Workshop Manual

Audi A4 2015 ➤
Audi A4 Avant 2015 ➤
Audi A5 2016 ➤

6-cylinder TDI engine, 3.0 ltr. 4-valve common rail (EA 897 Gen. I)									
Engine ID	CRT C	CSW B							

Edition 11.2018

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

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00 – Technical data

1 Identification

(ARL006113; Edition 11.2018)

All information can be found in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Identification .

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2 Safety precautions

All information can be found in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Safety precautions .

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3 Repair instructions

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10 – Removing and installing engine

1 Removing and installing engine

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⇒ “1.2 Separating engine and gearbox”, page 20

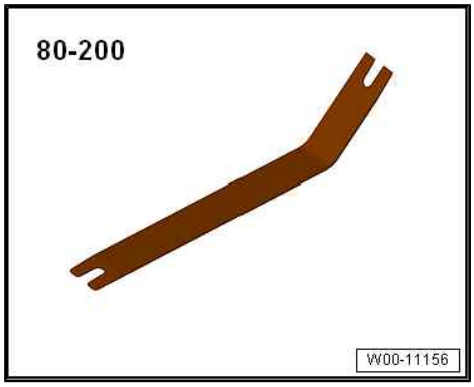
⇒ “1.3 Securing engine to engine and gearbox support”, page 25

⇒ “1.4 Installing engine”, page 28

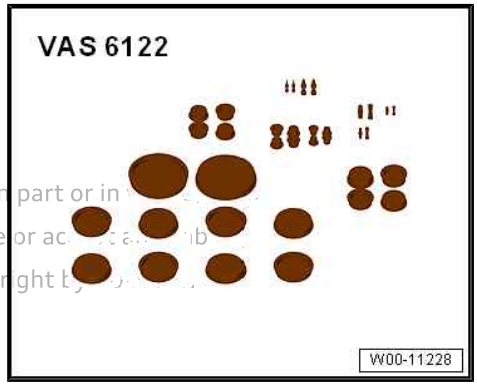
1.1 Removing engine

Special tools and workshop equipment required

- Removal lever - 80-200-



- Engine bung set - VAS 6122-



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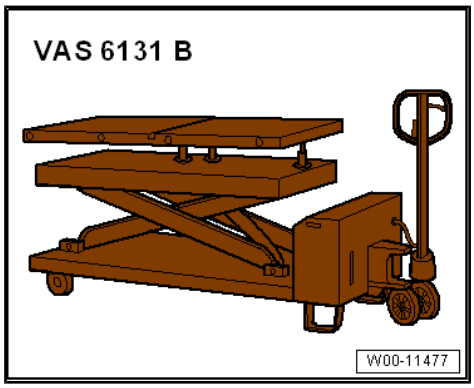
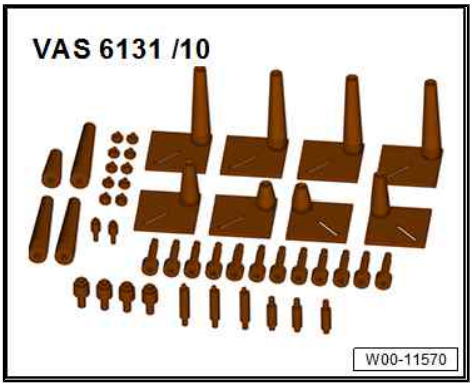
- Scissor-type assembly platform - VAS 6131 B-



- Support set for Audi - VAS 6131/10-



- Adapter -VAS 6131/11-1- from support set, Audi A8 >2002 - VAS 6131/11- (not illustrated)
- Adapter (2x) -VAS 6131/13-2- 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 6362-

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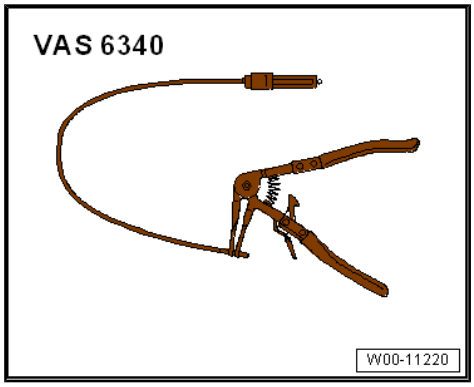
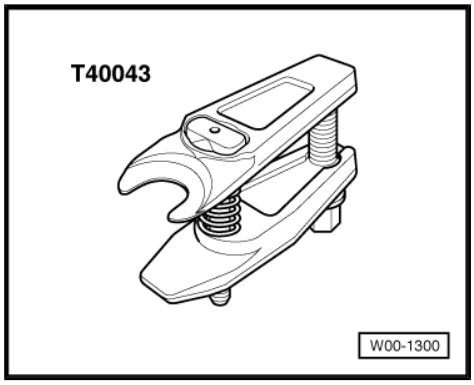
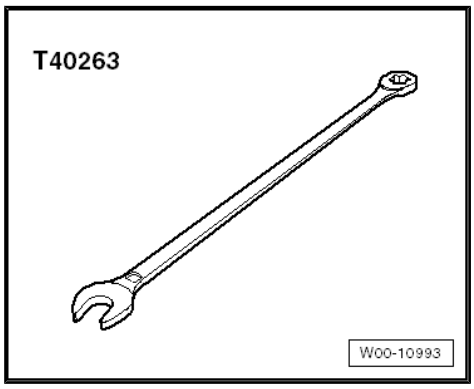
- Hose clip pliers - VAS 6340-



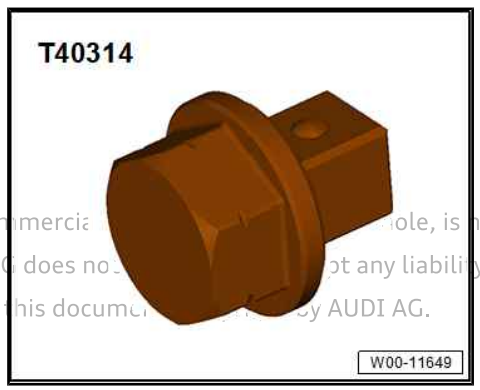
- Ball joint ejector - VAS 251 805- (not illustrated)
- Ball joint puller - T40043-



- Wrench, 21 mm - T40263-



- Adapter - T40314-



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- Stepladder (commercially available)

Procedure

Note

- *The engine is removed from underneath together with the gearbox and subframe (with lock carrier installed).*
- *Fit cable ties in the same locations when installing.*
- *Observe rules for cleanliness ⇒ Servicing 6-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.

Note

- *The electromechanical parking brake must be released before disconnecting the battery, so that the propshaft can be turned during removal.*
- *If the engine has been removed in order to remove the turbocharger, the turbocharger 1 control unit - J724- must be moved into the "closed" position using the vehicle diagnostic tester ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Removing and installing turbocharger .*

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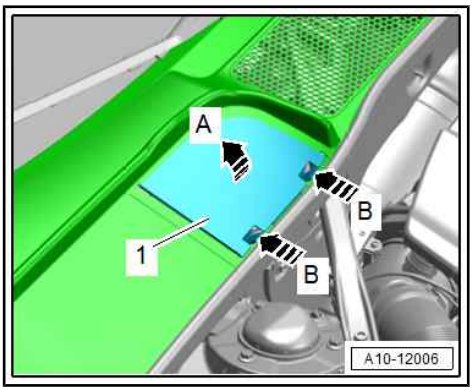
Caution

Risk of irreparable damage to electronic components.

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

– Disconnect battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .

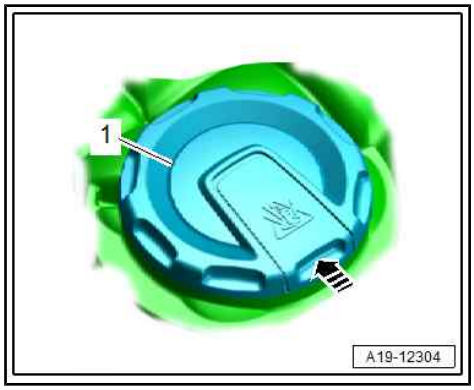
– Release catches -arrows B- and open cover -1- -arrow A-.



WARNING

Risk of scalding as hot coolant can escape.

- *Observe safety precautions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Safety precautions; Safety precautions when working on the cooling system .*



– 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) .
– Remove front wheels ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .
– Remove wheel spoilers (left and right) and wheel housing liner (front right) ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Removing and installing wheel housing liner (front) .
– Remove noise insulation panels ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
– Remove propshaft ⇒ Rear final drive; Rep. gr. 39 ; Propshaft; Removing and installing propshaft .

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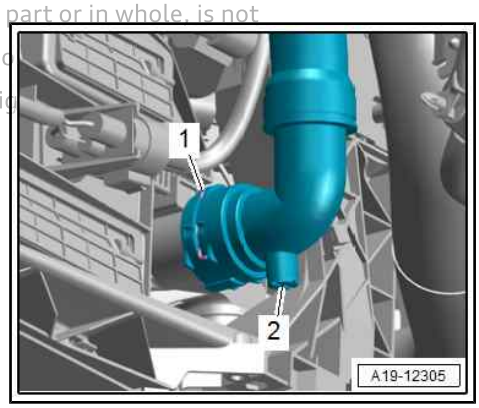
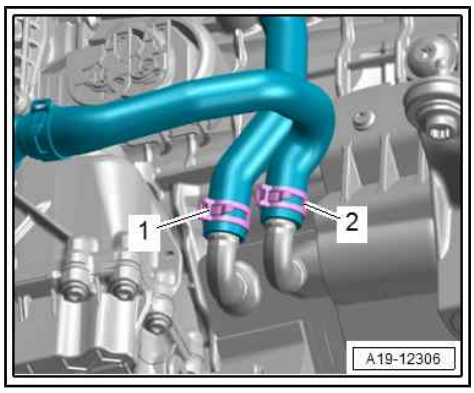
– Place collector tank from coolant collecting system -VAS 5014- or drip tray for workshop hoist - VAS 6208- underneath.
– Remove drain plug -2- and drain off coolant.
– Lift retaining clip -1- and detach coolant hose from radiator.



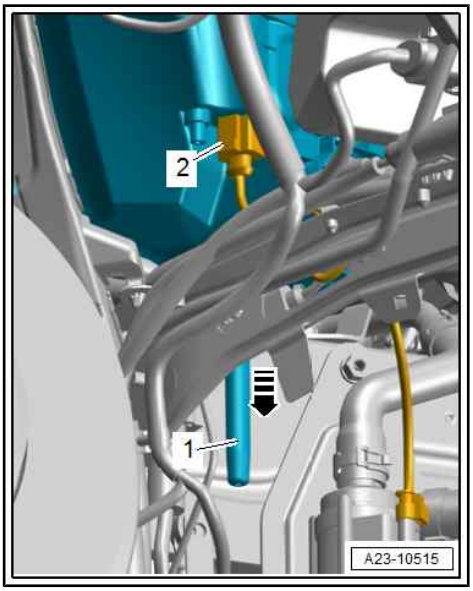
– Release hose clip -2-, disconnect coolant hose from gearbox and drain off coolant.

Note

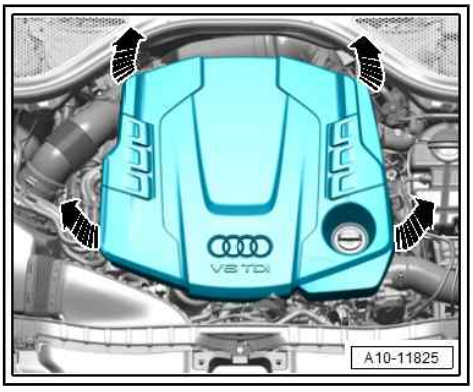
Disregard -item 1-.



– Unplug electrical connector -2- for air filter bypass flap valve - N275- .
– Detach water drain -1- downwards -arrow-.



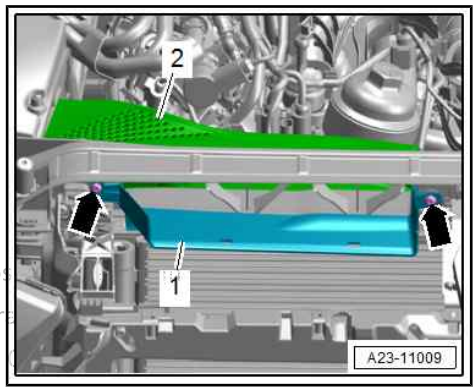
– Carefully pull engine cover panel off retaining pins one after another -arrows-. Do not jerk engine cover panel away, and do not try to pull on one side only.



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

Note

Disregard -item 1-.



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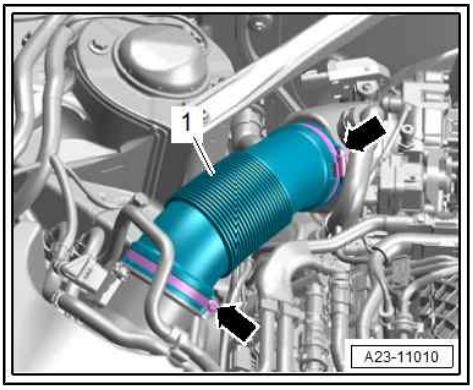
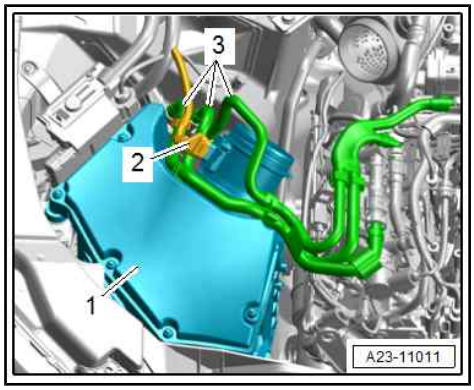
– Release hose clips -arrows- and detach air pipe -1-.



– Unplug electrical connector -2- for air mass meter - G70- .
– Move fuel hoses -3- clear and push to one side.
– Lift off air cleaner housing -1- and detach.



Caution

Risk of malfunctions caused by dirt.

- *Observe rules for cleanliness when working on the fuel supply system ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair notes; Rules for cleanliness .*

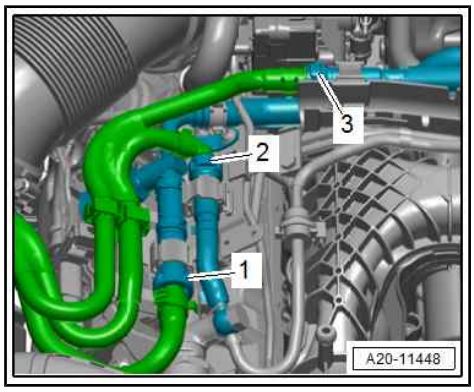
WARNING

The fuel system is pressurised.

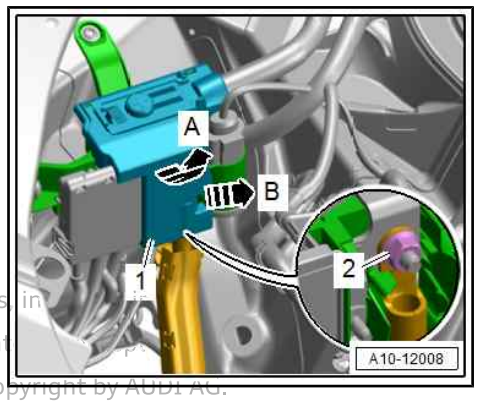
Risk of injury as fuel may spray out.

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

– Disconnect fuel hoses -1, 2, 3- ⇒ Fuel supply system; Rep. gr. 20 ; Plug-in connectors; Disconnecting plug-in connectors .
– Move coolant hoses clear and tie 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 (top) clear.



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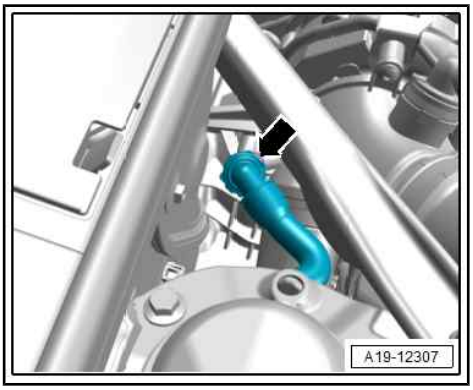
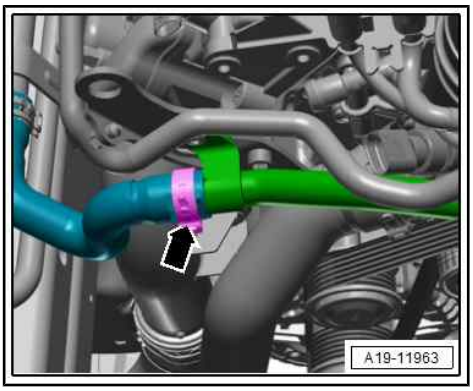
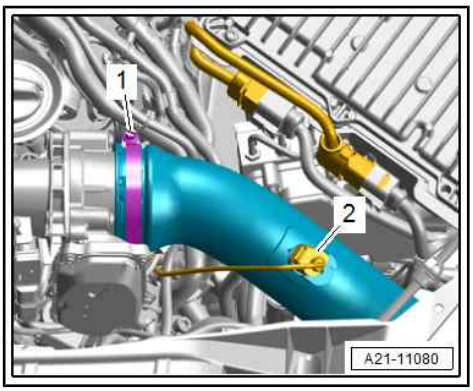
– Lift retaining clip -arrow- and disconnect coolant hose.



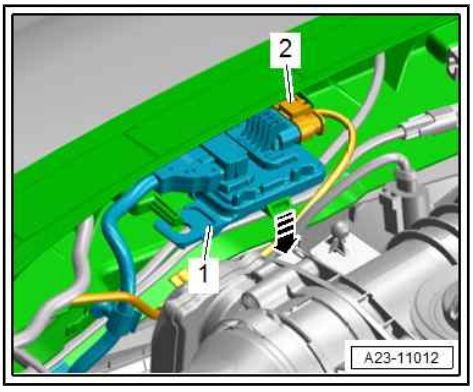
– Release hose clip -arrow- and disconnect coolant hose from coolant pipe (front).



– Unplug electrical connector -2- for intake air temperature sender - G42- .
– Release hose clip -1-, detach air pipe and tie up to left side.



– 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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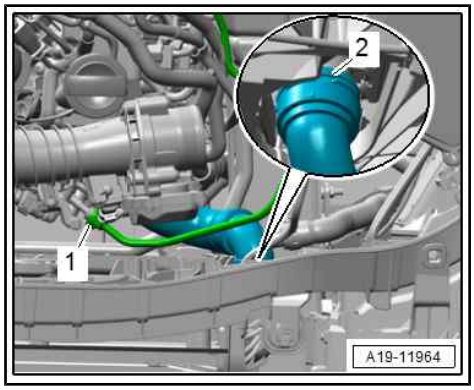
– Lift retaining clip -2- and disconnect coolant hose (top left) from radiator.
– Lift retaining clip -1- and disconnect coolant hose.



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

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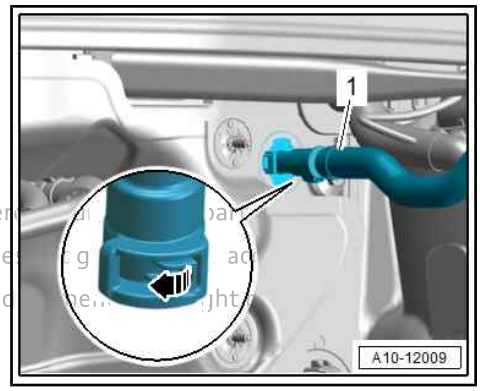
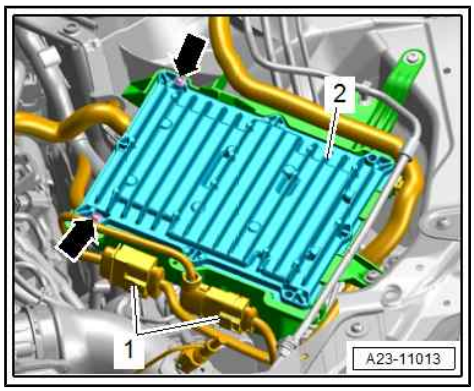
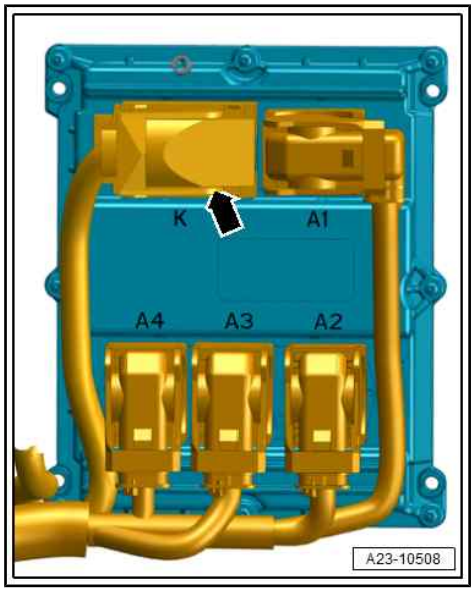


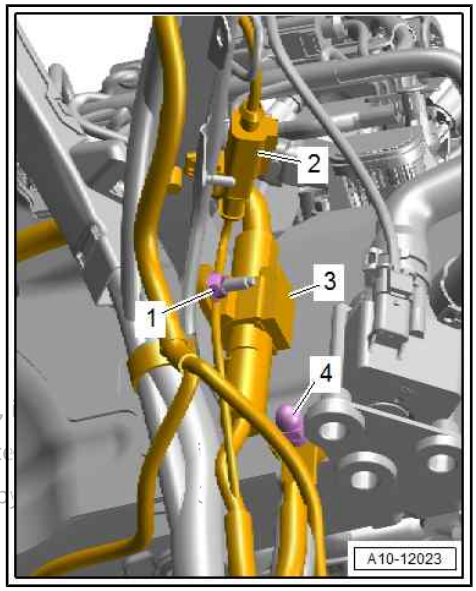
– Take electrical connectors -1- out of bracket, disconnect them and move electrical wiring clear.
– Remove bolts -arrows- and detach engine control unit - J623- -item 2-.



– Unplug electrical connector “K” -arrow-.
– Place engine control unit - J623- on engine and secure to prevent it from dropping.



– Unplug electrical connector -2- and move wiring clear.
– Loosen nut -1- a few turns, move electrical connector -3- clear and unplug.
– Remove nut -4- and move earth wires clear.



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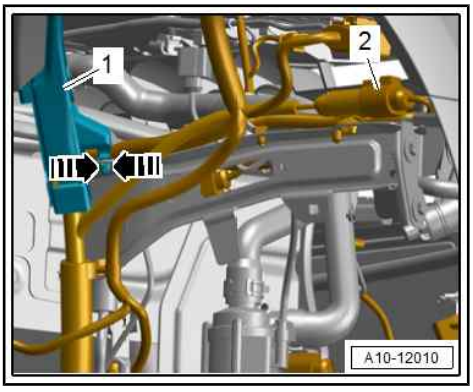
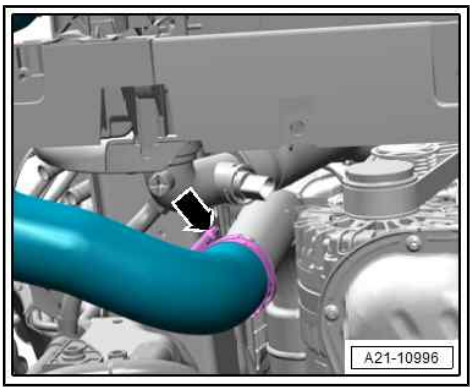
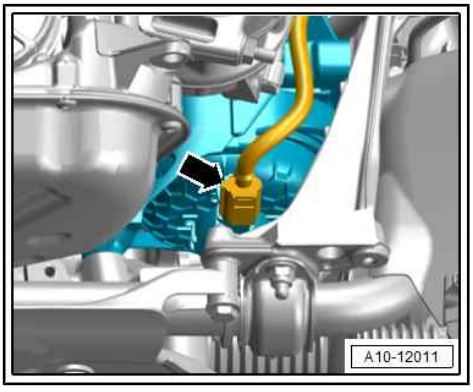
– Take electrical connector -2- out of bracket, unplug it and move electrical wiring clear.
– Release fasteners -arrows- and move wiring duct -1- clear.



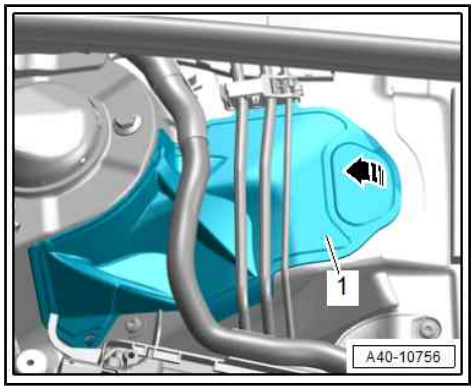
– Release hose clip -arrow- and detach air hose from air pipe.



– Unplug electrical connector -arrow- for electrohydraulic engine mounting solenoid valve on both sides and move wiring clear.



– Open cover -1- -arrow- on suspension turret (both sides).

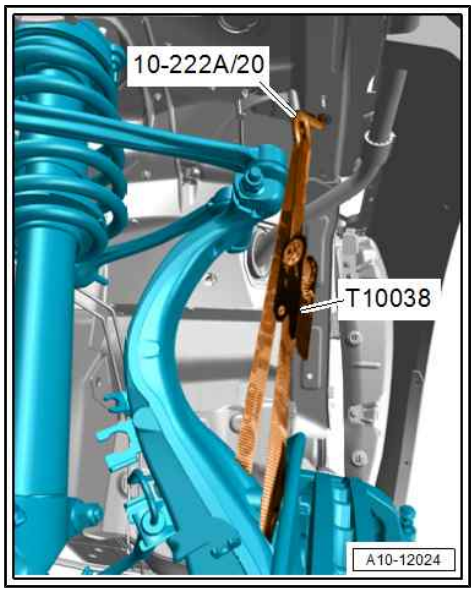


Caution

Danger of damage to the joints of the upper links.

- *The weight of the wheel bearing housings must be supported.*

– Tie up wheel bearing housing -1- on both sides with tensioning strap - T10038- as shown (use the handle of a hammer -2- to do so).

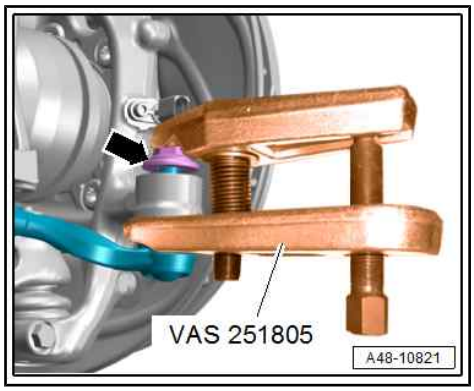


– To protect thread, unscrew nut -arrow- on joint pin of track rod ball joint until nut is flush with thread of joint pin.

WARNING

Risk of injury if parts are allowed to drop out.

- *The track rod ball joint will release suddenly from the wheel bearing housing when pressed out. Use engine and gearbox jack - VAS 6931- or similar to provide support.*



Caution

Risk of damage to ball joint puller.

- *Make sure the two lever arms of the puller are parallel when maximum force is exerted.*

– Press track rod ball joint off wheel bearing housing using ball joint ejector - VAS 251 805-, counterhold with a 6 mm hexagon socket.

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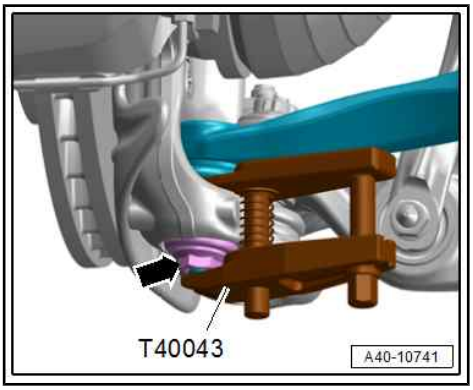
– To protect thread, unscrew nut -arrow- on joint pin of guide link until nut is flush with thread of joint pin. Counterhold joint pin if necessary.



WARNING

Risk of injury if parts are allowed to drop out.

- *The swivel joint will release suddenly from the wheel bearing housing when pressed out. Use engine and gearbox jack - VAS 6931- or similar to provide support.*

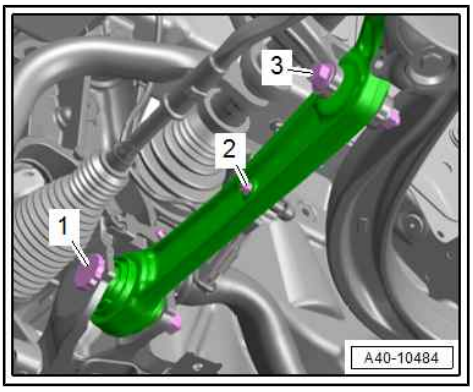
– Press joint pin of guide link out of tapered seat using ball joint puller - T40043- , taking care not to damage boot.

– Unscrew nut and move guide link clear at wheel bearing housing; if necessary, counterhold at joint pin with a TX 40 socket wrench.

– On appropriate versions: Remove nut -2- and move coupling rod for vehicle level sender clear.

– Detach bolted connections -1, 3- for track control link.

– Swivel track control link towards front.



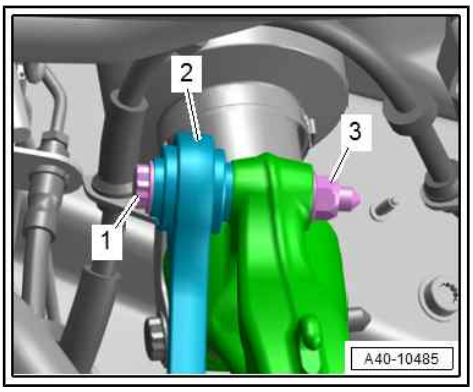
Note

To remove bolt -1-, turn steering to full left/right lock.

– Repeat procedure on opposite side of vehicle.

– On both sides, unscrew nut -3- and pull out bolt -1- for coupling rod -2-.

– Unbolt drive shaft (left and right) from gearbox ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Removing and installing drive shaft .



– Remove bolt -arrow- for subframe shield on both sides.

– Detach intermediate steering shaft from steering rack and move clear by telescoping together ⇒ Running gear, axles, steering; Rep. gr. 48 ; Steering column; Removing and installing intermediate steering shaft .

– Remove poly V-belt from air conditioner compressor pulley ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Removing and installing poly V-belt .

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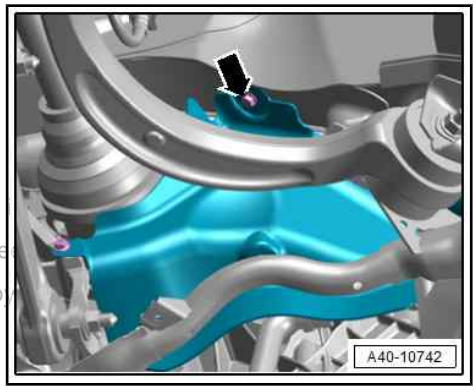
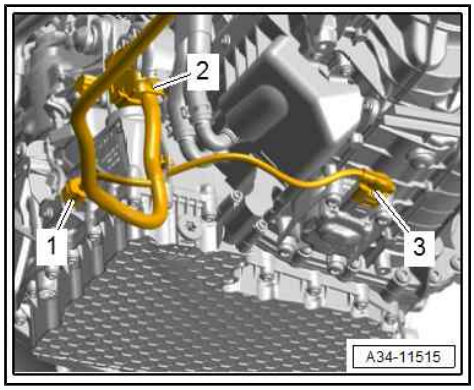
– Remove air conditioner compressor from bracket ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Detaching and attaching air conditioner compressor at bracket .



– Unplug electrical connectors:

1 - For parking lock solenoid - N486-

3 - For electric pump 2 for gearbox - V553-



Caution

Risk of irreparable damage to gearbox control unit (mechatronic unit) because of electrostatic discharge.

- ***Before unplugging or plugging in electrical connector, mechanic must discharge static electricity. To do so, touch vehicle earth, heater radiator, or lifting platform, with your hand.***
- ***Do NOT touch connector contacts in gearbox connector with your hands.***

– Unplug electrical connector -2- on gearbox.

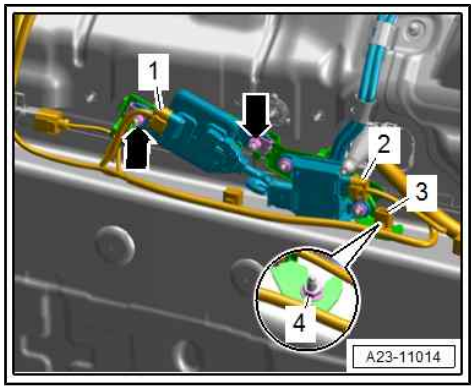
– Remove underbody trim (front left) ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim; Exploded view - underbody trim .

– Unplug electrical connector -1- and move clear.

– Pull clip -3- off stud.

– Remove nuts -arrows- and loosen (do not remove) nut -4-.

– Tie bracket with control unit for NOx sender 2 - J881- to front exhaust pipe.



Note

Disregard -item 2-.

WARNING

Reducing agent can cause skin irritation.

- ***Observe safety measures when handling reducing agent ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Safety precautions; Safety precautions when working on the SCR system .***
- ***Put on safety goggles.***

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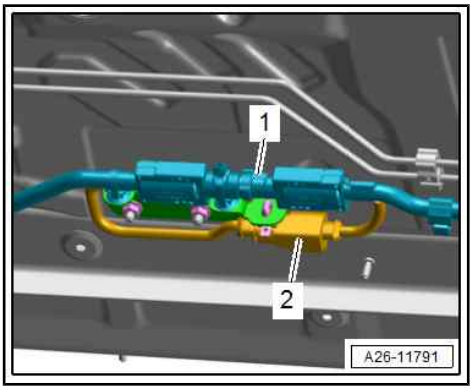
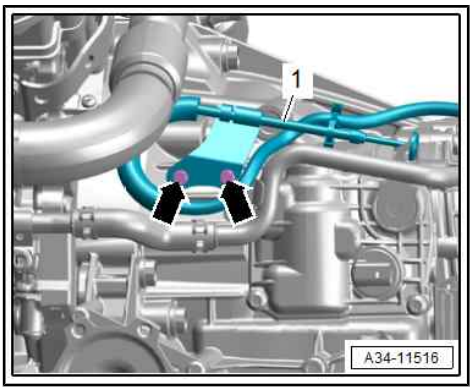
Note

Hold a clean cloth under separating point to catch escaping reducing agent.

– Unplug electrical connector -2-.
– Disconnect SCR supply line -1- ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; SCR (selective catalytic reduction) system; Exploded view - reducing agent supply line .
– Seal off open lines and connections with plugs (thoroughly cleaned) from engine bung set - VAS 6122- .



– Remove bolts -arrows- and move manual release cable -1- for parking lock clear.



If engine is to be separated from gearbox:

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

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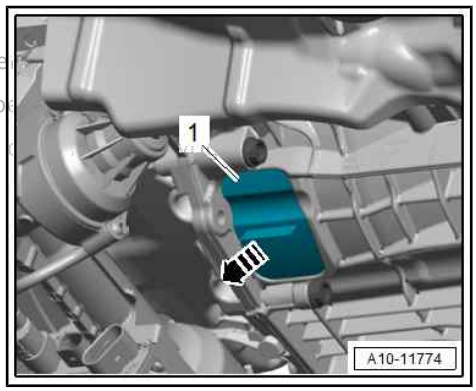
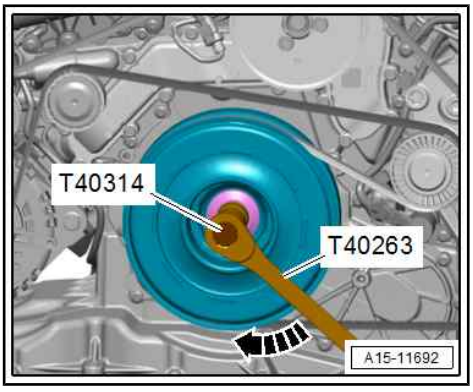


Caution

Irreparable damage can be caused if the camshaft timing chain slips.

- ***Turn crankshaft only in direction of engine rotation -arrow-.***

– To slacken bolts for flywheel, counterhold crankshaft at vibration damper using wrench, 21 mm - T40263- and adapter - T40314- .



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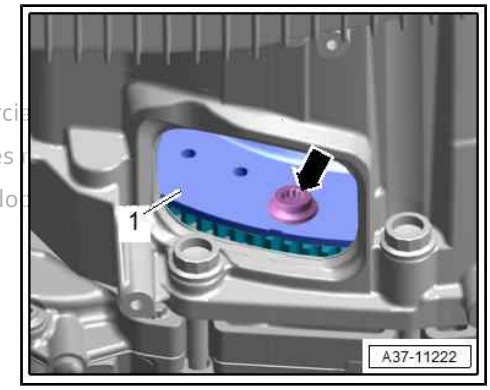
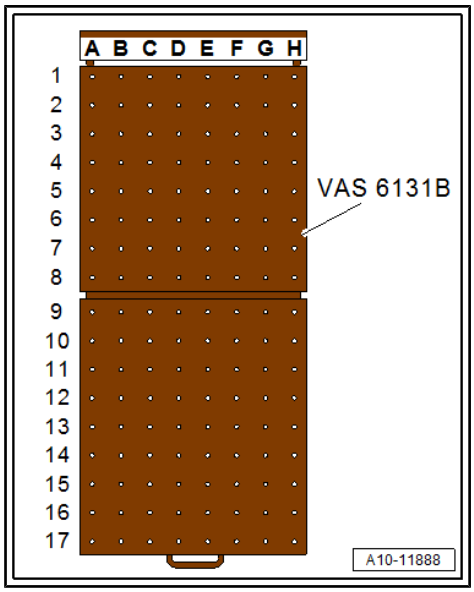
– Remove 6 bolts -arrow- for flywheel from drive plate -1-. Turn crankshaft 60° in direction of engine rotation each time.



Set up the scissor-type assembly platform as follows:

– Set up scissor-type assembly platform - VAS 6131 B- with support set for Audi - VAS 6131/10- , adapter -VAS 6131/11-1- and adapters -VAS 6131/13-2- as follows:

Platform coordinates	Parts from -VAS 6131/10- , adapter -VAS 6131/11-1- and adapter -VAS 6131/13-2-			
C4	/10-1	/10-4	/10-5	/10-11
E4	/10-1	/10-4	/10-5	/10-11
E10	/10-1	/10-2	/10-5	/13-2
B15	/10-1	/10-3	/10-5	/11-1
F15	/10-1	/10-2	/10-5	/10-6
F17	/10-1	/10-2	/10-5	/13-2



– Initially hand-tighten the support elements on the scissor-type assembly platform.

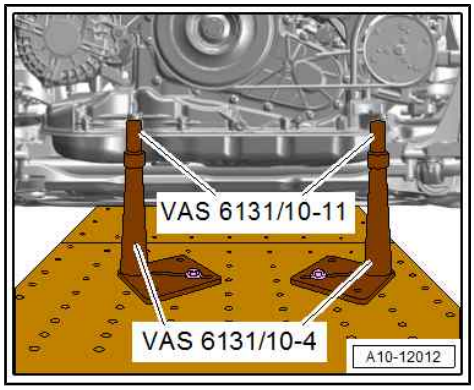
– Position scissor-type assembly platform - VAS 6131 B- horizontally.

• 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- at both sides of engine, as shown.

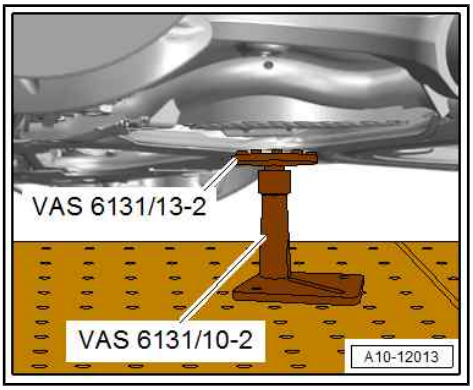
– Make sure that threaded spindles are screwed in completely.



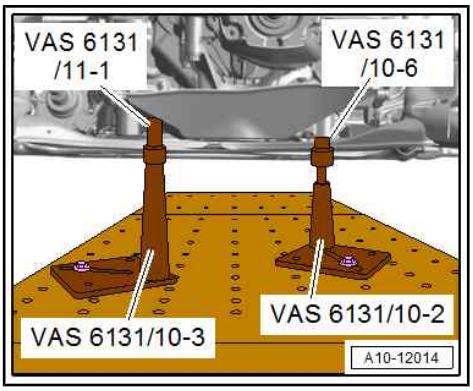
– Support subframe as shown using support elements from -VAS 6131/10- and adapter -VAS 6131/13-2- .

Note

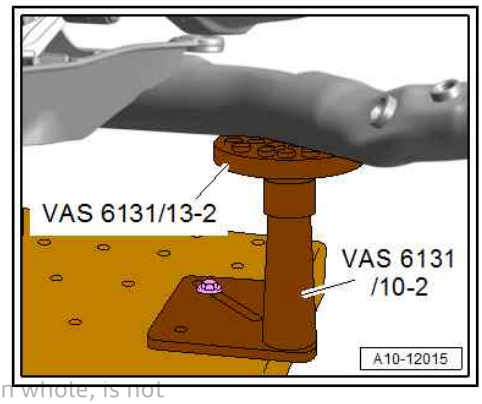
The support elements only support the subframe; the base plate is not secured to the scissor-type assembly platform.



– Position support elements from -VAS 6131/10- and adapter -VAS 6131/11-1- at tunnel cross member, as shown.



– Position support elements from -VAS 6131/10- and adapter -VAS 6131/13-2- under front exhaust pipe, as shown.
– Turn remaining spindles for support elements 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- .
– Fix position of subframe ⇒ Running gear, axles, steering; Rep. gr. 40 ; Subframe; Fixing position of subframe .



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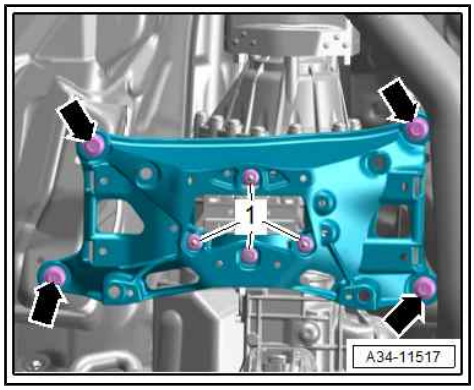
– Remove bolts -arrows- on tunnel cross member.



Note

Disregard -item 1-.

Caution

Danger of damage to hoses, pipes and wiring connections and to engine compartment.

- ***Check that all hoses and wiring connections between engine, gearbox, subframe and body have been detached.***
- ***Carefully guide out engine/gearbox assembly with subframe from engine compartment when lowering.***
- ***Guide drive shafts carefully past gearbox.***

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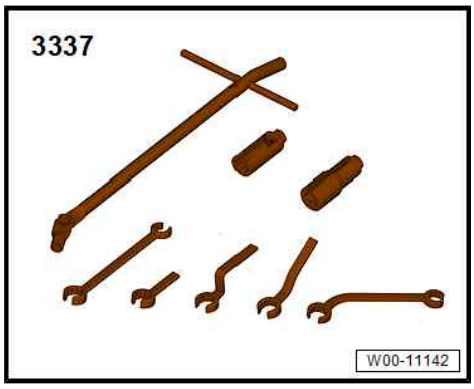
– Lower scissor-type assembly platform - VAS 6131 B- with engine/gearbox assembly and pull out from underneath vehicle.

– Tie up drive shafts.

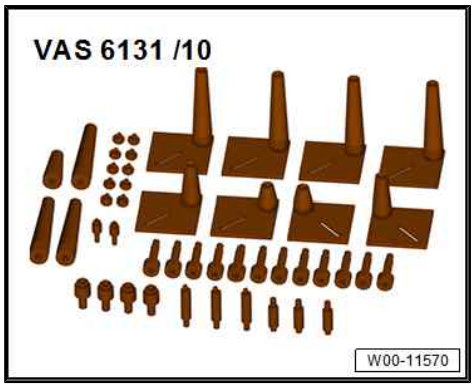
1.2 Separating engine and gearbox

Special tools and workshop equipment required

- Lambda probe open ring spanner set - 3337-

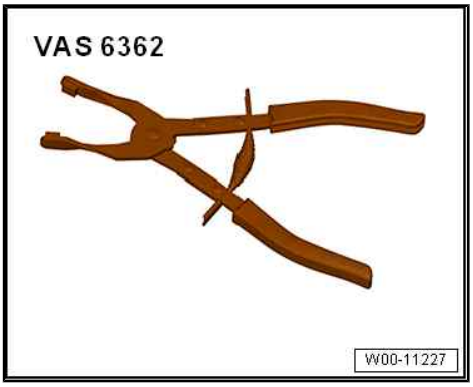


- Support set for Audi - VAS 6131/10-



- Adapter -VAS 6131/11-2- from support set, Audi A8 >2002 - VAS 6131/11- (not illustrated)
- Adapter -VAS 6131/12-2- from support set, Audi A6 >2005 - VAS 6131/12- (not illustrated)

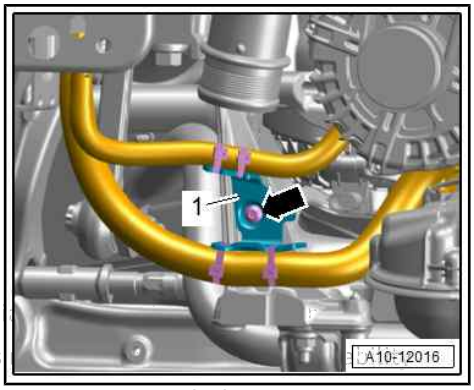
♦ Hose clip pliers - VAS 6362-



Procedure

- Engine/gearbox assembly removed and secured to scissor-type assembly platform - VAS 6131 B-

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



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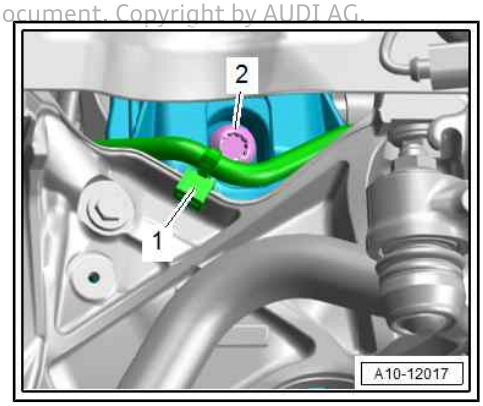
– Move SCR supply line -1- clear at subframe.

WARNING

Risk of accident caused by weight of subframe.

♦ ***A second mechanic is required for removal of the subframe.***

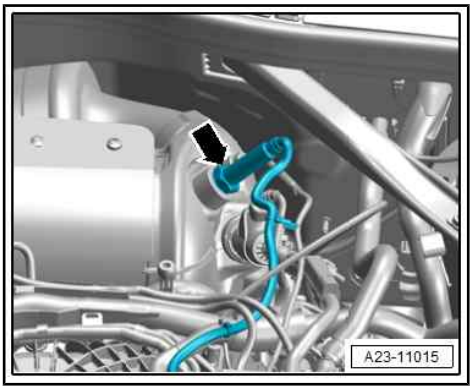


– On both sides, remove bolt -2- and detach subframe to one side (remove support elements).

Note

The illustration shows the installation position with the engine installed.

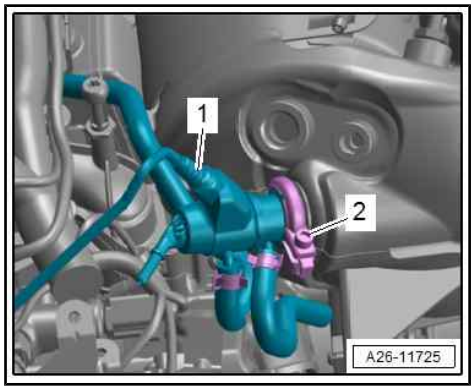
– Unscrew NOx sender - G295- -arrow- using a tool from Lambda probe open ring spanner set - 3337- .



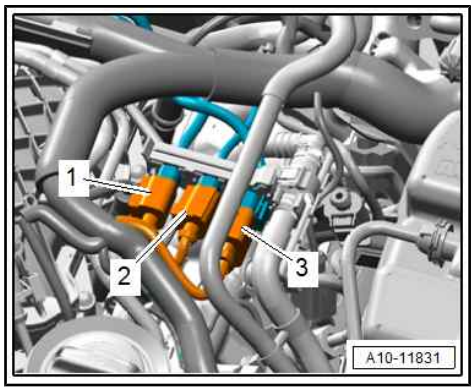
Note

The illustration shows the installation position with the engine installed.

– Unscrew bolt -2- and loosen retaining clip.
– Detach injector for reducing agent - N474- -item 1- and press to one side.



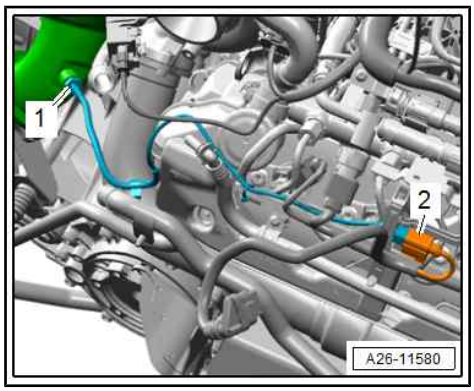
– Unplug electrical connectors -1, 2, 3- and move electrical wiring clear.



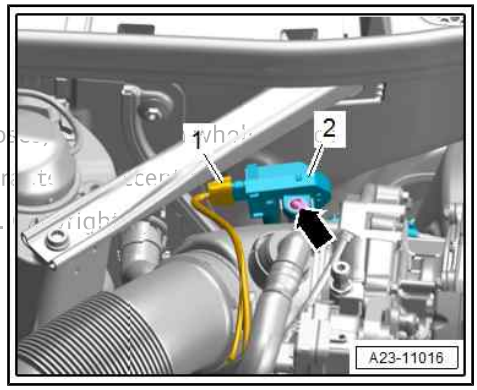
– Unplug electrical connector -2- at exhaust gas temperature sender 4 - G648- and move electrical wiring clear.

Note

Disregard -item 1-.



– Remove bolt -arrow-.
– Unplug electrical connector -1-.
– Move bracket -2- clear with pressure differential sender - G505-.



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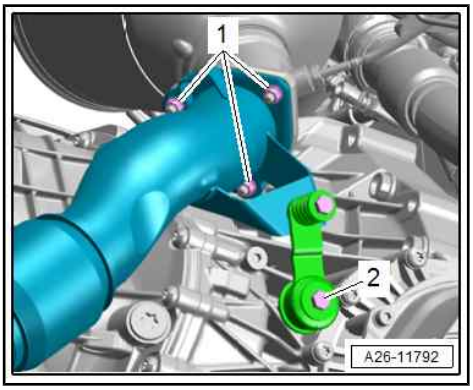
– Remove bolt -2- at bracket for front exhaust pipe.



Note

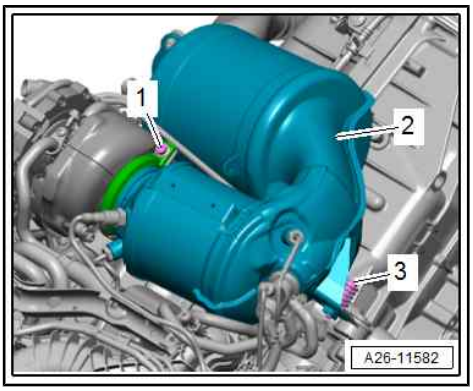
Disregard -item 1-.

– Remove bolt -3- on retainer.

WARNING

Please note the following warnings when working on all parts of the exhaust system:

- ***Wear gloves (e.g. rubber, not textile) and safety goggles to avoid contact with eyes and skin - risk of injury.***



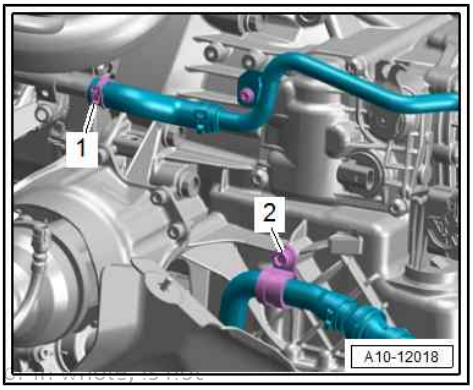
– Open screw-type clip -1- and place it on intake funnel of emission control module -2-.

– Detach emission control module with front exhaust pipe.

– Place collector tank from coolant collecting system -VAS 5014- or drip tray for workshop hoist - VAS 6208- underneath.

– Unscrew bolt -2- and move coolant hose to one side.

– Release hose clip -1- and disconnect coolant hose.



