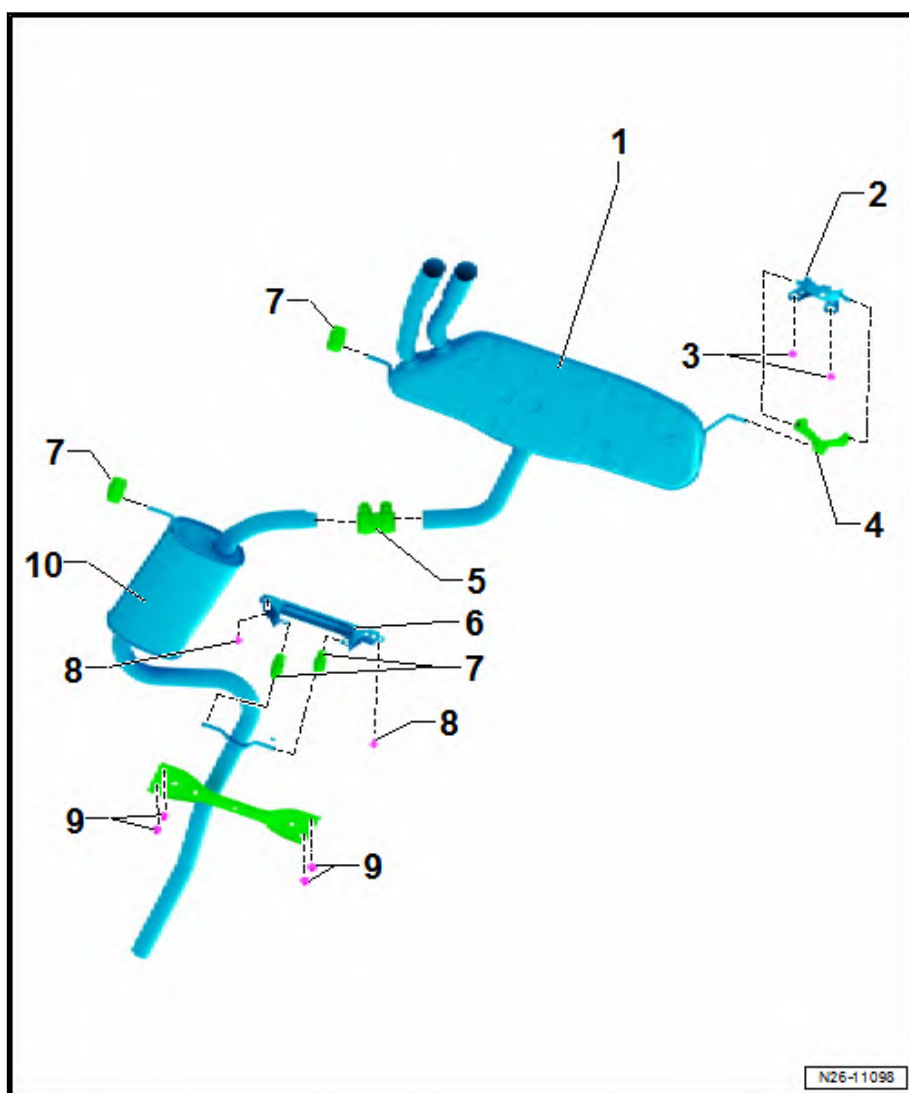
- ☐ 20 Nm

## 4 - Retainer

- ☐ Renew if damaged

## 5 - Rear clamp

- ☐ Align exhaust system free of tension before tightening ⇒ [e1.5 xhaust system free of stress", page 560](#).
- ☐ Installation position ⇒ [p1.4 osition of clamp", page 559](#)
- ☐ Specified torque ⇒ [page 537](#)



Volkswagen Technical Site: <https://vwts.ru>

## 6 - Mounting

- ☐ Renew if damaged

## 7 - Retainer

- ☐ Renew if damaged

## 8 - Bolt

- ☐ 20 Nm

## 9 - Nut

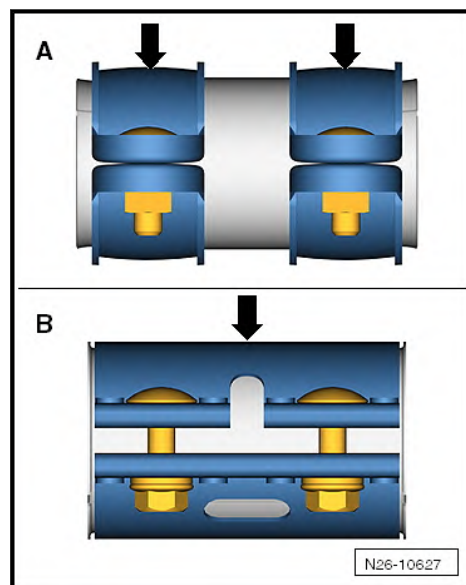
- ☐ 20 Nm

## 10 - Centre silencer

- ☐ Combined in one unit with rear silencer as original equipment. Can be renewed individually for repair purposes.
- ☐ Removing and installing ⇒ [a1.3 nd installing silencer", page 550](#)
- ☐ Separating exhaust pipes from silencers ⇒ [e1.2 xhaust pipes from silencers", page 546](#)
- ☐ Aligning exhaust system free of tension ⇒ [e1.5 xhaust system free of stress", page 560](#).

Specified torque for clamp





Variante A - 25 Nm

Variante B - 30 Nm

## 1.1.2 Assembly overview - silencer, CC





### 1 - Clamping sleeve

- ☐ Installation position ⇒ [p1.4 osition of clamp](#), [page 559](#)
- ☐ Specified torque ⇒ [page 539](#)

### 2 - Mounting

- ☐ Renew if damaged

### 3 - Fixture for mounting

- ☐ To body
- ☐ Bolt 25 Nm

### 4 - Centre silencer

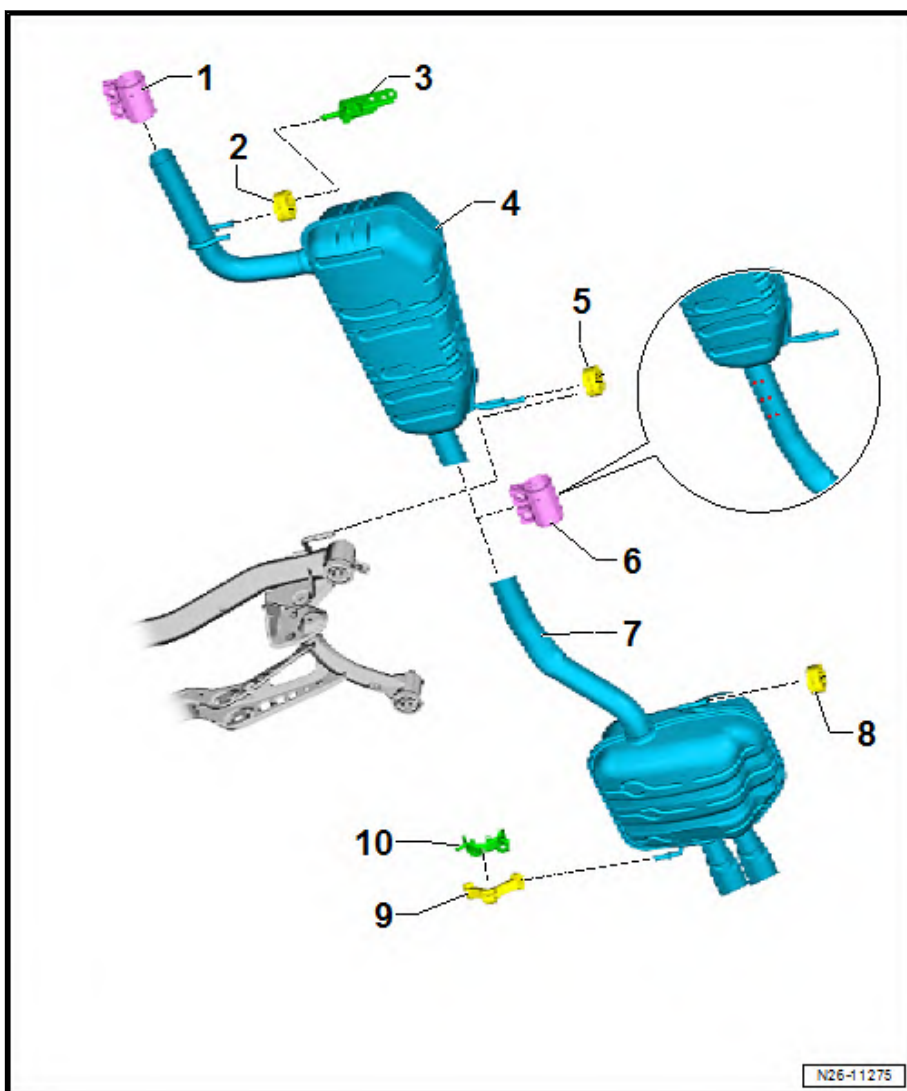
- ☐ Removing and installing ⇒ [a1.3 nd installing silencer](#), [page 550](#)
- ☐ Aligning exhaust system free of tension ⇒ [e1.5 xhaust system free of stress](#), [page 560](#).

### 5 - Mounting

- ☐ Renew if damaged

### 6 - Separating point for repairs

- ☐ Marked by indentation on exhaust pipe.
- ☐ Cut through exhaust pipe perpendicularly at separating point for repairs using chain pipe cutter -VAS 6254- ⇒ [e1.2.1 xhaust pipes/silencers, CC](#), [page 546](#).



### 7 - Rear silencer

- ☐ Removing and installing ⇒ [a1.3 nd installing silencer](#), [page 550](#)
- ☐ Aligning exhaust system free of tension ⇒ [e1.5 xhaust system free of stress](#), [page 560](#).

### 8 - Mounting

- ☐ Renew if damaged

### 9 - Mounting

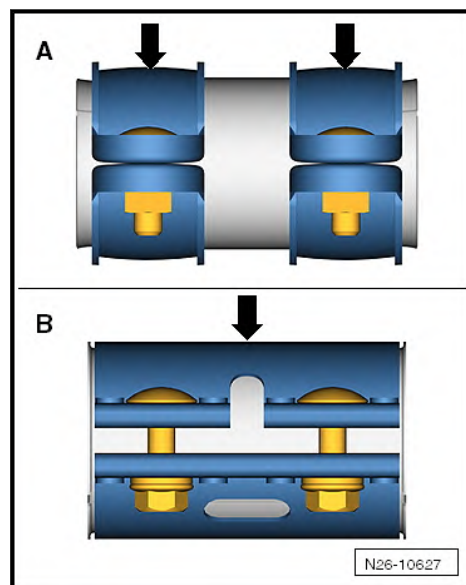
- ☐ Renew if damaged

### 10 - Bracket

- ☐ To body
- ☐ Bolt 25 Nm

Specified torque for clamp





Variante A - 25 Nm

Variante B - 30 Nm

### 1.1.3 Assembly overview - silencers, Sharan





### 1 - Clamping sleeve

- ☐ Installation position ⇒ [p1.4 osition of clamp](#), page 559
- ☐ Specified torque ⇒ Fig. [“Specified torque for clamp”](#), page 541

### 2 - Centre silencer

- ☐ Removing and installing ⇒ [a1.3 nd installing silencer](#), page 550
- ☐ Aligning exhaust system free of tension ⇒ [e1.5 xhaust system free of stress](#), page 560 .

### 3 - Separating point for repairs

- ☐ Marked by indentation on exhaust pipe.
- ☐ Cut through exhaust pipe perpendicularly at separating point for repairs using chain pipe cutter -VAS 6254-.

### 4 - Centre pipe

### 5 - Clamping sleeve

- ☐ Installation position ⇒ [p1.4 osition of clamp](#), page 559
- ☐ Specified torque ⇒ Fig. [“Specified torque for clamp”](#), page 541

### 6 - Mounting

- ☐ Renew if damaged

### 7 - Rear silencer

- ☐ Removing and installing ⇒ [a1.3 nd installing silencer](#), page 550
- ☐ Aligning exhaust system free of tension ⇒ [e1.5 xhaust system free of stress](#), page 560 .

