



Workshop Manual

Audi A4 2015 ➤

Audi A5 Sportback 2017 ➤

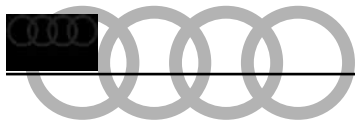
4-cylinder TDI engine, 2.0 ltr. 4-valve common rail (EA 288 EVO)

Engine ID	DEZ E	DEZ B							
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Edition 07.2018



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List of Workshop Manual Repair Groups

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Repair Group

- 00 - Technical data
- 10 - Removing and installing engine
- 13 - Crankshaft group
- 15 - Cylinder head, valve gear
- 17 - Lubrication
- 19 - Cooling
- 21 - Turbocharging/supercharging
- 23 - Mixture preparation - injection
- 26 - Exhaust system
- 28 - Glow plug system

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



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00 – Technical data

1 Identification

(ARL005514; Edition 07.2018)

All information can be found in ⇒ Servicing 4-cylinder TDI engine,
common rail; Rep. gr. 00 ; Identification .



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2 Safety precautions

All information can be found in ⇒ Servicing 4-cylinder TDI engine,
common rail; Rep. gr. 00 ; Safety precautions .



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3 Repair instructions

All information can be found in ⇒ Servicing 4-cylinder TDI engine,
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10 – Removing and installing engine

1 Removing and installing engine

⇒ [“1.1 Removing engine”, page 4](#)

⇒ [“1.2 Separating engine and gearbox”, page 13](#)

⇒ [“1.3 Removing engine from scissor-type assembly platform”, page 19](#)

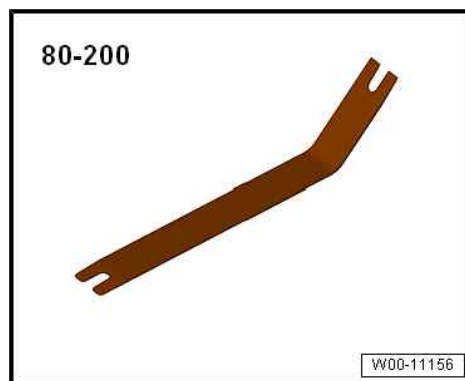
⇒ [“1.4 Securing engine to engine and gearbox support”, page 19](#)

⇒ [“1.5 Installing engine”, page 19](#)

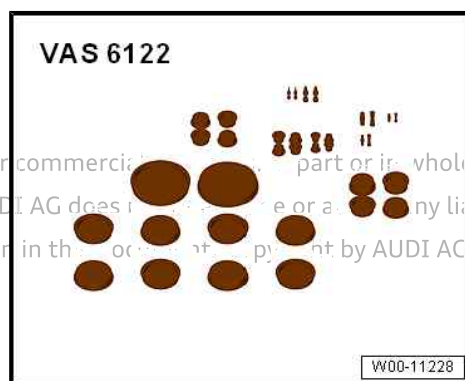
1.1 Removing engine

Special tools and workshop equipment required

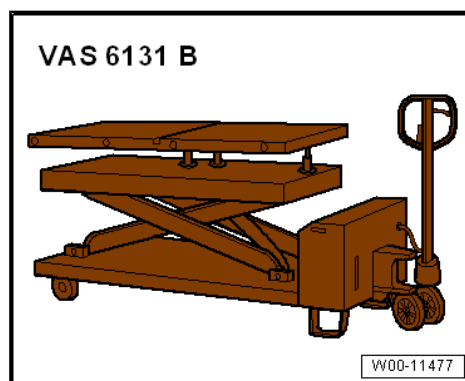
◆ Removal lever - 80-200-



◆ Engine bung set - VAS 6122-

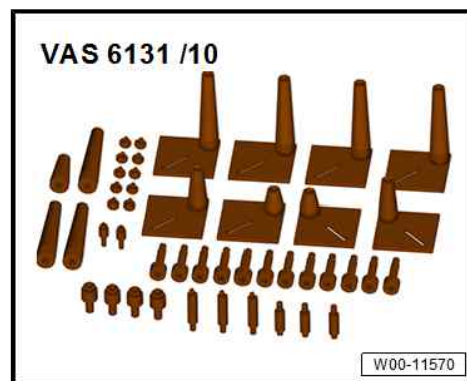


◆ Scissor-type assembly platform - VAS 6131 B-





- ◆ Support set for Audi - VAS 6131/10-



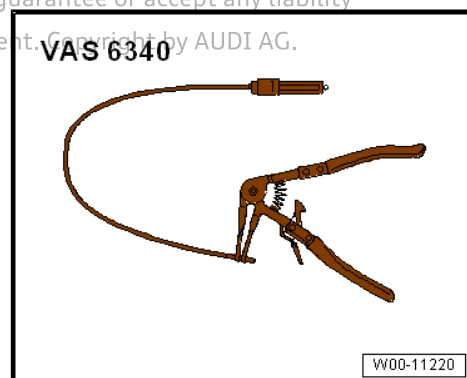
- ◆ Adapter -VAS 6131/11-4- (2x) from support set, Audi A8 >2002 - VAS 6131/11- (not illustrated)
- ◆ Tapered mounting pins - VAS 6131/12-2- (2x) from support set, Audi A6 >2005 - VAS 6131/12- (not illustrated)
- ◆ Threaded spindle (2x) from support set, Audi Q7 >2005 - VAS 6131/13-



- ◆ Coolant collecting system - VAS 5014- or drip tray for workshop hoist - VAS 6208-



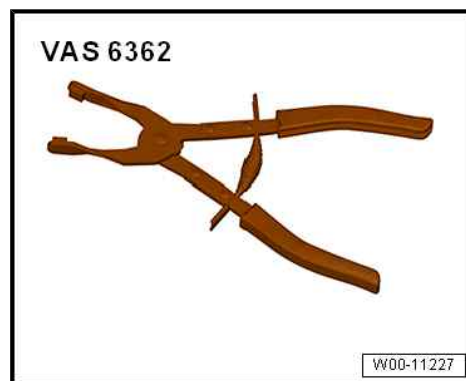
- ◆ Hose clip pliers - VAS 6340-



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- ◆ Hose clip pliers - VAS 6362-



- ◆ Wrench 21 mm - T40263-



- ◆ Safety goggles
- ◆ Protective gloves

Procedure

- The engine is removed from underneath together with the gearbox and subframe (with lock carrier installed).
- Re-install all cable ties in the same locations when installing.
- Observe rules for cleanliness ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair instructions; Rules for cleanliness .
- All bolts on running gear components with bonded rubber bushes must be tightened with suspension in unladen position (vehicle unladen).
- Bonded rubber bushes can only be turned to a limited extent. Therefore, before tightening the bolts, suspension components with bonded rubber bushes must be brought into a position corresponding to the normal position while driving (unladen position). Otherwise, the bush would be subject to torsion loading and its service life shortened.
- Before starting work, determine unladen position ⇒ Running gear, axles, steering; Rep. gr. 00 ; Repair instructions; Lifting suspension to unladen position (vehicles with coil springs) .
- Bring front wheels into straight-ahead position.
- Disconnect earth wire from battery terminal ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .

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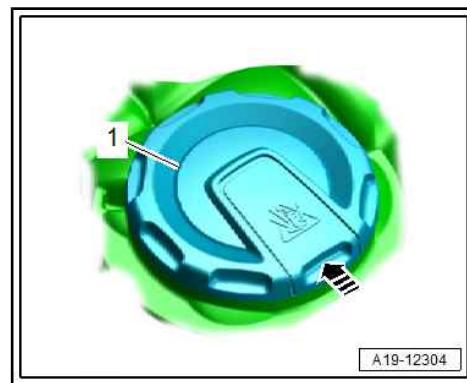


⚠ CAUTION

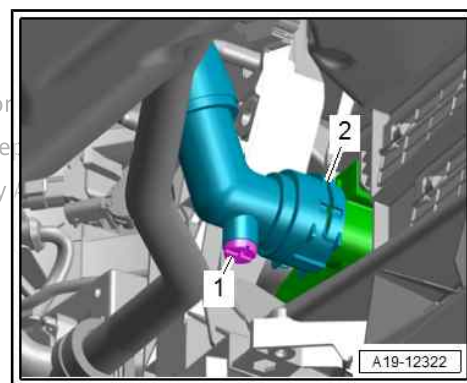
The cooling system is under pressure when the engine is hot.
Risk of scalding due to hot steam and hot coolant.

Danger of scalding skin and other parts of the body.

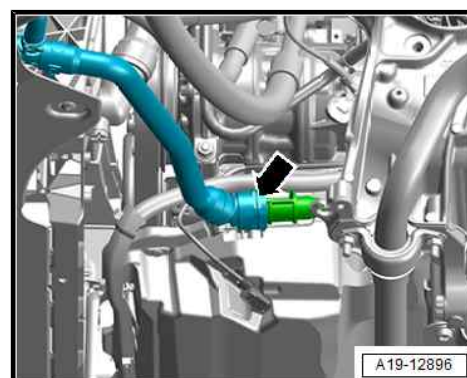
- Put on protective gloves.
- Put on safety goggles.
- Cover filler cap on expansion tank with a cloth and open carefully to release pressure.



- Release fastener -arrow- and open filler cap -1- on coolant expansion tank.
- Remove lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Exploded view - bumper cover .
- Remove front wheels ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .
- Remove wheel spoiler (both sides) and wheel housing liner (front right) ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Exploded view - wheel housing liner (front) .
- Unfasten front section of wheel housing liner (front left) and press slightly towards rear ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Exploded view - wheel housing liner (front) .
- Remove noise insulation panels ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Place collector tank from coolant collecting system -VAS 5014- or drip tray for workshop hoist - VAS 6208- underneath.
- Open drain plug -1- at connection and drain off coolant.

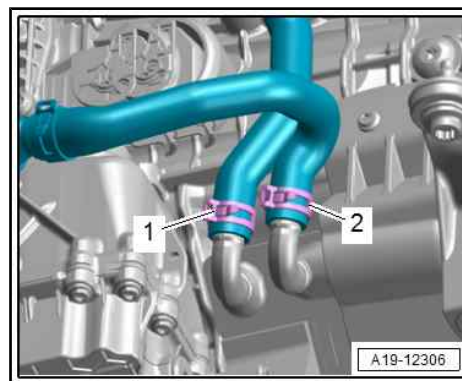


- Lift retaining clip -arrow- and disconnect coolant hose.

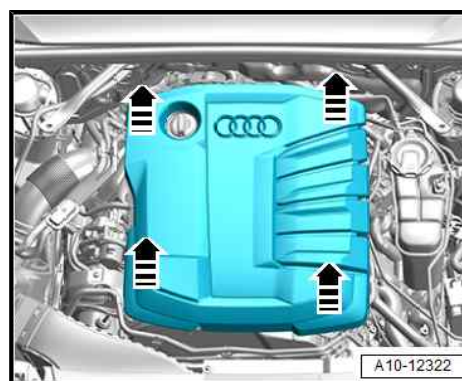




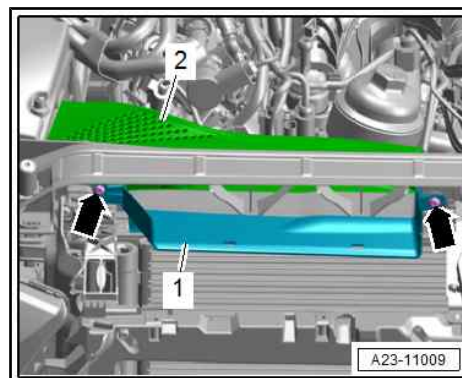
- Release hose clip -2-, disconnect coolant hose from gearbox and drain off coolant.



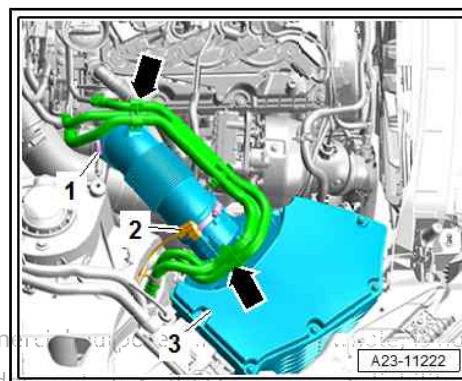
- Carefully pull engine cover panel off retaining pins one after another -arrows-. Do not jerk engine cover panel away, and do not try to pull on one side only.



- Remove bolts -arrows- and detach air duct -2-.



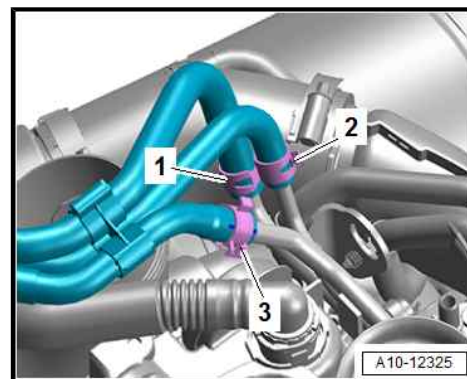
- Move retaining clips -arrows- clear with fuel hoses and press to one side.
- Release hose clip -1- and disconnect air hose.
- Unplug electrical connector -2- for air mass meter - G70- .
- Lift off air cleaner housing -3- and detach.



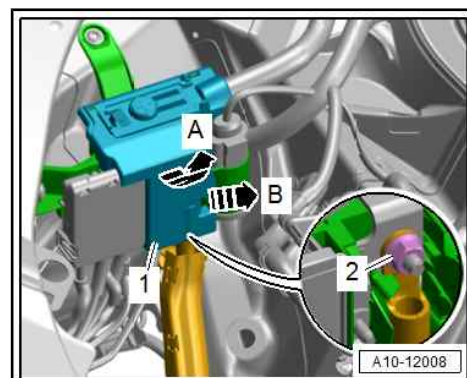
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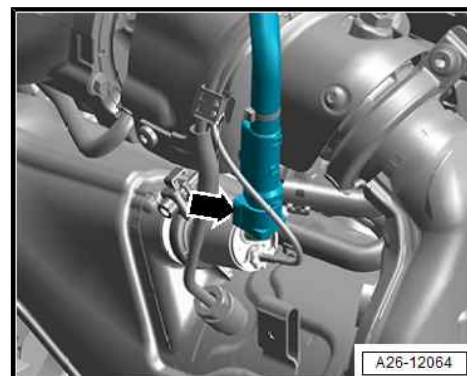
- Disconnect fuel hoses -1, 2, 3- ⇒ Fuel supply system; Rep. gr. 20 ; Plug-in connectors; Disconnecting plug-in connectors .
- Move coolant hoses clear and tie up to right side.
- Seal off open lines and connections with plugs (thoroughly cleaned) from engine bung set - VAS 6122- .



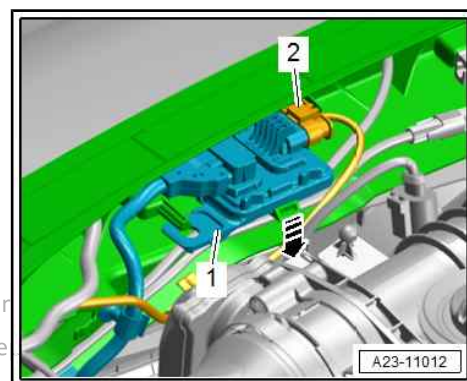
- Release catch -arrow B- and open electronics box -1- -arrow A-.
- Remove nut -2- and move B+ wire clear.
- Move wiring duct clear at top.



- Release pressure in SCR system ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 26 ; SCR (selective catalytic reduction) system; Releasing pressure in SCR system .
- Press release tab and disconnect SCR supply line -arrow- from injector for reducing agent - N474- .
- Move SCR line clear at engine.
- Seal off open lines and connections with plugs (thoroughly cleaned) from engine bung set - VAS 6122- .



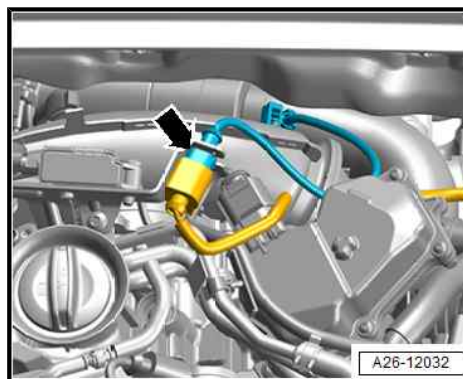
- Unplug electrical connector -2-.
- Release catch -arrow- and detach control unit for NOx sender - J583- -item 1-; move control unit clear and place it on engine.



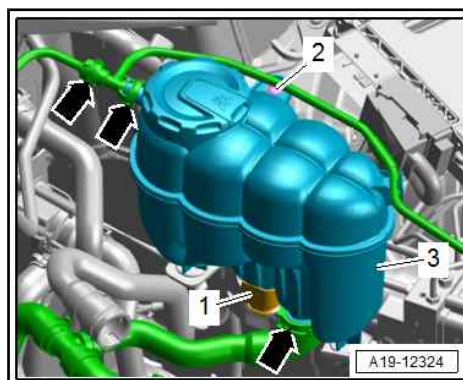
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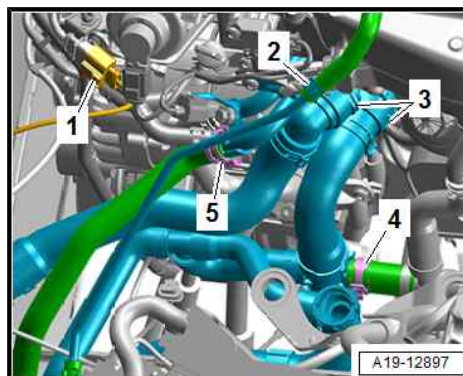
- Unplug electrical connector -arrow- for exhaust gas temperature sender 4 - G648- and move wiring clear.
- If engine is to be separated from gearbox, detach electrical connectors from bracket and move them clear.



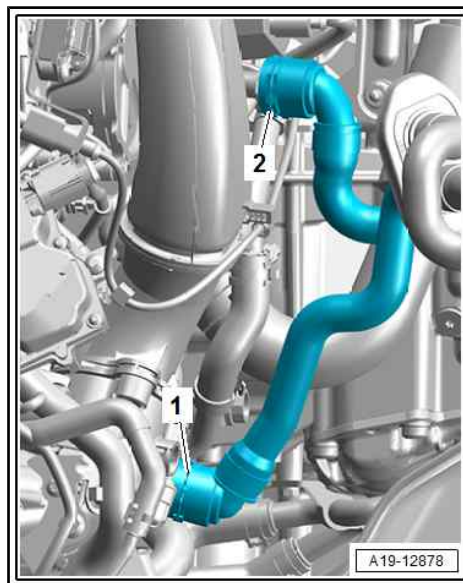
- Move electrical wiring harness clear.
- Lift retaining clips -arrows-, disconnect coolant hoses and move them clear.
- Unplug electrical connector -1- for coolant shortage indicator switch - F66- .
- Unscrew bolt -2- and detach coolant expansion tank -3-.



- Lift retaining clips -3- and disconnect coolant hoses.
- Release hose clips -2, 4, 5- and disconnect coolant hoses.
- Unplug electrical connector -1- for Lambda probe 1 before catalytic converter - GX10- .



- Lift retaining clips -1, 2- and disconnect coolant hoses.

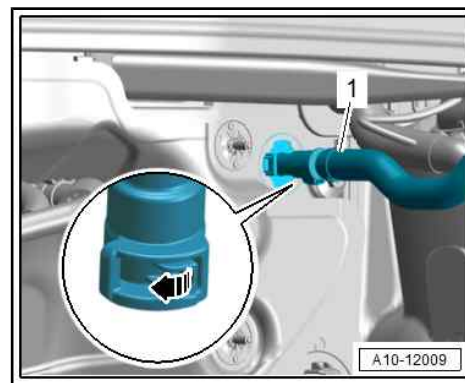


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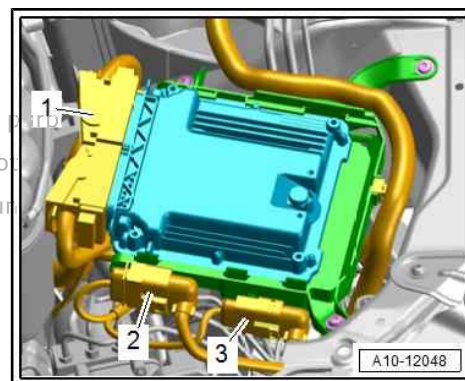
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- Release catch -arrow- and disconnect vacuum hose -1-.



- Detach electrical connector -2- from bracket and unplug.
- Unplug electrical connector -1- at engine control unit.
- Move electrical wiring harness clear and place down on top of engine.
- Remove subframe ⇒ Running gear, axles, steering; Rep. gr. 40 ; Subframe; Removing and installing subframe with steering rack .
- Unbolt drive shaft (left and right) from gearbox ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Removing and installing drive shaft .
- Remove poly V-belt from air conditioner compressor ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Removing and installing poly V-belt .
- Remove air conditioner compressor from bracket ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Detaching and attaching air conditioner compressor at bracket .
- Unplug electrical connectors and move electrical wiring clear:

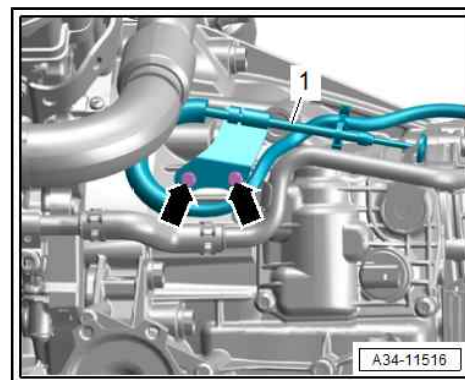
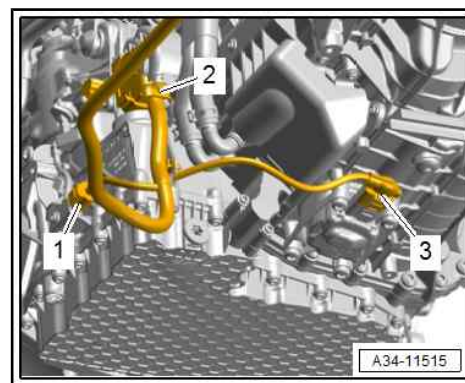


- 1 - For parking lock solenoid - N486-
- 3 - For electric pump 2 for gearbox - V553-

! NOTICE

Risk of irreparable damage due to electrostatic discharge.

- Do not touch connector contacts with your hands.
- Touch the lifting platform or other earthed object to discharge static electricity.
- Unplug electrical connector -2- on gearbox.
- Remove bolts -arrows- and move manual release cable -1- for parking lock clear.





CAUTION

Risk of injury caused by soot particles in the air.
Eyes and skin can suffer irritation or injuries.

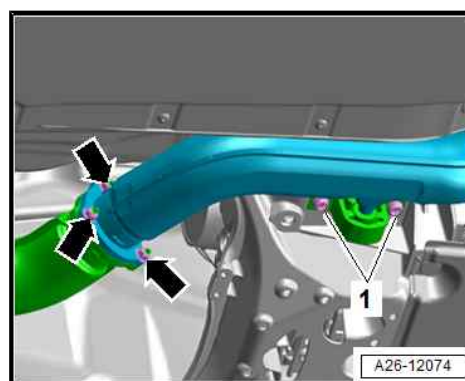
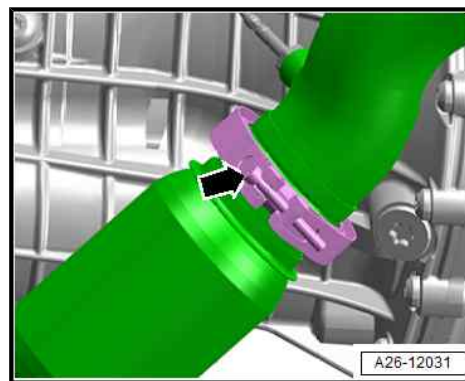
- Put on safety goggles.
- Put on protective gloves.

- Release screw-type clip -arrow-.

Note:

To loosen screw-type clip, lock two nuts on threaded shaft of screw and loosen screw.

- Remove nuts -arrows- and bolts -1- and detach front exhaust pipe.

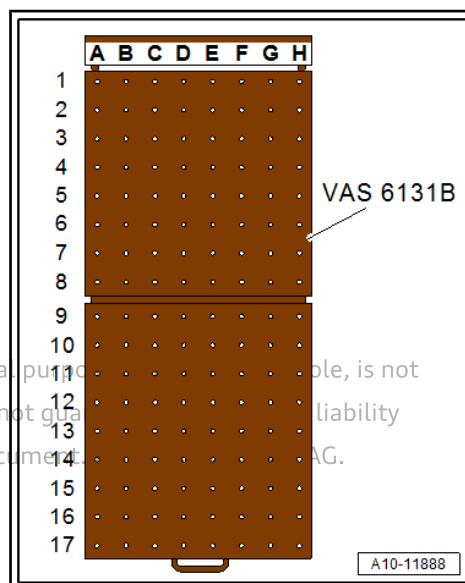


Set up the scissor-type assembly platform as follows:

- Set up scissor-type assembly platform - VAS 6131 B- as follows:

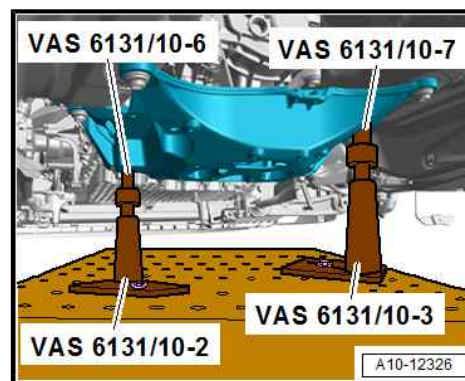
Platform coordinates	Parts of -VAS 6131/10-, adapter -VAS 6131/11-4-, tapered mounting pin - VAS 6131/12-2- and threaded spindle from -VAS 6131/13-			
B7	/10-1	/12-2	Threaded spindle from - VAS 6131/13-	/11-4
G7	/10-1	/12-2	Threaded spindle from - VAS 6131/13-	/11-4
C15	/10-1	/10-2	/10-5	/10-6
F15	/10-1	/10-3	/10-5	/10-7

- Initially hand-tighten the support elements on the scissor-type assembly platform.
- Position scissor-type assembly platform - VAS 6131 B- horizontally.
- Take note of spirit level (bubble gauge).
- Position scissor-type assembly platform - VAS 6131 B- below engine/gearbox assembly.





- Position support elements from -VAS 6131/10- on tunnel cross member, as shown.
- Make sure that threaded spindle (right-side) is screwed in completely.



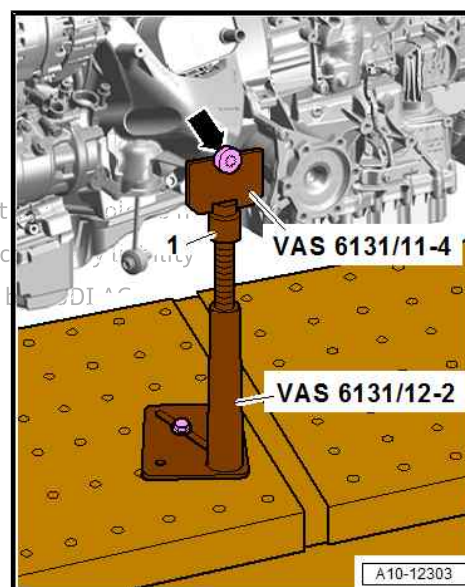
- Position support elements from -VAS 6131/10- , adapter -VAS 6131/11-4- , tapered mounting pin - VAS 6131/12-2- and threaded spindle -1- from support set, Audi Q7 >2005 - VAS 6131/13- against engine on left and right, as shown.
- Screw in bolt -arrow- for engine mounting until it makes contact with adapter.

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- Turn remaining spindles for support elements upwards until all locating lugs make contact with mounting points.

with reference to the support set, Audi Q7 >2005 - VAS 6131/13- against engine on left and right, as shown.

- Tighten base plates for support elements to 20 Nm on scissor-type assembly platform - VAS 6131 B- .

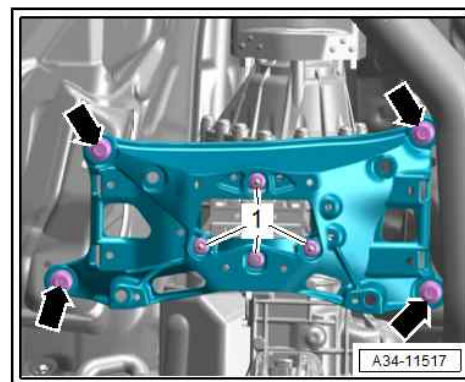


- Remove bolts -arrows- on tunnel cross member.

! NOTICE

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

- Check that all connections between engine, gearbox and body have been detached.
- Carefully guide engine/gearbox assembly out of engine compartment when lowering.

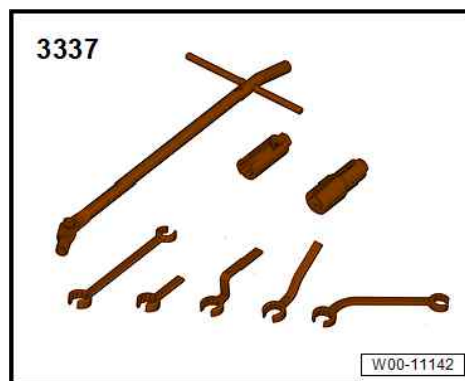


1.2 Separating engine and gearbox

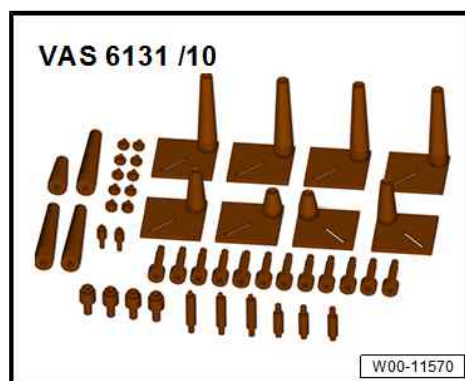
Special tools and workshop equipment required



- ◆ Lambda probe open ring spanner set - 3337-



- ◆ Support set for Audi - VAS 6131/10-



- ◆ Adapter -VAS 6131/11-2- from support set, Audi A8 >2002 - VAS 6131/11- (not illustrated)
- ◆ Hose clip pliers - VAS 6362-



- ◆ Engine support - T10533-



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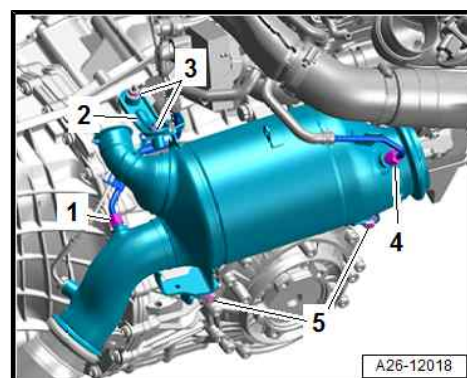
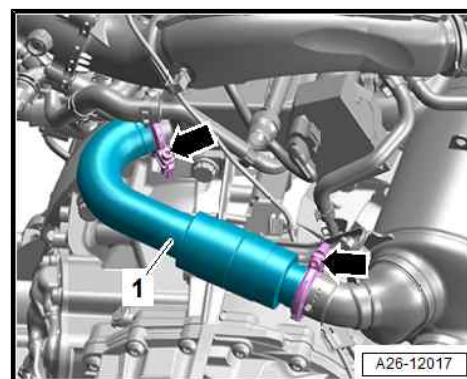
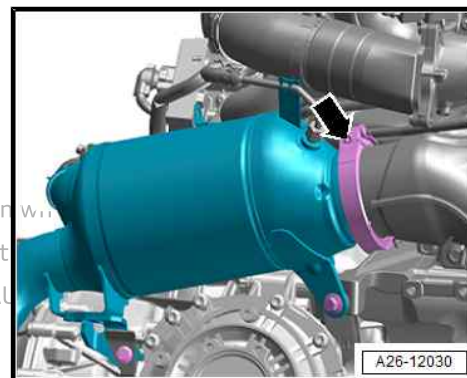
- ◆ Wrench 21 mm - T40263-



- ◆ Key -T40405- (not illustrated)

Procedure

- Engine/gearbox assembly removed and secured to scissor-type assembly platform - VAS 6131 B-
- Release screw-type clip -arrow- for particulate filter.



CAUTION

Risk of injury caused by soot particles in the air.
Eyes and skin can suffer irritation or injuries.

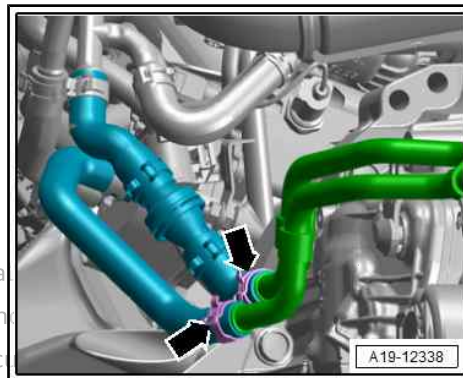
- Put on safety goggles.
- Put on protective gloves.
- Release screw-type clips -arrows- and detach exhaust gas recirculation pipe -1-.
- Unscrew union nuts -1, 4- and move pressure pipes clear.
- Unscrew bolts - 5- and nuts -3- and remove bracket -2-.
- Detach particulate filter.



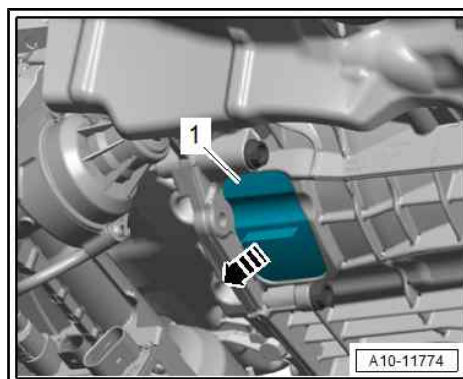
- Place a cloth underneath to catch escaping coolant.
- Release hose clips -arrows- and disconnect coolant hoses.



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- Detach bottom cover -1- from gearbox -arrow-.



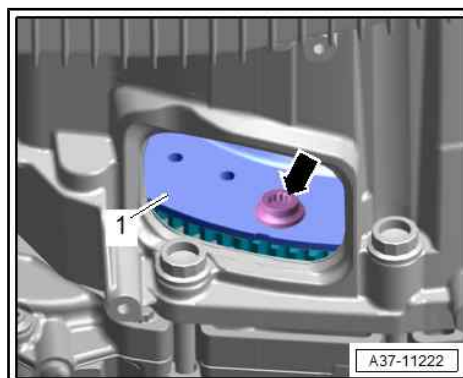
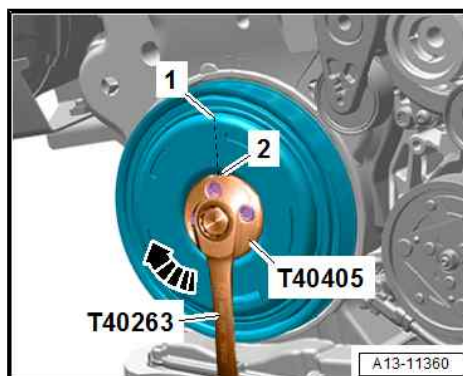
- Position wrench, 21 mm - T40263- and key -T40405- on vibration damper.
- Notch -2- aligns with “OT” (TDC) marking -1- on vibration damper.