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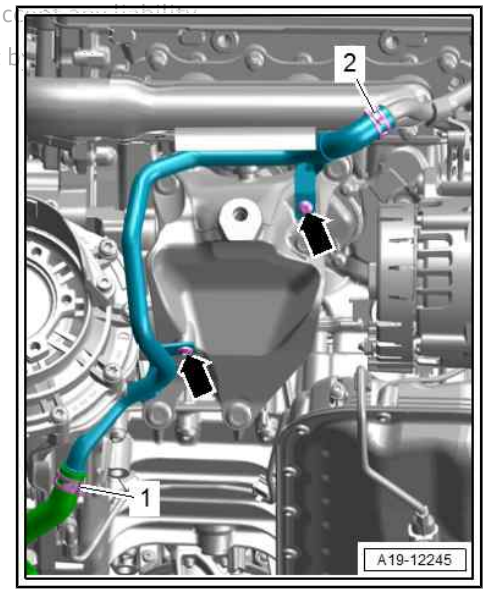
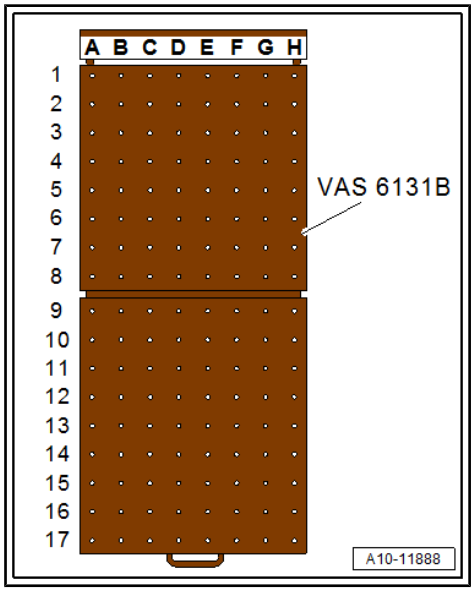
– Remove bolts -arrows- and move coolant pipe (right-side) to one side.



Note

Disregard items -1 and 2-.

– Set up scissor-type assembly platform - VAS 6131 B- with support set for Audi - VAS 6131/10- , adapter -VAS 6131/11-2- and adapter -VAS 6131/12-2- as follows:

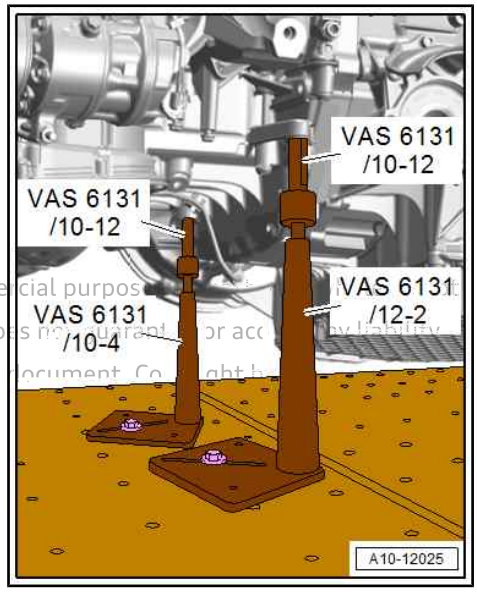


Note

The other support elements remain unchanged.

Platform coordinates	Parts of support set for Audi - VAS 6131/10- , adapter -VAS 6131/11-2- and adapter - VAS 6131/12-2-			
C7	/10-1	/12-2	/10-5	/10-12
E7	/10-1	/10-4	/10-5	/10-12
C10	/10-1	/10-4	/10-5	/11-2
F10	/10-1	/10-4	/10-5	/10-9

– Position support elements from -VAS 6131/10- and adapter - VAS 6131/12-2- at both sides of engine, as shown.



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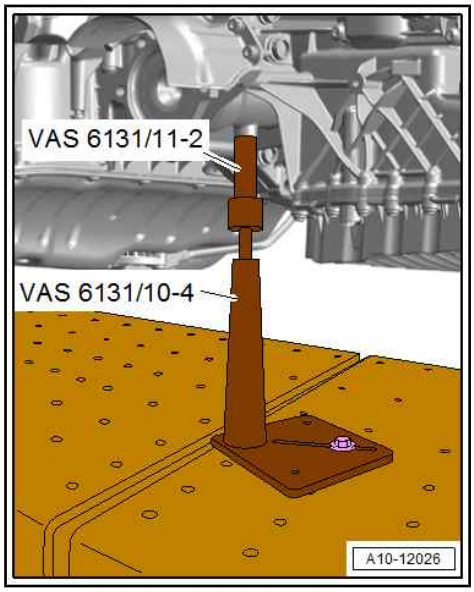
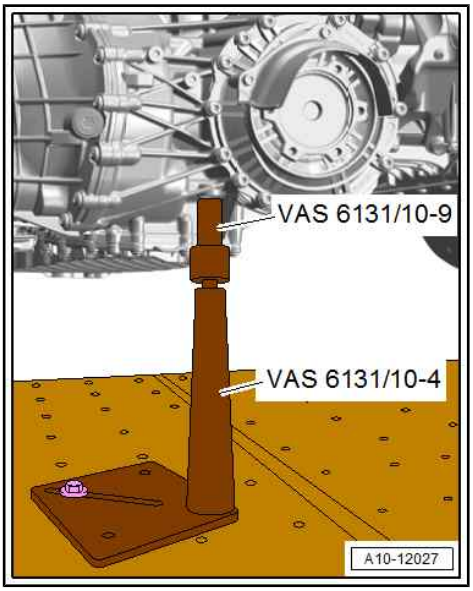
– Position support elements from -VAS 6131/10- and adapter - VAS 6131/11-2- at left of gearbox, as shown.



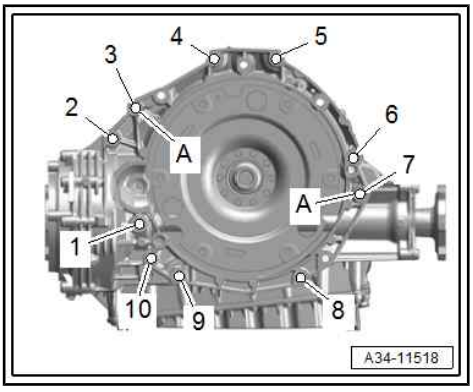
– Position support elements from -VAS 6131/10- at right of gearbox, as shown.
– Turn spindles (left and right) upwards until all locating lugs make contact with mounting points.
– Tighten base plates for support elements to 20 Nm on scissor-type assembly platform - VAS 6131 B- .



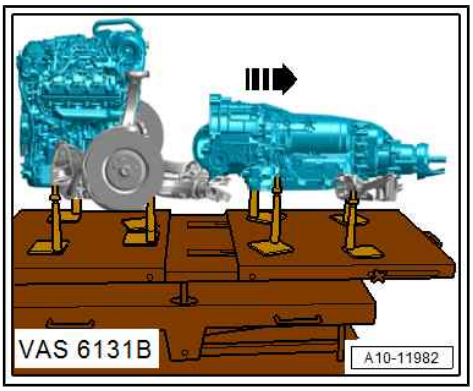
– Remove bolts -2 ... 10- securing gearbox to engine.
– Loosen bolt -1- for starter.

Note

Disregard -item A-.



– 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.



1.3 Securing engine to engine and gearbox support

Special tools and workshop equipment required

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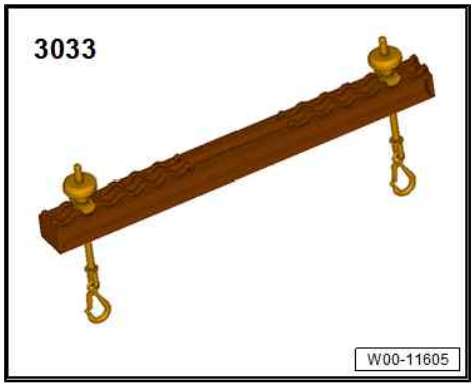
- Lifting tackle - 3033-



- Engine and gearbox support - VAS 6095A-

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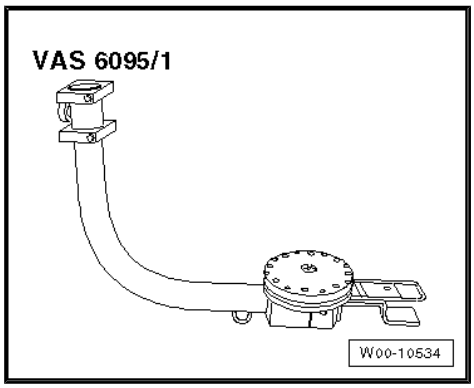
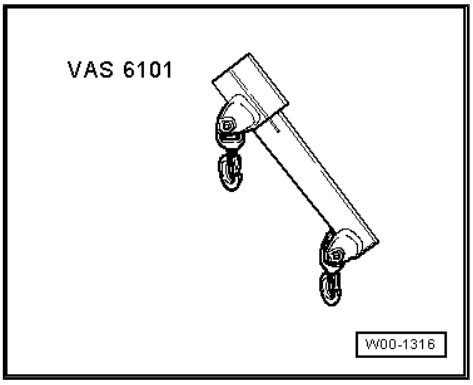
- Universal mounting - VAS 6095/1- and bracket for V6 TDI engine - VAS 6095/1-14-



- Workshop hoist - VAS 6100-

♦ Lift arm extension/workshop hoist - VAS 6101-



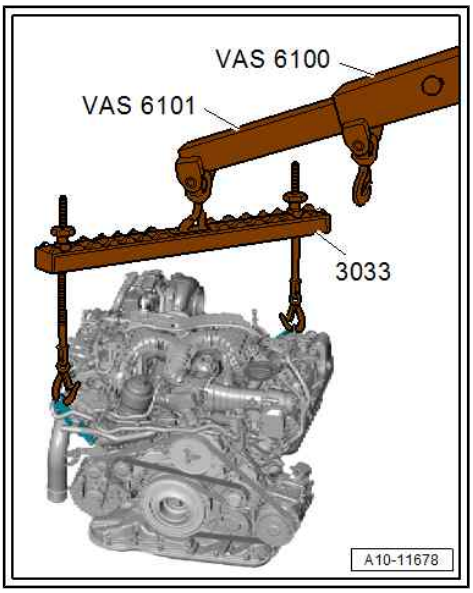
Procedure

- Engine/gearbox assembly removed and secured to scissor-type assembly platform - VAS 6131 B- (with engine detached from gearbox)

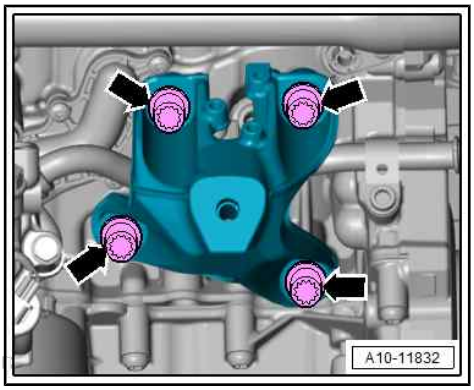
– Attach lift arm extension - VAS 6101- to workshop hoist - VAS 6100- .

– Attach lifting tackle - 3033- to engine lifting eyes and workshop hoist as shown in illustration.

– Take up weight of engine with workshop hoist, but do not lift.



– Unscrew bolts -arrows- and remove engine support (left-side).



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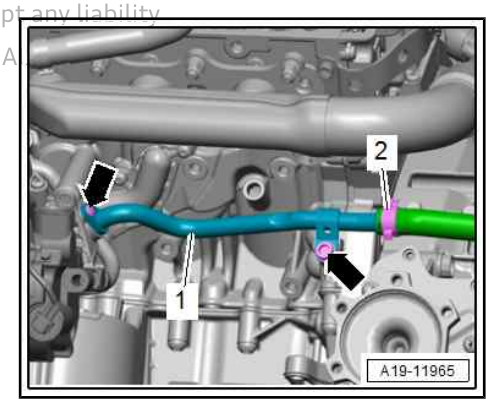
– Remove bolts -arrows-.

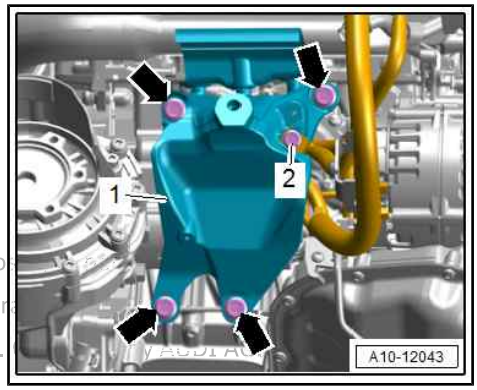
– Detach coolant pipe (left-side) -1- and move clear to side.



Note

Disregard -item 2-.

– Remove bolt -2- for earth wire.
– Remove bolts -arrows- and detach engine support -1-.
– Tie up starter on engine.



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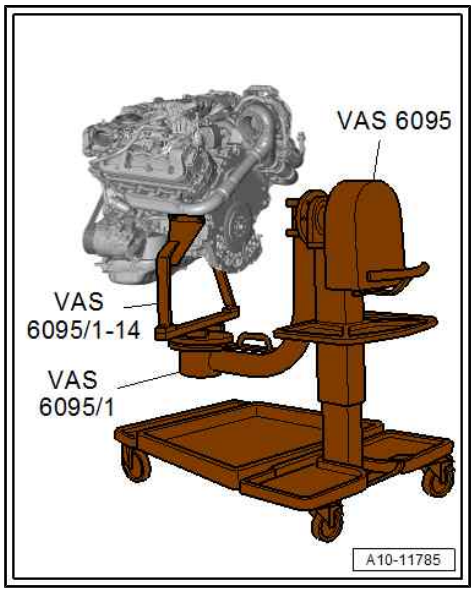
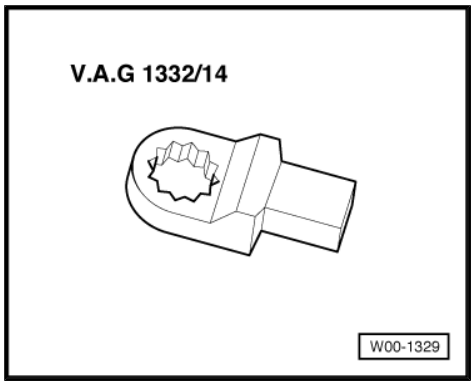
– Using universal mounting - VAS 6095/1- and bracket for V6 TDI engine - VAS 6095/1-14- , secure engine to engine and gearbox support - VAS 6095A- (40 Nm), as shown.



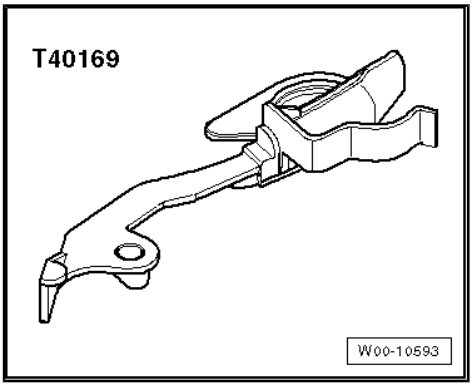
1.4 Installing engine

Special tools and workshop equipment required

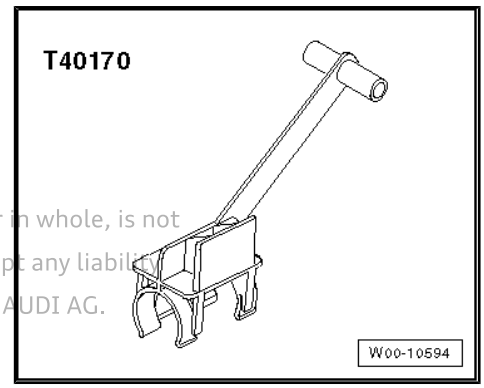
♦ Ring spanner insert AF 16 - V.A.G 1332/14-



- Assembly aid - T40169-



- Transportation lock - T40170-



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- All special tools listed under "Removing engine"
- Cleaning solution - D 009 401 04-

Tightening torques

Note

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

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

- ⇒ “2.1 Exploded view - assembly mountings”, page 35
- Engine to gearbox ⇒ Rep. gr. 34 ; Removing and installing gearbox; Tightening torques for gearbox

Procedure

Note

- *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.*
- *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 .*
- *Re-install all cable ties in the same locations when installing.*
- *Bonded rubber bushes can only be turned to a limited extent. Therefore, only tighten the bolted connections for the suspension once the vehicle is in the unladen position or the reference position.*

– Install coolant pipes ⇒ page 97 .

– Install engine supports and engine mountings ⇒ page 35 .

• Engine with subframe positioned on scissor-type assembly platform - VAS 6131 B-

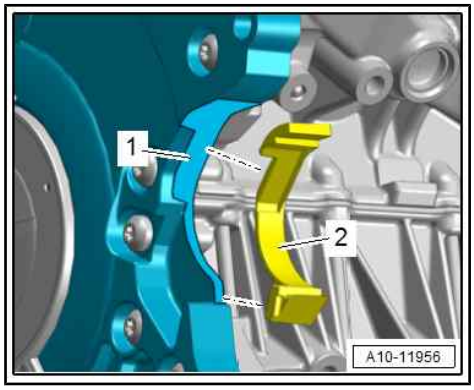
– Before installing gearbox, remove residue from threaded holes for engine/gearbox bolts in cylinder block using a thread tap.

– The following preparations are required before joining engine and gearbox:

– Clean contact surface -1- on timing chain cover (bottom) and on sealing element -2- with cleaning fluid - D 009 401 04- .

– Bond sealing element to timing chain cover (bottom).

– Move starter into installation position.



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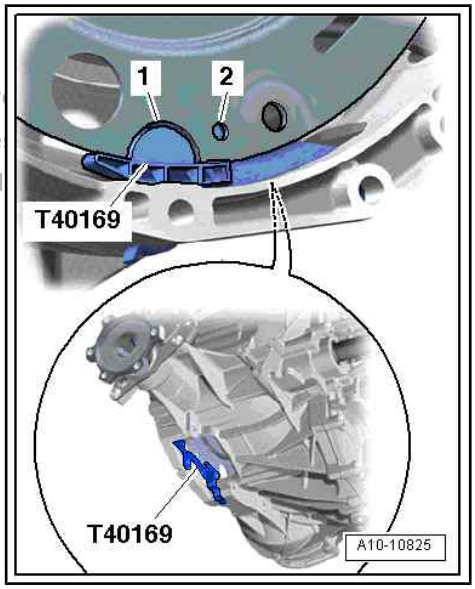
– Insert assembly aid - T40169- into gearbox housing between flywheel and torque converter from below, as illustrated.

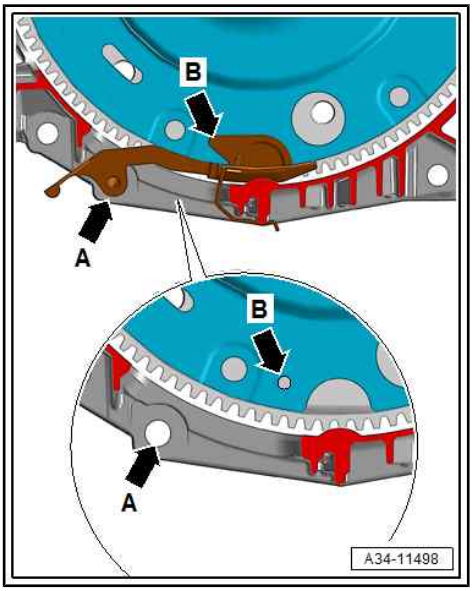
• Assembly aid must engage in semi-circular recess -1-.



Note

Disregard -item 2-.

• Additionally, assembly aid must engage in holes -arrow A- and -arrow B-.

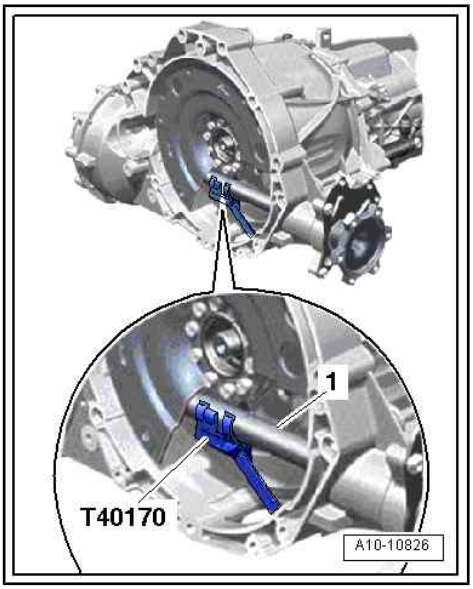


Note

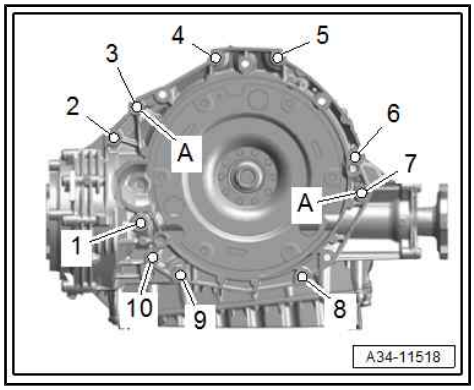
There is only one inspection hole -arrow B- on the circumference; turn the flywheel accordingly.

– Insert pin of assembly aid into hole on gearbox housing.

– Insert transportation lock - T40170- into gearbox housing from below and clamp onto flange shaft -1-.



– Check whether dowel sleeves -A- for centring engine and gearbox are fitted in cylinder block.
– Check whether aluminium bolts securing engine to gearbox can be reused; if so, apply marking ⇒ Rep. gr. 34 ; Removing and installing gearbox; Tightening torques for gearbox .
– Bring gearbox into position on engine and tighten bolts -3 … 10-.



Note

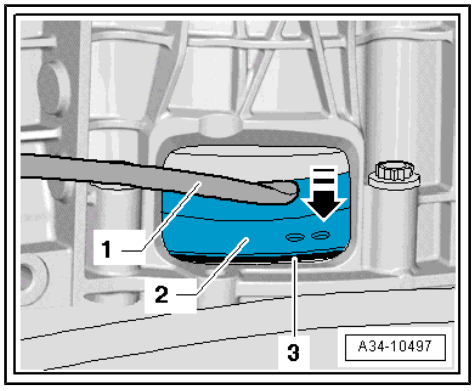
Apply a small amount of lubricant to the end seal if the starter cannot be installed easily.

– Install starter ⇒ Electrical system; Rep. gr. 27 ; Starter; Exploded view - starter .
– Remove transport lock - T40170- and assembly aid - T40169- .
– Install front exhaust pipe and emission control module ⇒ page 175 .
– Tighten bolts for tunnel cross member ⇒ Rep. gr. 34 ; Removing and installing gearbox; Tightening torques for gearbox .
– Install subframe and subframe shield ⇒ Running gear, axles, steering; Rep. gr. 40 ; Subframe; Exploded view - subframe .
– Secure intermediate steering shaft to steering rack ⇒ Running gear, axles, steering; Rep. gr. 48 ; Steering column; Removing and installing intermediate steering shaft .

Note

The following step is necessary to ensure that the flywheel is straight and that it makes even contact with the drive plate.

– Using assembly lever -1-, press flywheel -2- slightly against drive plate -3- -arrow-.

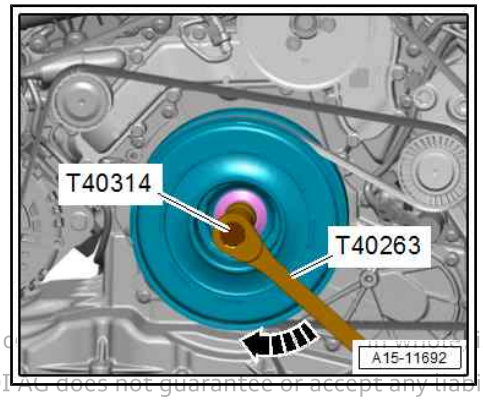


– Bolt flywheel onto drive plate as follows:

Caution

Irreparable damage can be caused if the camshaft timing chain slips.

- ***Turn crankshaft only in direction of engine rotation -arrow-.***



– Turn crankshaft with wrench, 21 mm - T40263- and adapter - T40314- .

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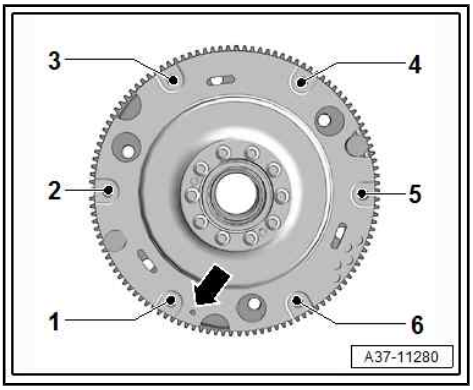

Note

Use ring spanner insert AF 16 - V.A.G 1332/14- to tighten bolts.

– Tighten first bolt -1- to 10 Nm and then slacken again; then tighten again to 2 Nm (hand tight).
– Turn crankshaft by 180° in direction of engine rotation.
– Tighten bolt -4- to specified torque ⇒ Rep. gr. 30 ; Clutch; Exploded view - flywheel and dual clutch .
– Turn crankshaft 60° at a time in direction of engine rotation and tighten bolts in the sequence -5, 6, 1, 2, 3-.

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

– Install manual release cable for parking lock ⇒ Rep. gr. 37 ; Selector mechanism .
– Connect SCR supply line ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; SCR (selective catalytic reduction) system; Exploded view - reducing agent supply line .
– Install air conditioner compressor ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Exploded view - air conditioner compressor drive unit .
– Install poly V-belt ⇒ Servicing 6-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 coupling rod ⇒ Running gear, axles, steering; Rep. gr. 40 ; Subframe; Exploded view - subframe .
– Install lower suspension links ⇒ Running gear, axles, steering; Rep. gr. 40 ; Lower suspension links, swivel joint; Exploded view - lower suspension links, swivel joint .
– Install track rod ball joint ⇒ Running gear, axles, steering; Rep. gr. 48 ; Steering rack; Exploded view - steering rack .
– Install engine control unit - J623- ⇒ page 162 .
– Electrical connections and routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
– Connect fuel hoses ⇒ Fuel supply system, diesel engines; Rep. gr. 20 ; Plug-in connectors; Disconnecting plug-in connectors .
– Observe steps required after re-connecting battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .

Caution

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

- ***Never use battery charging equipment for boost starting.***

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– Install air cleaner housing ⇒ page 136 .
– Fill with engine oil and check oil level ⇒ Maintenance ; Booklet 830 .

– Install propshaft ⇒ Rear final drive; Rep. gr. 39 ; Propshaft; Removing and installing propshaft .
– Install wheel spoiler and wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Exploded view - wheel housing liner (front) .
– Fit front wheels ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .
– Install lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front) .
– If engine was renewed, perform adaptions listed in Guided Function “0001 - Adapt learnt values - after component replacement” ⇒ Vehicle diagnostic tester.

Caution

Risk of damage to components.

- *Only perform additional adaptions for those components which were renewed after removal.*

– Bleed fuel system ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Injection system; Filling and bleeding fuel system .
– Install engine cover panel ⇒ page 45 .
– Connect coolant hoses with plug-in connector ⇒ page 111 .

Note

Do not reuse coolant.

– Fill up with coolant ⇒ page 87 .
– Check ATF level ⇒ Rep. gr. 34 ; ATF; Checking ATF level .
– Install underbody trim ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim; Exploded view - underbody trim .
– Install noise insulation panels ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation .

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2 Assembly mountings

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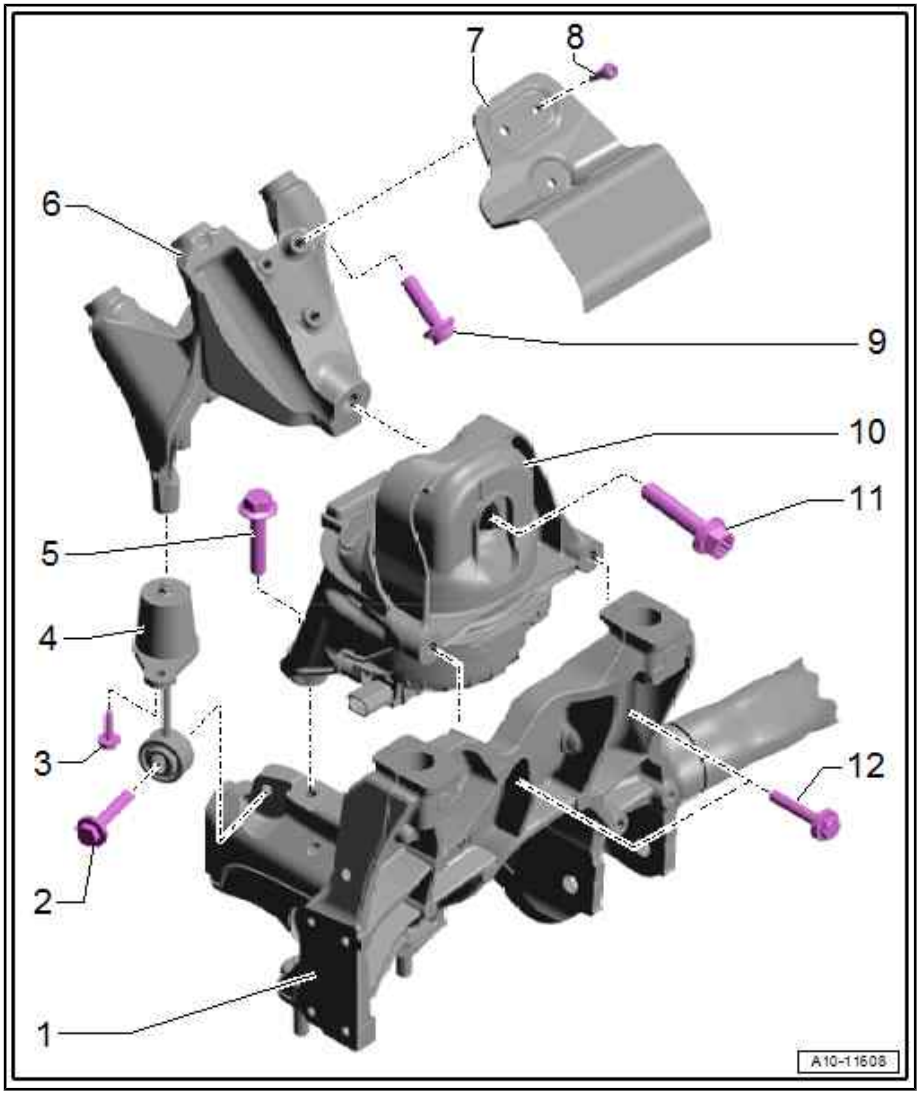
⇒ “2.1 Exploded view - assembly mountings”, page 35
⇒ “2.2 Supporting engine in installation position”, page 37
⇒ “2.3 Removing and installing engine mountings”, page 39
⇒ “2.5 Removing and installing gearbox mounting”, page 43

2.1 Exploded view - assembly mountings

Engine mounting



1 - Subframe

2 - Bolt
- ❑ 20 Nm

3 - Bolt
- ❑ 10 Nm

4 - Support mounting
- ❑ Removing and installing ⇒ page 42
- ❑ Installation position ⇒ page 36

5 - Bolt
- ❑ 55 Nm

6 - Engine support
- ❑ Removing and installing ⇒ page 50

7 - Heat shield

8 - Bolt
- ❑ 10 Nm

9 - Bolt
- ❑ 55 Nm

10 - Engine mounting
- ❑ with

♦ Left electrohydraulic engine mounting solenoid valve - N144-

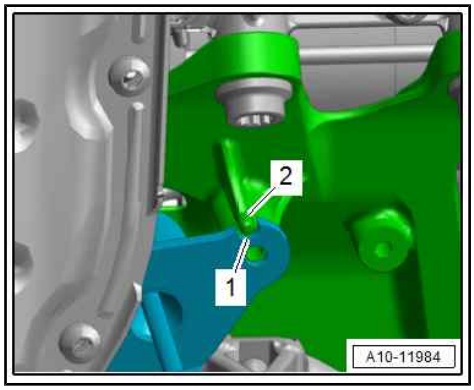
♦ Right electrohydraulic engine mounting solenoid valve - N145-
- ❑ Removing and installing ⇒ page 39

11 - Bolt
- ❑ Renew after removing
- ❑ 90 Nm +90°

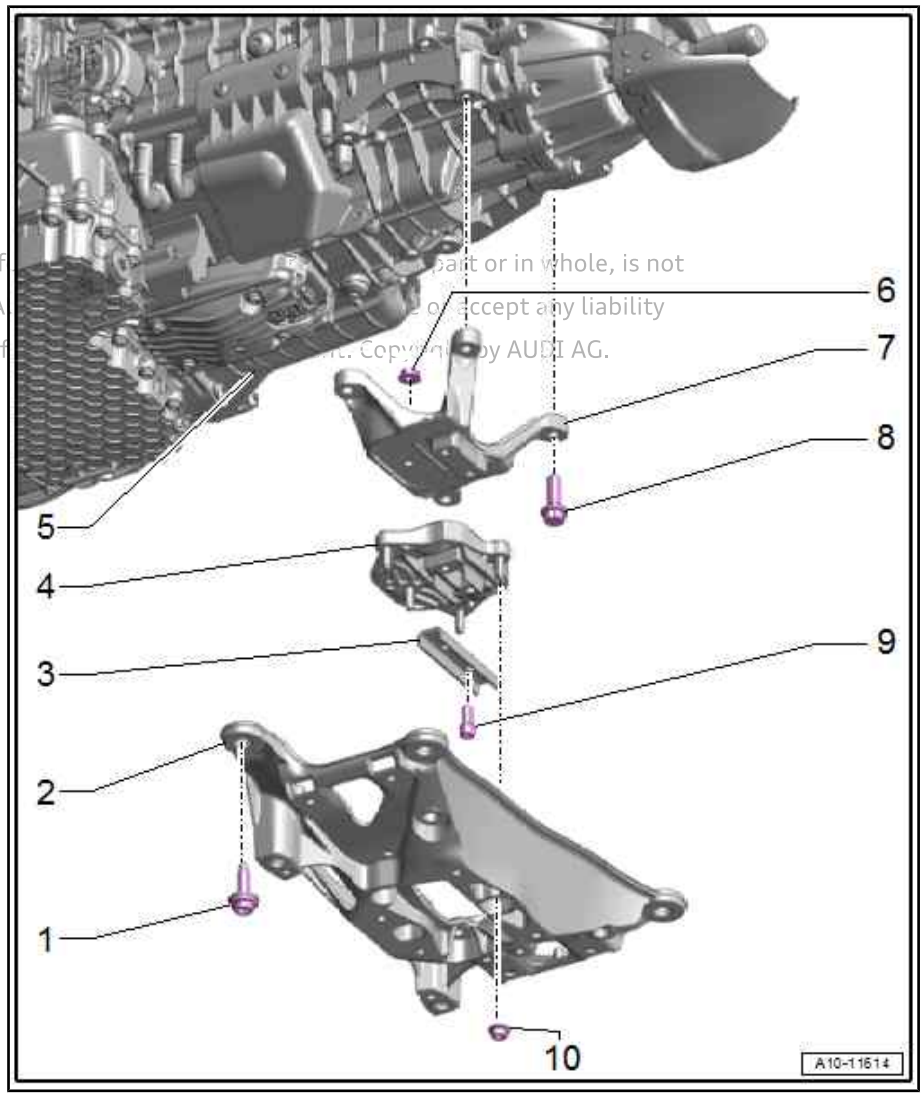
12 - Bolt
- ❑ 30 Nm

Installation position of support mounting

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



Gearbox mounting



1 - Bolt

- Tightening torques ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings
- Tightening torques ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Assembly mountings; Exploded view - assembly mountings

2 - Tunnel cross member

- Removing and installing ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings
- Removing and installing ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Assembly mountings; Exploded view - assembly mountings

3 - Stop plate

- For gearbox mounting

4 - Gearbox mounting

- Removing and installing ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings
- Removing and installing ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Assembly mountings; Exploded view - assembly mountings

5 - Gearbox

6 - Nut

- Only remove if detaching gearbox mounting from gearbox support
- Tightening torques ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings
- Tightening torques ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Assembly mountings; Exploded view - assembly mountings

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7 - Gearbox support

- ❑ Removing and installing ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings
- ❑ Removing and installing ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Assembly mountings; Exploded view - assembly mountings

8 - Bolt

- ❑ Tightening torques ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings
- ❑ Tightening torques ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Assembly mountings; Exploded view - assembly mountings

9 - Bolt

- ❑ Only remove if detaching gearbox mounting from gearbox support
- ❑ Tightening torques ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings
- ❑ Tightening torques ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Assembly mountings; Exploded view - assembly mountings

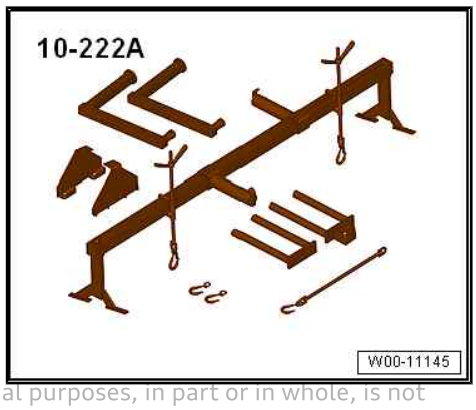
10 - Nut

- ❑ Only remove if detaching gearbox mounting from gearbox support
- ❑ Tightening torques ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings
- ❑ Tightening torques ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Assembly mountings; Exploded view - assembly mountings

2.2 Supporting engine in installation position

Special tools and workshop equipment required

- ♦ Support bracket - 10-222A-



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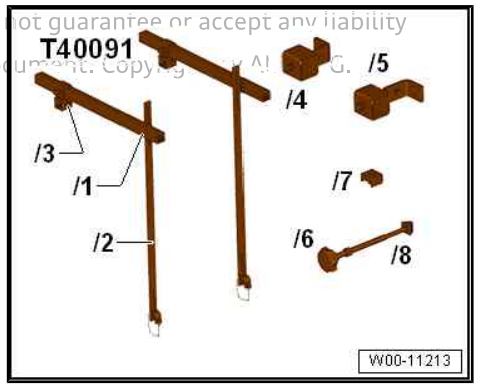
- ♦ Engine support (basic set) - T40091-



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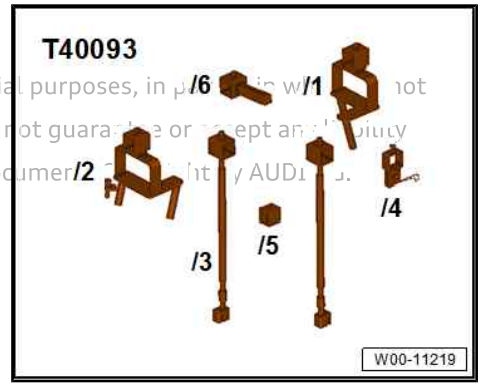
- Engine support bracket (supplementary set) - T40093-



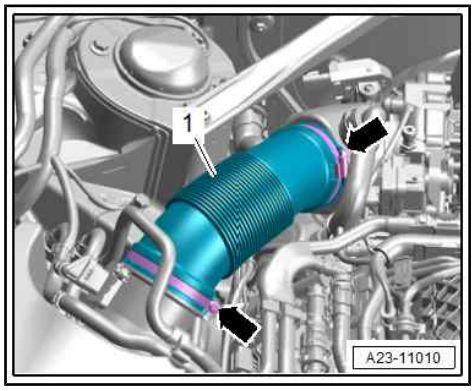
Procedure

WARNING

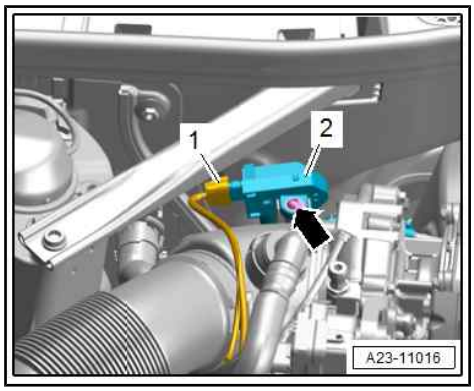
Risk of accident when weight of engine is shifted.

- *In order to support the engine as described below, the gearbox and tunnel cross members must be installed.*

– Remove engine cover panel ⇒ page 45 .
– Release screw-type clips -arrows- and detach air pipe -1-.



– Remove bolt -arrow-.
– Unplug electrical connector -1-.
– Move bracket -2- clear with pressure differential sender - G505- .



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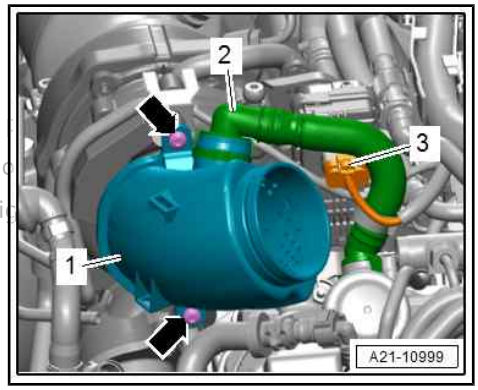
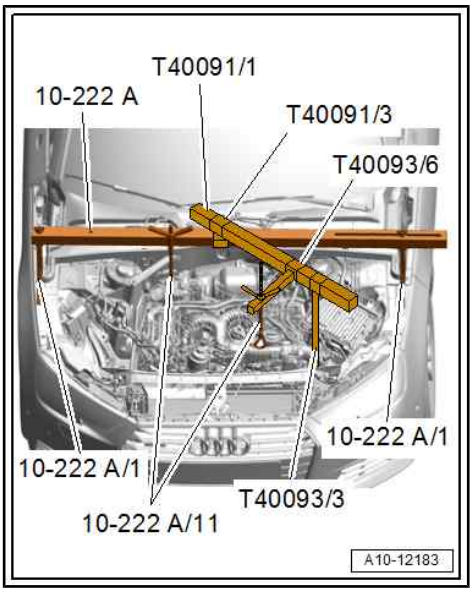
– Press release tabs on both sides and disconnect crankcase breather hose -2-.
– Unscrew bolts -arrows- and detach intake connecting pipe -1-.



Note

Disregard -item 3-.

– Set up support bracket - 10-222A- on longitudinal members (left and right), as shown.
– Engage spindles -10-222A/11- at engine lifting eyes (left and right).
– Tighten spindles slightly to take up weight of engine, but do not lift.



Attaching

Assembly is performed in reverse sequence; note the following:

Note

Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .

– Install engine cover panel ⇒ page 45 .

Tightening torques

- ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Exploded view - turbocharger
- ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Exploded view - hose connections for charge air system
- ⇒ Fig. ""Bracket with pressure differential sender -G505- - tightening torque"" , page 158

2.3 Removing and installing engine mountings

⇒ "2.3.1 Removing and installing engine mounting (left-side)", page 39

⇒ "2.3.2 Removing and installing engine mounting (right-side)", page 41

2.3.1 Removing and installing engine mounting (left-side)

Removing

– Support engine in installation position ⇒ page 37 and take up weight with spindle - 10-222A/11- until load on engine mounting is relieved.

Caution

Risk of damage to drive shafts.

- *When lifting the engine, the drive shafts must not make contact with the suspension struts.*

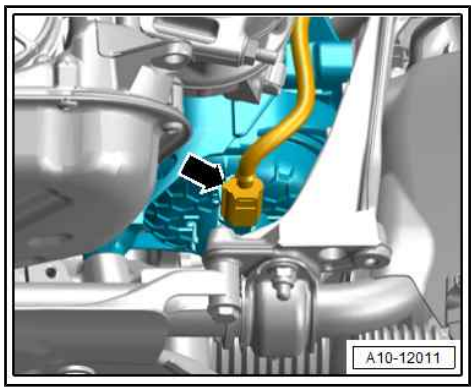
– Remove noise insulation (front) ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .

– Remove front left wheel spoiler ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Removing and installing wheel housing liner (front) .

– Remove poly V-belt from air conditioner compressor pulley ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Removing and installing poly V-belt .

– Remove air conditioner compressor from bracket and tie up to left side ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Detaching and attaching air conditioner compressor at bracket .

– Unplug electrical connector -arrow- for left electrohydraulic engine mounting solenoid valve - N144- .



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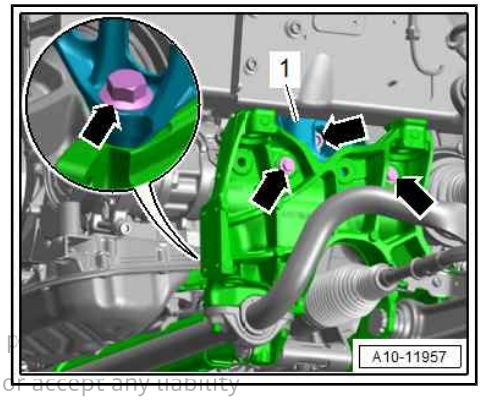
– Remove bolts -arrows- and detach engine mounting -1-.



Installing

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

Note

After removing, renew bolts tightened with specified tightening angle.

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– Electrical connections and routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
– Install poly V-belt ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Removing and installing poly V-belt .

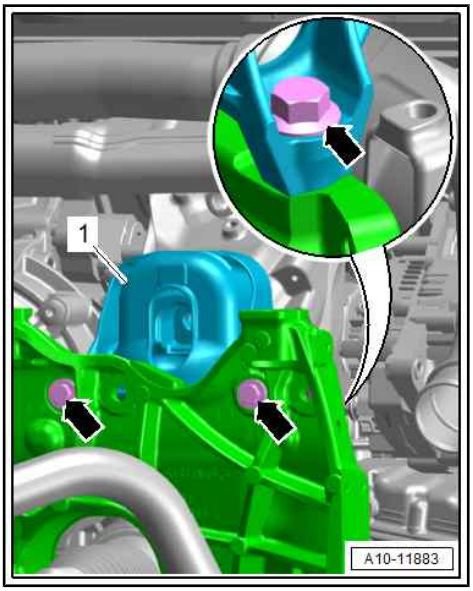
Tightening torques

- ⇒ “2.1 Exploded view - assembly mountings”, page 35
- ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Exploded view - air conditioner compressor drive unit
- ⇒ 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

2.3.2 Removing and installing engine mounting (right-side)

Removing

– Lower subframe ⇒ Running gear, axles, steering; Rep. gr. 40 ; Subframe; Lowering subframe .
– Remove bolts -arrows- and detach engine mounting (right-side) -1-.



Installing

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

Note

After removing, renew bolts tightened with specified tightening angle.

– Install subframe ⇒ Running gear, axles, steering; Rep. gr. 40 ; Subframe; Lowering subframe .

Tightening torques

- ⇒ “2.1 Exploded view - assembly mountings”, page 35

2.4 Removing and installing support mounting

⇒ “2.4.1 Removing and installing support mounting (left-side)”, page 42

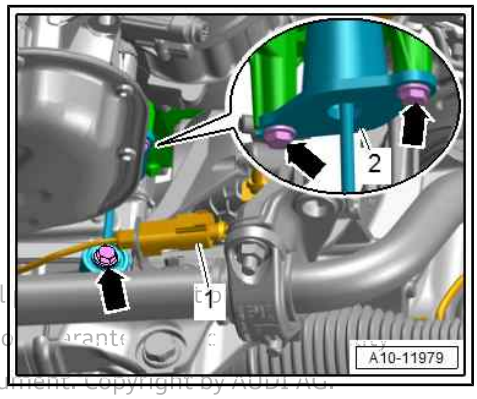
⇒ “2.4.2 Removing and installing support mounting (right-side)”, page 42

2.4.1 Removing and installing support mounting (left-side)

Removing

– Remove noise insulation panels ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .

– Remove bolts -arrows- and detach support mounting (left-side) -2-.



Installing

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

Note

After removing, renew bolts tightened with specified tightening angle.

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- Installation position ⇒ page 36 .

Tightening torques

◆ ⇒ “2.1 Exploded view - assembly mountings”, page 35

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

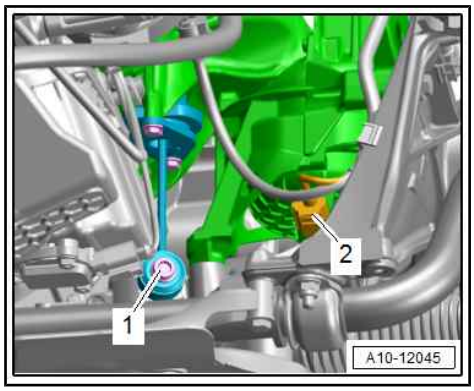
2.4.2 Removing and installing support mounting (right-side)

Removing

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

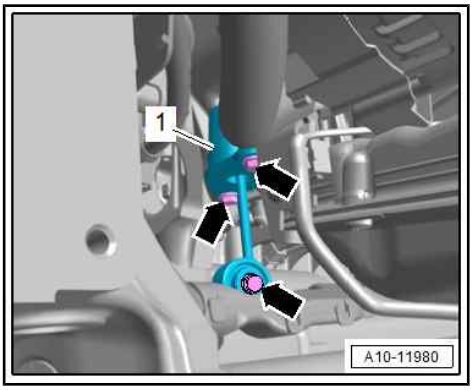
– Support engine in installation position ⇒ page 37 .

– Remove bolt -1- for support mounting (left-side).



– Remove bolts -arrows- for support mounting (right-side) -1-.

– Raise engine slightly with spindle - 10-222A/11- and detach support mounting towards left.



Installing

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

- Installation position ⇒ page 36 .

Tightening torques

◆ ⇒ “2.1 Exploded view - assembly mountings”, page 35

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

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2.5 Removing and installing gearbox mounting

⇒ “2.5.1 Removing and installing gearbox support with gearbox mounting”, page 43

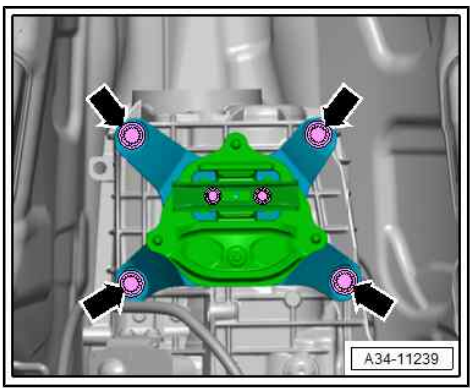
⇒ “2.5.2 Removing and installing gearbox mounting”, page 44

2.5.1 Removing and installing gearbox support with gearbox mounting

Removing

– Remove tunnel cross member ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings , or ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Assembly mountings; Exploded view - assembly mountings .

– Remove bolts -arrows- and detach gearbox support and gearbox mounting from gearbox.



Installing

Installation is carried out in reverse sequence.

Tightening torques

◆ ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings

◆ ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Assembly mountings; Exploded view - assembly mountings

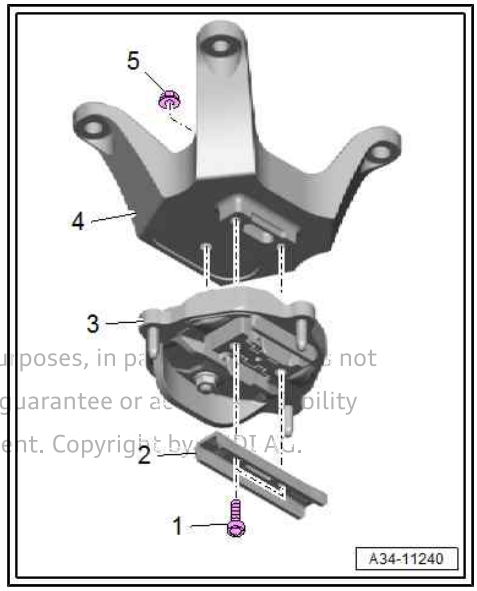
2.5.2 Removing and installing gearbox mounting

Removing

– Remove gearbox support with gearbox mounting ⇒ page 43 .

– Unscrew bolts -1- and detach stop -2- for gearbox mounting.

– Remove nut -5- and detach gearbox mounting -3- from gearbox support -4-.



Installing

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

– Tighten nut -5- hand-tight initially.

– Tighten bolts -1- and then nut -5-.

– Install gearbox support with gearbox mounting ⇒ page 43 .

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Tightening torques

- ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings
- ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Assembly mountings; Exploded view - assembly mountings

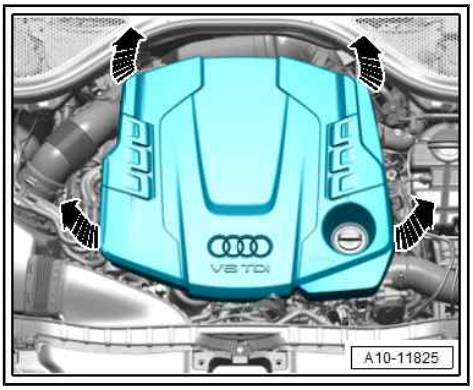
3 Engine cover panel

⇒ “3.1 Removing and installing engine cover panel”, page 45

3.1 Removing and installing engine cover panel

Removing

– 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.



Installing

– To avoid damage, do not strike the engine cover panel with your fist or with any kind of tool.

– When fitting engine cover panel, take care not to damage oil filler neck.

– First press engine cover panel onto rear retaining pins and then onto front retaining pins with both hands.