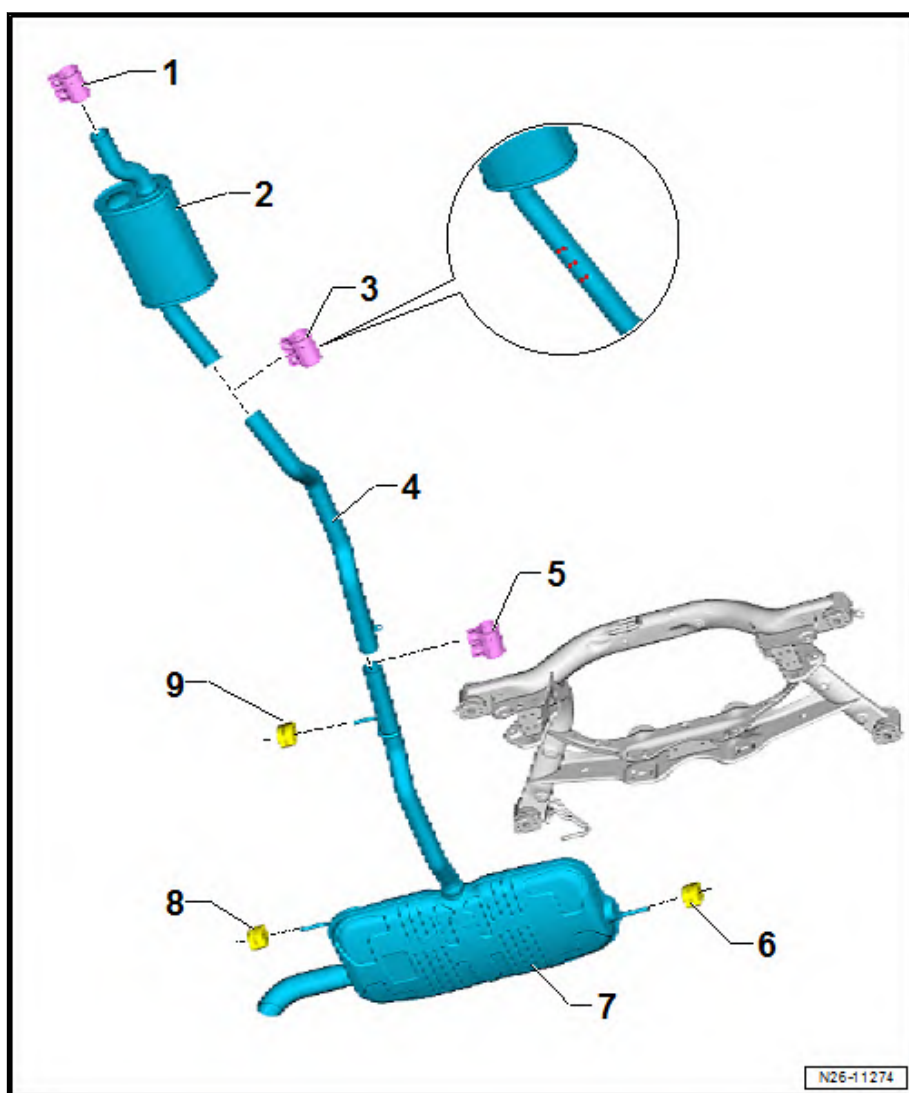
### 8 - Mounting

- ☐ Renew if damaged

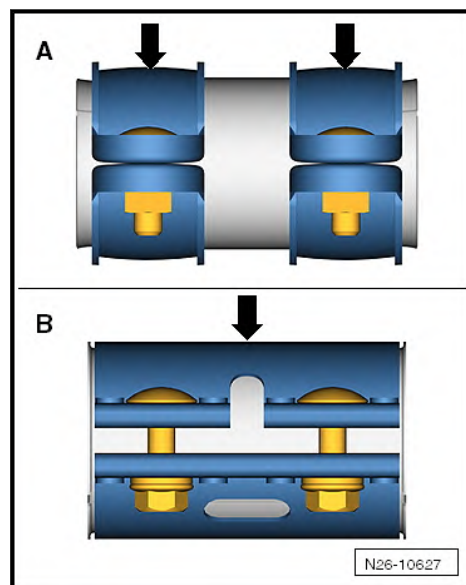
### 9 - Mounting

- ☐ Renew if damaged

### Specified torque for clamp







Variante A - 25 Nm

Variante B - 30 Nm

#### 1.1.4 Assembly overview - silencers, Tiguan





### 1 - Clamping sleeve

- ☐ Installation position ⇒ [p1.4 osition of clamp](#), [page 559](#)
- ☐ Specified torque ⇒ [page 543](#)

### 2 - Mounting

- ☐ Renew if damaged

### 3 - Bolt

- ☐ 25 Nm

### 4 - Centre silencer and rear silencer

- ☐ Combined in one unit with rear silencer as original equipment. Can be renewed individually for repair purposes.
- ☐ Removing and installing ⇒ [a1.3 nd installing silencer](#), [page 550](#)
- ☐ Separating exhaust pipes from silencers ⇒ [e1.2 xhaust pipes from silencers](#), [page 546](#)
- ☐ Aligning exhaust system free of tension ⇒ [e1.5 xhaust system free of stress](#), [page 560](#)

### 5 - Right mounting

- ☐ Renew if damaged

### 6 - Bolt

- ☐ 25 Nm

### 7 - Bolt

- ☐ 25 Nm

### 8 - Left exhaust hanger

- ☐ Renew if damaged

### 9 - Mounting

- ☐ Renew if damaged

### 10 - Nut

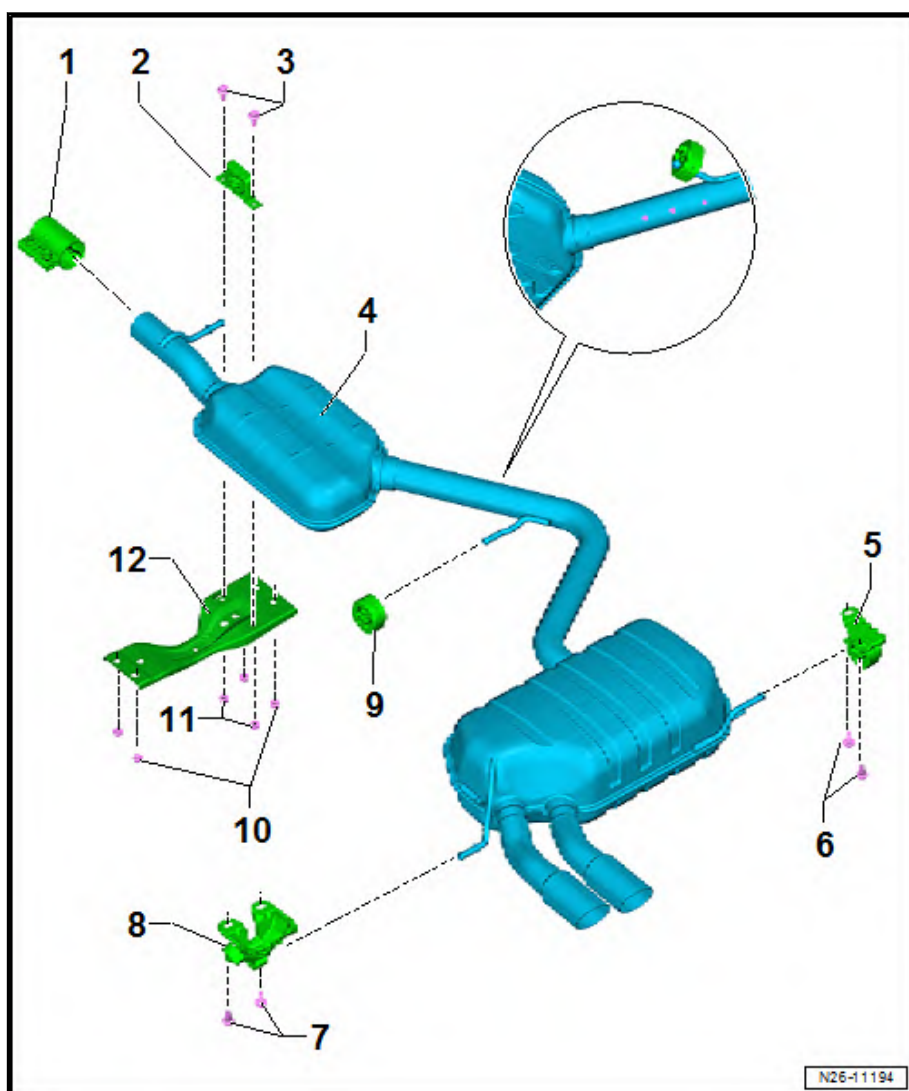
- ☐ ⇒ General body repairs, exterior; Rep. gr. 66; Underbody cladding; Assembly overview - underbody cladding

### 11 - Nut

- ☐ ⇒ General body repairs, exterior; Rep. gr. 66; Underbody cladding; Assembly overview - underbody cladding

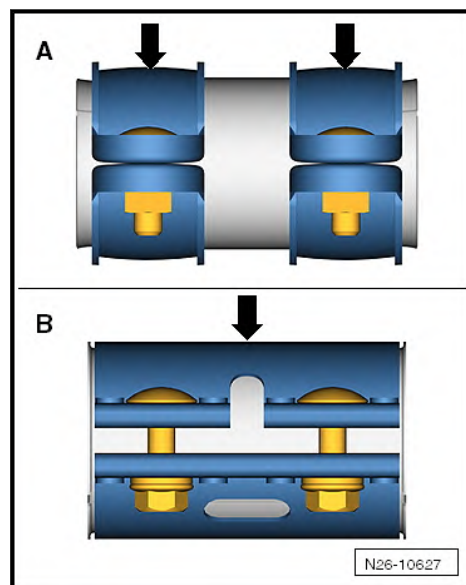
### 12 - Tunnel cross-piece

- ☐ ⇒ General body repairs, exterior; Rep. gr. 66; Underbody cladding; Assembly overview - underbody cladding



### Specified torque for clamp





Variante A - 25 Nm

Variante B - 30 Nm

### 1.1.5 Assembly overview - silencer, T-Roc 2018, Golf 2020, Golf Estate 2021



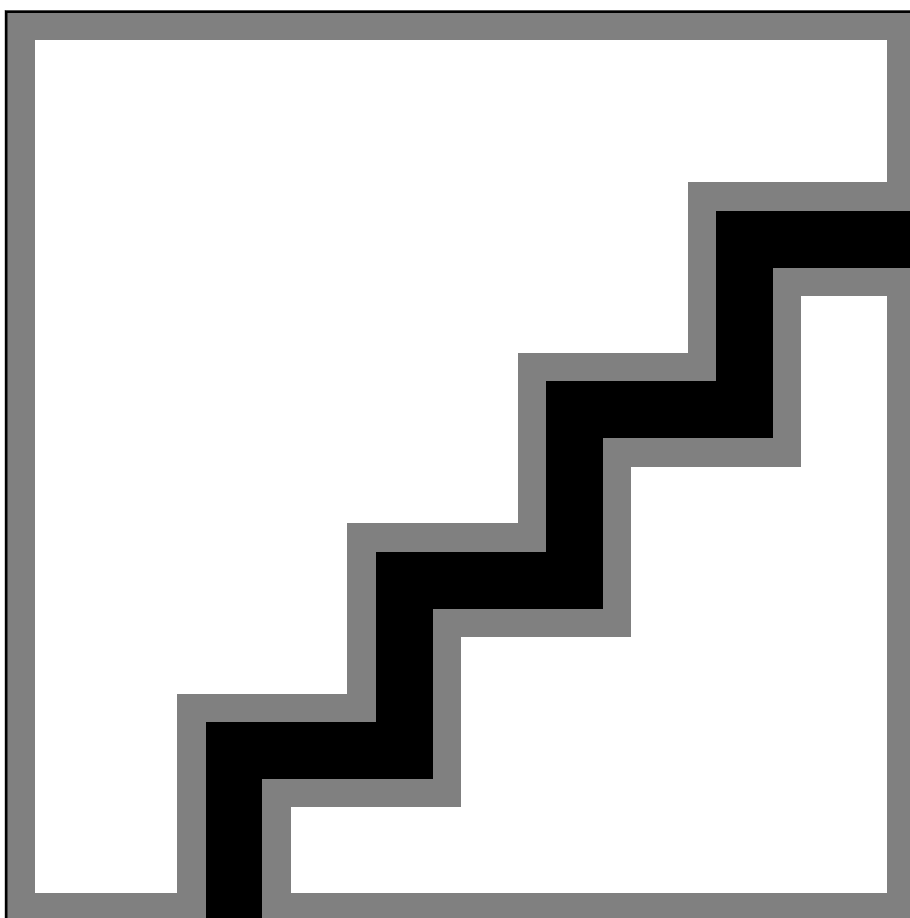


### 1 - Clamping sleeve

- ☐ Align exhaust system free of tension before tightening ⇒ [e1.5 exhaust system free of stress", page 560](#).
- ☐ Installation position ⇒ [p1.4 osition of clamp", page 559](#).
- ☐ Specified torque ⇒ Fig. [""Specified torque for clamp""", page 546](#)

### 2 - Front silencer

- ☐ Front and rear silencers are combined in one unit when fitted in the factory Renew separately for repair purposes.
- ☐ Removing and installing ⇒ [a1.3 nd installing silencer", page 550](#)
- ☐ Separating exhaust pipes from silencers ⇒ [e1.2 exhaust pipes from silencers", page 546](#)
- ☐ Aligning exhaust system free of tension ⇒ [e1.5 exhaust system free of stress", page 560](#).



### 3 - Retainer

- ☐ Renew if damaged
- ☐ Aligning exhaust system free of tension ⇒ [e1.5 exhaust system free of stress", page 560](#).

### 4 - Bracket

- ☐ For mounting

### 5 - Bolt

- ☐ 23 Nm

### 6 - Bracket

- ☐ For mounting

### 7 - Bolt

- ☐ 23 Nm

### 8 - Retainer

- ☐ Renew if damaged
- ☐ Aligning exhaust system free of tension ⇒ [e1.5 exhaust system free of stress", page 560](#).

### 9 - Rear silencer

- ☐ Front and rear silencers are combined in one unit when fitted in the factory Renew separately for repair purposes.
- ☐ Removing and installing ⇒ [a1.3 nd installing silencer", page 550](#)
- ☐ Separating exhaust pipes from silencers ⇒ [e1.2 exhaust pipes from silencers", page 546](#)
- ☐ Aligning exhaust system free of tension ⇒ [e1.5 exhaust system free of stress", page 560](#).