NOTICE

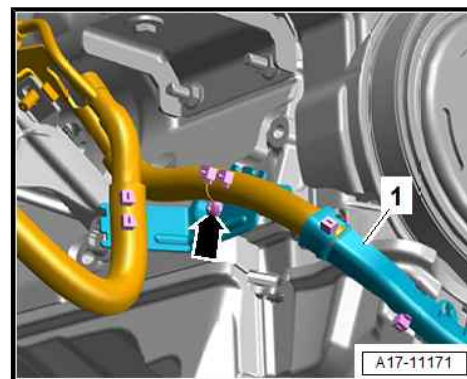
Risk of engine damage if valve gear drive slips

- Only turn engine in normal direction of rotation.
- Counterhold crankshaft at vibration damper.
- Remove 3 bolts -arrow- from drive plate -1-. Turn crankshaft 120° in direction of engine rotation each time.



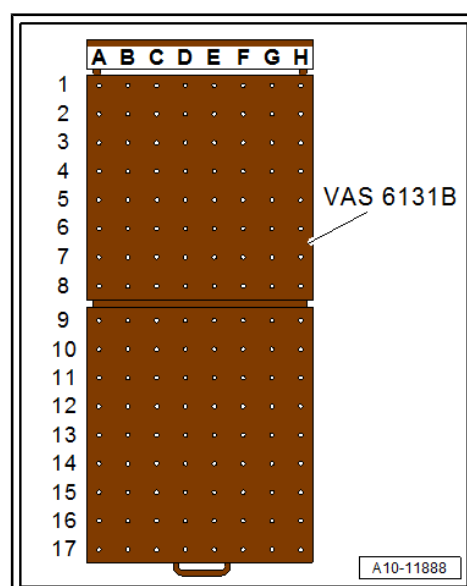


- Remove bolt -arrow-, move cable duct -1- with B+ wire clear and push it to one side.

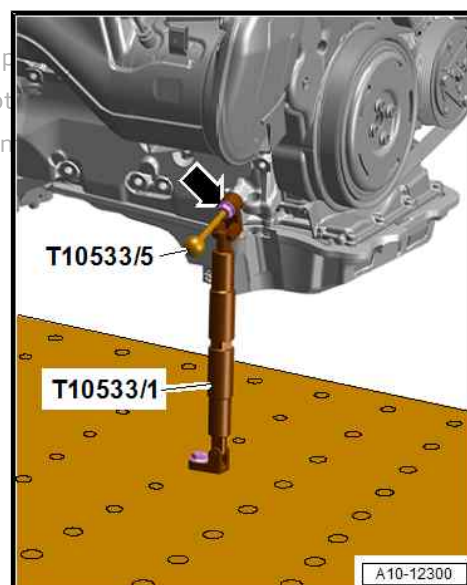


- Set up scissor-type assembly platform - VAS 6131 B- as follows:
- The other support elements remain unchanged.

Platform coordinates	Parts of support set for Audi - VAS 6131/10- , adapter -VAS 6131/11-2- and engine support - T10533/1- with -T10533/5-			
F5	Engine support - T10533/1- with -T10533/5-			
C10	/10-1	/10-4	/10-5	/11-2
F10	/10-1	/10-4	/10-5	/10-6

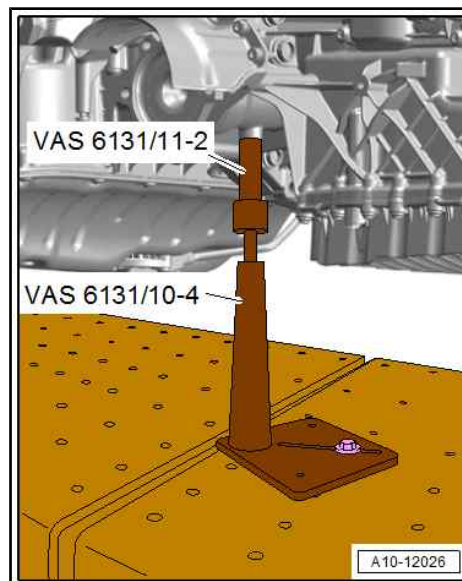


- Secure engine support - T10533/1- to engine (right-side) with -T10533/5- and nut -arrow-, as shown.
- Secure engine support to scissor-type assembly platform VAS 6131 B- and tighten to 20 Nm.





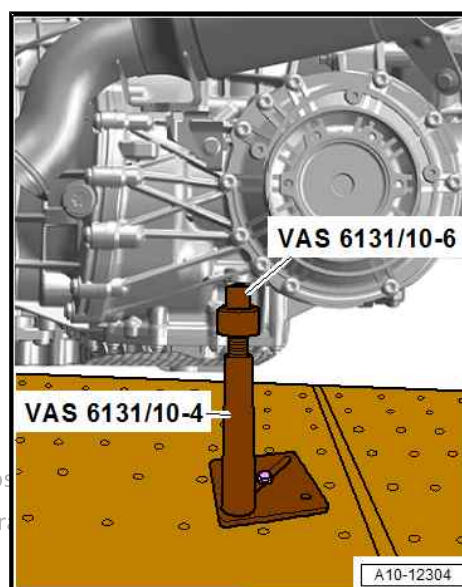
- Position support elements from -VAS 6131/10- and adapter - VAS 6131/11-2- at left of gearbox, as shown.



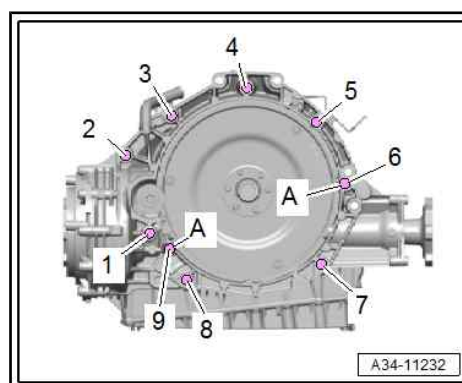
- Position support elements from -VAS 6131/10- at right of gearbox, as shown.
- Turn spindles (left and right) upwards until all locating lugs make contact with mounting points.
- Tighten base plates for support elements to 20 Nm on scissor-type assembly platform - VAS 6131 B- .



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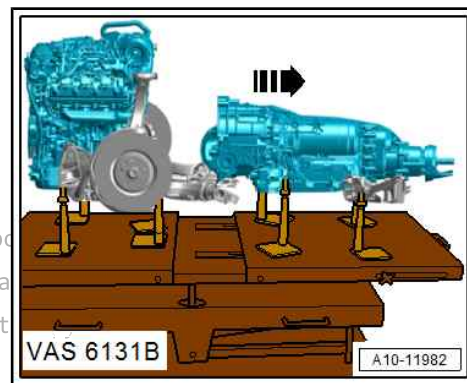
- Remove bolts -1 ... 9- securing gearbox to engine.





- Loosen clamping bolts on sides of scissor-type assembly platform - VAS 6131 B- , pull rear section of platform (together with gearbox) slightly towards rear -arrow-, and at the same time remove bolt for starter completely.
- Pull gearbox towards rear as far as it will go; lower it slightly with front spindles if necessary.

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1.3 Removing engine from scissor-type assembly platform

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 10 ; Removing and installing engine; Removing engine from scissor-type assembly platform .

1.4 Securing engine to engine and gearbox support

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 10 ; Removing and installing engine; Securing engine to engine and gearbox support .

1.5 Installing engine

When installing a new base engine, you must check whether there is a sticker on the cylinder head cover.

If a sticker is attached which states Spannpratzen auf vorgeschriebenes Drehmoment angezogen (clamping pieces tightened to specified torque), the clamping pieces have already been tightened to the specified final torque at the factory.

If no sticker is attached, it is essential that the clamping pieces for the injectors are tightened to the specified torque after installing the high-pressure pipes. If these instructions are not observed, the engine could be damaged.

Special tools and workshop equipment required

- ◆ All special tools specified in removal procedure

Procedure

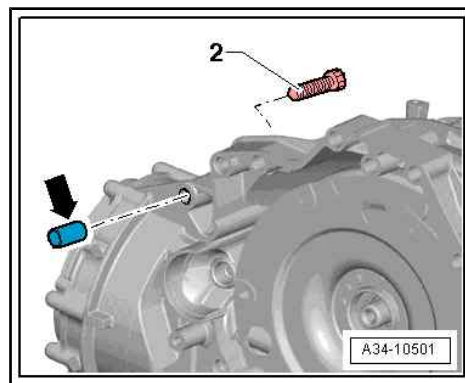
- After removing, renew bolts tightened with specified tightening angle.
- Renew self-locking nuts and bolts as well as seals, gaskets and O-rings after removal.
- Do not remove plugs or protective caps until you are ready to fit the relevant line.
- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .
- Re-install all cable ties in the same locations when installing.
- Do not reuse coolant.
- Engine positioned on scissor-type assembly platform - VAS 6131 B-
- Fit gearbox to engine ⇒ Gearbox; Rep. gr. 34 ; Removing and installing gearbox; Installing gearbox .



Note:

Bolt -2- secures the starter to the gearbox and is provided with a spacer sleeve -arrow-.

- The spacer sleeve must be fitted between the starter and the gearbox.
- Install starter ⇒ Electrical system; Rep. gr. 27 ; Starter; Removing and installing starter .
- Install particulate filter ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 26 ; Emission control system; Removing and installing particulate filter .
- Install tunnel cross member ⇒ Gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings .
- Install front exhaust pipe
⇒ ["1.2 Removing and installing front exhaust pipe", page 114](#) .
- Install manual release cable for parking lock ⇒ Gearbox; Rep. gr. 34 ; Selector mechanism; Exploded view - selector mechanism .
- Install air conditioner compressor ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Detaching and attaching air conditioner compressor at bracket .
- Install poly V-belt ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Removing and installing poly V-belt .
- Secure drive shafts ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Exploded view - drive shaft .
- Install subframe ⇒ Running gear, axles, steering; Rep. gr. 40 ; Subframe; Removing and installing subframe with steering rack .
- Install plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber cover .
- Connect fuel hoses ⇒ Fuel supply system; Rep. gr. 20 ; Plug-in connectors; Disconnecting plug-in connectors .
- Connect SCR supply line ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 26 ; SCR (selective catalytic reduction) system; Exploded view - reducing agent supply line .
- Electrical connections and routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Install air cleaner housing ⇒ [page 100](#) .
- Install lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Exploded view - bumper cover .
- Fill up with engine oil (⇒ Maintenance ; Booklet 830 ; Maintenance; Engine oil: filling up), and check oil level (⇒ Maintenance ; Booklet 830 ; Maintenance; Engine oil: checking oil level and correcting if necessary) .
- Connect coolant hoses with plug-in connector ⇒ [page 79](#) .
- Fill coolant expansion tank and carry out bleeding routine using ⇒ Vehicle diagnostic tester
⇒ ["1.3 Draining and filling cooling system", page 52](#) .
- Install engine cover panel ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 10 ; Engine cover panel; Removing and installing engine cover panel .





- Observe steps required after re-connecting battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .

! NOTICE

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

- **Do not use a battery charger to boost starting.**
- Install wheel housing liner and wheel spoiler ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Removing and installing wheel housing liner (front)
- Fit front wheels ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .
- Install underbody trim ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim; Exploded view - underbody trim .
- Install noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation .
- After renewing engine, perform required adaptations using ⇒ Vehicle diagnostic tester ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair instructions ; Performing adaptations after renewing a component.

Tightening torques

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

Component		Nm
Bolts/nuts	M6	10
	M7	15
	M8	20
	M10	40
	M12	65

- ◆ ⇒ [“2.1 Exploded view - assembly mountings”, page 22](#)
- ◆ Bolts securing engine to gearbox ⇒ Gearbox; Rep. gr. 34 ; Removing and installing gearbox; Tightening torques for gearbox



2 Assembly mountings

⇒ [“2.1 Exploded view - assembly mountings”, page 22](#)

⇒ [“2.2 Supporting engine in installation position”, page 24](#)

⇒ [“2.3 Removing and installing engine mountings”, page 24](#)

⇒ [“2.4 Removing and installing gearbox mounting”, page 27](#)

2.1 Exploded view - assembly mountings

◆ Exploded view - engine mounting ⇒ [page 22](#)

◆ Exploded view - gearbox mounting for dual clutch gearbox
⇒ [page 23](#)

Exploded view - engine mounting

1 - Subframe

2 - Bolt

□ 20 Nm

3 - Bolt

□ 10 Nm

4 - Support mounting

□ Removing and installing
⇒ [page 26](#)

□ Installation position
⇒ [page 23](#)

5 - Bolt

□ 55 Nm

6 - Engine support

□ Removing and installing
⇒ [page 31](#)

7 - Heat shield

8 - Bolt

□ 10 Nm

9 - Bolt

□ 55 Nm

10 - Engine mounting

□ with

◆ Left electrohydraulic engine mounting solenoid valve - N144-

◆ Right electrohydraulic engine mounting solenoid valve - N145-

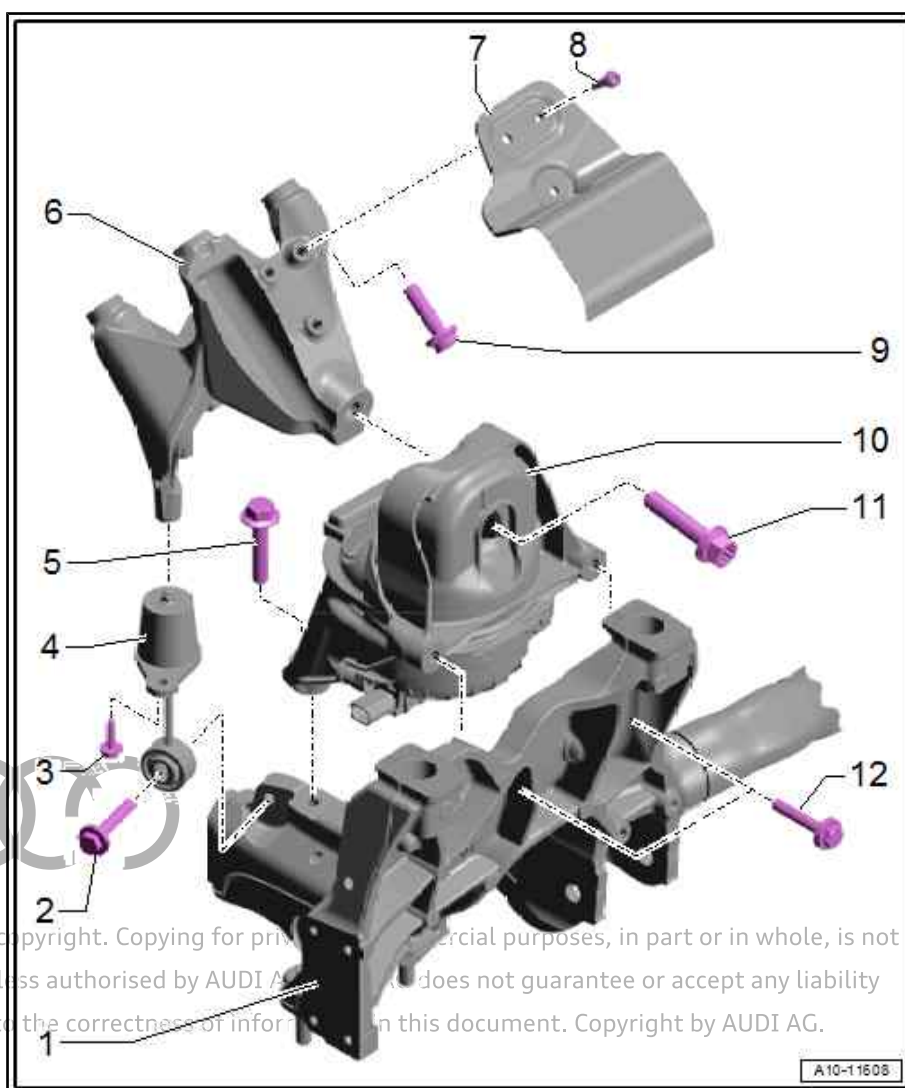
□ Removing and installing
⇒ [page 24](#)

11 - Bolt

□ Renew after removing
□ 90 Nm +90°

12 - Bolt

□ 30 Nm

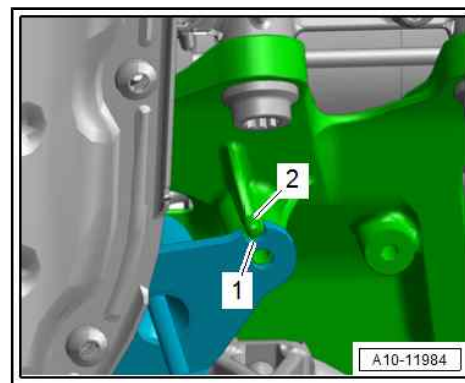


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Installation position of support mounting

- ◆ Projection -2- on engine support must engage in recess -1- on support mounting.



Exploded view - gearbox mounting for dual clutch gearbox

1 - Bolt

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

2 - Tunnel cross member

- Removing and installing ⇒ Gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings

3 - Stop

- For gearbox mounting

4 - Gearbox mounting

- Removing and installing ⇒ [page 27](#)

5 - Gearbox

6 - Nut

- Only remove if detaching gearbox mounting from gearbox support
- Tightening torque ⇒ Gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings

7 - Gearbox support

- Removing and installing ⇒ ["2.4 Removing and installing gearbox mounting", page 27](#)

8 - Bolt

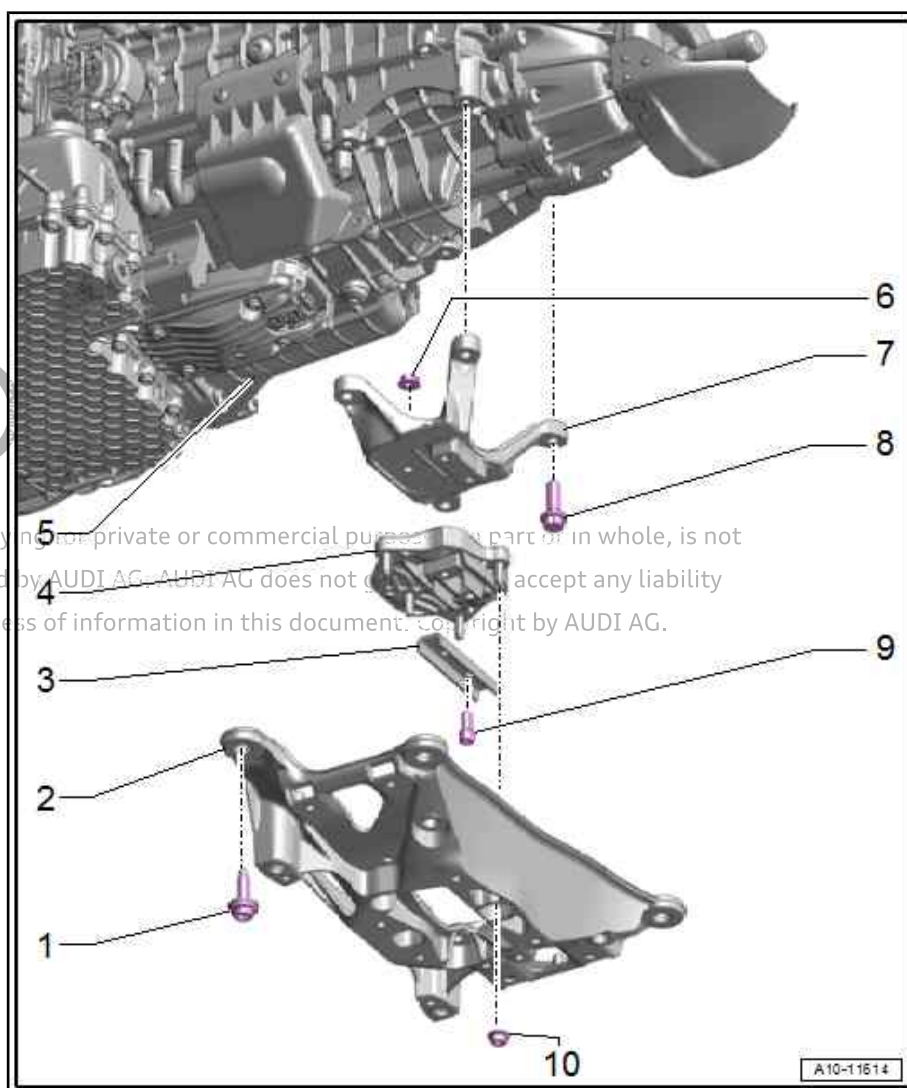
- Tightening torque ⇒ Gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings

9 - Bolt

- Only remove if detaching gearbox mounting from gearbox support
- Tightening torque ⇒ Gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings

10 - Nut

- Only remove if detaching gearbox mounting from gearbox support
- Tightening torque ⇒ Gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings

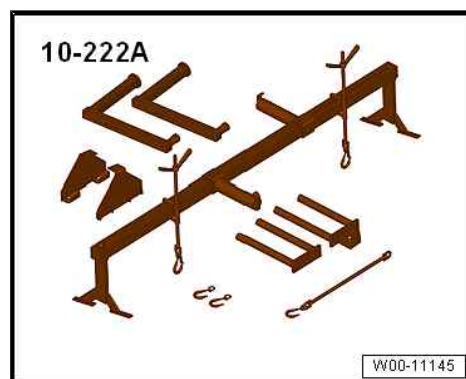




2.2 Supporting engine in installation position

Special tools and workshop equipment required

- ◆ Support bracket - 10-222A-



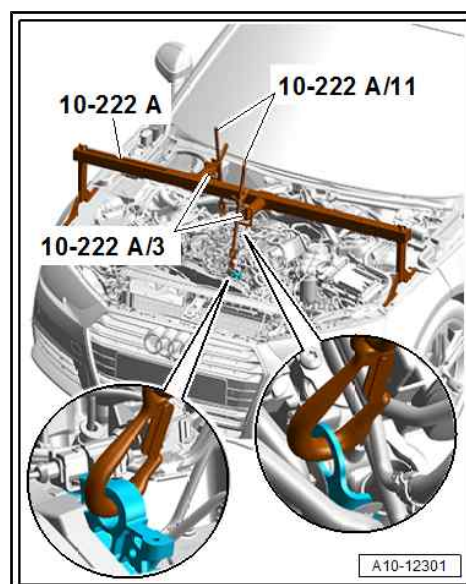
Procedure

- Remove engine cover panel ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 10 ; Engine cover panel; Removing and installing engine cover panel .
- Set up support bracket - 10-222A- on wing mounting flanges (left and right) as illustrated.
- Attach spindles -10-222A/11- to engine lifting eyes.
- Partly take up weight of engine with spindles.

Assembling

Assembly is performed in reverse sequence; note the following:

- Install engine cover panel ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 10 ; Engine cover panel; Removing and installing engine cover panel .



2.3 Removing and installing engine mountings

⇒ [“2.3.1 Removing and installing engine mountings”, page 24](#)

⇒ [“2.3.2 Removing and installing support mounting”, page 26](#)

2.3.1 Removing and installing engine mountings

Removing

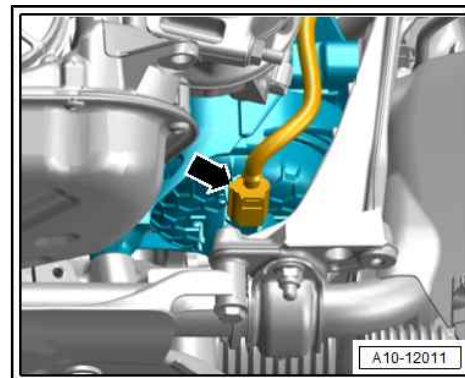
- Remove noise insulation (front) ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Remove front wheel on relevant side ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .



- Remove relevant front wheel spoiler ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Exploded view - wheel housing liner (front) .

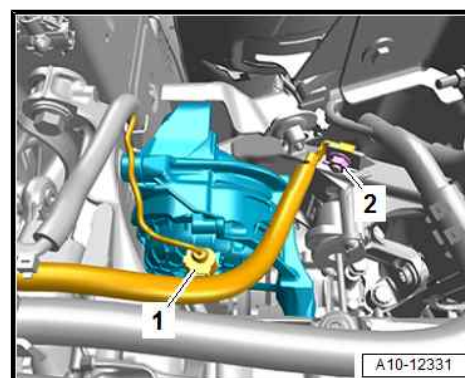
Engine mounting (left-side):

- Unplug electrical connector -arrow- for electrohydraulic engine mounting solenoid valve.

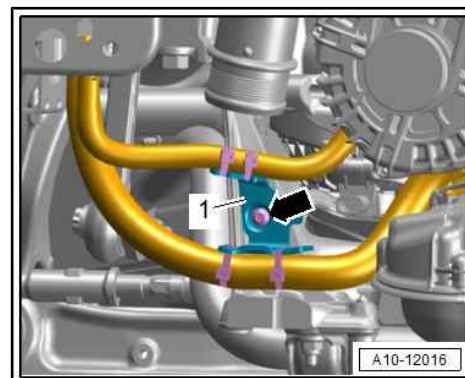


Engine mounting (right-side):

- Remove support mounting (right-side) ⇒ [page 26](#) .
- Unplug electrical connector -1- for right electrohydraulic engine mounting solenoid valve - N145- .
- Remove nut -2- and move earth wire clear.



- Remove bolt -arrow- and move bracket -1- clear with electrical wiring harness.



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Both sides (continued):

- Support engine in installation position ⇒ [page 24](#) and take up weight with spindle - 10-222A/11- until load on engine mounting is relieved.
- Remove bolts -arrows- and detach engine mounting.

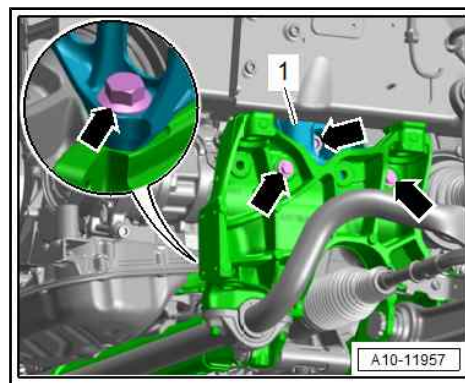
Installing

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

- After removing, renew bolts tightened with specified tightening angle.
- Detach support bracket - 10-222A- ⇒ [page 24](#) .

Tightening torques

- ♦ ⇒ [“2.1 Exploded view - assembly mountings”, page 22](#)
- ♦ ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres
- ♦ ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Exploded view - wheel housing liner (front)
- ♦ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation
- ♦ Earth wire ⇒ Current flow diagrams, Electrical fault finding and Fitting locations



2.3.2 Removing and installing support mounting

Removing

- Remove noise insulation (front) ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Unscrew bolts -1, 3- and detach support mounting -2-.

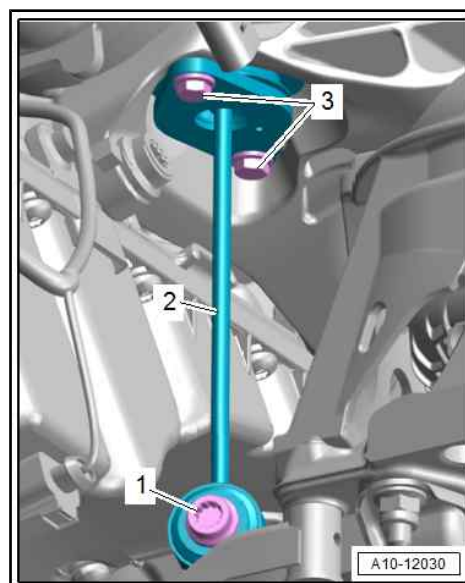
Installing

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

- After removing, renew bolts tightened with specified tightening angle.
- Observe correct installation position ⇒ [page 23](#) .

Tightening torques

- ♦ ⇒ [“2.1 Exploded view - assembly mountings”, page 22](#)
- ♦ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation



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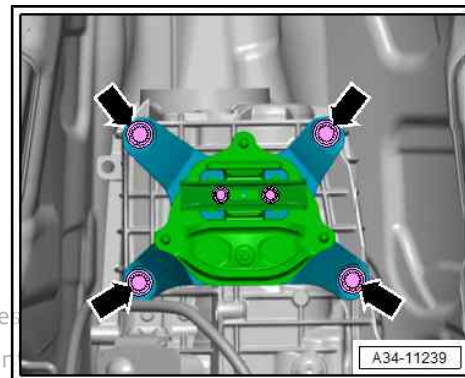
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2.4 Removing and installing gearbox mounting

Removing gearbox support with gearbox mounting

- Remove tunnel cross member ⇒ Gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings .
- Remove bolts -arrows- and detach gearbox support and gearbox mounting from gearbox.



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Removing gearbox mounting

- Unscrew bolts -1- and detach stop -2- for gearbox mounting.
- Remove nut -5- and detach gearbox mounting -3- from gearbox support -4-.

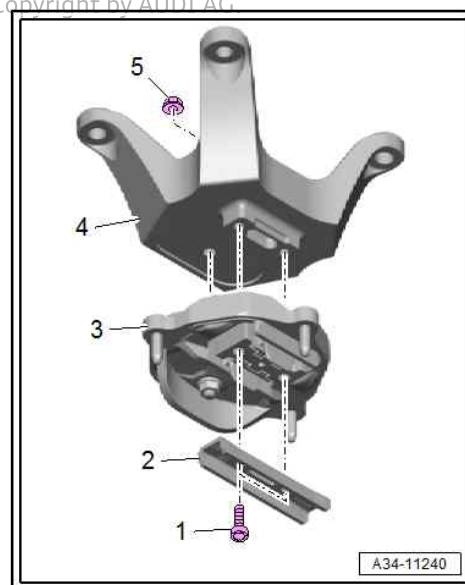
Installing

- Tighten nut -5- hand-tight initially.
- Tighten bolts -1- and then nut -5-.

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

Tightening torques

- ♦ ⇒ Gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings





3 Engine cover panel

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 10 ; Engine cover panel .



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13 – Crankshaft group

1 Cylinder block (pulley end)

⇒ [“1.1 Exploded view - cylinder block \(pulley end\)”, page 29](#)

⇒ [“1.2 Exploded view - sealing flange \(pulley end\)”, page 29](#)

⇒ [“1.3 Removing and installing poly V-belt”, page 29](#)

⇒ [“1.4 Removing and installing tensioner for poly V-belt”, page 29](#)

⇒ [“1.5 Removing and installing vibration damper”, page 29](#)

⇒ [“1.6 Removing and installing bracket for ancillaries”, page 31](#)

⇒ [“1.7 Removing and installing engine support”, page 31](#)

⇒ [“1.8 Removing and installing sealing flange \(pulley end\)”, page 34](#)

1.1 Exploded view - cylinder block (pulley end)

All components are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Exploded view - cylinder block (pulley end) .

1.2 Exploded view - sealing flange (pulley end)

All components are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Exploded view - sealing flange (pulley end) .

1.3 Removing and installing poly V-belt

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Removing and installing poly V-belt .

1.4 Removing and installing tensioner for poly V-belt

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Removing and installing tensioner for poly V-belt .

1.5 Removing and installing vibration damper

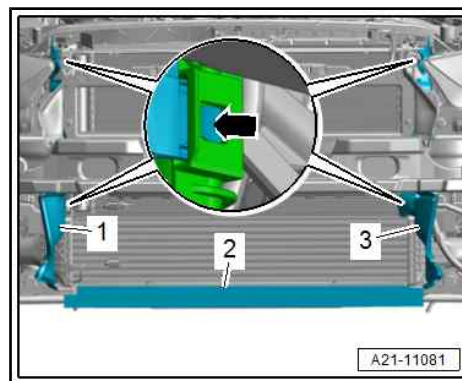
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Removing

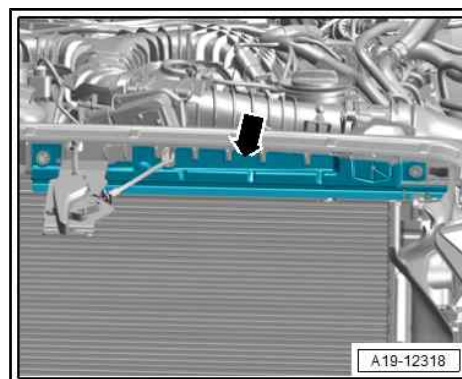
- Remove lock carrier cover and closure plate at bumper cover
⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Exploded view - bumper cover .



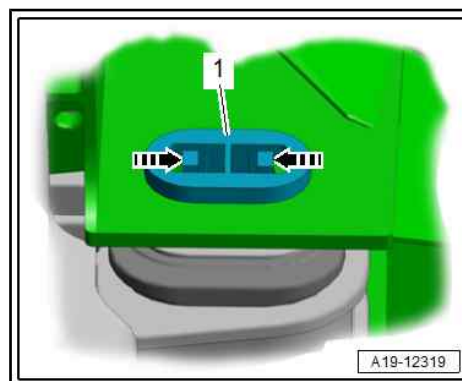
- Release catches -arrow- and detach air ducts -1, 3-.
- Unclip air duct -2-.



- Detach air duct (top) -arrow-.



- Release fasteners -arrows- on both sides and pull retaining pins -1- for radiator out upwards.

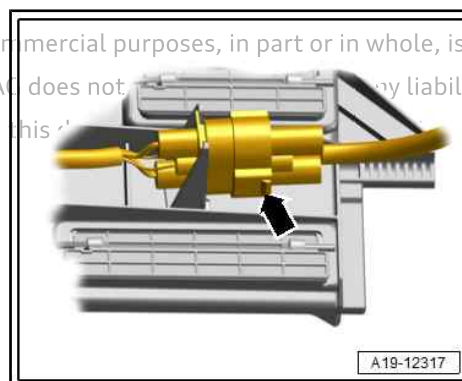


CAUTION

Risk of injury as the radiator fan may start up automatically.

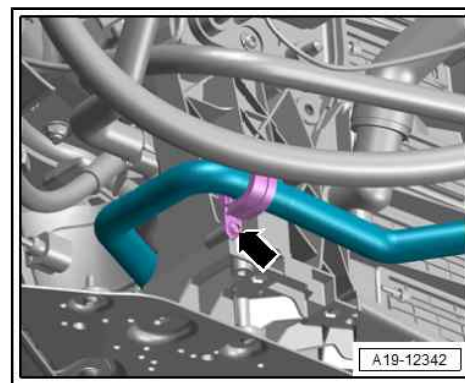
- Unplug electrical connectors.

- Unplug electrical connector -arrow- for radiator fan.