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13 – Crankshaft group

1 Cylinder block (pulley end)

⇒ “1.1 Exploded view - cylinder block (pulley end)”, page 46

⇒ “1.2 Exploded view - sealing flange (pulley end)”, page 48

⇒ “1.3 Removing and installing poly V-belt”, page 49

⇒ “1.4 Removing and installing tensioner for poly V-belt”, page 49

⇒ “1.5 Removing and installing vibration damper”, page 49

⇒ “1.6 Removing and installing bracket for ancillaries”, page 50

⇒ “1.7 Removing and installing engine support”, page 50

⇒ “1.8 Renewing crankshaft oil seal (pulley end)”, page 51

⇒ “1.9 Removing and installing sealing flange (pulley end)”, page 51

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1.1 Exploded view - cylinder block (pulley end)

1 - Poly V-belt

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Exploded view - cylinder block (pulley end)
- ❑ Removing and installing ⇒ page 49

2 - Vibration damper

- ❑ With poly V-belt pulley
- ❑ Removing and installing ⇒ page 49

3 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Exploded view - cylinder block (pulley end)

4 - Idler roller

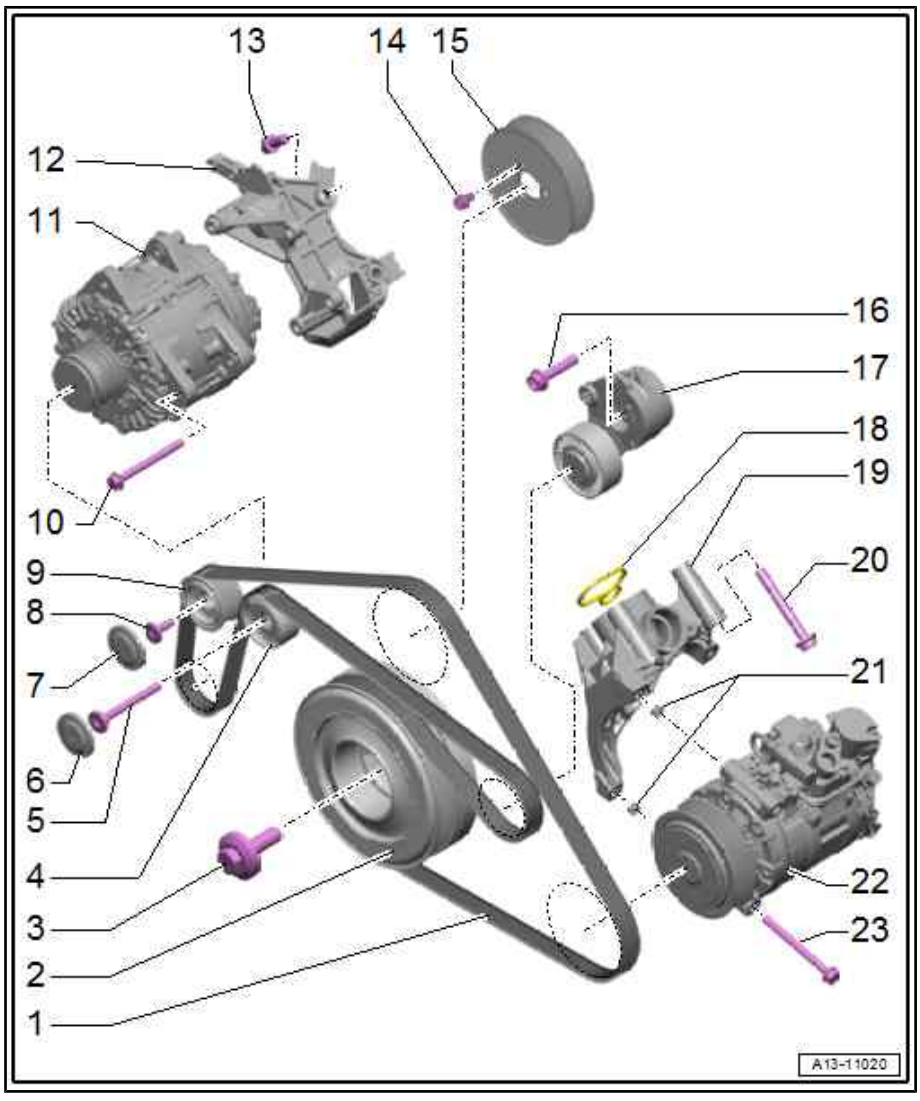
- ❑ For poly V-belt

5 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Exploded view - cylinder block (pulley end)

6 - Cover

- ❑ For idler roller



7 - Cover

- ❑ For idler roller

8 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Exploded view - cylinder block (pulley end)

9 - Idler roller

- ❑ For poly V-belt

10 - Bolt

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

11 - Alternator

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

12 - Bracket

- ❑ For alternator
- ❑ Removing and installing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Removing and installing bracket for ancillaries

13 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Exploded view - cylinder block (pulley end)

14 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - coolant pump

15 - Pulley

- ❑ For coolant pump

16 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Exploded view - cylinder block (pulley end)

17 - Tensioner for poly V-belt

- ❑ Removing and installing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Removing and installing tensioner for poly V-belt

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18 - Gasket

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Exploded view - cylinder block (pulley end)

19 - Bracket

- ❑ For air conditioner compressor
- ❑ Removing and installing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Removing and installing bracket for ancillaries

20 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Exploded view - cylinder block (pulley end)

21 - Dowel sleeves

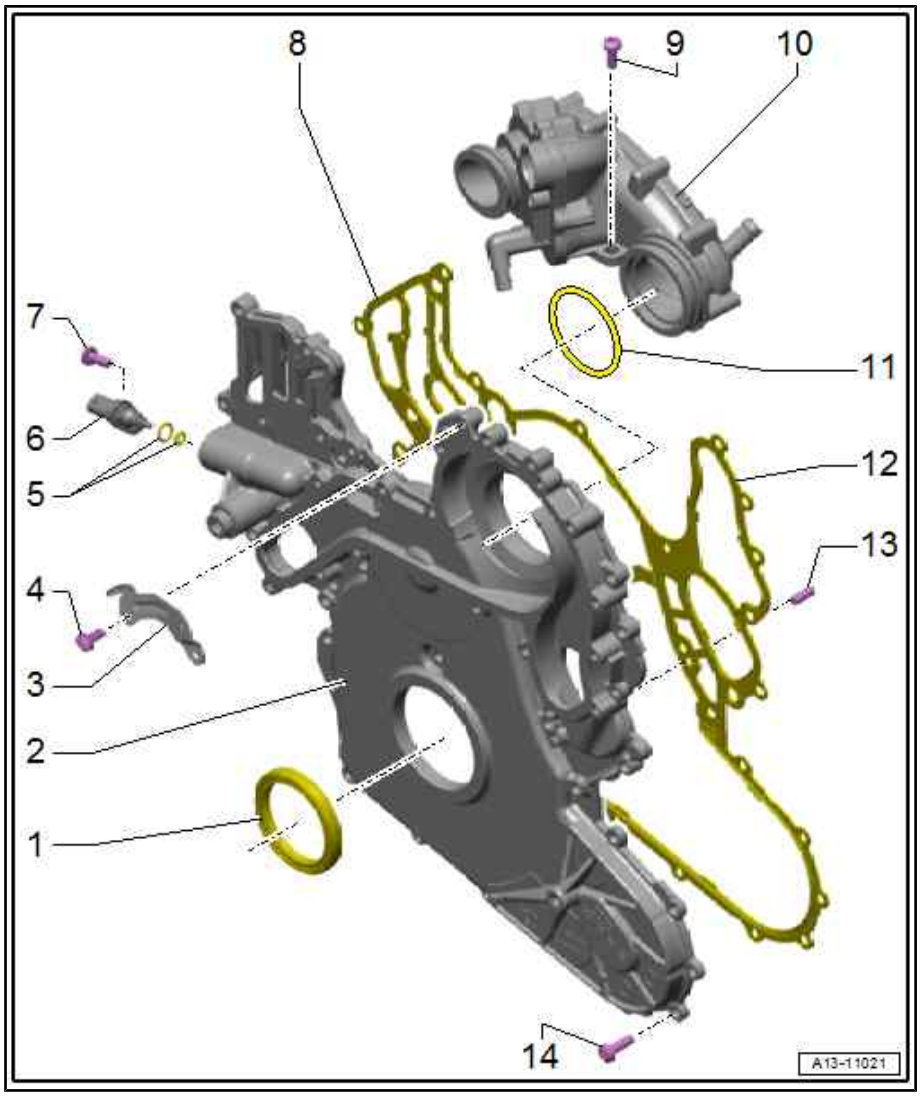
22 - Air conditioner compressor

- ❑ Removing and installing ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Detaching and attaching air conditioner compressor at bracket

23 - Bolt

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

1.2 Exploded view - sealing flange (pulley end)



1 - Oil seal

- ❑ For crankshaft (pulley end)
- ❑ Renewing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Renewing crankshaft oil seal (pulley end)

2 - Sealing flange (pulley end)

- ❑ Removing and installing ⇒ page 51

3 - Bracket

- ❑ For intake manifold flap motor - V157-

4 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Exploded view - sealing flange (pulley end)

5 - O-rings

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Exploded view - cylinder block (pulley end)

6 - Oil temperature sender 2 - G664-

- ❑ Removing and installing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Oil filter/oil pressure switch ; Removing and installing oil temperature sender 2 - G664-

7 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Exploded view - sealing flange (pulley end)

8 - Gasket

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Exploded view - cylinder block (pulley end)

9 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - coolant pump

10 - Thermostat housing

- ❑ Exploded view ⇒ page 91

11 - O-ring

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Exploded view - cylinder block (pulley end)

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12 - Gasket

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Exploded view - cylinder block (pulley end)

13 - Dowel pin

- ❑ 2x

14 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-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

Removing

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

All other procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Removing and installing poly V-belt .

Tightening torques

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

1.4 Removing and installing tensioner for poly V-belt

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Removing and installing tensioner for poly V-belt .

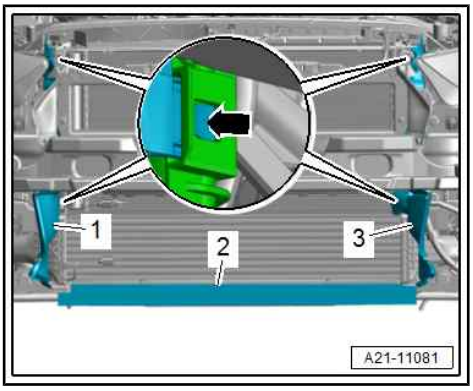
1.5 Removing and installing vibration damper

Removing

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

– Release catches -arrow- and detach air ducts -1, 3-.

– Unclip air duct (bottom) -2-.



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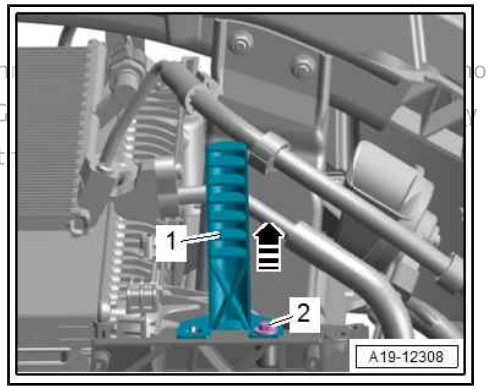
– Remove bolt -2- on both sides and press radiator bracket -1- with radiator towards front -arrow-.



All other procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Removing and installing vibration damper .

Installing

Additional work:

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

Tightening torques

◆ ⇒ “4.1 Exploded view - radiator/radiator fan”, page 110

1.6 Removing and installing bracket for ancillaries

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Removing and installing bracket for ancillaries .

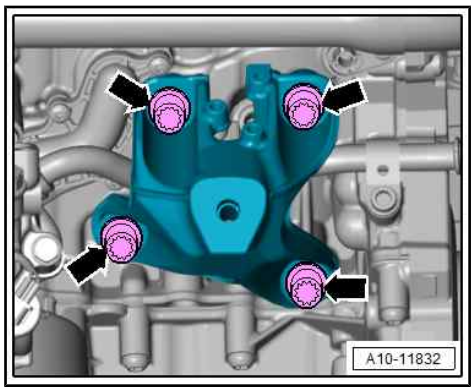
1.7 Removing and installing engine support

Removing

– Remove engine mounting ⇒ page 39 .

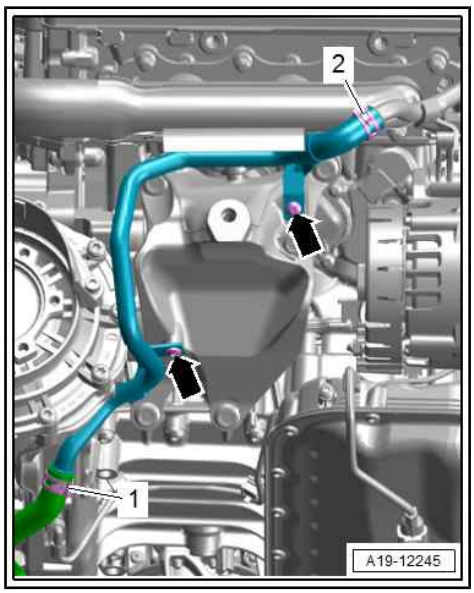
Engine support (left-side):

– Unscrew bolts -arrows- and remove engine support.



Engine support (right-side):

– Remove bolts -arrows- and press coolant pipe (right-side) slightly to one side.

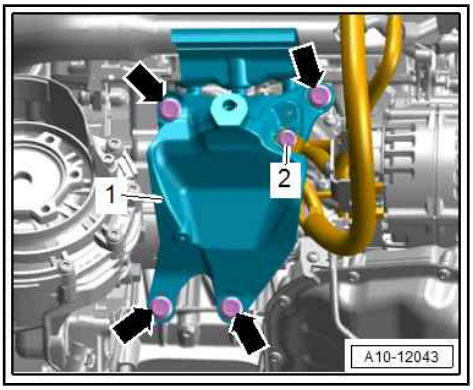


Note

Disregard items -1 and 2-.

– Remove bolt -2- for earth wire.

– Remove bolts -arrows- and detach engine support -1-.



Installing

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

– Install engine mountings ⇒ page 39 .

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

Tightening torques

◆ ⇒ “2.1 Exploded view - assembly mountings”, page 35

◆ ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pipes; Exploded view - coolant pipes

1.8 Renewing crankshaft oil seal (pulley end)

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Renewing crankshaft oil seal (pulley end) .

1.9 Removing and installing sealing flange (pulley end)

Removing

– Drain off engine oil ⇒ Maintenance ; Booklet 830 .

– Remove oil filter element ⇒ Maintenance ; Booklet 830 .

– Remove intake manifold flap motor ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Removing and installing intake manifold flap motor - V157- .

All other procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Removing and installing sealing flange (pulley end) .

Installing

Additional work:

– Install intake manifold flap motor ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Removing and installing intake manifold flap motor - V157- .

– Install oil filter element and fill up with engine oil ⇒ Maintenance ; Booklet 830 .

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2 Cylinder block (gearbox end)

All procedures and components are described in ⇒ Servicing 6-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 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Crankshaft .

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4 Balance shaft

All procedures and components are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Balance shaft .

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5 Pistons and conrods

All procedures and components are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Pistons and conrods .

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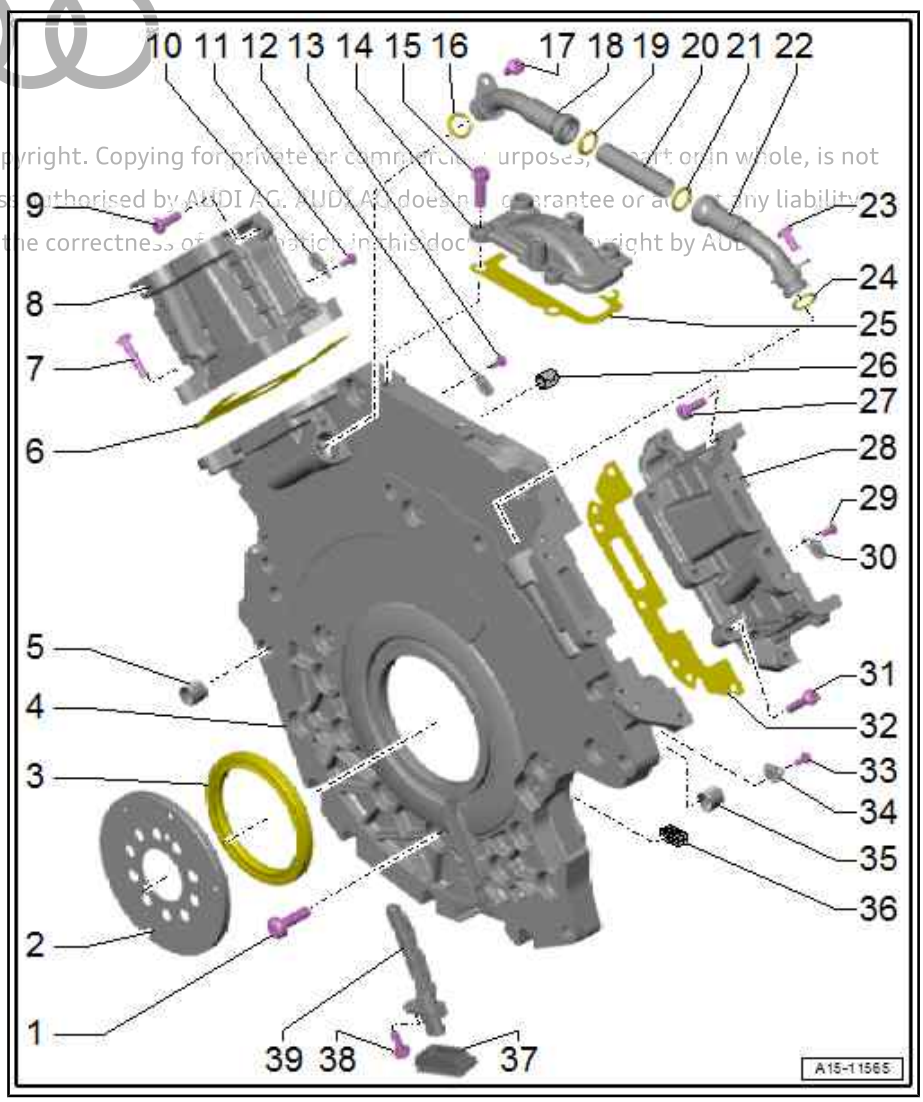
15 – Cylinder head, valve gear

1 Timing chain cover

⇒ “1.1 Exploded view - timing chain cover”, page 56

⇒ “1.2 Removing and installing timing chain cover”, page 58

1.1 Exploded view - timing chain cover



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1 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Timing chain cover; Exploded view - timing chain cover

2 - Sender wheel

- ❑ For engine speed sender - G28-
- ❑ Removing and installing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Crankshaft; Removing and installing sender wheel

3 - Oil seal

- ❑ For crankshaft (gearbox end)
- ❑ Renewing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (gearbox end); Renewing crankshaft oil seal (gearbox end)

4 - Timing chain cover (bottom)

- ❑ Removing and installing ⇒ page 58

5 - Dowel sleeve

- ❑ 2x

6 - Gasket

- ❑ Renew after removing

7 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Timing chain cover; Exploded view - timing chain cover

8 - Timing chain cover (left-side)

- ❑ Removing and installing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Timing chain cover; Removing and installing timing chain cover

9 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Timing chain cover; Exploded view - timing chain cover

10 - Reed valve

- ❑ For crankcase breather

11 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Timing chain cover; Exploded view - timing chain cover

12 - Reed valve

- ❑ For crankcase breather

13 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Timing chain cover; Exploded view - timing chain cover

14 - Cover

15 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Timing chain cover; Exploded view - timing chain cover

16 - O-ring

- ❑ Renew after removing

17 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Timing chain cover; Exploded view - timing chain cover

18 - Line

- ❑ For crankcase breather

19 - O-ring

- ❑ Renew after removing

20 - Line

- ❑ For crankcase breather

21 - O-ring

- ❑ Renew after removing

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22 - Line

- ❑ For crankcase breather

23 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Timing chain cover; Exploded view - timing chain cover

24 - O-ring

- ❑ Renew after removing

25 - Gasket

- ❑ Renew after removing

26 - Clamping sleeve

- ❑ 3x
- ❑ Prevents ingress of lubricant into threaded hole

27 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Timing chain cover; Exploded view - timing chain cover

28 - Timing chain cover (right-side)

- ❑ Removing and installing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Timing chain cover; Removing and installing timing chain cover

29 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Timing chain cover; Exploded view - timing chain cover

30 - Reed valve

- ❑ For crankcase breather

31 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Timing chain cover; Exploded view - timing chain cover

32 - Gasket

- ❑ Renew after removing

33 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Timing chain cover; Exploded view - timing chain cover

34 - Reed valve

- ❑ For crankcase breather

35 - Dowel sleeve

36 - Sealing element

37 - Not fitted

38 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 28 ; Glow plug system; Exploded view - glow plug system

39 - Engine speed sender - G28-

- ❑ Exploded view ⇒ page 196

1.2 Removing and installing timing chain cover

⇒ “1.2.1 Removing and installing timing chain cover (top)”, page 58

⇒ “1.2.2 Removing and installing timing chain cover (bottom)”, page 58

1.2.1 Removing and installing timing chain cover (top)

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Timing chain cover; Removing and installing timing chain cover .

1.2.2 Removing and installing timing chain cover (bottom)

Removing

- Gearbox removed ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Removing and installing gearbox; Removing gearbox
- Gearbox removed ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Removing and installing gearbox
- Steering rack secured to subframe with original bolts (bolts should be tightened to specified torque but not turned through specified angle).

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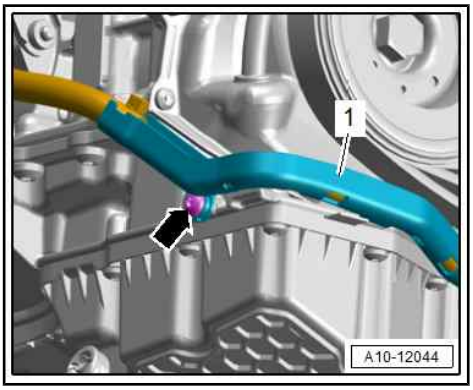
– Lower engine evenly using spindles -10-222/11- until spindle at engine lifting eye at rear right is loosened.
– Disengage spindle from engine lifting eye at rear right and move clear to one side.



WARNING

Risk of injury

- *The engine must be secured with the spindle at the engine lifting eye (front left) to keep it from tipping.*

All further procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Timing chain cover; Removing and installing timing chain cover .

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2 Chain drive

All procedures and components are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Chain drive .

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3 Cylinder head

⇒ “3.1 Exploded view - cylinder head”, page 61
⇒ “3.2 Exploded view - cylinder head cover”, page 63
⇒ “3.3 Removing and installing cylinder head”, page 65
⇒ “3.4 Removing and installing cylinder head cover”, page 65
⇒ “3.5 Removing and installing seals for injectors”, page 67
⇒ “3.6 Checking compression”, page 68

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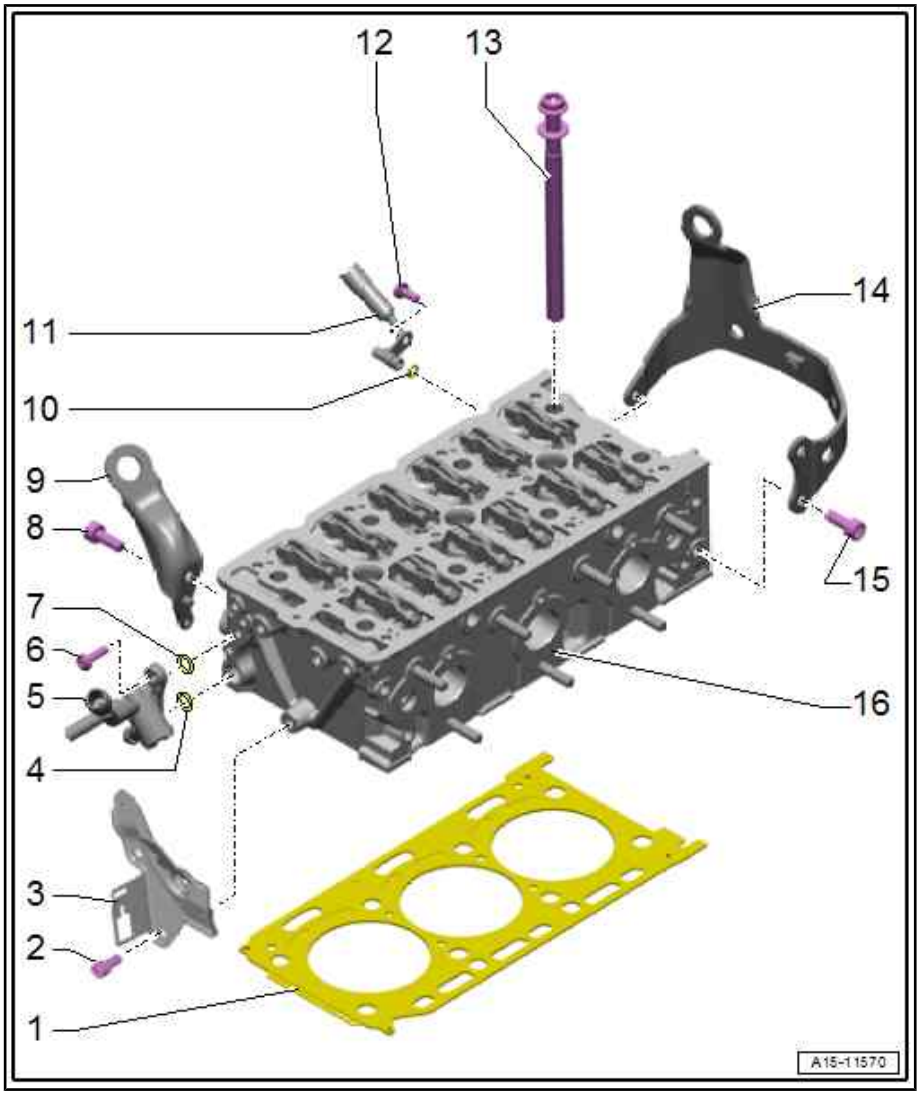
3.1 Exploded view - cylinder head

Note

Illustration shows the cylinder head for cylinder bank 2 (left-side) as an example.



1 - Cylinder head gasket

- ❑ Renewing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Removing and installing cylinder head .
- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Exploded view - cylinder head

2 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Exploded view - cylinder head

3 - Bracket

4 - O-ring

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Exploded view - cylinder head

5 - Coolant pipe

6 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Exploded view - cylinder head

7 - Seal

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Exploded view - cylinder head

8 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Exploded view - cylinder head

9 - Engine lifting eye

10 - O-ring

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Exploded view - cylinder head

11 - Coolant pipe

12 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pipes; Exploded view - coolant pipes

13 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Exploded view - cylinder head

14 - Engine lifting eye

15 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Exploded view - cylinder head

16 - Cylinder head

- ❑ Removing and installing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Removing and installing cylinder head
- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Exploded view - cylinder head

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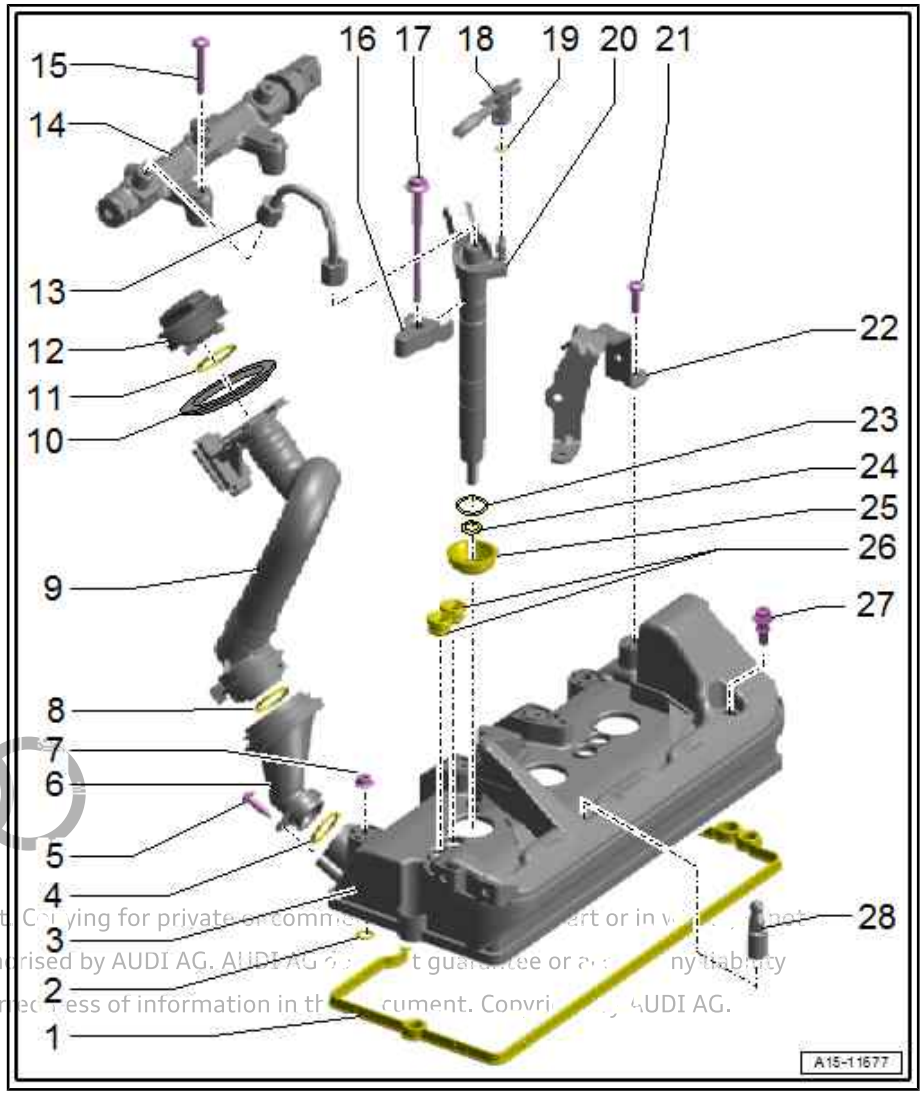
3.2 Exploded view - cylinder head cover

Note

Illustration shows the cylinder head cover for cylinder bank 2 (left-side) as an example.



1 - Gasket

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Exploded view - cylinder head cover

2 - O-ring

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Exploded view - cylinder head cover

3 - Cylinder head cover

- ❑ Removing and installing ⇒ page 65

4 - O-ring

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Exploded view - cylinder head cover

5 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Exploded view - cylinder head cover

6 - Oil filler neck

7 - Nut

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Exploded view - cylinder head cover

8 - Not fitted

9 - Not fitted

10 - Grommet

11 - Seal

- ❑ For sealing cap
- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Exploded view - cylinder head cover

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12 - Filler cap

13 - High-pressure pipe

- ❑ Installing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Removing and installing high-pressure pipes

14 - High-pressure reservoir (rail)

15 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Exploded view - injectors

16 - Clamping piece

- ❑ Removing and installing ⇒ “5.8 Removing and installing injectors”, page 146

17 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Exploded view - injectors

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18 - Fuel return hose

19 - O-ring

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Exploded view - cylinder head cover

20 - Injector

- ❑ Removing and installing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Removing and installing injectors ⇒ page 146

21 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Exploded view - cylinder head cover

22 - Bracket

23 - O-ring

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Exploded view - cylinder head cover

24 - Copper seal

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Exploded view - cylinder head cover

25 - Seal

- ❑ For injector
- ❑ Renewing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Removing and installing seals for injectors

26 - Grommets

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Exploded view - cylinder head cover

27 - Bolt

- ❑ With seal
- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Exploded view - cylinder head cover

28 - Ball stud

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Exploded view - cylinder head cover

3.3 Removing and installing cylinder head

Removing

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Removing and installing cylinder head .

Installing

Additional work:

– Change engine oil ⇒ Maintenance ; Booklet 830 .

3.4 Removing and installing cylinder head cover

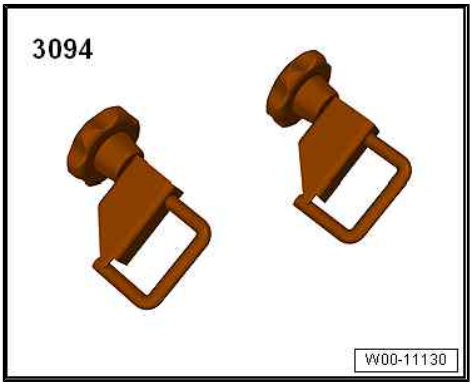
⇒ "3.4.1 Removing and installing cylinder head cover - bank 1 (right-side)", page 65

⇒ "3.4.2 Removing and installing cylinder head cover - bank 2 (left-side)", page 66

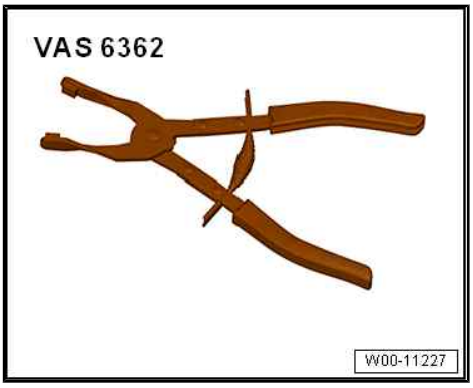
3.4.1 Removing and installing cylinder head cover - bank 1 (right-side)

Special tools and workshop equipment required

♦ Hose clamps, up to 25 mm - 3094-



♦ Hose clip pliers - VAS 6362-



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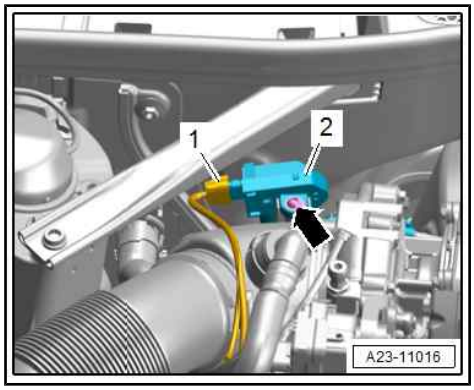
Removing

– Remove air cleaner housing ⇒ page 136 .

– Remove bolt -arrow-.

– Unplug electrical connector -1-.

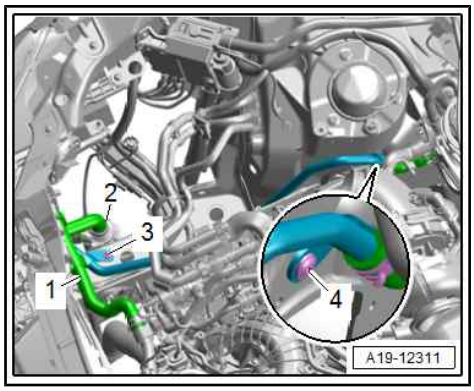
– Move bracket -2- clear with pressure differential sender -G505- .



– Clamp off coolant hose -1- with hose clamp up to 25 mm -3094- and move it clear.

– Clamp off coolant hose using -3094- , release hose clip -2- and disconnect hose.

– Remove nut -3- and bolt -4- and pivot coolant pipe (right-side) at longitudinal member towards rear.



All further procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Removing and installing cylinder head .

Installing

Additional work:

– Install air cleaner housing ⇒ page 136 .

Tightening torques

- ⇒ Fig. ""Bracket with pressure differential sender -G505- - tightening torque"" , page 158
- ⇒ Fig. ""Coolant pipe (right-side) on longitudinal member - tightening torques"" , page 99

3.4.2 Removing and installing cylinder head cover - bank 2 (left-side)

Special tools and workshop equipment required

- Removal lever - 80-200-

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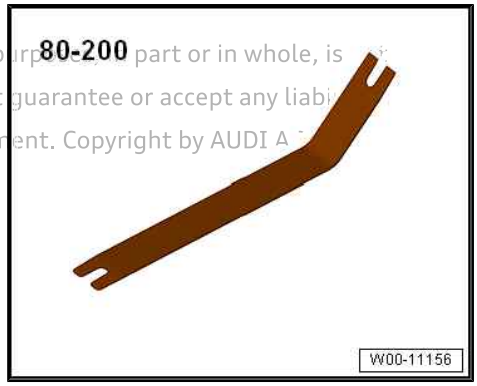


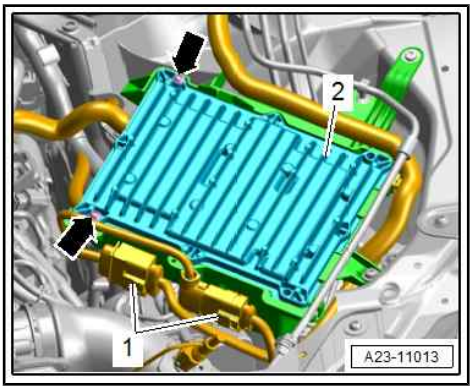
- Sealant ⇒ Electronic parts catalogue

Removing

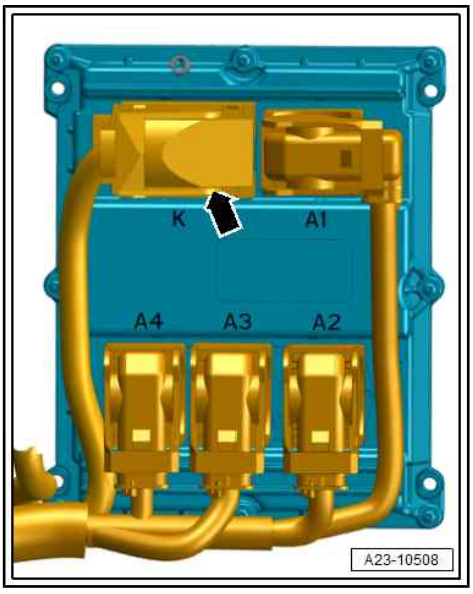
– Remove engine cover panel ⇒ page 45 .

– Disconnect battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .

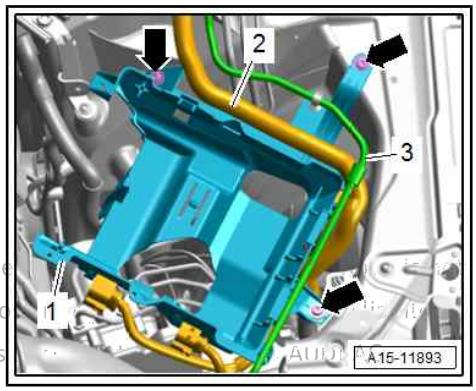
– Take electrical connectors -1- out of bracket, disconnect them and move electrical wiring clear.
– Remove bolts -arrows- and detach engine control unit - J623- -item 2-.



– Unplug electrical connector “K” -arrow-.
– Place engine control unit - J623- on engine and secure to prevent it from dropping.



– Move coolant line -3- and electrical wiring harness -2- clear.
– Remove bolts -arrows- and detach bracket -1- for engine control unit.



All further procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Removing and installing cylinder head .

Installing

Additional work:

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– Observe steps required after re-connecting battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .
– Install engine cover panel ⇒ page 45 .

Tightening torques

◆ ⇒ “9.1 Exploded view - engine control unit”, page 161

3.5 Removing and installing seals for injectors

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Removing and installing seals for injectors .

3.6 Checking compression

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Checking compression .

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4 Valve gear

All procedures and components are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Valve gear .

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5 Inlet and exhaust valves

All procedures and components are described in ⇒ Servicing 6-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 71

⇒ “1.2 Engine oil”, page 74

⇒ “1.3 Removing and installing sump (bottom section)”, page 75

⇒ “1.4 Removing and installing sump (top section)”, page 75

⇒ “1.5 Removing and installing oil pump”, page 75

⇒ “1.6 Removing and installing oil level and oil temperature sender G266 ”, page 75

1.1 Exploded view - sump/oil pump

Note

Oil spray jet for piston cooling ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Pistons and conrods; Exploded view - pistons and conrods

Sump (bottom section)/oil pump

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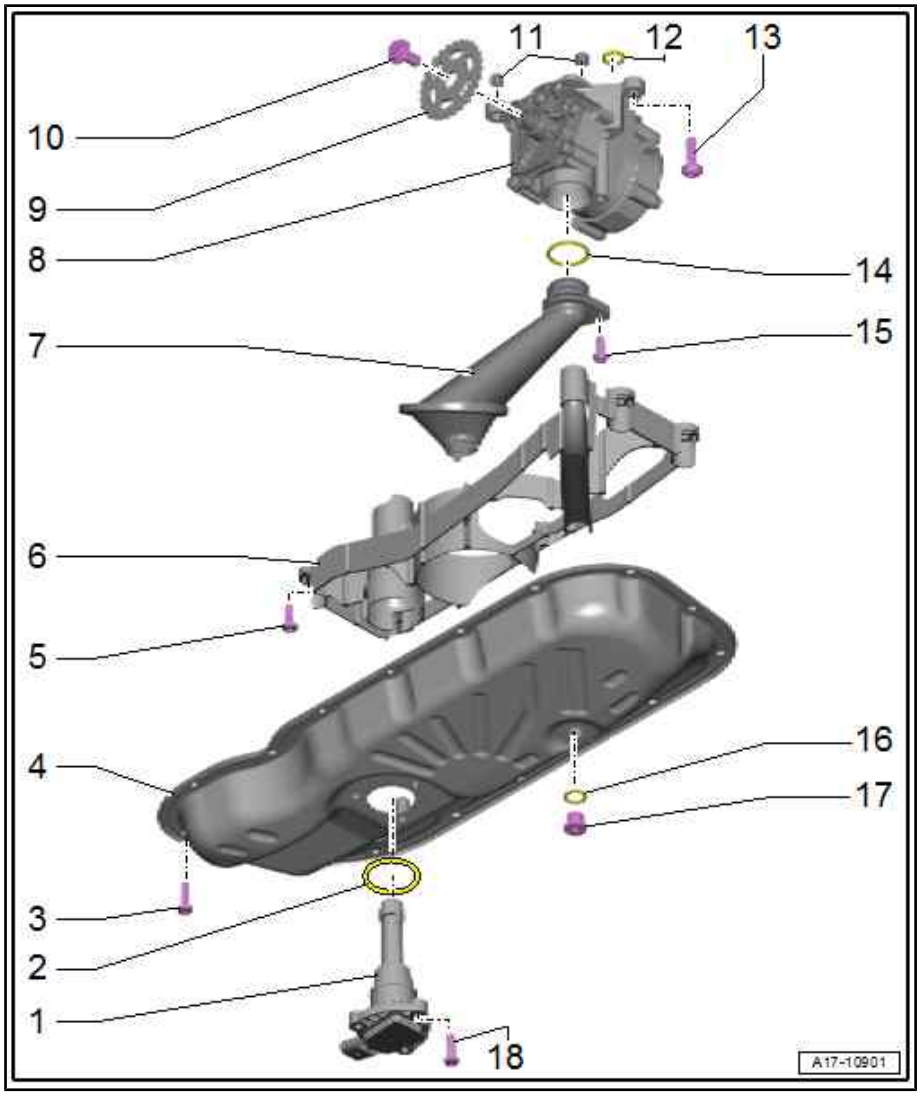

1 - Oil level and oil temperature sender - G266-

- ❑ Removing and installing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Removing and installing oil level and oil temperature sender - G266-

2 - Seal

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Exploded view - sump/oil pump

3 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Exploded view - sump/oil pump

4 - Sump (bottom section)

- ❑ Removing and installing ⇒ page 75

5 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Exploded view - sump/oil pump

6 - Baffle plate

7 - Suction pipe

8 - Oil pump

- ❑ With vacuum pump for brake servo
- ❑ Removing and installing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Removing and installing oil pump

9 - Chain sprocket

- ❑ For oil pump

10 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Exploded view - sump/oil pump

11 - Dowel sleeves

12 - Seal

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Exploded view - sump/oil pump

13 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Exploded view - sump/oil pump

14 - O-ring

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Exploded view - sump/oil pump

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15 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Exploded view - sump/oil pump

16 - Seal

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Exploded view - sump/oil pump

17 - Oil drain plug

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Exploded view - sump/oil pump

18 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Exploded view - sump/oil pump

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Sump (top section)

1 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Exploded view - sump/oil pump

2 - Valve for oil pressure control - N428-

- ❑ Removing and installing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Oil filter/oil pressure switch; Removing and installing valve for oil pressure control - N428-

3 - O-ring

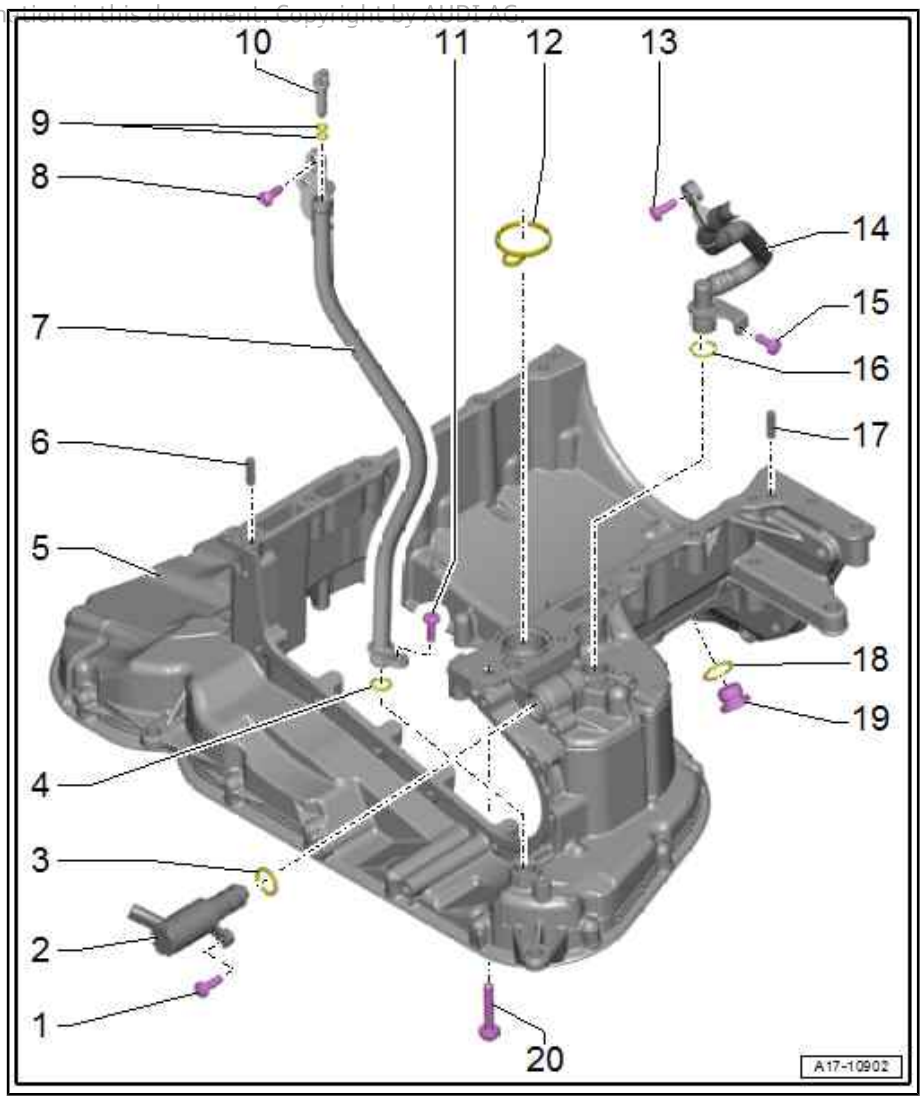
- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Exploded view - sump/oil pump

4 - O-ring

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Exploded view - sump/oil pump

5 - Sump (top section)

- ❑ Removing and installing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Removing and installing sump (top section)



6 - Dowel sleeve

7 - Guide tube

- ❑ For oil dipstick

8 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Exploded view - sump/oil pump

9 - O-rings

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Exploded view - sump/oil pump

10 - Sealing plug

11 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Exploded view - sump/oil pump

12 - Gasket

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Exploded view - sump/oil pump

13 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Exploded view - sump/oil pump

14 - Vacuum line

- ❑ Leading from vacuum pump

15 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Exploded view - sump/oil pump

16 - O-ring

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Exploded view - sump/oil pump

17 - Dowel sleeve

18 - Seal

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Exploded view - sump/oil pump

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19 - Plug

- ❑ For “TDC” marking
- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Exploded view - sump/oil pump

20 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Exploded view - sump/oil pump

1.2 Engine oil

- ♦ Refer to ⇒ Maintenance ; Booklet 830 for instructions on draining and filling up engine oil, checking oil level, removing and installing oil filter element.
- ♦ Oil capacities, oil specifications and viscosity grades ⇒ Maintenance tables .

Caution

Risk of damage to catalytic converter.

- ♦ *The oil level must not be above the “MAX” mark on the dipstick.*

1.3 Removing and installing sump (bottom section)

Removing

– Lower subframe cross brace (do not press off joint pin of guide link) ⇒ Running gear, axles, steering; Rep. gr. 40 ; Subframe; Removing and installing subframe cross brace .

All further procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Removing and installing sump (bottom section) .

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Tightening torques

♦ ⇒ Running gear, axles, steering; Rep. gr. 40 ; Subframe; Exploded view - subframe

1.4 Removing and installing sump (top section)

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Removing and installing sump (top section) .

1.5 Removing and installing oil pump

All procedures are described in ⇒ Servicing 6-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 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Sump/oil pump; Removing and installing oil level and oil temperature sender - G266- .

2 Engine oil cooler

All procedures and components are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Engine oil cooler .

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3 Oil filter/oil pressure switches

⇒ “3.1 Exploded view - oil filter”, page 77

⇒ “3.2 Removing and installing oil pressure sender G10 ”, page 78

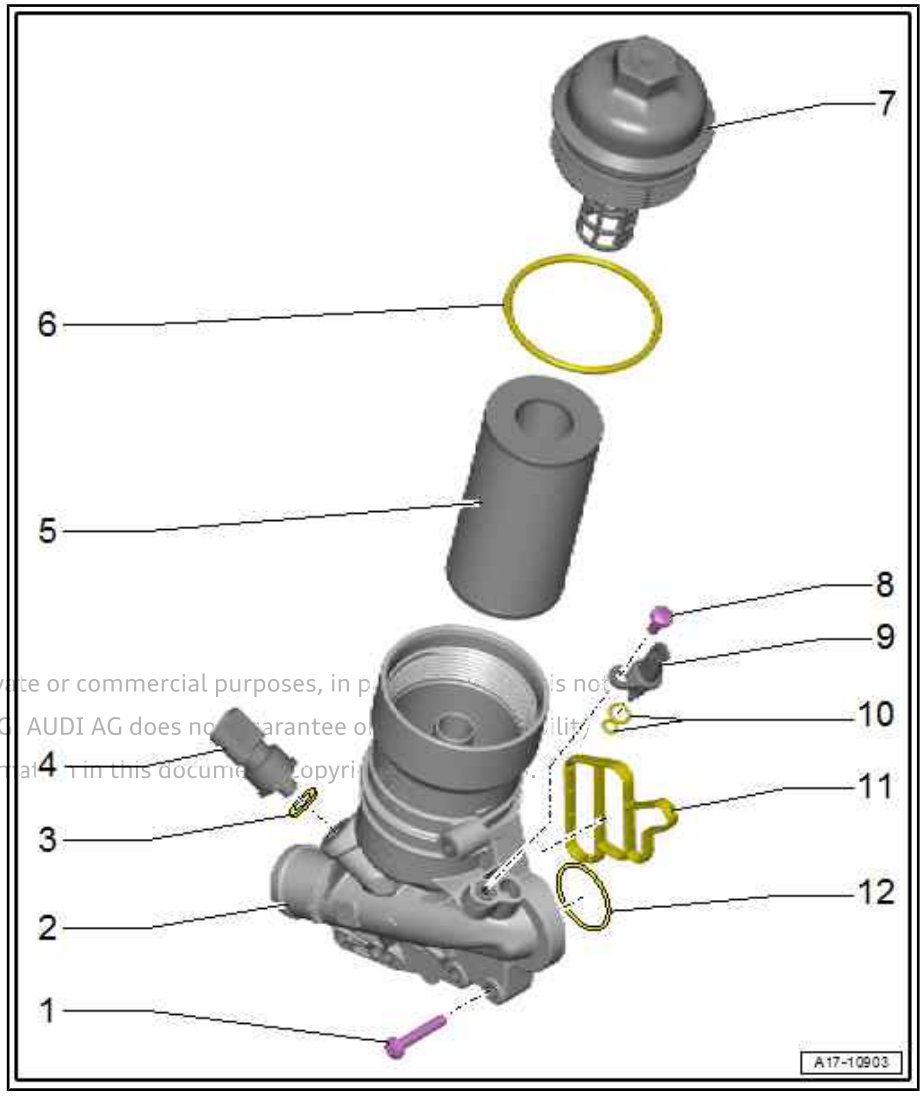
⇒ “3.3 Checking oil pressure”, page 78

⇒ “3.4 Removing and installing oil filter housing”, page 78

⇒ “3.5 Removing and installing valve for oil pressure control N428 ”, page 79

⇒ “3.6 Removing and installing oil temperature sender 2 G664 ”, page 79

3.1 Exploded view - oil filter



1 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Oil filter/oil pressure switch; Exploded view - oil filter

2 - Oil filter housing

- ❑ With map-controlled engine cooling system thermostat - F265-
- ❑ Removing and installing ⇒ page 78

3 - Seal

4 - Oil pressure sender - G10-

- ❑ Checking ⇒ Vehicle diagnostic tester
- ❑ Removing and installing ⇒ page 78
- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Oil filter/oil pressure switch; Exploded view - oil filter

5 - Oil filter element

- ❑ Removing and installing ⇒ Maintenance ; Booklet 830

6 - O-ring

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Oil filter/oil pressure switch; Exploded view - oil filter

7 - Sealing cap

- ❑ With oil filter bypass valve
- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Oil filter/oil pressure switch; Exploded view - oil filter

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8 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Oil filter/oil pressure switch; Exploded view - oil filter

9 - Coolant temperature sender 2 - G802-

- ❑ Removing and installing ⇒ page 96

10 - O-rings

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Oil filter/oil pressure switch; Exploded view - oil filter

11 - Gasket

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Oil filter/oil pressure switch; Exploded view - oil filter

12 - O-ring

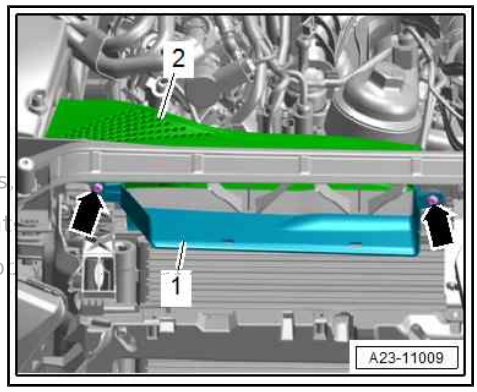
- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Oil filter/oil pressure switch; Exploded view - oil filter

3.2 Removing and installing oil pressure sender - G10-

Removing

– Remove lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front) .