### 10 - Clamping sleeve

- ☐ For repair cases

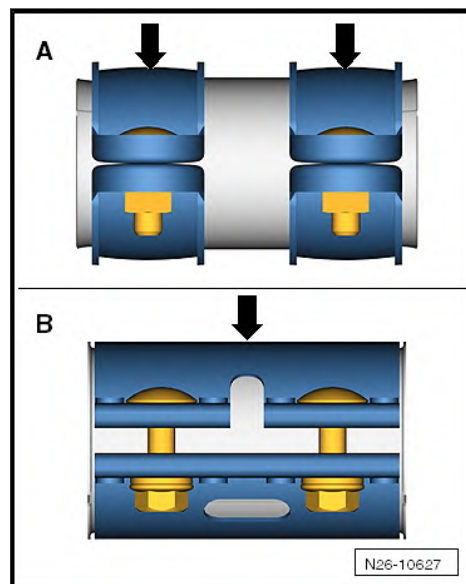




- ❑ Align exhaust system free of tension before tightening ⇒ [e1.5 exhaust system free of stress", page 560](#).
- ❑ Installation position ⇒ [p1.4 osition of clamp", page 559](#)
- ❑ Specified torque ⇒ [Fig. ""Specified torque for clamp""", page 546](#)

Pfeil - Coupling point of exhaust system

Specified torque for clamp



Variante A - 25 Nm

Variante B - 30 Nm

## 1.2 Separating exhaust pipes from silencers

⇒ [e1.2.1 xhaust pipes/silencers, CC", page 546](#)

⇒ [e1.2.2 xhaust pipes/silencers, Tiguan, Sharan", page 548](#)

⇒ [e1.2.3 xhaust pipes/silencers, Scirocco, Golf Cabriolet, Scirocco, Golf Cabriolet, T-Roc, Golf. Golf Estate", page 549](#)

### 1.2.1 Separating exhaust pipes/silencers, CC

Special tools and workshop equipment required

- ◆ Chain pipe cutter -VAS 6254-



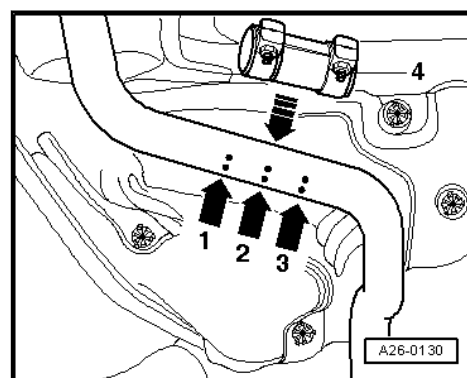




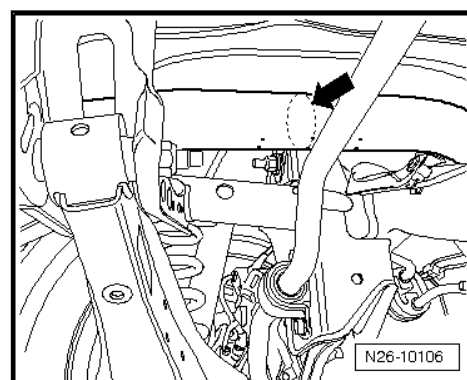
- ◆ The connecting pipe can be cut through at the separating point for repairs in order to renew the centre and rear silencers separately.
- ◆ The separating point for repairs is marked by an indentation on the circumference of the exhaust pipe.
- ◆ The separating point for repairs is located in the area of the rear axle.

### Sequence of operations

- Remove underbody cover on rear axle ⇒ General body repairs, exterior; Rep. gr. 66; Underbody cover.
- Cut silencer at right angles at the mark -Arrow 2- on the rear silencer.



- Cut through exhaust pipe at separating point for repairs -arrow- using chain pipe cutter -VAS 6254-.



- Install exhaust pipes/silencers ⇒ [a1.3 nd installing silencer", page 550](#) .
- Cut through exhaust pipe perpendicularly at separating point.
- Note installation position of clamp ⇒ [p1.4 osition of clamp", page 559](#) .
- Checking exhaust system for leaks ⇒ [e1.6 xhaust system for leaks", page 567](#) .
- Align exhaust system free of stress ⇒ [e1.5 xhaust system free of stress", page 560](#) .
- Align tailpipes ⇒ [e1.5.2 xhaust system such that it is not under stress, CC", page 561](#) .





## 1.2.2 Separating exhaust pipes/silencers, Tiguan, Sharan

- ◆ The connecting pipe can be cut through at the cutting location in order to renew the centre and rear silencers separately.
- ◆ Cutting location is marked by an indentation on the circumference of exhaust pipe.

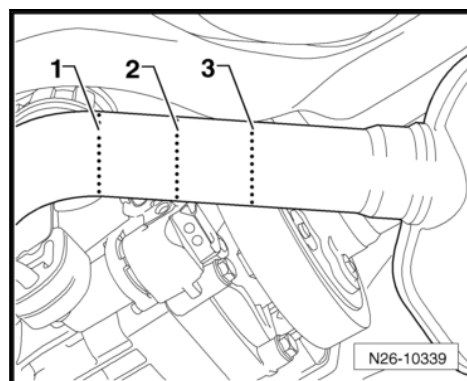
### Special tools and workshop equipment required

- ◆ Chain pipe cutter -VAS 6254-



### Sequence of operations

- ◆ For individual renewal of the rear silencer, a cutting point is provided in the connecting pipe.
- ◆ Cutting location is marked by an indentation on the circumference of exhaust pipe.
- Cut through exhaust pipe at separating point for repairs -2- using chain pipe cutter -VAS 6254-.



- Install exhaust pipes/silencers ⇒ [a1.3 nd installing silencer", page 550](#) .
- Cut through exhaust pipe perpendicularly at separating point.
- Note installation position of clamp ⇒ [p1.4 osition of clamp", page 559](#) .
- Checking exhaust system for leaks ⇒ [e1.6 xhaust system for leaks", page 567](#) .
- Align exhaust system free of stress ⇒ [e1.5 xhaust system free of stress", page 560](#) .
- Align tailpipes ⇒ [e1.5.4 xhaust system free of stress, Sharan", page 564](#) .





### 1.2.3 Separating exhaust pipes/silencers, Scirocco, Golf Cabriolet, Scirocco, Golf Cabriolet, T-Roc, Golf. Golf Estate

Special tools and workshop equipment required

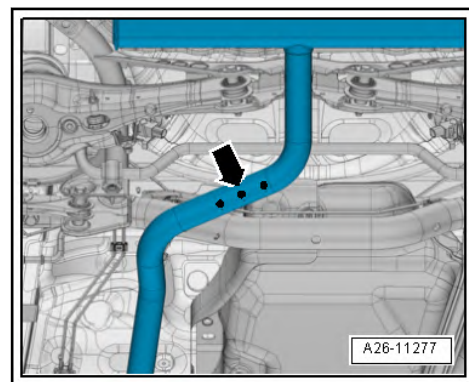
- ◆ Chain pipe cutter -VAS 6254-



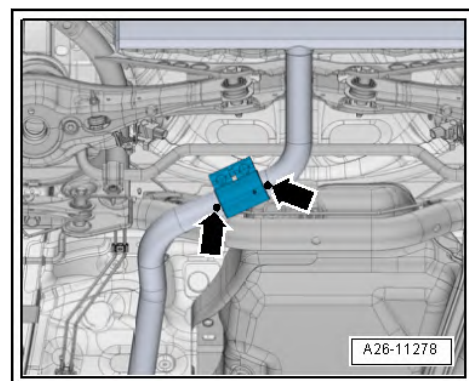
#### Note

- ◆ Coupling points are provided to allow for renewing the silencers separately ➔ [o1.1 verview - silencers", page 536](#).
- ◆ Coupling points are marked by an indentation on circumference of exhaust pipe.

#### Procedure



- Cut through exhaust pipe perpendicularly at corresponding separating point -arrow- using chain pipe cutter -VAS 6254-.
- Position clamp centrally at side marks -arrows- when installing.







- Install clamp ⇒ [p1.4 osition of clamp", page 559](#) .
- Align exhaust system free of stress ⇒ [e1.5 xhaust system free of stress", page 560](#) .

### 1.3 Removing and installing silencer

⇒ [a1.3.1 nd installing silencer, Golf Cabriolet", page 550](#)

⇒ [a1.3.2 nd installing silencer, CC", page 551](#)

⇒ [a1.3.3 nd installing silencer, Tiguan", page 554](#)

⇒ [a1.3.4 nd installing silencer, Sharan", page 555](#)

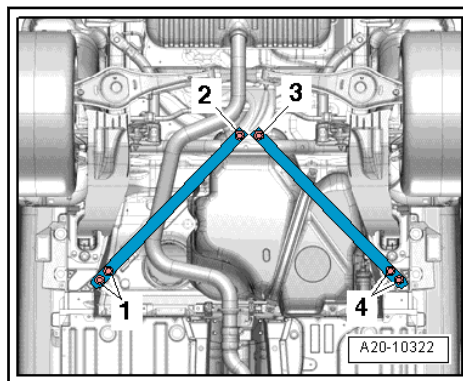
⇒ [a1.3.5 nd installing silencers, Scirocco", page 556](#)

⇒ [a1.3.6 nd installing silencers, T-Roc, Golf, Golf Estate", page 558](#)

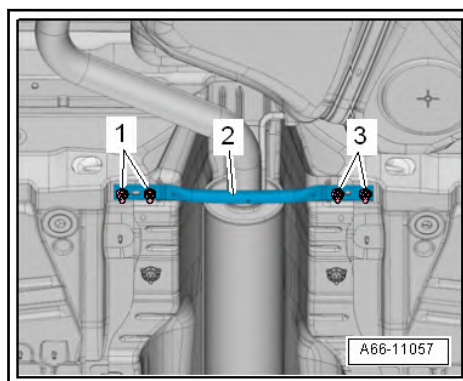
#### 1.3.1 Removing and installing silencer, Golf Cabriolet

##### Removing

- Unscrew bolts -1- to -4- and remove both diagonal struts.

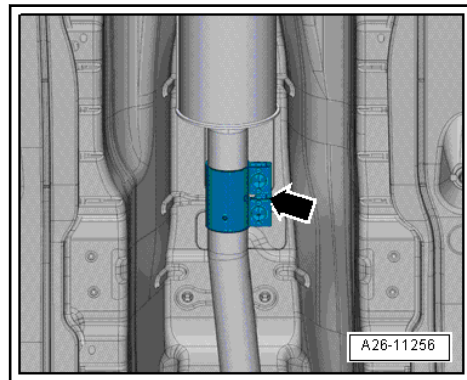


- Remove rear tunnel cross-piece -2-.



- Loosen bolt connections for front clamp -arrow-.

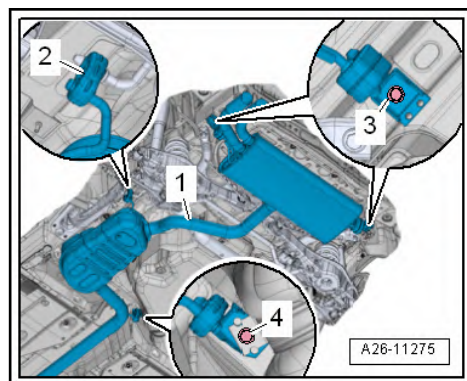




### ⚠ CAUTION

Risk of accident caused by high weight of silencers.

- Seek help from a second a mechanic for the following work.
- Detach exhaust hanger -2-, and unscrew bolts -3- and -4-. Remove silencer -1-.



### Installing

Install in reverse order of removal, observing the following:

- Align exhaust system free of stress ⇒ [e1.5 xhaust system free of stress", page 560](#) .

### Specified torques

- ◆ ⇒ [o1.1.1 verview - silencers, Golf Cabriolet and Scirocco", page 536](#)
- ◆ Underbody cladding; Assembly overview - underbody cladding ⇒ General body repairs, exterior; Rep. gr. 66; Underbody cladding; Assembly overview - underbody cladding.

## 1.3.2 Removing and installing silencer, CC

Special tools and workshop equipment required





◆ Chain pipe cutter -VAS 6254-

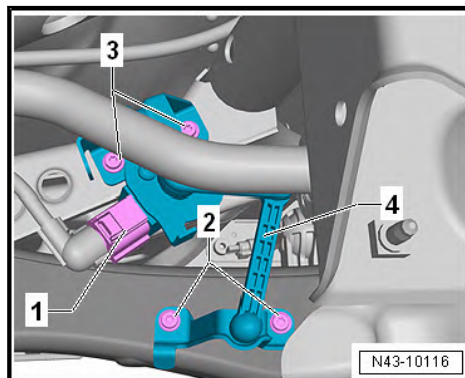


**Note**

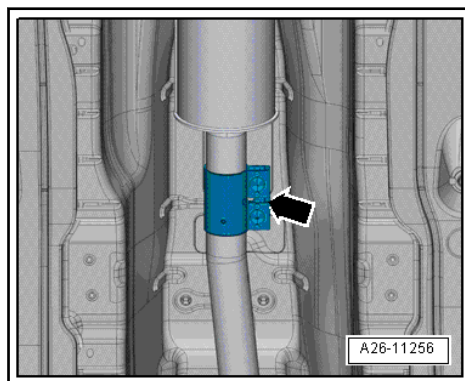
*To allow for removing the silencers without having to remove the rear axle, the rear silencer must be cut off.*

**Removing**

- If fitted, remove rear left underbody trim ⇒ General body repairs, exterior; Rep. gr. 66; Underbody trim; Assembly overview - underbody panels.
- Remove rear left vehicle level sender -G76- ⇒ Running gear, axles, steering; Rep. gr. 43; Vehicle level sender; Removing and installing rear vehicle level sender -G76-/G77-.



- Remove bolts -2- and position vehicle level sender so that it does not become damaged.
- Loosen clamp -arrow-, and push it to rear.



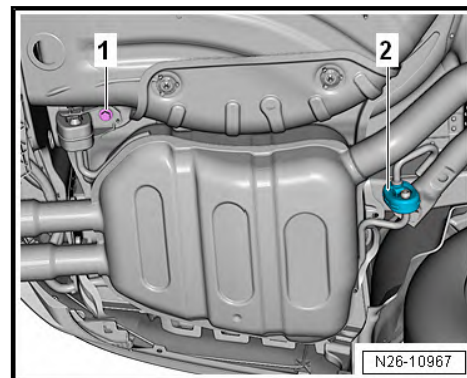




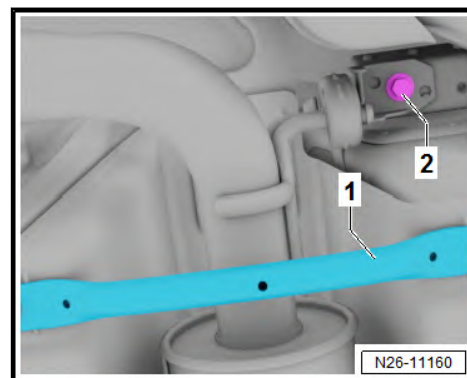
**CAUTION**

Risk of accident caused by high weight of silencers.