- Remove bolt -arrow- for retaining clip.



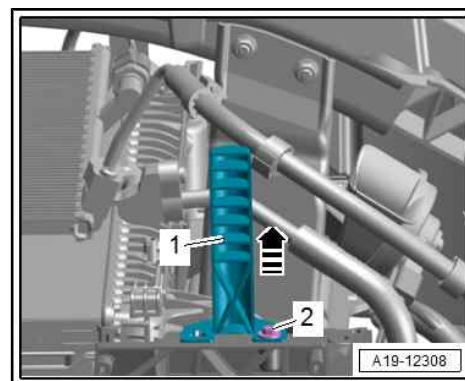
- Remove bolt -2- on both sides and press radiator bracket -1- with radiator towards front -arrow-.

All other procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Removing and installing vibration damper .

Installing

Additional work:

- Install closure plate at bumper cover and lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Exploded view - bumper cover .



Tightening torques

- ◆ ⇒ [“4.1 Exploded view - radiators/radiator fan”, page 78](#)

1.6 Removing and installing bracket for ancillaries

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Removing and installing bracket for ancillaries .

1.7 Removing and installing engine support

⇒ [“1.7.1 Removing and installing engine support \(left-side\)”, page 31](#)

⇒ [“1.7.2 Removing and installing engine support \(right-side\)”, page 33](#)

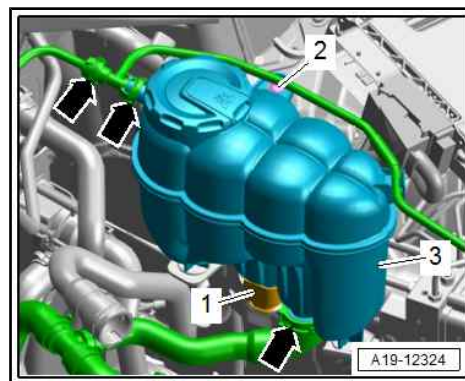
1.7.1 Removing and installing engine support (left-side)

Removing

- Remove poly V-belt ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Removing and installing poly V belt.
- Remove air conditioner compressor from bracket with refrigerant lines still attached and tie up to left side ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Detaching and attaching air conditioner compressor at bracket .



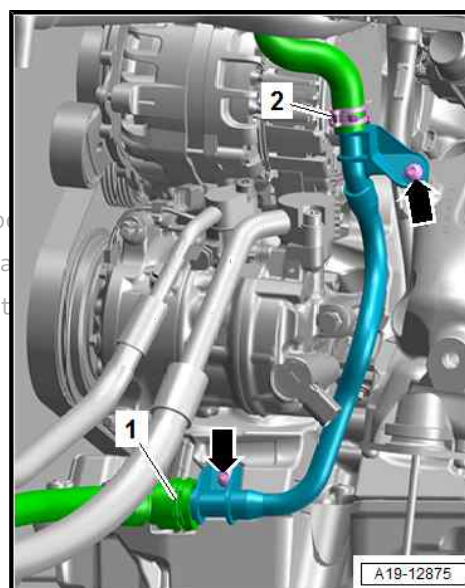
- Move electrical wiring harness clear.
- Lift retaining clips -top arrows-, disconnect coolant hoses and move them clear.
- Unplug electrical connector -1- for coolant shortage indicator switch - F66- .
- Remove bolt -3- and place coolant expansion tank to one side.



- Remove bolts -arrows- and push coolant pipe (left-side) to one side.



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- Move electrical wiring clear.
- Remove bolts -top arrows-.
- Remove engine mounting (left-side)
⇒ [“2.3.1 Removing and installing engine mountings”, page 24](#) .
- Unscrew bolts -bottom arrows- and remove engine support (left-side) -1-.

Installing

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

- After removing, renew bolts tightened with specified tightening angle.
- Install engine mounting (left-side)
⇒ [“2.3.1 Removing and installing engine mountings”, page 24](#) .
- Install air conditioner compressor ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Detaching and attaching air conditioner compressor at bracket .
- Install poly V-belt ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Removing and installing poly V-belt .

Tightening torques

- ◆ ⇒ [“2.1 Exploded view - assembly mountings”, page 22](#)
- ◆ ⇒ [“3.1 Exploded view - coolant pipes”, page 73](#)

1.7.2 Removing and installing engine support (right-side)

Removing

- Disconnect earth wire from battery terminal ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .
- Remove engine mounting (right-side) ⇒ [page 24](#) .
- Remove bolts -arrows- and detach engine support -1- (right-side).

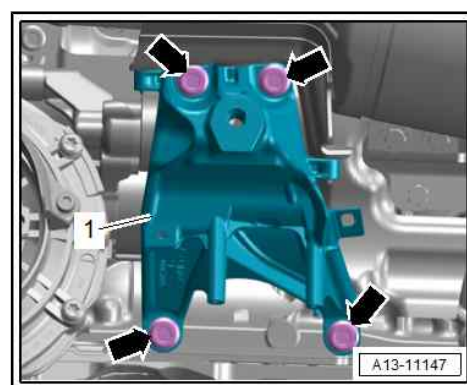
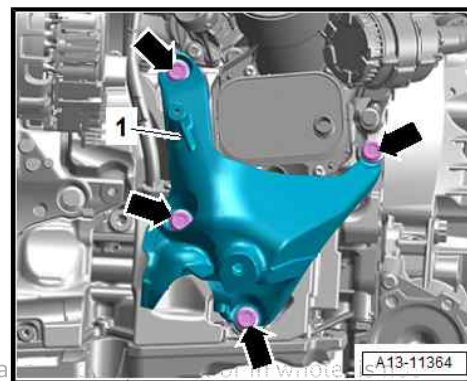
Installing

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

- After removing, renew bolts tightened with specified tightening angle.
- Observe steps required after re-connecting battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .

Tightening torques

- ◆ ⇒ [“2.1 Exploded view - assembly mountings”, page 22](#)
- ◆ ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Exploded view - charge air system
- ◆ ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Exploded view - hose connections for charge air system





1.8 Removing and installing sealing flange (pulley end)

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Removing and installing sealing flange (pulley end) .



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2 Cylinder block (gearbox end)

All procedures and components are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (gearbox end) .



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3 Crankshaft

All procedures and components are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 13 ; Crankshaft .



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4 Pistons and conrods

All procedures and components are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 13 ; Pistons and conrods .



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15 – Cylinder head, valve gear

1 Toothed belt drive

All procedures and components are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 15 ; Toothed belt drive .



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2 Cylinder head

⇒ [“2.1 Exploded view - cylinder head cover”, page 39](#)

⇒ [“2.2 Exploded view - cylinder head”, page 39](#)

⇒ [“2.3 Removing and installing cylinder head cover”, page 39](#)

⇒ [“2.4 Removing and installing seals for injectors”, page 39](#)

⇒ [“2.5 Removing and installing cylinder head”, page 39](#)

⇒ [“2.6 Removing and installing camshaft housing”, page 40](#)

⇒ [“2.7 Checking compression”, page 41](#)

2.1 Exploded view - cylinder head cover

All components are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Exploded view - cylinder head cover .

2.2 Exploded view - cylinder head

All components are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Exploded view - cylinder head .

2.3 Removing and installing cylinder head cover

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Removing and installing cylinder head cover .

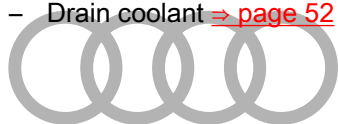
2.4 Removing and installing seals for injectors

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Removing and installing seals for injectors .

2.5 Removing and installing cylinder head

Removing

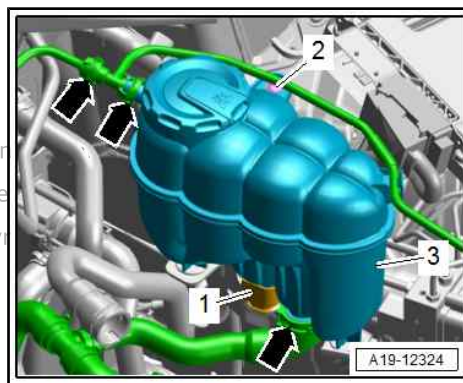
- Remove air cleaner housing ⇒ [page 100](#) .
- Remove plenum chamber partition panel ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber partition panel .
- Remove engine cover panel ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 10 ; Engine cover panel; Removing and installing engine cover panel .
- Drain coolant ⇒ [page 52](#) .



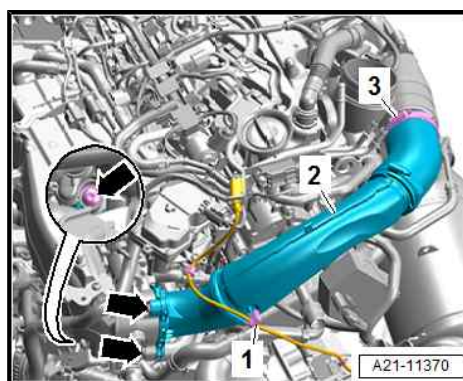
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- Move electrical wiring harness clear.
- Lift retaining clips -arrows-, disconnect coolant hoses and move them clear.
- Unplug electrical connector -1- for coolant shortage indicator switch - F66-.
- Unscrew bolt -3- and detach coolant expansion tank.



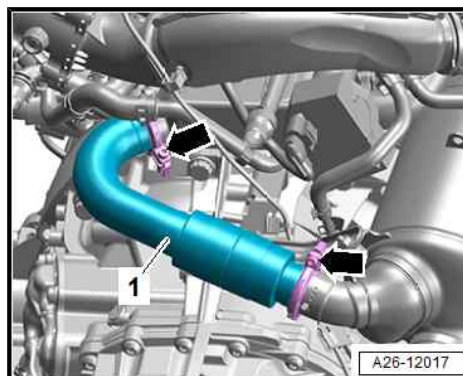
- Open clip -1- and move electrical wiring clear.
- Remove bolts -arrows-.
- Release screw-type clip -3- and detach air pipe.



⚠ CAUTION

Risk of injury caused by soot particles in the air.
Eyes and skin can suffer irritation or injuries.

- Put on safety goggles.
- Put on protective gloves.
- Remove bolts -arrows- and detach exhaust gas recirculation pipe -1-.
- Lift retaining clip -2-, release hose clip -1- and disconnect coolant hoses.

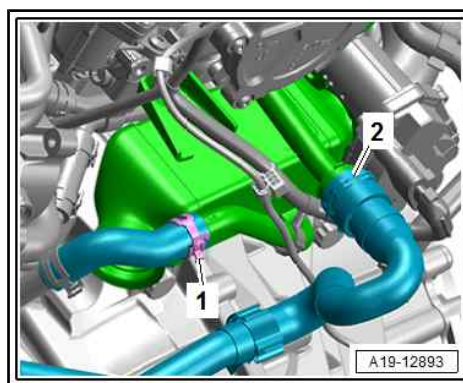


All further procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Removing and installing cylinder head .

Installing

Additional work:

- Connect coolant hose with plug-in connector ⇒ [page 79](#) .
- Install air cleaner housing ⇒ [page 100](#) .



2.6 Removing and installing camshaft housing

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Removing and installing camshaft housing .



2.7 Checking compression

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Checking compression .



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3 Valve gear

All procedures and components are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 15 ; Valve gear .



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4 Inlet and exhaust valves

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 15 ; Inlet and exhaust valves .



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17 – Lubrication

1 Sump/oil pump

⇒ [“1.1 Exploded view - sump/oil pump”, page 44](#)

⇒ [“1.2 Engine oil”, page 44](#)

⇒ [“1.3 Removing and installing sump \(bottom section\)”, page 44](#)

⇒ [“1.4 Removing and installing sump \(top section\)”, page 45](#)

⇒ [“1.5 Removing and installing oil pump”, page 45](#)

⇒ [“1.6 Removing and installing oil level and oil temperature sender G266”, page 45](#)

1.1 Exploded view - sump/oil pump

All components are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Exploded view - sump/oil pump .

1.2 Engine oil

- ◆ Draining engine oil ⇒ Maintenance ; Booklet 830 ; Maintenance; Engine oil: draining
- ◆ Extracting engine oil ⇒ Maintenance ; Booklet 830 ; Maintenance; Engine oil: extracting
- ◆ Filling up with engine oil ⇒ Maintenance ; Booklet 830 ; Maintenance; Engine oil: filling up
- ◆ Removing and installing oil filter element ⇒ Maintenance ; Booklet 830 ; Maintenance; Engine oil: renewing oil filter

- ◆ Checking oil level ⇒ Maintenance ; Booklet 830 ; Maintenance; Engine oil: checking oil level and correcting if necessary

- ◆ Oil capacities, oil specifications and viscosity grades ⇒ Maintenance tables

1.3 Removing and installing sump (bottom section)

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Removing and installing sump (bottom section) .



1.4 Removing and installing sump (top section)

Removing

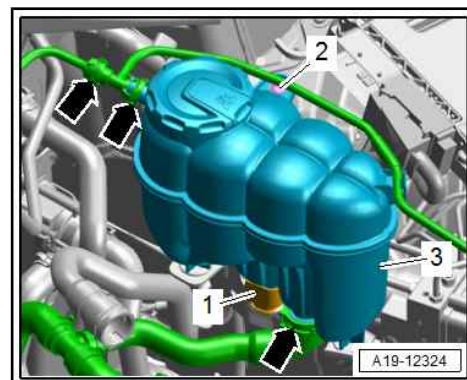
- Move electrical wiring harness clear.
- Lift retaining clips -top arrows-, disconnect coolant hoses and move them clear.
- Unplug electrical connector -1- for coolant shortage indicator switch - F66- .
- Remove bolt -3- and place coolant expansion tank to one side.

All further procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Removing and installing sump (top section) .

Installing

Additional work:

- Connect coolant hose with plug-in connector ⇒ [page 79](#) .



1.5 Removing and installing oil pump

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Removing and installing oil pump .

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

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Removing and installing oil level and oil temperature sender -G266- .



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2 Engine oil cooler

Engine oil cooler must not be separated from oil filter housing. In the event of a fault, the engine oil cooler must be renewed with the oil filter housing ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 17 ; Oil filter/oil pressure switches; Removing and installing oil filter housing .



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3 Oil filter/oil pressure switches

⇒ [“3.1 Exploded view - oil filter”, page 47](#)

⇒ [“3.2 Exploded view - oil pressure switches/oil pressure control”, page 47](#)

⇒ [“3.3 Removing and installing oil filter housing”, page 47](#)

⇒ [“3.4 Removing and installing oil pressure sender G10”, page 47](#)

⇒ [“3.5 Removing and installing valve for oil pressure control N428”, page 48](#)

⇒ [“3.6 Checking oil pressure”, page 48](#)

⇒ [“3.7 Removing and installing piston cooling jet control valve N522”, page 48](#)

3.1 Exploded view - oil filter

All components are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 17 ; Oil filter/oil pressure switches; Exploded view - oil filter .

3.2 Exploded view - oil pressure switches/oil pressure control

All components are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 17 ; Oil filter/oil pressure switches; Exploded view - oil pressure switches/oil pressure control .

3.3 Removing and installing oil filter housing

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 17 ; Oil filter/oil pressure switches; Removing and installing oil filter housing .

3.4 Removing and installing oil pressure sender - G10-

Removing

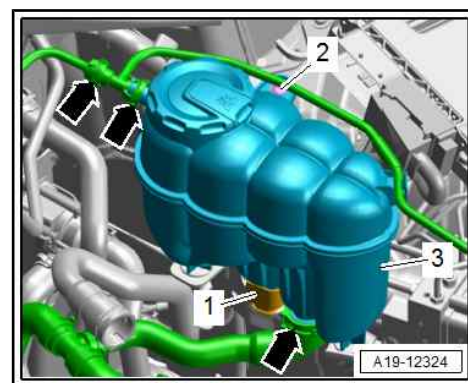
- Drain coolant ⇒ [page 52](#) .
- Move electrical wiring harness clear.
- Lift retaining clips -arrows-, disconnect coolant hoses and move them clear.
- Unplug electrical connector -1- for coolant shortage indicator switch - F66- .
- Unscrew bolt -3- and detach coolant expansion tank.

All further procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 17 ; Oil filter/oil pressure switches; Removing and installing oil pressure sender - G10- .

Installing

Additional work:

- Fill up with coolant ⇒ [page 52](#) .





3.5 Removing and installing valve for oil pressure control - N428-

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 17 ; Oil filter/oil pressure switches; Removing and installing valve for oil pressure control - N428- .

3.6 Checking oil pressure

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 17 ; Oil filter/oil pressure switches; Checking oil pressure .

3.7 Removing and installing piston cooling jet control valve - N522-

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 17 ; Oil filter/oil pressure switch ; Removing and installing piston cooling jet control valve - N522- .



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19 – Cooling

1 Cooling system/coolant

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⇒ [“1.1 Connection diagram - coolant hoses”, page 49](#)
⇒ [“1.2 Checking cooling system for leaks”, page 52](#)
⇒ [“1.3 Draining and filling cooling system”, page 52](#)

1.1 Connection diagram - coolant hoses

⇒ [“1.1.1 Connection diagram - coolant hoses, vehicles without auxiliary/supplementary heater”, page 49](#)
⇒ [“1.1.2 Connection diagram - coolant hoses, vehicles with auxiliary/supplementary heater”, page 50](#)

1.1.1 Connection diagram - coolant hoses, vehicles without auxiliary/supplementary heater

- ◆ Blue = Large coolant circuit
- ◆ Red = Small coolant circuit
- ◆ Violet = Coolant circuit for charge air cooler.
- ◆ Brown = Heating circuit
- ◆ Green = Coolant circuit for gearbox
- ◆ Arrows = Direction of coolant flow



1 - Water radiator for charge air cooling circuit

2 - Radiator

3 - Engine temperature sender - G652-

4 - Coolant pump

5 - Engine temperature sender - G27-

6 - Cylinder head/cylinder block

7 - Engine oil cooler

8 - Exhaust gas recirculation cooler

9 - Coolant pump for high-temperature circuit - V467-

10 - Bleeder hole

11 - Heat exchanger for heater

12 - Gear oil cooler

13 - Thermostat

- ☐ For coolant circuit for gearbox

14 - Coolant expansion tank

15 - Filler cap

- ☐ For coolant expansion tank
- ☐ Checking pressure relief valve ➔ [page 52](#)

16 - Restrictor

17 - Non-return valve

18 - Non-return valve

19 - Throttle valve module - GX3-

20 - Charge air cooler

21 - Restrictor

22 - Non-return valve

23 - Temperature sensor - G18-

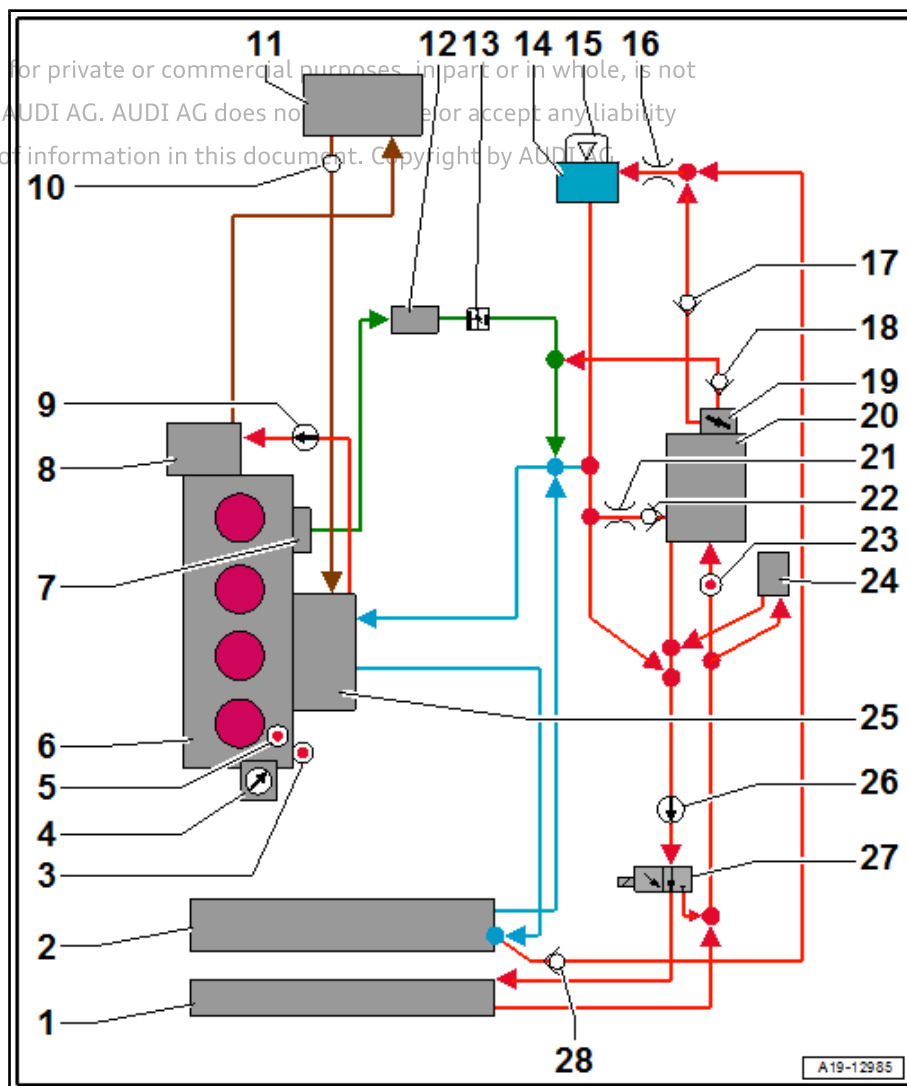
24 - Injector for reducing agent - N474-

25 - Actuator for engine temperature regulation - N493-

26 - Coolant pump for low-temperature circuit - V468-

27 - Coolant circuit control unit - GX28-

28 - Non-return valve



1.1.2 Connection diagram - coolant hoses, vehicles with auxiliary/supplementary heater

- ◆ Blue = Large coolant circuit



- ◆ Red = Small coolant circuit
- ◆ Violet = Coolant circuit for charge air cooler.
- ◆ Brown = Heating circuit
- ◆ Green = Coolant circuit for gearbox
- ◆ Arrows = Direction of coolant flow

1 - Water radiator for charge air cooling circuit

2 - Radiator

3 - Engine temperature sender
2 - G652-

4 - Coolant pump

5 - Engine temperature sender
- G27-

6 - Cylinder head/cylinder
block

7 - Engine oil cooler

8 - Auxiliary/supplementary
heater

☐ With circulation pump -
V55-

9 - Exhaust gas recirculation
cooler

10 - Coolant pump for high-
temperature circuit - V467-

11 - Non-return valve

12 - Restrictor

13 - Heater coolant shut-off
valve - N279-

14 - Bleeder hole

15 - Heat exchanger for heater

16 - Gear oil cooler

17 - Thermostat

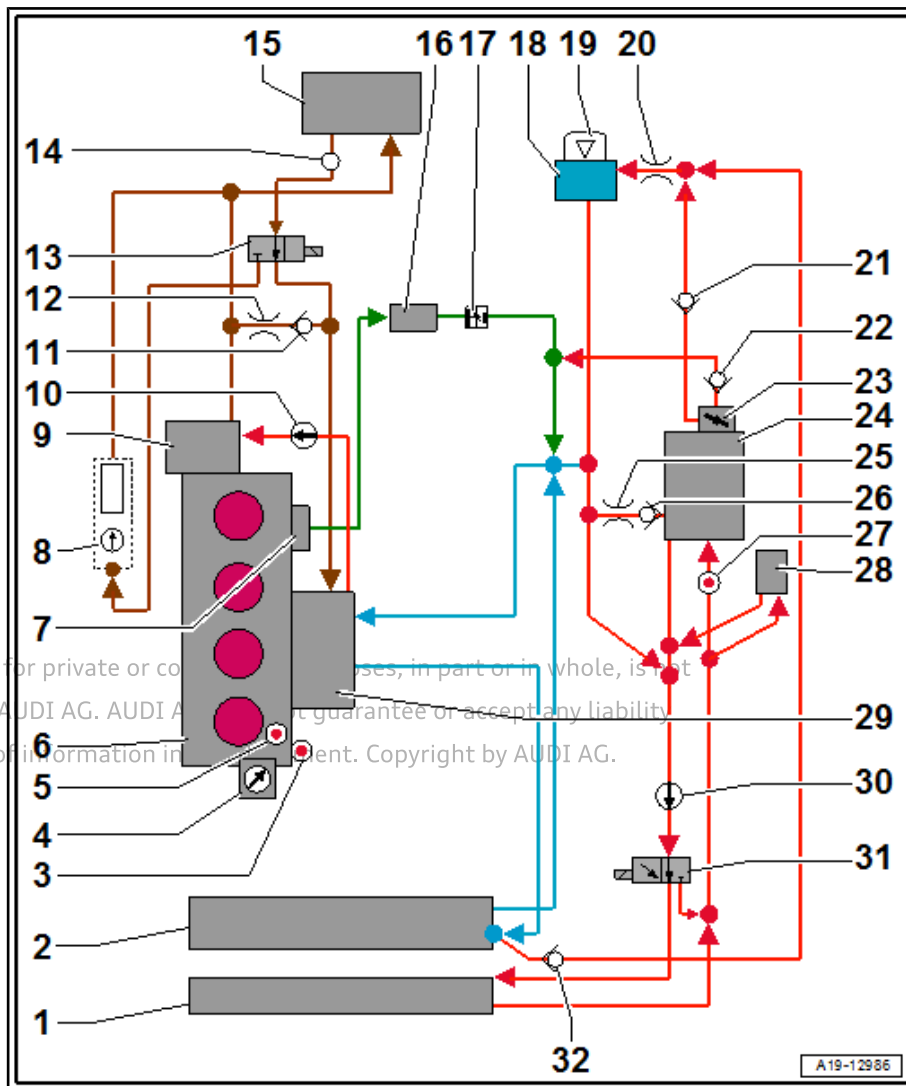
☐ For coolant circuit for
gearbox

18 - Coolant expansion tank

19 - Filler cap

☐ For coolant expansion tank

☐ Checking pressure relief valve ➔ [page 52](#)





- 20 - Restrictor
- 21 - Non-return valve
- 22 - Non-return valve
- 23 - Throttle valve module - GX3-
- 24 - Charge air cooler
- 25 - Restrictor
- 26 - Non-return valve
- 27 - Temperature sensor - G18-
- 28 - Injector for reducing agent - N474-
- 29 - Actuator for engine temperature regulation - N493-
- 30 - Coolant pump for low-temperature circuit - V468-
- 31 - Coolant circuit control unit - GX28-
- 32 - Non-return valve

1.2 Checking cooling system for leaks

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 19 ; Cooling system/coolant; Checking cooling system for leaks .

1.3 Draining and filling cooling system

Draining coolant ⇒ [page 54](#)

Filling and bleeding coolant circuit ⇒ [page 55](#)

Bleeding high-temperature cooling circuit and low-temperature cooling circuit ⇒ [page 59](#)

Special tools and workshop equipment required

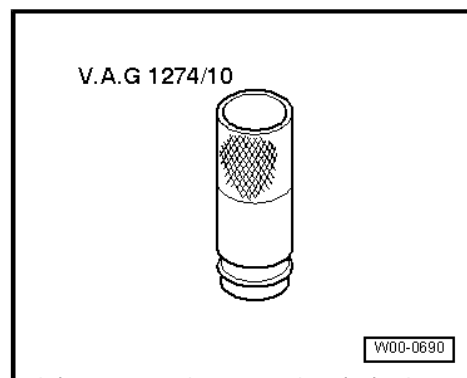
- ◆ Vehicle diagnostic tester
- ◆ Adapter for cooling system tester - V.A.G 1274/8-



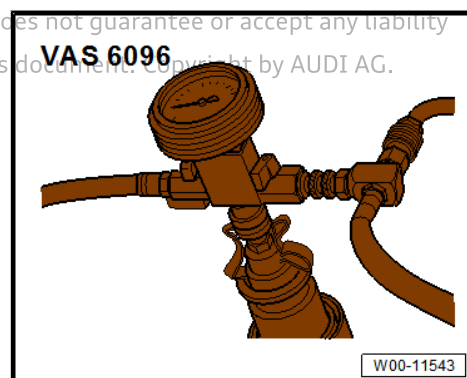
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- ◆ Pipe for cooling system tester - V.A.G 1274/10-



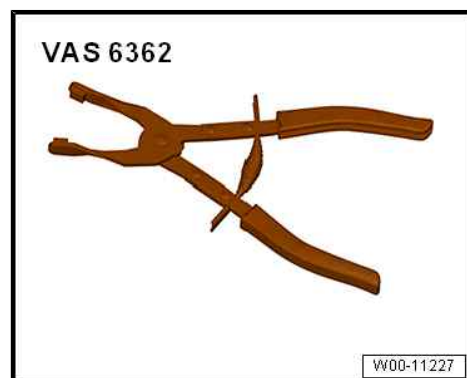
- ◆ Cooling system charge unit - VAS 6096-



- ◆ Coolant collecting system - VAS 5014- or drip tray for workshop hoist - VAS 6208-



- ◆ Hose clip pliers - VAS 6362-

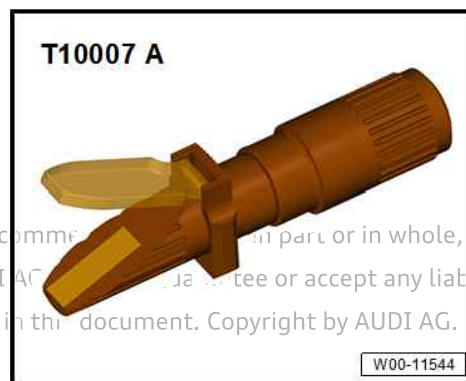




◆ Refractometer - T10007A-



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- ◆ Safety goggles
- ◆ Protective gloves

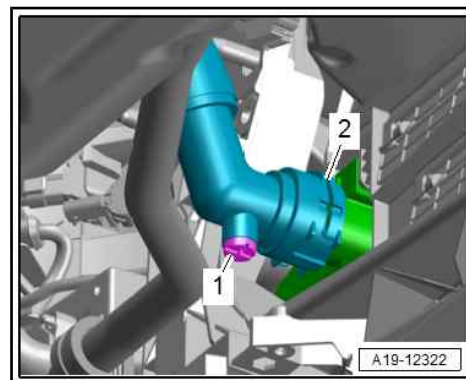
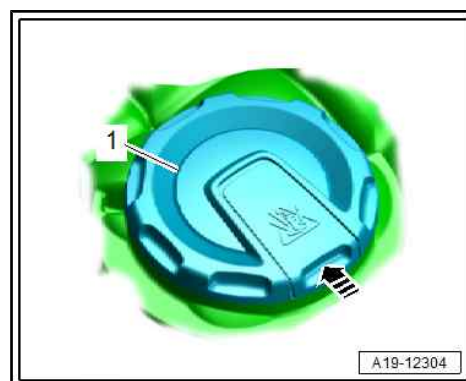
Draining coolant

! CAUTION

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

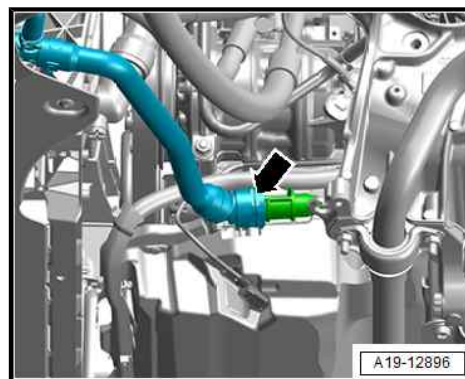
Danger of scalding skin and other parts of the body.

- Put on protective gloves.
 - Put on safety goggles.
 - Cover filler cap on expansion tank with a cloth and open carefully to release pressure.
-
- Release fastener -arrow- and open filler cap -1- on coolant expansion tank.
 - Remove noise insulation (front) ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
 - Place collector tank from coolant collecting system -VAS 5014- or drip tray for workshop hoist - VAS 6208- underneath.
-
- Lift retaining clip -2-, disconnect coolant hose and drain off coolant (new illustration).

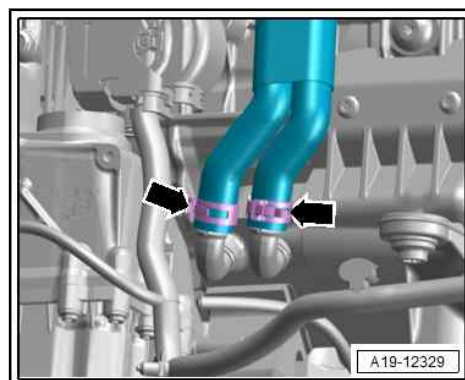




- Lift retaining clip -arrow-, disconnect coolant hose and drain off coolant.



- Vehicles with dual clutch gearbox: Release hose clips -arrows-, disconnect coolant hoses from ATF cooler and drain off coolant.
- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .
- Connect coolant hoses.
- Connect coolant hose with plug-in connector ⇒ [page 79](#) .



Filling and bleeding coolant circuit:



NOTICE

Risk of damage to engine if cooling system is insufficiently filled/bled.

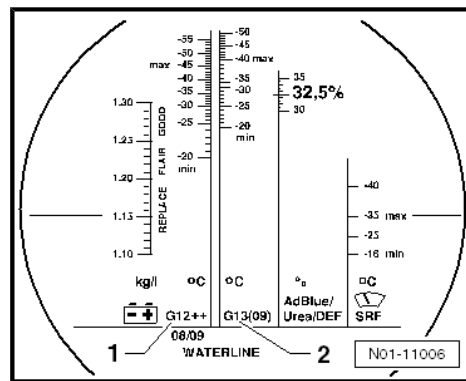
- After it is filled, the cooling system must be bled using the
⇒ Vehicle diagnostic tester.