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



Note

Disregard -item 1-.

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All further procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Oil filter/oil pressure switch; Exploded view - oil filter .

Installing

Additional work:

– Install lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front) .

Tightening torques

- ⇒ “3.1 Exploded view - air cleaner housing”, page 135

3.3 Checking oil pressure

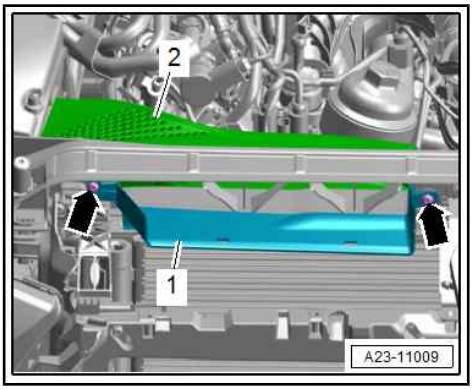
All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Oil filter/oil pressure switches; Checking oil pressure .

3.4 Removing and installing oil filter housing

Removing

– Remove lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front) .

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



Note

Disregard -item 1-.

All further procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Oil filter/oil pressure switch; Removing and installing oil filter housing .

Installing

Additional work:

– Install lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front) .

Tightening torques

◆ ⇒ “3.1 Exploded view - air cleaner housing”, page 135

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

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Oil filter/oil pressure switches; Removing and installing valve for oil pressure control - N428- .

3.6 Removing and installing oil temperature sender 2 - G664-

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 17 ; Oil filter/oil pressure switch ; Removing and installing oil temperature sender 2 - G664- .

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19 – Cooling

1 Cooling system/coolant

⇒ “1.1 Connection diagram - coolant hoses”, page 80

⇒ “1.2 Checking cooling system for leaks”, page 84

⇒ “1.3 Draining and filling cooling system”, page 84

1.1 Connection diagram - coolant hoses

⇒ “1.1.1 Connection diagram - coolant hoses, equipment version without auxiliary heater”, page 80

⇒ “1.1.2 Connection diagram - coolant hoses, equipment version with auxiliary heater”, page 83

1.1.1 Connection diagram - coolant hoses, equipment version without auxiliary heater

Note

- *Blue = Large coolant circuit*
- *Red = Small coolant circuit*
- *Orange = Coolant circuit for cylinder block.*
- *Brown = Heating circuit*
- *Green = Coolant circuit for gearbox*
- *Arrows show direction of coolant flow.*

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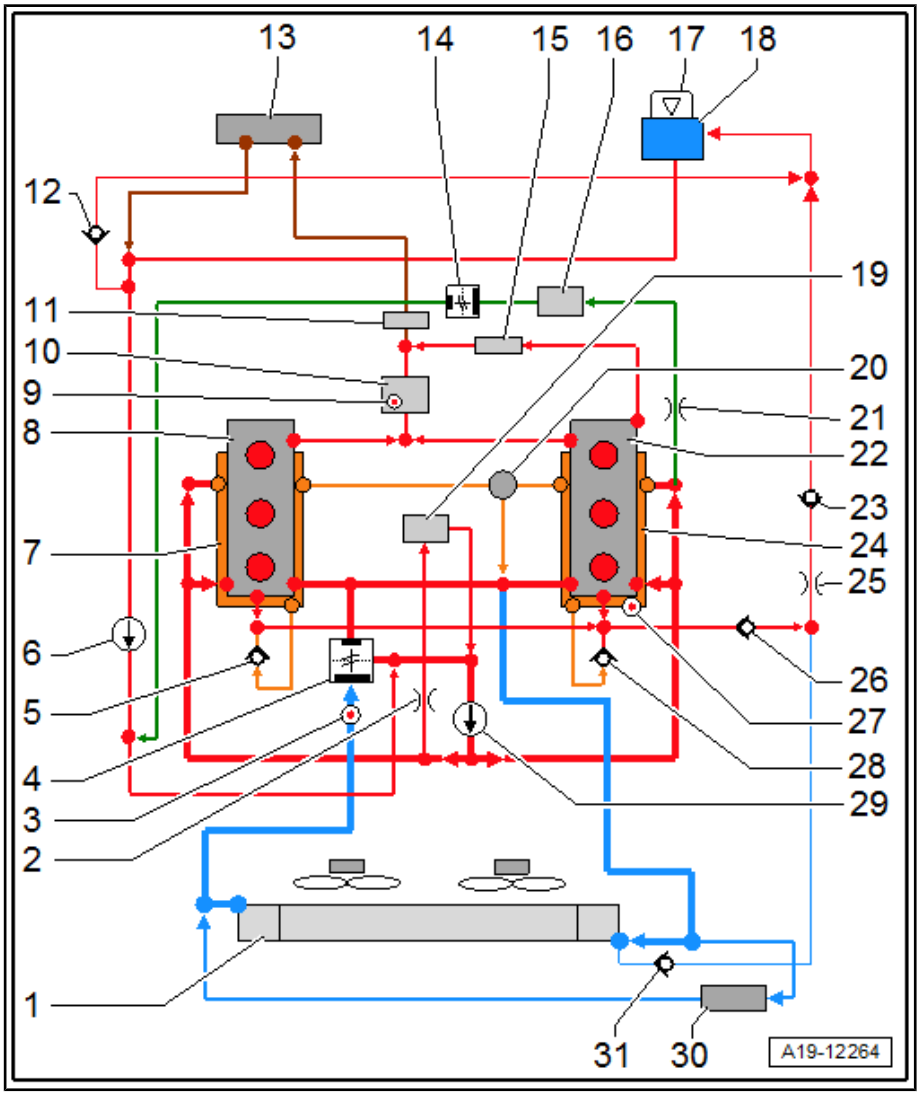

1 - Radiator

2 - Restrictor

3 - Coolant temperature sender 2 - G802-

4 - Map-controlled engine cooling system thermostat - F265-

5 - Non-return valve

6 - Coolant circulation pump - V50-

7 - Cylinder block
- ❑ Cylinder bank 1 (right-side)

8 - Cylinder head
- ❑ Cylinder bank 1 (right-side)

9 - Coolant temperature sender - G62-

10 - Exhaust gas recirculation cooler

11 - Turbocharger

12 - Non-return valve

13 - Heat exchanger for heater

14 - Thermostat
- ❑ For coolant circuit for gearbox

15 - Injector for reducing agent - N474-

16 - ATF cooler

17 - Filler cap
- ❑ Checking pressure relief valve ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Cooling system/coolant; Checking cooling system for leaks

18 - Coolant expansion tank

19 - Engine oil cooler

20 - Coolant shut-off valve

21 - Restrictor

22 - Cylinder head
- ❑ Cylinder bank 2 (left-side)

23 - Non-return valve

24 - Cylinder block
- ❑ Cylinder bank 2 (left-side)

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25 - Restrictor

26 - Non-return valve

27 - Temperature sender for engine temperature regulation - G694-

28 - Non-return valve

29 - Coolant pump

30 - Auxiliary radiator

- ❑ Optional equipment

31 - Non-return valve

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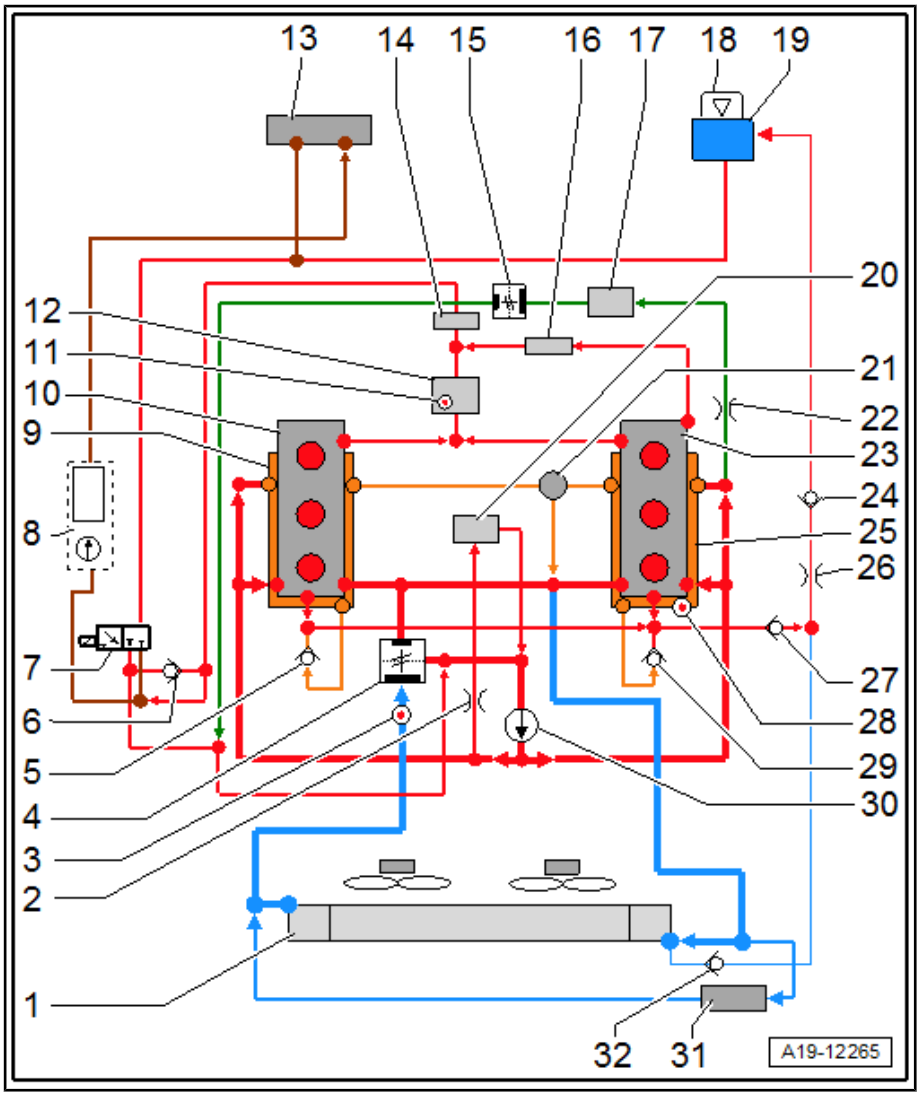
1.1.2 Connection diagram - coolant hoses, equipment version with auxiliary heater

Note

- *Blue = Large coolant circuit*
- *Red = Small coolant circuit*
- *Orange = Coolant circuit for cylinder block.*
- *Brown = Heating circuit*
- *Green = Coolant circuit for gearbox*
- *Arrows show direction of coolant flow.*



1 - Radiator

2 - Restrictor

3 - Coolant temperature sender 2 - G802-

4 - Map-controlled engine cooling system thermostat - F265-

5 - Non-return valve

6 - Non-return valve

7 - Heater coolant shut-off valve - N279-

8 - Auxiliary heater

- ❑ With circulation pump - V55-

9 - Cylinder block

- ❑ Cylinder bank 1 (right-side)

10 - Cylinder head

- ❑ Cylinder bank 1 (right-side)

11 - Coolant temperature sender - G62-

12 - Exhaust gas recirculation cooler

13 - Heat exchanger for heater

14 - Turbocharger

15 - Thermostat

- ❑ For coolant circuit for gearbox

16 - Injector for reducing agent - N474-

17 - ATF cooler

18 - Filler cap

- ❑ Checking pressure relief valve ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Cooling system/coolant; Checking cooling system for leaks

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19 - Coolant expansion tank

20 - Engine oil cooler

21 - Coolant shut-off valve

22 - Restrictor

23 - Cylinder head

- ❑ Cylinder bank 2 (left-side)

24 - Non-return valve

25 - Cylinder block

- ❑ Cylinder bank 2 (left-side)

26 - Restrictor

27 - Non-return valve

28 - Temperature sender for engine temperature regulation - G694-

29 - Non-return valve

30 - Coolant pump

31 - Auxiliary radiator

- ❑ Optional equipment

32 - Non-return valve

1.2 Checking cooling system for leaks

Procedure

– Release catches -arrows B- and open cover -1- -arrow A-.

All further procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Cooling system/coolant; Checking cooling system for leaks .

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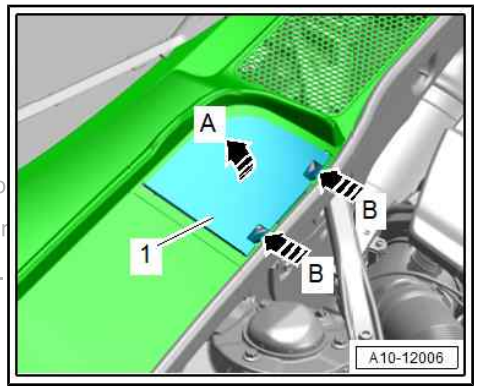

1.3 Draining and filling cooling system

Special tools and workshop equipment required

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

- Hose clip pliers - VAS 6362-

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- Safety goggles
- Protective gloves

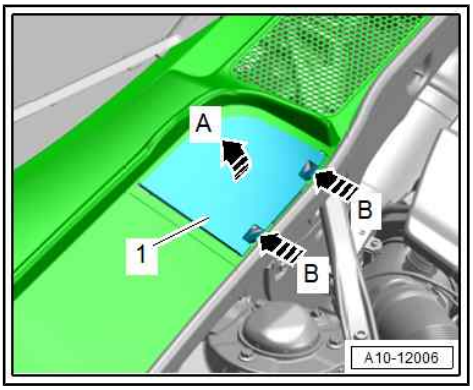
Draining coolant

WARNING

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

- *Even when the ignition is switched off, the radiator fans can start up without warning due to accumulated heat in the engine compartment, etc.*

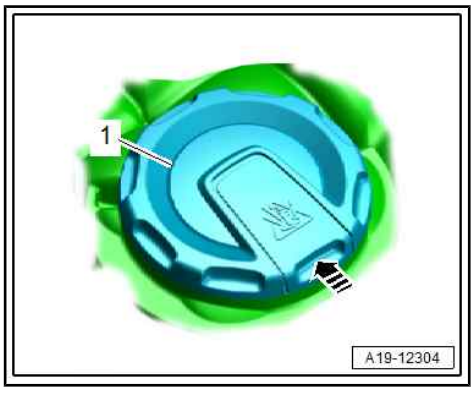
– Release catches -arrows B- and open cover -1- -arrow A-.



WARNING

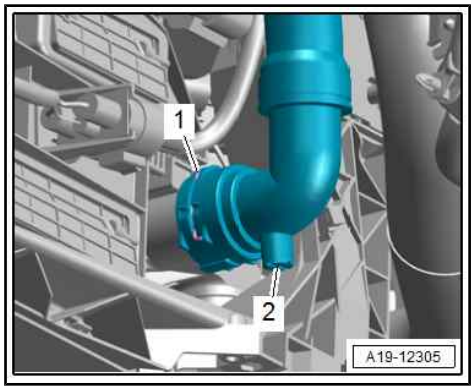
Risk of scalding as hot coolant can escape.

- *Observe safety precautions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Safety precautions; Safety precautions when working on the cooling system .*



– 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 .

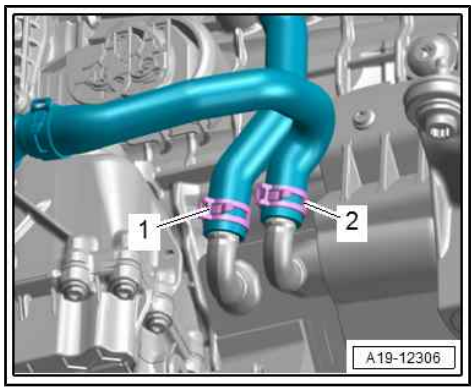
– Place collector tank from coolant collecting system -VAS 5014- or drip tray for workshop hoist - VAS 6208- underneath.
– Remove drain plug -2- at connection and drain off coolant.



Note

Disregard -item 1-.

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



Note

Disregard -item 1-.

– Tighten drain plug and re-connect coolant hoses.

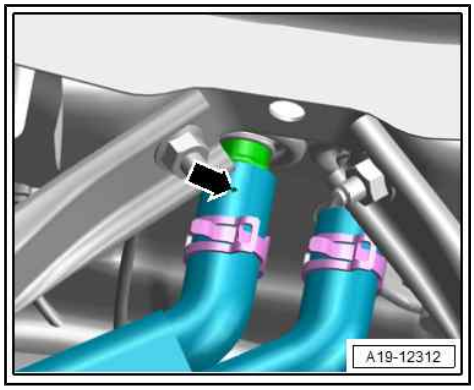
Preparing coolant mixture and filling cooling system

– Prepare coolant mixture and fill cooling system ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Cooling system/coolant; Draining and filling cooling system .

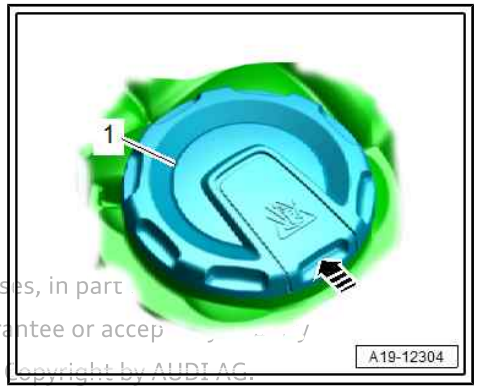
Bleeding cooling system

– Remove plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber cover .

– Release hose clip on coolant hose going to heat exchanger for heater and pull back hose until bleeder hole -arrow- is no longer blocked by connection.
– Fill up with coolant until it flows out at bleeder hole in coolant hose.
– Push coolant hose back onto connection and secure with hose clip.



– Close filler cap -1- on coolant expansion tank (make sure it engages).
– On vehicles with auxiliary/supplementary heater, switch heater on for about 30 seconds.
– Start engine.



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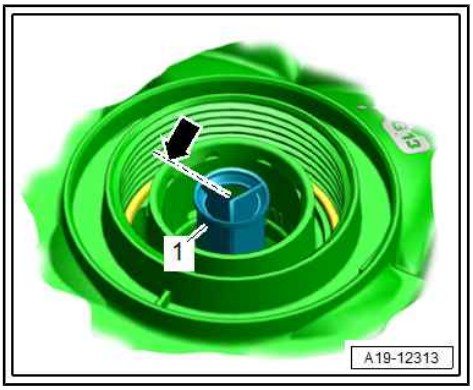
Time period	Engine speed	Air conditioner/heater setting
2 minutes	2500 rpm	• Air conditioning system “OFF”, LED in AC button not lit • Heating at “HI”, select lowest possible blower speed (= 0)
3 minutes	Idling speed	• Air conditioning system “OFF” • Heating at “HI”
2 minutes	2500 rpm	
3 minutes	Idling speed	
2 minutes	2500 rpm	
3 minutes	Idling speed	
1 minute	Switch off engine	
2 minutes	2500 rpm	
Until both large coolant hoses at radiator become warm	Idling	
1 minute	2500 rpm	

– Switch off ignition and allow engine to cool down.

– Install plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber cover .

Checking coolant level



- The top edge (= MAX marking) of the float -1- must be flush with the opening -arrow- on the coolant expansion tank when the engine is cold.
- The top edge of the float may be above the opening on the coolant expansion tank when the engine is at operating temperature.

– Top up with coolant again if necessary.

Tightening torques

◆ ⇒ “4.1 Exploded view - radiator/radiator fan”, page 110

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

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2 Coolant pump/thermostat assembly

⇒ “2.1 Exploded view - coolant pump”, page 88

⇒ “2.2 Exploded view - electric coolant pump”, page 90

⇒ “2.3 Exploded view - thermostat”, page 91

⇒ “2.4 Exploded view - coolant temperature senders”, page 93

⇒ “2.5 Removing and installing electric coolant pump”, page 94

⇒ “2.6 Removing and installing coolant pump”, page 95

⇒ “2.8 Removing and installing map-controlled engine cooling system thermostat F265 ”, page 95

⇒ “2.9 Removing and installing coolant temperature sender G62 ”, page 95

⇒ “2.10 Removing and installing temperature sender for engine temperature regulation G694 ”, page 95

⇒ “2.11 Removing and installing coolant temperature sender 2 G802 ”, page 96

⇒ “2.12 Removing and installing coolant valves”, page 96

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2.1 Exploded view - coolant pump

1 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - coolant pump

2 - Bolt

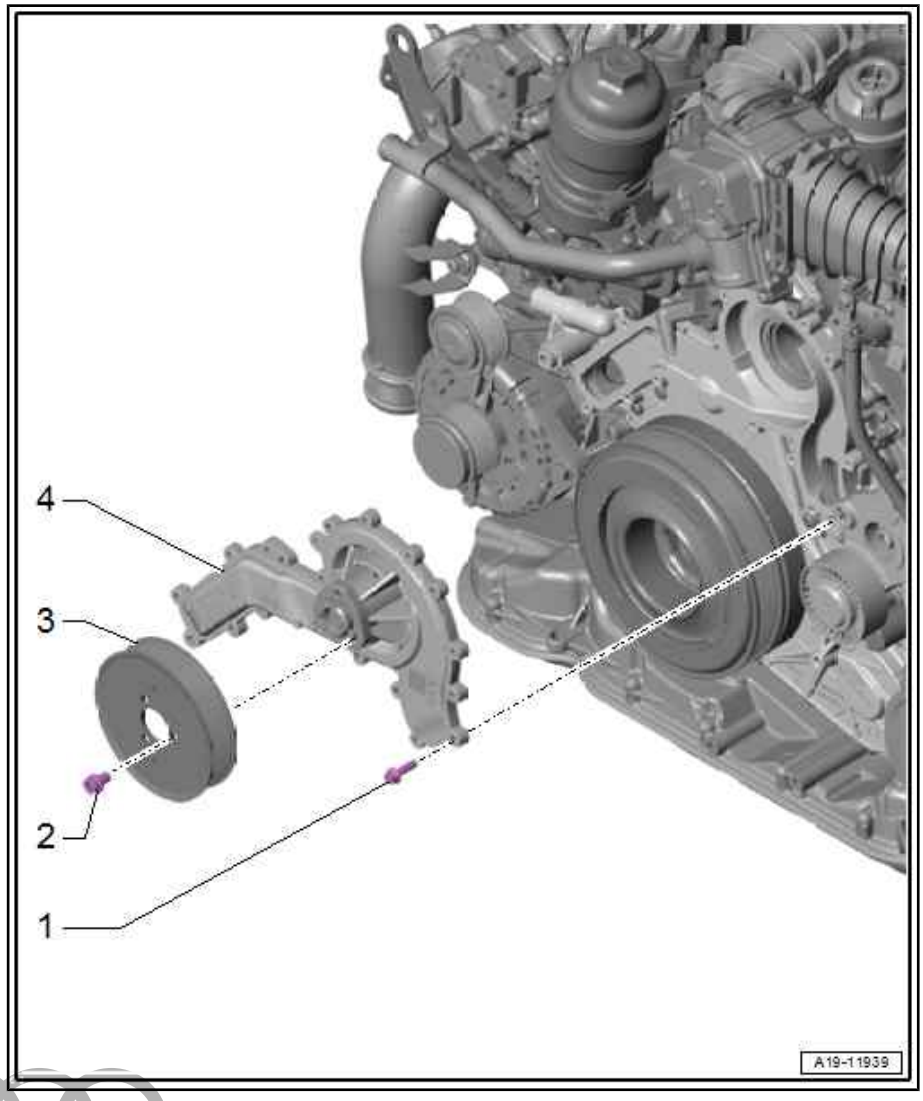
- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - coolant pump

3 - Poly V-belt pulley for coolant pump

- ❑ Installation position: marking “vorne” (front) faces in direction of travel

4 - Coolant pump

- ❑ Removing and installing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Removing and installing coolant pump



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2.2 Exploded view - electric coolant pump

Coolant circulation pump - V50-

1 - Bolt
- ❑ 1.5 Nm

2 - Retaining lug

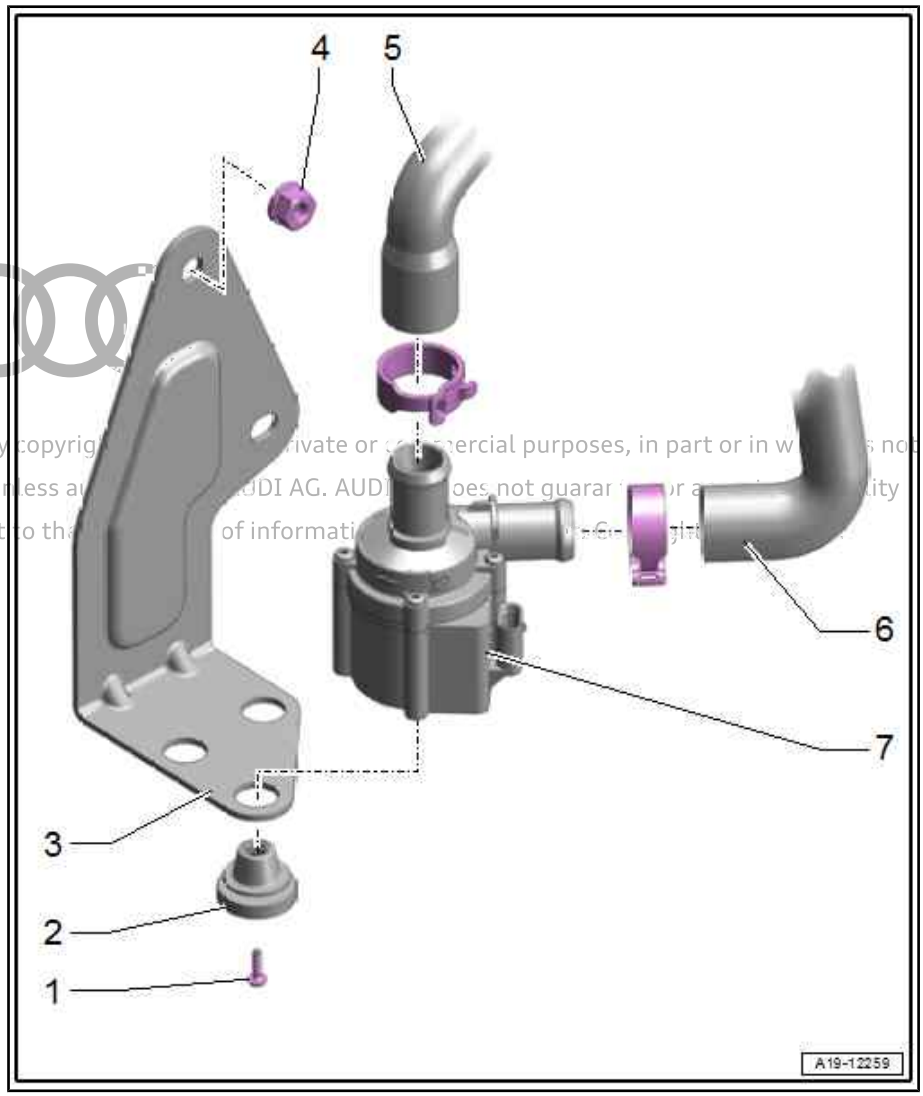
3 - Bracket
- ❑ For coolant circulation pump - V50-

4 - Nut
- ❑ 8 Nm

5 - Coolant hose

6 - Coolant hose

7 - Coolant circulation pump - V50-
- ❑ Removing and installing ⇒ page 94



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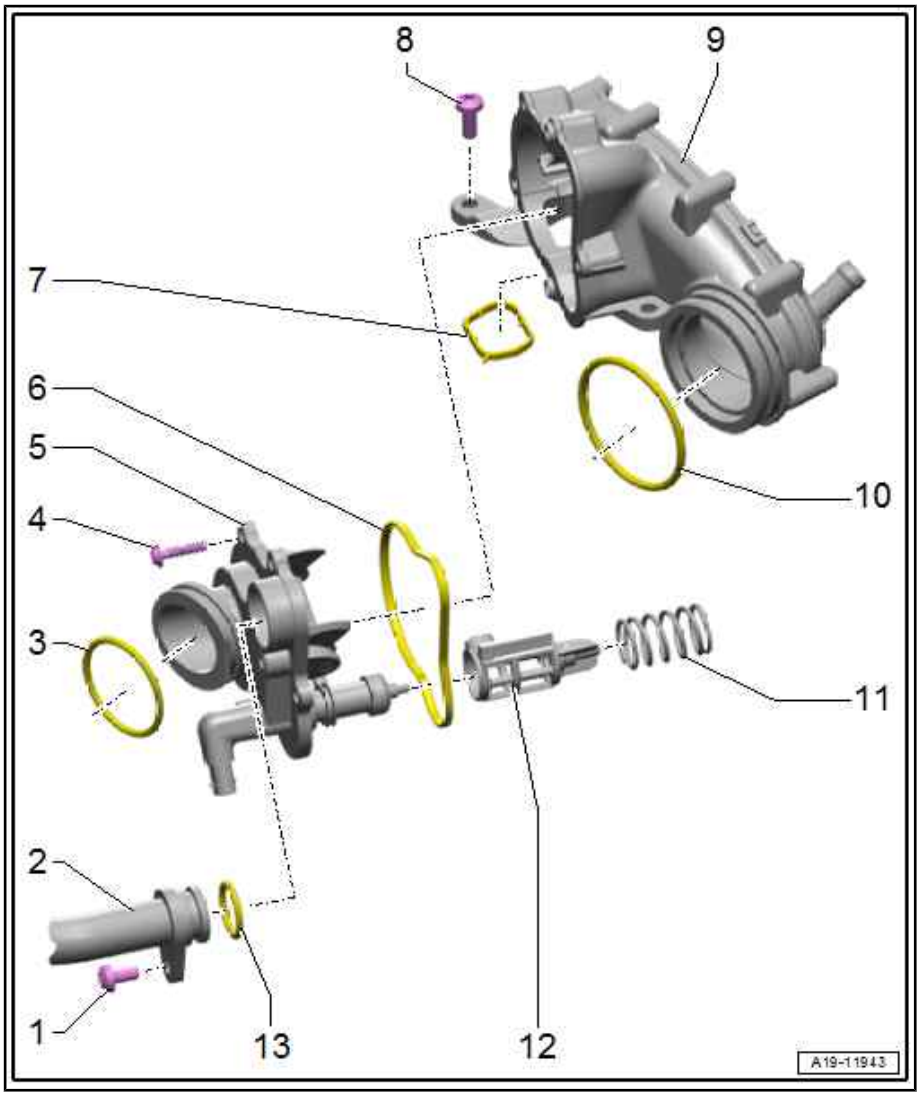
2.3 Exploded view - thermostat

⇒ "2.3.1 Exploded view - thermostat, map-controlled engine cooling system thermostat F265 ", page 91

⇒ "2.3.2 Exploded view - thermostat, coolant shut-off valve", page 92

2.3.1 Exploded view - thermostat, map-controlled engine cooling system thermostat - F265-



1 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pipes; Exploded view - coolant pipes

2 - Coolant pipe (front)

- ❑ Exploded view ⇒ page 97

3 - O-ring

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - thermostat

4 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - thermostat

5 - Map-controlled engine cooling system thermostat - F265-

- ❑ Removing and installing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Removing and installing map-controlled engine cooling system thermostat - F265-

6 - Gasket

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - thermostat

7 - Gasket

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - thermostat

8 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - thermostat

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9 - Thermostat housing

- ❑ Removing and installing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - thermostat

10 - O-ring

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - thermostat

11 - Compression spring

- ❑ Removing and installing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Removing and installing map-controlled engine cooling system thermostat - F265-

12 - Valve

- ❑ For coolant flap
- ❑ Removing and installing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Removing and installing map-controlled engine cooling system thermostat - F265-

13 - O-ring

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - thermostat

2.3.2 Exploded view - thermostat, coolant shut-off valve

1 - Seal

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - thermostat

2 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - thermostat

3 - Coolant connection

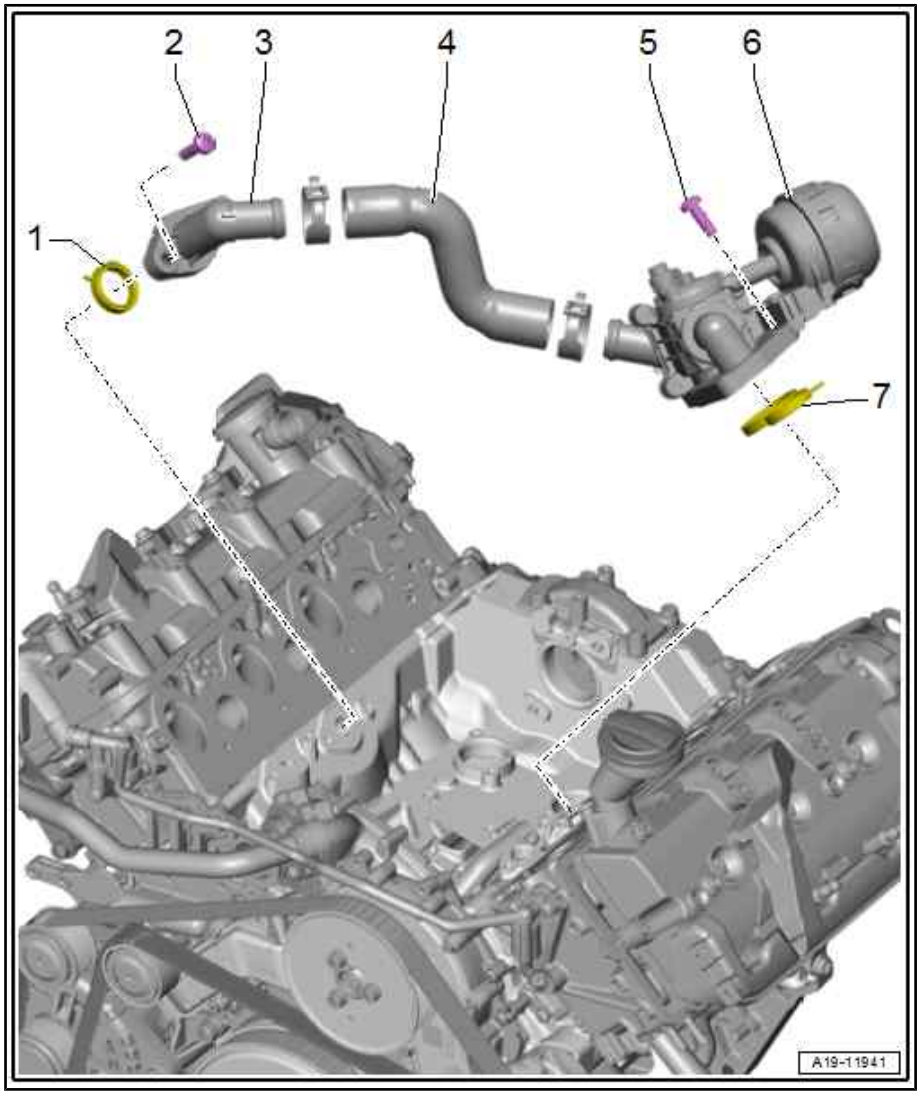
4 - Coolant hose

5 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - thermostat

6 - Coolant shut-off valve

- ❑ Removing and installing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Removing and installing coolant valves



7 - Gasket

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - thermostat

2.4 Exploded view - coolant temperature senders

1 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - coolant temperature senders

2 - Coolant temperature sender - G62-

- ❑ Removing and installing ⇒ page 95

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3 - O-rings

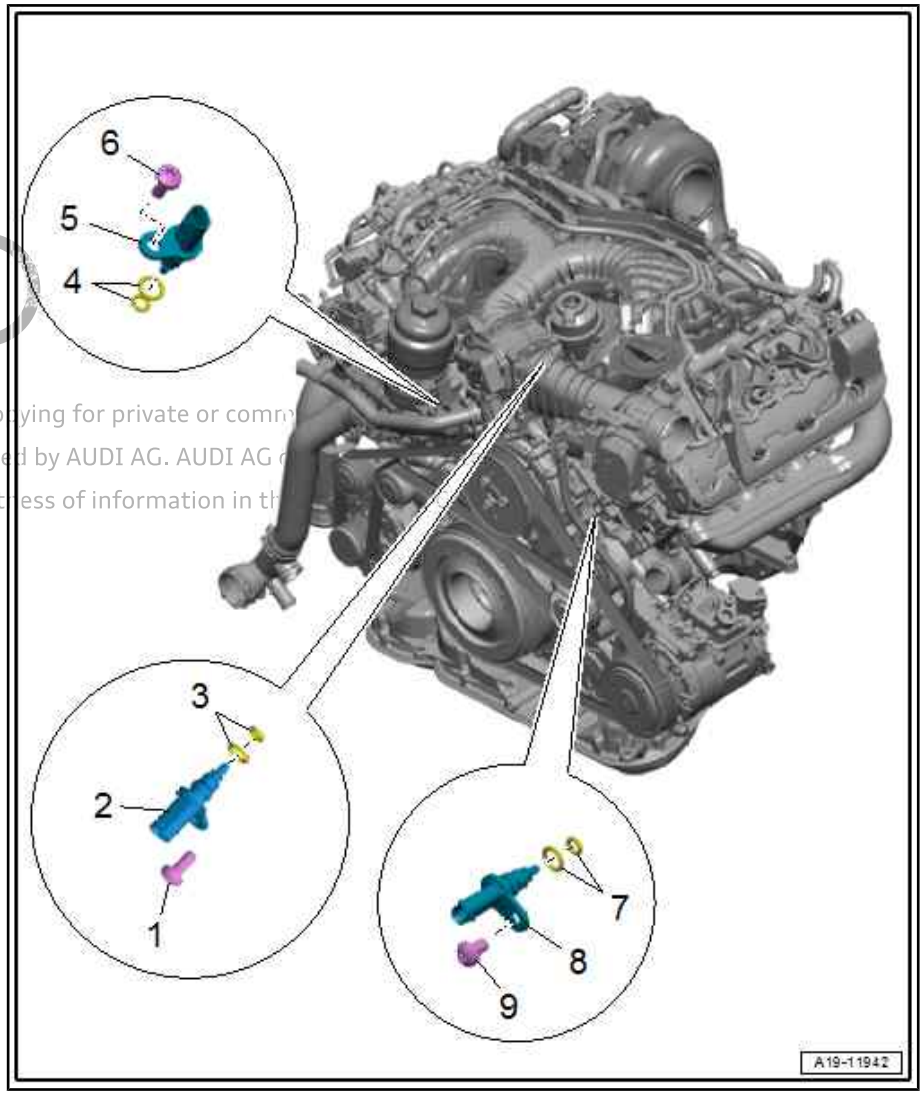
- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - coolant temperature senders

4 - O-rings

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - coolant temperature senders

5 - Coolant temperature sender 2 - G802-

- ❑ Removing and installing ⇒ page 96



6 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - coolant temperature senders

7 - O-rings

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - coolant temperature senders

8 - Temperature sender for engine temperature regulation - G694-

- ❑ Removing and installing ⇒ page 95

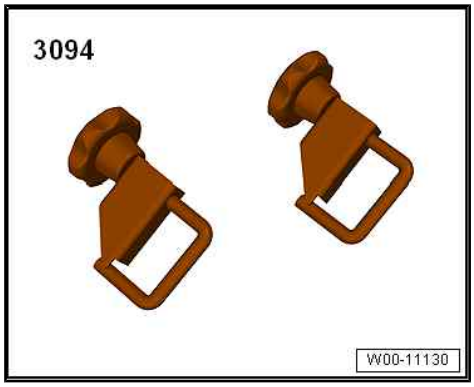
9 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Exploded view - coolant temperature senders

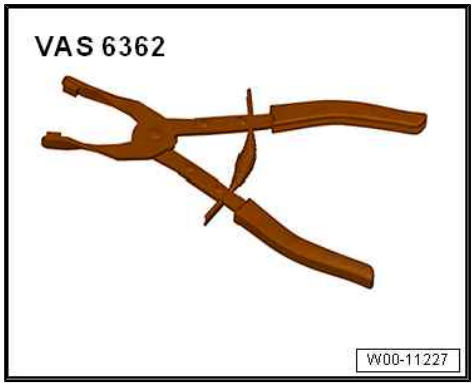
2.5 Removing and installing electric coolant pump

Special tools and workshop equipment required

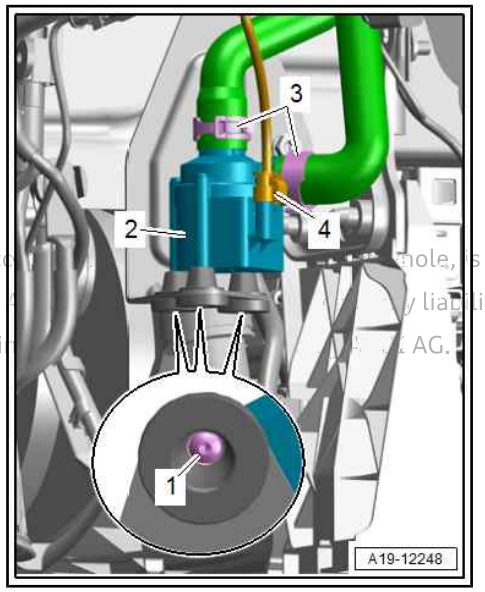
- Hose clamps, up to 25 mm - 3094-



- Hose clip pliers - VAS 6362-



Removing



– Remove wheel spoiler (front right) ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Removing and installing wheel housing liner (front) .
– Unplug electrical connector -4-.
– Clamp off coolant hoses using hose clamps up to 25 mm - 3094- , release hose clips -3- and disconnect hoses.
– Remove bolts -1- and detach coolant circulation pump - V50- -item 2-.

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Installing

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

Note

- *Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .*
- *Do not reuse coolant.*

– Fill up with coolant ⇒ page 84 .

Tightening torques

- ⇒ “2.2 Exploded view - electric coolant pump”, page 90
- ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Exploded view - wheel housing liner (front)

2.6 Removing and installing coolant pump

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Removing and installing coolant pump .

2.7 Removing and installing thermostat housing

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail (EA 897 Gen I); Rep. gr. 19 ; Coolant pump/thermostat assembly; Removing and installing thermostat housing .

2.8 Removing and installing map-controlled engine cooling system thermostat - F265-

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Removing and installing map-controlled engine cooling system thermostat - F265- .

2.9 Removing and installing coolant temperature sender - G62-

Removing

– Remove engine cover panel ⇒ page 45 .

– Release catches -arrows B- and open cover -1- -arrow A-.

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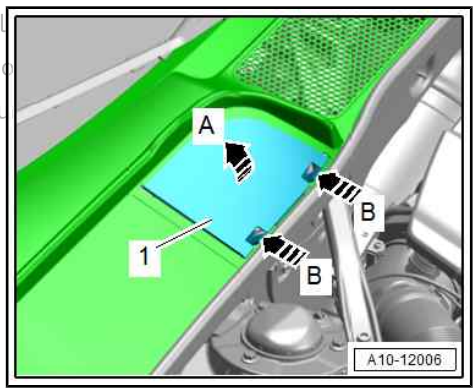
All further procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Removing and installing coolant temperature sender - G62- .



Installing

Additional work:

– Install engine cover panel ⇒ page 45 .

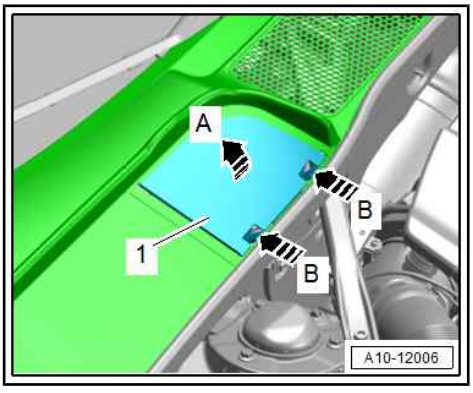
2.10 Removing and installing temperature sender for engine temperature regulation - G694-

Removing

– Remove engine cover panel ⇒ page 45 .

– Release catches -arrows B- and open cover -1- -arrow A-.

All further procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Removing and installing temperature sender for engine temperature regulation - G694- .



Installing

Additional work:

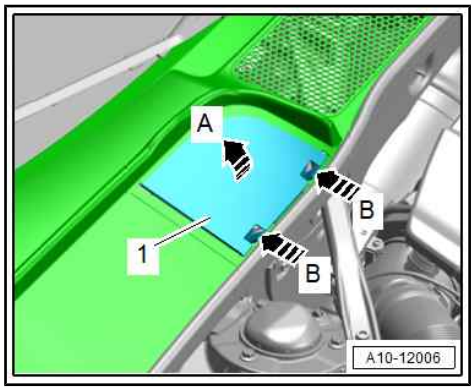
– Install engine cover panel ⇒ page 45 .

2.11 Removing and installing coolant temperature sender 2 - G802-

Removing

– Remove engine cover panel ⇒ page 45 .

– Release catches -arrows B- and open cover -1- -arrow A-.



All further procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly ; Removing and installing coolant temperature sender 2 - G802- .

Installing

Additional work:

– Install engine cover panel ⇒ page 45 .

2.12 Removing and installing coolant valves

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pump/thermostat assembly; Removing and installing coolant valves .

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3 Coolant pipes

⇒ “3.1 Exploded view - coolant pipes”, page 97

⇒ “3.2 Removing and installing coolant pipes”, page 100

⇒ “3.3 Removing and installing coolant pipes for gearbox”, page 108

3.1 Exploded view - coolant pipes

Note

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

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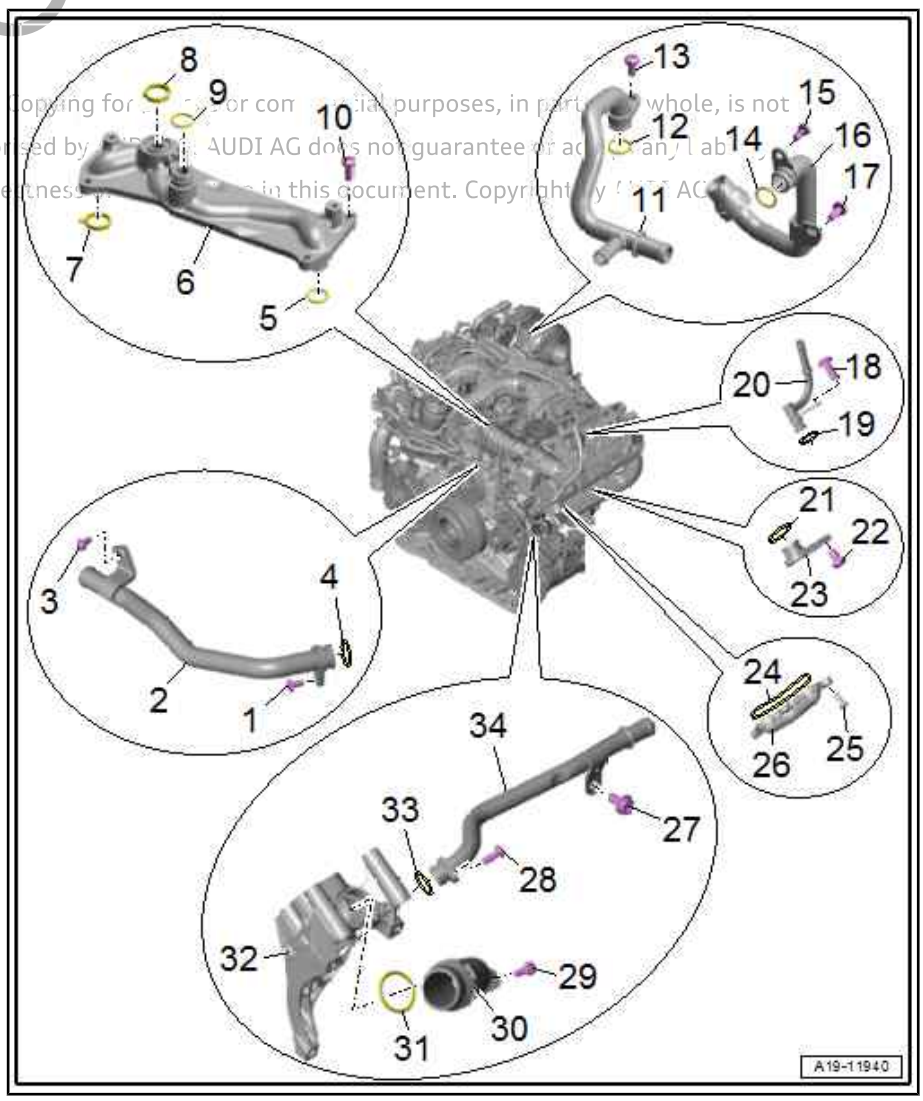

1 - Bolt
- ❑ 9 Nm

2 - Coolant pipe (front)
- ❑ Removing and installing ⇒ “3.2.2 Removing and installing coolant pipe (front)”, page 101

3 - Bolt
- ❑ 9 Nm

4 - O-ring
- ❑ Renew after removing

5 - O-ring
- ❑ Renew after removing

6 - Coolant pipe (top)
- ❑ Different versions depending on equipment version
- ❑ Removing and installing ⇒ “3.2.1 Removing and installing coolant pipe (top)”, page 100

7 - Seal
- ❑ Renew after removing

8 - Seal
- ❑ Only fitted on versions with auxiliary cooler for exhaust gas recirculation
- ❑ Renew after removing

9 - O-ring
- ❑ Renew after removing

10 - Bolt
- ❑ 9 Nm

11 - Coolant pipe (front) for turbocharger
- ❑ Removing and installing ⇒ “3.2.5 Removing and installing coolant pipe (front) for turbocharger”, page 106

12 - O-ring
- ❑ Renew after removing

13 - Bolt
- ❑ 9 Nm

14 - O-ring
- ❑ Renew after removing

15 - Bolt
- ❑ 9 Nm

16 - Coolant pipe (rear) for turbocharger
- ❑ Different versions available; for allocation refer to ⇒ Electronic parts catalogue
- ❑ Removing and installing ⇒ “3.2.4 Removing and installing coolant pipe (right-side)”, page 104

17 - Bolt
- ❑ 9 Nm

18 - Bolt
- ❑ 9 Nm

19 - O-ring
- ❑ Renew after removing

20 - Coolant pipe
- ❑ For cylinder head

21 - O-ring
- ❑ Renew after removing

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22 - Bolt
- ❑ 9 Nm

23 - Sealing plug
- ❑ For cylinder block

24 - Seal
- ❑ Renew after removing

25 - Bolt
- ❑ 9 Nm

26 - Housing cover
- ❑ For cylinder block

27 - Bolt
- ❑ 9 Nm

28 - Bolt
- ❑ 9 Nm

29 - Bolt
- ❑ 9 Nm

30 - Connection
- ❑ For coolant hose

31 - O-ring
- ❑ Renew after removing

32 - Bracket
- ❑ For air conditioner compressor
- ❑ Exploded view ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Cylinder block (pulley end); Exploded view - cylinder block (pulley end)

33 - O-ring

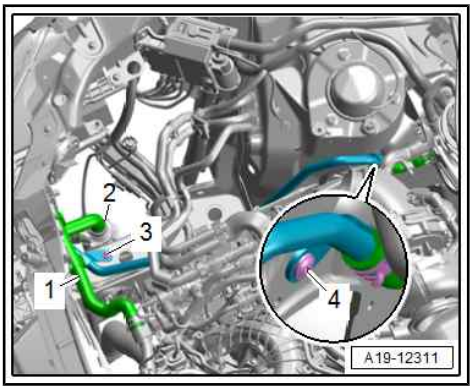
❑ Renew after removing

34 - Coolant pipe (left-side)

❑ Removing and installing ⇒ “3.2.3 Removing and installing coolant pipe (left-side)”, page 103

Coolant pipe (right-side) on longitudinal member - tightening torques

– Tighten nuts -arrows- to 9 Nm.



Coolant pipe (right-side) - tightening torques

– Tighten bolts -arrows- to 9 Nm.