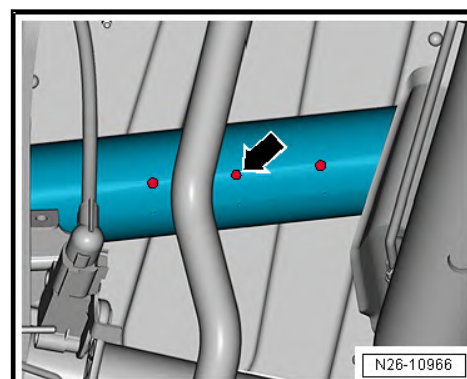
- Seek help from a second mechanic for the following work.
- Unscrew bolts -1- for bracket, and detach exhaust hanger -2-.



- Remove tunnel cross-piece -1-, and unscrew bolt -2-.



- Push exhaust system towards rear. Cut through rear silencer at right angles at separating point -arrow- using chain pipe cutter -VAS 6254-.



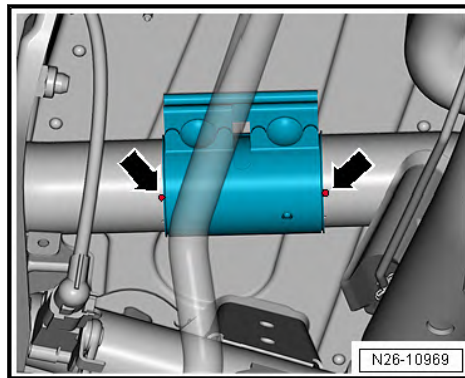
- Remove rear silencer towards rear. Remove front silencer with centre silencer towards front.

**Installing**

Install in reverse order of removal, observing the following:

- Position clamp for rear silencer centrally at side marks -arrows- when installing.





- Turn clamp in such a way that there is sufficient clearance to adjacent components.
- Align exhaust system free of stress ⇒ [e1.5 xhaust system free of stress](#), [page 560](#) .
- Install rear left vehicle level sender -G76- ⇒ Running gear, axles, steering; Rep. gr. 43; Vehicle level sender; Removing and installing rear vehicle level sender -G76-/G77-.

#### Specified torques

- ♦ ⇒ [o1.1.2 verview - silencer, CC](#), [page 538](#)
- ♦ ⇒ General body repairs, exterior; Rep. gr. 66; Underbody cladding; Assembly overview - underbody cladding

### 1.3.3 Removing and installing silencer, Tiguan

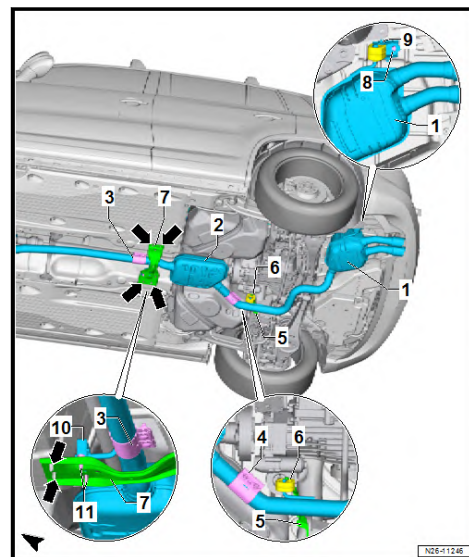
#### Removing

#### CAUTION

Risk of accident caused by high weight of silencers.

- Seek help from a second a mechanic for the following work.
- If fitted, remove rear left underbody trim ⇒ General body repairs, exterior; Rep. gr. 66; Underbody trim; Assembly overview - underbody panels.
- Remove rear tunnel cross member -7- ⇒ General body repairs, exterior; Rep. gr. 66; Underbody cladding; Assembly overview - underbody cladding.
- Detach centre and rear silencer -1- and -2- from brackets -6- and -9-.





- Loosen clamp -3- and push to rear.
- Remove centre and rear silencer -1- and -2-.

#### Separating centre and rear silencers

- Release clamp -4- and remove rear silencer -1-.

#### Installing

Install in reverse order of removal, observing the following:

- Align exhaust system free of stress ⇒ [e1.5 xhaust system free of stress](#), page 560 .

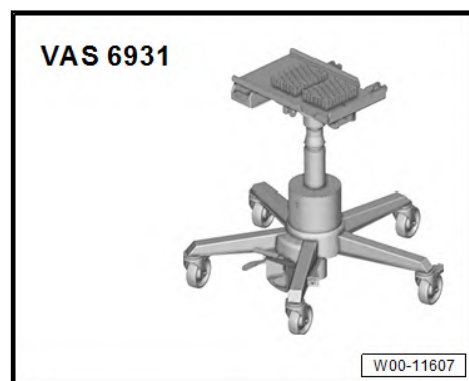
#### Specified torques

- ◆ ⇒ [o1.1 verview - silencers](#), page 536
- ◆ Assembly overview - underbody covers ⇒ General body repairs, exterior; Rep. gr. 66; Underbody cover; Assembly overview - underbody covers.

### 1.3.4 Removing and installing silencer, Shar-an

#### Special tools and workshop equipment required

- ◆ Engine and gearbox jack -VAS 6931-







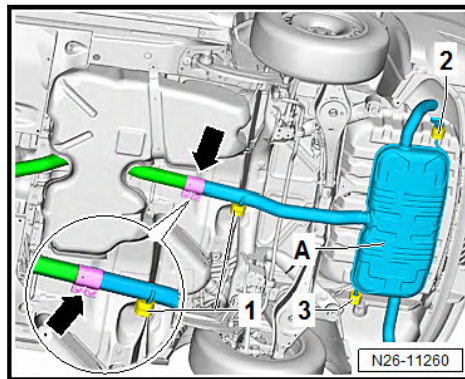
## Removing

### CAUTION

Risk of accident caused by high weight of silencers.

- Seek help from a second a mechanic for the following work.

## Removing rear silencer



- Loosen clamp -arrow-.
- Detach exhaust hangers -1, 2- and -3-.
- Remove rear silencer -A-.

## Removing intermediate pipe

- Release clamp -arrow- and slide away.
- Guide out intermediate pipe on fuel tank.

## Installing

Install in reverse order of removal, observing the following:

- Make sure that the guide lug on rear right of bracket engages in recess in longitudinal member.
- Align exhaust system free of stress ⇒ [e1.5 xhaust system free of stress](#), page 560 .

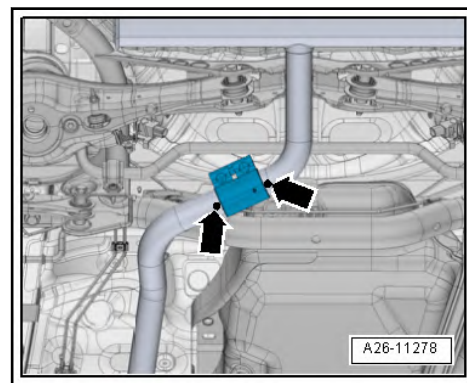
## Specified torques

- ♦ ⇒ [o1.1 verview - silencers](#), page 536
- ♦ ⇒ General body repairs, exterior; Rep. gr. 66; Underbody cladding; Assembly overview - underbody cladding

### 1.3.5 Removing and installing silencers, Scirocco

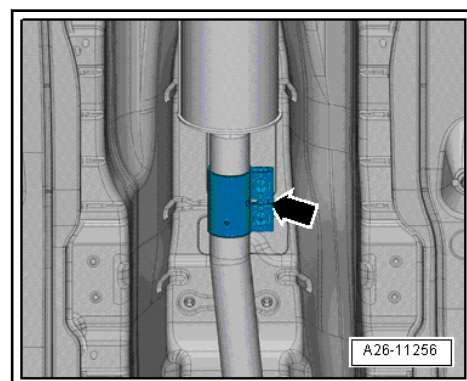
- If necessary, separate exhaust pipe at separating point ⇒ [e1.2 xhaust pipes from silencers](#), page 546 .
- Position clamp centrally at side marks -arrows- when installing.





### Removing

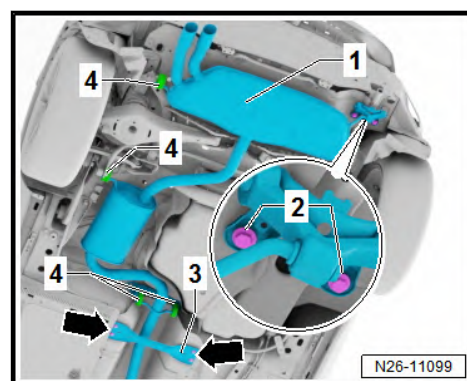
- If fitted, remove rear left underbody trim ⇒ General body repairs, exterior; Rep. gr. 66; Underbody trim; Assembly overview - underbody panels.
- Remove rear tunnel cross member ⇒ General body repairs, exterior; Rep. gr. 66; Underbody cladding; Assembly overview - underbody cladding.
- Loosen clamp -arrow-, and push it to rear.



### ⚠ CAUTION

Risk of accident caused by high weight of silencers.

- Seek help from a second a mechanic for the following work.
- Unscrew nuts -arrows- of tunnel cross-piece -3-.
- Detach rubber mountings -4-.



- Unscrew bolts -2-, and remove silencer -1-.





## Installing

Install in reverse order of removal, observing the following:

- Align exhaust system free of stress ⇒ [e1.5 xhaust system free of stress](#), [page 560](#) .

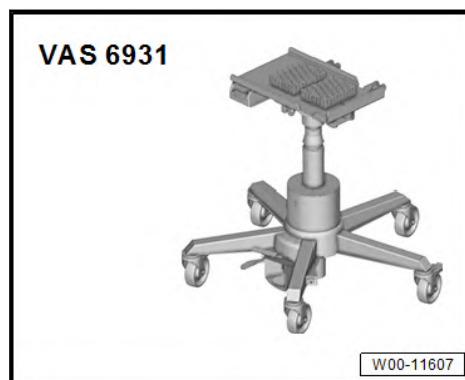
## Specified torques

- ♦ ⇒ [o1.1 verview - silencers](#), [page 536](#)
- ♦ ⇒ [o2.1 verview - emission control](#), [page 568](#)
- ♦ ⇒ General body repairs, exterior; Rep. gr. 66; Underbody cladding; Assembly overview - underbody cladding

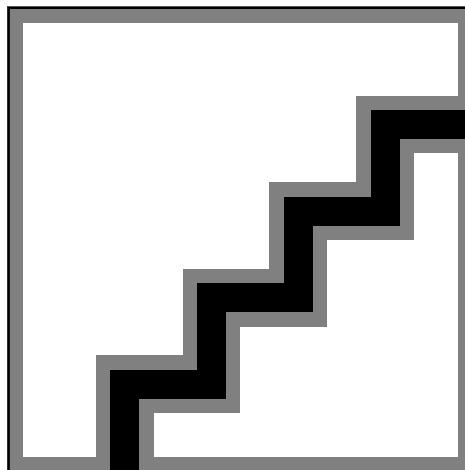
## 1.3.6 Removing and installing silencers, T-Roc, Golf, Golf Estate

### Special tools and workshop equipment required

- ♦ Torque wrench (20-100 Nm) -VAS 5820A- (not illustrated)
- ♦ Engine and gearbox jack -VAS 6931-



Remove rear silencers -3- individually:



### CAUTION

Risk of accident caused by high weight of silencers.

- Seek help from a second a mechanic for the following work.
- If necessary, separate silencer at coupling point ⇒ [e1.2 xhaust pipes from silencers](#), [page 546](#) .
- After silencers have been separated, loosen clamps ⇒ [Item 10 \(page 545\)](#) .





- Support rear silencer -3- with engine and gearbox jack -VAS 6931-.
- Unscrew bolts -5-.
- Detach bracket -6-.
- Remove rear silencer -3-.

#### **Remove front silencers -2- individually:**

- Remove rear tunnel cross-piece ⇒ General body repairs, exterior; Rep. gr. 66; Underbody cladding.
- If necessary, separate silencer at coupling point ⇒ [e1.2 xhaust pipes from silencers", page 546](#) .
- After silencers have been separated, loosen clamps ⇒ [Item 10 \(page 545\)](#) .
- Release clamping sleeve -1-, and slide it forwards.
- Support front silencer -2- with engine and gearbox jack -VAS 6931-.
- Unscrew bolt -7-.
- Detach bracket -8-.
- Detach front silencer -2-.

#### **Installing**

Install in reverse order of removal, observing the following:

- Align holes of front bracket with the two markings in securing strap of fuel tank.
- Align exhaust system free of stress ⇒ [e1.5 xhaust system free of stress", page 560](#) .

#### **Specified torques**

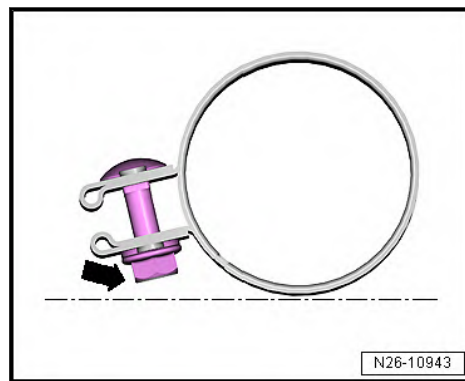
- ◆ ⇒ [o1.1.5 verview - silencer, T-Roc 2018, Golf 2020, Golf Estate 2021", page 544](#)
- ◆ ⇒ [o2.1 verview - emission control", page 568](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66; Underbody cladding

## **1.4 Installation position of clamp**

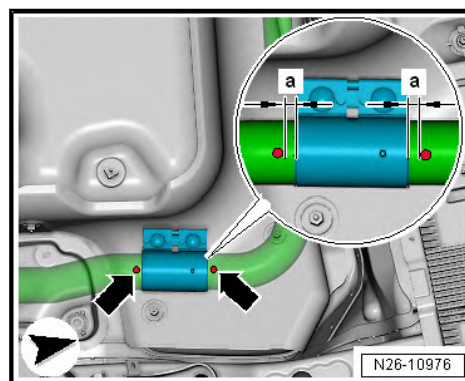
#### **Special tools and workshop equipment required**

- ◆ Torque wrench (20-100 Nm) -VAS 5820A- (not illustrated)
- Align exhaust system free of stress ⇒ [e1.5 xhaust system free of stress", page 560](#) .
- Install clamping sleeve so that end of bolt -arrow- does not extend beyond lower edge of clamping sleeve.