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**Note**

- ◆ *The effectiveness of the coolant is greatly influenced by the quality of the water with which it is mixed. Because water may contain different substances depending on the country or even the region, the water quality to be used for cooling systems has been specified. Distilled water meets all the requirements and is therefore recommended for use when topping up or filling up with coolant.*
- ◆ *Use only coolant additives listed in the ⇒ Electronic parts catalogue (ETKA). If you use other coolant additives, this can significantly impair in particular the corrosion protection effect. The resulting damage could lead to loss of coolant and consequently to serious engine damage.*
- ◆ *Coolant with the recommended mixture ratio prevents frost and corrosion damage and stops scaling. At the same time it raises the boiling point of the fluid in the system. For this reason the cooling system must be filled all year round with the correct coolant additive.*
- ◆ *Because of its high boiling point, the coolant improves engine reliability under heavy loads, particularly in countries with tropical climates.*
- ◆ *The refractometer - T10007A- MUST be used to determine the current level of frost protection.*
- ◆ *The mixture must guarantee frost protection down to at least -25 °C (in countries with arctic climate: down to -36 °C). The amount of antifreeze should only be increased if greater frost protection is required in very cold climates. This must only be down to -48 °C, however, as otherwise the cooling efficiency of the coolant is impaired.*
- ◆ *The coolant concentration must not be reduced by adding water even in warmer seasons and in warmer countries. Frost protection must be provided to at least -25 °C.*
- ◆ *Read off the level of frost protection on the scale for the relevant coolant additive.*
- ◆ *The temperature indicated on the refractometer - T10007A- corresponds to the temperature at which the first ice crystals can form in the coolant.*
- ◆ *Do not reuse coolant.*
- ◆ *Only use water/coolant additive as a lubricant for coolant hoses.*

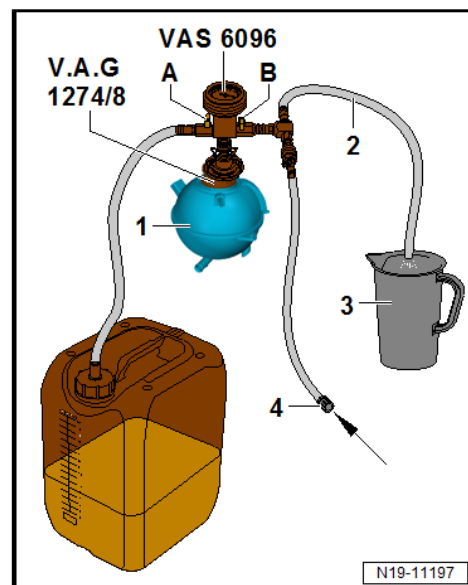
**Recommended mixture ratio for coolant**

- Coolant (40 %) and distilled water (60 %) for frost protection to -25 °C
- Coolant (50 %) and distilled water (50 %) for frost protection to -36 °C
- Coolant ⇒ Electronic parts catalogue (ETKA)



To fill up with coolant:

- Ignition switched off.
- To simplify filling procedure, place reservoir on as high a surface as possible, e.g. on a workshop trolley or the engine and gearbox jack.
- Fill reservoir of cooling system charge unit -VAS 6096- with at least 8 litres of premixed coolant (according to recommended ratio):
- Fit adapter for cooling system tester - V.A.G 1274/8- onto coolant expansion tank.
- Attach cooling system charge unit - VAS 6096- to adapter - V.A.G 1274/8- .
- Run vent hose -2- into a small container -3-.
- Connect ⇒ Vehicle diagnostic tester.
- Switch on ignition and select following menu options:
- Start Guided Fault Finding.
- Choose **Select own test** tab and select following options one after the other:
 - ◆ **0001 - Systems with diagnostic capability**
 - ◆ **0001 - Engine electronics J623**
 - ◆ **0001 - Engine electronics, functions**
 - ◆ **0001 - Charge/bleed coolant circuit**
- Start selected program and follow instructions shown on display of vehicle diagnostic tester.



Note:

The vented air draws along a small amount of coolant, which should be collected.

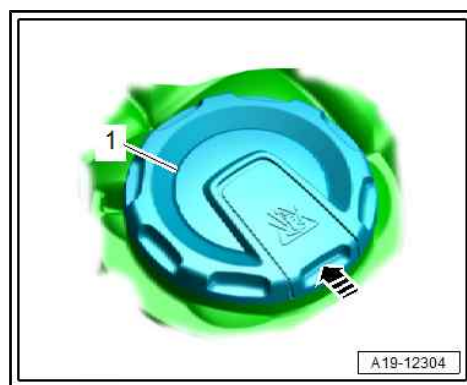
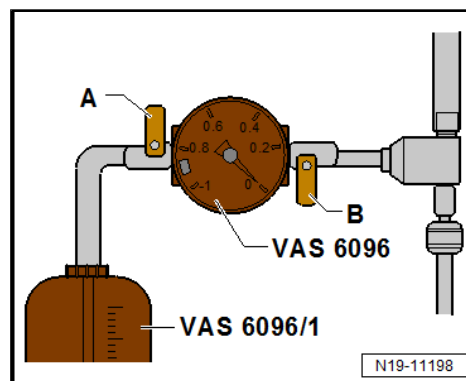
- Close both valves -A- and -B- (turn lever at right angles to direction of flow).
- Connect hose -4- to compressed air supply.
- Pressure: 7 ... 10 bar.



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- Open valve -B- by setting lever in direction of flow.
- The suction jet pump generates a partial vacuum in the cooling system; the needle on the gauge should move into the green zone.
- Also briefly open valve -A- (turn lever in direction of flow) so that hose on reservoir of -VAS 6096- can fill with coolant.
- Close valve -A- again.
- Leave valve -B- open for another 2 minutes.
- The suction jet pump continues to generate a partial vacuum in the cooling system; the needle on the gauge should remain in the green zone.
- Close valve -B-.
- The needle on the gauge should stop in the green zone. The vacuum level in the cooling system is then sufficient for subsequent filling.
- If the needle does not reach the green zone, repeat the process.
- Check cooling system for leaks if the vacuum is not maintained.
- Detach compressed air hose.
- Open valve -A-.
- The vacuum in the cooling system causes the coolant to be drawn out of the reservoir of -VAS 6096- ; the cooling system is then filled.
- Detach cooling system charge unit - VAS 6096- from adapter -V.A.G 1274/8- on coolant expansion tank.
- Close filler cap -1- on coolant expansion tank (make sure it engages).





Bleeding high-temperature cooling circuit and low-temperature cooling circuit:

- Coolant must be topped up to “max” mark.
- Activate electromechanical parking brake.
- Vehicles with automatic gearbox: Move selector lever to position **P**.
- ⇒ Vehicle diagnostic tester must be connected.
- Start engine.
- Set temperature to “HI”.
- Switch off air conditioner compressor (press **AC** button).
- LED in button should not light up.
- Set fresh air blower to lowest setting.
- If vehicle diagnostic tester is not yet connected: Connect ⇒ Vehicle diagnostic tester.
- Start Guided Fault Finding.
- Choose **Select own test** tab and select following options one after the other:
 - ◆ **0001 - Systems with diagnostic capability**
 - ◆ **0001 - Engine electronics J623**
 - ◆ **0001 - Engine electronics, functions**
 - ◆ **0001 - Charge/bleed coolant circuit**
- Start selected program and follow instructions shown on display of vehicle diagnostic tester.



Procedure for bleeding low-temperature cooling circuit:

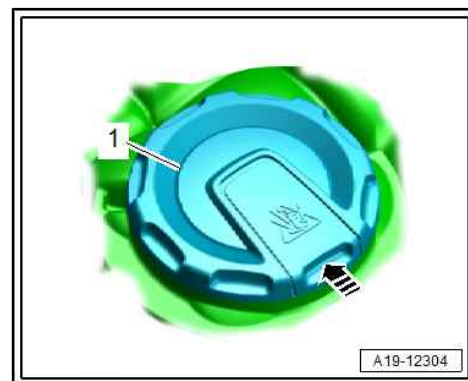
CAUTION

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

Danger of scalding skin and other parts of the body.

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

- Engine must be switched off.
- Cover filler cap on expansion tank with a cloth and open carefully to release pressure.
- Release fastener -arrow- and open filler cap -1- on coolant expansion tank.





- Fit cooling system tester - V.A.G 1274 B- with adapter - V.A.G 1274/8- onto coolant expansion tank.
- Using hand pump on cooling system tester, build up a pressure of 1.0 bar.
- Follow instructions shown on display of vehicle diagnostic tester.

Checking coolant level after bleeding:



Note

Checking coolant level without bleeding ⇒ [page 60](#)

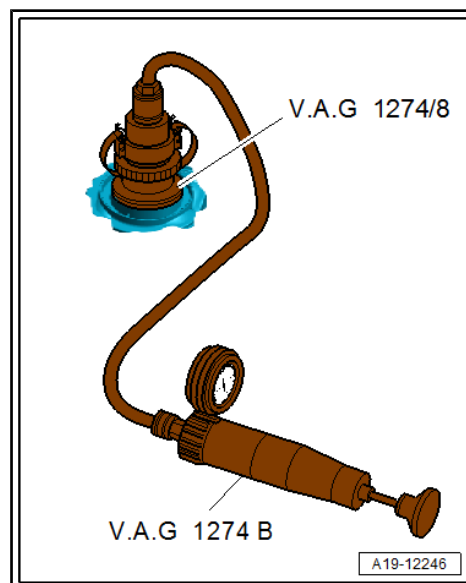


CAUTION

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

Danger of scalding skin and other parts of the body.

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



The coolant level can be above the “MAX” marking when the engine is warm.

- Fill up coolant to approx. 8 mm above max. marking when engine is cold.
- Top up with coolant again if necessary.



Note

The increased coolant level is necessary as the coolant level drops during the bleeding process.



- Install engine cover panel.
- If previously removed, install plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber cover .

Checking coolant level without bleeding:



CAUTION

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

Danger of scalding skin and other parts of the body.

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



- The coolant level must be at the “MAX” marking when the engine is cold.
- The coolant level can be above the “MAX” marking when the engine is warm.



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2 Coolant pump/thermostat assembly

- ⇒ [“2.1 Exploded view - coolant pump/thermostat”, page 62](#)
- ⇒ [“2.2 Exploded view - electric coolant pump”, page 62](#)
- ⇒ [“2.3 Exploded view - coolant valves”, page 65](#)
- ⇒ [“2.4 Exploded view - coolant temperature senders”, page 65](#)
- ⇒ [“2.5 Removing and installing electric coolant pump”, page 65](#)
- ⇒ [“2.6 Removing and installing coolant pump”, page 68](#)
- ⇒ [“2.7 Removing and installing coolant circuit control unit GX28”, page 68](#)
- ⇒ [“2.8 Removing and installing coolant valve for cylinder head N489”, page 70](#)
- ⇒ [“2.9 Removing and installing actuator for engine temperature regulation N493”, page 70](#)
- ⇒ [“2.10 Removing and installing temperature sensor G18”, page 70](#)
- ⇒ [“2.11 Removing and installing engine temperature sender G27”, page 71](#)
- ⇒ [“2.12 Removing and installing engine temperature sender 2 G652”, page 72](#)

2.1 Exploded view - coolant pump/thermostat

All components are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - coolant pump/thermostat .

2.2 Exploded view - electric coolant pump

- ◆ Exploded view - coolant pump for high-temperature circuit - V467- ⇒ [page 62](#)
- ◆ Exploded view - coolant pump for low-temperature circuit - V468- ⇒ [page 63](#)

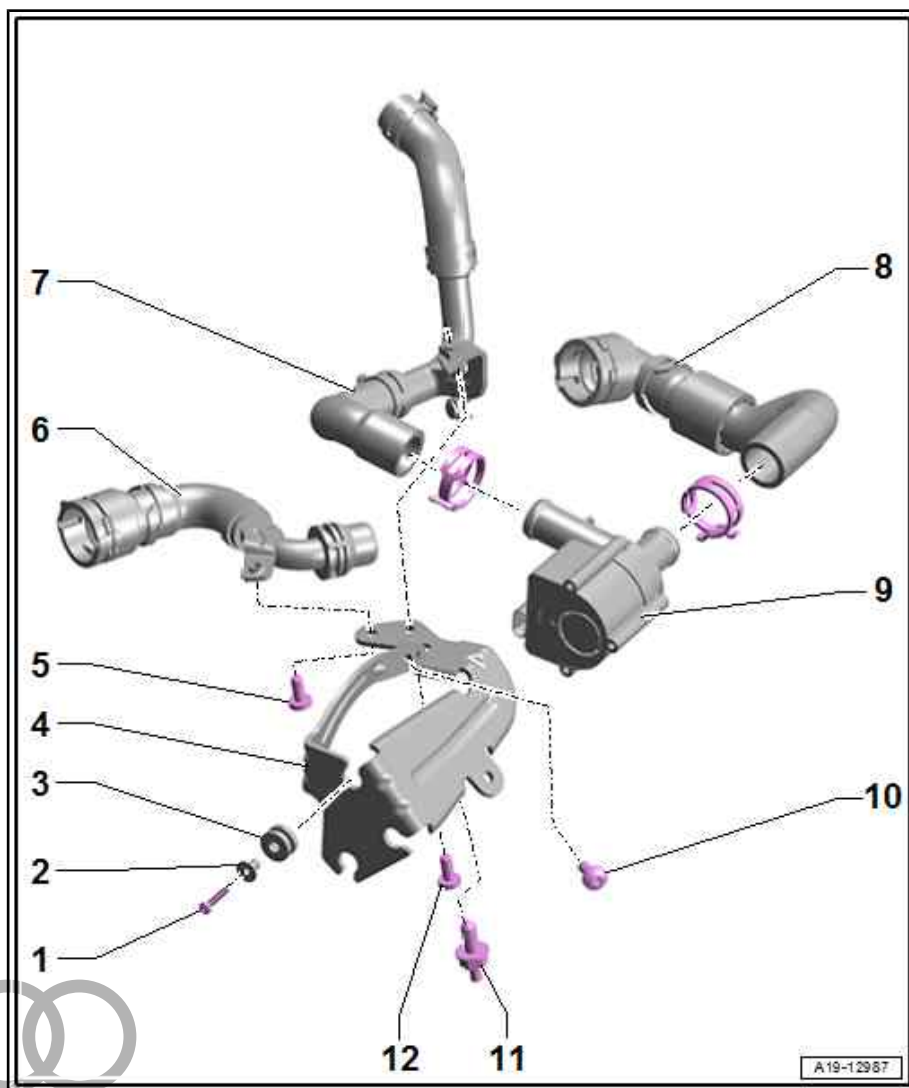
Exploded view - coolant pump for high-temperature circuit - V467-



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- 1 - Bolt
 - 1.5 Nm
- 2 - Spacer bush
- 3 - Rubber bush
- 4 - Bracket
 - For coolant pump for high-temperature circuit - V467-
- 5 - Bolt
 - 9 Nm
- 6 - Coolant pipe
- 7 - Coolant pipe
- 8 - Coolant hose
- 9 - Coolant pump for high-temperature circuit - V467-
 - Removing and installing
⇒ [page 67](#)
- 10 - Bolt
 - 9 Nm
- 11 - Bolt
 - 20 Nm
- 12 - Bolt
 - 9 Nm



Exploded view - coolant pump for low-temperature circuit - V468-

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1 - Bracket

- ❑ For coolant pump for low-temperature circuit - V468-

2 - Bolt

- ❑ 20 Nm

3 - Coolant hose

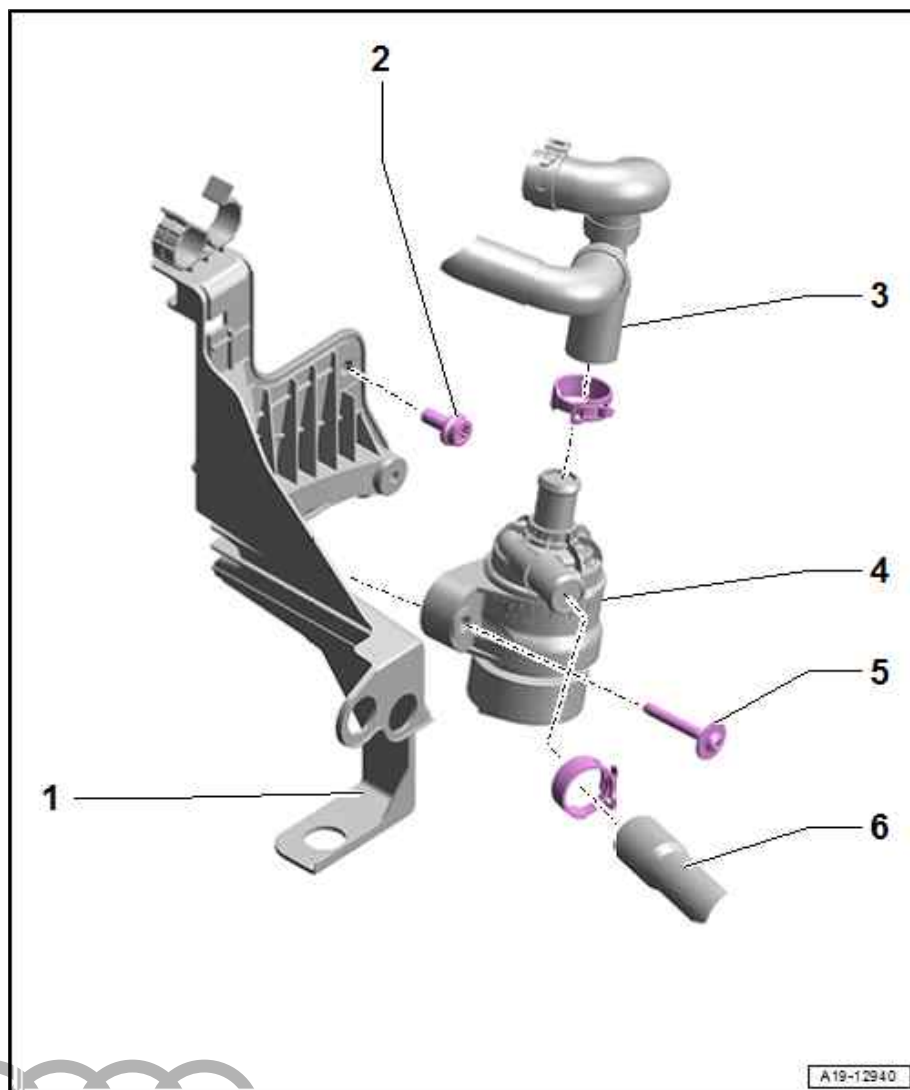
4 - Coolant pump for low-temperature circuit - V468-

- ❑ Removing and installing
⇒ [page 65](#)

5 - Bolt

- ❑ 9 Nm

6 - Coolant hose



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2.3 Exploded view - coolant valves

1 - Coolant circuit control unit - GX28-

- ❑ Removing and installing
⇒ ["2.9 Removing and installing actuator for engine temperature regulation N493"](#),
[page 70](#)

2 - Coolant hose

3 - Bracket

- ❑ For coolant circuit control unit - GX28-

4 - Bolt

5 - Washer

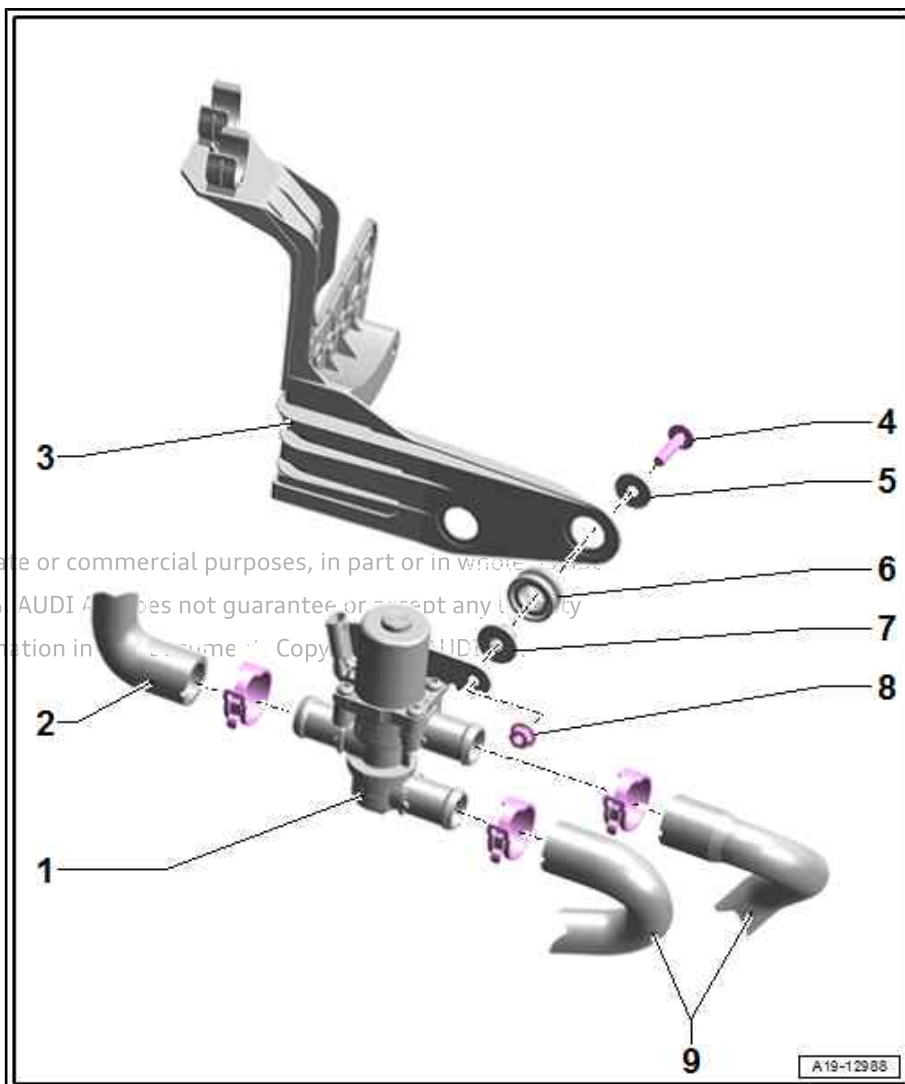
6 - Rubber bush

7 - Spacer bush

8 - Nut

- ❑ 9 Nm

9 - Coolant hoses



2.4 Exploded view - coolant temperature senders

All components are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - coolant temperature senders .

2.5 Removing and installing electric coolant pump

⇒ ["2.5.1 Removing and installing coolant pump for high-temperature circuit V467"](#), [page 65](#)

⇒ ["2.5.2 Removing and installing coolant pump for low-temperature circuit V468"](#), [page 67](#)

2.5.1 Removing and installing coolant pump for high-temperature circuit - V467-

Special tools and workshop equipment required



- ◆ Hose clamps, up to 25 mm - 3094-



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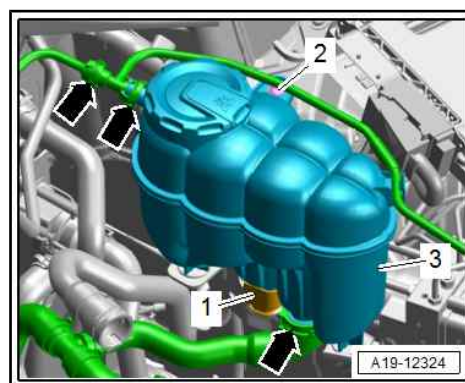
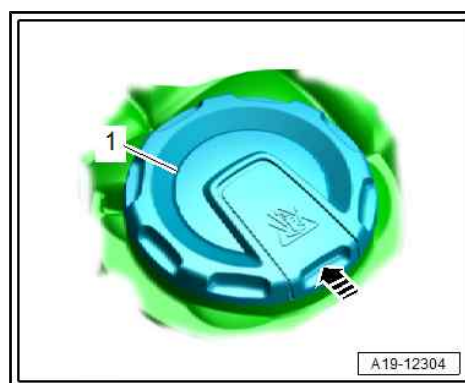
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- ◆ Hose clip pliers - VAS 6362-



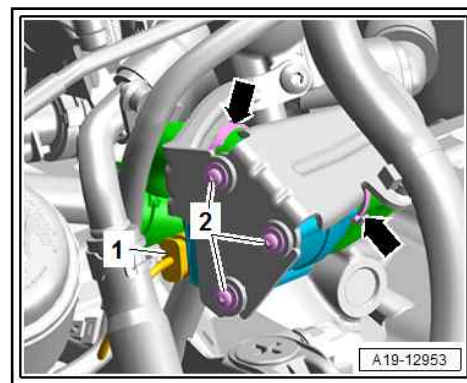
Removing

- Remove engine cover panel ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 10 ; Engine cover panel; Removing and installing engine cover panel .
- Engine cold.
- Relieve residual pressure in cooling system by releasing fastener -arrow- and briefly opening filler cap -1- on coolant expansion tank (cover filler cap with a cloth beforehand and open carefully).
- Close filler cap again.
- Move electrical wiring harness clear.
- Lift retaining clips -arrows-, disconnect coolant hoses and move them clear.
- Unplug electrical connector -1- for coolant shortage indicator switch - F66- .
- Unscrew bolt -3- and detach coolant expansion tank.





- Unplug electrical connector -1-.
- Remove bolts -2-.
- Place a cloth underneath to catch escaping coolant.
- Clamp off coolant hoses with hose clamps up to 25 mm - 3094- .
- Release hose clips -arrows- and detach coolant hoses from coolant pump for high-temperature circuit - V467- .



Installing

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

- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .
- Do not reuse coolant.
- Bleed high-temperature cooling circuit and low-temperature cooling circuit ⇒ [page 59](#) .
- Install engine cover panel ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 10 ; Engine cover panel; Removing and installing engine cover panel .

Tightening torques

⇒ ["2.2 Exploded view - electric coolant pump", page 62](#)



2.5.2 Removing and installing coolant pump for low-temperature circuit - V468-

Special tools and workshop equipment required

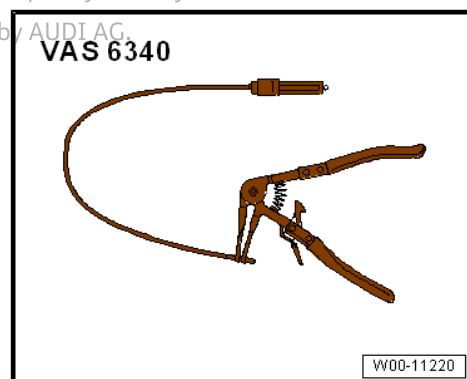
- ◆ Hose clamps, up to 25 mm - 3094-



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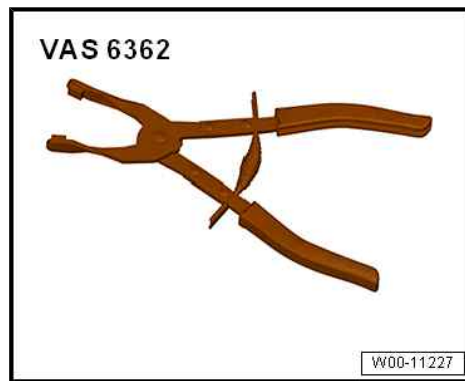
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- ◆ Hose clip pliers - VAS 6340-



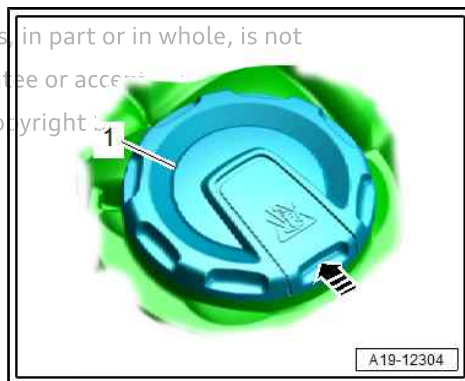


- ◆ Hose clip pliers - VAS 6362-



Removing

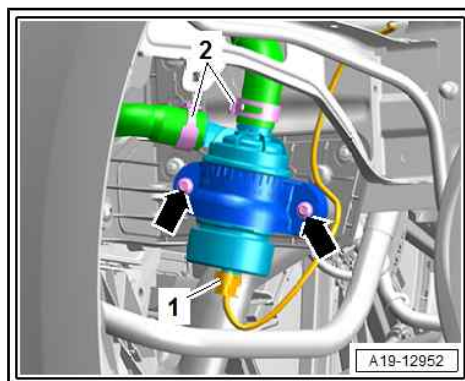
- Engine cold.
- Remove engine cover panel ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 10 ; Engine cover panel; Removing and installing engine cover panel .
- Relieve residual pressure in cooling system by releasing fastener -arrow- and briefly opening filler cap -1- on coolant expansion tank (cover filler cap with a cloth beforehand and open carefully).
- Close filler cap again.
- Unplug electrical connector -1-.
- Place a cloth underneath to catch escaping coolant.
- Clamp off coolant hoses using hose clamps up to 25 mm - 3094- , release hose clips -2- and disconnect hoses.
- Remove bolts -arrows- and detach coolant pump for low-temperature circuit - V468- .



Installing

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

- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .
- Do not reuse coolant.
- Bleed high-temperature cooling circuit and low-temperature cooling circuit ⇒ [page 59](#) .



Tightening torques

- ◆ ⇒ [“2.2 Exploded view - electric coolant pump”, page 62](#)

2.6 Removing and installing coolant pump

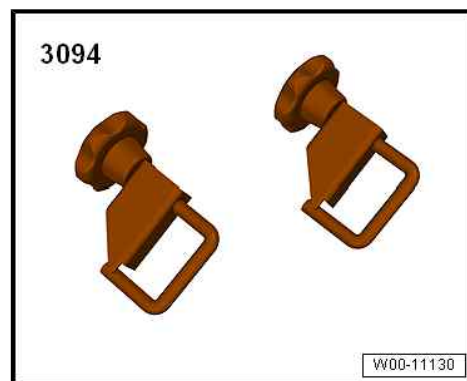
All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Removing and installing coolant pump .

2.7 Removing and installing coolant circuit control unit - GX28-

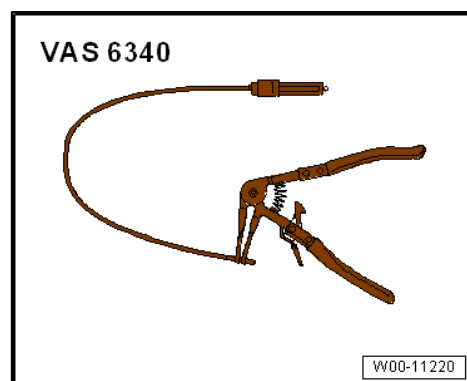
Special tools and workshop equipment required



- ◆ Hose clamps, up to 25 mm - 3094-



- ◆ Hose clip pliers - VAS 6340-



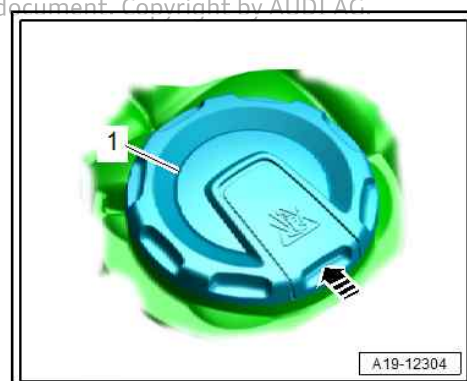
- ◆ Hose clip pliers - VAS 6362-



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Removing

- Engine cold.
- Relieve residual pressure in cooling system by releasing fastener -arrow- and briefly opening filler cap -1- on coolant expansion tank (cover filler cap with a cloth beforehand and open carefully).
- Close filler cap again.
- Remove wheel spoiler (front left) and unfasten front section of wheel housing liner (front left) ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Exploded view - wheel housing liner (front) .





- Unplug electrical connector -2-.
- Place a cloth underneath to catch escaping coolant.
- Clamp off coolant hoses with hose clamps up to 25 mm - 3094- .
- Release hose clips -1- and detach coolant hoses.
- Remove nuts -arrows- and detach coolant circuit control unit - GX28- .

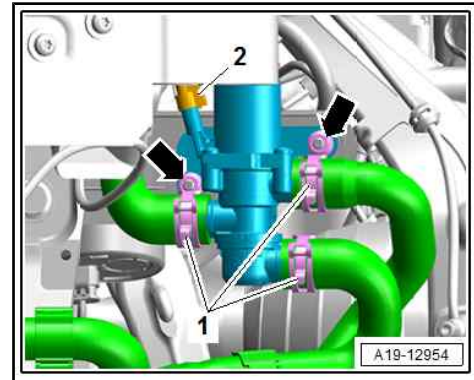
Installing

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

- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .
- Do not reuse coolant.
- Bleed high-temperature cooling circuit and low-temperature cooling circuit ⇒ [page 59](#) .

Tightening torques

- ♦ ⇒ ["2.3 Exploded view - coolant valves", page 65](#)
- ♦ ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Exploded view - wheel housing liner (front)



2.8 Removing and installing coolant valve for cylinder head - N489-

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Removing and installing coolant valve for cylinder head - N489- .

2.9 Removing and installing actuator for engine temperature regulation - N493-

All further procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Removing and installing actuator for engine temperature regulation - N493- .

2.10 Removing and installing temperature sensor - G18-

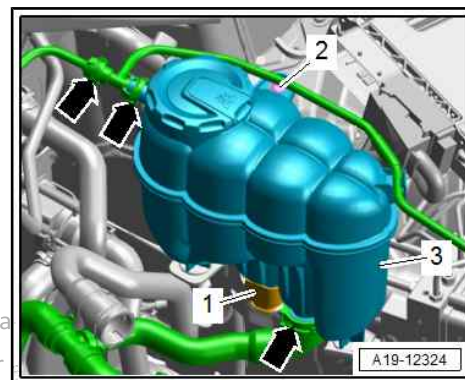
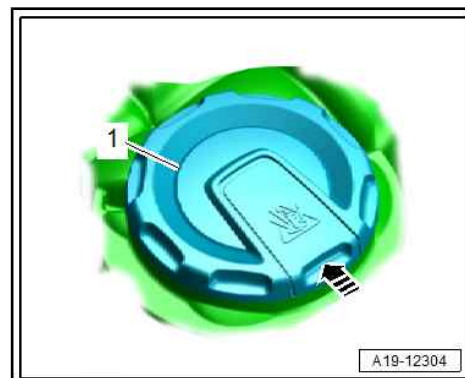
All further procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly ; Removing and installing temperature sensor - G18- .



2.11 Removing and installing engine temperature sender - G27-

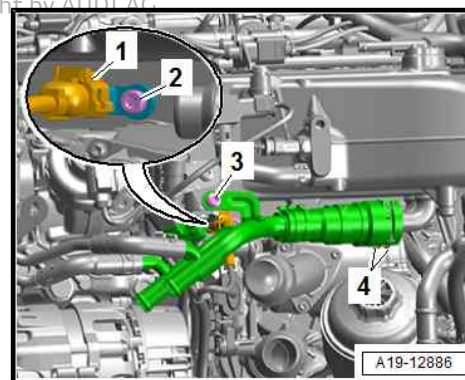
Removing

- Remove engine cover panel ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 10 ; Engine cover panel; Removing and installing engine cover panel .
- Engine cold.
- Relieve residual pressure in cooling system by releasing fastener -arrow- and briefly opening filler cap -1- on coolant expansion tank (cover filler cap with a cloth beforehand and open carefully).
- Close filler cap again.
- Lift retaining clips -arrows-, disconnect coolant hoses and move them clear.
- Unplug electrical connector -1- for coolant shortage indicator switch - F66- .
- Unscrew bolt -3- and detach coolant expansion tank.



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- Unscrew bolt -3-, detach coolant lines and press to one side.
- Unplug electrical connector -1-.
- Unscrew bolt -2- and pull off engine temperature sender - G27- .



Note:

If an O-ring or spacer ring remains lodged in cylinder head, lift it out with a piece of wire, taking care not to damage sealing surface.

Installing

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

- Renew O-ring after removal.
- Renew spacer ring if damaged.
- Do not reuse coolant.
- Bleed high-temperature cooling circuit and low-temperature cooling circuit ⇒ [page 59](#) .
- Install engine cover panel ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 10 ; Engine cover panel; Removing and installing engine cover panel .