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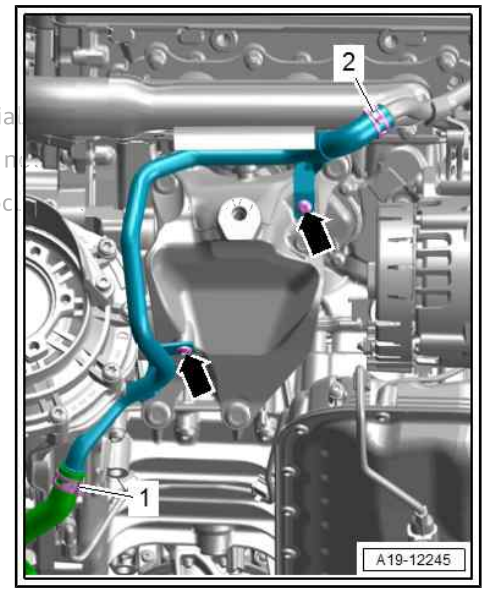


Coolant pipe for gearbox

1 - Coolant hose

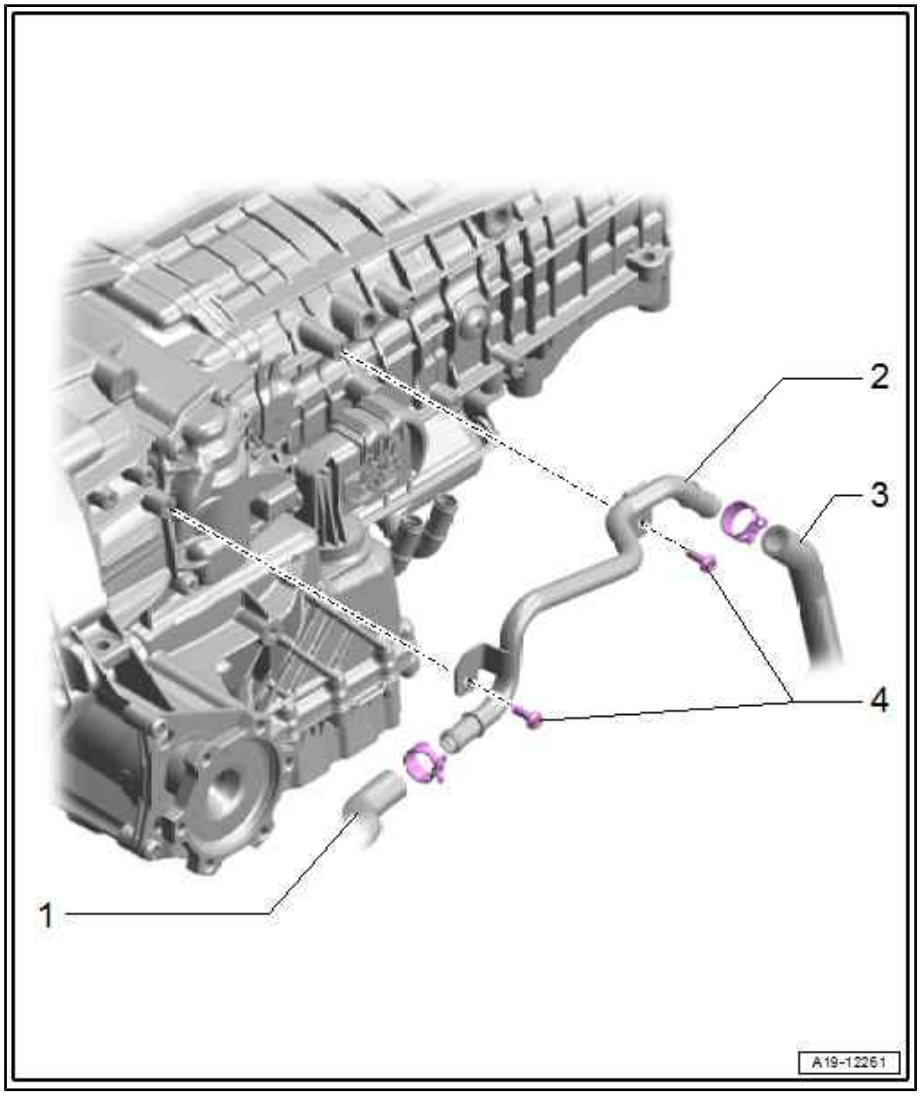
2 - Coolant pipe for gearbox

- ❑ Removing and installing ⇒ page 108

3 - Coolant hose

4 - Bolts

- ❑ 4 Nm



3.2 Removing and installing coolant pipes

⇒ “3.2.1 Removing and installing coolant pipe (top)”, page 100

⇒ “3.2.2 Removing and installing coolant pipe (front)”, page 101

⇒ “3.2.3 Removing and installing coolant pipe (left-side)”, page 103

⇒ “3.2.4 Removing and installing coolant pipe (right-side)”, page 104

⇒ “3.2.5 Removing and installing coolant pipe (front) for turbo-charger”, page 106

⇒ “3.2.6 Removing and installing coolant pipe (rear) for turbo-charger”, page 107

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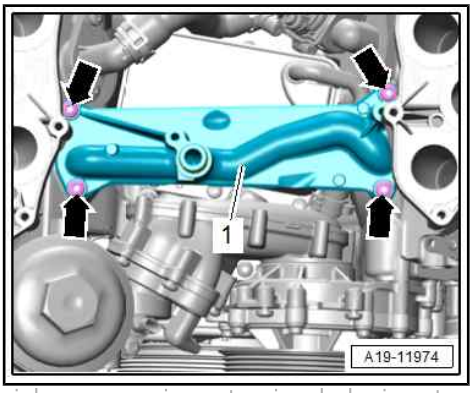
3.2.1 Removing and installing coolant pipe (top)

Removing

– Remove exhaust gas recirculation cooler ⇒ page 190 .

– Unscrew bolts -arrows- and remove coolant pipe (top) -1-.



Installing

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

Note

Renew seal and O-ring after removing.

– Clean and smoothen sealing surface for O-ring.

– Lubricate O-ring with coolant and slide onto coolant pipe.

– Install exhaust gas recirculation cooler ⇒ page 190 .

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Tightening torques

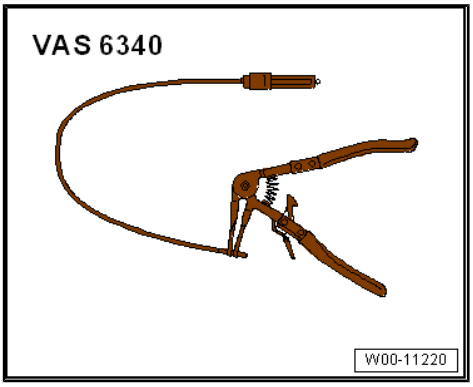
♦ ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pipes; Exploded view - coolant pipes

3.2.2 Removing and installing coolant pipe (front)

Special tools and workshop equipment required

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

♦ Hose clip pliers - VAS 6340-

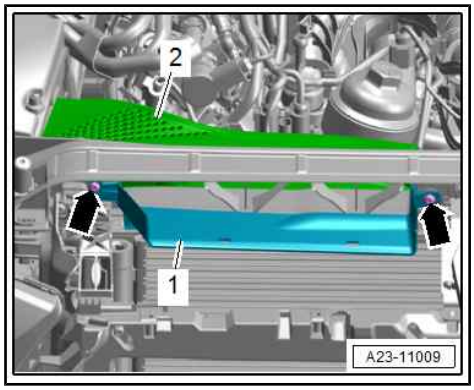


Removing

– Remove engine cover panel ⇒ page 45 .

– Remove lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front) .

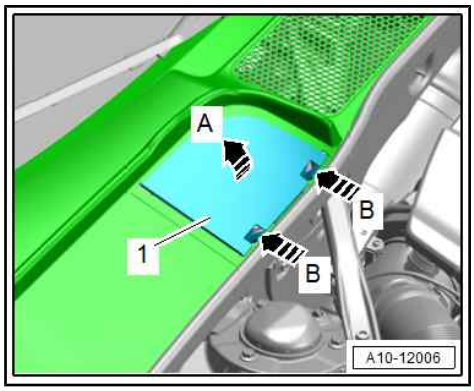
– Remove bolts -arrows- and detach air duct -2-.



Note

Disregard -item 1-.

– Release catches -arrows B- and open cover -1- -arrow A-.



WARNING

Risk of scalding as hot coolant can escape.

- ***Observe safety precautions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Safety precautions; Safety precautions when working on the cooling system .***

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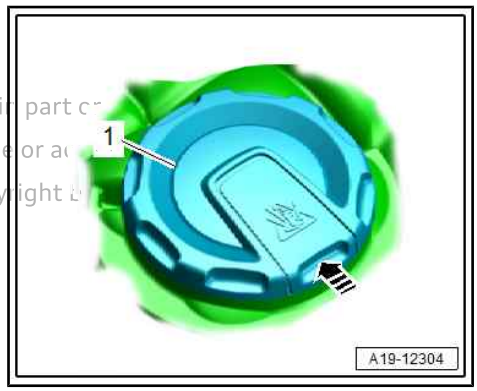
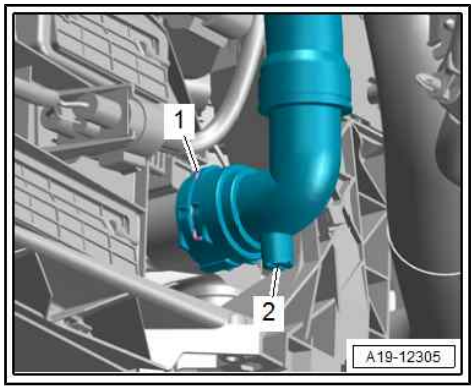


– To relieve residual pressure in cooling system, release fastener -arrow- and briefly open filler cap -1- on coolant expansion tank.

– 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.

– Remove drain plug -2- and drain off coolant.

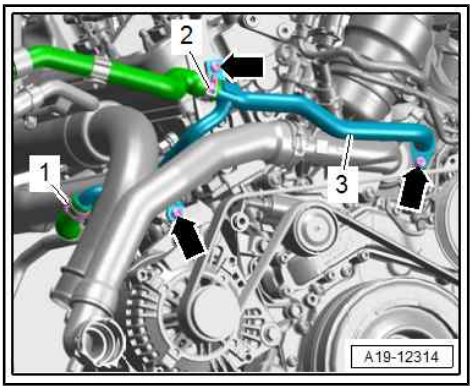


Note

Disregard -item 1-.

– Release hose clips -1, 2- and disconnect coolant hoses.

– Remove bolts -arrows- and detach coolant pipe (front) -3- from map-controlled engine cooling system thermostat - F265- .



Installing

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

Note

- *Renew O-ring after removal.*
- *Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .*

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– Clean and smoothen sealing surface for O-ring.

– Lubricate O-ring with coolant and slide onto coolant pipe.

Note

Do not reuse coolant.

– Fill up with coolant ⇒ page 84 .

– Install lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front) .

– Install engine cover panel ⇒ page 45 .

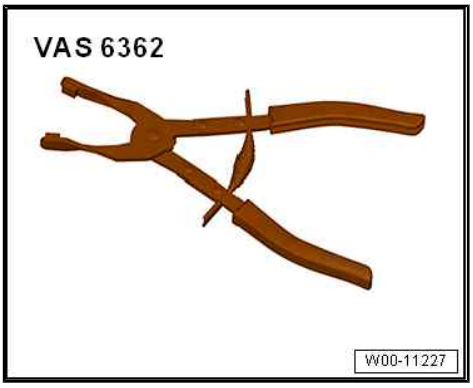
Tightening torques

- ⇒ “4.1 Exploded view - radiator/radiator fan”, page 110
- ⇒ “3.1 Exploded view - air cleaner housing”, page 135
- ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pipes; Exploded view - coolant pipes
- ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation

3.2.3 Removing and installing coolant pipe (left-side)

Special tools and workshop equipment required

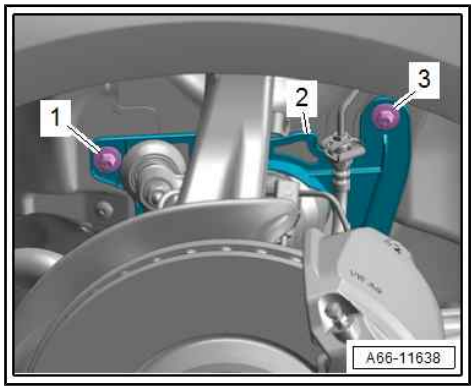
- Hose clip pliers - VAS 6362-



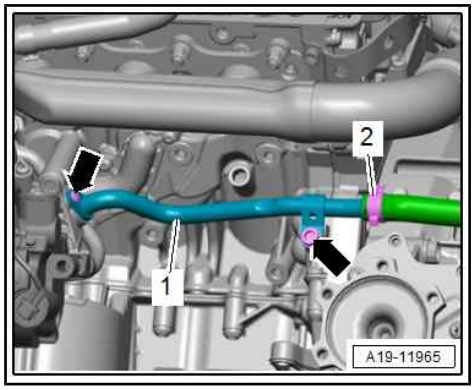
Removing

– Drain coolant ⇒ page 84 .

– Remove noise insulation panels ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
– Remove air conditioner compressor from bracket and tie up to left side ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Detaching and attaching air conditioner compressor at bracket .
– Unscrew nuts -1, 3- and remove cover -2- for drive shaft.



– Release hose clip -2- and detach coolant hose from coolant pipe.
– Remove bolts -arrows-.
– Detach coolant pipe (left-side) -1-.



Note

For illustration purposes, the installation position is shown with the engine support removed.

Installing

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

Note

- *Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .*
- *Do not reuse coolant.*

– Fill up with coolant ⇒ page 84 .

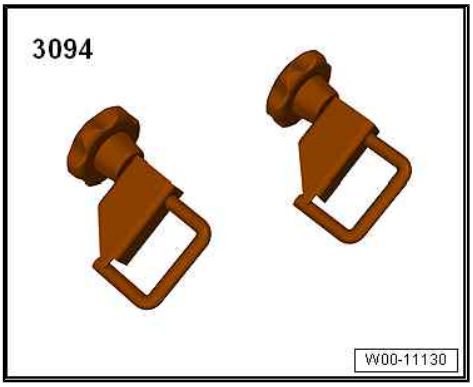
Tightening torques

- ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pipes; Exploded view - coolant pipes
- ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Exploded view - air conditioner compressor drive unit
- ⇒ 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

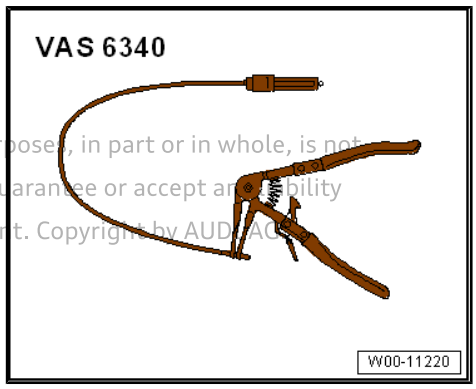
3.2.4 Removing and installing coolant pipe (right-side)

Special tools and workshop equipment required

♦ Hose clamps, up to 25 mm - 3094-



♦ Hose clip pliers - VAS 6340-



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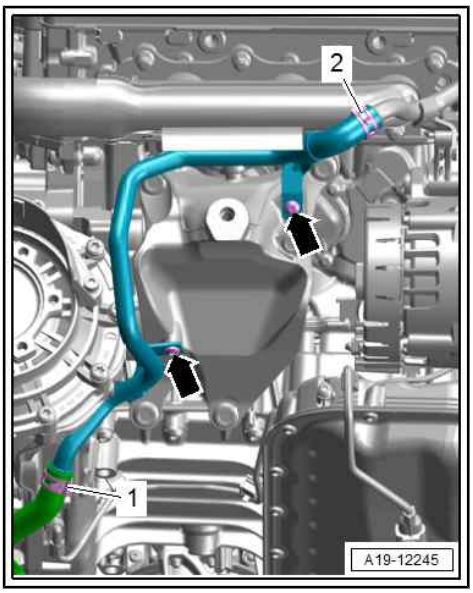
Removing

– Lower subframe ⇒ Running gear, axles, steering; Rep. gr. 40 ; Subframe; Lowering subframe .

– Clamp off coolant hoses using hose clamps, up to 25 mm - 3094- , release hose clips -1 and 2- and disconnect hoses.

– Unscrew bolts -arrows- and remove coolant pipe (right-side).



Installing

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

Note

♦ *Renew O-ring after removal.*

♦ *Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .*

– Install subframe ⇒ Running gear, axles, steering; Rep. gr. 40 ; Subframe; Lowering subframe .

Note

Do not reuse coolant.

– Fill up with coolant ⇒ page 84 .

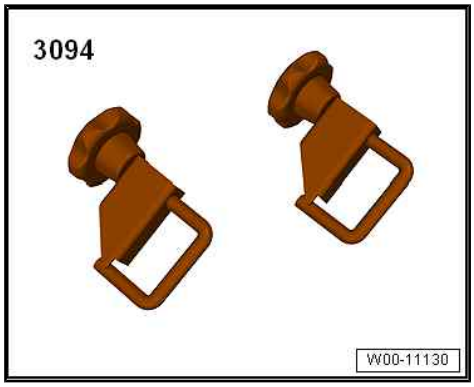
Tightening torques

♦ ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pipes; Exploded view - coolant pipes

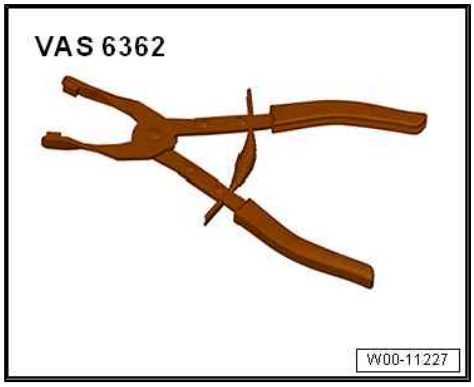
3.2.5 Removing and installing coolant pipe (front) for turbocharger

Special tools and workshop equipment required

- Hose clamps, up to 25 mm - 3094-



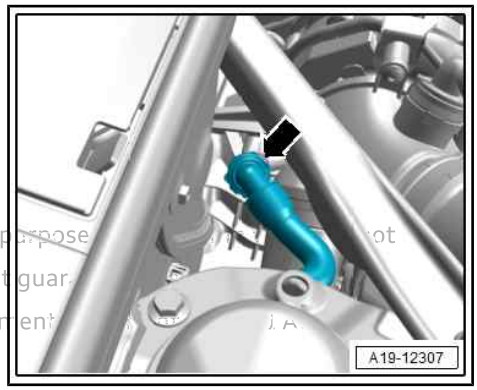
- Hose clip pliers - VAS 6362-



Removing

– Remove engine cover panel ⇒ page 45 .

– Clamp off coolant hose -arrow- with hose clamp, up to 25 mm -3094- .



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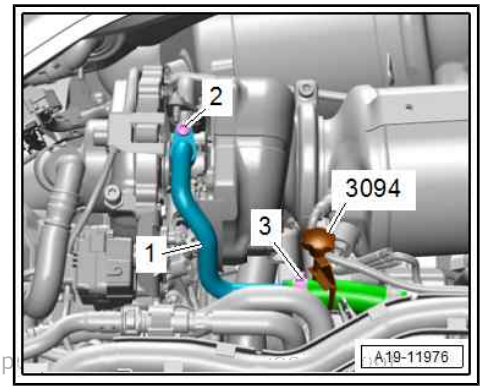
Note

Place a cloth underneath to catch escaping coolant.

– Clamp off coolant hose using hose clamp up to 25 mm -3094- , release hose clip -3- and disconnect hose.
– Unscrew bolt -2- and detach coolant pipe -1- from turbocharger.



Installing

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

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Note

- *Renew O-ring after removal.*
- *Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .*

Note

Do not reuse coolant.

– Fill up with coolant ⇒ page 84 .
– Install engine cover panel ⇒ page 45 .

Tightening torques

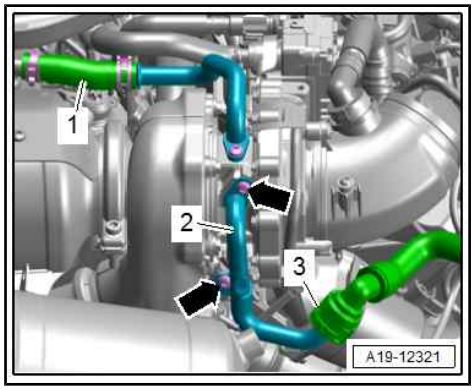
- ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pipes; Exploded view - coolant pipes

3.2.6 Removing and installing coolant pipe (rear) for turbocharger

Removing

– Remove emission control module ⇒ page 175 .

– Clamp off coolant hose -1- with hose clamp, up to 25 mm -3094- .



Note

Place a cloth underneath to catch escaping coolant.

– Clamp off coolant hose using hose clamp up to 25 mm -3094- , lift retaining clip -3- and disconnect hose.
– Unscrew bolts -arrows- and detach coolant pipe -2-.

Installing

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

Note

Renew O-ring after removal.

– Install emission control module ⇒ page 175 .
– Connect coolant hose with plug-in connector ⇒ page 111 .

Note

Do not reuse coolant.

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– Fill up with coolant ⇒ page 84 .

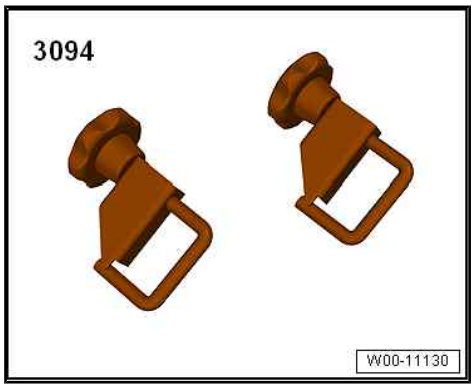
Tightening torques

♦ ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 19 ; Coolant pipes; Exploded view - coolant pipes

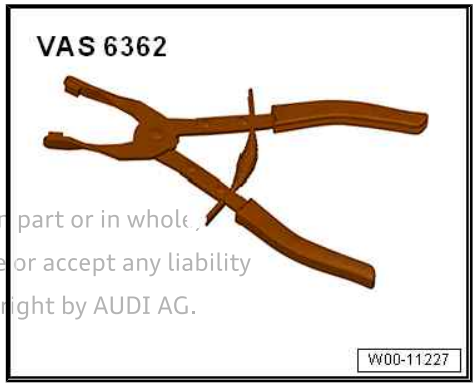
3.3 Removing and installing coolant pipes for gearbox

Special tools and workshop equipment required

♦ Hose clamps, up to 25 mm - 3094-



♦ Hose clip pliers - VAS 6362-



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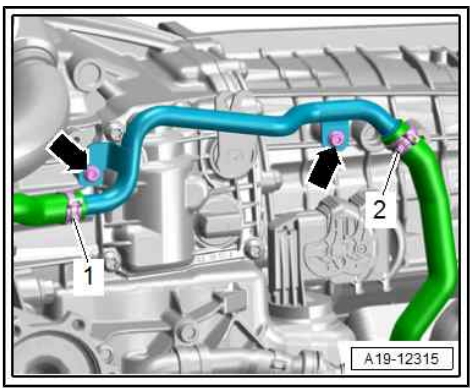
Removing

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

– Clamp off coolant hoses using hose clamps, up to 25 mm - 3094- , release hose clips -1 and 2- and disconnect hoses.

– Unscrew bolts -arrows- and remove coolant pipe for gearbox.



Installing

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

Note

Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .

Note

Do not reuse coolant.

– Fill up with coolant ⇒ page 84 .

Tightening torques

♦ ⇒ “3.1 Exploded view - coolant pipes”, page 97

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

4 Radiator/radiator fan

⇒ “4.1 Exploded view - radiator/radiator fan”, page 110

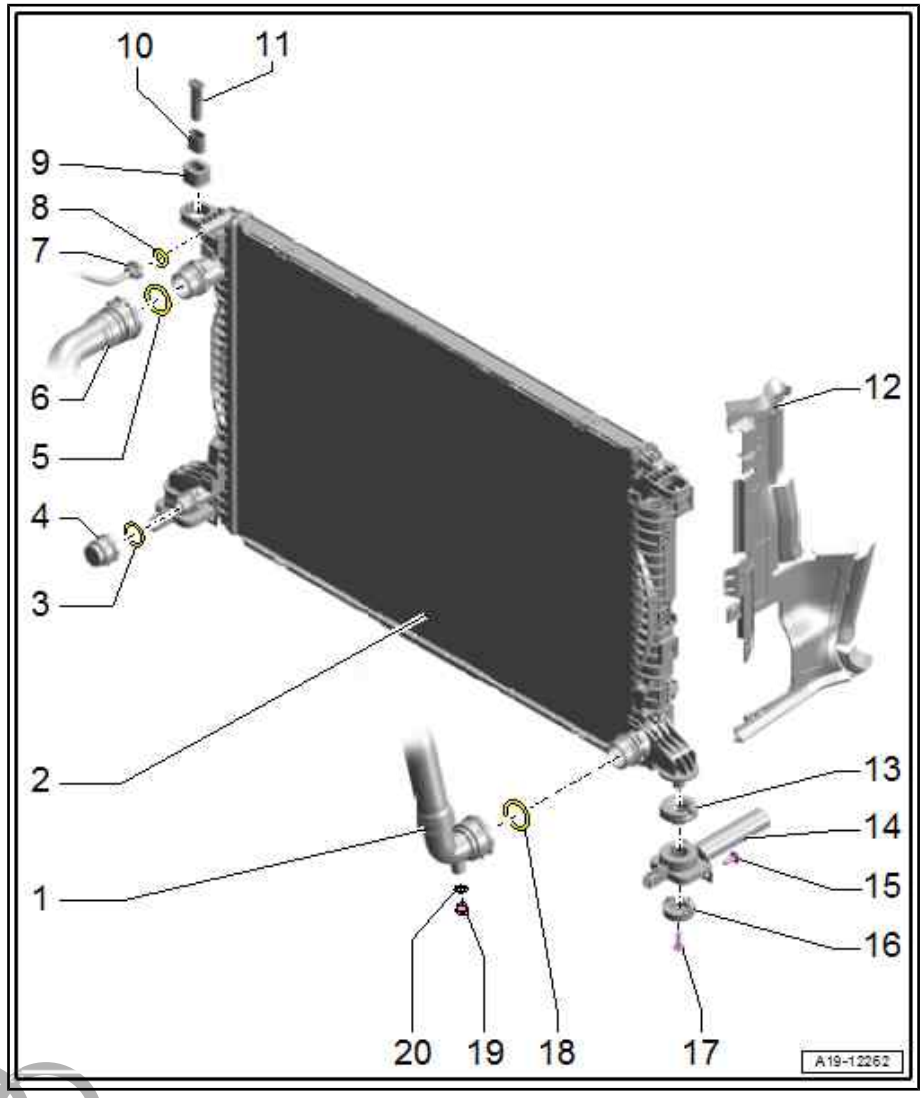
⇒ “4.2 Removing and installing radiator”, page 112

⇒ “4.3 Removing and installing radiator cowl”, page 116

⇒ “4.4 Removing and installing radiator fan V7 ”, page 118

4.1 Exploded view - radiator/radiator fan

Radiator



1 - Coolant hose

- ❑ Lift retaining clip to detach
- ❑ Connecting ⇒ page 111

2 - Radiator

- ❑ Removing and installing ⇒ page 112
- ❑ If there are slight impressions on the fins, refer to ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair instructions; Installing radiators and condensers

3 - O-ring

- ❑ Renew after removing

4 - Sealing plug

- ❑ Lift retaining clip to detach
- ❑ Connecting ⇒ page 111

5 - O-ring

- ❑ Renew after removing

6 - Coolant hose

- ❑ Lift retaining clip to detach
- ❑ Connecting ⇒ page 111

7 - Coolant pipe

- ❑ To coolant expansion tank
- ❑ Lift retaining clip to detach
- ❑ Connecting ⇒ page 111

8 - O-ring

- ❑ Renew after removing

9 - Rubber bush

- ❑ For radiator

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10 - Sleeve

11 - Retaining pin

- ❑ Use screwdriver to release and pull off

12 - Air duct

13 - Rubber bush

- ❑ For radiator

14 - Radiator bracket

15 - Bolt

- ❑ 5 Nm

16 - Washer

17 - Bolt

- ❑ 4.5 Nm

18 - O-ring

- ❑ Renew after removing

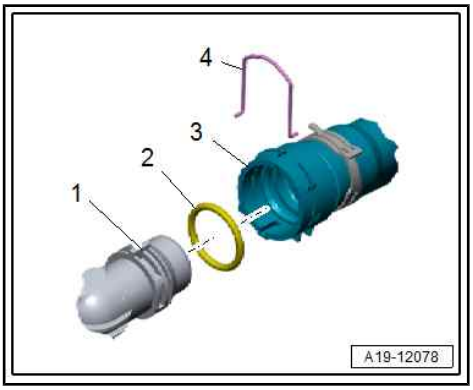
19 - Drain plug

- ❑ 1.5 … 3 Nm

20 - O-ring

- ❑ Renew after removing

Connecting coolant hose with plug-in connector



Note

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.

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Radiator cowl and radiator fan

1 - Radiator cowl

- ❑ Removing and installing ⇒ page 116

2 - Bolt

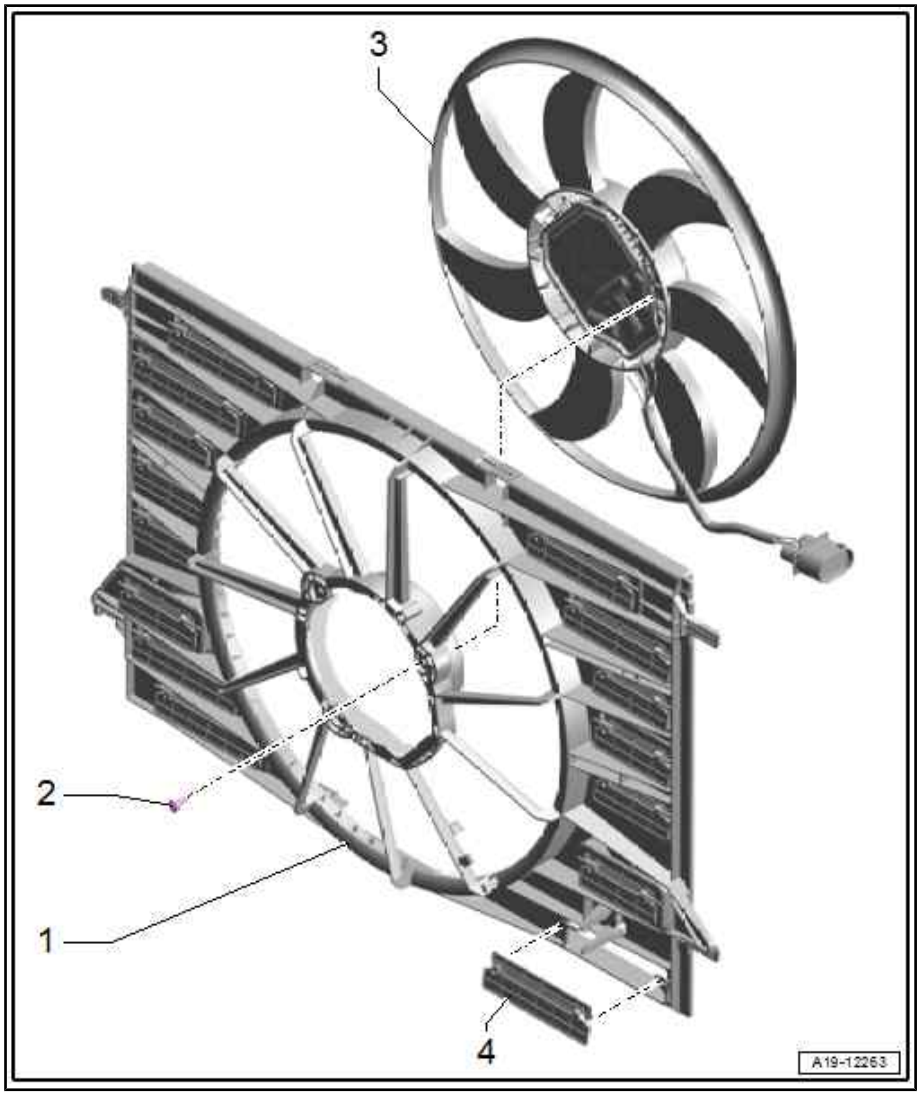
- ❑ 5 Nm

3 - Radiator fan - V7-

- ❑ With radiator fan control unit - J293-
- ❑ Removing and installing ⇒ page 118

4 - Air flow flap

- ❑ Different versions available ⇒ Electronic parts catalogue



4.2 Removing and installing radiator

Note

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

Special tools and workshop equipment required

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

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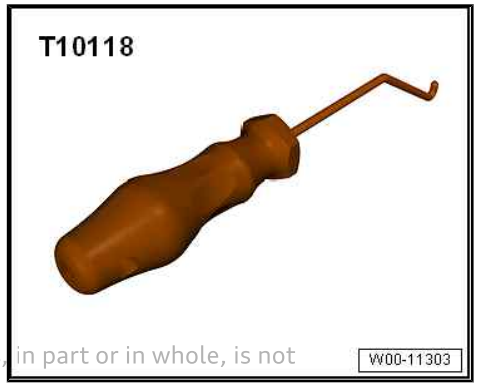
- Assembly tool - T10118-



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Removing

WARNING

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

- ***Even when the ignition is switched off, the radiator fans can start up without warning due to accumulated heat in the engine compartment, etc.***

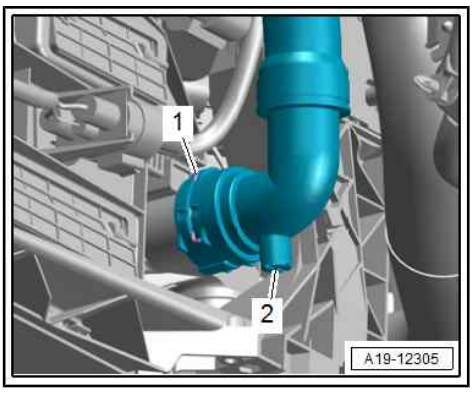
– Remove noise insulation (front) ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .

– Remove bracket for bumper cover ⇒ General body repairs, exterior; Rep. gr. 50 ; Lock carrier; Exploded view - lock carrier .

– A4 with LED and matrix LED headlights: Remove headlight (left-side) ⇒ Electrical system; Rep. gr. 94 ; Headlights; Removing and installing headlights .

– Place collector tank from coolant collecting system -VAS 5014- or drip tray for workshop hoist - VAS 6208- underneath.

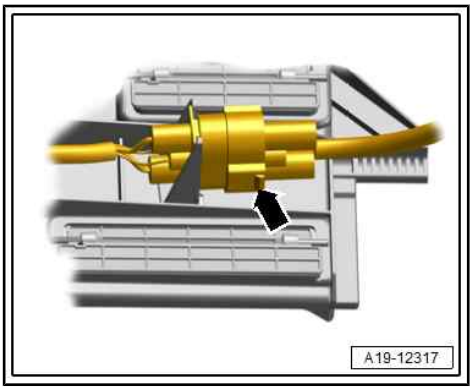
– Lift retaining clip -1- and disconnect coolant hose from radiator (bottom right).



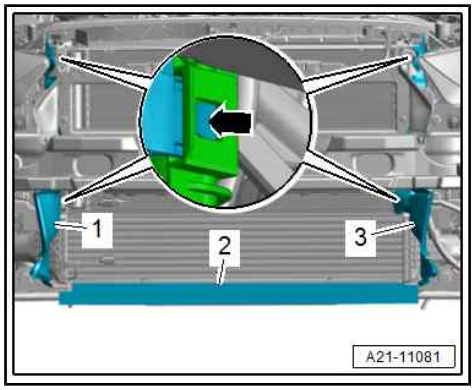
Note

Disregard -item 2-.

– Unplug electrical connector -arrow- for radiator fan.



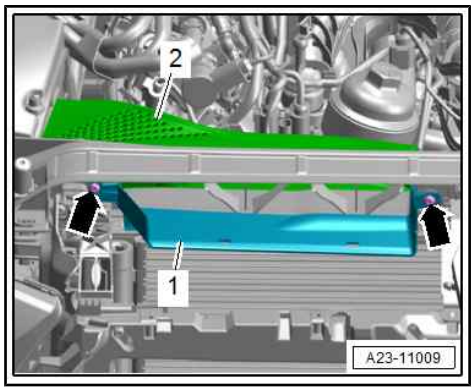
– Release catches -arrow- and detach air ducts -1, 3-.
– Unclip air duct -2-.



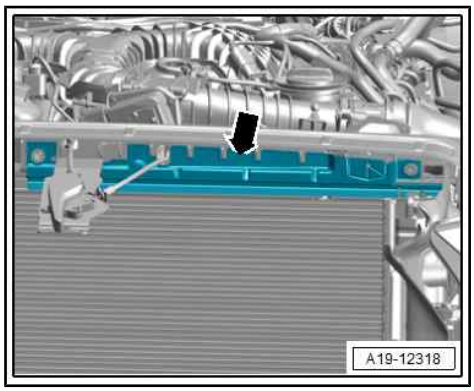
– Remove bolts -arrows- and detach air duct -1-.

Note

Disregard -item 2-.



– Detach air duct (top) -arrow-.
– Remove charge air cooler ⇒ page 124 .



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

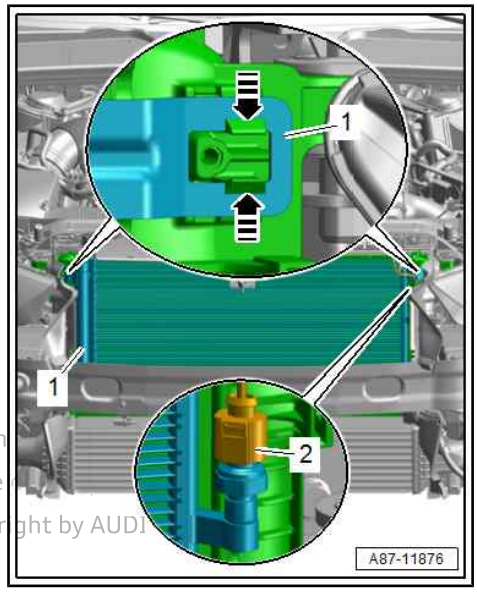
Caution

Risk of irreparable damage to radiator.

- ***The radiator must be renewed if the fasteners are damaged.***

Risk of damage to refrigerant lines and hoses

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



– Release fasteners -arrows- on both sides, disengage condenser -1- from radiator and tie up to one side.

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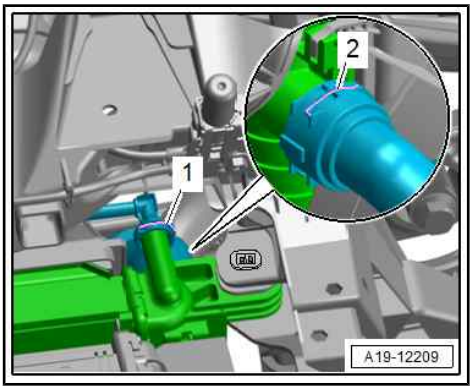
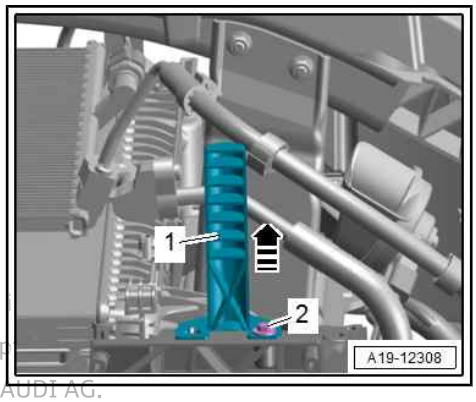
– Lift retaining clips -1, 2-, detach coolant connection from radiator and move connection clear.



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



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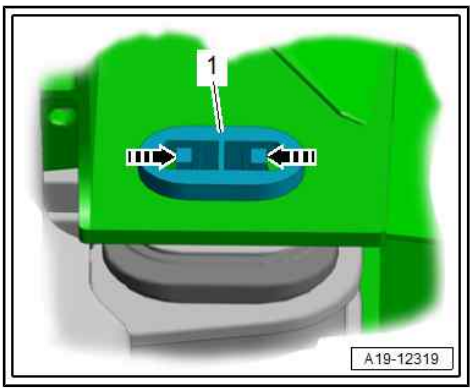
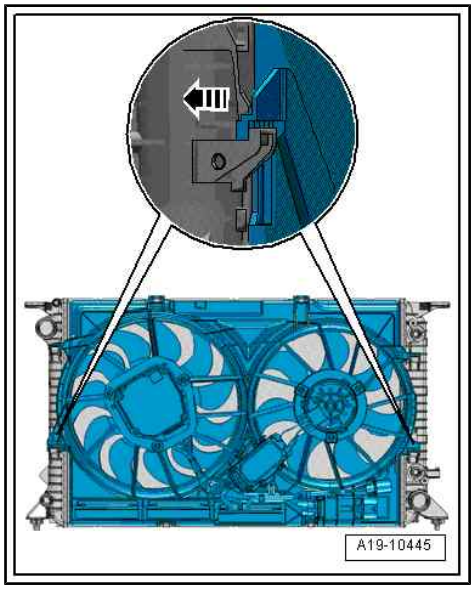
– Release fasteners -arrows- on both sides and pull retaining pins -1- for radiator out upwards.

– 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:

Note

If there are slight impressions on the fins, refer to ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair instructions; Installing radiators and condensers .

– Install charge air cooler ⇒ page 124 .
– Electrical connections and routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
– Connect coolant hose with plug-in connector ⇒ page 111 .

Note

Do not reuse coolant.

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– Fill up with coolant ⇒ page 87 .
– If removed: Install headlight (left-side) ⇒ Electrical system; Rep. gr. 94 ; Headlights; Removing and installing headlights .

Tightening torques

- ⇒ “4.1 Exploded view - radiator/radiator fan”, page 110
- ⇒ “3.1 Exploded view - air cleaner housing”, page 135
- ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Exploded view - hose connections for charge air system
- ⇒ 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 radiator cowl

Special tools and workshop equipment required

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

Removing

WARNING

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

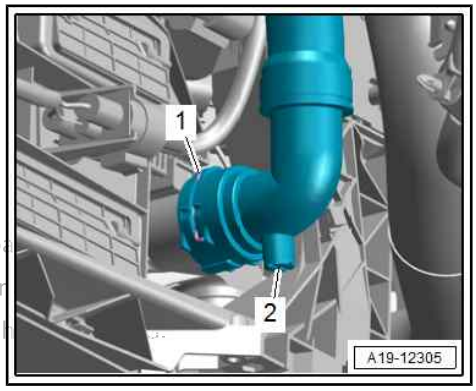
- *Unplug electrical connectors before working in vicinity of radiator cowl.*

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

– Remove charge air cooler ⇒ page 124 .

– Place collector tank from coolant collecting system -VAS 5014- or drip tray for workshop hoist - VAS 6208- underneath.

– Lift retaining clip -1- and disconnect coolant hose from radiator (bottom right).



Note

Disregard -item 2-.

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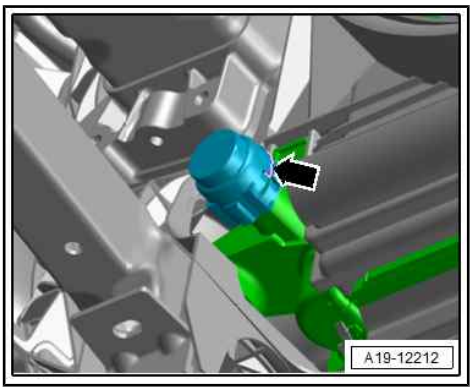
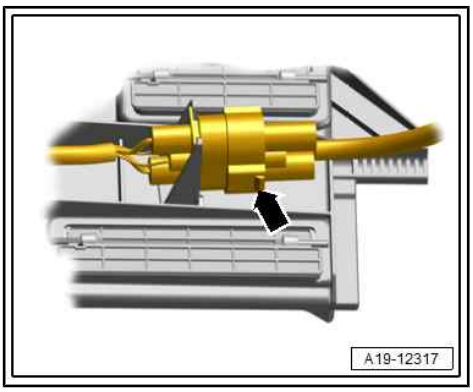
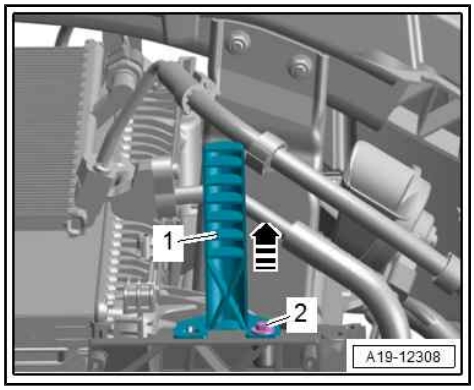
– Lift retaining clip -arrow- and remove sealing plug (bottom left) on radiator.



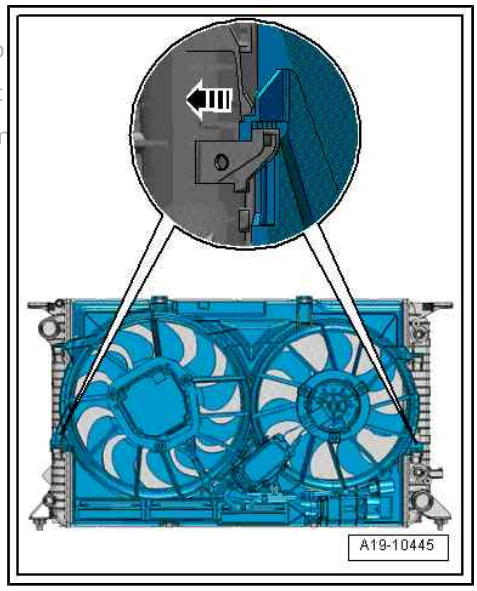
– Unplug electrical connector -arrow- for radiator fan.



– 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.



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Installing

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

Note

Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .

– Install charge air cooler ⇒ page 124 .
– Attach connection with plug-in connector ⇒ page 111 .

Note

Do not reuse coolant.

– Fill up with coolant ⇒ page 87 .

Tightening torques

- ⇒ “4.1 Exploded view - radiator/radiator fan”, page 110
- ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Exploded view - hose connections for charge air system
- ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation

4.4 Removing and installing radiator fan - V7-

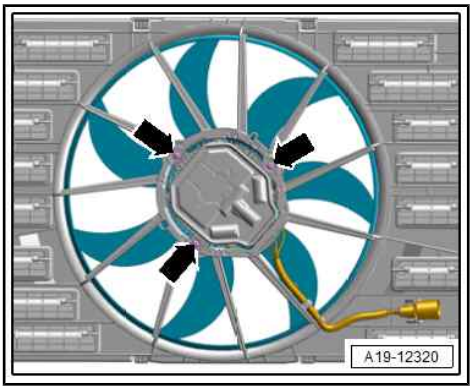
Removing

Note

Secure all cable ties in the same locations when re-installing.

– Remove radiator cowl ⇒ page 116 .
– Move electrical wiring harness clear.

– Unscrew bolts -arrows- and remove radiator fan.



Caution

Risk of noise due to imbalance in fan wheel.

- *Do not remove balancing clamps from fan wheel.*

Installing

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

– Install radiator cowl ⇒ page 116 .

Tightening torques

- ⇒ “4.1 Exploded view - radiator/radiator fan”, page 110

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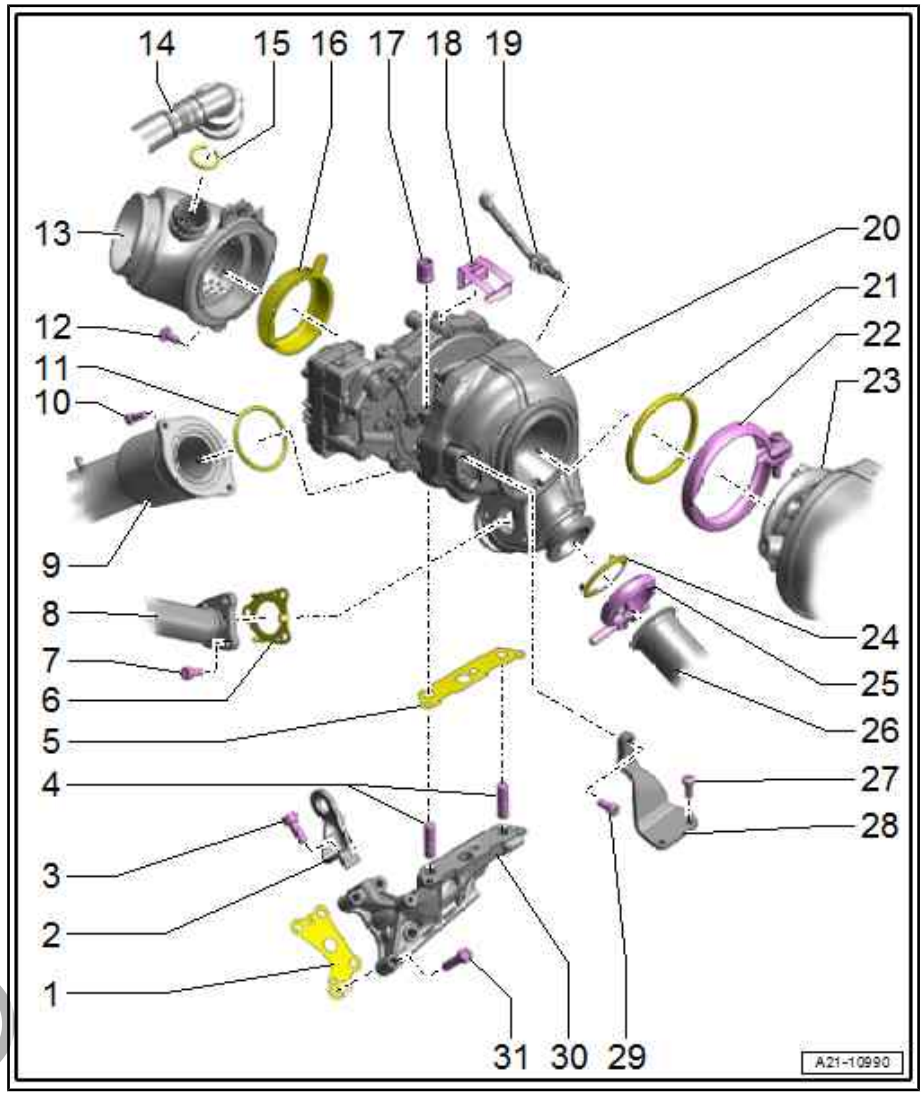
21 – Turbocharging/supercharging

1 Turbocharger

⇒ "1.1 Exploded view - turbocharger", page 120

⇒ "1.2 Removing and installing turbocharger", page 122

1.1 Exploded view - turbocharger



1 - Gasket

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Exploded view - turbocharger

2 - Engine lifting eye

3 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Exploded view - turbocharger

4 - Studs

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Exploded view - turbocharger

5 - Gasket

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Exploded view - turbocharger

6 - Gasket

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Exploded view - turbocharger

7 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Exploded view - turbocharger

8 - Pipe

- ❑ To exhaust gas recirculation cooler

9 - Air pipe

10 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Exploded view - turbocharger

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11 - O-ring

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Exploded view - turbocharger

12 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Exploded view - turbocharger

13 - Connection

- ❑ For air hose
- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Exploded view - turbocharger

14 - Hose

- ❑ For crankcase breather

15 - O-ring

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Exploded view - turbocharger

16 - Seal

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Exploded view - turbocharger

17 - Nut

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Exploded view - turbocharger

18 - Retaining clip

19 - Exhaust gas temperature sender 1 - G235-

- ❑ Exploded view ⇒ page 185

20 - Turbocharger

- ❑ With turbocharger 1 control unit - J724-

Caution

Risk of further damage if the turbocharger has suffered mechanical damage.
Check entire charge air system for foreign matter ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Removing and installing turbocharger .

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- ❑ Removing and installing ⇒ page 122

21 - Seal

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Exploded view - turbocharger

22 - Screw-type clip

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Exploded view - turbocharger

23 - Emission control module

- ❑ Exploded view ⇒ page 173

24 - Seal

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Exploded view - turbocharger

25 - Screw-type clip

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Exploded view - turbocharger

26 - Exhaust manifold

- ❑ Exploded view ⇒ page 191

27 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Exploded view - turbocharger

28 - Bracket

- ❑ For turbocharger

29 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Exploded view - turbocharger

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30 - Bracket

- ❑ For turbocharger

31 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Exploded view - turbocharger

1.2 Removing and installing turbocharger

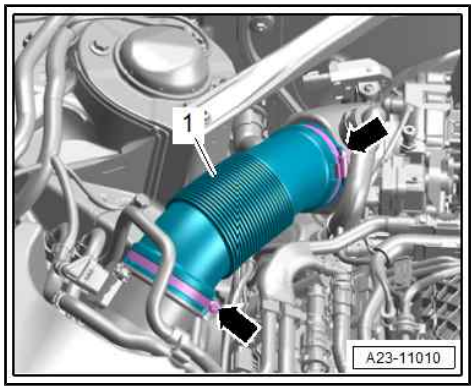
Removing

Note

Observe rules for cleanliness ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair instructions; Rules for cleanliness .

– Remove engine cover panel ⇒ page 45 .

– Release hose clips -arrows- and detach air pipe -1-.



All further procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Removing and installing turbocharger .

Installing

Additional work:

Note

Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .

– Install engine cover panel ⇒ page 45 .