- Position clamp centrally at side marks -a- when installing.



- Turn clamp in such a way that there is sufficient clearance to adjacent components.
- Tighten threaded connections evenly.

#### Specified torques

- ♦ ➔ [o1.1 verview - silencers", page 536](#)

### 1.5 Aligning exhaust system free of stress

⇒ [e1.5.1 xhaust system free of stress, Golf Cabriolet and Scirocco", page 560](#)

⇒ [e1.5.2 xhaust system such that it is not under stress, CC", page 561](#)

⇒ [e1.5.3 xhaust system free of stress, Tiguan", page 562](#)

⇒ [e1.5.4 xhaust system free of stress, Sharan", page 564](#)

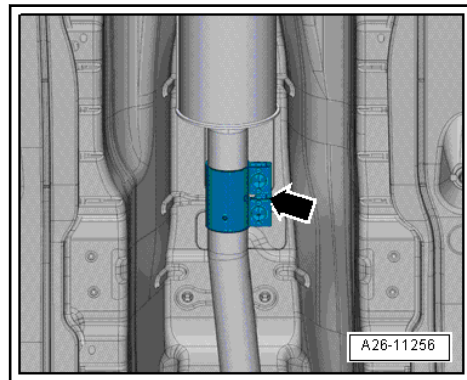
⇒ [e1.5.5 xhaust system free of tension, T-Roc, Golf, Golf Estate", page 566](#)

#### 1.5.1 Aligning exhaust system free of stress, Golf Cabriolet and Scirocco

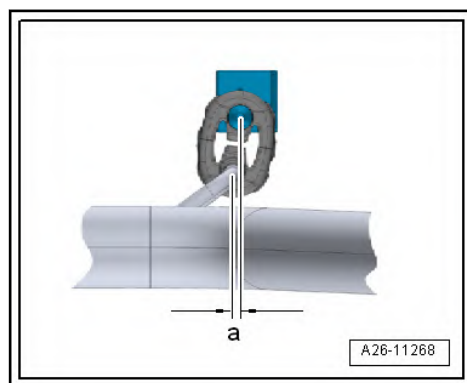
##### Sequence of operations

- The exhaust system must be aligned when cold.
- Loosen bolt connections for front clamp -arrow-.



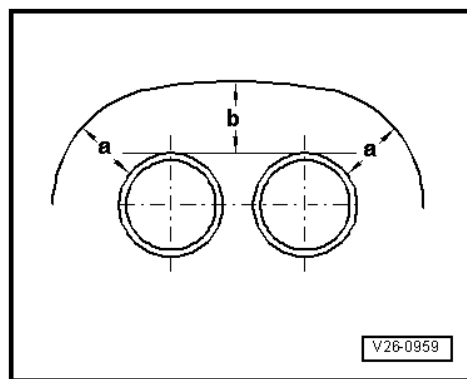


#### Exhaust hanger at end of tunnel



- Push exhaust system towards front of vehicle until preloading at mounting for exhaust pipe -a- = 6 mm.

#### Align end exhaust pipes



- Align rear silencer so that there is an even distance -a- between bumper cut-out and tailpipes.
- Dimension -b- is approx. 20 mm.
- Unfasten rear silencer mounting to align tailpipes.

◆ [⇒ o1.1 verview - silencers", page 536](#)

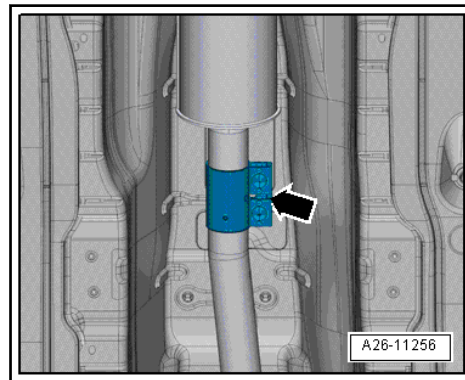
◆ [⇒ o2.1 verview - emission control", page 568](#)

### 1.5.2 Align exhaust system such that it is not under stress, CC

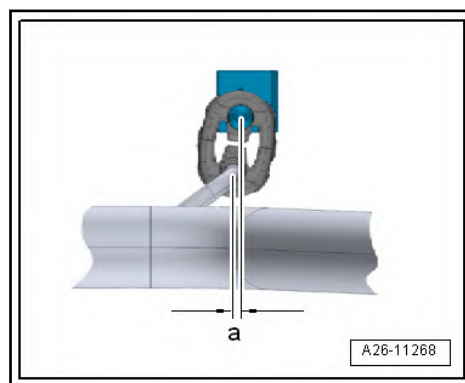
#### Sequence of operations

- The exhaust system must be aligned when cold.
- Loosen bolt connections for front clamp -arrow-.



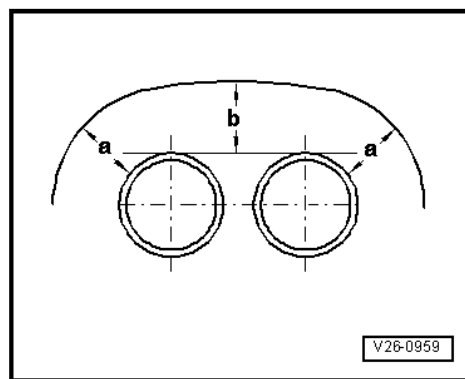


### Exhaust hanger at end of tunnel



- Push exhaust system towards front of vehicle until preloading at mounting for exhaust pipe -a- = 6 mm.

### Align end exhaust pipes



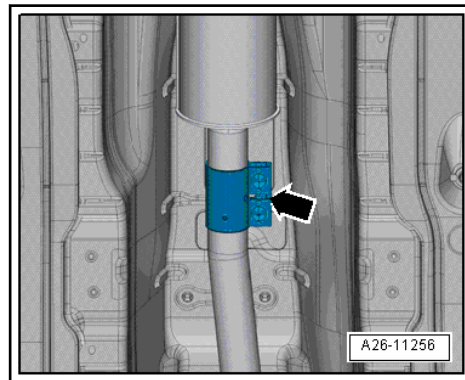
- Align rear silencer so that there is an even distance -a- between bumper cut-out and tailpipes.
- Dimension -b- is approx. 20 mm.
- Unfasten rear silencer mounting to align tailpipes.
- ♦ ⇒ [o1.1 overview - silencers", page 536](#)
- ♦ ⇒ [o2.1 overview - emission control", page 568](#)

## 1.5.3 Aligning exhaust system free of stress, Tiguan

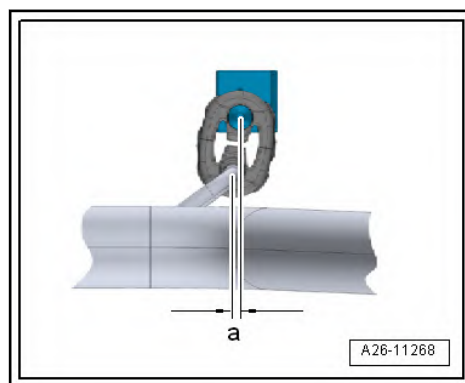
### Sequence of operations

- The exhaust system must be aligned when cold.
- Loosen bolt connections for front clamp -arrow-.



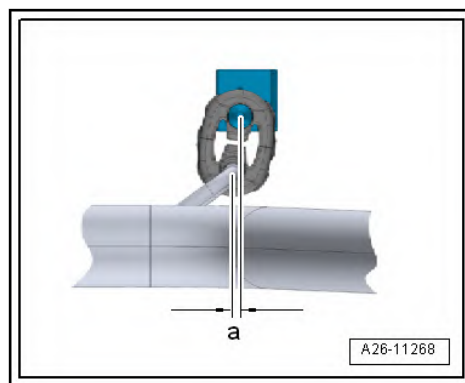


#### Exhaust hanger on rear axle



- Push exhaust system towards front of vehicle until preloading at mounting for exhaust pipe -a- = 8 mm.

#### Exhaust hanger on rear silencer

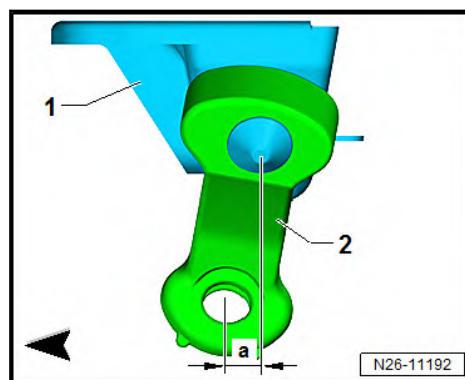


- Push exhaust system towards front of vehicle until preloading at mounting for exhaust pipe -a- = 10 mm.



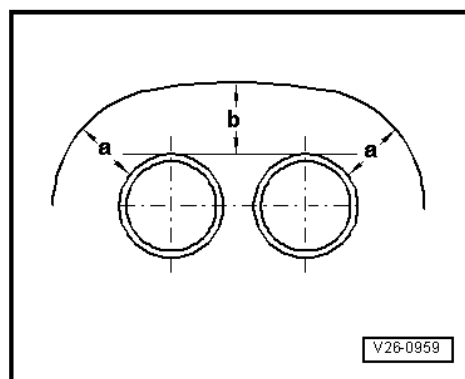


### Installation position of retaining bracket



- Install retaining bracket in the position shown.
- Dimension -a- = 11 mm.

### Align end exhaust pipes



- Align rear silencer so that there is an even distance -a- between bumper cut-out and tailpipes.
- Dimension -b- is approx. 20 mm.
- Unfasten rear silencer mounting to align tailpipes.
- ♦ ➔ [o1.1 verview - silencers", page 536](#)
- ♦ ➔ [o2.1 verview - emission control", page 568](#)

## 1.5.4 Aligning exhaust system free of stress, Sharan

### Sequence of operations

- The exhaust system must be aligned when cold.

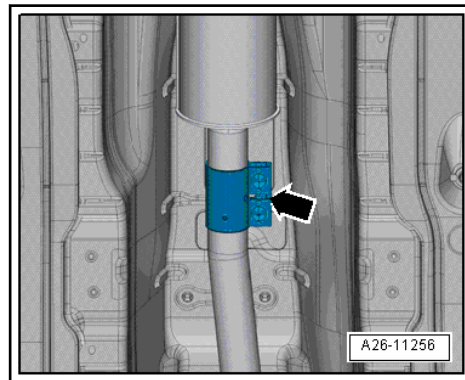


#### Note

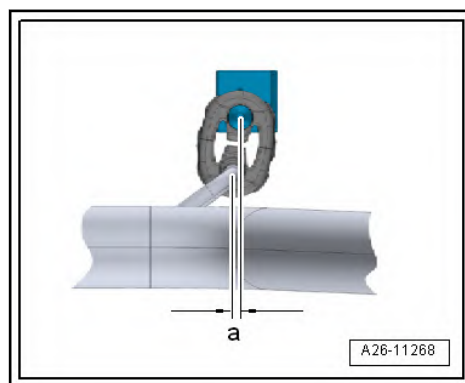
*-Arrow- points in direction of travel.*

- Loosen bolt connections for front clamp -arrow-.



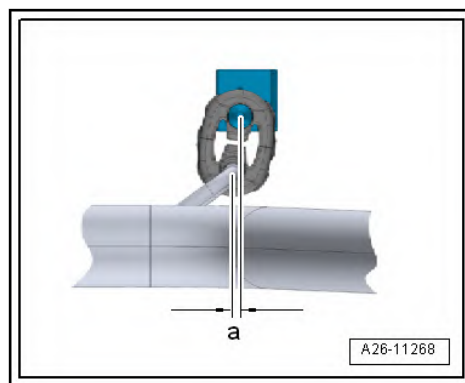


#### Exhaust hanger on rear axle



- Push exhaust system towards front of vehicle until preloading at mounting for exhaust pipe -a- = 8 mm.

#### Exhaust hanger on rear silencer

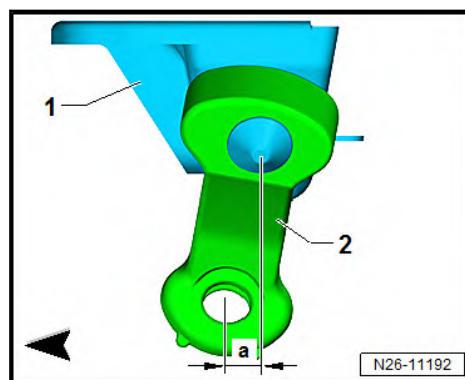


- Push exhaust system towards front of vehicle until preloading at mounting for exhaust pipe -a- = 10 mm.



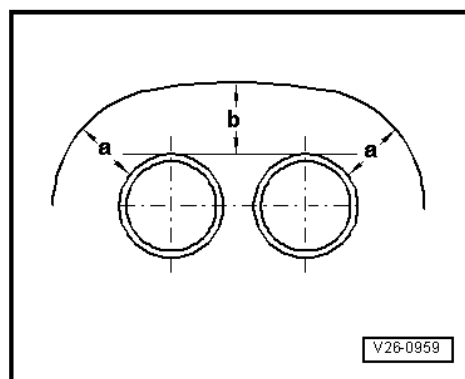


### Installation position of retaining bracket



- Install retaining bracket in the position shown.
- Dimension -a- = 11 mm.