Tightening torques

- ◆ ⇒ ["3.1 Exploded view - intake manifold", page 102](#)



2.12 Removing and installing engine temperature sender 2 - G652-

Removing

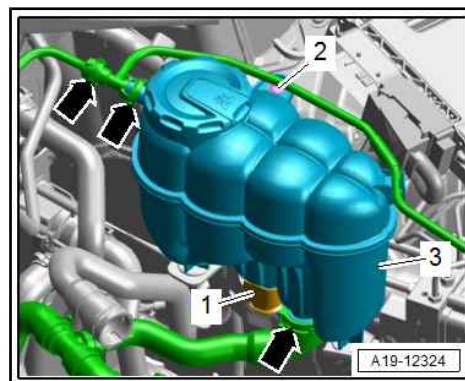
- Drain coolant
⇒ [“1.3 Draining and filling cooling system”, page 52](#) .
- Move electrical wiring harness clear.
- Lift retaining clips -arrows-, disconnect coolant hoses and move them clear.
- Unplug electrical connector -1- for coolant shortage indicator switch - F66- .
- Unscrew bolt -3- and detach coolant expansion tank.

All further procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly ; Removing and installing engine temperature sender 2 - G652- .

Installing

Additional work:

- Connect coolant hose with plug-in connector ⇒ [page 79](#) .



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3 Coolant pipes

⇒ [“3.1 Exploded view - coolant pipes”, page 73](#)

⇒ [“3.2 Removing and installing coolant pipes”, page 74](#)

⇒ [“3.3 Removing and installing coolant pipes for gearbox”, page 76](#)

3.1 Exploded view - coolant pipes

◆ Exploded view - coolant pipe on engine ⇒ [page 73](#)

◆ Exploded view - coolant pipe for gearbox ⇒ [page 73](#)

The arrow markings on coolant pipes and on ends of hoses must align.

Exploded view - coolant pipe on engine

1 - Bolt

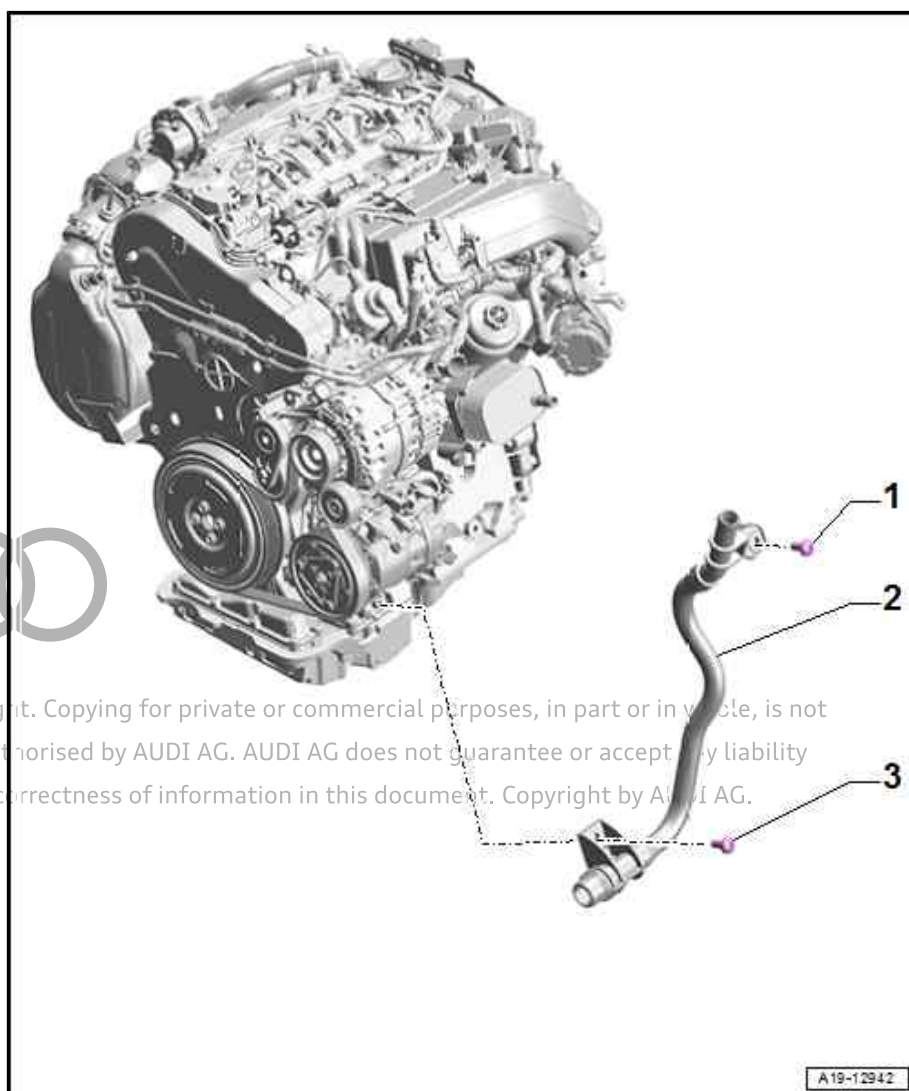
- 9 Nm

2 - Coolant pipe (left-side)

- Removing and installing
⇒ [page 74](#)

3 - Bolt

- 9 Nm



Exploded view - coolant pipes for gearbox



1 - Coolant hoses

2 - Coolant hoses

3 - Bolt

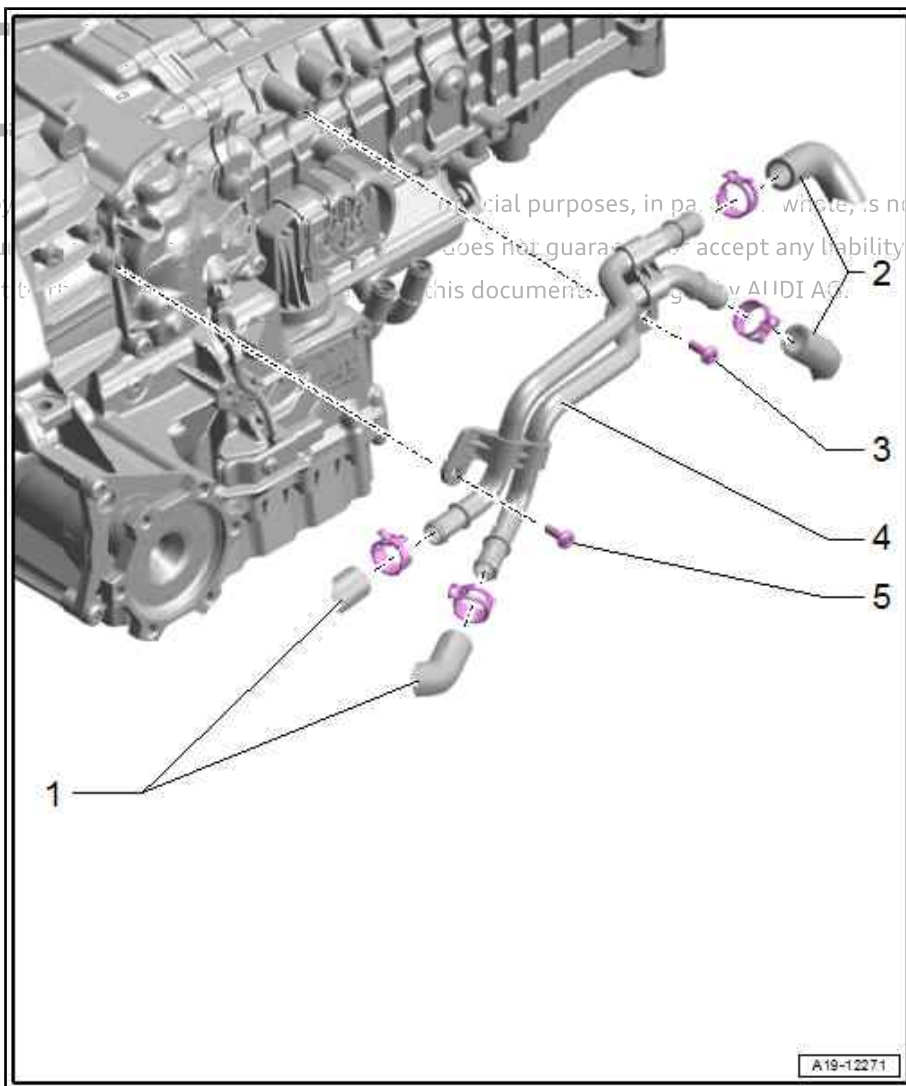
□ 9 Nm

4 - Coolant pipes for gearbox

□ Removing and installing
⇒ [page 76](#)

5 - Bolt

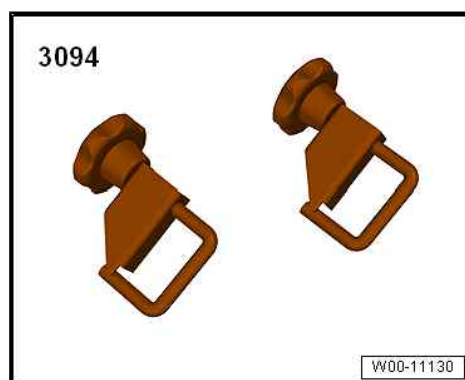
□ 9 Nm



3.2 Removing and installing coolant pipes

Special tools and workshop equipment required

- ◆ Hose clamps, up to 25 mm - 3094-





- ◆ Coolant collecting system - VAS 5014- or drip tray for workshop hoist - VAS 6208-

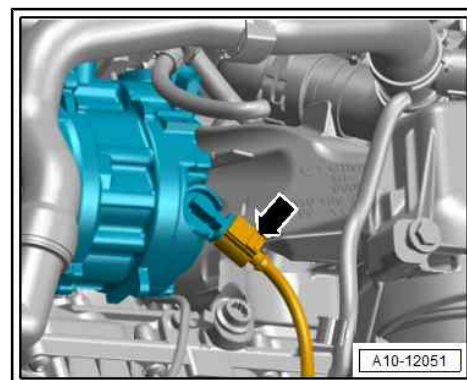


- ◆ Hose clip pliers - VAS 6362-



Removing

- Remove noise insulation (front) ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Unplug electrical connector -arrow- for air conditioner compressor.



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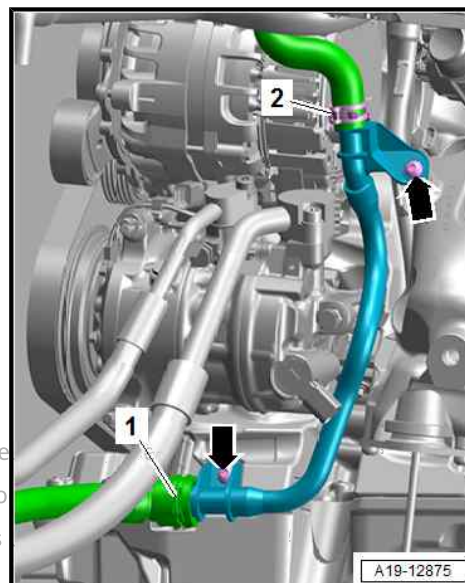


- Place collector tank from coolant collecting system -VAS 5014- or drip tray for workshop hoist - VAS 6208- underneath.
- Clamp off coolant hoses with hose clamps up to 25 mm - 3094- .
- Lift retaining clip -1-, release hose clip -2- and disconnect coolant hoses.
- Remove bolts -arrows- and detach coolant pipe (left-side).

Installing

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

- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .
- Do not reuse coolant.
- Connect coolant hose with plug-in connector ⇒ [page 79](#)
- Bleed high-temperature cooling circuit and low-temperature cooling circuit ⇒ [page 59](#) .



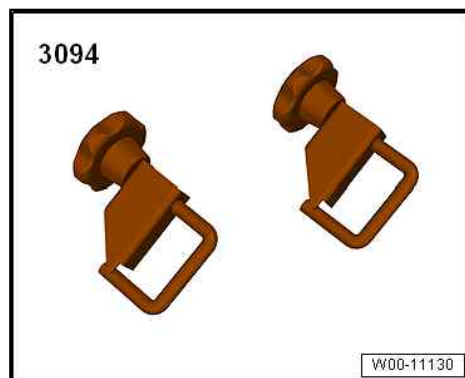
Tightening torques

- ♦ ⇒ [“3.1 Exploded view - coolant pipes”, page 73](#)
- ♦ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation

3.3 Removing and installing coolant pipes for gearbox

Special tools and workshop equipment required

- ♦ Hose clamps, up to 25 mm - 3094-
- ♦ Coolant collecting system - VAS 5014- or drip tray for workshop hoist - VAS 6208-





- ◆ Hose clip pliers - VAS 6362-



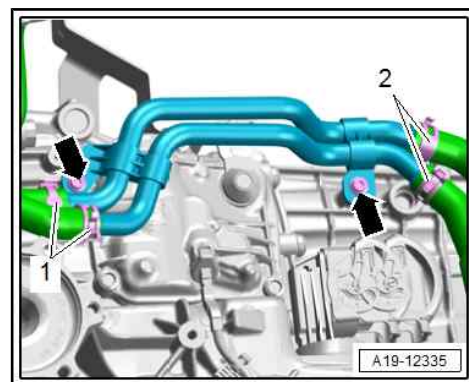
Removing

- Remove noise insulation (rear) ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Place collector tank from coolant collecting system -VAS 5014- or drip tray for workshop hoist - VAS 6208- underneath.
- Remove bolts -arrows-.
- Clamp off coolant hoses using hose clamps up to 25 mm - 3094- , release hose clips -2- and disconnect hoses.
- Detach coolant pipes.

Installing

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

- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .
- Do not reuse coolant.
- Bleed high-temperature cooling circuit and low-temperature cooling circuit ⇒ [page 59](#) .



Tightening torques

- ◆ ⇒ [“3.1 Exploded view - coolant pipes”, page 73](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation



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4 Radiators/radiator fan

⇒ "4.1 Exploded view - radiators/radiator fan", page 78

⇒ "4.2 Removing and installing radiator", page 80

⇒ "4.3 Removing and installing water radiator for charge air cooling circuit", page 84

⇒ "4.4 Removing and installing radiator cowl", page 85

⇒ "4.5 Removing and installing radiator fan V7 ", page 87

4.1 Exploded view - radiators/radiator fan

◆ Exploded view - radiators ⇒ [page 78](#)

◆ Exploded view - radiator cowl and radiator fan ⇒ [page 79](#)

Exploded view - radiators

1 - Radiator

- ☐ Removing and installing
⇒ [page 80](#)
- ☐ If there are slight impressions on the fins, refer to ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair instructions; Installing radiators and condensers
- ☐ If renewed, change coolant in entire system

2 - Drain plug

- ☐ 1.5 ... 3 Nm

3 - O-ring

- ☐ Renew after removing

4 - Coolant hose

- ☐ Lift retaining clip to detach
- ☐ Connecting
⇒ [page 79](#)

5 - O-rings

- ☐ Renew after removing

6 - Coolant hose

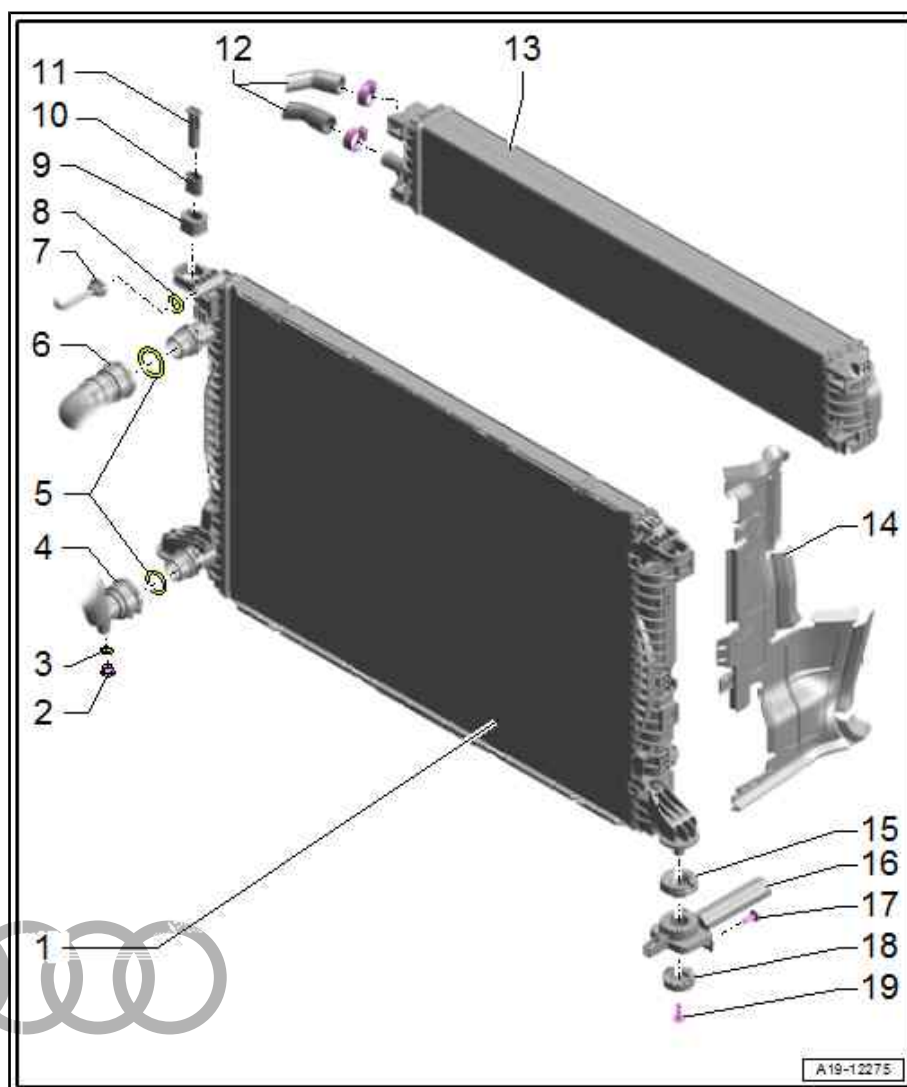
- ☐ Lift retaining clip to detach
- ☐ Connecting
⇒ [page 79](#)

7 - Coolant pipe

- ☐ To coolant expansion tank
- ☐ Press release ring to detach
- ☐ Connecting ⇒ [page 79](#)

8 - O-ring

- ☐ Renew after removing



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9 - Rubber mounting

- ☐ For radiator

10 - Sleeve

11 - Retaining pin

- ☐ Use screwdriver to release and pull off

12 - Coolant hoses

13 - Water radiator for charge air cooling circuit

- ☐ Removing and installing ⇒ [page 84](#)
- ☐ If there are slight impressions on the fins, refer to ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair instructions; Installing radiators and condensers
- ☐ If renewed, change coolant in entire system

14 - Air duct

15 - Rubber bush

- ☐ For radiator

16 - Radiator bracket

17 - Bolt

- ☐ 5 Nm

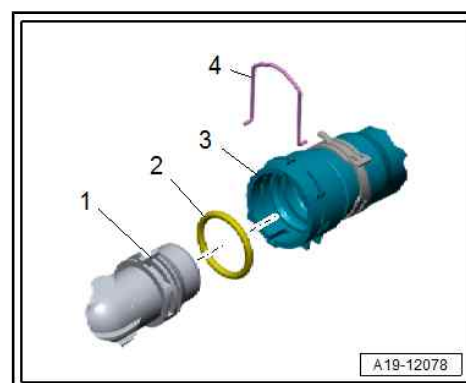
18 - Washer

19 - Bolt

- ☐ 4.5 Nm

Connecting coolant hose with plug-in connector

- If damaged, renew retaining clip -4-.
- Remove old O-ring -2- from coolant hose -3-.
- Lightly lubricate new O-ring with coolant and fit O-ring in coolant hose.
- Press coolant hose onto connection -1- until it engages audibly.
- Press coolant hose in again and then pull to check that plug-in connector is correctly engaged.



Exploded view - radiator cowl and radiator fans



1 - Radiator cowl

- ❑ Removing and installing
⇒ [page 85](#)

2 - Bolt

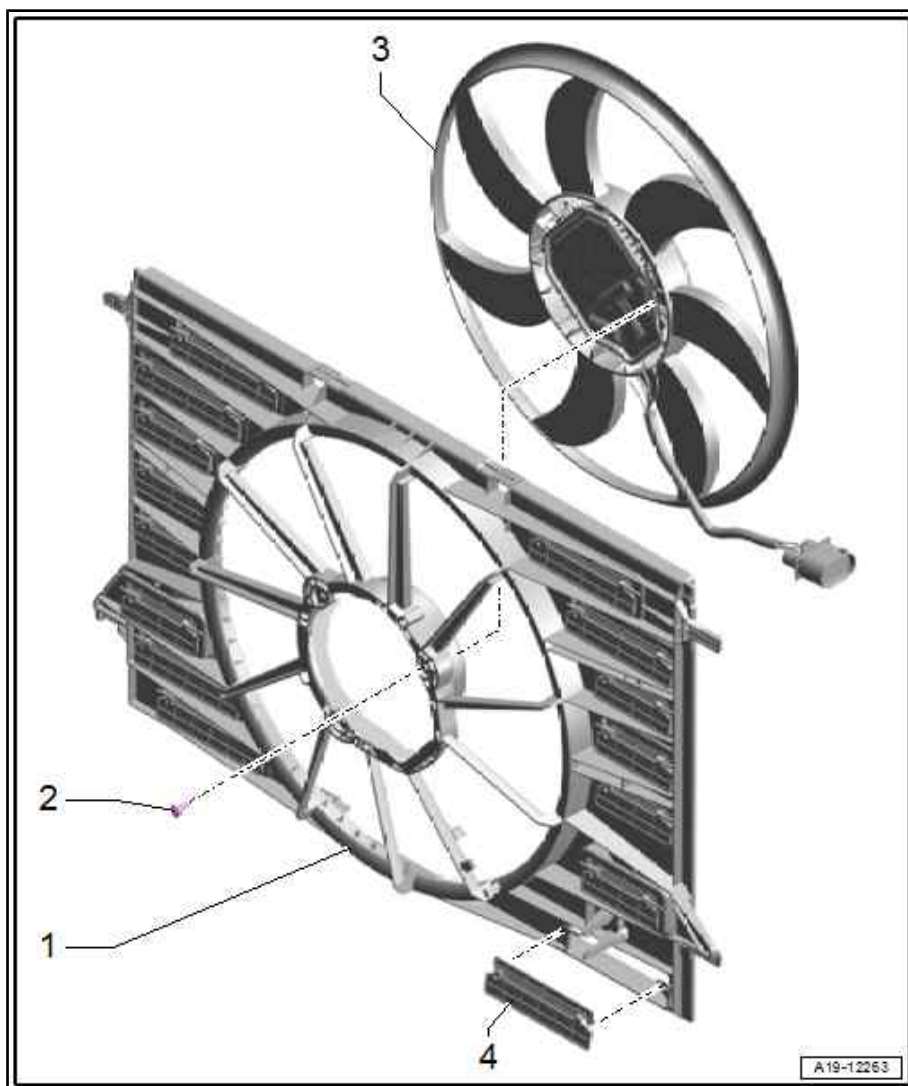
- ❑ 5 Nm

3 - Radiator fan - V7-

- ❑ With radiator fan control unit - J293-
- ❑ Removing and installing
⇒ [page 87](#)

4 - Air flow flap

- ❑ Different versions available ⇒ Electronic parts catalogue



4.2 Removing and installing radiator

The radiator must be removed and installed together with the radiator cowl.

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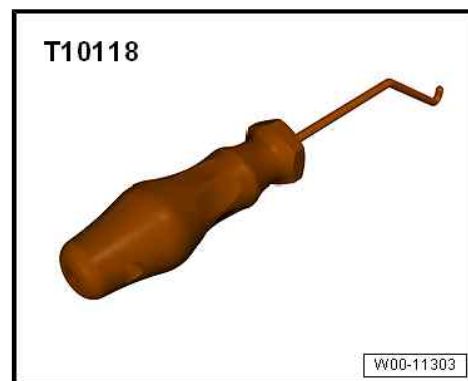
Special tools and workshop equipment required

- ◆ Coolant collecting system - VAS 5014- or drip tray for workshop hoist - VAS 6208-





- ◆ Assembly tool - T10118-



- ◆ Electric drill
- ◆ Pop rivets ⇒ Electronic parts catalogue

Removing

CAUTION

Risk of injury as the radiator fan may start up automatically.

- When working in the vicinity of the radiator, keep a safe distance from the radiator fan.

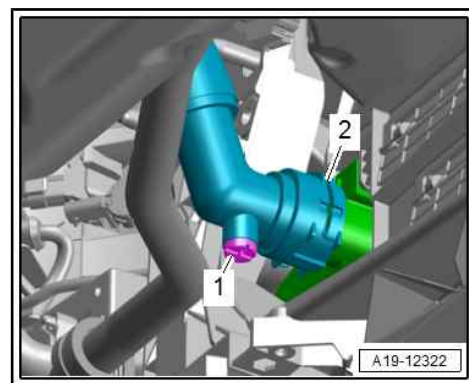
- Remove noise insulation (front) ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .

The following step is required on A4 vehicles with LED headlights or matrix LED headlights:

- Remove headlight (left-side) ⇒ Electrical system; Rep. gr. 94 ; Headlights; Removing and installing headlights .

All vehicles (continued):

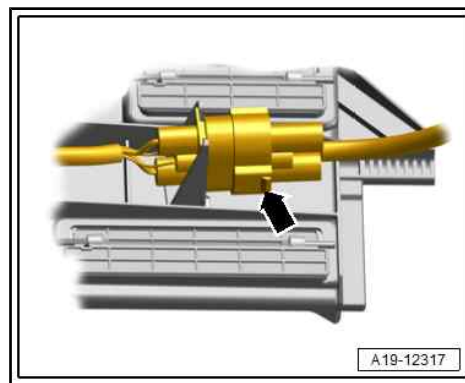
- Remove bracket for bumper cover together with impact bar ⇒ General body repairs, exterior; Rep. gr. 50 ; Lock carrier; Exploded view - lock carrier .
- Place collector tank from coolant collecting system -VAS 5014- or drip tray for workshop hoist - VAS 6208- underneath.
- Lift retaining clip -2- and disconnect coolant hose from radiator (bottom right).



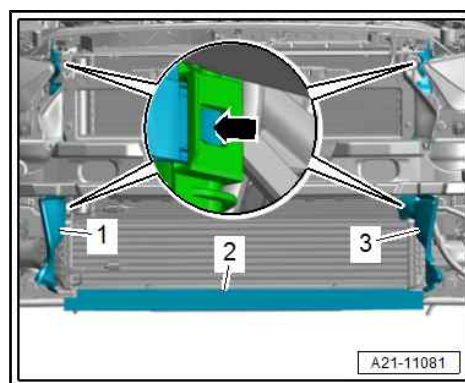
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- Unplug electrical connector -arrow- for radiator fan.



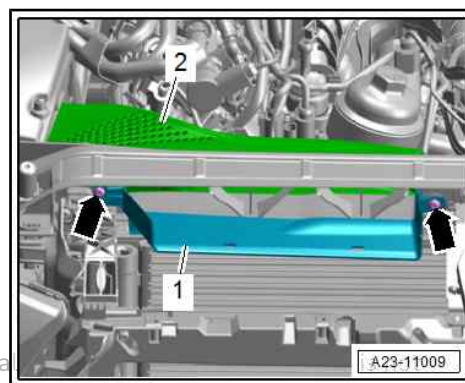
- Release catches -arrow- and detach air ducts -1, 3-.
- Unclip air duct -2-.



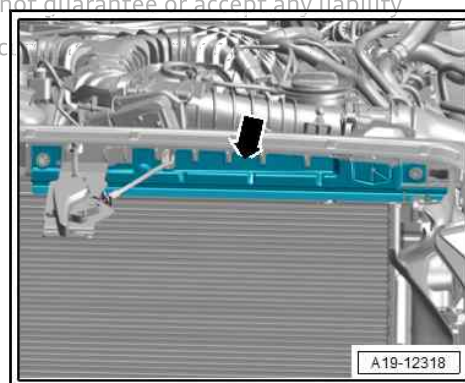
- Remove bolts -arrows- and detach air duct -1-.



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- Detach air duct (top) -arrow-.
- Remove water radiator for charge air cooling circuit
⇒ [page 84](#) .





- Unplug electrical connector -2- for high-pressure sender - G65- .

! NOTICE

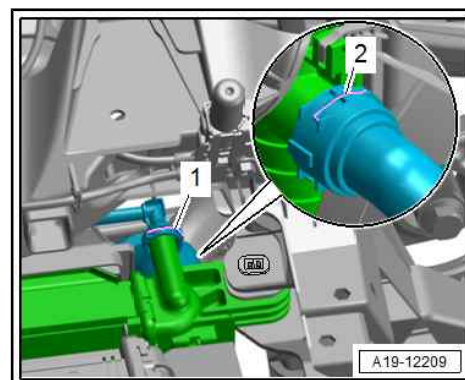
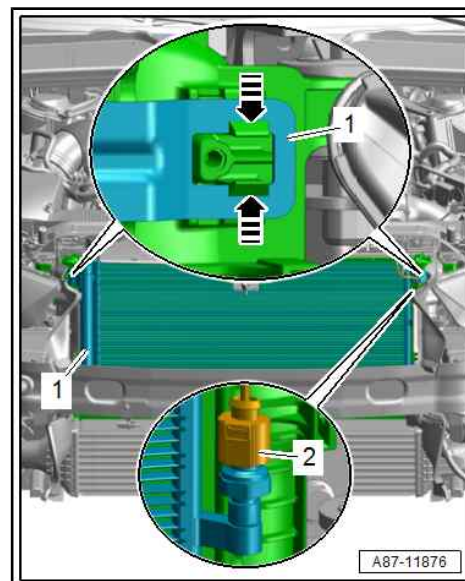
Danger of damage to refrigerant lines and hoses when detaching and pivoting condenser.

- Do NOT stretch, kink or bend refrigerant lines and hoses.

! NOTICE

Risk of damage to fasteners if handled incorrectly.

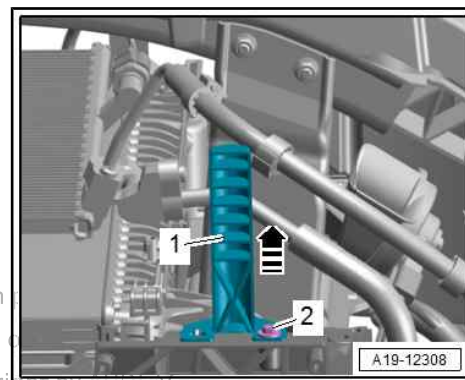
- Release fasteners carefully.
- Release fasteners -arrows- on both sides, disengage condenser -1- from radiator and tie up to one side.
- Lift retaining clips -1, 2-, detach coolant connection from radiator and move connection clear.



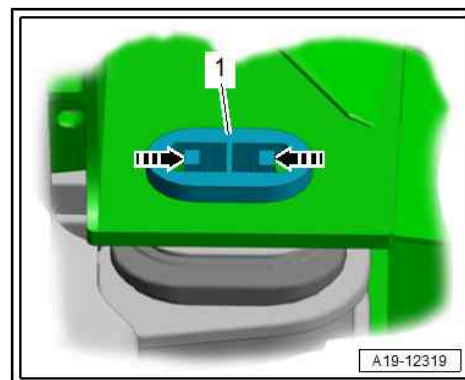
- Remove bolt -2- on both sides and press radiator bracket -1- with radiator towards front -arrow-.



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- Release fasteners -arrows- on both sides and pull retaining pins -1- for radiator out upwards.
- Detach radiator.





- Press locking tabs on left and right sides of radiator cowl together -arrow- and lift radiator cowl off radiator.

Installing

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

- If there are slight impressions on the fins, refer to ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair instructions; Installing radiators and condensers .
- Do not reuse coolant.
- Install water radiator for charge air cooling circuit ⇒ [page 84](#) .
- Install headlight ⇒ Electrical system; Rep. gr. 94 ; Headlights; Removing and installing headlights .
- Connect coolant hose with plug-in connector ⇒ [page 79](#) .
- Fill and bleed coolant circuit ⇒ [page 55](#) .

Tightening torques

- ◆ ⇒ [“4.1 Exploded view - radiators/radiator fan”, page 78](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 50 ; Lock carrier; Exploded view - lock carrier
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation

4.3 Removing and installing water radiator for charge air cooling circuit

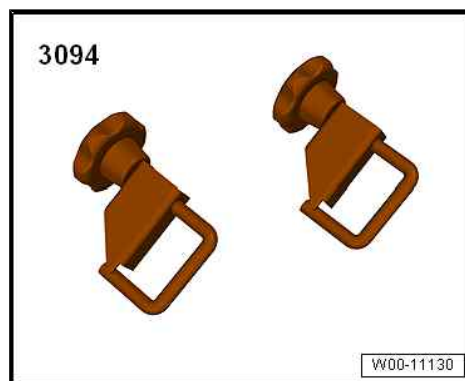
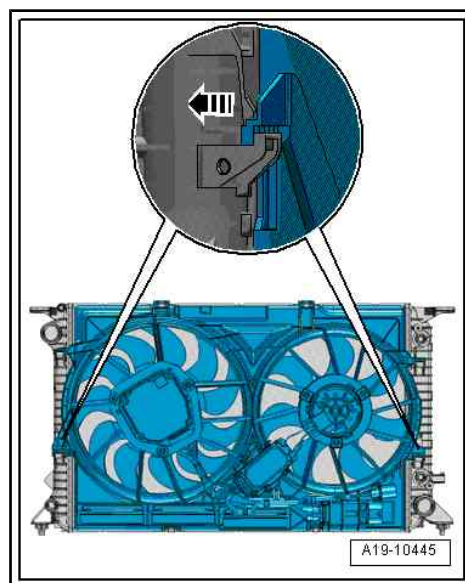
Special tools and workshop equipment required

- ◆ Hose clamps, up to 25 mm - 3094-



- ◆ Coolant collecting system - VAS 5014- or drip tray for workshop hoist - VAS 6208-

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- ◆ Hose clip pliers - VAS 6362-

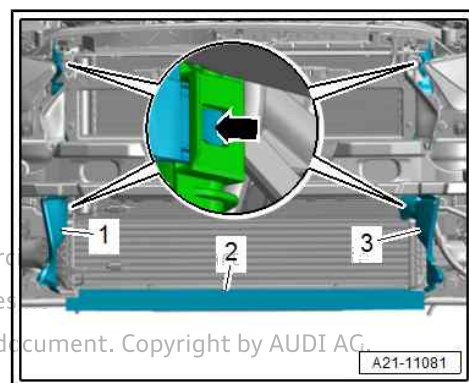


Removing

- Remove closure plate at bumper cover and air intake grille (left and right) ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Exploded view - bumper cover .
- Drain coolant ⇒ [page 54](#) .
- Move air ducts -1, 3- (left and right) clear at water radiator for charge air cooling circuit.