Tightening torques

- ♦ ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Exploded view - hose connections for charge air system

2 Charge air system

⇒ “2.1 Exploded view - charge air system”, page 123

⇒ “2.2 Exploded view - hose connections for charge air system”, page 124

⇒ “2.3 Removing and installing charge air cooler”, page 124

⇒ “2.4 Removing and installing charge pressure sender G31 ”, page 125

⇒ “2.5 Checking charge air system for leaks”, page 126

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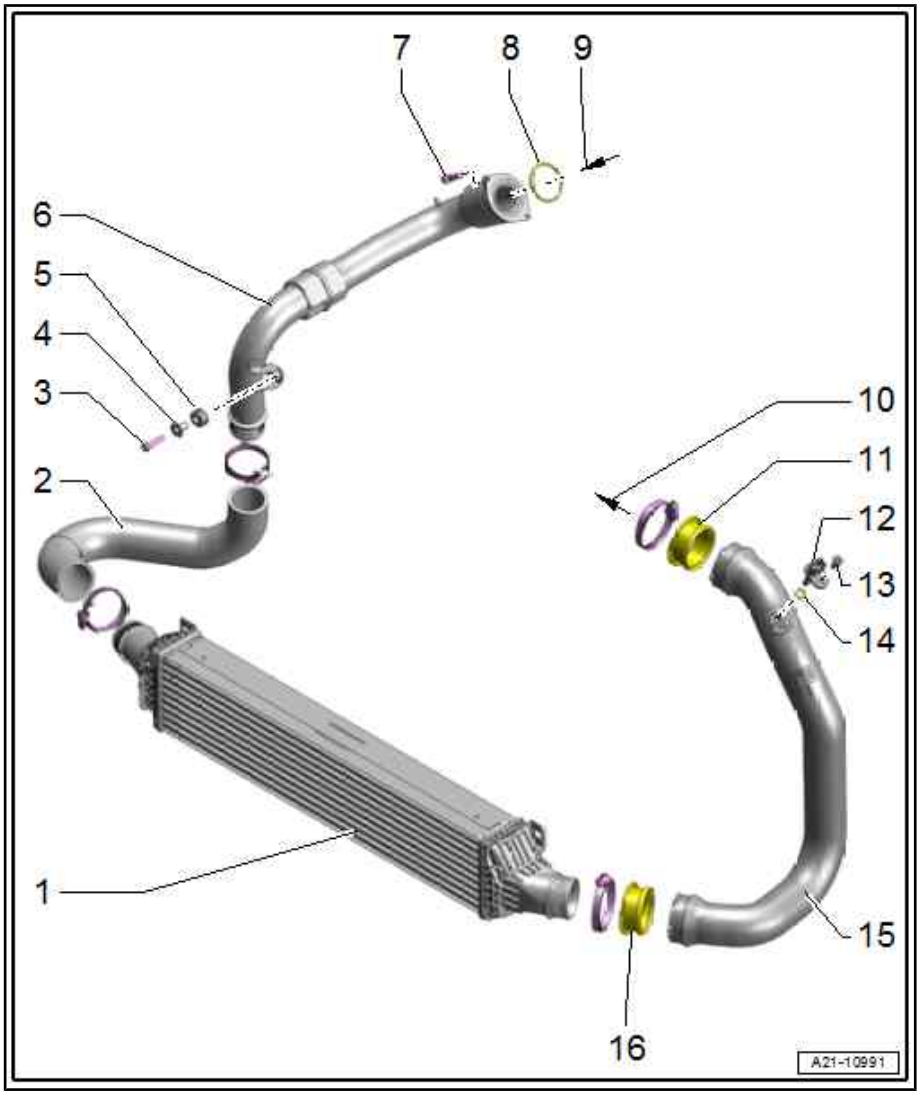
2.1 Exploded view - charge air system



1 - Charge air cooler

- ❑ Removing and installing ⇒ page 124
- ❑ If there are slight impressions on the fins, refer to ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair instructions; Installing radiators and condensers

2 - Air hose

- ❑ Must be free of oil and grease when installing

3 - Bolt

- ❑ 9 Nm

4 - Spacer sleeve

5 - Grommet

6 - Air pipe

7 - Bolt

- ❑ 9 Nm

8 - O-ring

- ❑ Renew after removing

9 - From turbocharger

10 - To intake manifold

11 - Seal

- ❑ Renew if damaged

12 - Intake air temperature sender - G42-

- ❑ Removing and installing ⇒ page 149

13 - Bolt

- ❑ Repair method if fastener breaks off
- ❑ Thread-forming
- ❑ Fit and screw in bolt by hand so that it is screwed into old thread. Then tighten bolt to torque
- ❑ 7 Nm

14 - O-ring

- ❑ Renew after removing

15 - Air pipe

- ❑ Must be free of oil and grease when installing

16 - Seal

- ❑ Renew if damaged

2.2 Exploded view - hose connections for charge air system

All components are described in ⇒ Servicing 6-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 air cooler

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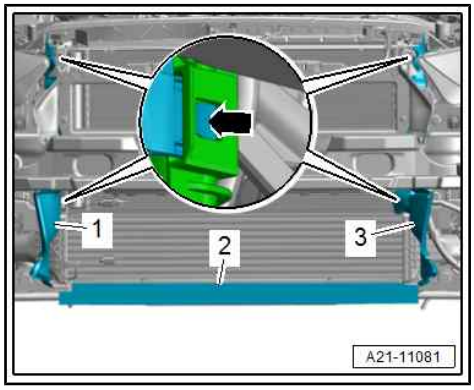
Removing

Note

Observe rules for cleanliness ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair instructions; Rules for cleanliness .

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

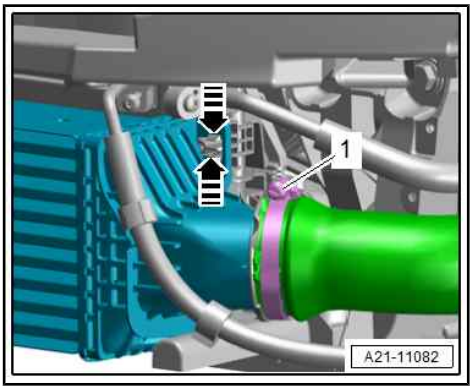
– Release catches -arrow- and detach air ducts -1, 3-.



Note

Disregard -item 2-.

– Release hose clip -1- on both sides and detach air pipe from charge air cooler.



Caution

Risk of irreparable damage to charge air cooler.

- *The charge air cooler must be renewed if the fasteners are damaged.*

– Release fasteners -arrows- on both sides and disengage charge air cooler from radiator.

– Take out charge air cooler from underneath.

Installing

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

Note

- *If there are slight impressions on the fins, refer to ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair instructions; Installing radiators and condensers .*
- *Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .*

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

Tightening torques

- ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Exploded view - hose connections for charge air system

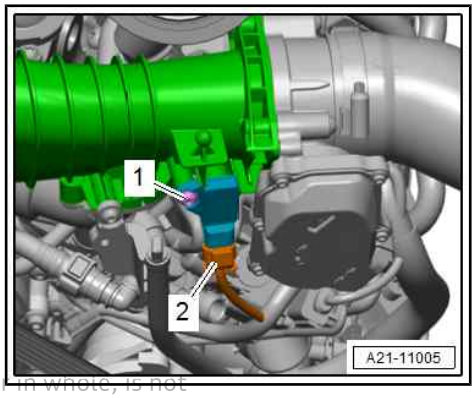
2.4 Removing and installing charge pressure sender - G31-

Removing

– Remove engine cover panel ⇒ page 45 .

– Unplug electrical connector -2-.

– Unscrew bolt -1- and remove charge pressure sender - G31- .



Installing

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

Note

Renew O-ring after removal.

– Install engine cover panel ⇒ page 45 .

Tightening torques

- ⇒ “4.1 Exploded view - intake manifold”, page 139

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2.5 Checking charge air system for leaks

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail (EA 897 Gen I); Rep. gr. 21 ; Charge air system; Checking charge air system for leaks .

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23 – Mixture preparation - injection

1 Injection system

⇒ “1.1 Overview - fuel system”, page 127

⇒ “1.2 Overview of fitting locations - injection system”, page 128

⇒ “1.3 Filling and bleeding fuel system”, page 133

1.1 Overview - fuel system

Note

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

1 - Injector

2 - High-pressure reservoir (rail)

- ❑ For cylinder bank 1 (right-side)

3 - Fuel temperature sender - G81-

4 - Fuel filter

5 - Fuel tank

- ❑ With fuel system pressurisation pump - G6-

6 - Fuel metering valve - N290-

7 - High-pressure pump

8 - Fuel pressure sender - G247-

9 - High-pressure reservoir (rail)

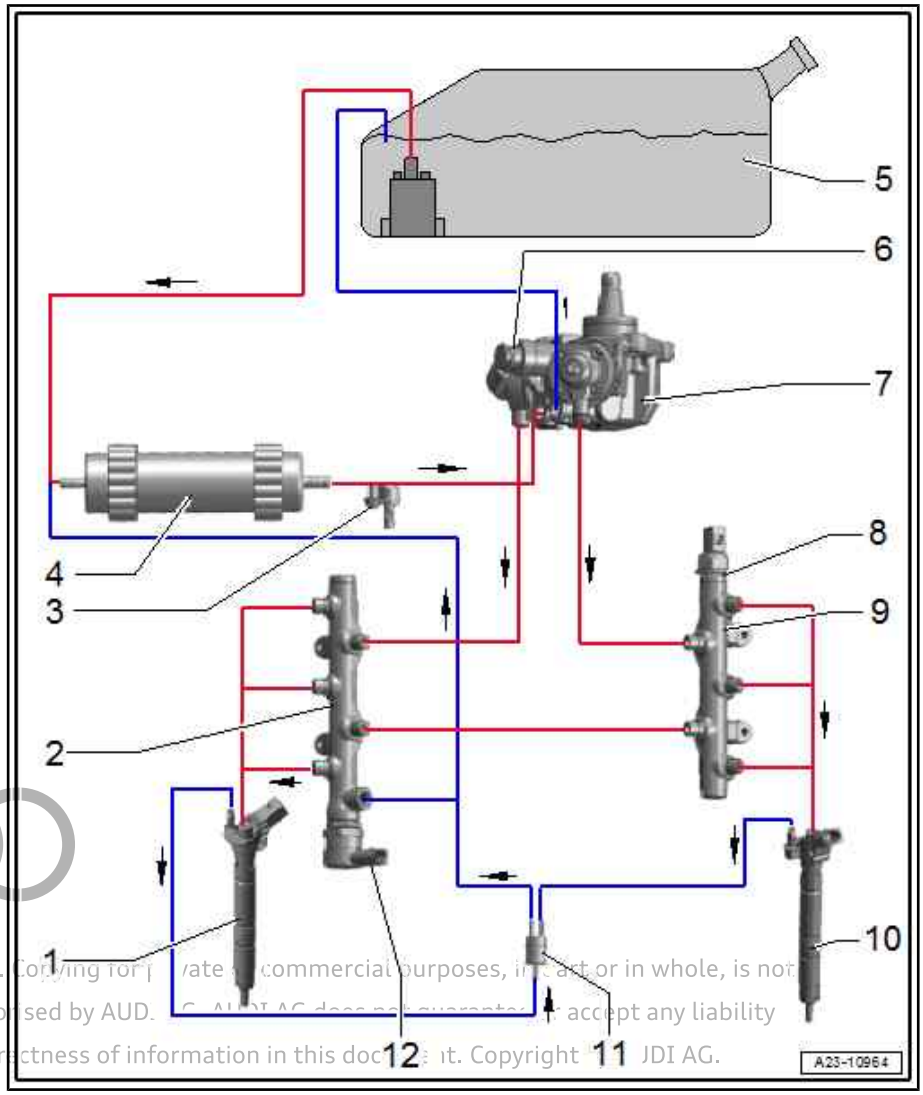
- ❑ For cylinder bank 2 (left-side)

10 - Injector

11 - Restrictor

- ❑ Maintains a residual pressure in fuel return hoses

12 - Fuel pressure regulating valve - N276-



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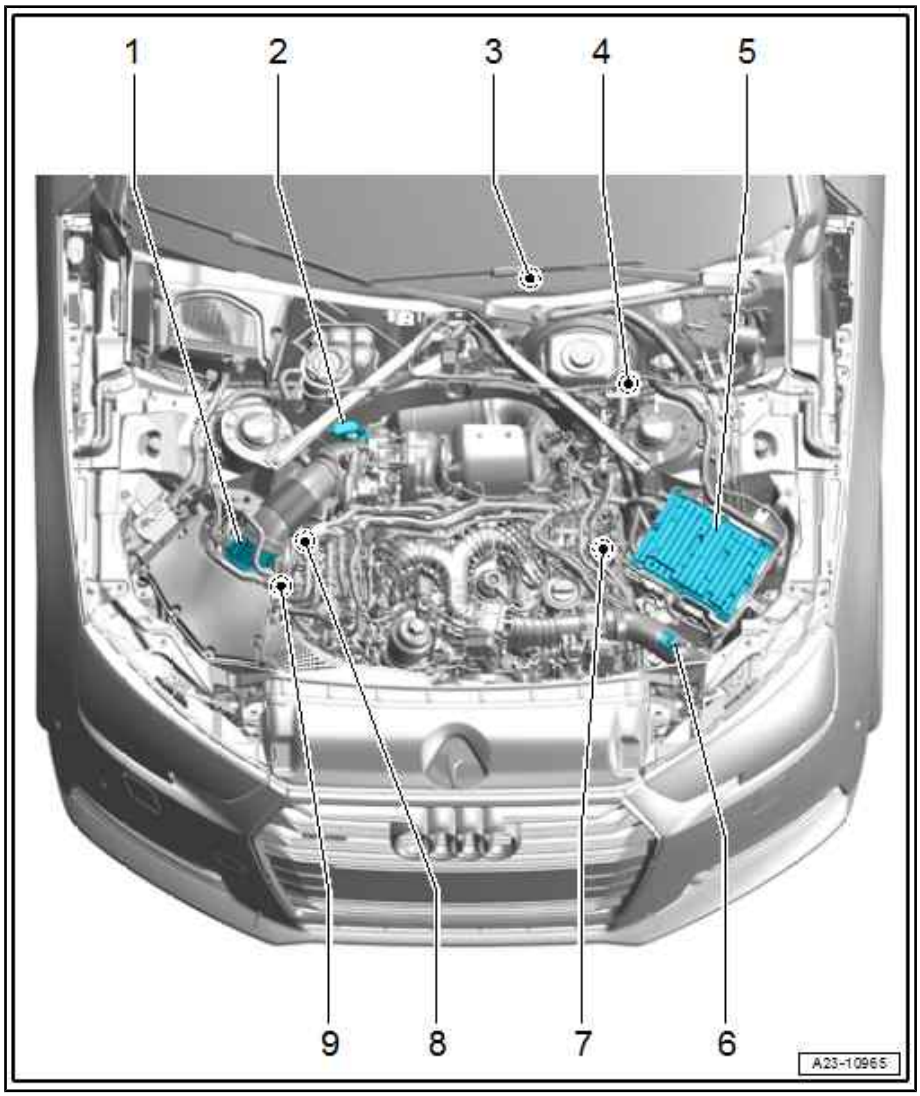
1.2 Overview of fitting locations - injection system

Engine compartment



1 - Air mass meter - G70-

- ❑ Exploded view ⇒ page 135

2 - Pressure differential sender - G505-

- ❑ Exploded view ⇒ page 157

3 - Accelerator position sender - G79- and accelerator position sender 2 - G185-

- ❑ Fitting location ⇒ page 129

4 - Brake light switch - F-

- ❑ Fitting location ⇒ page 129

5 - Engine control unit - J623-

- ❑ Exploded view ⇒ page 161

6 - Intake air temperature sender - G42-

- ❑ Exploded view ⇒ page 123

7 - Left electrohydraulic engine mounting solenoid valve - N144-

- ❑ Fitting location ⇒ page 129

8 - Right electrohydraulic engine mounting solenoid valve - N145-

- ❑ Fitting location ⇒ page 129

9 - Coolant circulation pump - V50-

- ❑ Fitting location ⇒ page 130

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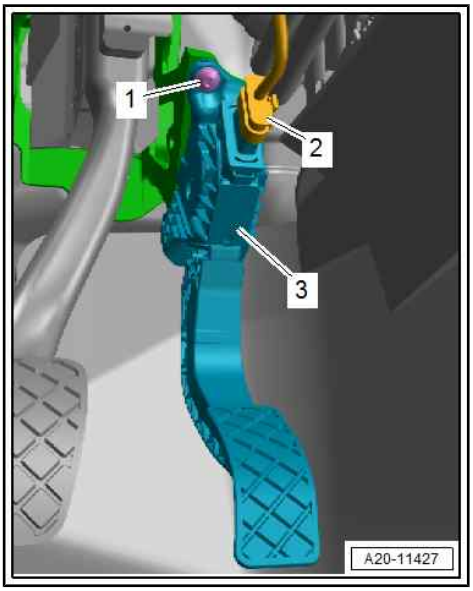
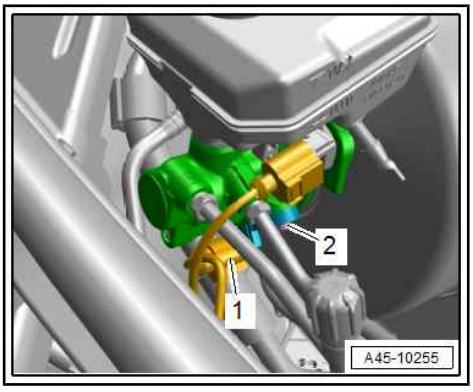
Fitting location of accelerator position sender - G79- / accelerator position sender 2 - G185-



- Integrated in accelerator pedal module -3-. Accelerator position senders cannot be renewed separately if defective.

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

Fitting location of brake light switch - F-

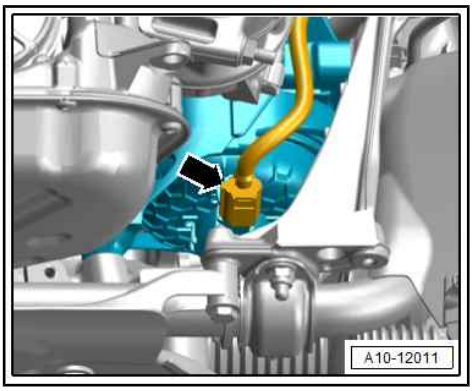


- In plenum chamber on brake master cylinder

1 - Electrical connector for brake light switch - F-

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

Removing and installing
⇒ “2.3 Removing and installing engine mountings”, page 39

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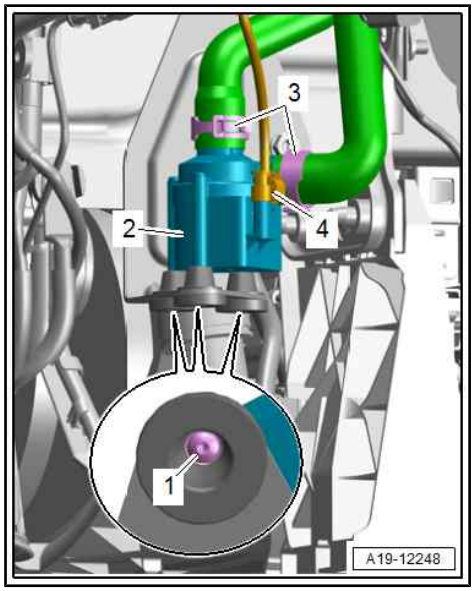
Fitting location of coolant circulation pump - V50-

- At bottom on longitudinal member (right-side).

2 - Coolant circulation pump - V50-

Exploded view ⇒ page 90 .



Engine (top view)

1 - Fuel pressure regulating valve - N276-

- ❑ Removing and installing ⇒ page 153
- ❑ Checking ⇒ page 151

2 - Injectors for cylinder bank 1 (right-side)

- Injector, cylinder 1 - N30-
- Injector, cylinder 2 - N31-
- Injector, cylinder 3 - N32-
  - ❑ Exploded view ⇒ page 143

3 - Control unit for turbocharger 1 - J724-

- ❑ On turbocharger
- ❑ Exploded view ⇒ page 120

4 - Fuel metering valve - N290-

5 - Exhaust gas recirculation control motor - V338-

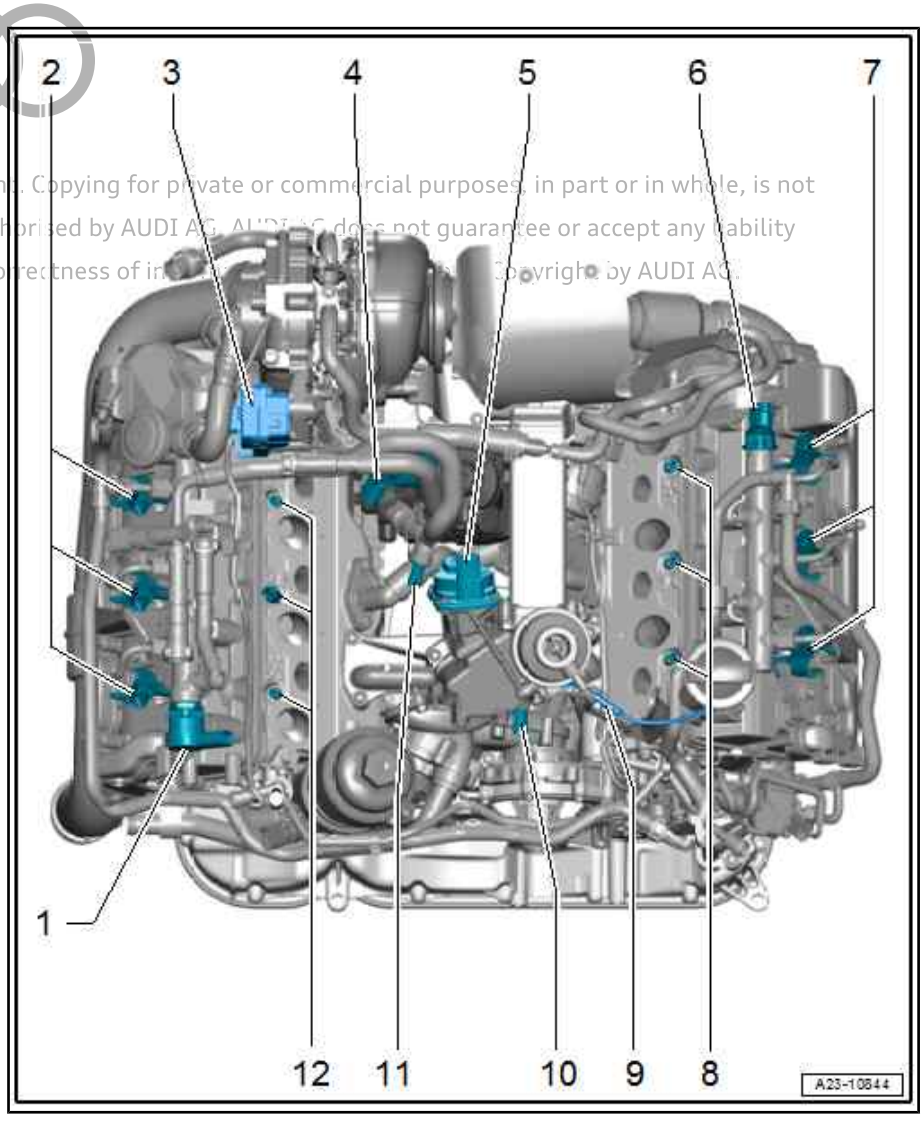
- ❑ With exhaust gas recirculation potentiometer - G212-
- ❑ Exploded view ⇒ page 189

6 - Fuel pressure sender - G247-

- ❑ Removing and installing ⇒ page 150

7 - Injectors for cylinder bank 2 (left-side)

- Injector, cylinder 6 - N84-
- Injector, cylinder 5 - N83-



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- Injector, cylinder 4 - N33-
  - Exploded view ⇒ page 143

8 - Glow plugs for cylinder bank 2 (left-side)

- Glow plug 6 - Q15-
- Glow plug 5 - Q14-
- Glow plug 4 - Q13-
  - Exploded view ⇒ page 196

9 - Exhaust gas recirculation temperature sensor - G98-

- Exploded view ⇒ page 189

10 - Coolant temperature sender - G62-

- Exploded view ⇒ page 93

11 - Fuel temperature sender - G81-

12 - Glow plugs for cylinder bank 1 (right-side)

- Glow plug 1 - Q10-
- Glow plug 2 - Q11-
- Glow plug 3 - Q12-
  - Exploded view ⇒ page 196

Engine (front view)

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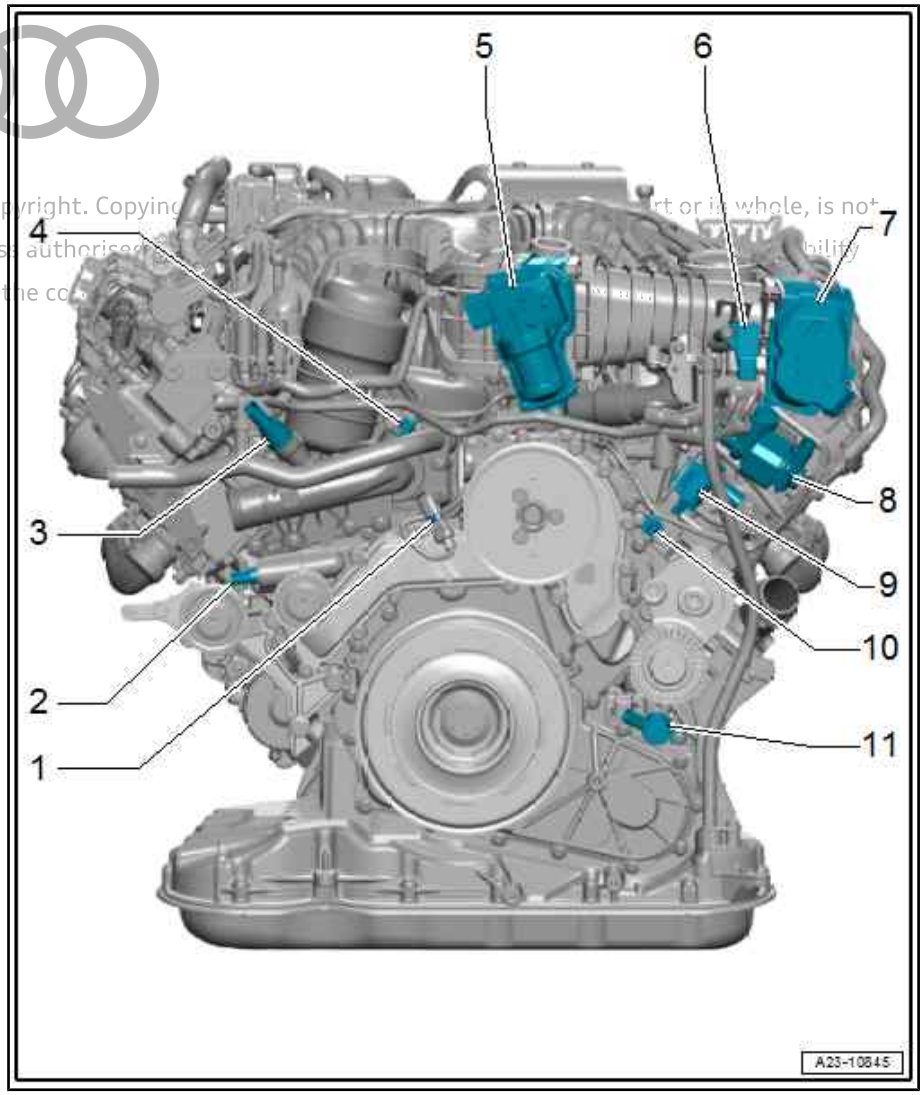

1 - Map-controlled engine cooling system thermostat - F265-

2 - Oil temperature sender 2 - G664-

- ❑ Exploded view ⇒ page 48

3 - Oil pressure sender - G10-

4 - Coolant temperature sender 2 - G802-

- ❑ Exploded view ⇒ page 93

5 - Intake manifold flap motor - V157-

- ❑ Exploded view ⇒ page 139

6 - Charge pressure sender - G31-

- ❑ Exploded view ⇒ page 139

7 - Throttle valve module - J338-

- ❑ Exploded view ⇒ page 139

8 - Coolant valve for cylinder head - N489-

9 - Exhaust gas recirculation cooler change-over valve - N345-

10 - Temperature sender for engine temperature regulation - G694-

11 - Valve for oil pressure control - N428-

- ❑ Exploded view ⇒ page 71

Engine (side view, right-side)

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1 - Engine speed sender - G28-

- ❑ Exploded view ⇒ page 196

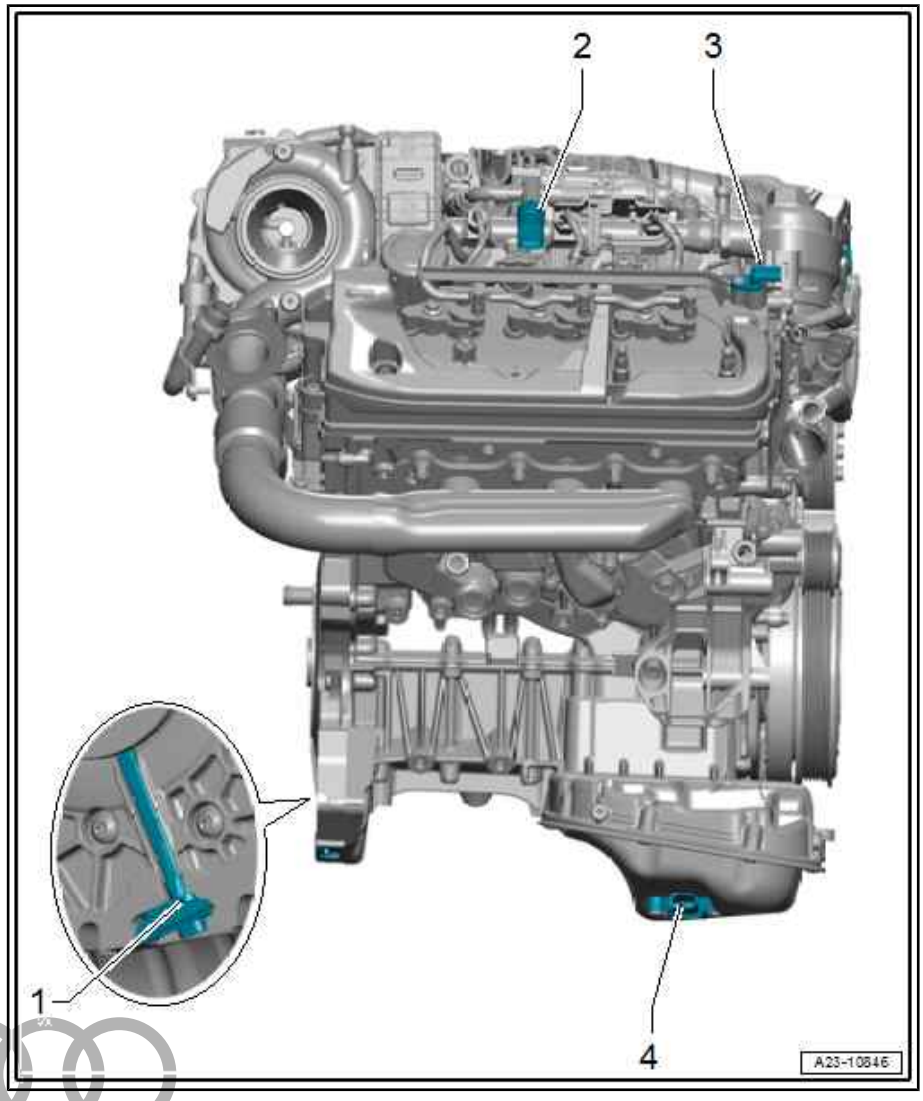
2 - Fuel pressure sender for low pressure - G410-

3 - Hall sender - G40-

- ❑ Exploded view ⇒ page 196

4 - Oil level and oil temperature sender - G266-

- ❑ Exploded view ⇒ page 71



1.3 Filling and bleeding fuel system

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All procedures are described in ⇒ Servicing 6-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 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Injection system; Checking fuel system for leaks .

2 Vacuum system

⇒ “2.1 Connection diagram - vacuum system”, page 134

⇒ “2.2 Checking vacuum system”, page 134

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2.1 Connection diagram - vacuum system

1 - Exhaust gas recirculation cooler change-over valve - N345-

2 - Vacuum hose

- From exhaust gas recirculation cooler change-over valve - N345- to vacuum unit at exhaust gas recirculation cooler

3 - Vacuum unit

- At exhaust gas recirculation cooler

4 - Vacuum unit

- At coolant shut-off valve

5 - Vacuum line

- From coolant valve for cylinder head - N489- to vacuum unit at coolant shut-off valve

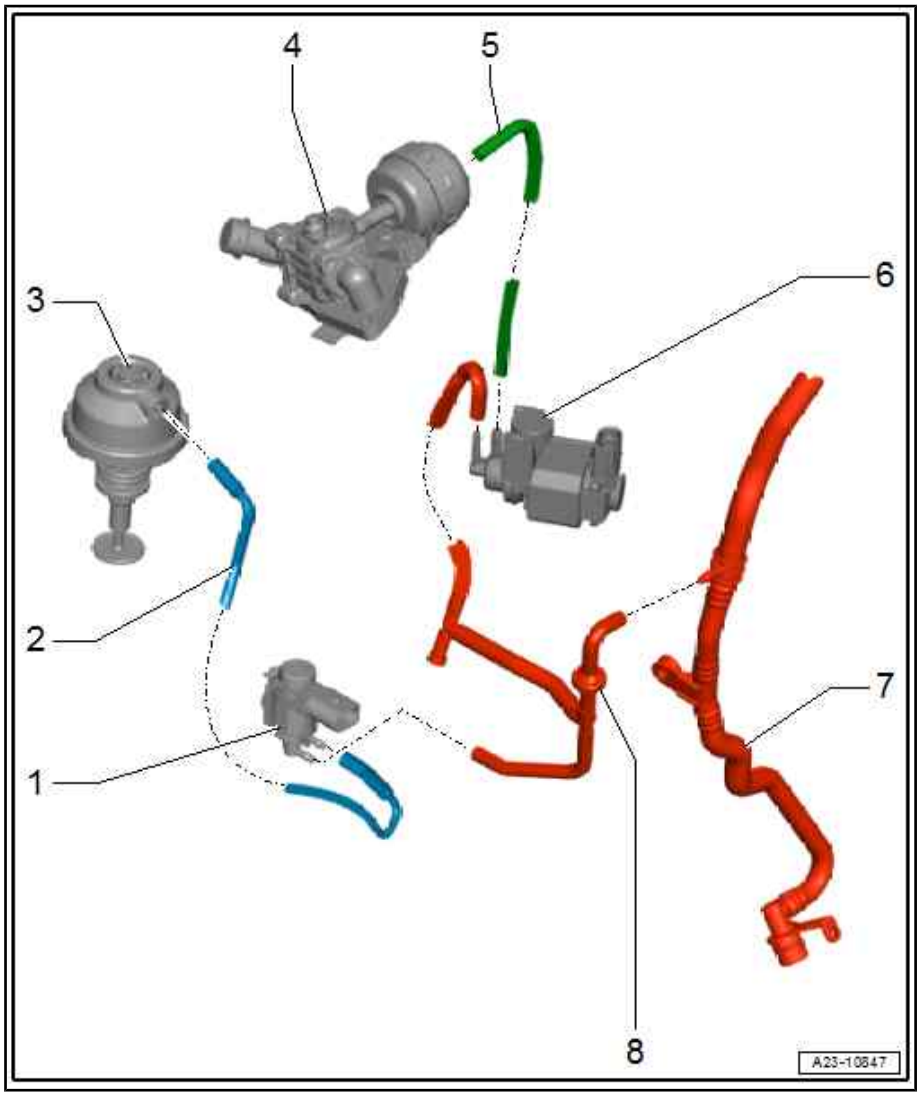
6 - Coolant valve for cylinder head - N489-

7 - Vacuum supply hose

- With non-return valve
- Leading from vacuum pump to brake servo

8 - Vacuum supply hose

- With non-return valve
- To coolant valve for cylinder head - N489- and exhaust gas recirculation cooler change-over valve - N345-



2.2 Checking vacuum system

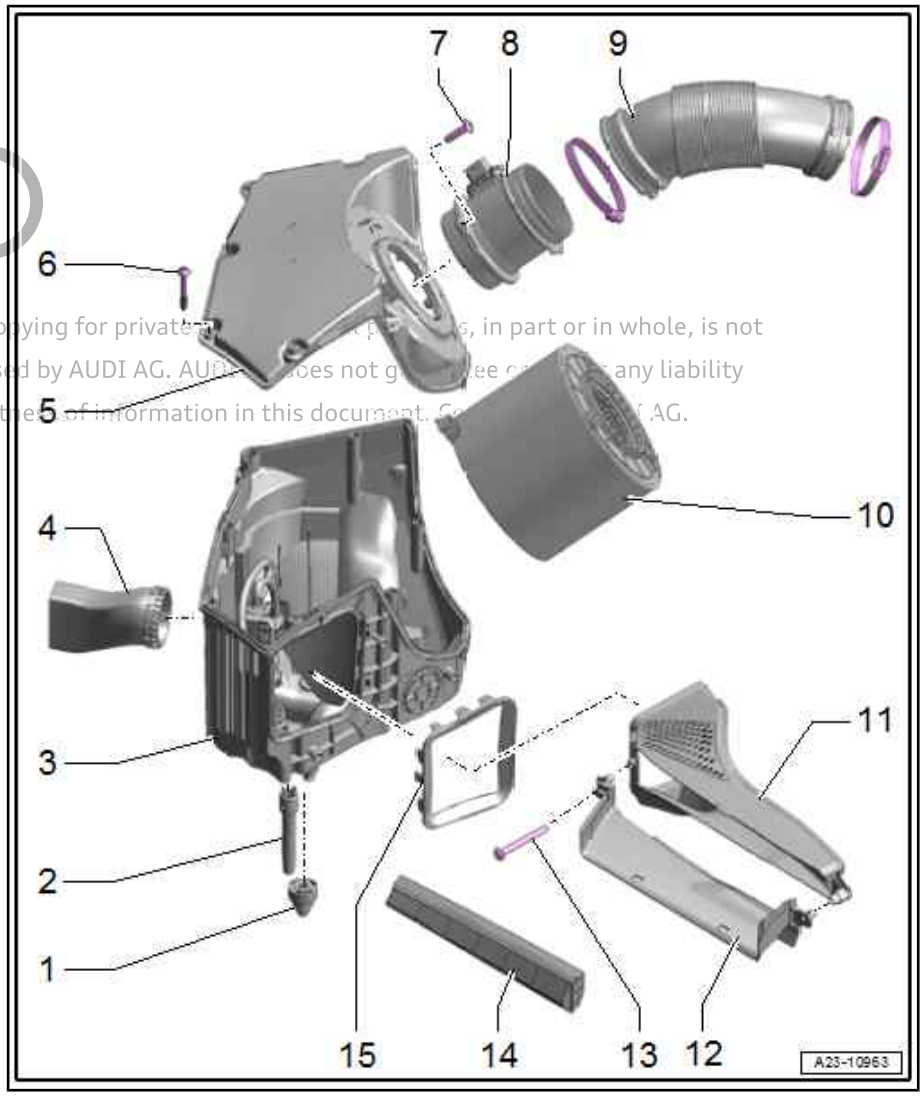
All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Vacuum system; Checking vacuum system .

3 Air cleaner

⇒ “3.1 Exploded view - air cleaner housing”, page 135

⇒ “3.2 Removing and installing air cleaner housing”, page 136

3.1 Exploded view - air cleaner housing



1 - Mounting
- ❑ For air cleaner housing

2 - Water drain
- ❑ Clean

3 - Air cleaner (bottom section)
- ❑ Remove any salt deposits or dirt
- ❑ Removing and installing ⇒ “3.2 Removing and installing air cleaner housing”, page 136

4 - Air pipe
- ❑ Observe installation markings
- ❑ Only installed on vehicles with air filter bypass flap valve - N275-

5 - Air cleaner (top section)
- ❑ Remove any salt deposits or dirt
- ❑ Removing and installing ⇒ Maintenance ; Booklet 830

6 - 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

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 mass meter - G70-
- ❑ Removing and installing ⇒ page 149

9 - Air pipe
- ❑ Observe installation markings
- ❑ Tightening torques for hose clips ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Exploded view - hose connections for charge air system

10 - Air filter element
- ❑ Use genuine air filter element ⇒ Electronic parts catalogue
- ❑ Change intervals ⇒ Maintenance tables
- ❑ Removing and installing ⇒ Maintenance ; Booklet 830

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11 - Air duct

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

12 - Air duct

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

13 - 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

14 - Snow screen

- ❑ Country-specific version

15 - Sealing element

3.2 Removing and installing air cleaner housing

Removing

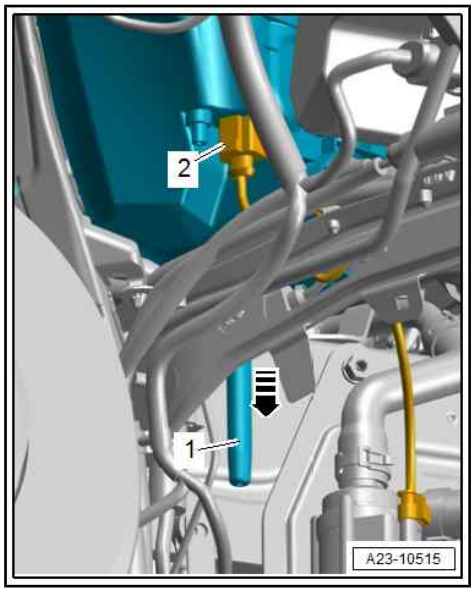
– Remove engine cover panel ⇒ page 45 .

– Remove lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front) .

– Remove wheel spoiler (front right) ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Removing and installing wheel housing liner (front) .

– Depending on vehicle version, electrical connector -2- for air filter bypass flap valve - N275- must be unplugged and vacuum line must be disconnected.

– Detach water drain -1- downwards -arrow-.



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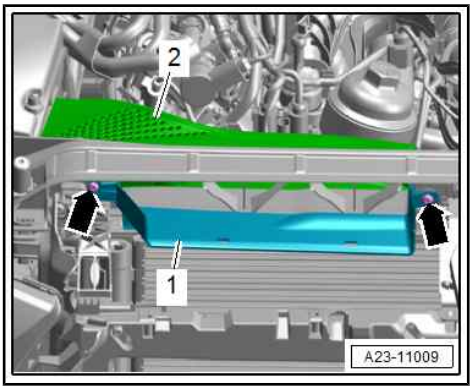
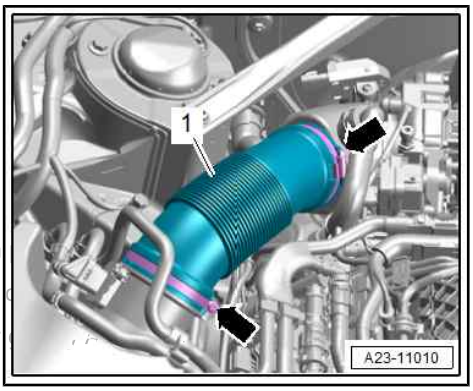
– Remove bolts -arrows- and detach air duct -2-.



Note

Disregard -item 1-.

– Release hose clips -arrows- and detach air pipe -1-.



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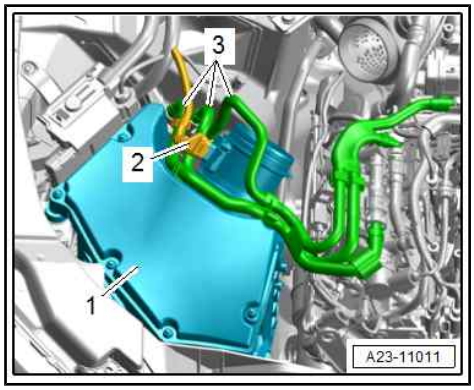
– Unplug electrical connector -2- for air mass meter - G70- .
– Move fuel hoses -3- clear and push to one side.
– Lift off air cleaner housing -1- and detach.



Installing

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

Note

- *If a new air cleaner housing without air filter bypass flap valve - N275- is being fitted, the electrical connector at the wiring harness must be tied back.*
- *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.*
- *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 for salt residue and dirt in air pipe (engine intake side).
– 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) .
– Install engine cover panel ⇒ page 45 .

Tightening torques

- ⇒ “3.1 Exploded view - air cleaner housing”, page 135
- ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Exploded view - hose connections for charge air system
- ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Exploded view - wheel housing liner (front)

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4 Intake manifold

⇒ “4.1 Exploded view - intake manifold”, page 139

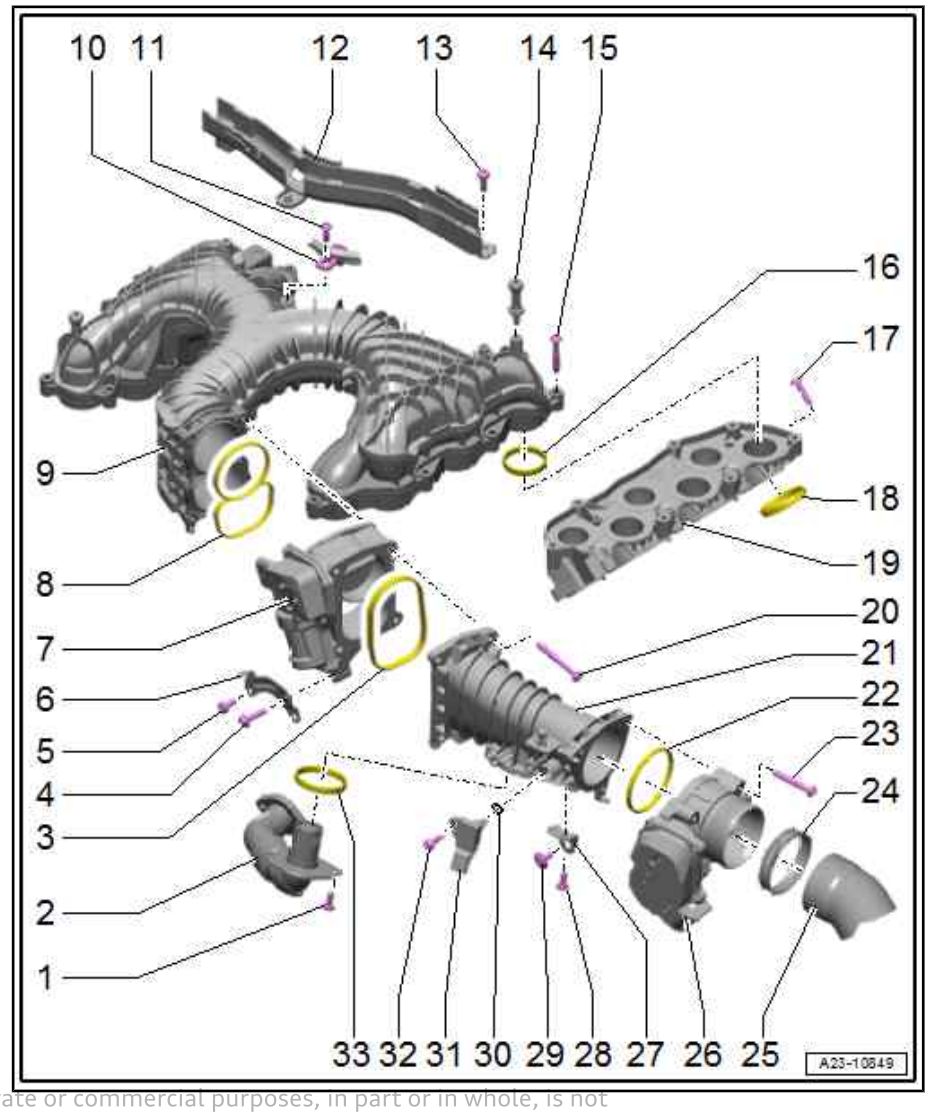
⇒ “4.2 Removing and installing intake manifold (top section)”, page 141

⇒ “4.3 Removing and installing intake manifold (bottom section)”, page 142

⇒ “4.4 Removing and installing intake manifold flap motor V157 ”, page 142

⇒ “4.5 Removing and installing throttle valve module J338 ”, page 142

4.1 Exploded view - intake manifold



1 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Exploded view - intake manifold

2 - Pipe

- ❑ For exhaust gas recirculation

3 - Gasket

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Exploded view - intake manifold

4 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Exploded view - intake manifold

5 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Exploded view - intake manifold

6 - Bracket

- ❑ For air pipe

7 - Intake manifold flap motor - V157-

- ❑ Removing and installing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Removing and installing intake manifold flap motor - V157-

8 - Gasket

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Exploded view - intake manifold

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9 - Intake manifold (top section)

- ❑ Removing and installing ⇒ page 141

10 - Bracket

- ❑ For high-pressure pipe

11 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Exploded view - intake manifold

12 - Cable guide

13 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Exploded view - intake manifold

14 - Mounting pin

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Exploded view - intake manifold

15 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Exploded view - intake manifold

16 - Seal

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Exploded view - intake manifold

17 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Exploded view - intake manifold

18 - Seal

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Exploded view - intake manifold

19 - Intake manifold (bottom section)

- ❑ Removing and installing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Removing and installing intake manifold (bottom section)

20 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Exploded view - intake manifold

21 - Air pipe

22 - Seal

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Exploded view - intake manifold

23 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Exploded view - intake manifold

24 - Screw-type clip

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Exploded view - hose connections for charge air system

25 - Air hose

26 - Throttle valve module - J338-

- ❑ Removing and installing ⇒ page 142

27 - Bracket

- ❑ For air pipe

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28 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Exploded view - intake manifold

29 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Exploded view - intake manifold

30 - O-ring

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Exploded view - intake manifold

31 - Charge pressure sender - G31-

- ❑ Removing and installing ⇒ page 125

32 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Exploded view - intake manifold

33 - Seal

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Exploded view - intake manifold

4.2 Removing and installing intake manifold (top section)

Removing

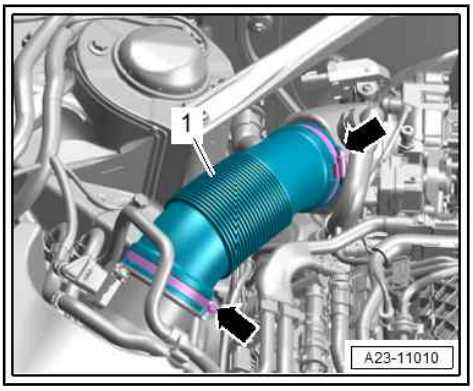
Caution

Risk of malfunctions caused by dirt.

- ***Observe rules for cleanliness ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair instructions; Rules for cleanliness .***

– Remove engine cover panel ⇒ page 45 .

– Release hose clips -arrows- and detach air pipe -1-.



All further procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Removing and installing intake manifold (top section) .

Installing

Additional work:

Note

Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .

– Install engine cover panel ⇒ page 45 .

Tightening torques

- ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Exploded view - hose connections for charge air system

4.3 Removing and installing intake manifold (bottom section)

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Removing and installing intake manifold (bottom section) .

4.4 Removing and installing intake manifold flap motor - V157-

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Removing and installing intake manifold flap motor - V157- .

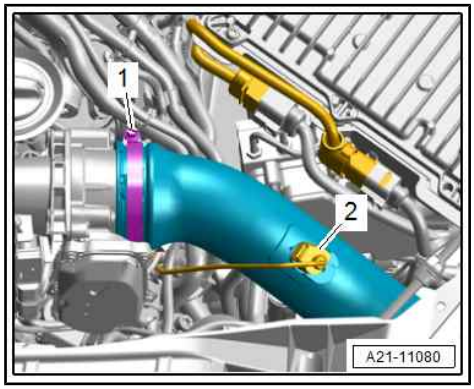
4.5 Removing and installing throttle valve module - J338-

Removing

– Remove engine cover panel ⇒ page 45 .

– Unplug electrical connector -2- for intake air temperature sender - G42- .

– Release hose clip -1-, detach air pipe and tie up to left side.



All further procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Intake manifold; Removing and installing throttle valve module - J338- .

Installing

Additional work:

Note

Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .

– Install engine cover panel ⇒ page 45 .

Tightening torques

◆ ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Exploded view - hose connections for charge air system

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5 Injectors/high-pressure reservoir (rail)

⇒ “5.1 Exploded view - injectors”, page 143

⇒ “5.2 Checking injectors”, page 145

⇒ “5.3 Performing adaption of correction values for injectors”, page 145

⇒ “5.4 Checking for injectors sticking open”, page 145

⇒ “5.5 Checking return flow rate of injectors with engine running”, page 145

⇒ “5.6 Checking return flow rate of injectors at starter cranking speed”, page 145

⇒ “5.7 Checking restrictor in fuel return line”, page 145

⇒ “5.8 Removing and installing injectors”, page 146

⇒ “5.9 Removing and installing high-pressure pipes”, page 147

⇒ “5.10 Removing and installing high-pressure reservoir (rail)”, page 147

5.1 Exploded view - injectors

Caution

Risk of malfunctions caused by dirt.

- *Observe rules for cleanliness ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair instructions; Rules for cleanliness .*

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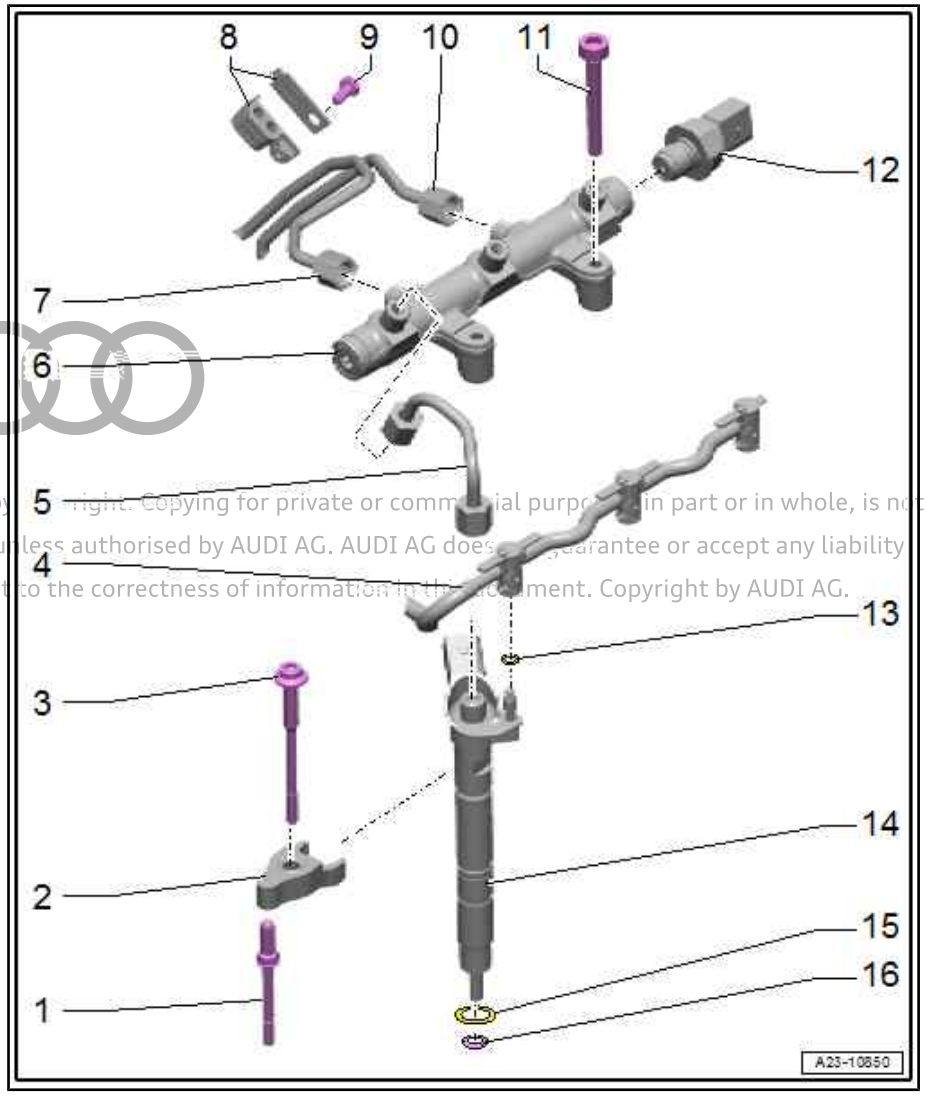

1 - Support bracket

- For clamping piece
- Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/ high-pressure reservoir (rail); Exploded view - injectors

2 - Clamping piece

- Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Exploded view - injectors

3 - Bolt

- Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/ high-pressure reservoir (rail); Exploded view - injectors

4 - Fuel return hose

- From injectors
- Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Exploded view - injectors

5 - High-pressure pipe

- From high-pressure reservoir (rail) to injector
- Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Exploded view - injectors

6 - High-pressure reservoir (rail)

- Removing and installing ⇒ page 147

7 - High-pressure pipe

- From high-pressure reservoir (rail) on opposite side
- Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Exploded view - injectors

8 - Retaining clamp

- For high-pressure pipe

9 - Bolt

- Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Exploded view - injectors

10 - High-pressure pipe

- From high-pressure pump to high-pressure reservoir (rail)
- Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Exploded view - injectors

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11 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Exploded view - injectors

12 - Fuel pressure sender - G247-

- ❑ Removing and installing ⇒ page 150

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13 - O-ring

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Exploded view - injectors

14 - Injector

- ❑ Removing and installing ⇒ page 146

15 - O-ring

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Exploded view - injectors

16 - Copper seal

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Exploded view - injectors

5.2 Checking injectors

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Checking injectors .