### Align end exhaust pipes

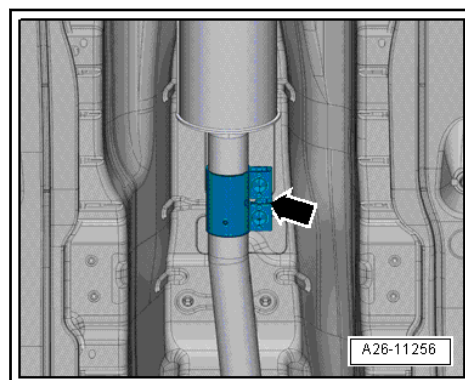


- Align rear silencer so that there is an even distance -a- between bumper cut-out and tailpipes.
- Dimension -b- is approx. 20 mm.
- Unfasten rear silencer mounting to align tailpipes.
- ♦ ⇒ [o1.1 verview - silencers", page 536](#)
- ♦ ⇒ [o2.1 verview - emission control", page 568](#)

## 1.5.5 Aligning exhaust system free of tension, T-Roc, Golf, Golf Estate

### Procedure

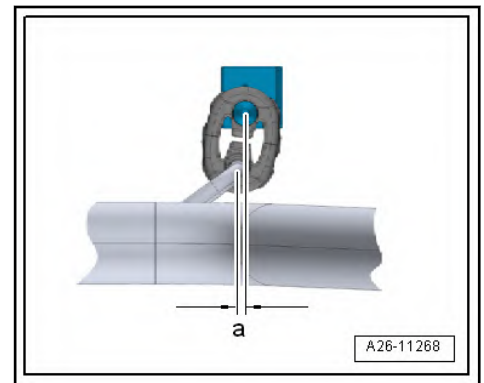
- The exhaust system must be aligned when cold.
- Loosen threaded connections on clamps -arrow-.





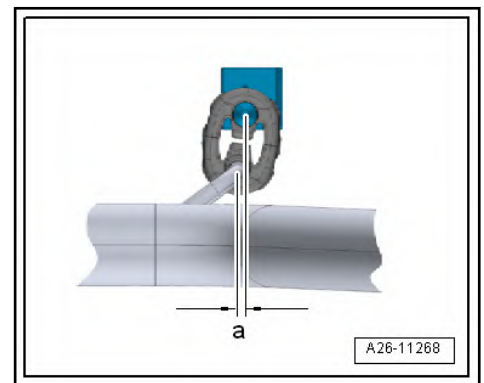


### Exhaust hanger at end of tunnel



- Push exhaust system towards front of vehicle until preloading at mounting for exhaust pipe -a- = 6 mm.

### Exhaust hanger on rear silencer



- Push exhaust system towards front of vehicle until preloading at mounting for exhaust pipe -a- = 10 mm.
- Tighten clamps [⇒ o1.1 verview - silencers", page 536](#) .
- Make sure that there is sufficient clearance between exhaust system and all components.

### Specified torques

- ◆ [⇒ o2.1 verview - emission control", page 568](#)
- ◆ [⇒ o1.1 verview - silencers", page 536](#)

## 1.6 Checking exhaust system for leaks

### Sequence of operations

- Start engine and run it at idling speed.
- Seal end exhaust pipes with cloths or plugs, for example, for the duration of the leakage test.
- Check (by listening) points of connection between exhaust manifold and the cylinder head, between turbocharger and front exhaust pipe etc. to make sure there are no leaks.
- Repair any leaks found.





## 2 Emission control

⇒ [o2.1 verview - emission control", page 568](#)

⇒ [a2.2 nd installing catalytic converter", page 570](#)

⇒ [a2.3 nd installing particulate filter", page 577](#)

### 2.1 Assembly overview - emission control





**1 - Bolt**

- ☐ 20 Nm

**2 - Bracket**

- ☐ Renew if damaged

**3 - Nut**

- ☐ Specified torque and tightening sequence ⇒ [page 570](#)

**4 - Bolt**

- ☐ 20 Nm

**5 - Nut**

- ☐ Specified torque and tightening sequence ⇒ [page 570](#)

**6 - Bracket**

**7 - Bracket**

**8 - Bolt**

- ☐ Specified torque and tightening sequence ⇒ [page 570](#)

**9 - Bolt**

- ☐ Specified torque and tightening sequence ⇒ [page 570](#)

**10 - Front exhaust pipe with catalytic converter**

- ☐ Do not bend flexible joint more than 10°. Otherwise, it can be damaged.
- ☐ Install flexible joint so that it is not under tension
- ☐ Take care not to damage wire mesh on decoupling element.
- ☐ Protect catalytic converter from damage by knocks and impact
- ☐ Removing and installing ⇒ [a2.2 nd installing catalytic converter", page 570](#)
- ☐ Do not remove protective packaging from replacement part until you are ready to fit the flexible joint
- ☐ Aligning exhaust system free of tension ⇒ [e1.5 exhaust system free of stress", page 560](#) .

**11 - Screw-type clamp**

- ☐ Renew after removal
- ☐ Specified torque and tightening sequence ⇒ [page 570](#)

**12 - Seal**

- ☐ Renew after removal
- ☐ Removing and installing ⇒ [a2.2 nd installing catalytic converter", page 570](#)

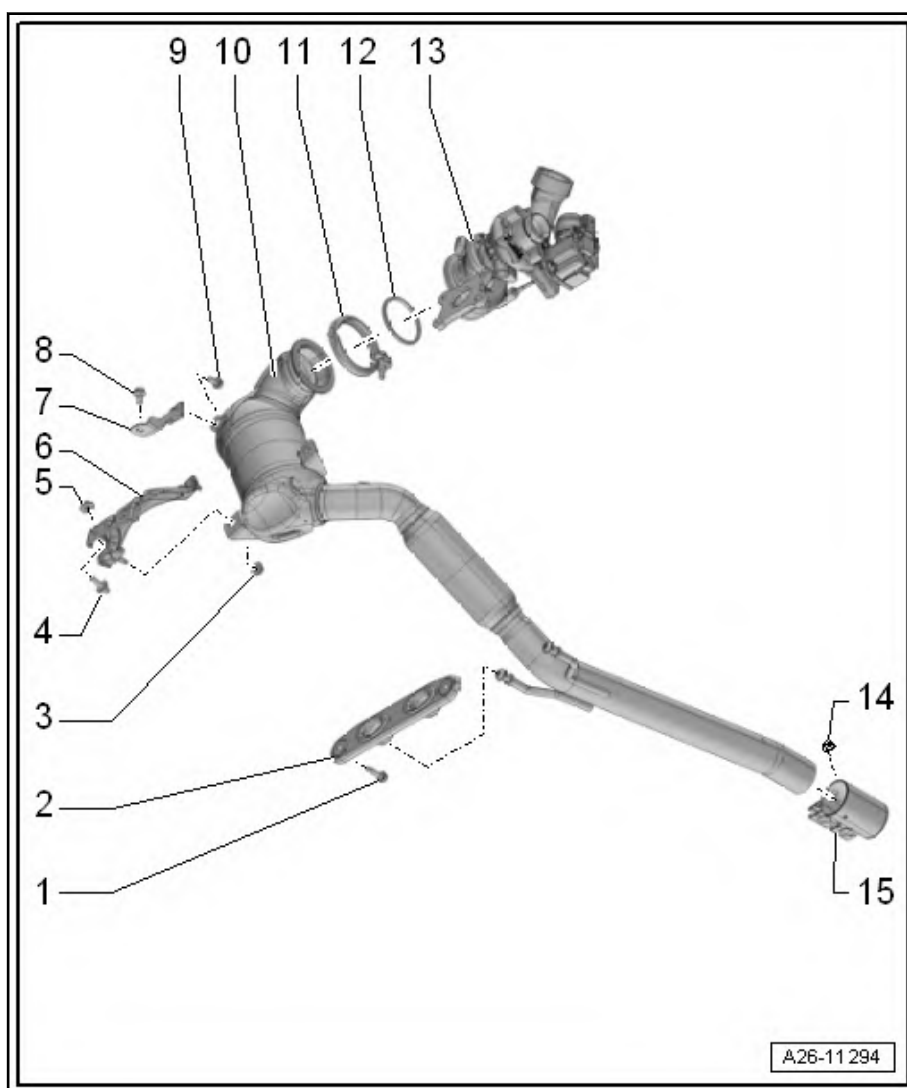
**13 - Turbocharger**

**14 - Nut**

- ☐ 30 Nm

**15 - Front clamping sleeve**

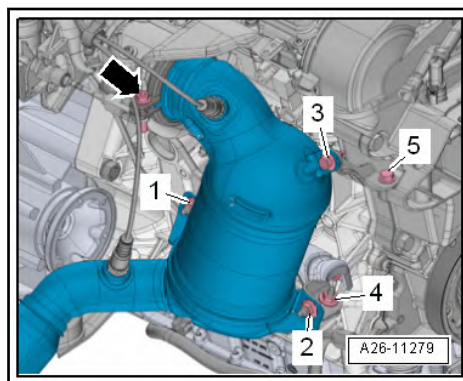
- ☐ Align exhaust system free of tension before tightening ⇒ [e1.5 exhaust system free of stress", page 560](#) .
- ☐ Tighten threaded connections evenly.







## Installing catalytic converter - specified torque and sequence



1.	– Fit catalytic converter to turbocharger and fit screw-type clip -arrow- without tightening	
2.	– Loosely screw in bolts -3, 5- and bolts -1, 2, 4- by hand	• It should still be possible to move catalytic converter and bracket.
3.	– Tighten screw-type clip -arrow-	15 Nm
4.	– Tighten bolts and nuts in the sequence -1 ... 5-	20 Nm

## 2.2 Removing and installing catalytic converter



### Note

*The catalytic converter is removed together with the front exhaust pipe.*

### Special tools and workshop equipment required

- ♦ High-temperature paste ⇒ Electronic parts catalogue.

### Removing

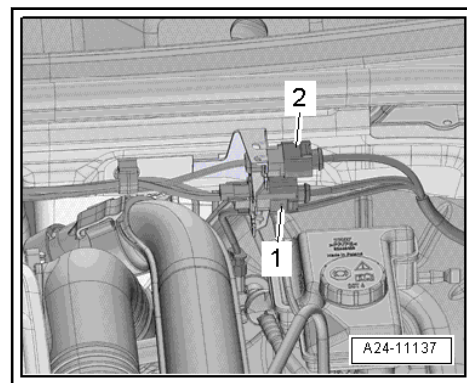


### Note

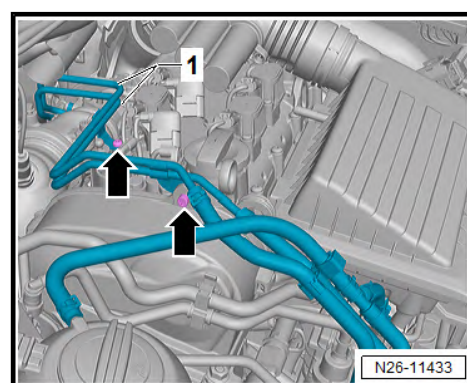
*Reinstall all cable ties in the same locations when installing.*

- Remove resonator for intake air ⇒ [a3.4 nd installing resonator for intake air”, page 476](#) .
- Remove connectors -1- and -2- from retainer, release them, and pull them off.





- Lay electrical wires to one side.
- Remove wires from heat shield of turbocharger.

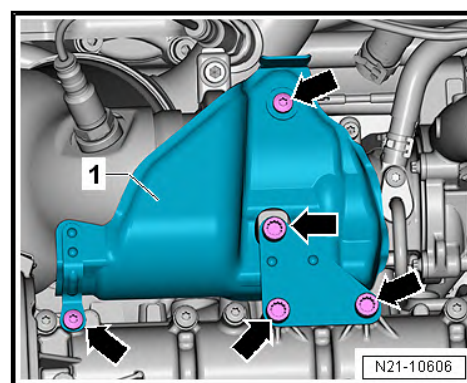


- Unscrew bolts -arrows- on camshaft housing.



#### Note

- ◆ *Do not loosen bolts on turbocharger.*
- ◆ *Coolant lines on turbocharger are not removed.*
- Unscrew nuts and bolts -arrows-.



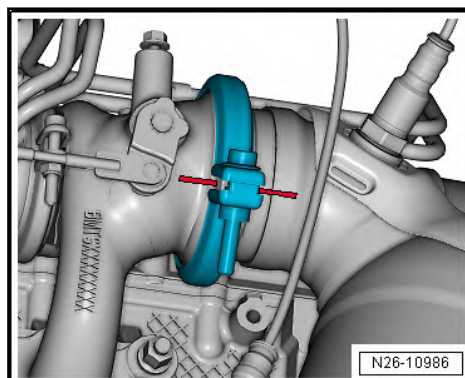




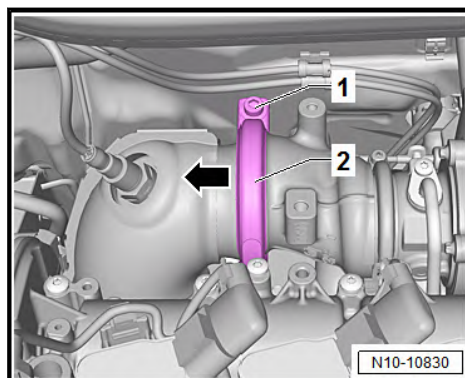
## Note

- ◆ Prior to loosening the connection between the catalytic converter and the turbocharger, mark the position of the clamp ➔ [page 572](#).
- ◆ Depending on the component that might need to be renewed, a mark is to be made on the component opposite to the component to be renewed.
- ◆ Make sure that the clamp is fitted at the same position on reinstallation.