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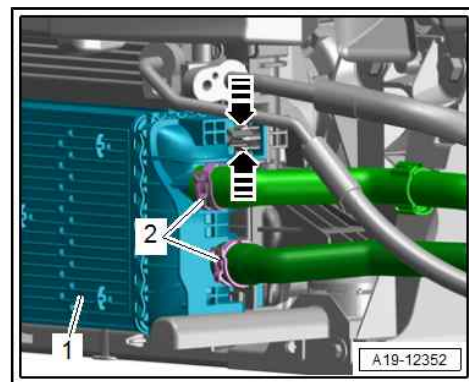


- Place collector tank from coolant collecting system -VAS 5014- or drip tray for workshop hoist - VAS 6208- underneath.
- Clamp off coolant hoses using hose clamps up to 25 mm - 3094- , release hose clips -2- and disconnect hoses.
- Release fasteners on both sides and detach water radiator for charge air cooling circuit -1-.

Installing

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

- Do not reuse coolant.
- Fill and bleed coolant circuit ⇒ [page 55](#) .
- Install closure plate at bumper cover and air intake grille (left and right) ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Exploded view - bumper cover .



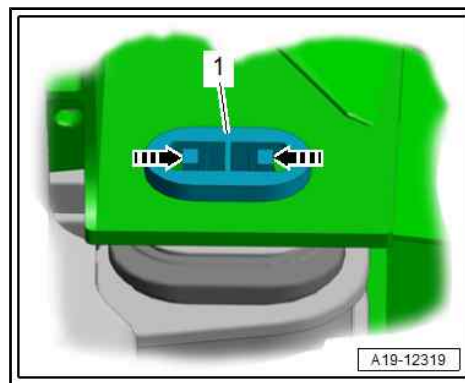
4.4 Removing and installing radiator cowl

Removing

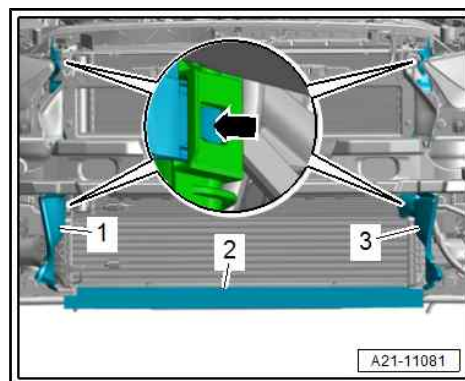
- Remove closure plate at bumper cover, lock carrier cover and air intake grille (left and right) ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Exploded view - bumper cover .



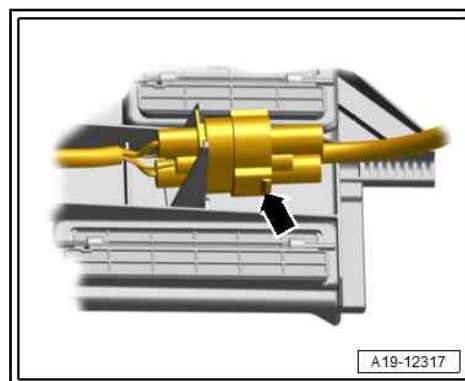
- Release fasteners -arrows- on both sides and pull retaining pins -1- for radiator out upwards.
- Remove noise insulation (front) ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .



- Release catches -arrow- and detach air ducts -1, 3-.
- Unclip air duct -2-.

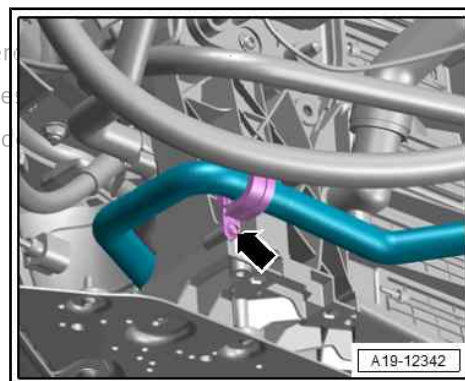


- Unplug electrical connector -arrow- for radiator fan.



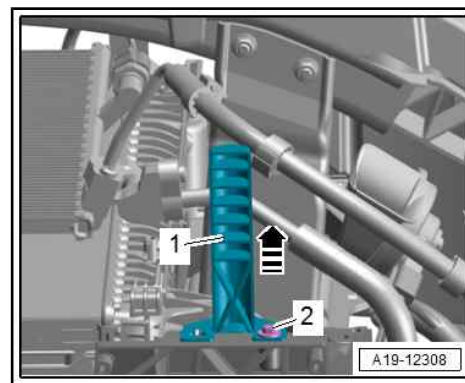
- Remove bolt -arrow- for retaining clip.

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- Remove bolt -2- on both sides and press radiator bracket -1- with radiator towards front -arrow-.



- Press locking tabs on left and right sides of radiator cowl simultaneously -arrow-, lift radiator cowl off radiator and remove from below.

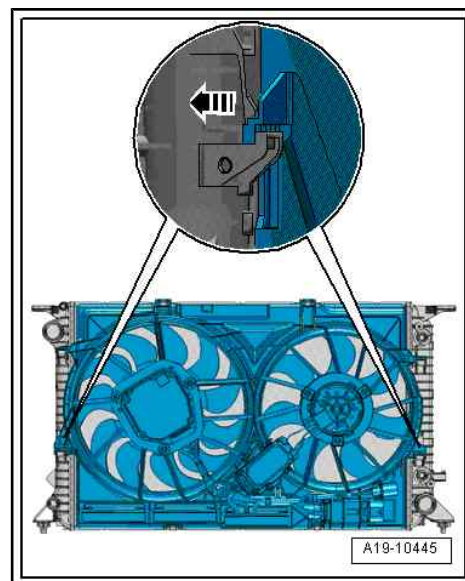
Installing

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

- Install air intake grille, lock carrier cover and closure plate for bumper cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Exploded view - bumper cover .

Tightening torques

- ◆ ⇒ [“4.1 Exploded view - radiators/radiator fan”, page 78](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation



4.5 Removing and installing radiator fan - V7-

Removing

- Secure all cable ties in the same locations when re-installing.
- Remove radiator cowl ⇒ [page 85](#) .
- Move electrical wiring harness clear.
- Unscrew bolts -arrows- and remove radiator fan.

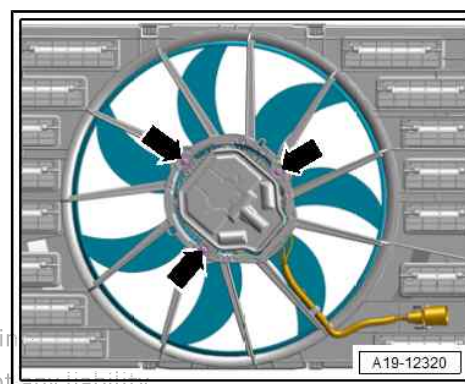
Installing

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

- Do not remove balancing clamps from fan wheel.
- Install radiator cowl ⇒ [page 85](#) .

Tightening torques

- ◆ ⇒ [“4.1 Exploded view - radiators/radiator fan”, page 78](#)



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21 – Turbocharging/supercharging

1 Turbocharger

⇒ [“1.1 Exploded view - turbocharger”, page 88](#)

⇒ [“1.2 Removing and installing turbocharger”, page 88](#)

1.1 Exploded view - turbocharger

All components are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Exploded view - turbocharger .

1.2 Removing and installing turbocharger

Removing

- Remove plenum chamber partition panel ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber partition panel .

All further procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Removing and installing turbocharger .

Installing

Additional work:

- Install plenum chamber partition panel ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber partition panel .

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2 Charge air system

⇒ [“2.1 Exploded view - charge air system”, page 89](#)

⇒ [“2.2 Exploded view - hose connections for charge air system”, page 89](#)

⇒ [“2.3 Removing and installing charge pressure sender G31 ”, page 89](#)

⇒ [“2.4 Removing and installing charge air temperature sender”, page 89](#)

⇒ [“2.5 Checking charge air system for leaks”, page 89](#)

2.1 Exploded view - charge air system

All components are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Exploded view - charge air system .

2.2 Exploded view - hose connections for charge air system

All components are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Exploded view - hose connections for charge air system .

2.3 Removing and installing charge pressure sender - G31-

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Removing and installing charge pressure sender - G31- .

2.4 Removing and installing charge air temperature sender

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system ; Removing and installing charge air temperature sender.

2.5 Checking charge air system for leaks

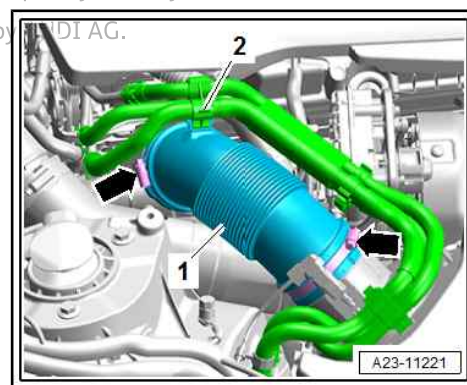
Procedure

- Move fuel hoses clear at retaining clip -2-.
- Release screw-type clips -arrows- and detach air pipe -1-.

All further procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Checking charge air system for leaks .

Tightening torques

- ◆ ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Exploded view - hose connections for charge air system





23 – Mixture preparation - injection

1 Injection system

⇒ [“1.1 Overview - fuel system”, page 90](#)

⇒ [“1.2 Overview of fitting locations - injection system”, page 91](#)

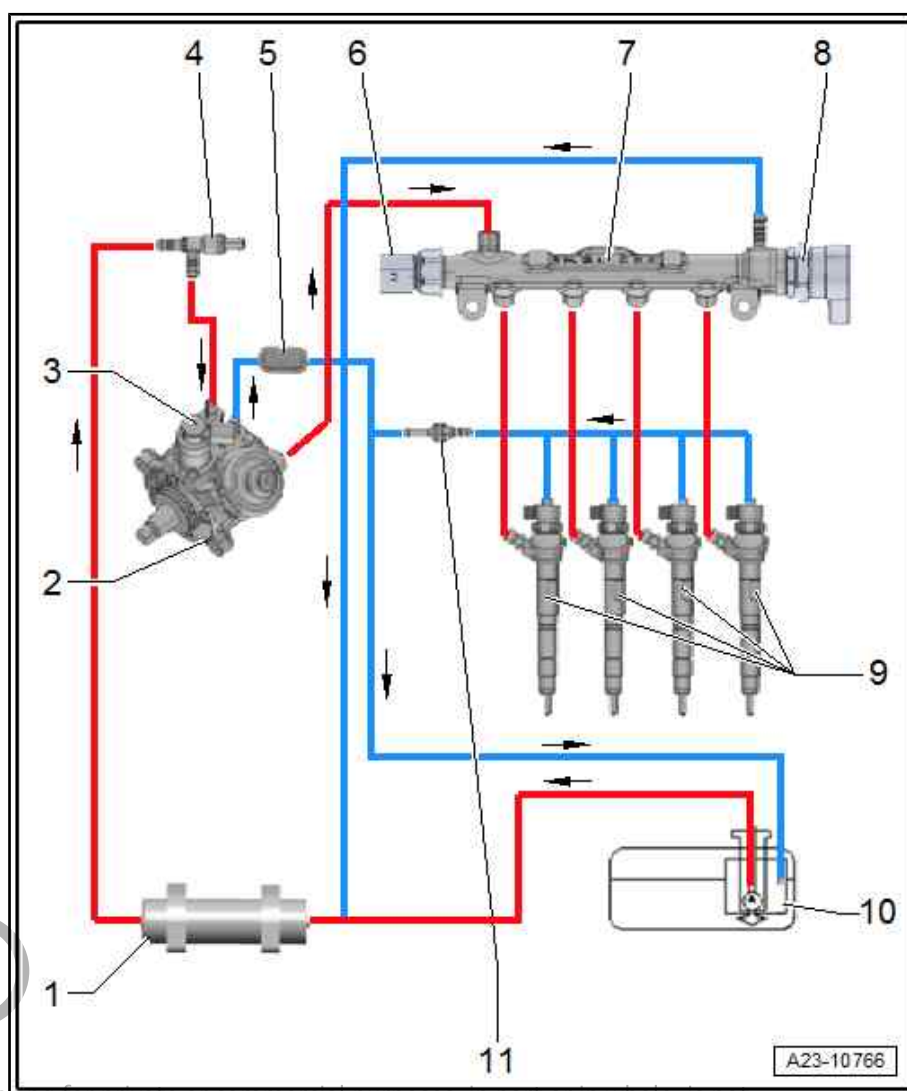
⇒ [“1.3 Filling and bleeding fuel system”, page 98](#)

⇒ [“1.4 Checking fuel system for leaks”, page 98](#)

1.1 Overview - fuel system

- ◆ Red = fuel supply
- ◆ Blue = fuel return
- ◆ Arrows = direction of fuel flow

- 1 - Fuel filter
- 2 - High-pressure pump
- 3 - Fuel metering valve - N290-
- 4 - Fuel pressure sender for low pressure - G410-
- 5 - Restrictor
- 6 - Fuel pressure sender - G247-
- 7 - High-pressure reservoir (rail)
- 8 - Fuel pressure regulating valve - N276-
- 9 - Injectors
- 10 - Fuel tank
 - With fuel system pressurisation pump - G6-
- 11 - Restrictor



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1.2 Overview of fitting locations - injection system

- ◆ Overview of fitting locations - engine compartment
⇒ [page 91](#)
- ◆ Overview of fitting locations - engine (left-side), part 1
⇒ [page 93](#)
- ◆ Overview of fitting locations - engine (left-side), part 2
⇒ [page 94](#)
- ◆ Overview of fitting locations - engine (right-side) ⇒ [page 95](#)
- ◆ Overview of fitting locations - engine (from above)
⇒ [page 96](#)
- ◆ Overview of fitting locations - engine (rear) ⇒ [page 98](#)

Overview of fitting locations - engine compartment

1 - Right electrohydraulic engine mounting solenoid valve - N145-

- Fitting location
⇒ [Fig. "Fitting location of electrohydraulic engine mounting solenoid valves -N144- / -N145-""](#), [page 93](#)

2 - Automatic glow period control unit - J179-

- Removing and installing
⇒ [1.3 Removing and installing automatic glow period control unit J179](#), [page 128](#)

3 - Exhaust flap control unit - J883-

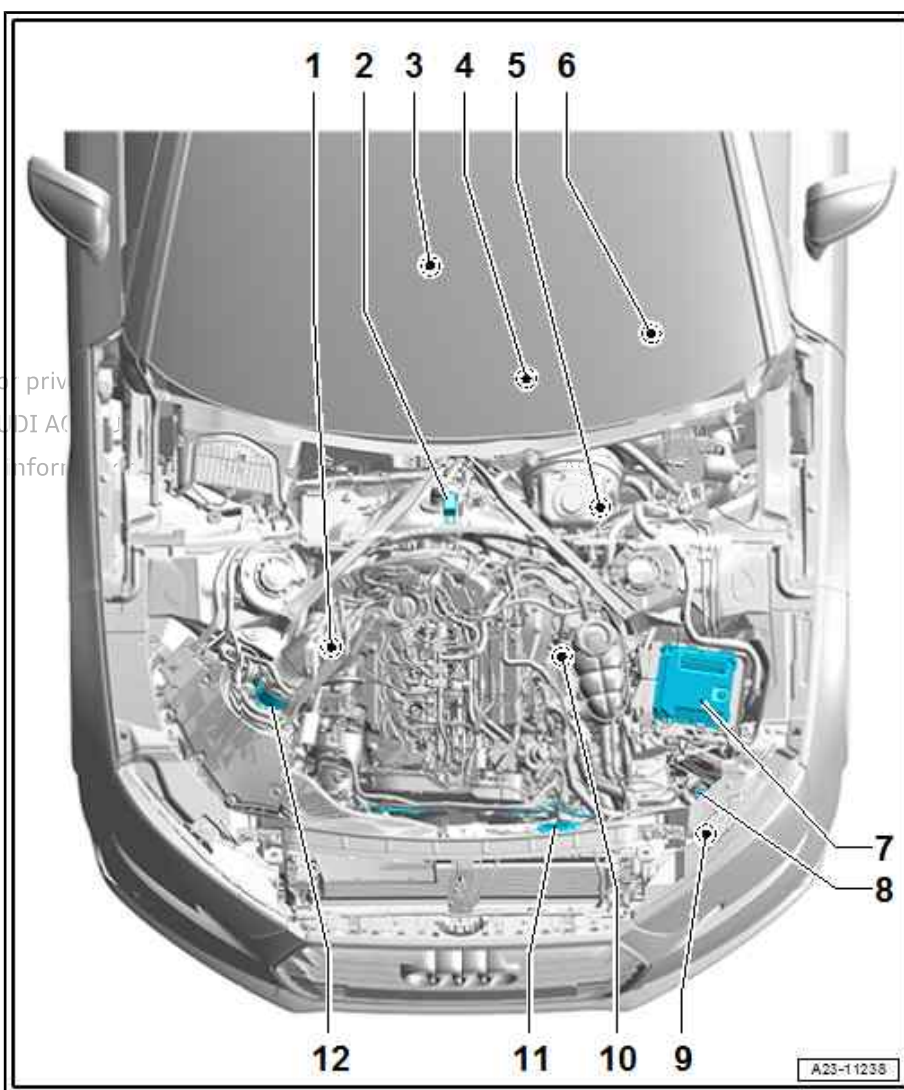
- Fitting location
⇒ [Fig. "Fitting location of exhaust flap control unit -J883-""](#), [page 93](#)

4 - Accelerator pedal module - GX2-

- with
- ◆ Accelerator position sender - G79-
- ◆ Accelerator position sender 2 - G185-
- Fitting location
⇒ [Fig. "Fitting location of accelerator pedal module -GX2-""](#), [page 92](#)

5 - Brake light switch - F-

- With brake pedal position sender - G100-
- Fitting location
⇒ [Fig. "Fitting location of brake light switch -F- / brake pedal position sender -G100-""](#), [page 92](#)





6 - Cruise control system switch - E45-

- ❑ Fitting location: in steering column switch module

7 - Engine control unit - J623-

- ❑ Exploded view ⇒ [“8.1 Exploded view - engine control unit”, page 111](#)

8 - Coolant pump for low-temperature circuit - V468-

- ❑ Fitting location
⇒ [Fig. “Fitting location of coolant pump for low-temperature circuit -V468- ””, page 93](#)

9 - Coolant circuit control unit - GX28-

- ❑ Fitting location ⇒ [Fig. “Fitting location of coolant circuit control unit -GX28- ””, page 93](#)

10 - Left electrohydraulic engine mounting solenoid valve - N144-

- ❑ Fitting location
⇒ [Fig. “Fitting location of electrohydraulic engine mounting solenoid valves -N144- / -N145- ””, page 93](#)

11 - Control unit for NOx sender - J583-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Lambda probe; Exploded view - Lambda probe

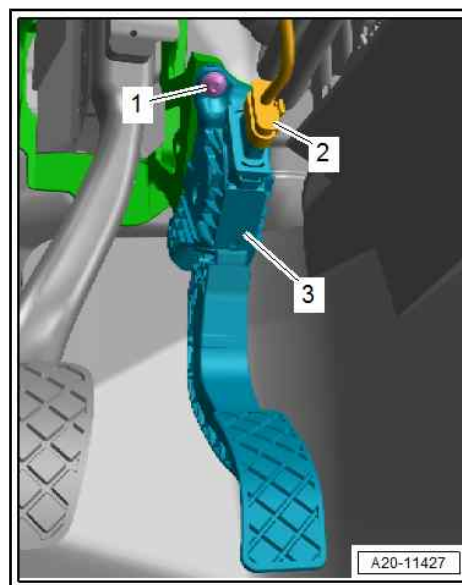
12 - Air mass meter - G70-

- ❑ Exploded view ⇒ [“2.1 Exploded view - air cleaner housing”, page 99](#)

Fitting location of accelerator pedal module - GX2-

- ◆ On mounting bracket for pedal cluster
- ◆ The components of the accelerator pedal module -3- cannot be renewed separately.

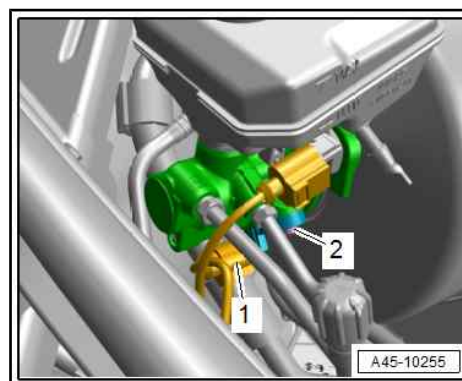
Exploded view ⇒ Fuel supply system; Rep. gr. 20 ; Accelerator mechanism; Exploded view - accelerator pedal module



Fitting location of brake light switch - F- / brake pedal position sender - G100-

- ◆ In plenum chamber on brake master cylinder
- 1 - Electrical connector for brake light switch - F- / brake pedal position sender - G100-

Exploded view ⇒ Brake system; Rep. gr. 47 ; Brake servo/brake master cylinder; Exploded view - brake servo/brake master cylinder





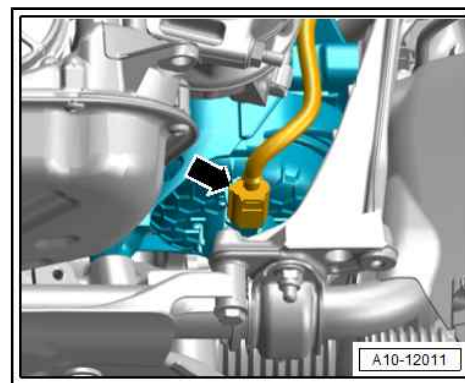
Fitting location of electrohydraulic engine mounting solenoid valves -N144- / -N145-

- ◆ Integrated in engine mounting. It cannot be renewed separately if defective.

Pfeil - -Arrow- Electrical connector for left electrohydraulic engine mounting solenoid valve - N144-

Removing and installing

⇒ ["2.3.1 Removing and installing engine mountings", page 24](#)



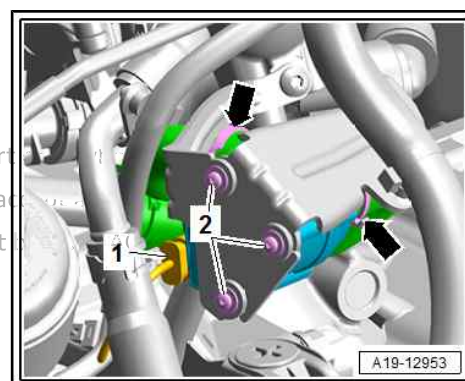
Fitting location of coolant pump for low-temperature circuit - V468-

- ◆ In wheel housing (front left)

1 - Electrical connector for coolant pump for low-temperature circuit - V468-

Exploded view

⇒ ["2.2 Exploded view - electric coolant pump", page 62](#)

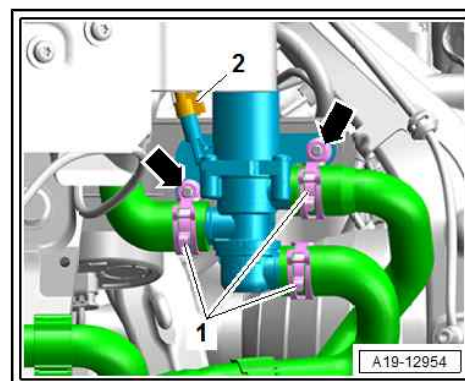


Fitting location of coolant circuit control unit - GX28-

- ◆ In wheel housing (front left)

2 - Electrical connector for coolant circuit control unit - GX28-

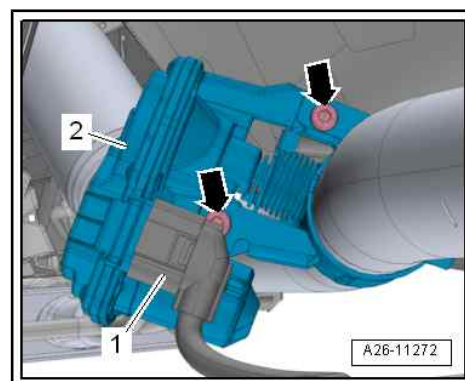
Exploded view ⇒ ["2.3 Exploded view - coolant valves", page 65](#)



Fitting location of exhaust flap control unit - J883-

- ◆ -Item 2- on trap catalytic converter

Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail;
Rep. gr. 26 ; Emission control system; Exploded view - emission control system



Overview of fitting locations - engine (left-side), part 1



1 - Valve for oil pressure control - N428-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Exploded view - sump/oil pump

2 - Starter-alternator - C29-

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

3 - Temperature sensor - G18-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - coolant temperature senders

4 - Fuel metering valve - N290-

- ❑ Integrated in high-pressure pump

5 - Charge pressure sender - G31-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Exploded view - charge air system

6 - Intake air temperature sender - G42-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Exploded view - charge air system

7 - Exhaust gas recirculation valve 1 - GX5-

- ❑ with

♦ Exhaust gas recirculation potentiometer - G212-

♦ Exhaust gas recirculation control motor - V338-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas recirculation; Exploded view - exhaust gas recirculation

8 - Coolant pump for high-temperature circuit - V467-

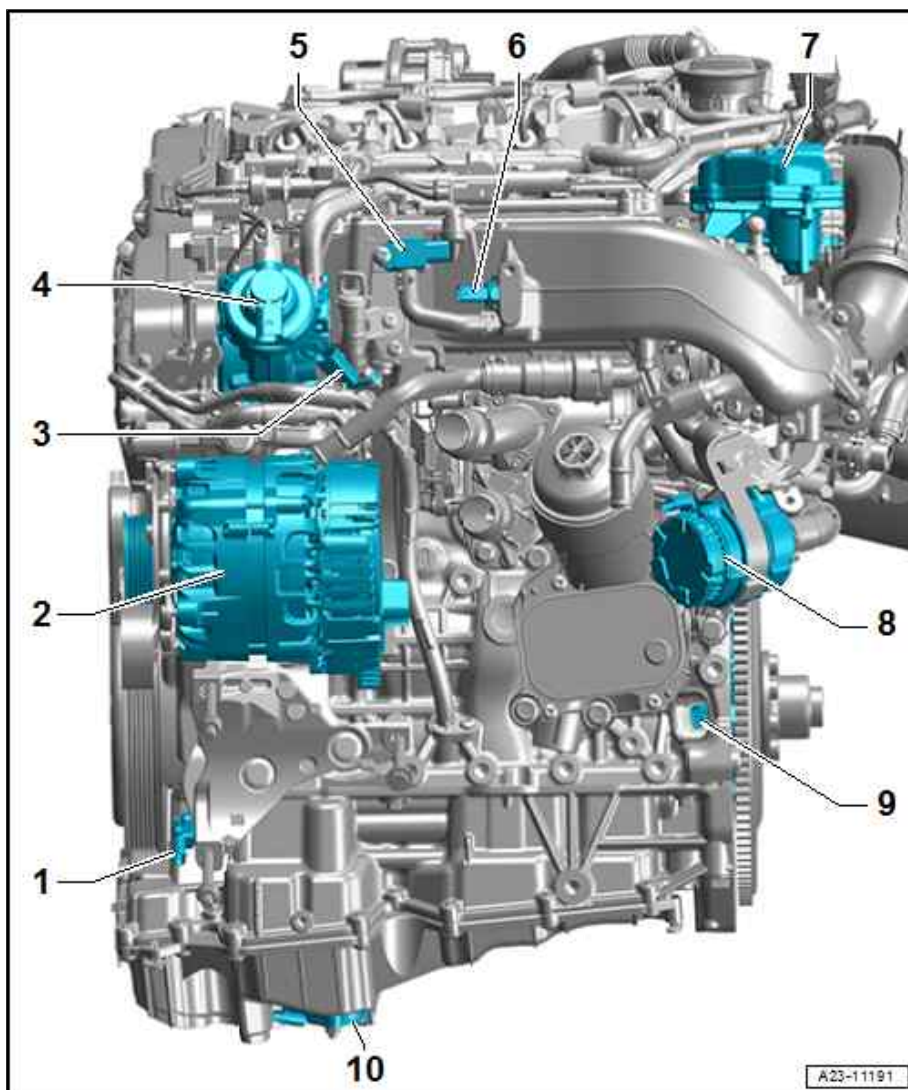
- ❑ Different versions
- ❑ Exploded view ⇒ ["2.2 Exploded view - electric coolant pump", page 62](#)

9 - Engine speed sender - G28-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 28 ; Glow plug system; Exploded view - glow plug system

10 - Oil level and oil temperature sender - G266-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Exploded view - sump/oil pump



Overview of fitting locations - engine (left-side), part 2



1 - Oil pressure sender - G10-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 17 ; Oil filter/oil pressure switches; Exploded view - oil filter housing/oil pressure switches

2 - Actuator for engine temperature regulation - N493-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - coolant temperature senders

3 - Engine temperature sender 2 - G652-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - coolant temperature senders

4 - Engine temperature sender - G27-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - coolant temperature senders

5 - Glow plug 1 - Q10-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 28 ; Glow plug system; Exploded view - glow plug system

6 - Glow plug 2 - Q11-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 28 ; Glow plug system; Exploded view - glow plug system

7 - Hall sender - G40- (camshaft position sensor)

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 28 ; Glow plug system; Exploded view - glow plug system

8 - Glow plug 3 - Q12-

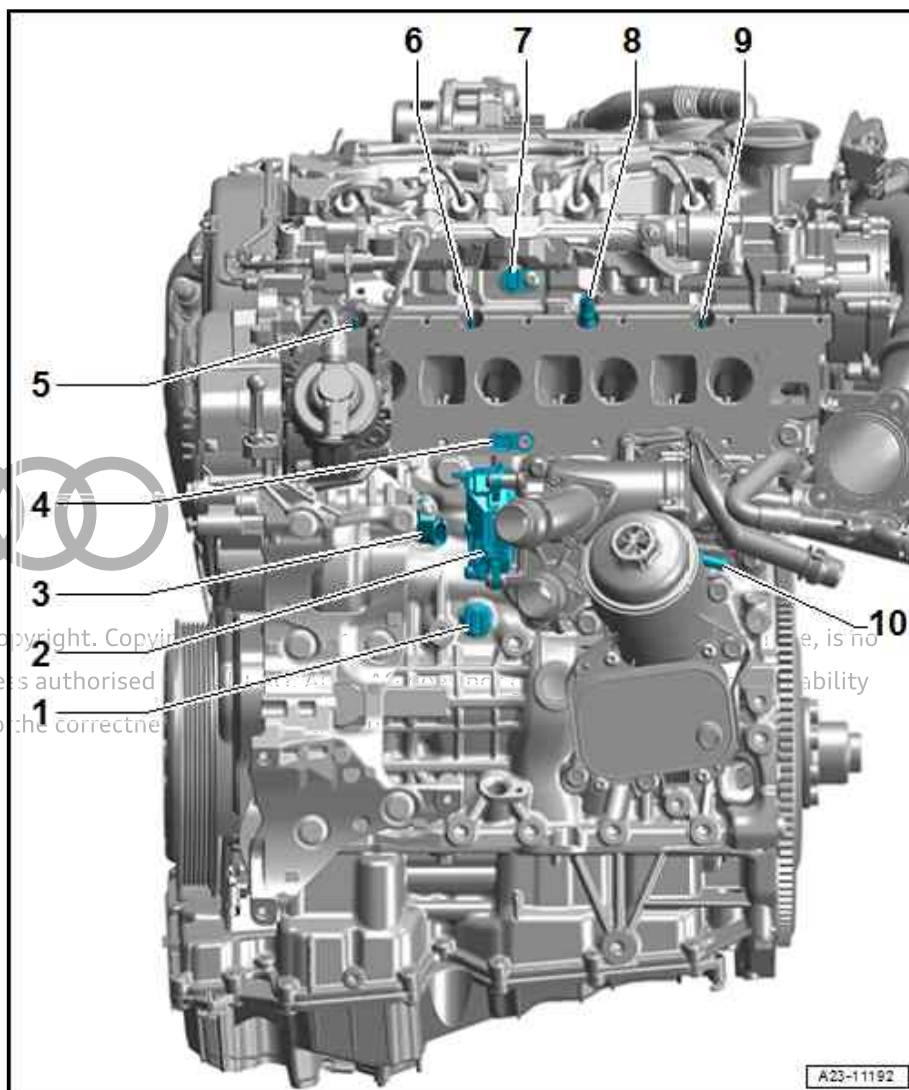
- ❑ With cylinder 3 combustion chamber pressure sender - G679-
- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 28 ; Glow plug system; Exploded view - glow plug system

9 - Glow plug 4 - Q13-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 28 ; Glow plug system; Exploded view - glow plug system

10 - Piston cooling jet control valve - N522-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 17 ; Oil filter/oil pressure switches; Exploded view - oil filter housing/oil pressure switches



Overview of fitting locations - engine (right-side)



1 - Heating element for crankcase breather - N79-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Exploded view - turbocharger

2 - Control unit for turbocharger 1 - J724-

- ❑ Different versions
- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Exploded view - turbocharger

3 - Exhaust gas temperature sender 2 - G448-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas temperature control; Exploded view - exhaust gas temperature control

4 - Lambda probe 1 before catalytic converter - GX10-

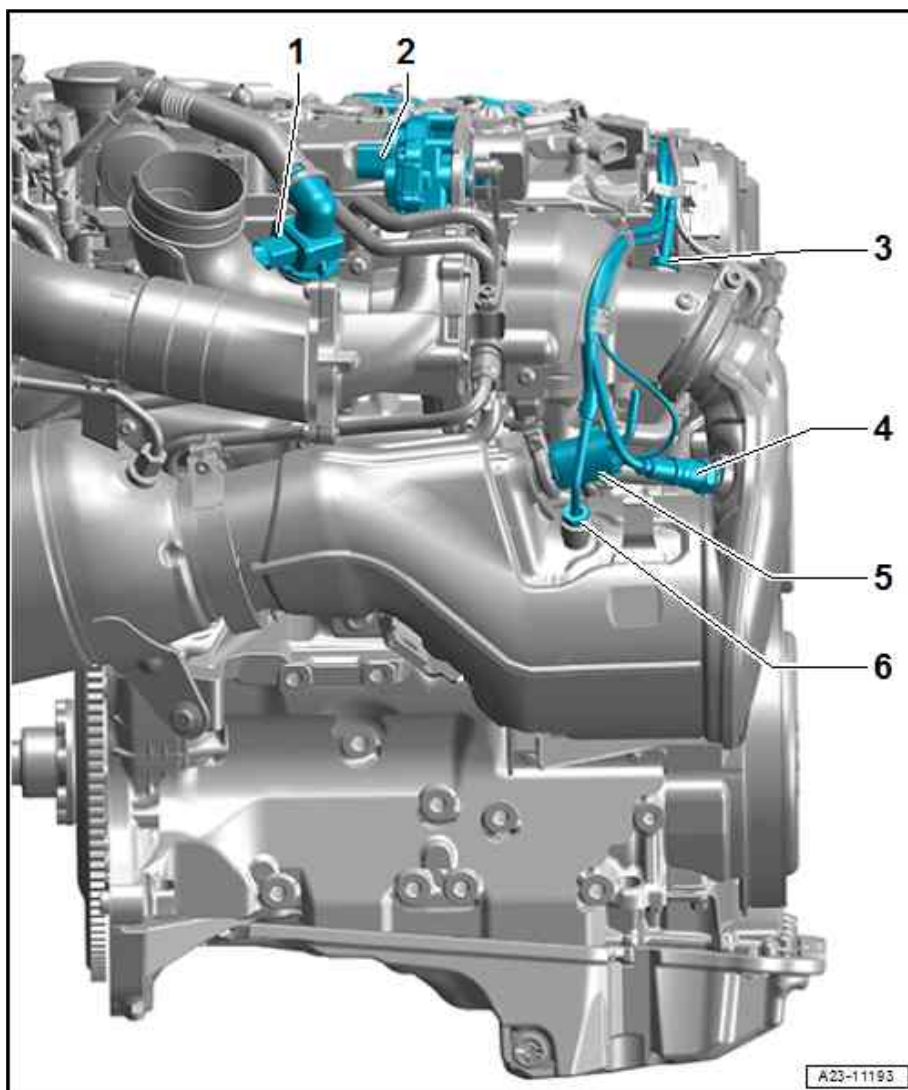
- ❑ with
- ◆ Lambda probe - G39-
- ◆ Lambda probe heater - Z19-
- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Lambda probe; Exploded view - Lambda probe