5.3 Performing adaption of correction values for injectors

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Performing adaption of correction values for injectors .

5.4 Checking for injectors sticking open

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Checking for injectors sticking open .

5.5 Checking return flow rate of injectors with engine running

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Checking return flow rate of injectors with engine running .

5.6 Checking return flow rate of injectors at starter cranking speed

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Checking return flow rate of injectors at starter cranking speed .

5.7 Checking restrictor in fuel return line

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Checking restrictor in fuel return line .

5.8 Removing and installing injectors

Removing

Note

All cable ties which are released or cut open when removing must be refitted in the same position when installing.

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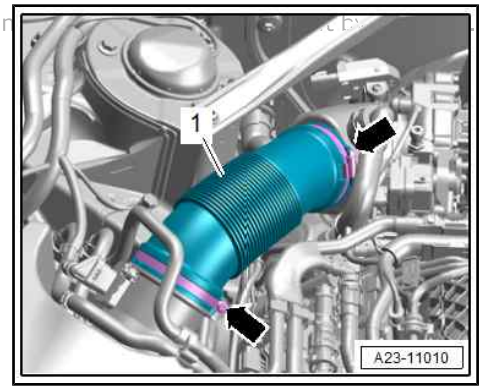
– Remove engine cover panel ⇒ page 45 .

Cylinder bank 1 (right-side):

– Release hose clips -arrows- and detach air pipe -1-.

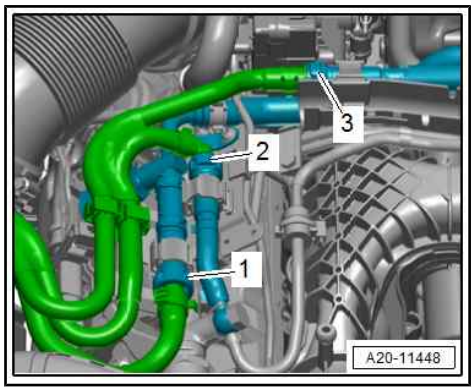


Cylinder bank 1 (right-side), injector for cylinders 1 and 2:

Caution

Risk of malfunctions caused by dirt.

- *Observe rules for cleanliness ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair instructions; Rules for cleanliness .*



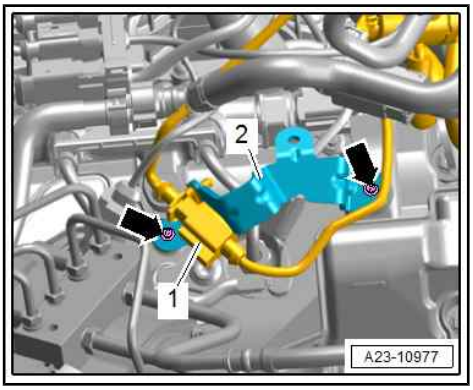
– Disconnect fuel hoses -1, 2, 3- ⇒ Fuel supply system; Rep. gr. 20 ; Plug-in connectors; Disconnecting plug-in connectors .

– Remove air cleaner housing ⇒ page 136 .

Cylinder bank 2 (left-side), injector for cylinder 5:

– Detach engine control unit - J623- from bracket and move aside ⇒ page 162 .

Cylinder bank 2 (left-side), injector for cylinder 6:



– Move electrical connector -1- for injector for reducing agent - N474- clear at bracket -2-.

– Unscrew bolts -arrows- and detach bracket.

All further procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Removing and installing injectors .

Installing

Additional work:

Note

Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .

– Connect fuel hoses ⇒ Fuel supply system; Rep. gr. 20 ; Plug-in connectors; Disconnecting plug-in connectors .

– Install air cleaner housing ⇒ page 136 .

– Install engine control unit - J623- ⇒ page 162 .

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

– Install engine cover panel ⇒ page 45 .

Tightening torques

♦ ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 15 ; Cylinder head; Exploded view - cylinder head cover

♦ ⇒ Rep. gr. 21 ; Charge air system; Exploded view - hose connections for charge air system

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5.9 Removing and installing high-pressure pipes

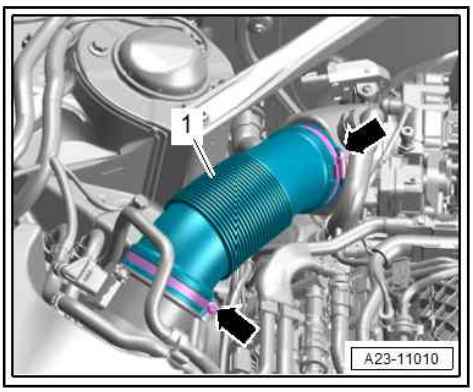
All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Removing and installing high-pressure pipes .

5.10 Removing and installing high-pressure reservoir (rail)

Removing

– Remove engine cover panel ⇒ page 45 .

Cylinder bank 1 (right-side):

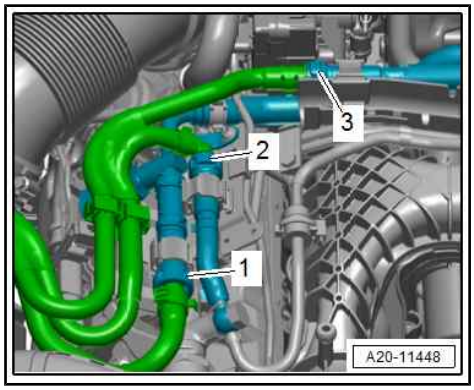


– Release hose clips -arrows- and detach air pipe -1-.

Caution

Risk of malfunctions caused by dirt.

- *Observe rules for cleanliness ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair instructions; Rules for cleanliness .*



– Disconnect fuel hoses -1, 2, 3- ⇒ Fuel supply system; Rep. gr. 20 ; Plug-in connectors; Disconnecting plug-in connectors .

– Remove air cleaner housing ⇒ page 136 .

All further procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Injectors/high-pressure reservoir (rail); Removing and installing high-pressure reservoir (rail) .

Installing

Additional work:

Note

Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .

– Connect fuel hoses ⇒ Fuel supply system, diesel engines; Rep. gr. 20 ; Plug-in connectors; Disconnecting plug-in connectors .

– Install air cleaner housing ⇒ page 136 .

– Install engine cover panel ⇒ page 45 .

Tightening torques

- ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Exploded view - hose connections for charge air system

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6 Senders and sensors

⇒ “6.1 Removing and installing intake air temperature sender G42 ”, page 149

⇒ “6.2 Removing and installing air mass meter G70 ”, page 149

⇒ “6.3 Removing and installing fuel temperature sender G81 ”, page 150

⇒ “6.4 Removing and installing fuel pressure sender G247 ”, page 150

⇒ “6.5 Removing and installing fuel pressure sender for low pressure G410 ”, page 150

⇒ “6.7 Removing and installing fuel pressure regulating valve N276 ”, page 153

⇒ “6.6 Checking fuel pressure regulating valve N276 ”, page 151

⇒ “6.8 Removing and installing pressure differential sender G505 ”, page 153

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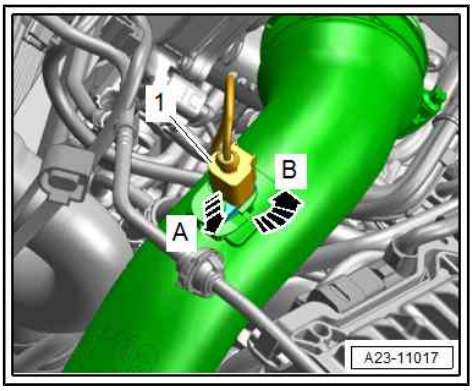
6.1 Removing and installing intake air temperature sender - G42-

Removing

– Unplug electrical connector -1-.

– Release fastener -arrow A-, turn intake air temperature sender - G42- in anti-clockwise direction -arrow B- and detach.



Installing

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

Note

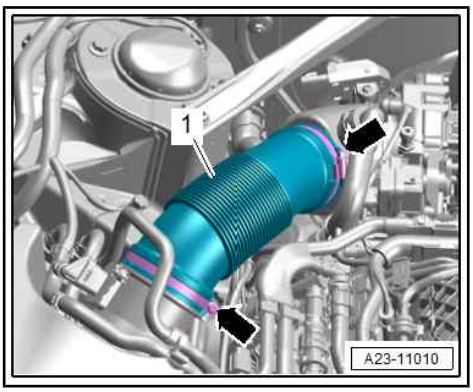
- *Renew O-ring after removal.*
- *If fastener on air pipe has broken off, secure intake air temperature sender - G42- with a bolt, refer to ⇒ Electronic parts catalogue .*

6.2 Removing and installing air mass meter - G70-

Removing

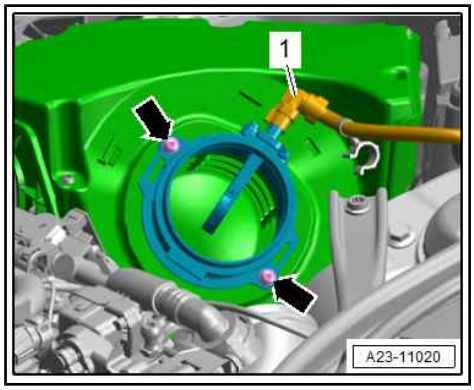
– Remove engine cover panel ⇒ page 45 .

– 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:

To ensure that the air mass meter -G70- functions correctly, it is important to observe the following notes and procedures.

Note

- *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 and clean if necessary ⇒ Maintenance ; Booklet 830 .*
- *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 .*

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– Install engine cover panel ⇒ page 45 .

Tightening torques

- ⇒ “3.1 Exploded view - air cleaner housing”, page 135
- ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Exploded view - hose connections for charge air system

6.3 Removing and installing fuel temperature sender - G81-

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Senders and sensors ; Removing and installing fuel temperature sender - G81- .

6.4 Removing and installing fuel pressure sender - G247-

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Senders and sensors; Removing and installing fuel pressure sender - G247- .

6.5 Removing and installing fuel pressure sender for low pressure - G410-

Removing

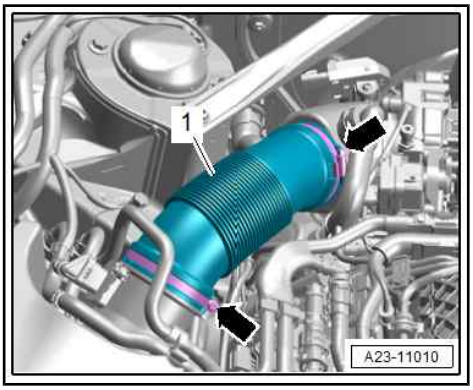
Caution

Risk of malfunctions caused by dirt.

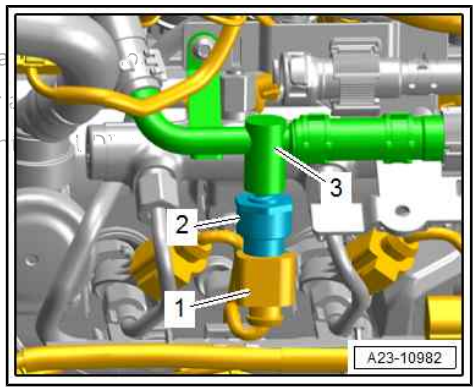
- ***Observe rules for cleanliness when working on the fuel supply system ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair notes; Rules for cleanliness .***

– Remove engine cover panel ⇒ page 45 .

– Release hose clips -arrows- and detach air pipe -1-.



– Unplug electrical connector -1-.
– Unscrew fuel pressure sender for low pressure - G410- -item 2- (counterhold at connection -3-).



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Installing

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

Note

Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .

– Screw in fuel pressure sender for low pressure - G410- by hand until it makes contact and then tighten.
– Install engine cover panel ⇒ page 45 .

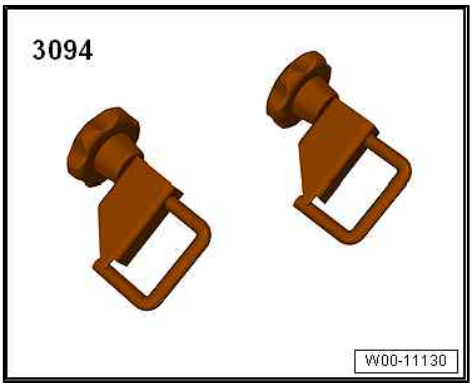
Tightening torques

- ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; High-pressure pump; Exploded view - high-pressure pump
- ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Exploded view - hose connections for charge air system

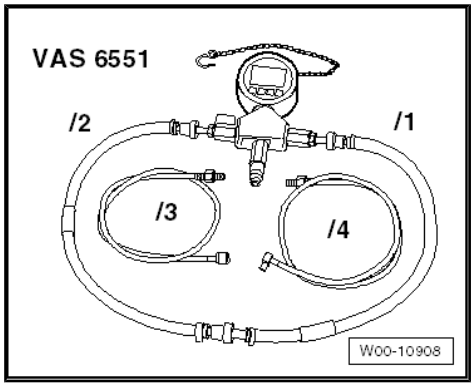
6.6 Checking fuel pressure regulating valve - N276-

Special tools and workshop equipment required

- Hose clamps, up to 25 mm - 3094-



- Test lead - VAS 6551/3- from pressure tester (diesel) - VAS 6551-



- Fuel-resistant measuring container
- Test hose for return line connection

Procedure

- Fuel temperature above 15 °C.

Caution

Risk of malfunctions caused by dirt.

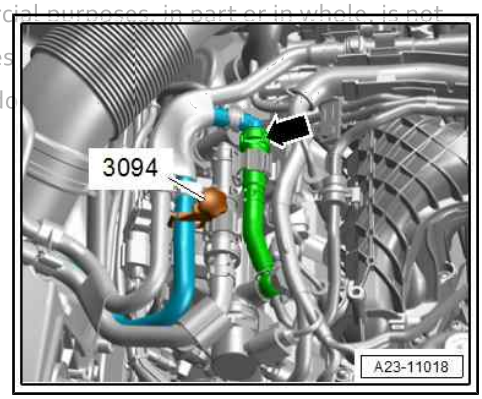
- ***Observe rules for cleanliness when working on the fuel supply system ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair notes; Rules for cleanliness .***

Procedure

– Remove engine cover panel ⇒ page 45 .

– Seal fuel return hose -arrow- with hose clamp up to 25 mm -3094- and disconnect hose ⇒ Fuel supply system; Rep. gr. 20 ; Plug-in connectors; Disconnecting plug-in connectors .

– Move fuel return hose clear to one side.



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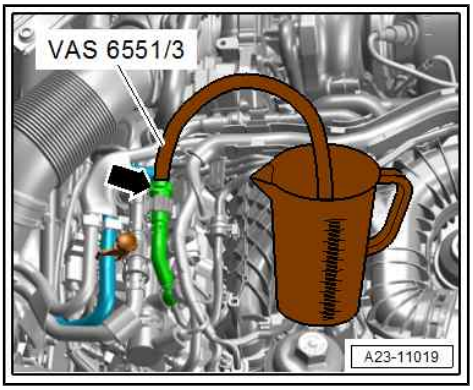
– Connect test lead - VAS 6551/3- to return hose -arrow- and hold into measuring container, as shown in illustration.
– Start engine and run at idling speed for one minute.
• Return flow rate (engine start): 0 ml
– Leave engine running at idling speed.
– While engine is running, empty measuring container, or exchange it for an empty container and begin measurement.
– Leave engine running at idling speed for two minutes and measure return flow rate.
• Return flow rate after 2 minutes: 0 ... 60 ml



Note

If specified values are obtained, fuel pressure regulating valve - N276- is OK.

If values do not match specifications:

Note

♦ *The fuel pressure regulating valve - N276- and injectors were checked during the preceding measuring process.*
♦ *To determine which component is defective, you must check the return flow rate of the injectors.*

– Measure return flow rate of injectors with engine running ⇒ page 145 .
– If return flow rate of injectors is OK, renew fuel pressure regulating valve - N276- .
– If return flow rate of injectors is not OK, renew defective injector.

Attaching

Assembly is performed in reverse sequence; note the following:

– Connect fuel hose ⇒ Fuel supply system, diesel engines; Rep. gr. 20 ; Plug-in connectors; Disconnecting plug-in connectors .
– Install engine cover panel ⇒ page 45 .

6.7 Removing and installing fuel pressure regulating valve - N276-

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Senders and sensors; Removing and installing fuel pressure regulating valve - N276- .

6.8 Removing and installing pressure differential sender - G505-

Special tools and workshop equipment required

♦ Vehicle diagnostic tester

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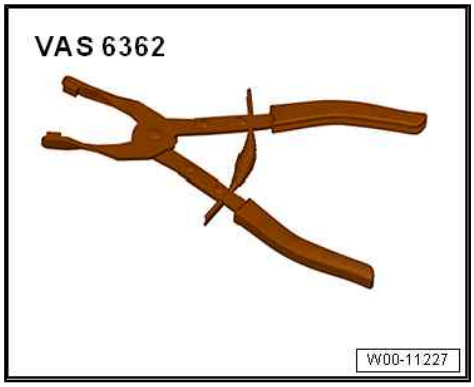
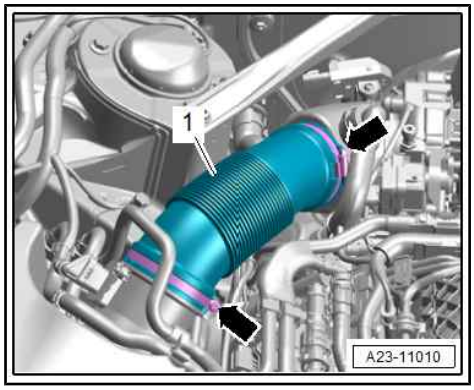
♦ Hose clip pliers - VAS 6362-

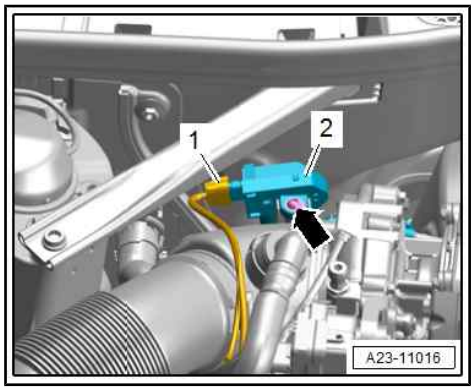


Removing

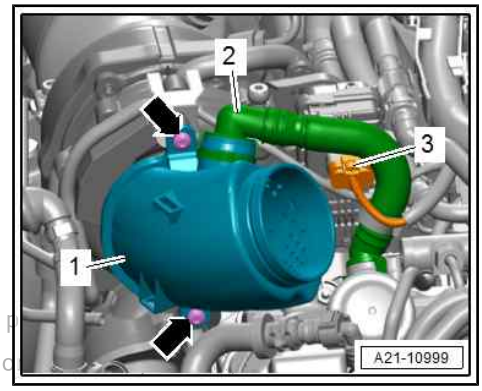
– Remove engine cover panel ⇒ page 45 .
– Release hose clips -arrows- and detach air pipe -1-.



– Remove bolt -arrow-.
– Unplug electrical connector -1-.
– Move bracket -2- clear with pressure differential sender - G505- .



– Press release tabs on both sides and disconnect crankcase breather hose -2-.
– Unplug electrical connector -3- and move wiring clear.
– Unscrew bolts -arrows- and detach intake connecting pipe -1-.



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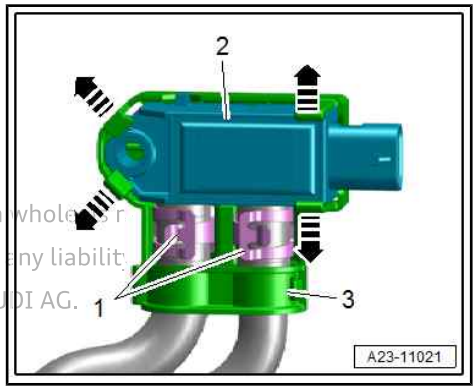
– Detach retaining clip -3-.
– Release catches -arrows- and detach bracket for pressure differential sender - G505- -item 2-.
– Release hose clips -1-.
– Spray hoses on pressure differential sender - G505- with silicone-free lubricant.
– To prevent hose connections from breaking off, carefully disconnect hoses and keep them straight when pulling them off.



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Installing

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

Note

- *Blow through hose (towards emission control module) with compressed air to remove dirt or ice (frozen condensation).*
- *Make sure that hoses are securely fitted and seal properly.*
- *If pressure pipes have been detached from emission control module, tighten them to specified torque.*
- *Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .*

– Install engine cover panel ⇒ page 45 .
– If pressure differential sender - G505- has been renewed, perform adaptions listed in Guided Function “0001 - Adapt learnt values - after component replacement” ⇒ Vehicle diagnostic tester.

Tightening torques

- ⇒ Fig. ““Bracket with pressure differential sender -G505- - tightening torque”“ , page 158
- ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Exploded view - turbocharger
- ⇒ Rep. gr. 21 ; Charge air system; Exploded view - hose connections for charge air system

7 High-pressure pump

All procedures and components are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; High-pressure pump .

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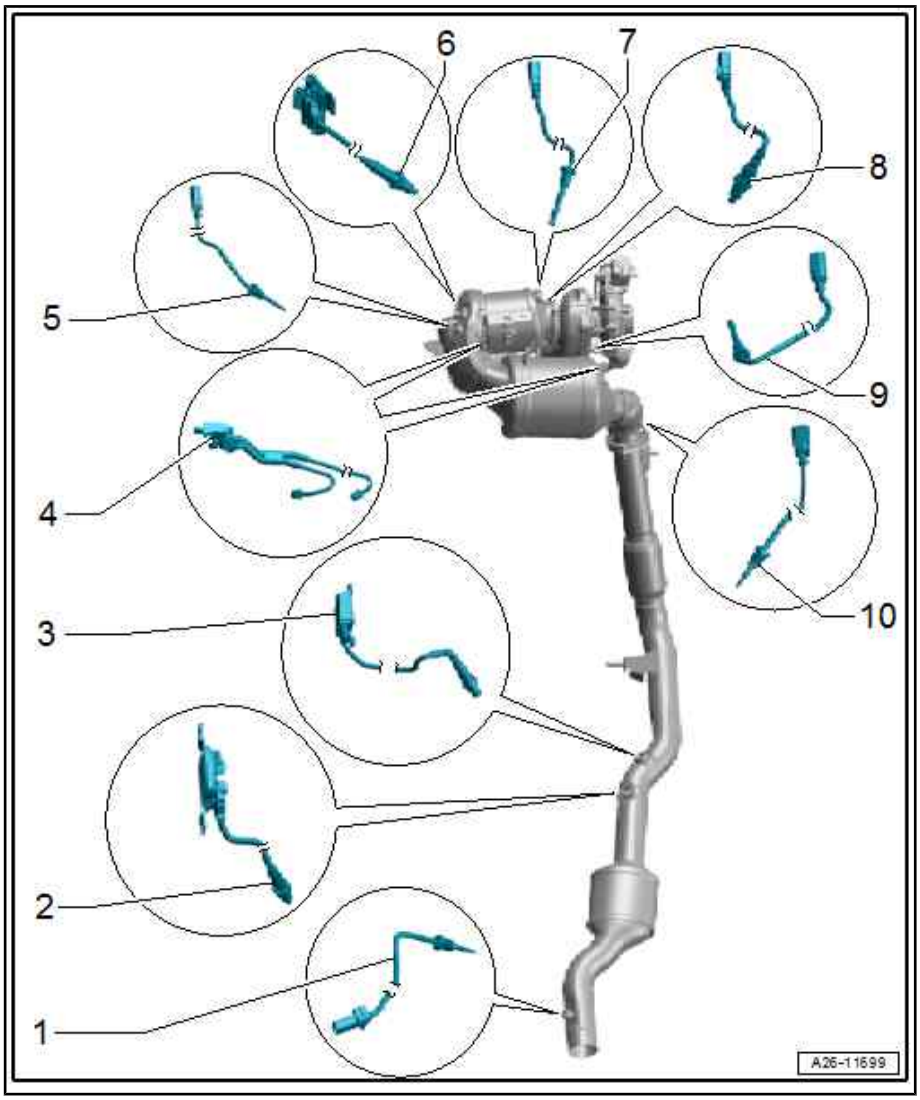
8 Lambda probe

⇒ “8.1 Exploded view - Lambda probe”, page 157

⇒ “8.2 Removing and installing Lambda probe”, page 158

⇒ “8.3 Removing and installing NOx senders”, page 158

8.1 Exploded view - Lambda probe



1 - Not fitted

2 - NOx sender 2 - G687- with control unit for NOx sender 2 - J881-

- ❑ Removing and installing ⇒ page 159
- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Lambda probe; Exploded view - Lambda probe

3 - Not fitted

4 - Pressure differential sender - G505-

- ❑ Removing and installing ⇒ page 153
- ❑ Tightening torques and installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Lambda probe; Exploded view - Lambda probe

5 - Exhaust gas temperature sender 3 - G495-

- ❑ Removing and installing ⇒ page 186

6 - NOx sender - G295- with control unit for NOx sender - J583-

- ❑ Removing and installing ⇒ page 158
- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Lambda probe; Exploded view - Lambda probe

7 - Exhaust gas temperature sender 2 - G448-

- ❑ Removing and installing ⇒ page 186

8 - Lambda probe - G39- with Lambda probe heater - Z19-

- ❑ Removing and installing ⇒ page 158

9 - Exhaust gas temperature sender 1 - G235-

- ❑ Removing and installing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas temperature control; Removing and installing exhaust gas temperature sender

10 - Exhaust gas temperature sender 4 - G648-

- ❑ Removing and installing ⇒ page 186

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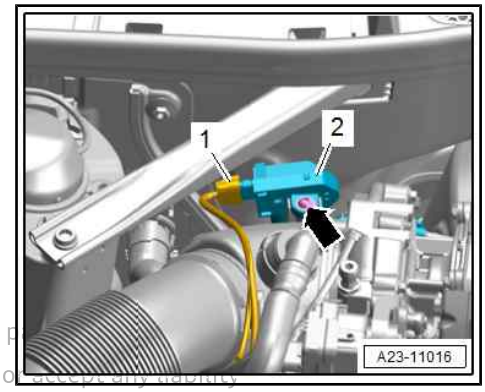
Bracket with pressure differential sender - G505- - tightening torque

– Tighten bolt -arrow- to 4.5 Nm.



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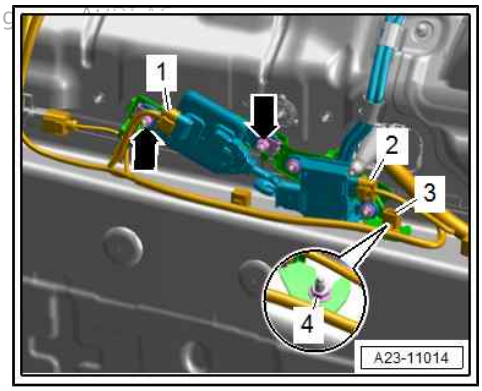
Bracket with NOx sender 2 - G687- - tightening torque

– Tighten nut -4- to 9 Nm.

– Fit nuts -arrows-.



8.2 Removing and installing Lambda probe

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Lambda probe; Removing and installing Lambda probe .

8.3 Removing and installing NOx senders

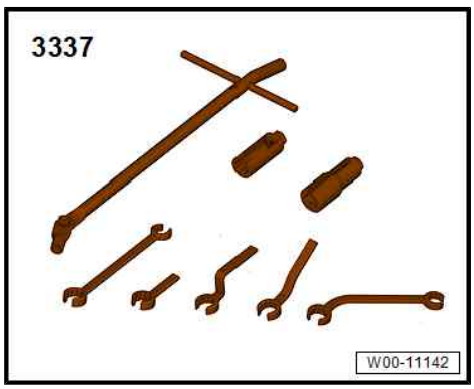
⇒ “8.3.1 Removing and installing NOx sender G295 ”, page 158

⇒ “8.3.2 Removing and installing NOx sender 2 G687 ”, page 159

8.3.1 Removing and installing NOx sender - G295-

Special tools and workshop equipment required

♦ Lambda probe open ring spanner set - 3337-



♦ High-temperature paste ⇒ Electronic parts catalogue

Removing

WARNING

When working on all parts of the exhaust system:

- *Observe safety precautions when working on the exhaust system ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Safety precautions; Safety precautions when working on the exhaust system .*

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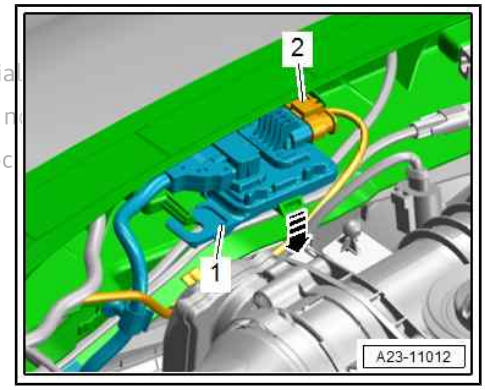
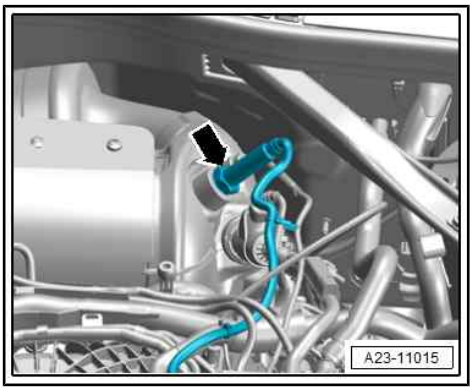
– Remove engine cover panel ⇒ page 45 .
– Unplug electrical connector -2-.
– Release fastener -arrow-, detach control unit for NOx sender - J583- -item 1- and move it clear.



– Unscrew NOx sender - G295- -arrow- using a tool from Lambda probe open ring spanner set - 3337- .



Installing

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

Note

Coat thread with high-temperature paste ⇒ Electronic parts catalogue .

– Move control unit for NOx sender - J583- into installation position and secure.
– Electrical connections and routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
– Install engine cover panel ⇒ page 45 .

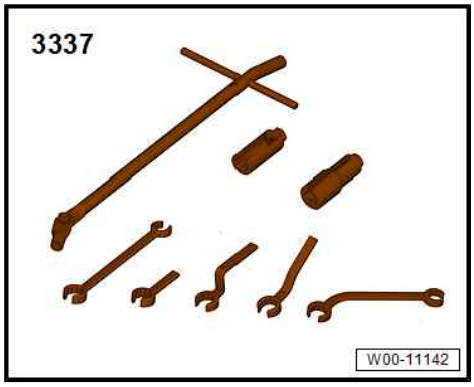
Tightening torques

- ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Lambda probe; Exploded view - Lambda probe

8.3.2 Removing and installing NOx sender 2 - G687-

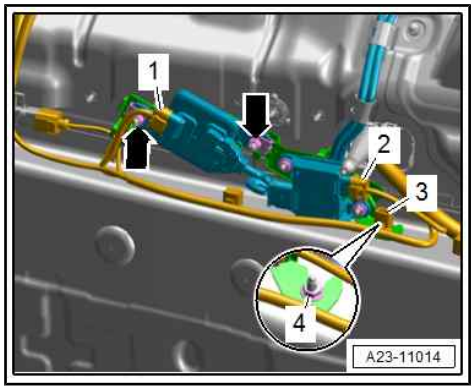
Special tools and workshop equipment required

- Lambda probe open ring spanner set - 3337-



- High-temperature paste ⇒ Electronic parts catalogue

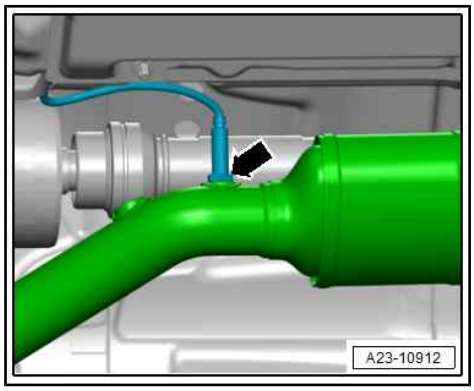
Removing



– 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 -1-.
– Pull clip -3- off stud.
– Remove nuts -arrows- and loosen (do not remove) nut -4-.
– Detach bracket and move control unit for NOx sender 2 - J881- clear.

Note

Disregard -item 2-.



– Unscrew NOx sender 2 - G687- -arrow- using a tool from Lambda probe open ring spanner set - 3337- .

Installing

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

Note

Coat thread with high-temperature paste ⇒ Electronic parts catalogue .

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

Tightening torques

- ⇒ Fig. ""Bracket with NOx sender 2 -G687- - tightening torque"", page 158
- ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Lambda probe; Exploded view - Lambda probe
- ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim; Exploded view - underbody trim

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9 Engine control unit

⇒ “9.1 Exploded view - engine control unit”, page 161

⇒ “9.2 Removing and installing engine/motor control unit J623 ”, page 162

9.1 Exploded view - engine control unit

1 - Suspension turret

2 - Mounting

- ❑ For engine control unit - J623-

3 - Engine control unit - J623-

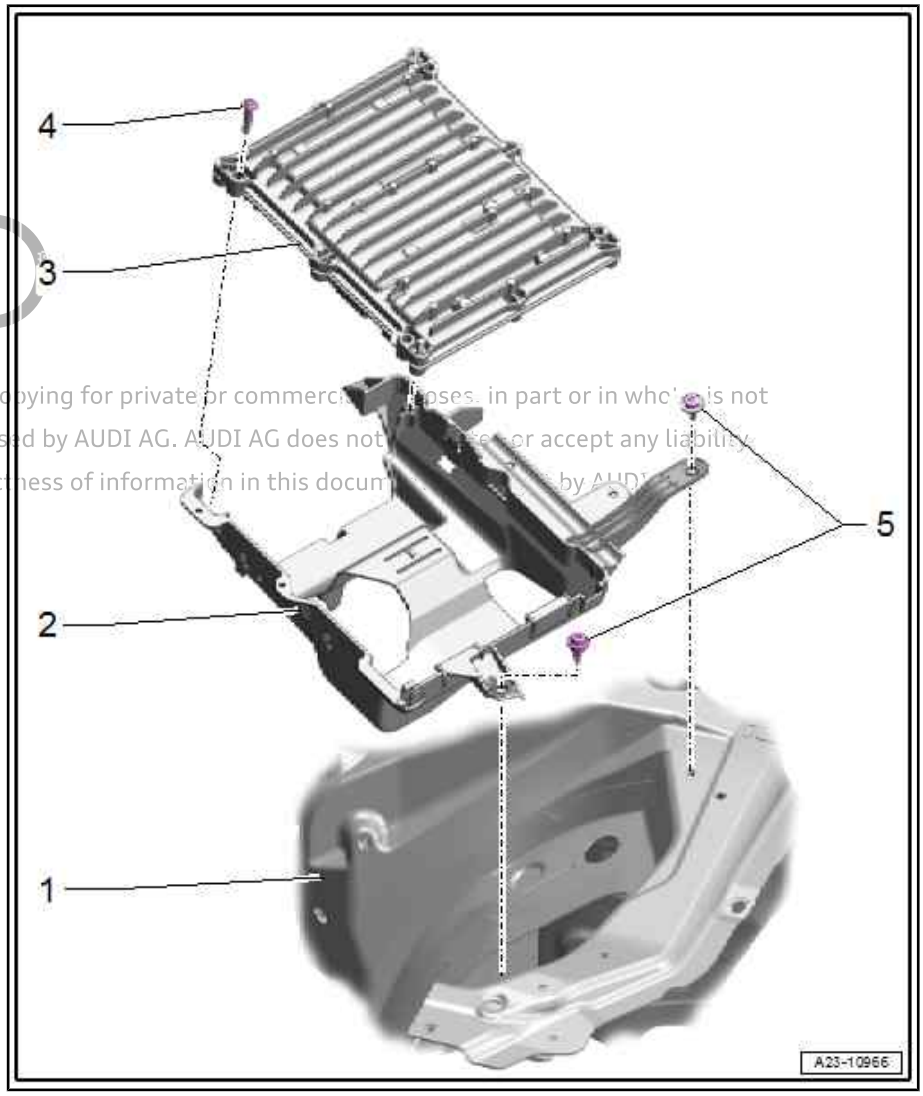
- ❑ After renewing, perform adaptions listed in Guided Function “0001 - Adapt learnt values - after component replacement” ⇒ Vehicle diagnostic tester
- ❑ Removing and installing ⇒ page 162

4 - Bolt

- ❑ 4.5 Nm

5 - Bolts

- ❑ 9 Nm



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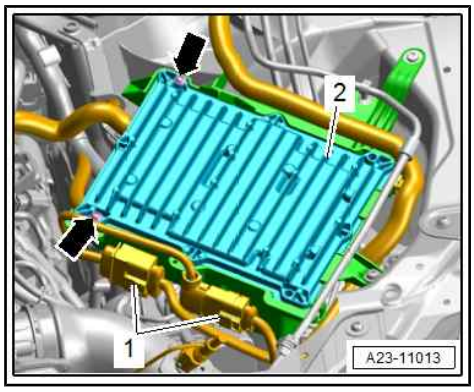
9.2 Removing and installing engine/motor control unit - J623-

Removing

Note

- *If renewing the engine control unit, perform the adaptions listed in the Guided Function "0001 - Adapt learnt values - after component replacement" ⇒ Vehicle diagnostic tester.*
- *If the adaption values of the injectors cannot be read out of the old (defective) engine control unit, they must be entered into the new engine control unit manually and the adaption procedure must be performed accordingly.*

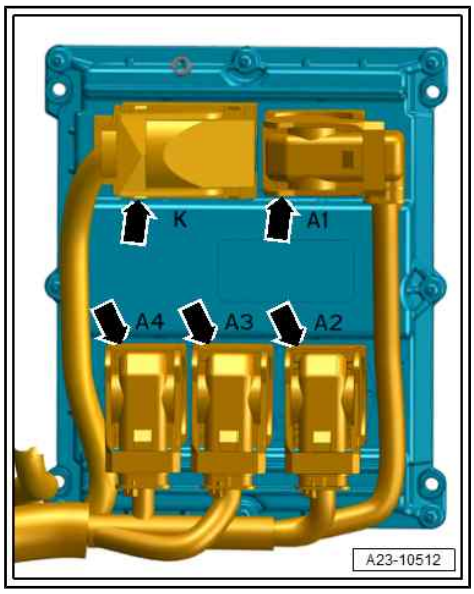
– Remove bolts -arrows- and take out engine control unit - J623- -item 2-.



Note

Disregard -item 1-.

– Unplug electrical connectors -arrows- and remove engine control unit - J623- .



Installing

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

– If engine control unit - J623- has been renewed, perform adaptions listed in Guided Function "0001 - Adapt learnt values - after component replacement" ⇒ Vehicle diagnostic tester.

Tightening torques

- ⇒ "9.1 Exploded view - engine control unit", page 161

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26 – Exhaust system

1 Exhaust pipes/silencers

⇒ “1.1 Exploded view - silencers”, page 163

⇒ “1.2 Removing and installing front exhaust pipe”, page 167

⇒ “1.3 Separating exhaust pipes/silencers”, page 169

⇒ “1.4 Removing and installing silencers”, page 171

⇒ “1.5 Stress-free alignment of exhaust system”, page 172

⇒ “1.6 Checking exhaust system for leaks”, page 172

1.1 Exploded view - silencers

⇒ “1.1.1 Exploded view - silencers, vehicles with front-wheel drive”, page 163

⇒ “1.1.2 Exploded view - silencers, vehicles with four-wheel drive”, page 166

1.1.1 Exploded view - silencers, vehicles with front-wheel drive

WARNING

When working on all parts of the exhaust system:

- *Observe safety precautions when working on the exhaust system ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Safety precautions; Safety precautions when working on the exhaust system .*

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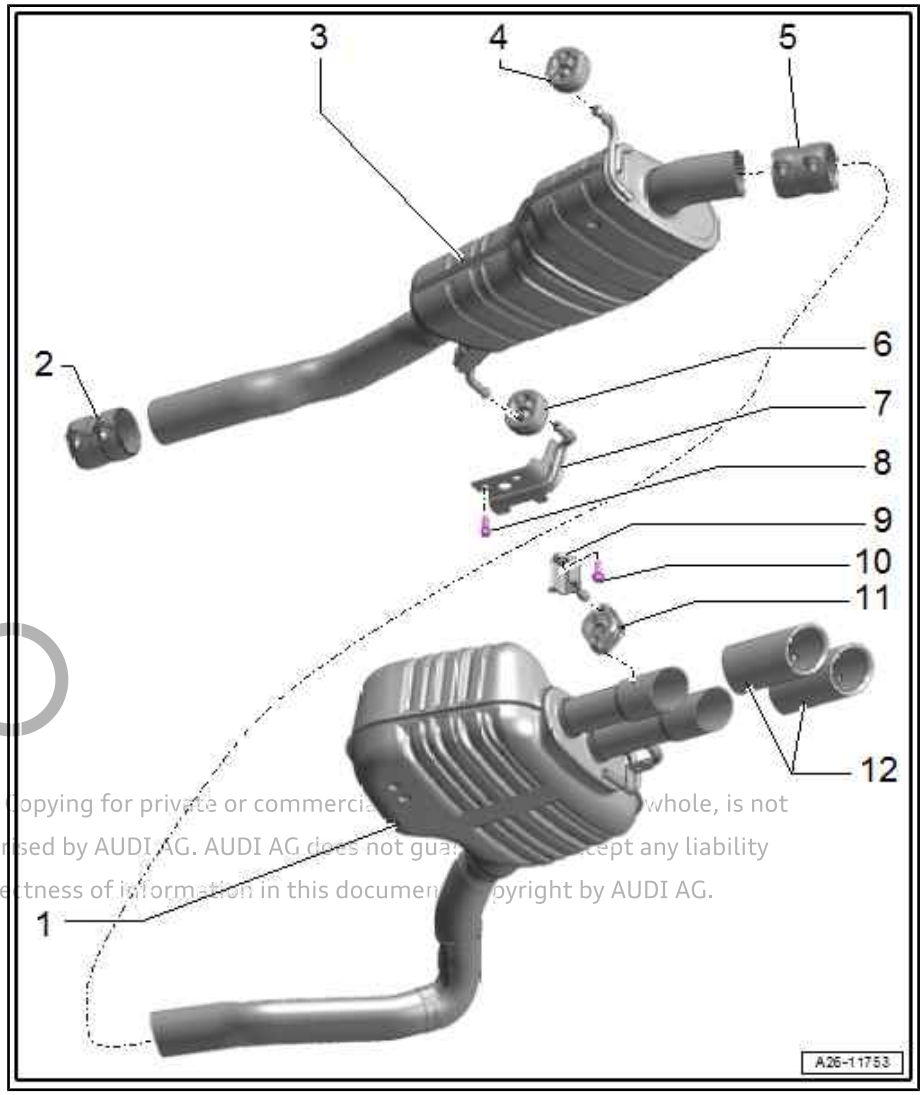

1 - Rear silencer

- ❑ Removing and installing ⇒ page 171
- ❑ Combined as one unit with centre silencer as original equipment
- ❑ Centre silencer and rear silencer can be renewed separately
- ❑ Cutting point ⇒ page 169
- ❑ Align exhaust system so it is free of stress ⇒ page 172

2 - Clamp (front)

- ❑ Before tightening, align exhaust system so it is free of stress ⇒ page 172
- ❑ Installation position ⇒ page 165
- ❑ Tighten screw connections evenly to 23 Nm

3 - Centre silencer

- ❑ Removing and installing ⇒ page 171
- ❑ Supplied as one unit with silencer as original equipment
- ❑ Centre silencer and rear silencer can be renewed separately
- ❑ Cutting point ⇒ page 169
- ❑ Align exhaust system so it is free of stress ⇒ page 172

4 - Rubber mounting

- ❑ Renew if damaged
- ❑ Align exhaust system so it is free of stress ⇒ page 172

5 - Clamp (rear)

- ❑ For separate replacement of centre and rear silencers
- ❑ Before tightening, align exhaust system so it is free of stress ⇒ page 172
- ❑ Installation position ⇒ page 165
- ❑ Tighten screw connections evenly to 23 Nm

6 - Rubber mounting

- ❑ Renew if damaged
- ❑ Align exhaust system so it is free of stress ⇒ page 172

7 - Bracket

- ❑ For rubber mounting

8 - Bolt

- ❑ 20 Nm

9 - Bracket

- ❑ For rubber mounting

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10 - Bolt

- ❑ 20 Nm

11 - Rubber mounting

- ❑ Renew if damaged
- ❑ Align exhaust system so it is free of stress ⇒ page 172

12 - Trim

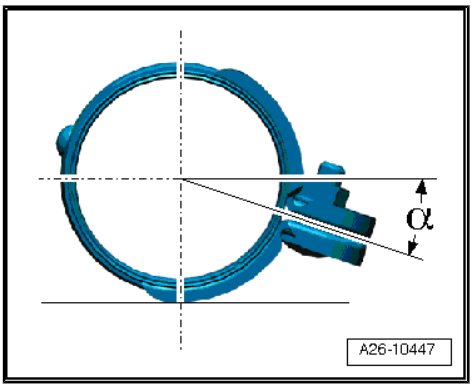
- ❑ For tailpipes

Clamps - installation position

– Fit clamp in position shown.

• Angle -α- = approx. 20°

• Bolt connections face outwards.



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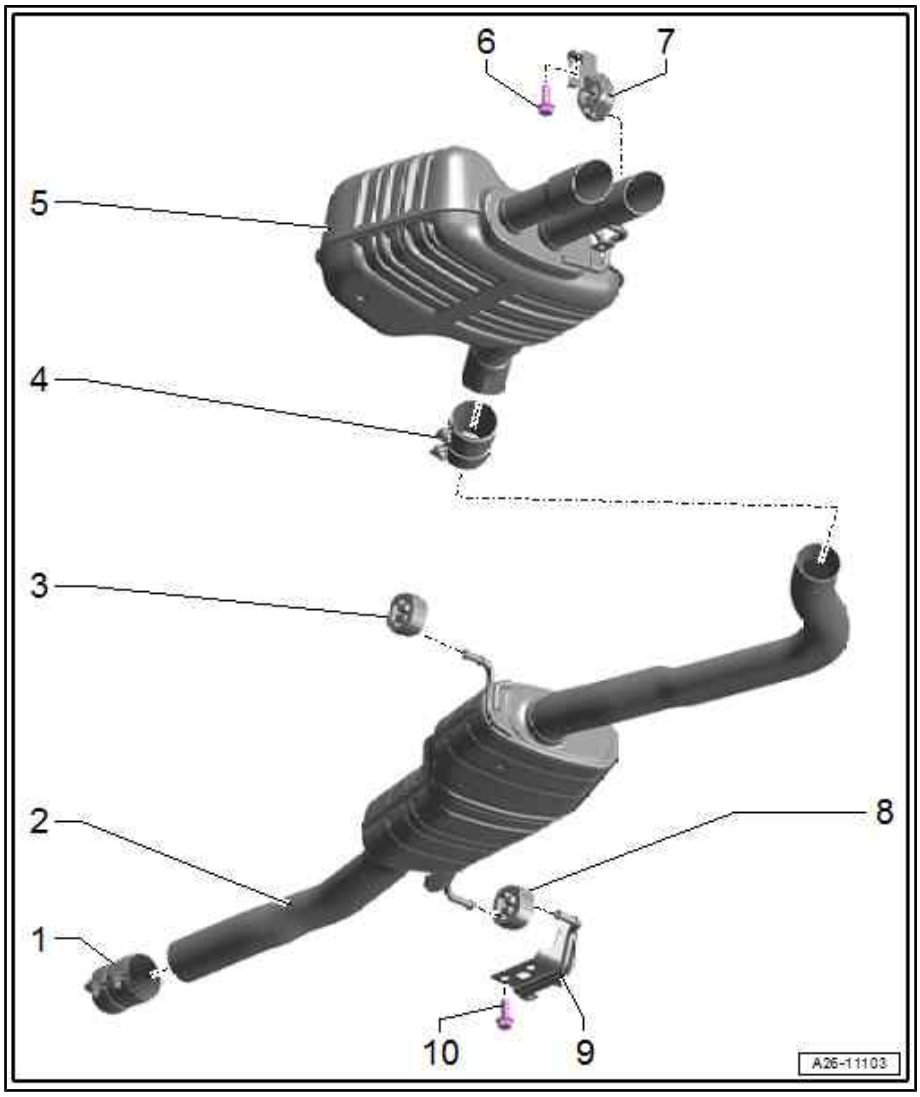
1.1.2 Exploded view - silencers, vehicles with four-wheel drive



1 - Clamp (front)

- ❑ Before tightening, align exhaust system so it is free of stress ⇒ page 172
- ❑ Installation position ⇒ page 167
- ❑ Tighten screw connections evenly to 23 Nm

2 - Centre silencer

- ❑ Removing and installing ⇒ page 171
- ❑ Centre silencer and rear silencer can be renewed separately
- ❑ Combined in one unit with rear silencers as original equipment. Can be renewed separately for repair purposes
- ❑ Cutting point between centre silencer and rear silencer ⇒ page 169
- ❑ Align exhaust system so it is free of stress ⇒ page 172

3 - Rubber mounting

- ❑ Renew if damaged

4 - Clamp (rear)

- ❑ For separate replacement of centre and rear silencers
- ❑ Before tightening, align exhaust system so it is free of stress ⇒ page 172
- ❑ Installation position ⇒ page 167
- ❑ Tighten screw connections evenly to 23 Nm

5 - Rear silencer

- ❑ Removing and installing ⇒ page 171
- ❑ Centre silencer and rear silencer can be renewed separately
- ❑ Combined in one unit with centre silencer as original equipment. Can be renewed separately for repair purposes
- ❑ Cutting point between centre silencer and rear silencer ⇒ page 169
- ❑ Align exhaust system so it is free of stress ⇒ page 172

6 - Bolt

- ❑ 23 Nm

7 - Mounting

- ❑ Renew if damaged

8 - Rubber mounting

- ❑ Renew if damaged

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9 - Bracket

10 - Bolt

❑ 23 Nm

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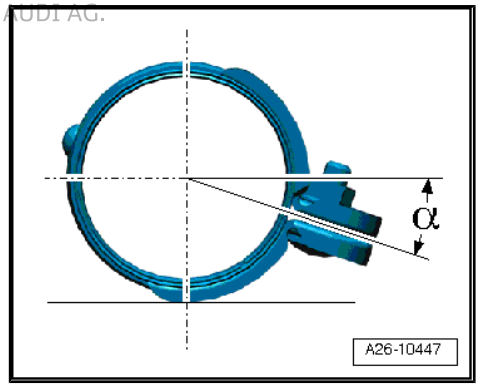
Clamps - installation position

– Fit clamp in position shown.

- Angle -α- = approx. 20°
- Bolt connections face outwards.



1.2 Removing and installing front exhaust pipe

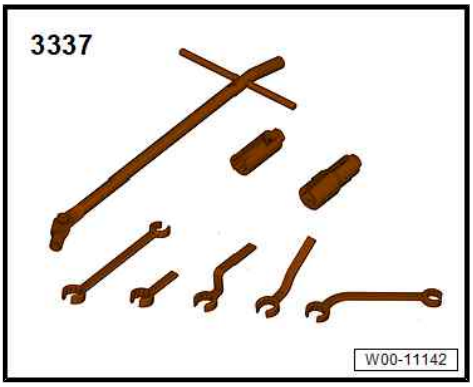
Note

The SCR catalytic converter is integrated in the front exhaust pipe.