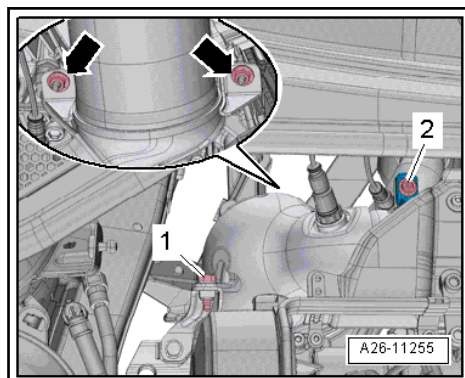
## Clamp position



- Loosen bolt -1- until clamp -2- can be pushed in direction of -arrow- over catalytic converter.

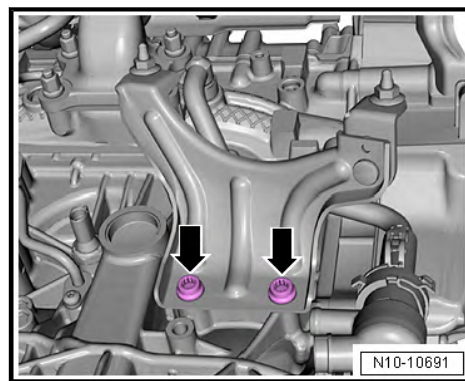


- Unscrew bolt -2- and remove screw-type clip.

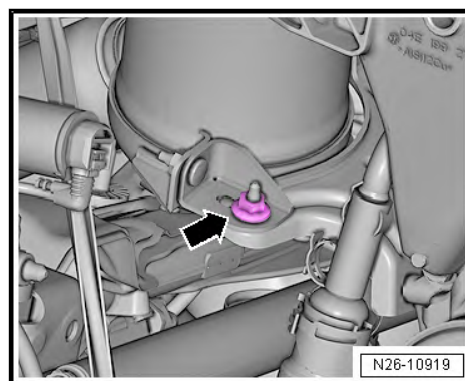


- Remove bolt -1- and nuts -arrows-.
- Unscrew bolts -arrows- of bracket.

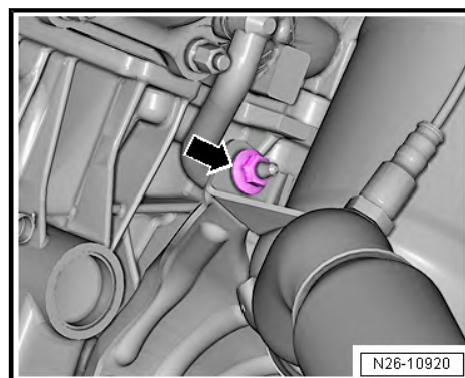




- Unscrew right nut -arrow- of bracket.

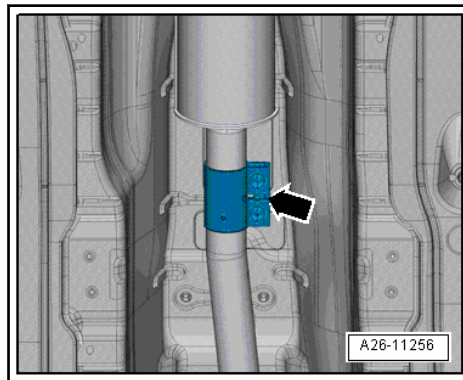


- Unscrew nut -arrow- to the left of the bracket.

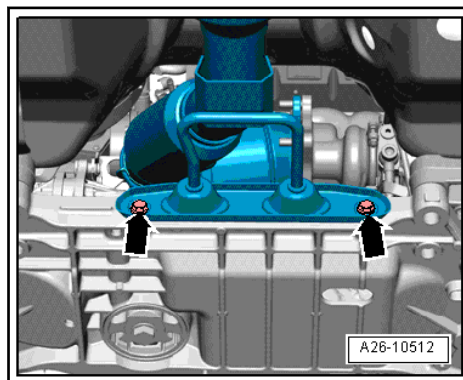


- Remove tunnel cross-piece ⇒ General body repairs, exterior; Rep. gr. 66; Underbody trim; Assembly overview - underbody trim panels.
- Detach connector from retainer and lay wire leading to Lambda probe to one side.
- Loosen clamp -arrow-, and push it to rear.



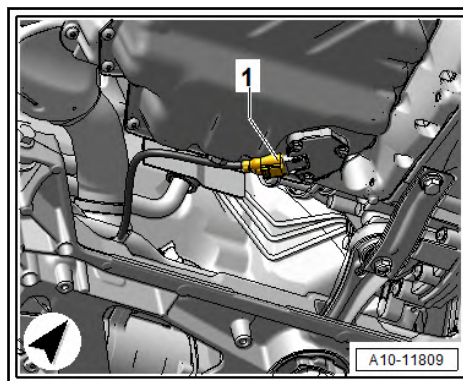


#### Vehicles with front-wheel drive



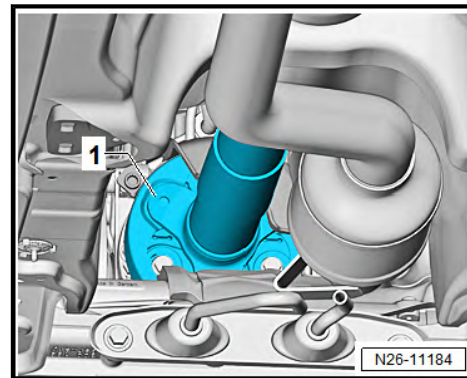
- Unscrew bolts -arrows-.
- Remove catalytic converter with front exhaust pipe towards rear.

#### Vehicles with all-wheel drive

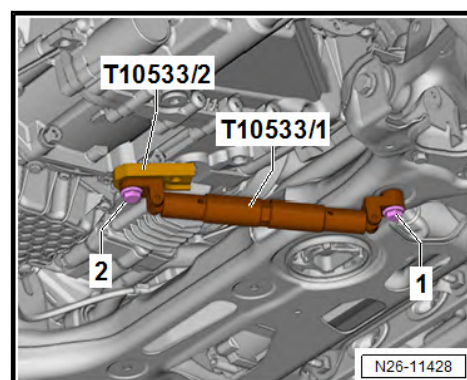


- Remove both lambda probes ⇒ [a8.2 nd installing Lambda probe](#), [page 531](#) .
- Remove pendulum support ⇒ [a2.4 nd installing pendulum support](#), [page 87](#) .
- Release and pull off electrical connector -1- on oil level and oil temperature sender -G266-.

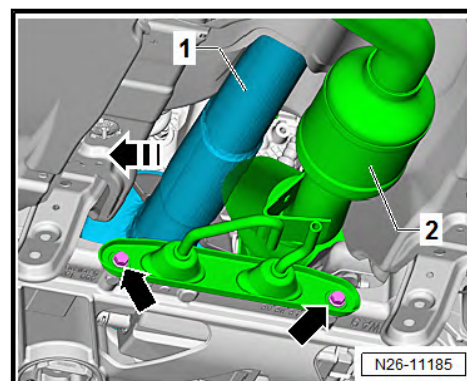




- Unbolt flexible coupling of propshaft -1- from bevel box  
⇒ Rep. gr. 39; Propshaft; Removing and installing propshaft.
- Position engine support -T10533- as shown.



- Engine support -T10533/2- is positioned on flat bolt connecting point of engine support -T10533/1-.
- Screw in original bolt of pendulum support -2- in front threaded hole of pendulum support.
- Screw bolt M8 x 40 mm -1- with washer -2- into left threaded hole of noise insulation.
- Tighten bolts by hand.
- Using engine support -T10533-, push engine as far forwards as possible.
- Unscrew bolts -arrows-.



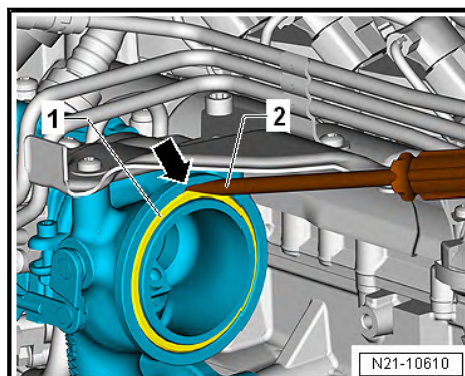
- Push propshaft -1- as far as stop in direction of -arrow-.
- Remove catalytic converter with front exhaust pipe -2- downwards.





- Turn catalytic converter with front exhaust pipe accordingly when doing this.

Continued for all vehicles



- Insert screwdriver -2- in recess -arrow- on turbocharger.
- Lever out seal -1-.

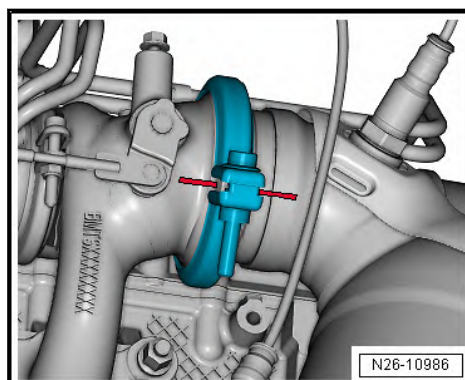
### Installing

Install in reverse order of removal, observing the following:



#### Note

- ◆ *Renew seal and self-locking nuts.*
- ◆ *Coat studs and bolts of catalytic converter with high-temperature paste; high-temperature paste → Electronic parts catalogue.*
- Position catalytic converter on turbocharger and engine ⇒ [page 570](#) .
- Align catalytic converter, turbocharger and clamp in relation to each other as per the markings.



- If new parts are installed, markings must be transferred.
- Align exhaust system free of stress ⇒ [e1.5 exhaust system free of stress](#) , [page 560](#) .

### Specified torques

- ◆ ⇒ [Fig. “Installing catalytic converter - specified torque and sequence”](#) , [page 570](#)
- ◆ ⇒ [o2.1 verview - emission control](#) , [page 568](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66; Underbody cladding; Assembly overview - underbody cladding





## 2.3 Removing and installing particulate filter



### Note

- ◆ *The removal and installation procedure for the particulate filter is the same as that for the catalytic converter. Therefore, only removal and installation of the catalytic converter is described ⇒ [a2.2 nd installing catalytic converter](#)", page 570.*
- ◆ *If the particulate filter was renewed, the ash load must be reset using ⇒ Vehicle diagnostic tester.*





## 28 – Ignition system

### 1 Ignition system

⇒ [o1.1 verview - ignition system", page 578](#)

⇒ [a1.2 nd installing ignition coils with output stage", page 580](#)

⇒ [a1.3 nd installing knock sensor 1G61", page 583](#)

⇒ [a1.4 nd installing Hall sender", page 584](#)

⇒ [a1.5 nd installing engine speed senderG28", page 585](#)

#### 1.1 Assembly overview - ignition system





### 1 - Bolt

- ☐ The specified torque influences the function of the knock sensor.
- ☐ 20 Nm

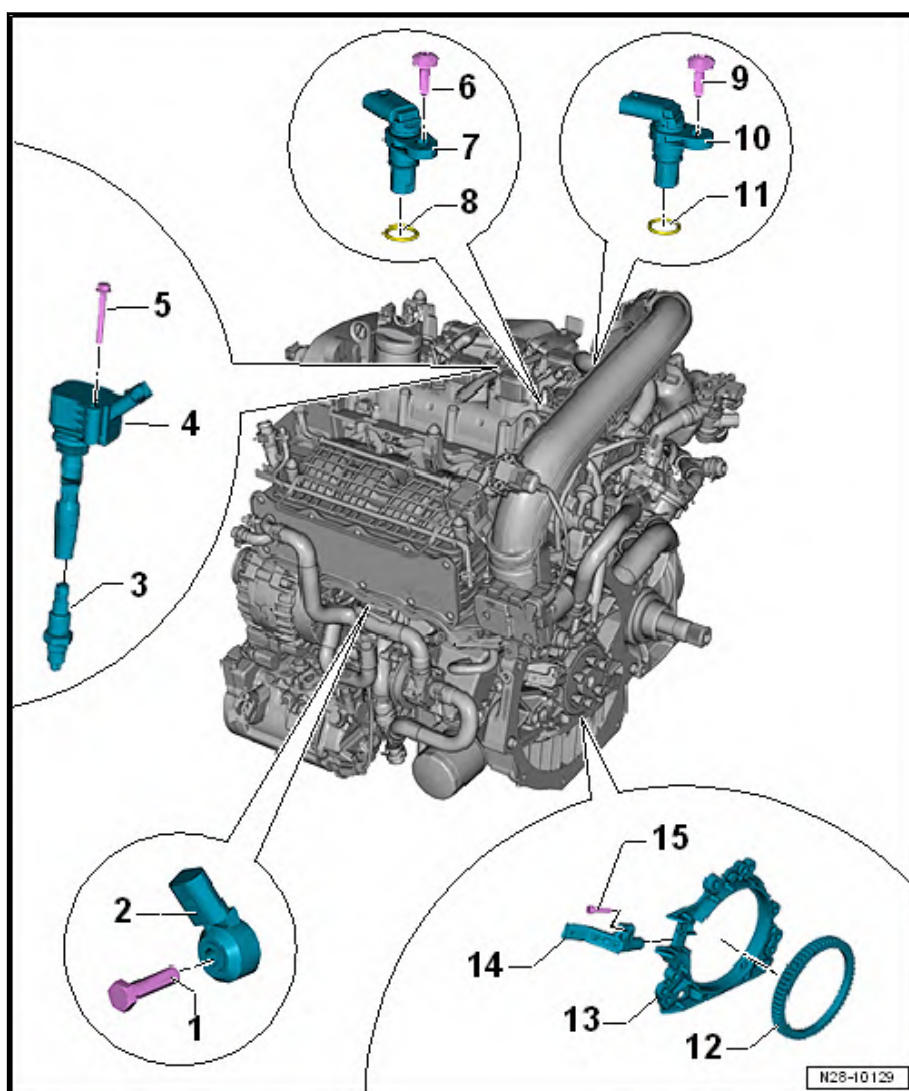
### 2 - Knock sensor 1 -G61-

- ☐ Removing and installing ⇒ [a1.3 nd installing knock sensor 1G61", page 583](#)