5 - Injector for reducing agent - N474-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 26 ; SCR (selective catalytic reduction) system; Exploded view - reducing agent supply line

6 - Exhaust gas temperature sender 3 - G495-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas temperature control; Exploded view - exhaust gas temperature control



Overview of fitting locations - engine (view from above)



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1 - Injector, cylinder 1 - N30-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Exploded view - injectors

2 - Injector, cylinder 2 - N31-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Exploded view - injectors

3 - Injector, cylinder 3 - N32-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Exploded view - injectors

4 - Injector, cylinder 4 - N33-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Exploded view - injectors

5 - Fuel pressure regulating valve - N276-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Exploded view - high-pressure reservoir (rail)

6 - Throttle valve module - GX3-

- ❑ With throttle valve module - J338-
- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Exploded view - intake manifold

7 - Charge air temperature sender after charge air cooler - G811-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Exploded view - charge air system

8 - Fuel pressure sender for low pressure - G410-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Exploded view - high-pressure reservoir (rail)

9 - Fuel pressure sender - G247-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Exploded view - high-pressure reservoir (rail)

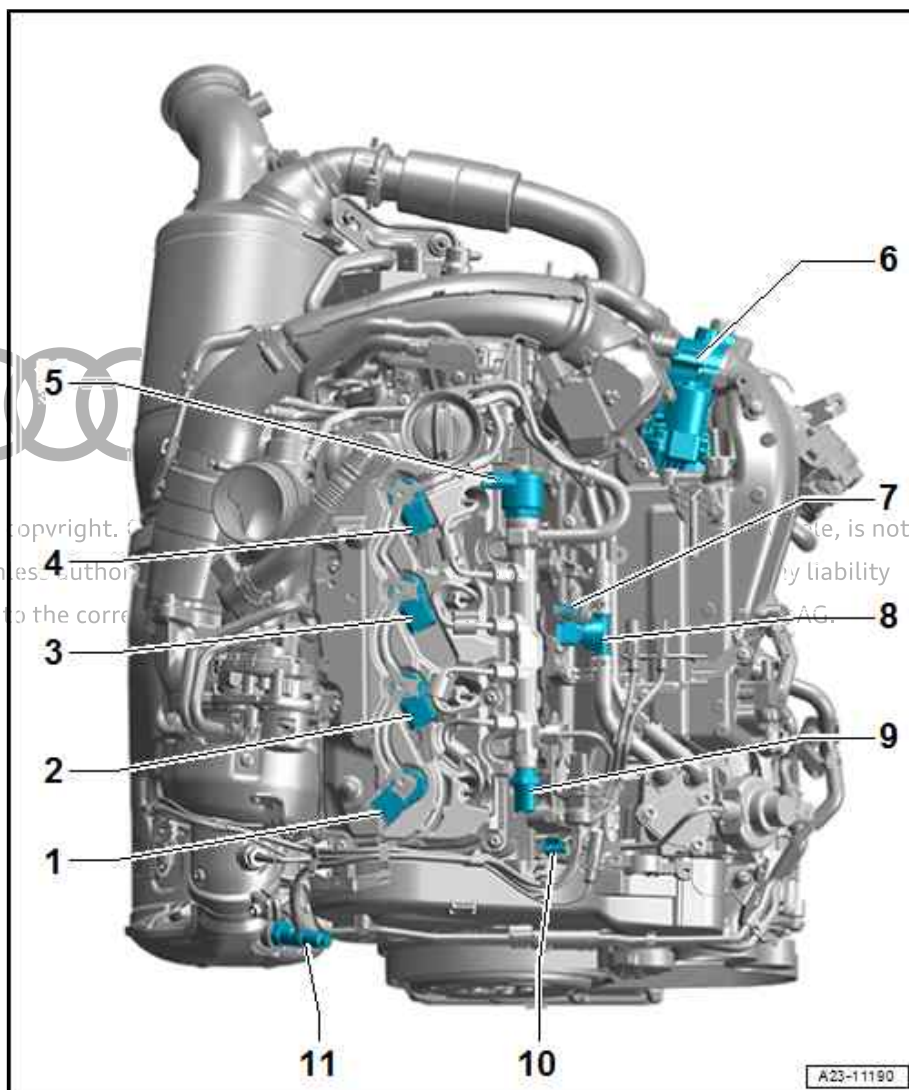
10 - Coolant valve for cylinder head - N489-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - coolant pump/thermostat

11 - Control unit for NOx sender - GX30-

- ❑ with

◆ NOx sender - G295-





◆ Control unit for NOx sender - J583-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Lambda probe; Exploded view - Lambda probe

12 - Exhaust gas temperature sender 1 - G235-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas temperature control; Exploded view - exhaust gas temperature control

Overview of fitting locations - engine (rear)

1 - Exhaust gas pressure sensor 1 - G450-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Lambda probe; Exploded view - Lambda probe

2 - Exhaust gas recirculation valve 2 - GX6-

- ❑ with

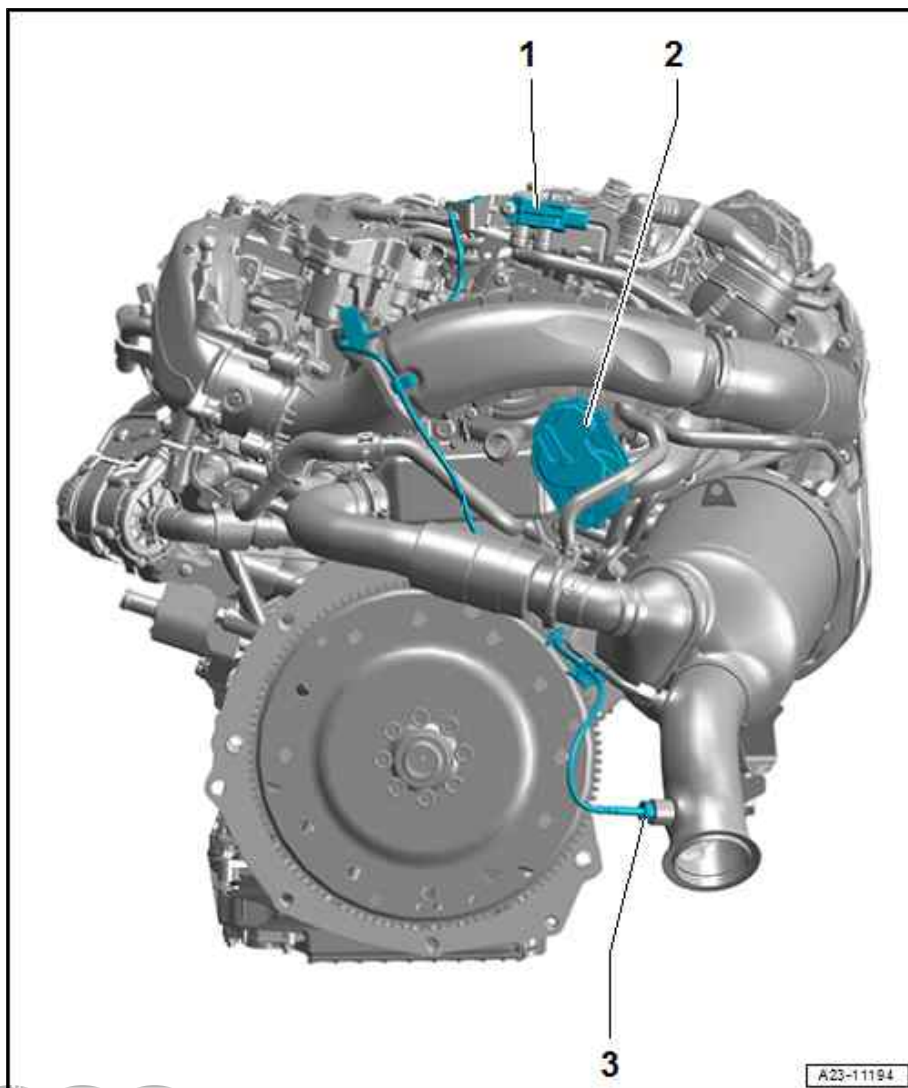
◆ Exhaust gas recirculation potentiometer 2 - G466-

◆ Exhaust gas recirculation control motor 2 - V339-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas recirculation; Exploded view - exhaust gas recirculation

3 - Exhaust gas temperature sender 4 - G648-

- ❑ Exploded view ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas temperature control; Exploded view - exhaust gas temperature control



1.3 Filling and bleeding fuel system

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Injection system; Filling and bleeding fuel system .

1.4 Checking fuel system for leaks

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Injection system; Checking fuel system for leaks .



2 Air cleaner

⇒ [“2.1 Exploded view - air cleaner housing”, page 99](#)

⇒ [“2.2 Removing and installing air cleaner housing”, page 100](#)

2.1 Exploded view - air cleaner housing

1 - Support

- ☐ For air cleaner housing

2 - Water drain

- ☐ Clean

3 - Air cleaner (bottom section)

- ☐ Remove any salt deposits or dirt
- ☐ Removing and installing
⇒ [“2.2 Removing and installing air cleaner housing”, page 100](#)

4 - Not fitted

5 - Bolt

- ☐ Thread-forming
- ☐ Fit and screw in bolt by hand so that it is screwed into old thread. Then tighten bolt to torque
- ☐ 3.5 Nm

6 - Air cleaner (top section)

- ☐ Remove any salt deposits or dirt
- ☐ Removing and installing
⇒ Maintenance ; Booklet 830 ; Maintenance; Air cleaner: renewing filter element and cleaning housing

7 - Bolt

- ☐ Thread-forming
- ☐ Fit and screw in bolt by hand so that it is screwed into old thread. Then tighten bolt to torque
- ☐ 3.5 Nm

8 - Air pipe

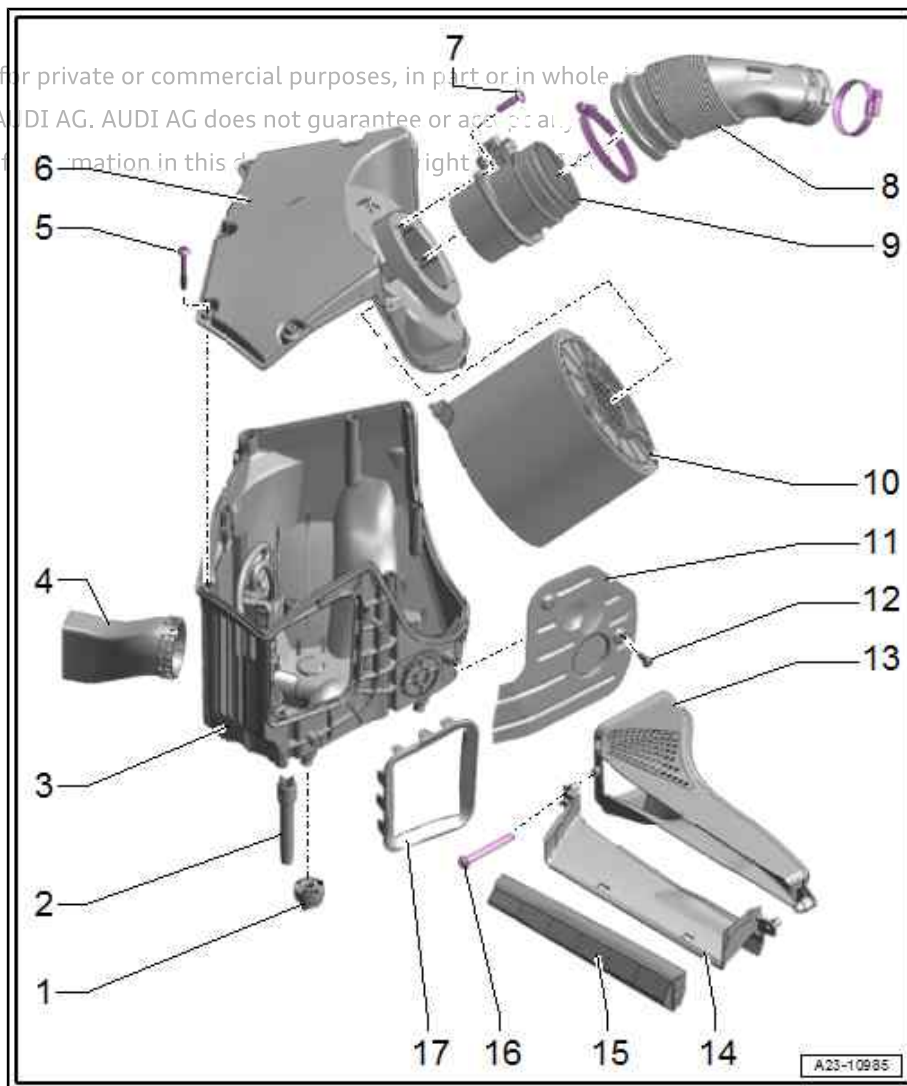
- ☐ Observe installation markings; fit on connection of turbocharger before fitting on air mass meter
- ☐ 3.5 Nm

9 - Air mass meter - G70-

- ☐ Removing and installing ⇒ [page 107](#)

10 - Air filter element

- ☐ Use genuine air filter element ⇒ Electronic parts catalogue
- ☐ Change intervals ⇒ Maintenance tables
- ☐ Removing and installing ⇒ Maintenance ; Booklet 830 ; Maintenance; Air cleaner: renewing filter element and cleaning housing





11 - Heat shield

12 - Bolt

- ☐ Thread-forming
- ☐ Fit and screw in bolt by hand so that it is screwed into old thread. Then tighten bolt to torque
- ☐ 1.5 Nm

13 - Air duct

- ☐ On lock carrier
- ☐ Remove any salt deposits or dirt

14 - Air duct

- ☐ On lock carrier
- ☐ Remove any salt deposits or dirt

15 - Snow screen

- ☐ Equipment version

16 - Bolt

- ☐ Thread-forming
- ☐ Fit and screw in bolt by hand so that it is screwed into old thread. Then tighten bolt to torque
- ☐ 2.5 Nm

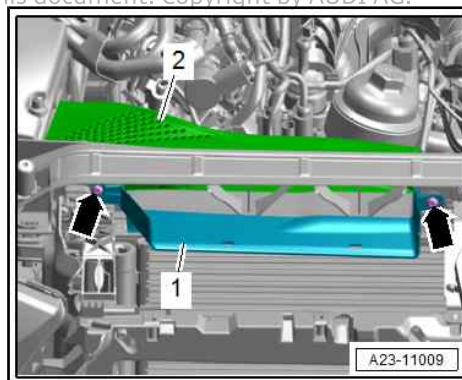
17 - Sealing element

2.2 Removing and installing air cleaner housing

Removing

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- Remove lock carrier cover ➤ General body repairs, exterior, Rep. gr. 63 ; Bumper (front); Exploded view - bumper cover .
- Remove bolts -arrows- and detach air duct -2-.



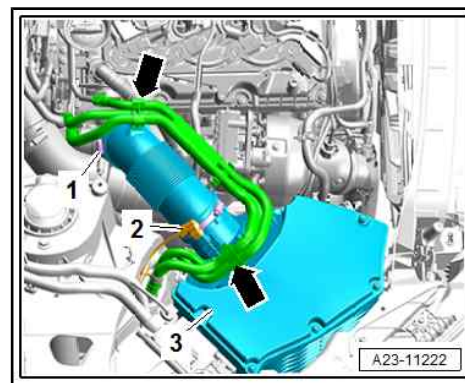


- Move retaining clips -arrows- clear with fuel hoses and press to one side.
- Release hose clip -1- and disconnect air hose.
- Unplug electrical connector -2- for air mass meter - G70- .
- Lift off air cleaner housing -3- and detach.

Installing

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

- If the air cleaner housing is being renewed and an air cleaner housing without air filter bypass flap valve - N275- is being fitted, the electrical connector at the wiring harness must be tied back and the vacuum line must be sealed off.
- The air cleaner housing must always be clean.
- To prevent malfunctions, cover critical parts of the engine air intake (air mass meter, air pipes, etc.) with a clean cloth when blowing out the air cleaner housing with compressed air.
- Hose connections and air pipes/hoses must be free of oil and grease prior to fitting.
- Use silicone-free lubricant when fitting air hoses.
- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .
- Check air pipe for salt residue, dirt and leaves.
- First fit air pipe on connection of turbocharger, then fit on air mass meter
- Check air duct leading from lock carrier to air cleaner housing for dirt and leaves.
- Install lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Exploded view - bumper cover .



Tightening torques

- ◆ ⇒ [“2.1 Exploded view - air cleaner housing”, page 99](#)
- ◆ ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Exploded view - hose connections for charge air system



3 Intake manifold

⇒ [“3.1 Exploded view - intake manifold”, page 102](#)

⇒ [“3.2 Removing and installing throttle valve module J338”, page 102](#)

⇒ [“3.3 Removing and installing intake manifold”, page 102](#)

3.1 Exploded view - intake manifold

All components are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Exploded view - intake manifold .

3.2 Removing and installing throttle valve module - J338-

Component designation in current flow diagram: throttle valve module - GX3-

Removing

- Remove plenum chamber partition panel ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber partition panel .

All further procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Removing and installing throttle valve module - J338- .

Installing

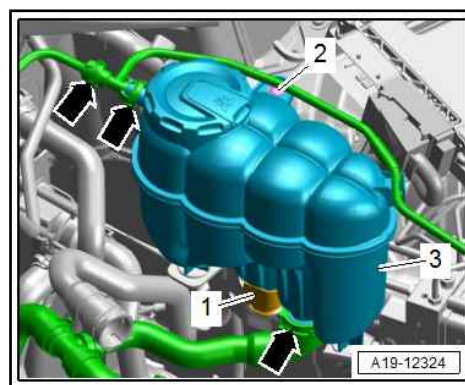
Additional work:

- Install plenum chamber partition panel ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber partition panel .

3.3 Removing and installing intake manifold

Removing

- Drain coolant
⇒ [“1.3 Draining and filling cooling system”, page 52](#) .
- Move electrical wiring harness clear.
- Lift retaining clips -arrows-, disconnect coolant hoses and move them clear.
- Unplug electrical connector -1- for coolant shortage indicator switch - F66- .
- Unscrew bolt -3- and detach coolant expansion tank.

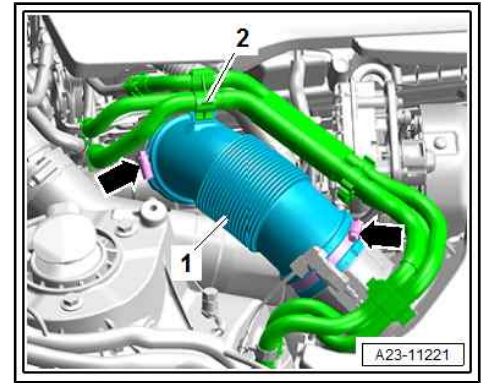


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- Move fuel hoses clear at retaining clip -2-.
- Release screw-type clips -arrows- and detach air pipe -1-.

All further procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Removing and installing intake manifold .





4 Injectors/high-pressure reservoir (rail)

⇒ [“4.1 Exploded view - injectors”, page 104](#)

⇒ [“4.2 Exploded view - high-pressure reservoir \(rail\)”, page 104](#)

⇒ [“4.3 Checking injectors”, page 104](#)

⇒ [“4.4 Removing and installing injectors”, page 104](#)

⇒ [“4.5 Removing and installing high-pressure pipes”, page 104](#)

⇒ [“4.6 Removing and installing high-pressure reservoir \(rail\)”,
page 105](#)

4.1 Exploded view - injectors

All components are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Exploded view - injectors .

4.2 Exploded view - high-pressure reservoir (rail)

All components are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Exploded view - high-pressure reservoir (rail) .

4.3 Checking injectors

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Checking injectors .

- ◆ Performing adaption of correction values for injectors
- ◆ Checking for injectors sticking open
- ◆ Checking return flow rate of injectors with engine running
- ◆ Checking return flow rate of injectors at starter cranking speed

4.4 Removing and installing injectors

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Removing and installing injectors .

4.5 Removing and installing high-pressure pipes

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Removing and installing high-pressure pipes .

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4.6 Removing and installing high-pressure reservoir (rail)

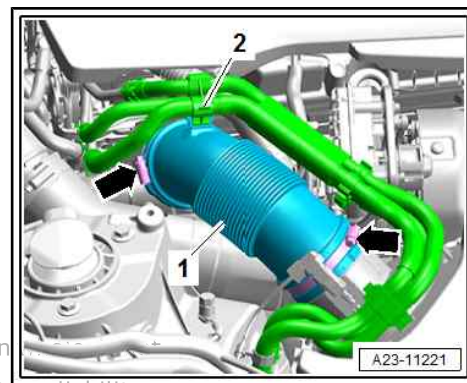
Removing

- Move fuel hoses clear at retaining clip -2-.
- Release screw-type clips -arrows- and detach air pipe -1-.

All further procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Removing and installing high-pressure reservoir (rail) .

Tightening torques

- ◆ ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Exploded view - hose connections for charge air system





5 High-pressure pump

All procedures and components are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; High-pressure pump .



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6 Senders and sensors

⇒ "6.1 Removing and installing air mass meter G70 ", page 107

⇒ "6.2 Removing and installing fuel temperature sender G81 ", page 108

⇒ "6.3 Removing and installing fuel pressure sender G247 ", page 108

⇒ "6.4 Checking fuel pressure regulating valve N276 ", page 108

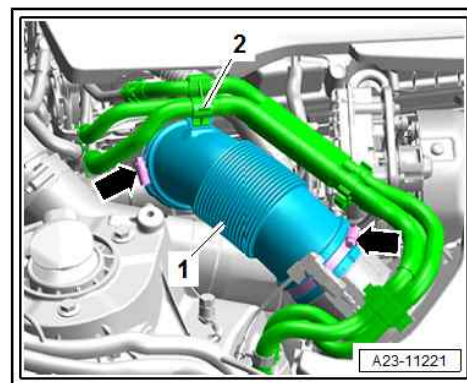
⇒ "6.5 Removing and installing fuel pressure regulating valve N276 ", page 108

⇒ "6.6 Removing and installing pressure differential sender G505 ", page 108

6.1 Removing and installing air mass meter - G70-

Removing

- Remove engine cover panel ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 10 ; Engine cover panel; Removing and installing engine cover panel .
- Move fuel hoses clear at retaining clip -2-.
- Release hose clips -arrows- and detach air pipe -1-.



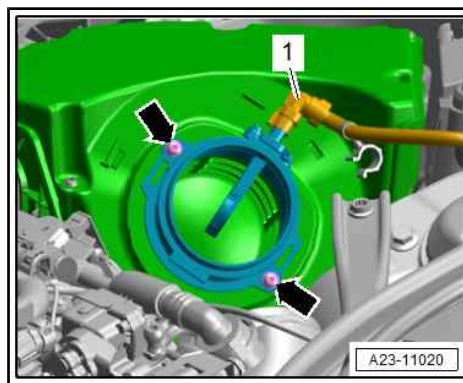


- Unplug electrical connector -1-.
- Unscrew bolts -arrows- and detach air mass meter - G70- .

Installing

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

- If the air filter element is very dirty or wet, dirt particles or water can reach the air mass meter and falsify the detected air mass values. This will cause a loss of power as the calculated injection quantities will be too low.
- Check air filter element and inside of air cleaner housing for dirt; clean if necessary ⇒ Maintenance ; Booklet 830 ; Maintenance work; Air cleaner: renewing filter element and cleaning housing .
- Hose connections and air pipes/hoses must be free of oil and grease prior to fitting.
- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .
- Install engine cover panel ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 10 ; Engine cover panel; Removing and installing engine cover panel .



Tightening torques

- ♦ ⇒ ["2.1 Exploded view - air cleaner housing", page 99](#)
- ♦ ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Exploded view - hose connections for charge air system

6.2 Removing and installing fuel temperature sender - G81-

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Senders and sensors ; Removing and installing fuel temperature sender - G81- .

6.3 Removing and installing fuel pressure sender - G247-

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Senders and sensors; Removing and installing fuel pressure sender - G247- .

6.4 Checking fuel pressure regulating valve - N276-

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Senders and sensors; Checking fuel pressure regulating valve - N276- .

6.5 Removing and installing fuel pressure regulating valve - N276-

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Senders and sensors; Removing and installing fuel pressure regulating valve - N276- .

6.6 Removing and installing pressure differential sender - G505-

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Senders and sensors; Removing and installing pressure differential sender - G505- .



7 Lambda probe

⇒ [“7.1 Exploded view - Lambda probe”, page 109](#)

⇒ [“7.2 Removing and installing Lambda probe”, page 109](#)

⇒ [“7.3 Removing and installing NOx senders”, page 109](#)

7.1 Exploded view - Lambda probe

All components are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Lambda probe; Exploded view - Lambda probe .

7.2 Removing and installing Lambda probe

Removing

- Remove lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Exploded view - bumper cover .
- Remove bolts -arrows- and detach air ducts -1, 2-.

All further procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Lambda probe; Removing and installing Lambda probe .

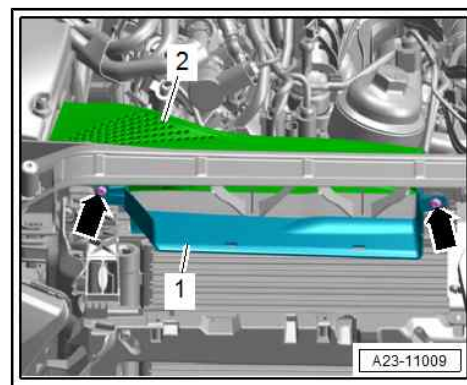
Installing

Additional work:

- Install lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Exploded view - bumper cover .

Tightening torques

- ◆ ⇒ [“2.1 Exploded view - air cleaner housing”, page 99](#)



7.3 Removing and installing NOx senders

⇒ [“7.3.1 Removing and installing NOx sender G295 ”, page 109](#)

⇒ [“7.3.2 Removing and installing NOx sender 2 G687 ”, page 110](#)

7.3.1 Removing and installing NOx sender - G295-

Removing

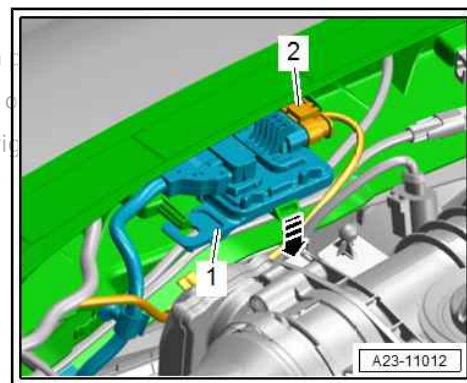
- Remove engine cover panel ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 10 ; Engine cover panel; Removing and installing engine cover panel .
- Unplug electrical connector -2-.
- Release fastener -arrow-, detach control unit for NOx sender J583- -item 1- and move it clear.

All further procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Lambda probe ; Removing and installing NOx senders.

Installing

Additional work:

- Install lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Exploded view - bumper cover .





7.3.2 Removing and installing NOx sender 2 - G687-

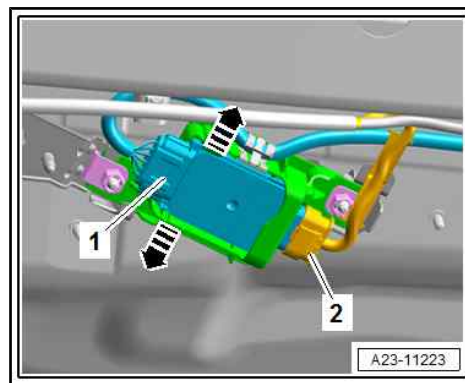
Removing

- Unfasten underbody trim (left-side) and lower it slightly ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim; Exploded view - underbody trim .
- Unplug electrical connector -2-.
- Release fasteners -arrows- and move control unit for NOx sender 2 - J881- clear.

All further procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 23 ; Lambda probe ; Removing and installing NOx senders.

Tightening torques

- ♦ ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim; Exploded view - underbody trim



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8 Engine control unit

⇒ ["8.1 Exploded view - engine control unit", page 111](#)

⇒ ["8.2 Removing and installing engine control unit J623 ", page 111](#)

8.1 Exploded view - engine control unit

1 - Bolt

- 9 Nm

2 - Mounting

- For engine control unit - J623-

3 - Engine control unit - J623-

- Removing and installing
⇒ [page 111](#)

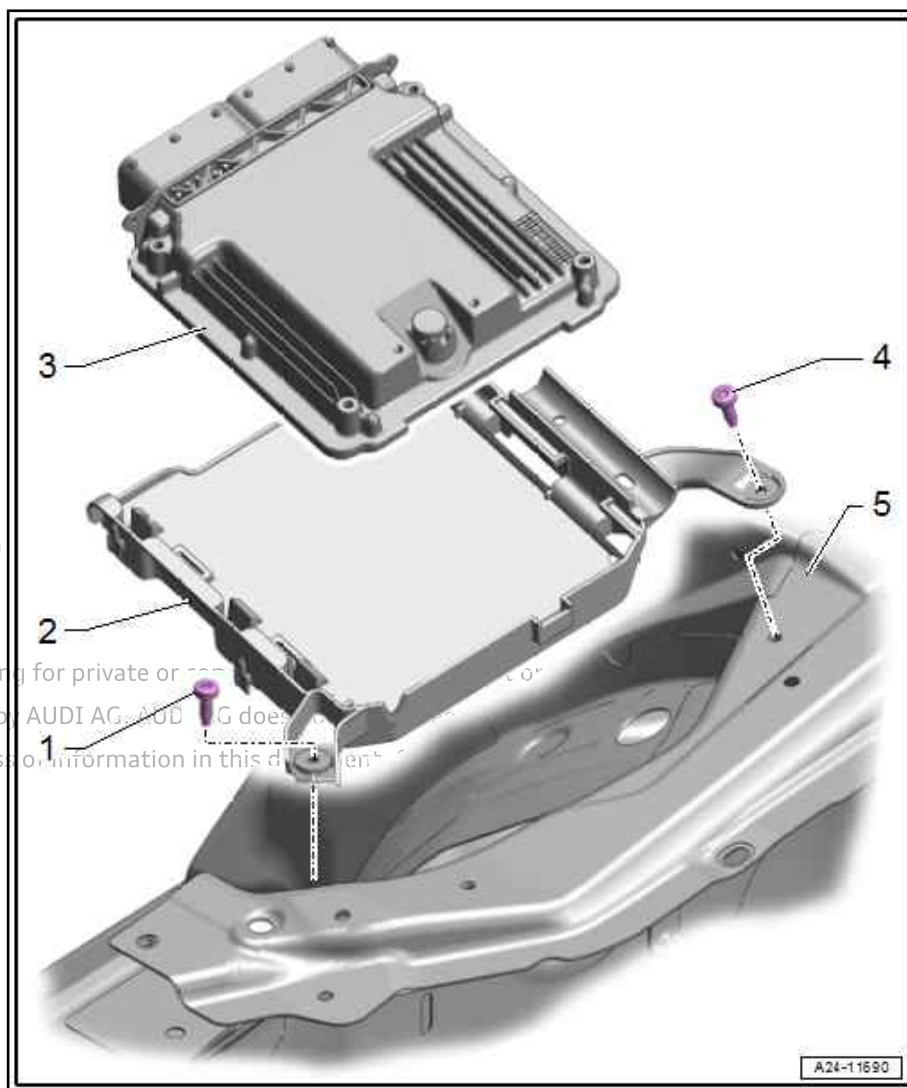
4 - Bolt

- 9 Nm

5 - Suspension turret



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8.2 Removing and installing engine control unit - J623-

Special tools and workshop equipment required

- ◆ Vehicle diagnostic tester

Removing

- If the engine control unit - J623- is renewed, the adaption values must be read out and stored before the engine control unit - J623- is removed.
- Connect ⇒ Vehicle diagnostic tester.
- Select **Diagnosis** mode and then **Start diagnosis**.



- Choose **Select own test** tab and select following options one after the other:

- ◆ **Self-diagnosis compatible systems**

- ◆ **0001 - Engine electronics**

- ◆ **0001 - Engine electronics, functions**

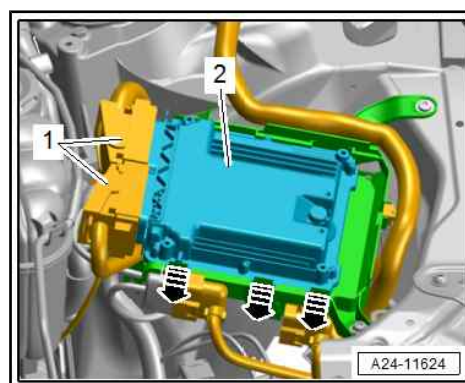
- ◆ **0001 - Adapt learnt values - after component re-placement**

- Switch off ignition and remove ignition key after storing electronic file containing adaption values.
- If the adaption values of the injectors cannot be read out of the old (defective) engine control unit, the adaption values must be entered into the new engine control unit manually and the adaption procedure must be performed accordingly.
- Release catches -arrows- and detach engine control unit - J623- -item 2-.
- Unplug electrical connectors -1-.

Installing

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

After renewing component, perform required adaptations using
⇒ Vehicle diagnostic tester ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair instructions .





26 – Exhaust system

1 Exhaust pipes/silencer

⇒ [“1.1 Exploded view - silencer”, page 113](#)

⇒ [“1.2 Removing and installing front exhaust pipe”, page 114](#)

⇒ [“1.3 Separating exhaust pipes/silencer”, page 115](#)

⇒ [“1.4 Removing and installing silencer”, page 116](#)

⇒ [“1.5 Stress-free alignment of exhaust system”, page 117](#)

⇒ [“1.6 Checking exhaust system for leaks”, page 117](#)

1.1 Exploded view - silencer

- Observe safety precautions when working on exhaust system
⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 00 ;
Safety precautions .