### 3 - Spark plug

- ☐ For latest spark plugs, see ⇒ Electronic parts catalogue (ETKA)
- ☐ Remove and install with spark plug socket and extension -3122 B-
- ☐ Specified torque: 22 Nm
- ☐ Change interval ⇒ Maintenance tables

### 4 - Ignition coil with output stage and spark plug connectors



### Note

*Ignition coils with output stage and spark plug connectors are available individually for repairs ⇒ Electronic parts catalogue (ETKA)*

- ◆ 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-
  - ☐ To remove, use puller -T10530-.
  - ☐ Removing and installing ⇒ [a1.2 nd installing ignition coils with output stage", page 580](#)

### 5 - Bolt

- ☐ 8 Nm

### 6 - Bolt

- ☐ 8 Nm

### 7 - Hall sender -G40-

- ☐ Removing and installing ⇒ [a1.4.1 nd installing Hall senderG40", page 584](#)





#### 8 - O-ring

#### 9 - Bolt

- ❑ 8 Nm

#### 10 - Hall sender 3 -G300-

- ❑ Removing and installing ⇒ [a1.4.2 nd installing Hall sender 3G300", page 584](#)
- ❑ Only installed in vehicles with exhaust camshaft adjuster

#### 11 - O-ring

- ❑ Renew if damaged

#### 12 - Sender wheel

- ❑ For engine speed sender -G28-
- ❑ Removing and installing ⇒ [a2.3 nd installing sealing flange on gearbox side", page 148](#)

#### 13 - Sealing flange, gearbox side

- ❑ Removing and installing ⇒ [a2.3 nd installing sealing flange on gearbox side", page 148](#)

#### 14 - Engine speed sender -G28-

- ❑ Removing and installing ⇒ [a1.5 nd installing engine speed senderG28", page 585](#)

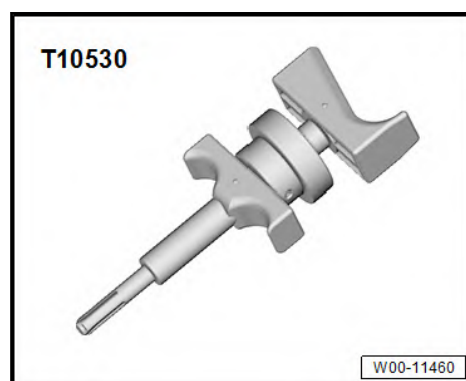
#### 15 - Bolt

- ❑ 4.5 Nm

## 1.2 Removing and installing ignition coils with output stage

### Special tools and workshop equipment required

- ◆ Puller -T10530-



### Note

- ◆ *The ignition coils are easier to remove when the engine is warm.*
- ◆ *The grease used upon assembly in the factory makes it easier to remove ignition coils or the spark plug connectors when the engine is warm.*
- ◆ *When installing used ignition coils with output stage, the ignition coils must be lubricated with silicone paste ⇒ Electronic parts catalogue (ETKA).*
- ◆ *Ignition coils with output stage and spark plug connectors are available individually for repairs ⇒ Electronic parts catalogue (ETKA)*



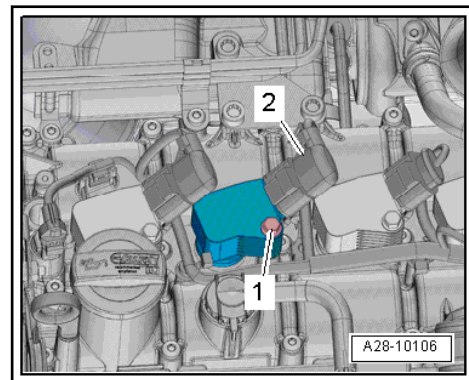


## Removing

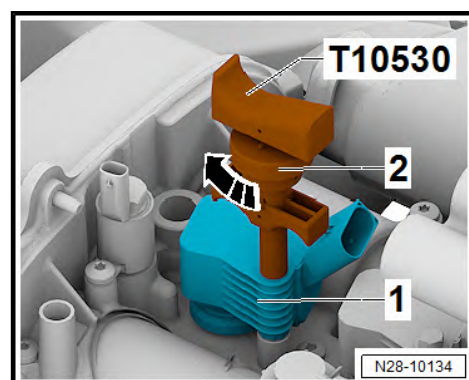
### Ignition coils "cyl. 2, 3 and 4":

- Remove resonator for intake air ➔ [a3.4 nd installing resonator for intake air](#), page 476 .

### All ignition coils (continued):

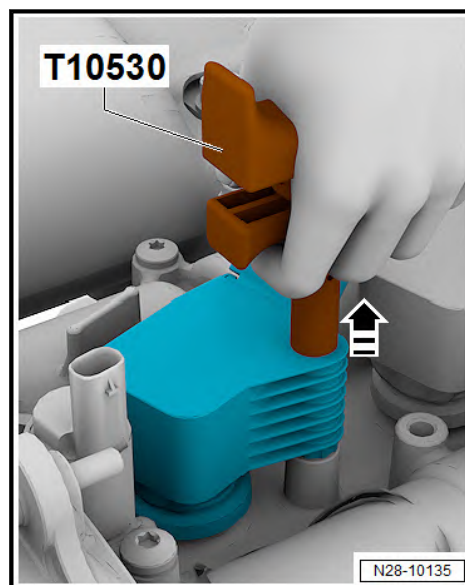


- Disconnect electrical connector -2-.
- Unscrew bolt -1-.
- Push puller -T10530- as far as stop into hole in ignition coil -1-.



- Tighten knurled nut -2- in -direction of arrow-.
- Pull ignition coil out of camshaft housing in -direction of arrow- using puller -T10530-.





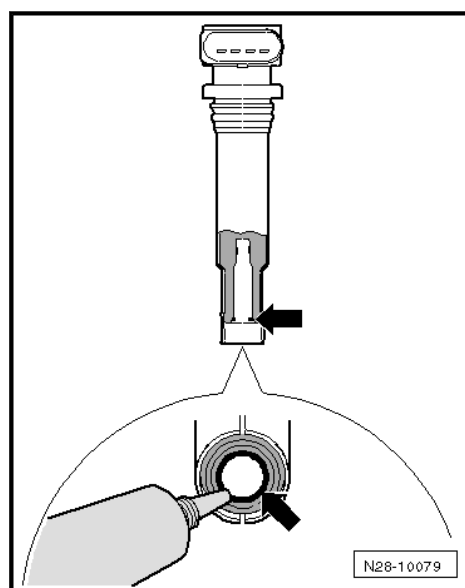
## Installing

Install in reverse order of removal, observing the following:



### Note

- ◆ *Ignition coils with output stage and spark plug connectors are available individually for repairs ⇒ Electronic parts catalogue (ETKA)*
  - ◆ *The spark plug connectors are removed from the ignition coils by hand.*
  - ◆ *When installing used ignition coils with output stage, the ignition coils must be lubricated with silicone paste ⇒ Electronic parts catalogue (ETKA).*
- Apply a thin bead of silicone paste around sealing hose of ignition coil.

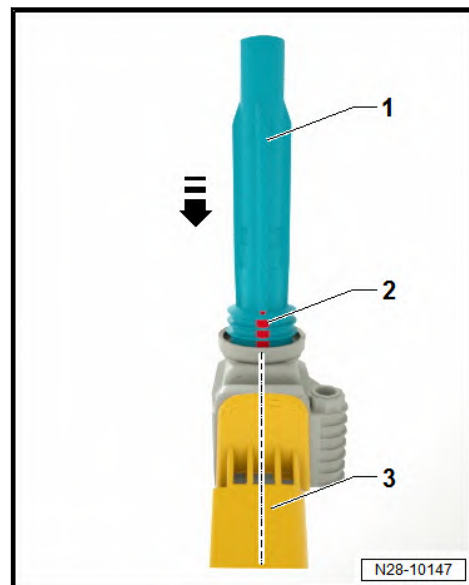


- Slide spark plug connector -1- by hand onto ignition coil as far as stop.





The vent drilling -2- must be centred relative to connector housing -3- while doing so.



- Insert all spark plugs with spark plug connector loosely into spark plug recess.
- Align ignition coils with connectors and simultaneously push all connectors onto ignition coils.
- Press ignition coils evenly onto spark plugs by hand (do not use tools).

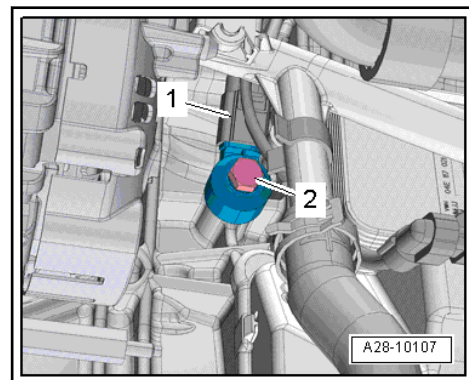
#### Specified torques

◆ ⇒ [o1.1 verview - ignition system](#)", page 578

### 1.3 Removing and installing knock sensor 1 -G61-

#### Removing

- Remove air conditioner compressor from bracket, and secure it on vehicle ⇒ Heating, air conditioning; Rep. gr. 87; Air conditioner compressor; Assembly overview - air conditioner compressor drive unit.
- Disconnect electrical connector -1-.



- Unscrew bolt -2- and remove knock sensor 1 -G61-.

#### Installing

Install in reverse order of removal, observing the following:





- Install air conditioner compressor ⇒ Heating, air conditioning; Rep. gr. 87; Air conditioner compressor; Assembly overview - drive unit of air conditioner compressor.

#### Specified torques

- ♦ ⇒ [o1.1 overview - ignition system", page 578](#)

## 1.4 Removing and installing Hall sender

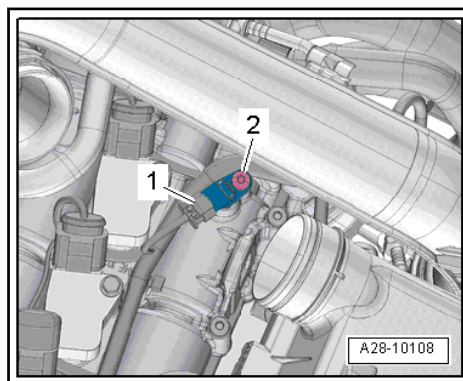
⇒ [a1.4.1 nd installing Hall sender G40", page 584](#)

⇒ [a1.4.2 nd installing Hall sender 3G300", page 584](#)

### 1.4.1 Removing and installing Hall sender - G40-

#### Removing

- Remove resonator for intake air ⇒ [a3.4 nd installing resonator for intake air", page 476](#) .
- Disconnect electrical connector -1-.



- Unscrew bolt -2- and remove Hall sender -G40-.

#### Installing

- Install in reverse order of removal.

#### Specified torques

- ♦ ⇒ [o1.1 overview - ignition system", page 578](#)

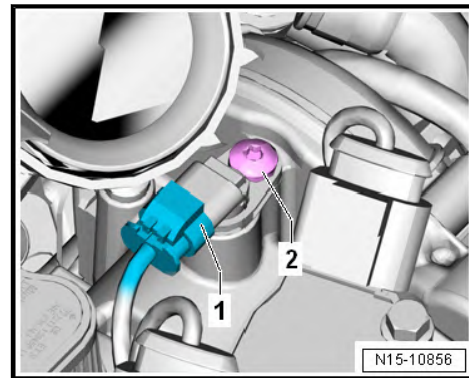
### 1.4.2 Removing and installing Hall sender 3-G300-

Only installed in vehicles with adjustable exhaust camshaft (engine codes: CZDA, DJKA).

#### Removing

- Remove resonator for intake air ⇒ [a3.4 nd installing resonator for intake air", page 476](#) .
- Disconnect electrical connector -1-.





- Unscrew bolt -2- and remove Hall sender 3 -G300-.

#### Installing

- Install in reverse order of removal.

#### Specified torques

- ◆ [⇒ 01.1 overview - ignition system", page 578](#)

## 1.5 Removing and installing engine speed sender -G28-

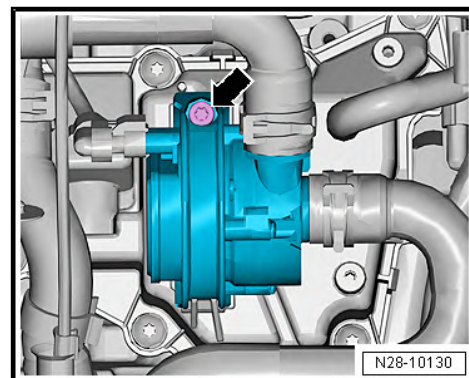
#### Special tools and workshop equipment required

- ◆ Socket, 4 mm -T10370-



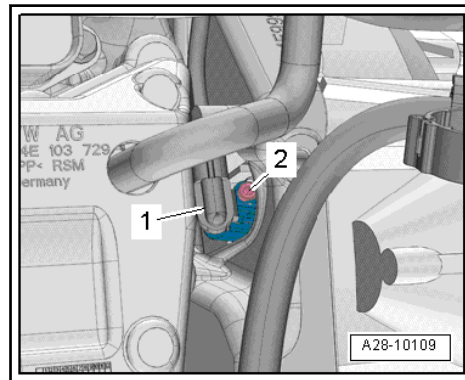
#### Removing

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- Unscrew bolt -arrow- and push charge air cooling pump -V188- to one side.



- Disconnect electrical connector -1-.





- Unscrew bolt -2- and remove engine speed sender -G28-.

#### Installing

- Install in reverse order of removal.
- Install noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview – noise insulation.

#### Specified torques

- ♦ ⇒ [o1.1 verview - ignition system", page 578](#)
- ♦ ⇒ [o2.2 verview - electric coolant pump", page 351](#)