1 - Clamp (rear)

- ☐ To enable individual renewal of silencer and exhaust pipe
- ☐ Before tightening, align exhaust system so it is free of stress
⇒ [page 117](#)
- ☐ Installation position
⇒ [page 114](#)
- ☐ Tighten screw connections evenly to 23 Nm

2 - Bolt

- ☐ 23 Nm

3 - Bracket

4 - Rubber mounting

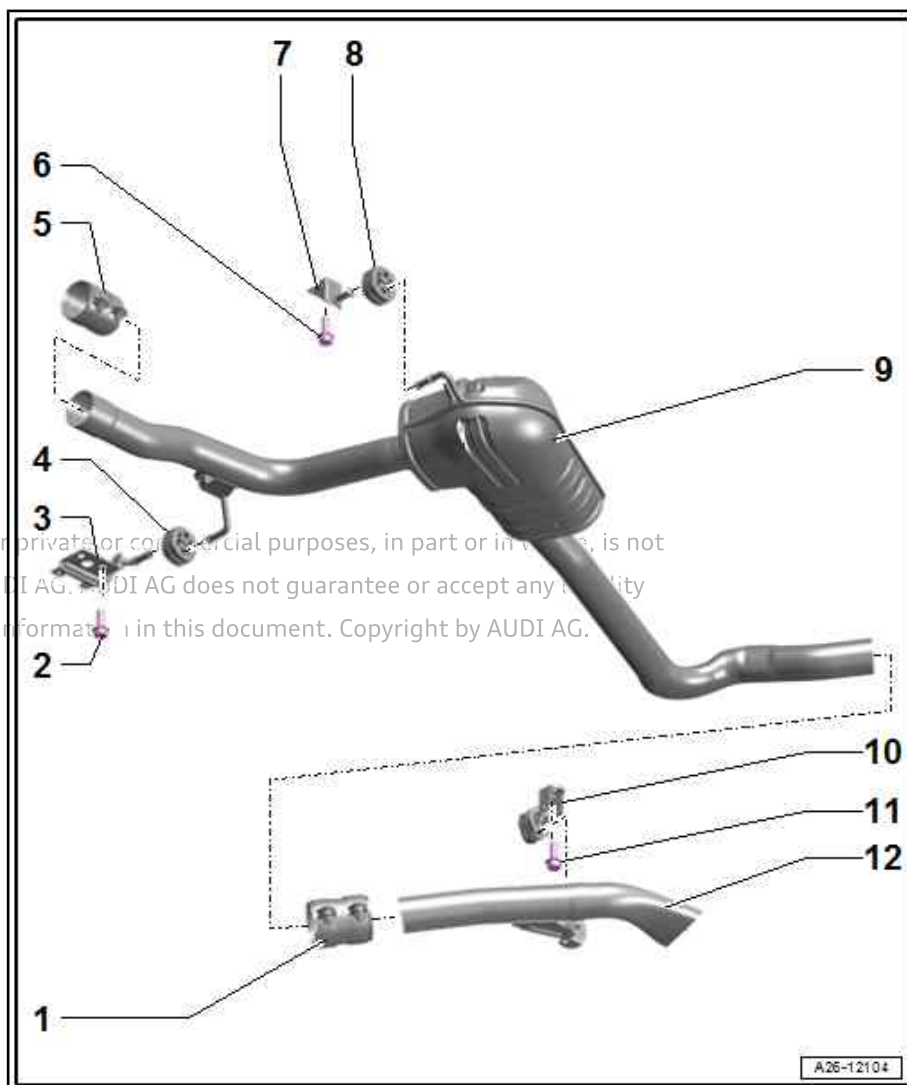
- ☐ Renew if damaged
- ☐ Red-coloured mounting must be renewed after it has been pulled off
- ☐ Align exhaust system so it is free of stress
⇒ [page 117](#)

5 - Clamp (front)

- ☐ Before tightening, align exhaust system so it is free of stress
⇒ [page 117](#)
- ☐ Installation position
⇒ [page 114](#)
- ☐ Tighten screw connections evenly to 23 Nm

6 - Bolt

- ☐ 23 Nm





7 - Bracket

8 - Rubber mounting

- ☐ Renew if damaged
- ☐ Red-coloured mounting must be renewed after it has been pulled off
- ☐ Align exhaust system so it is free of stress ➔ [page 117](#)

9 - Silencer

- ☐ Cutting point between silencer and exhaust pipe ➔ [page 115](#)
- ☐ Removing and installing ➔ [page 116](#)
- ☐ Align exhaust system so it is free of stress ➔ [page 117](#)

10 - Mounting

- ☐ Renew if damaged
- ☐ Red-coloured mounting must be renewed after it has been pulled off
- ☐ Align exhaust system so it is free of stress ➔ [page 117](#)

11 - Bolt

- ☐ 23 Nm

12 - Exhaust pipe

Installation position - clamp

- Fit clamp in position shown.
- Bolt connections face to left
- Nuts face downwards.
- Install clamp so that ends of bolts do not protrude beyond bottom of clamp -arrow-.

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1.2 Removing and installing front exhaust pipe

Removing

- Remove noise insulation (rear) ➔ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .

⚠ CAUTION

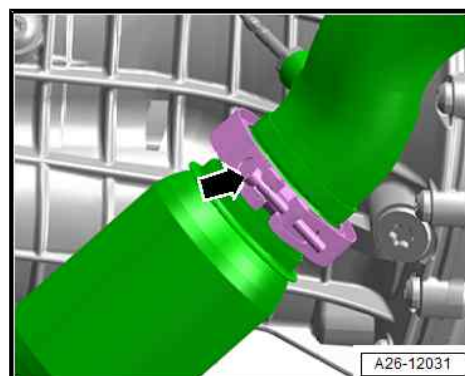
Risk of injury caused by soot particles in the air.
Eyes and skin can suffer irritation or injuries.

- Put on safety goggles.
- Put on protective gloves.

- Release screw-type clip -arrow-.

Note:

To loosen screw-type clip, lock two nuts on threaded shaft of screw and loosen screw.





NOTICE

Risk of damage to flexible joint if handled incorrectly.

- Do not bend flexible joint more than 10°.
- Install flexible joint so that it is not under tension.
- Remove nuts -arrows- and bolts -1- and detach front exhaust pipe.

Installing

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

- Renew seals, gaskets, nuts and screw-type clip after removal.
- To install, turn screw-type clip so that screw head is accessible from below. When doing so, ensure that there is enough clearance from the surrounding components.
- Align the exhaust system so it is free of stress ⇒ [page 117](#) .

Tightening torques

- ◆ ⇒ [“1.1 Exploded view - silencer”, page 113](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation

1.3 Separating exhaust pipes/silencer

- ◆ The connecting pipe can be cut through at the cutting point provided in order to renew the silencer and exhaust pipe separately.
- ◆ The cutting point is marked by an indentation on the circumference of the exhaust pipe.

Special tools and workshop equipment required

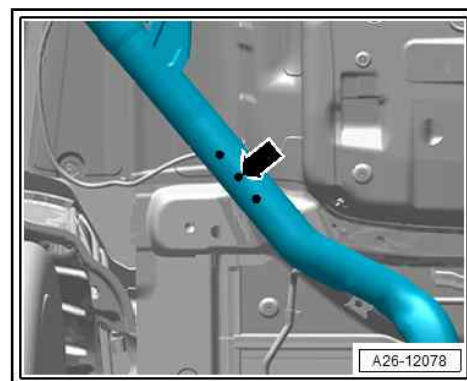
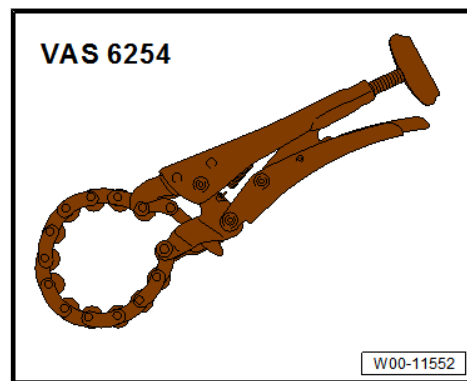
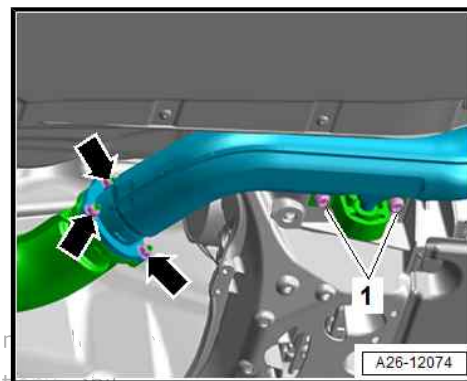
- ◆ Chain pipe cutter - VAS 6254-

Procedure

CAUTION

Risk of injury caused by soot particles in the air.
Eyes and skin can suffer irritation or injuries.

- Put on safety goggles.
- Put on protective gloves.
- Cut through exhaust pipe at right angle at centre notch -arrow- using chain pipe cutter - VAS 6254- .

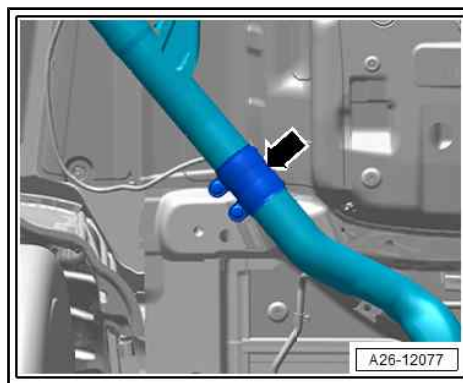




- Position centre of clamp -arrow- over cutting location.
- Fit clamp ⇒ [page 114](#) .
- Align the exhaust system so it is free of stress ⇒ [page 117](#) .

Tightening torques

- ♦ ⇒ [“1.1 Exploded view - silencer”, page 113](#)



1.4 Removing and installing silencer

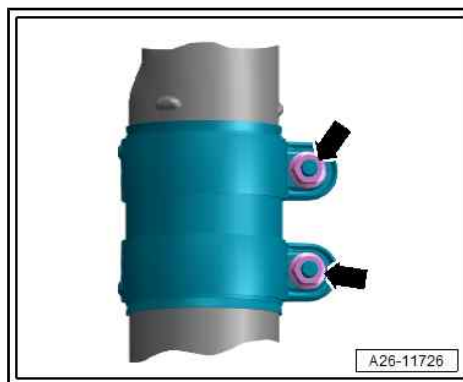
Removing

⚠ CAUTION

Risk of injury caused by soot particles in the air.

Eyes and skin can suffer irritation or injuries.

- Put on safety goggles.
 - Put on protective gloves.
-
- Loosen clamp -arrows- and push towards rear.
 - Tie up front exhaust pipe with trap catalytic converter.
 - Remove tunnel cross-piece ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim; Exploded view - underbody struts .



Note

- A second mechanic is required for removal of the silencer.
- Unscrew bolts -1, 3- and remove silencers.

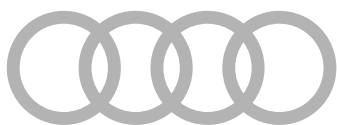
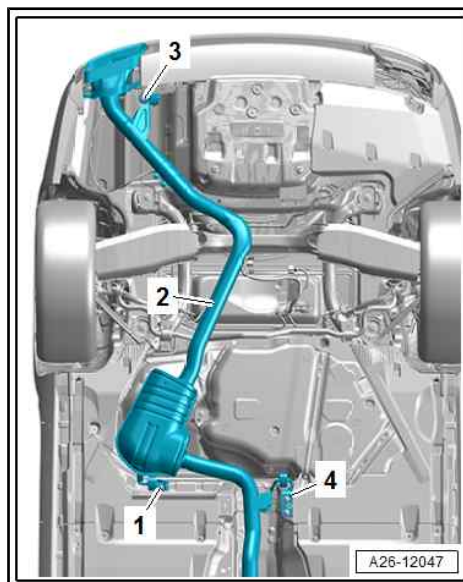
Installing

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

- Renew seals and nuts after removing.
- Align the exhaust system so it is free of stress ⇒ [page 117](#) .

Tightening torques

- ♦ ⇒ [“1.1 Exploded view - silencer”, page 113](#)
- ♦ ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim



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1.5 Stress-free alignment of exhaust system

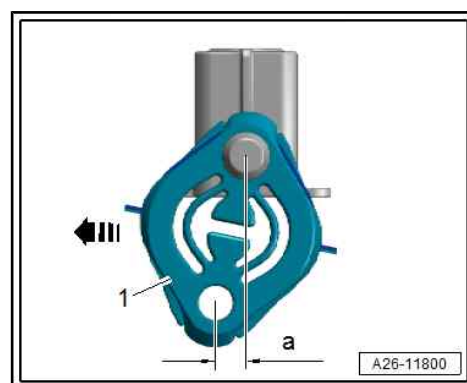
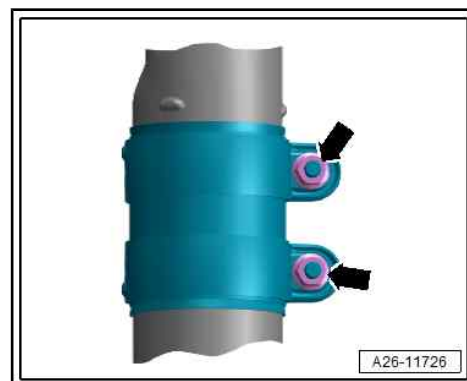
Procedure

- The exhaust system must be aligned when it is cool.

CAUTION

Risk of injury caused by soot particles in the air.
Eyes and skin can suffer irritation or injuries.

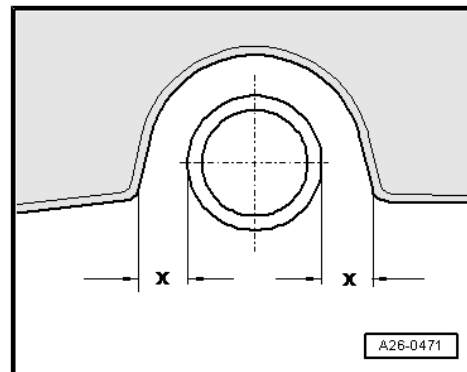
- Put on safety goggles.
 - Put on protective gloves.
-
- Slacken front clamp -arrows-.
-
- Push exhaust system towards front of vehicle -arrow- so that mounting for exhaust pipe is preloaded by -a- = 6 ... 10 mm.
 - Position clamp at front ➔ [page 114](#) and tighten bolted connections evenly.



- Check clearance between tailpipes and bumper:
- Dimension -x- (left-side) = dimension -x- (right-side)

Tightening torques

- ◆ ➔ ["1.1 Exploded view - silencer", page 113](#)



1.6 Checking exhaust system for leaks

All procedures are described in ➔ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust pipes/silencers; Checking exhaust system for leaks .



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2 Emission control system

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⇒ ["2.1 Exploded view - emission control system", page 118](#) does not guarantee or accept any liability

⇒ ["2.2 Removing and installing catalytic converter", page 118](#) of this document. Copyright by AUDI AG.

⇒ ["2.3 Removing and installing particulate filter", page 118](#)

⇒ ["2.4 Removing and installing trap catalytic converter", page 118](#)

⇒ ["2.5 Removing and installing exhaust flap control unit J883 ", page 118](#)

2.1 Exploded view - emission control system

All components are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 26 ; Emission control system; Exploded view - emission control system .

2.2 Removing and installing catalytic converter

Removing

- Remove plenum chamber partition panel ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber partition panel .

All further procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 26 ; Emission control system; Removing and installing catalytic converter .

Installing

Additional work:

- Install plenum chamber partition panel ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber partition panel .

2.3 Removing and installing particulate filter

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 26 ; Emission control system; Removing and installing particulate filter

2.4 Removing and installing trap catalytic converter

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 26 ; Emission control system ; Removing and installing trap catalytic converter.

2.5 Removing and installing exhaust flap control unit - J883-

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 26 ; Emission control system; Removing and installing exhaust flap control unit - J883- .



3 SCR (selective catalytic reduction) system

⇒ ["3.1 Exploded view - reducing agent tank", page 119](#)

⇒ ["3.2 Exploded view - reducing agent supply line", page 120](#)

⇒ ["3.3 Draining reducing agent tank", page 120](#)

⇒ ["3.4 Removing and installing reducing agent tank", page 121](#)

⇒ ["3.5 Removing and installing injector for reducing agent N474", page 123](#)

⇒ ["3.6 Removing and installing control unit for reducing agent metering system J880", page 123](#)

⇒ ["3.7 Removing and installing reducing agent quality sensor G849", page 124](#)

3.1 Exploded view - reducing agent tank

1 - Bolt

- ☐ 2 Nm

2 - Reducing agent quality sensor - G849-

- ☐ Depending on vehicle equipment
- ☐ Removing and installing ⇒ [page 124](#)

3 - Seal

- ☐ Renew after removing

4 - Reducing agent tank

- ☐ With delivery unit for reducing agent metering system - GX19-
- ☐ The following components are integrated in the delivery unit for reducing agent metering system - GX19- :

◆ Filter

◆ Tank sender for reducing agent - G684-

◆ Temperature sender for reducing agent - G685-

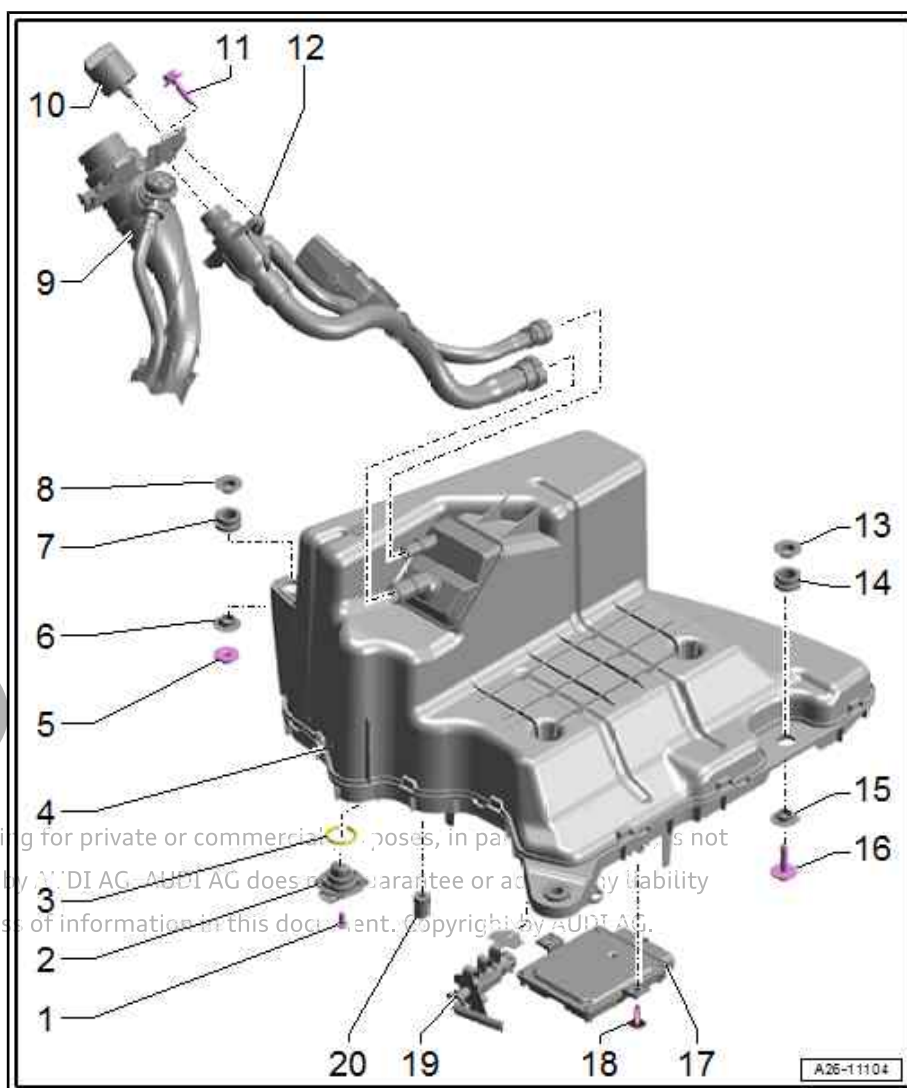
◆ Pressure sender for reducing agent metering system - G686-

◆ Pump for reducing agent - V437-

◆ Heater for reducing agent tank - Z102-

◆ Heater 2 for reducing agent tank (heater circuit 3) - Z167-

- ☐ Fitting location: on rear right under underbody
- ☐ Draining ⇒ [page 120](#)
- ☐ Removing and installing ⇒ [page 121](#)





5 - Nut

- ☐ 20 Nm

6 - Spacer sleeve

7 - Grommet

8 - Spacer sleeve

9 - Filler neck

- ☐ For fuel tank

10 - Filler cap

- ☐ For filler neck for reducing agent tank

11 - Bolt

- ☐ 8 Nm

12 - Filler neck

- ☐ For reducing agent tank

13 - Spacer sleeve

14 - Grommet

15 - Spacer sleeve

16 - Bolt

- ☐ 20 Nm

17 - Control unit for reducing agent metering system - J880-

- ☐ Checking ⇒ Vehicle diagnostic tester
- ☐ Removing and installing ⇒ [page 123](#)
- ☐ After renewing, perform required adaptations using ⇒ Vehicle diagnostic tester and refer to ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair instructions

18 - Bolt

- ☐ 3 Nm

19 - SCR supply line

20 - Sealing plug

- ☐ For drain pipe

3.2 Exploded view - reducing agent supply line

All components are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 26 ; SCR (selective catalytic reduction) system; Exploded view - reducing agent supply line .

3.3 Draining reducing agent tank

Special tools and workshop equipment required

- ◆ Safety goggles
- ◆ Protective gloves

Procedure

- Re-install all cable ties in the same locations when installing.
- Switch off ignition.



Note:

Wait until the reducing agent has been drawn back automatically, because large amounts of reducing agent can escape when the metering line is opened.

It can take up to 10 minutes after the ignition has been switched off for the reducing agent to be drawn back completely.

- Open tank flap.
- Unscrew filler cap -arrow- from filler neck for reducing agent.
- Remove underbody trim (rear right) ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim .

CAUTION

Risk of injury caused by escaping reducing agent

Reducing agent can cause eye and skin irritation, damage to the respiratory tract and poisoning.

- Put on safety goggles.
- Put on protective gloves.
- Wear protective clothing.
- Ensure that there is sufficient fresh air. In enclosed spaces, switch on the exhaust extraction system.



- Place drip tray underneath.
- Press release tab and remove sealing plug -arrow-.
- Allow reducing agent to drain off into drip tray.

Assembling

Assembly is performed in reverse sequence; note the following:

- Seal off drain pipe with sealing plug.

After filling with reducing agent or renewing component, perform required adaptations using ⇒ Vehicle diagnostic tester ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair instructions .



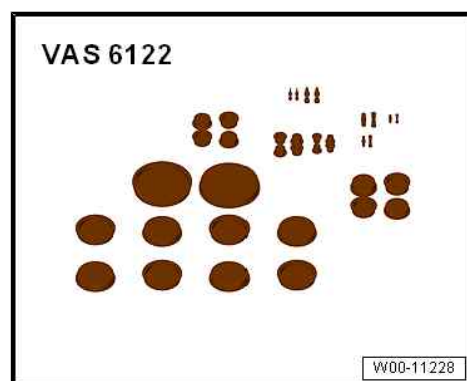
Tightening torques

- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim

3.4 Removing and installing reducing agent tank

Special tools and workshop equipment required

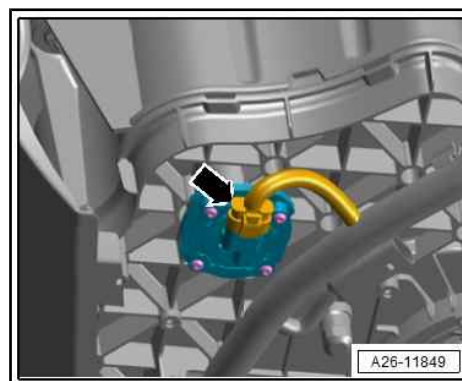
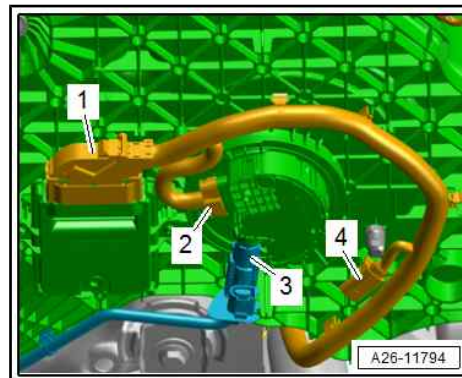
- ◆ Engine bung set - VAS 6122-





Removing

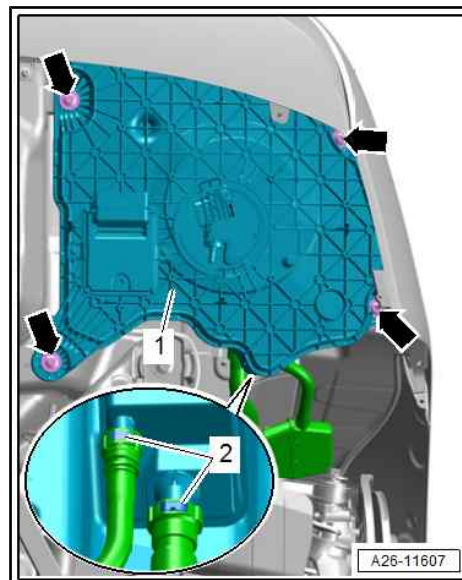
- Drain reducing agent tank ➔ [page 120](#) .
 - Detach rear section of rear right wheel housing liner ➔ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Removing and installing wheel housing liner (rear) .
 - Disconnect SCR supply line -3- and move it clear ➔ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 26 ; SCR (selective catalytic reduction) system; Exploded view - reducing agent supply line .
 - Detach electrical connector -4- from bracket.
 - Unplug electrical connectors -1, 2- and move electrical wiring harness clear.
 - Seal off open lines and connections with plugs (thoroughly cleaned) from engine bung set - VAS 6122- .
-
- Vehicles with reducing agent quality sensor - G849- : Unplug electrical connector -arrow-.



- Unscrew connections -arrows-.
- Lower reducing agent tank -1- slightly.
- Press release tabs on both sides and disconnect hoses -2-.
- Detach reducing agent tank.
- Seal off open lines and connections with plugs (thoroughly cleaned) from engine bung set - VAS 6122- .

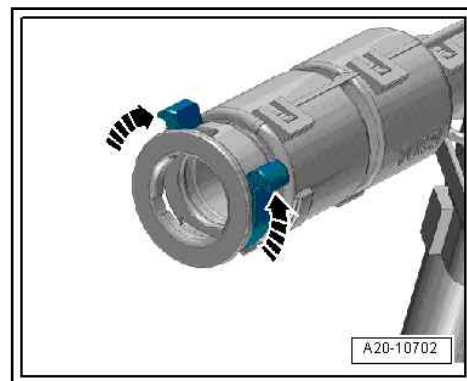
Installing

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





- Connect SCR supply line.
- Plug-in connector must engage audibly when connecting.
- Pull to check that plug-in connectors are correctly engaged.
- Check that lines are clipped onto reducing agent tank.
- Electrical connections and routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

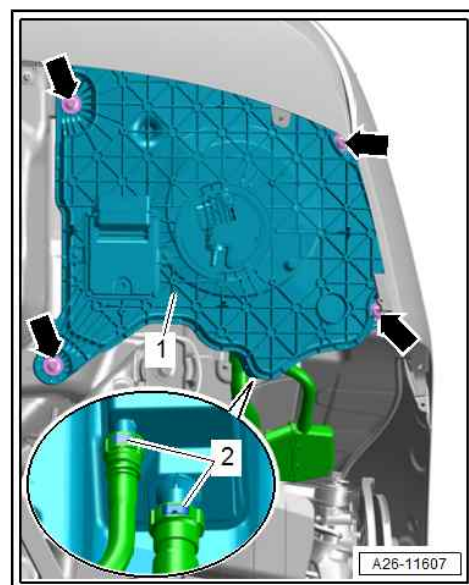


- Fit bolts -arrows-, then slide reducing agent tank towards rear of vehicle (with bolts in bolt holes) and finally tighten bolts -arrows-.

After filling with reducing agent or renewing component, perform required adaptations using ⇒ Vehicle diagnostic tester ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair instructions .

Tightening torques

- ◆ ⇒ ["3.1 Exploded view - reducing agent tank", page 119](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Exploded view - wheel housing liner (rear)



3.5 Removing and installing injector for reducing agent - N474-

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 26 ; SCR (selective catalytic reduction) system; Removing and installing injector for reducing agent - N474- .

3.6 Removing and installing control unit for reducing agent metering system - J880-

Special tools and workshop equipment required

- ◆ Vehicle diagnostic tester

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- Switch off ignition.
- Remove underbody trim (rear right) ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim .



- Remove bolts -arrows- and detach control unit for reducing agent metering system - J880- -item 1-.
- Unplug electrical connector -2-.

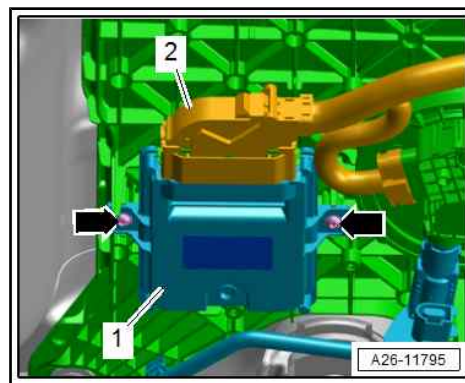
Installing

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

After renewing component, perform required adaptations using
⇒ Vehicle diagnostic tester ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair instructions .

Tightening torques

- ◆ ⇒ [“3.1 Exploded view - reducing agent tank”, page 119](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim



3.7 Removing and installing reducing agent quality sensor - G849-

Removing

- Drain reducing agent tank ⇒ [page 120](#) .
- Unplug electrical connector -1-.
- Unscrew bolts -arrows- and detach reducing agent quality sensor - G849-.

Installing

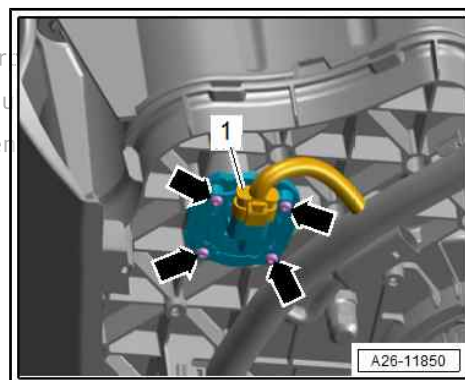
Installation is carried out in reverse order; note the following:

- Renew gasket after removing.

After filling with reducing agent or renewing component, perform required adaptations using ⇒ Vehicle diagnostic tester ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair instructions .

Tightening torques

- ◆ ⇒ [“3.1 Exploded view - reducing agent tank”, page 119](#)





4 Exhaust gas temperature control

All procedures and components are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas temperature control .



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5 Exhaust gas recirculation

⇒ [“5.1 Exploded view - exhaust gas recirculation system”, page 126](#)

⇒ [“5.2 Removing and installing exhaust gas recirculation control motor V338”, page 126](#)

⇒ [“5.3 Removing and installing exhaust gas recirculation control motor 2 V339”, page 126](#)

⇒ [“5.4 Removing and installing exhaust gas recirculation cooler”, page 126](#)

⇒ [“5.5 Checking exhaust gas recirculation cooler for leaks”, page 127](#)

5.1 Exploded view - exhaust gas recirculation system

All components are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas recirculation system; Exploded view - exhaust gas recirculation system .

5.2 Removing and installing exhaust gas recirculation control motor - V338-

Component designation in current flow diagram: exhaust gas recirculation valve 1 - GX5-

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas recirculation; Removing and installing exhaust gas recirculation control motor - V338- .

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5.3 Removing and installing exhaust gas recirculation control motor 2 - V339-

Component designation in current flow diagram: exhaust gas recirculation valve 2 - GX6-

Removing

- Remove plenum chamber partition panel ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber partition panel .

All further procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas recirculation; Removing and installing exhaust gas recirculation control motor 2 - V339- .

Installing

Additional work:

- Install plenum chamber partition panel ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber partition panel .

5.4 Removing and installing exhaust gas recirculation cooler

Removing

- Remove plenum chamber partition panel ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber partition panel .



All further procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas recirculation; Removing and installing exhaust gas recirculation cooler .

Installing

Additional work:

- Install plenum chamber partition panel ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber partition panel .

5.5 Checking exhaust gas recirculation cooler for leaks

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas recirculation; Checking exhaust gas recirculation cooler for leaks .

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28 – Glow plug system

1 Glow plug system

⇒ ["1.1 Exploded view - glow plug system", page 128](#)

⇒ ["1.2 Removing and installing glow plug", page 128](#)

⇒ ["1.3 Removing and installing automatic glow period control unit J179", page 128](#)

⇒ ["1.4 Removing and installing Hall sender G40", page 128](#)

⇒ ["1.5 Removing and installing engine speed sender G28", page 128](#)

1.1 Exploded view - glow plug system

All components are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 28 ; Glow plug system; Exploded view - glow plug system .

1.2 Removing and installing glow plug

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 28 ; Glow plug system; Removing and installing glow plug .

1.3 Removing and installing automatic glow period control unit - J179-

Removing

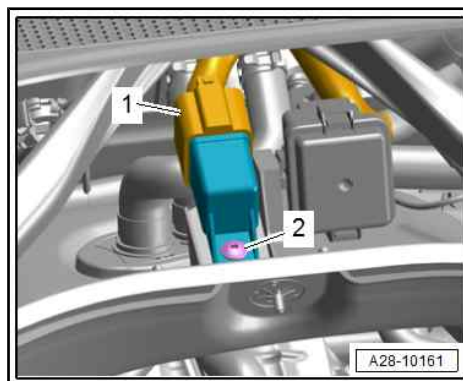
- Pull off seal and lift plenum chamber cover slightly.
- Remove bolt -arrow-.
- Unplug electrical connector -1- and detach automatic glow period control unit - J179- .

Installing

Installation is carried out in reverse sequence.

Tightening torques

Component	Nm
Automatic glow period control unit - J179- to plenum chamber	4.5



1.4 Removing and installing Hall sender - G40-

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 28 ; Glow plug system; Removing and installing Hall sender - G40- .

1.5 Removing and installing engine speed sender - G28-

All procedures are described in ⇒ Servicing 4-cylinder TDI engine, common rail; Rep. gr. 28 ; Glow plug system; Removing and installing engine speed sender - G28- .