Removing

Special tools and workshop equipment required

♦ Lambda probe open ring spanner set - 3337-



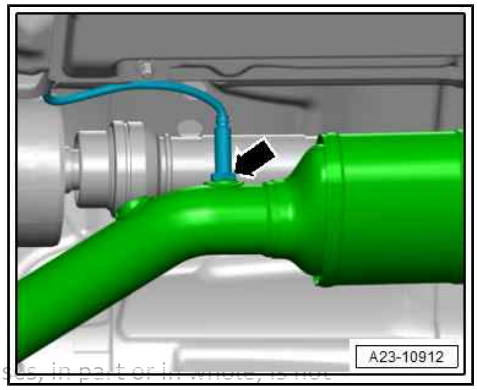
WARNING

When working on all parts of the exhaust system:

- ***Observe safety precautions when working on the exhaust system ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Safety precautions; Safety precautions when working on the exhaust system .***

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

– Unscrew NOx sender - G295- -arrow- using a tool from Lambda probe open ring spanner set - 3337- .



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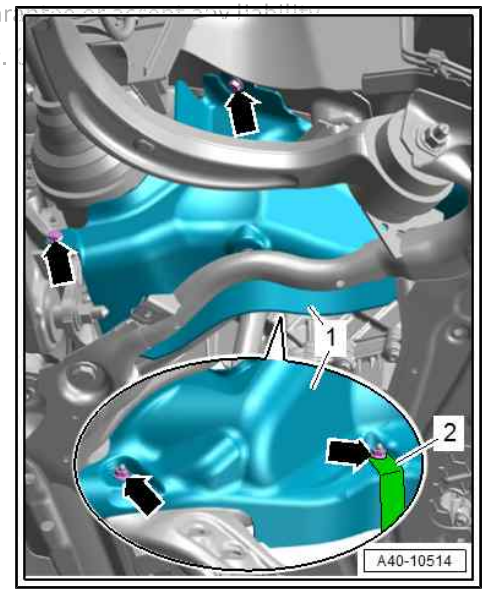
– Unscrew bolted connections -arrows- and press subframe shield (right-side) -1- to the side.



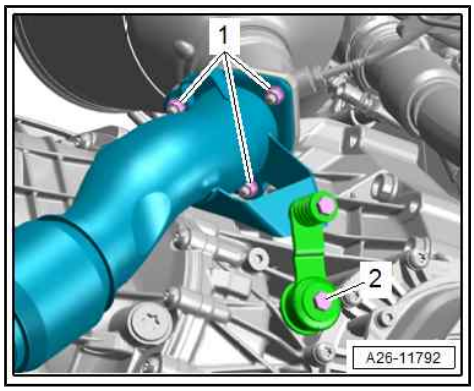
Note

- *The illustration shows the subframe shield (left-side); the right side is similar.*
- *Disregard -item 2-.*

Caution

Risk of damage to flexible joint in front exhaust pipe.

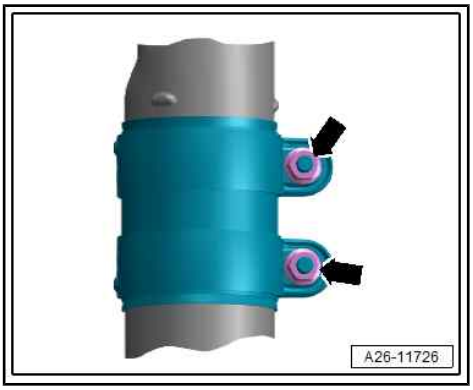
- ***Do NOT bend flexible joint in front exhaust pipe more than 10°.***



– Remove bolt -2- and nuts -1-.

– Bring subframe shield (right-side) back into installation position.

– Loosen clamp -arrows- and push towards rear.
– Detach front exhaust pipe.



Installing

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

Note

Renew gaskets and self-locking nuts after removal.

– Align the exhaust system so it is free of stress ⇒ page 172 .
– Electrical connections and routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

Tightening torques

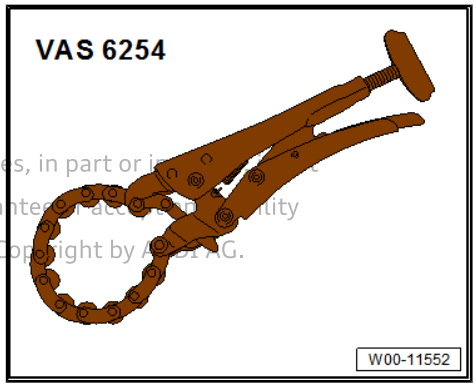
- ⇒ “2.1 Exploded view - emission control system”, page 173
- ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Lambda probe; Exploded view - Lambda probe
- ⇒ Running gear, axles, steering; Rep. gr. 40 ; Subframe; Exploded view - subframe
- ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation

1.3 Separating exhaust pipes/silencers

- The connecting pipe can be cut through at the cutting point in order to renew the centre or rear silencer 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-



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Procedure

WARNING

When working on all parts of the exhaust system:

- *Observe safety precautions when working on the exhaust system ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Safety precautions; Safety precautions when working on the exhaust system .*

Version 1:

– Cut through exhaust pipes at a right angle at cutting point -arrow- using chain pipe cutter - VAS 6254- .

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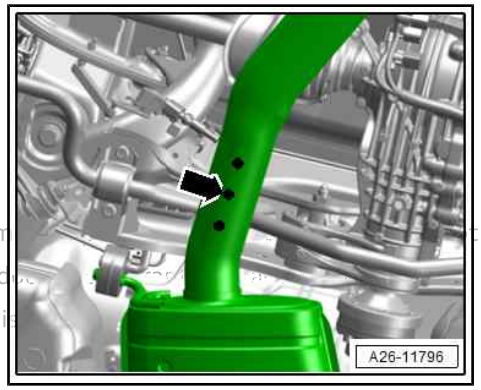
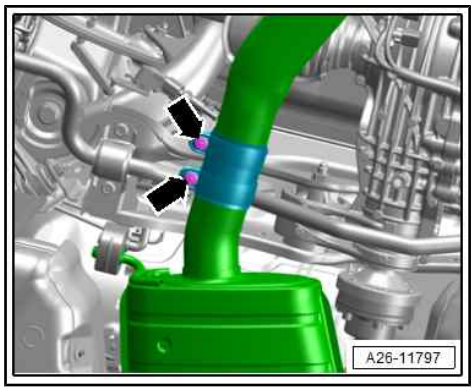
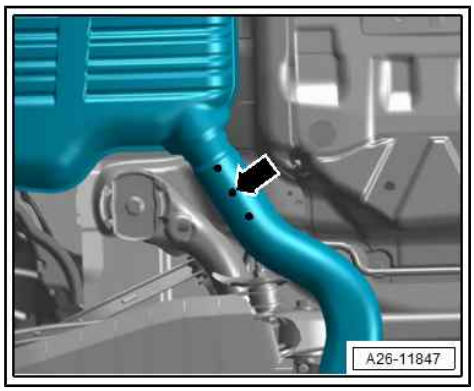


– Position centre of clamp over cutting point ⇒ page 165 and tighten nuts -arrows-.

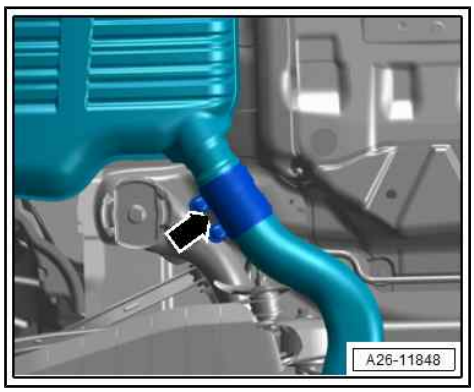


Version 2:

– 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.



All vehicles (continued):

– Align the exhaust system so it is free of stress ⇒ page 172 .

Tightening torques

◆ ⇒ “1.1 Exploded view - silencers”, page 163

1.4 Removing and installing silencers

Removing

WARNING

When working on all parts of the exhaust system:

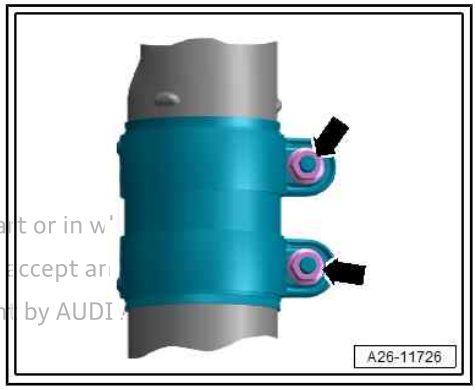
- *Observe safety precautions when working on the exhaust system ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Safety precautions; Safety precautions when working on the exhaust system .*

– Depending on equipment version: Remove diagonal strut (left-side) ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim; Exploded view - underbody trim .

– Loosen clamp -arrows- and push towards rear.

– Lower front exhaust pipe slightly and detach clamp.

– Tie up front exhaust pipe.



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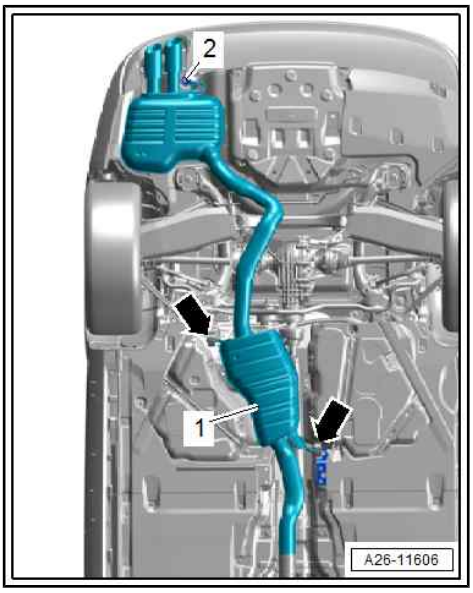
WARNING

Risk of accident caused by weight of silencers.

- *A second mechanic is required for removal of the rear silencer.*



– Disengage mountings -arrows- at exhaust system (rear).

– Unscrew bolt -2- and remove silencer -1-.

Installing

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

– Align the exhaust system so it is free of stress ⇒ page 172 .

Tightening torques

- ⇒ “1.1 Exploded view - silencers”, page 163
- ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim; Exploded view - underbody trim

1.5 Stress-free alignment of exhaust system

Procedure

WARNING

When working on all parts of the exhaust system:

- *Observe safety precautions when working on the exhaust system ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Safety precautions; Safety precautions when working on the exhaust system .*

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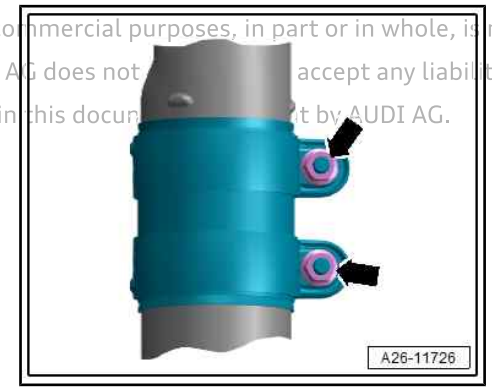
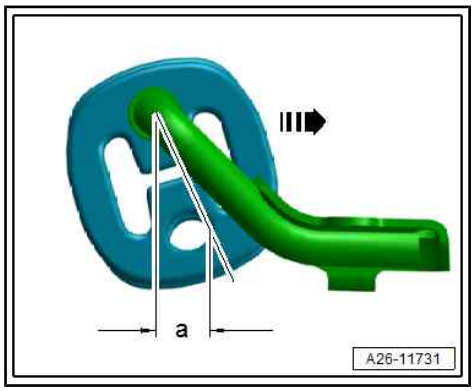
- The exhaust system must be aligned when it is cool.

– Loosen clamp -arrows- and push towards rear.



– Push exhaust system towards front of vehicle -arrow- so that mounting for exhaust pipe is preloaded by -a- = 10 ± 2 mm.

– Position clamp at front ⇒ page 165 and tighten bolted connections evenly.

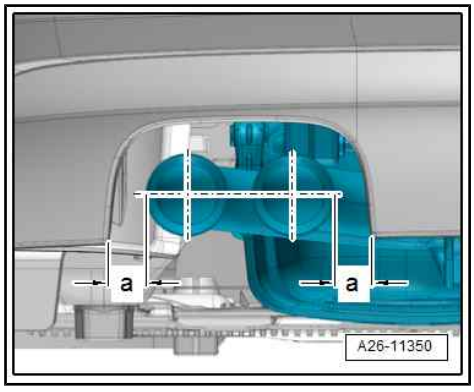


– Check clearance between tailpipes and bumper:

- Distance -a- is the same on both sides.

Tightening torques

- ⇒ “1.1 Exploded view - silencers”, page 163



1.6 Checking exhaust system for leaks

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust pipes/silencers; Checking exhaust system for leaks .

2 Emission control system

⇒ “2.1 Exploded view - emission control system”, page 173

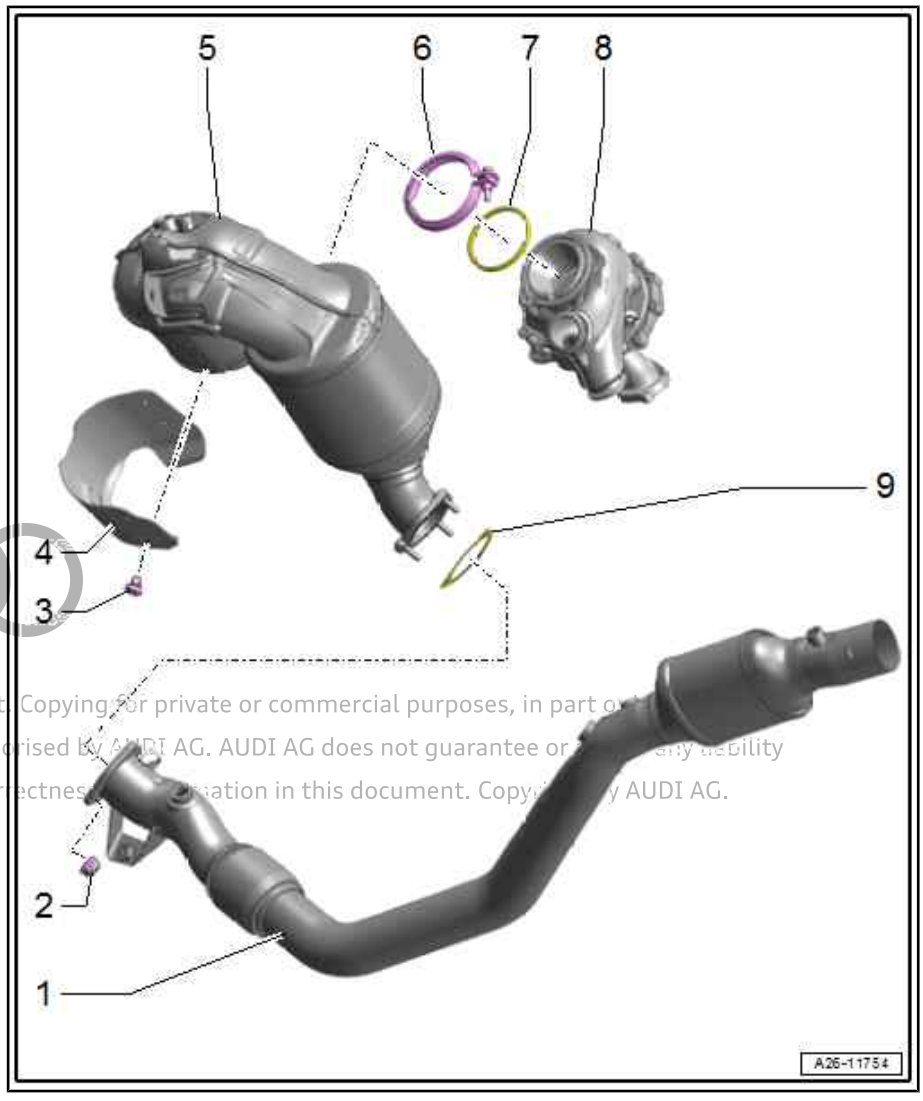
⇒ “2.2 Removing and installing emission control module”, page 175

2.1 Exploded view - emission control system

WARNING

When working on all parts of the exhaust system:

- *Observe safety precautions when working on the exhaust system ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Safety precautions; Safety precautions when working on the exhaust system .*



1 - Front exhaust pipe

- With integrated SCR catalytic converter
- With flexible joint; do not bend flexible joint more than 10° – otherwise it can be damaged
- Protect against knocks and impact
- Removing and installing ⇒ page 167
- Align exhaust system so it is free of stress ⇒ page 172

2 - Nut

- Renew after removing
- 25 Nm

3 - Bolt

- 9 Nm

4 - Heat shield

5 - Emission control module

- With pressure line for pressure differential sender - G505- ⇒ Item 4 (page 157)
- Removing and installing ⇒ page 175
- After renewing, perform adaptions listed in Guided Function “0001 - Adapt learnt values - after component replacement” ⇒ Vehicle diagnostic tester

6 - Screw-type clip

- Installation position ⇒ page 174
- Renew after removing

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❑ 15 Nm

7 - Seal

❑ Renew after removing

8 - Turbocharger

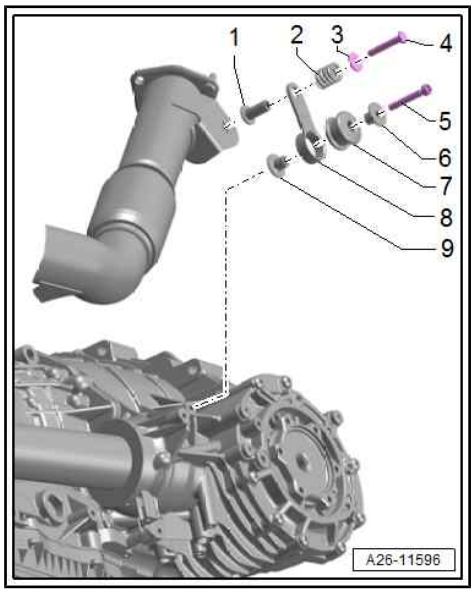
❑ Exploded view ⇒ page 120

9 - Gasket

❑ Renew after removing

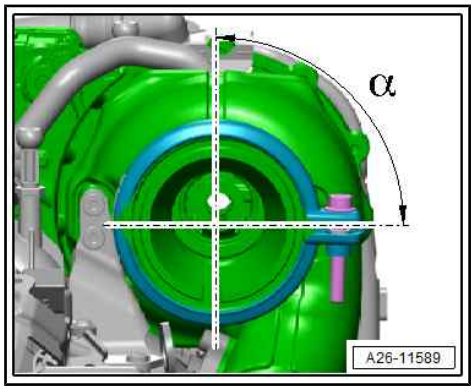
Components of mountings (front) for front exhaust pipe on gearbox

1 - Spacer sleeve
2 - Compression spring
3 - Washer
4 - Bolt, 23 Nm
5 - Bolt, 23 Nm
6 - Spacer sleeve
7 - Rubber buffer
8 - Bracket
9 - Spacer sleeve



Installation position of screw-type clip for emission control module

- Angle -α- = 90° ± 15°.



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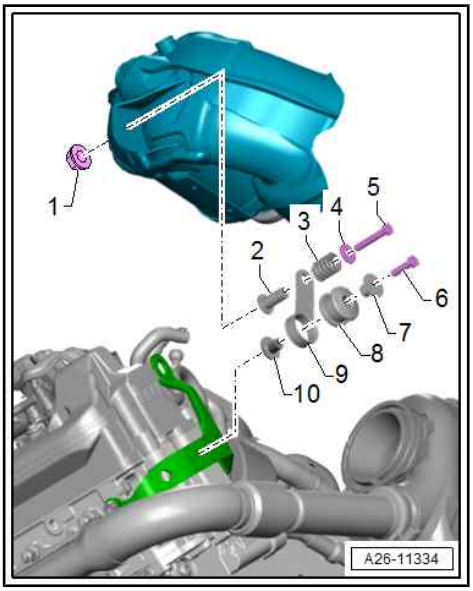
Mounting components for emission control module

1 - Cage nut (integrated in emission control module)
2 - Spacer sleeve
3 - Compression spring
4 - Washer
5 - Bolt, 23 Nm
6 - Bolt, 23 Nm
7 - Spacer sleeve
8 - Rubber buffer
9 - Bracket
10 - Spacer sleeve



2.2 Removing and installing emission control module

Removing

WARNING

When working on all parts of the exhaust system:

- *Observe safety precautions when working on the exhaust system ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Safety precautions; Safety precautions when working on the exhaust system .*

– Remove noise insulation (rear) ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
– Unscrew bolted connections -arrows- and press subframe shield (right-side) -1- to the side.

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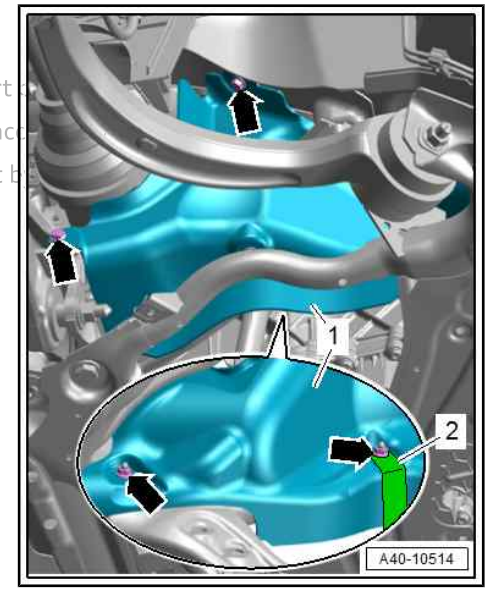
Note

- *The illustration shows the subframe shield (left-side); the right side is similar.*
- *Disregard -item 2-.*



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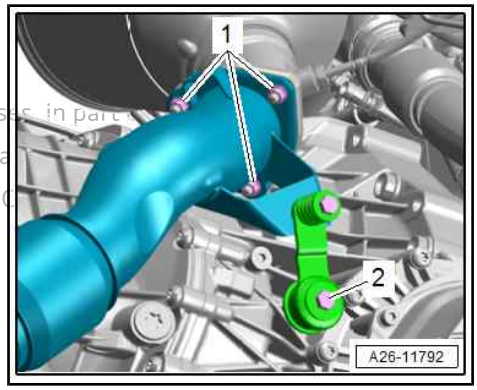
– Remove nuts -1-.

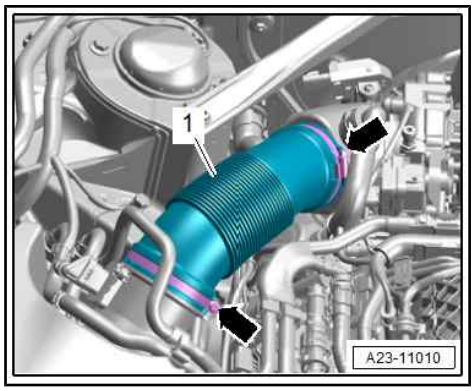


Note

Disregard -item 2-.

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

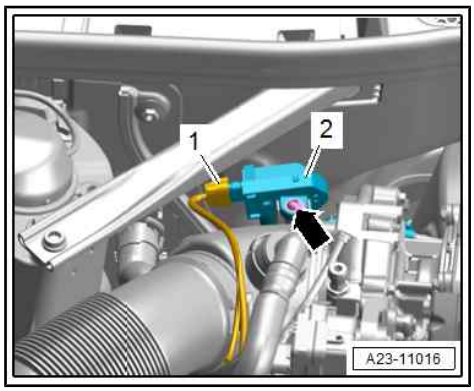
– Release hose clips -arrows- and detach air pipe -1-.



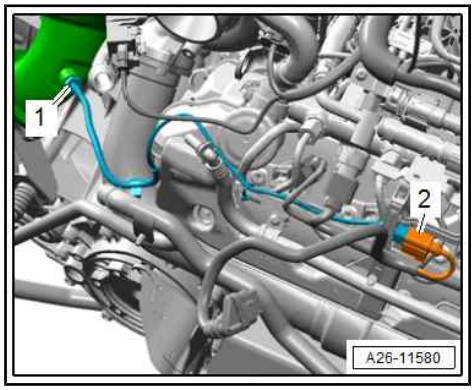
– Remove bolt -arrow-.

– Unplug electrical connector -1-.

– Move bracket -2- clear with pressure differential sender - G505- .



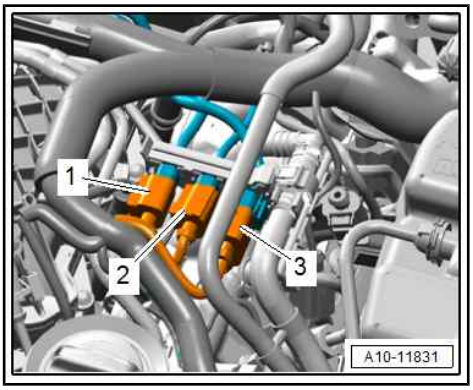
– Remove exhaust gas temperature sender 4 - G648- -item 1-.



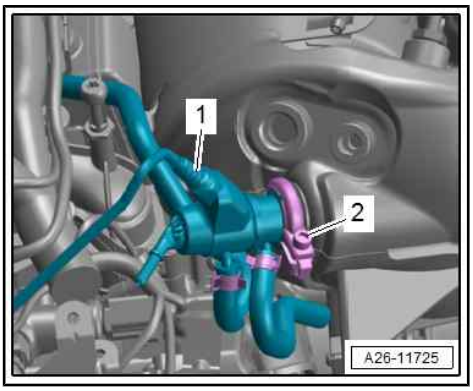
Note

Disregard -item 2-.

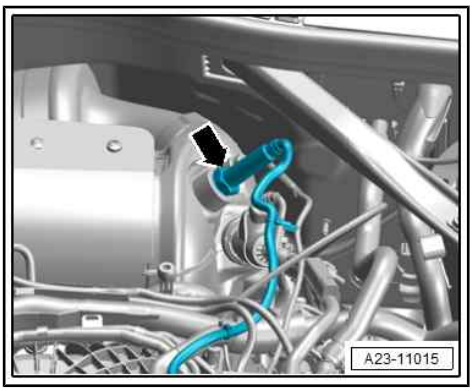
– Detach electrical connectors -1, 2, 3- from bracket, unplug connectors and move electrical wiring clear.



– Unscrew bolt -2- and loosen retaining clip.
– Detach injector for reducing agent - N474- -item 1- and place to one side.



– Unscrew NOx sender - G295- -arrow- using a tool from Lambda probe open ring spanner set - 3337- .



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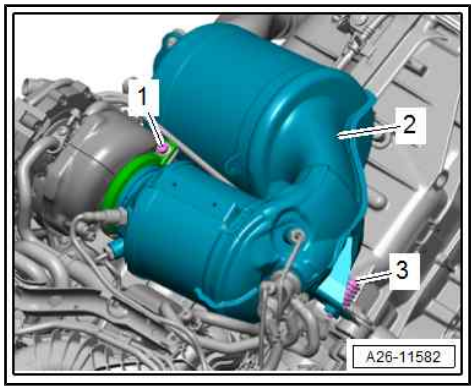
– Remove bolt -3- on retainer.
– Open screw-type clip -1- and place it on intake funnel of emission control module.
– Remove emission control module -2- (pay attention to brake servo pressure sensor - G294-).



Installing

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

Note

Renew gaskets and self-locking nuts after removal.

– Electrical connections and routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
– Install injector for reducing agent - N474- ⇒ page 183 .
– If emission control module has been renewed, perform adaptions listed in Guided Function “0001 - Adapt learnt values - after component replacement” ⇒ Vehicle diagnostic tester.

Tightening torques

- ⇒ “1.1 Exploded view - silencers”, page 163
- ⇒ “2.1 Exploded view - emission control system”, page 173
- ⇒ Fig. ““Bracket with pressure differential sender -G505- - tightening torque”“ , page 158
- ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 23 ; Lambda probe; Exploded view - Lambda probe
- ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas temperature control; Exploded view - exhaust gas temperature control
- ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Exploded view - hose connections for charge air system
- ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Exploded view - plenum chamber partition panel
- ⇒ Running gear, axles, steering; Rep. gr. 40 ; Subframe; Exploded view - subframe
- ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation

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3 SCR (selective catalytic reduction) system

⇒ “3.1 Exploded view - reducing agent tank”, page 179

⇒ “3.2 Exploded view - reducing agent supply line”, page 180

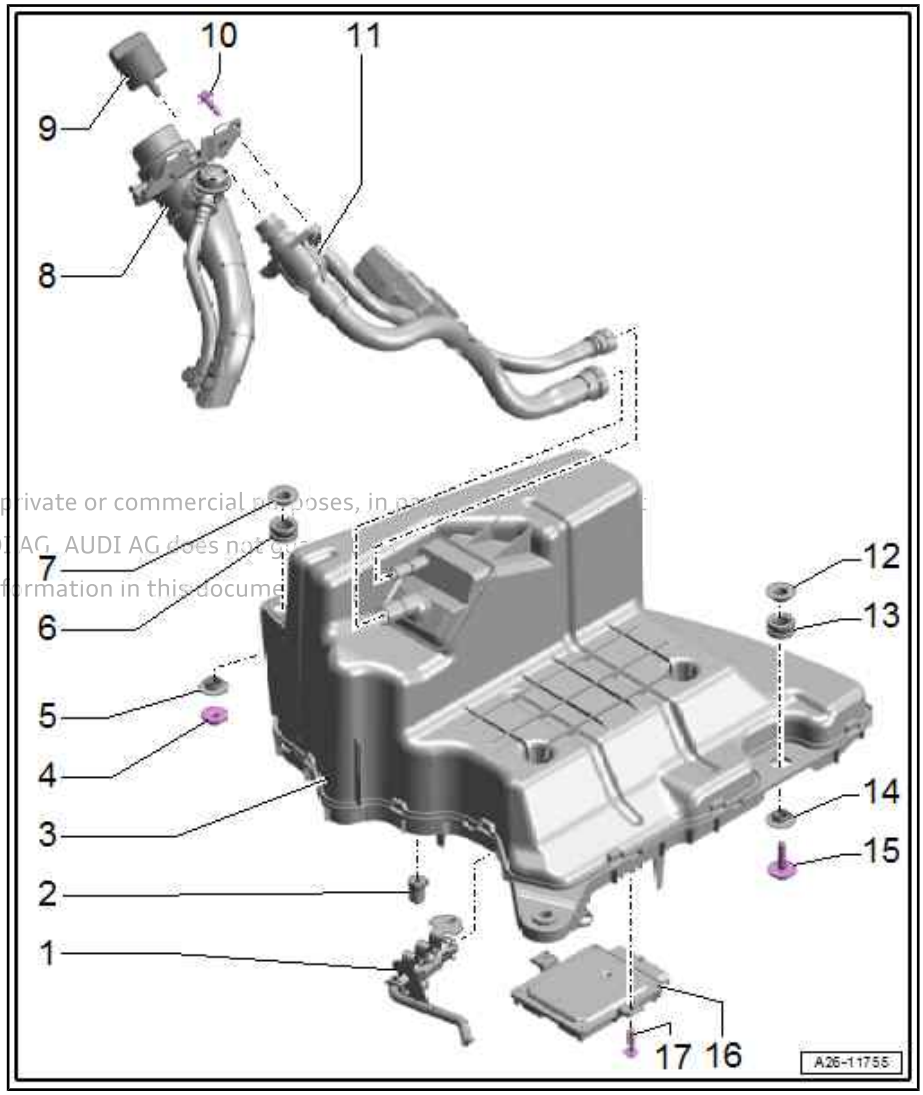
⇒ “3.3 Draining reducing agent tank”, page 180

⇒ “3.4 Removing and installing reducing agent tank”, page 181

⇒ “3.5 Removing and installing injector for reducing agent N474 ”, page 183

⇒ “3.6 Removing and installing control unit for reducing agent metering system J880 ”, page 183

3.1 Exploded view - reducing agent tank



1 - Supply line

WARNING

Safety risk due to escaping reducing agent. Observe safety measures when handling reducing agent ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Safety precautions; Safety precautions when working on the SCR system .

2 - Sealing plug

- ❑ For drain pipe

3 - 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-
- ♦ Reducing agent quality sensor - G849- (country-specific version)
- ♦ 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

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- ❑ Draining ⇒ page 180
- ❑ Removing and installing ⇒ page 181
- ❑ Adapt learnt value after filling or renewing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair notes; Adapting learnt values for SCR system

4 - Nut

- ❑ 20 Nm

5 - Spacer sleeve

6 - Grommet

7 - Spacer sleeve

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8 - Filler neck

- ❑ For fuel tank

9 - Filler cap

- ❑ For filler neck for reducing agent tank

10 - Bolt

- ❑ 8 Nm

11 - Filler neck

- ❑ For reducing agent tank

12 - Spacer sleeve

13 - Grommet

14 - Spacer sleeve

15 - Bolt

- ❑ 20 Nm
- ❑ Before tightening the four bolts, slide reducing agent tank towards rear of vehicle (with bolts in bolt holes)

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

- ❑ Checking ⇒ Vehicle diagnostic tester
- ❑ Removing and installing ⇒ page 183
- ❑ Adapt learnt value after renewing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair notes; Adapting learnt values for SCR system

17 - Bolt

- ❑ 3 Nm

3.2 Exploded view - reducing agent supply line

All components are described in ⇒ Servicing 6-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

Procedure

Note

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

WARNING

Reducing agent can cause skin irritation.

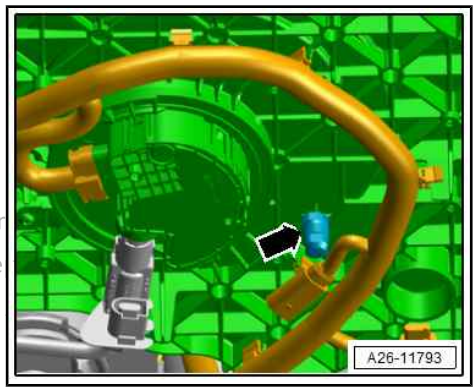
- *Observe safety measures when handling reducing agent ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Safety precautions; Safety precautions when working on the SCR system .*
- *Put on safety goggles.*

Safety risk due to escaping reducing agent.

- *To prevent large amounts of reducing agent from escaping when the supply line is opened, wait until the reducing agent has been drawn back automatically ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Safety precautions; Safety precautions when working on the SCR system .*

– Switch off ignition.
– 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; Exploded view - underbody trim .

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



Attaching

Assembly is performed in reverse sequence; note the following:
– Seal off drain pipe with sealing plug.
– Adapt learnt value after filling with reducing agent or renewing components ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair notes; Adapting learnt values for SCR system .

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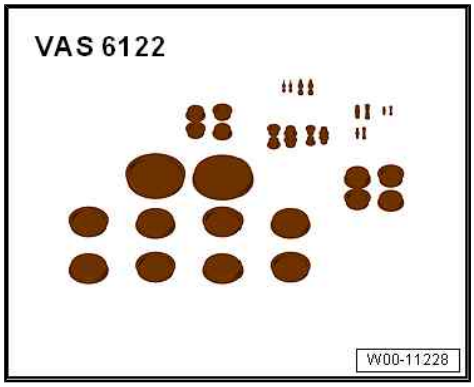
Tightening torques

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

3.4 Removing and installing reducing agent tank

Special tools and workshop equipment required

- Engine bung set - VAS 6122-



Removing

WARNING

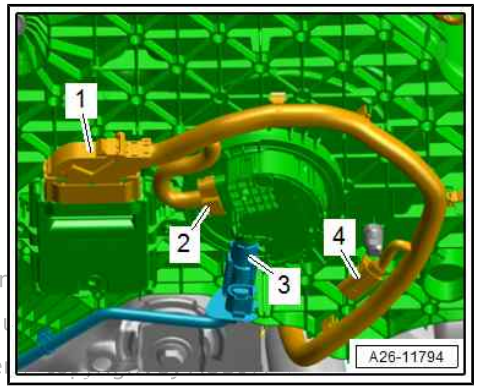
Reducing agent can cause skin irritation.

- *Observe safety measures when handling reducing agent ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Safety precautions; Safety precautions when working on the SCR system .*
- *Put on safety goggles.*

– Drain reducing agent tank ⇒ page 180 .

– 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 6-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- .

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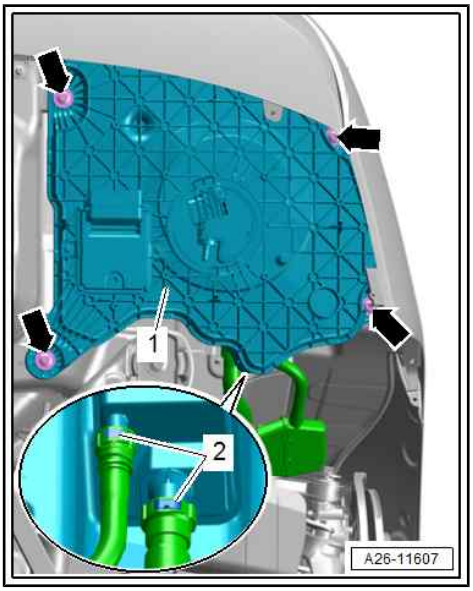
Caution

Safety risk due to escaping reducing agent.

- *Reducing agent tank must be empty when it is removed.*

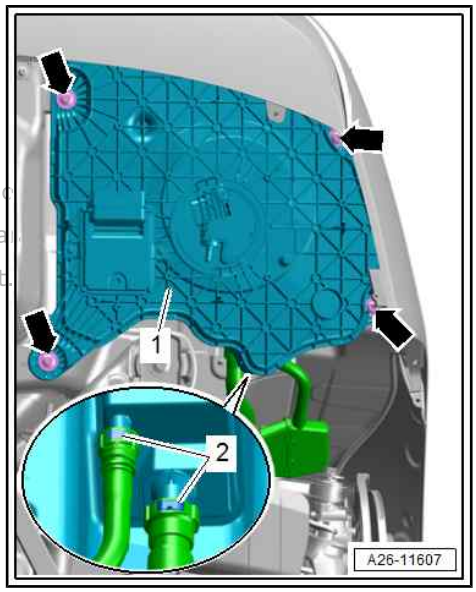


– Unscrew connections -arrows-.
– Lower reducing agent tank -1- slightly.
– Press release tabs on both sides and disconnect hoses -2-.
– Detach reducing agent tank.
– Seal off open lines and connections with plugs (thoroughly cleaned) from engine bung set - VAS 6122- .

Installing

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

– Connect SCR supply line ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; SCR (selective catalytic reduction) system; Exploded view - reducing agent supply line .
– 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-.
– Adapt learnt value after filling with reducing agent or renewing components ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair notes; Adapting learnt values for SCR system .

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Tightening torques

- ⇒ "3.1 Exploded view - reducing agent tank", page 179
- ⇒ 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 6-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

Removing

– Switch off ignition.

– Remove underbody trim (rear right) ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim; Exploded view - underbody trim .

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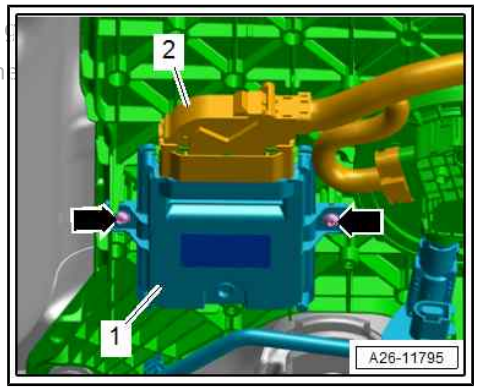
– Remove bolts -arrows- and detach control unit for reducing agent metering system - J880- -item 1-.

– Unplug electrical connector -2-.



Installing

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

– If control unit for reducing agent metering system - J880- is renewed, adapt “learnt value” ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Repair notes; Adapting learnt values for SCR system .

Tightening torques

◆ ⇒ “3.1 Exploded view - reducing agent tank”, page 179

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

4 Exhaust gas temperature control

⇒ “4.1 Exploded view - exhaust gas temperature control”, page 185

⇒ “4.2 Removing and installing exhaust gas temperature sender”, page 186

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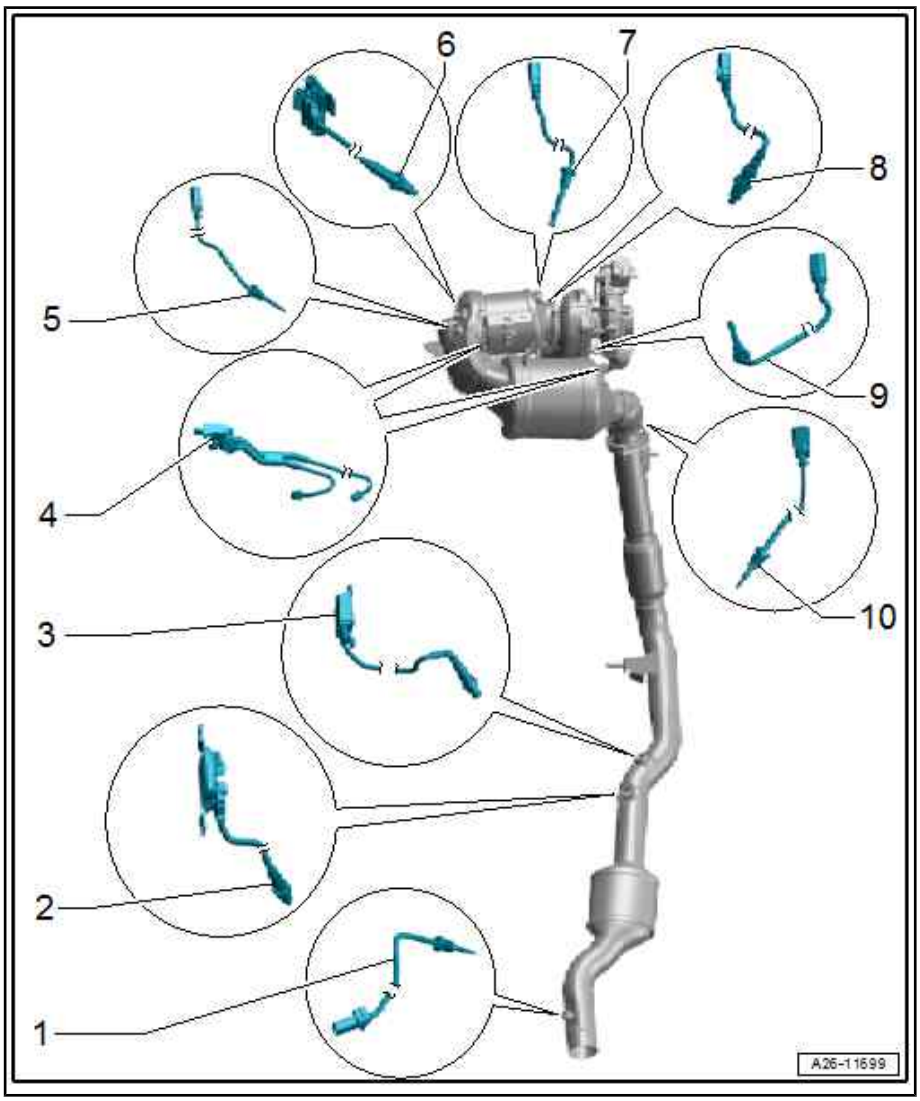
4.1 Exploded view - exhaust gas temperature control

WARNING

When working on all parts of the exhaust system:

- *Observe safety precautions when working on the exhaust system ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Safety precautions; Safety precautions when working on the exhaust system .*



1 - Not fitted

2 - NOx sender 2 - G687- with control unit for NOx sender 2 - J881-

- ❑ Removing and installing ⇒ page 158

3 - Not fitted

4 - Pressure differential sender - G505-

- ❑ Removing and installing ⇒ page 153

5 - Exhaust gas temperature sender 3 - G495-

- ❑ Removing and installing ⇒ page 186
- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas temperature control; Exploded view - exhaust gas temperature control

6 - NOx sender - G295- with control unit for NOx sender - J583-

- ❑ Removing and installing ⇒ page 158

7 - Exhaust gas temperature sender 2 - G448-

- ❑ Removing and installing ⇒ page 186
- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas temperature control; Exploded view - exhaust gas temperature control

8 - Lambda probe - G39- with Lambda probe heater - Z19-

- ❑ Removing and installing ⇒ page 158

9 - Exhaust gas temperature sender 1 - G235-

- ❑ Removing and installing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas temperature control; Removing and installing exhaust gas temperature sender
- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas temperature control; Exploded view - exhaust gas temperature control

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10 - Exhaust gas temperature sender 4 - G648-

- ❑ Removing and installing ⇒ page 186
- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas temperature control; Exploded view - exhaust gas temperature control

4.2 Removing and installing exhaust gas temperature sender

⇒ “4.2.1 Removing and installing exhaust gas temperature sender 1 G235 ”, page 186

⇒ “4.2.2 Removing and installing exhaust gas temperature sender 2 G448 ”, page 186

⇒ “4.2.3 Removing and installing exhaust gas temperature sender 3 G495 ”, page 186

⇒ “4.2.4 Removing and installing exhaust gas temperature sender 4 G648 ”, page 186

4.2.1 Removing and installing exhaust gas temperature sender 1 - G235-

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas temperature control; Removing and installing exhaust gas temperature sender .

4.2.2 Removing and installing exhaust gas temperature sender 2 - G448-

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas temperature control; Removing and installing exhaust gas temperature sender .

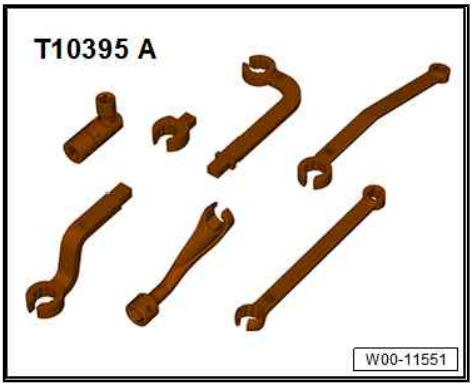
4.2.3 Removing and installing exhaust gas temperature sender 3 - G495-

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas temperature control; Removing and installing exhaust gas temperature sender .

4.2.4 Removing and installing exhaust gas temperature sender 4 - G648-

Special tools and workshop equipment required

- Tool set - T10395 A- with suitable tool insert



Removing

WARNING

When working on all parts of the exhaust system:

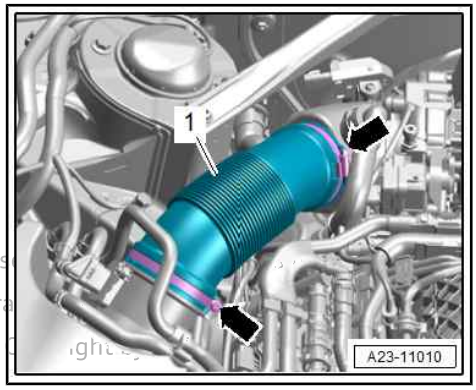
- *Observe safety precautions when working on the exhaust system ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Safety precautions; Safety precautions when working on the exhaust system .*

Note

- *Re-install all cable ties in the same locations when installing.*
- *When removing, the electrical wiring must not be cut, otherwise a fault diagnosis would no longer be possible.*

– Remove engine cover panel ⇒ page 45 .

– Release hose clips -arrows- and detach air pipe -1-.



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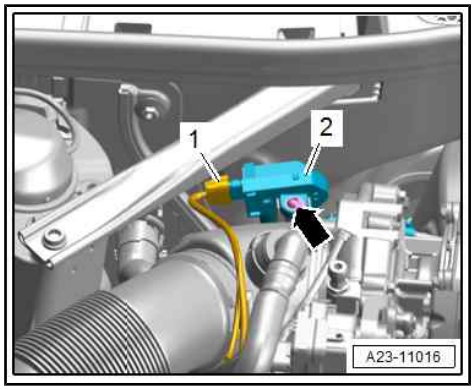
– Remove bolt -arrow-.
– Unplug electrical connector -1-.
– Move bracket -2- clear with pressure differential sender - G505- .
– Remove exhaust gas temperature sender 4 - G648- -item 1-.



Installing

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

Note

- *Take care to protect exhaust gas temperature sender from knocks and impact; if dropped, the exhaust gas temperature sender can no longer be used.*
- *Coat thread with high-temperature paste; for high-temperature paste refer to ⇒ Electronic parts catalogue .*
- *Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .*

– Move exhaust gas temperature sender 4 - G648- into installation position, screw in by hand and then tighten from above.
– Install engine cover panel ⇒ page 45 .

Tightening torques

-
- ⇒ Fig. ""Bracket with pressure differential sender -G505- - tightening torque"" , page 158
- ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas temperature control; Exploded view - exhaust gas temperature control
- ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Charge air system; Exploded view - hose connections for charge air system

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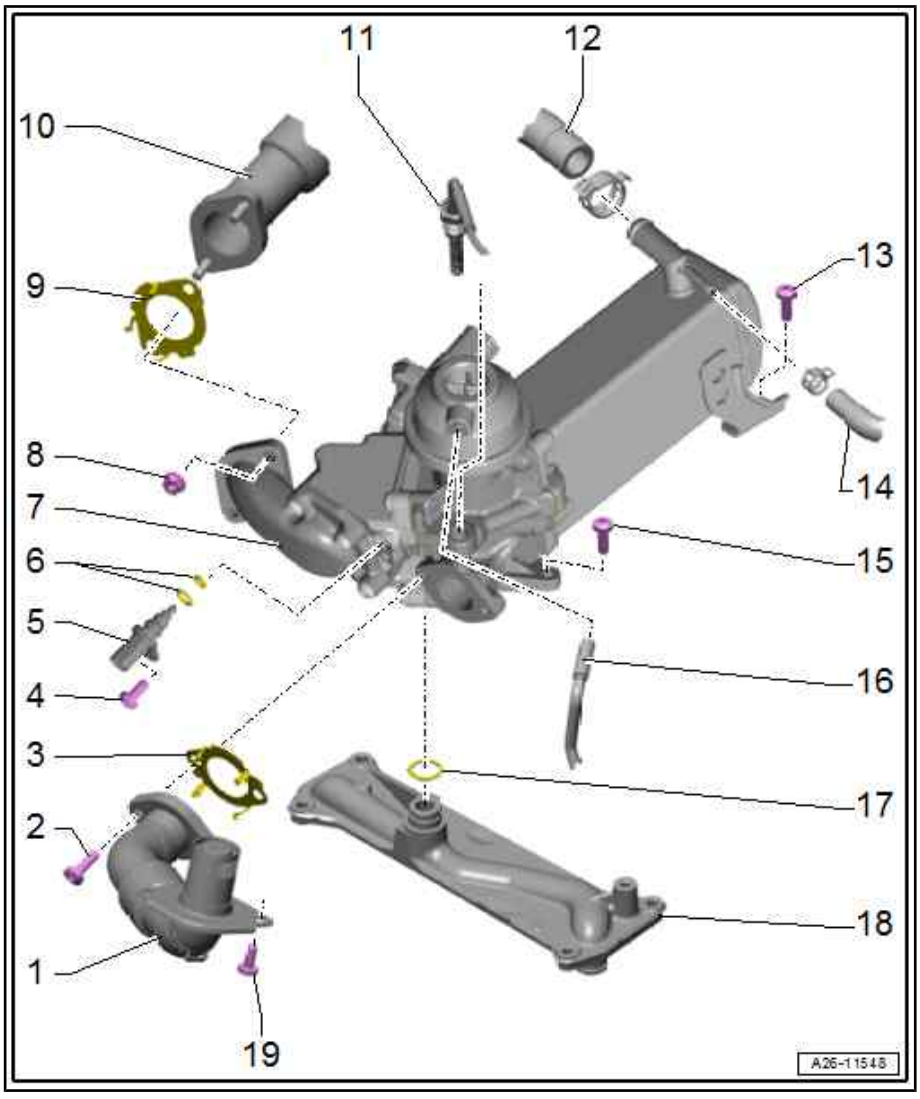
5 Exhaust gas recirculation

⇒ “5.1 Exploded view - exhaust gas recirculation system”, page 189

⇒ “5.2 Removing and installing exhaust gas recirculation cooler”, page 190

⇒ “5.3 Removing and installing exhaust gas recirculation temperature sensor G98 ”, page 190

5.1 Exploded view - exhaust gas recirculation system



1 - Exhaust gas recirculation pipe

- ❑ To intake manifold

2 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas recirculation; Exploded view - exhaust gas recirculation

3 - Gasket

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas recirculation; Exploded view - exhaust gas recirculation

4 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas recirculation; Exploded view - exhaust gas recirculation

5 - Coolant temperature sender - G62-

- ❑ Exploded view ⇒ page 93

6 - O-rings

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas recirculation; Exploded view - exhaust gas recirculation

7 - Exhaust gas recirculation cooler

- ❑ With exhaust gas recirculation control motor - V338-
- ❑ Removing and installing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas recirculation; Removing and installing exhaust gas recirculation cooler

8 - Nut

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas recirculation; Exploded view - exhaust gas recirculation

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9 - Gasket

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas recirculation; Exploded view - exhaust gas recirculation

10 - Exhaust gas recirculation pipe

- ❑ From turbocharger

11 - Exhaust gas recirculation temperature sensor - G98-

- ❑ Removing and installing ⇒ page 190
- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas recirculation; Exploded view - exhaust gas recirculation

12 - Coolant hose

13 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas recirculation; Exploded view - exhaust gas recirculation

14 - Coolant hose

15 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas recirculation; Exploded view - exhaust gas recirculation

16 - Vacuum hose

17 - O-ring

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas recirculation; Exploded view - exhaust gas recirculation

18 - Coolant pipe (top)

- ❑ Removing and installing ⇒ page 100

19 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas recirculation; Exploded view - exhaust gas recirculation

5.2 Removing and installing exhaust gas recirculation cooler

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas recirculation; Removing and installing exhaust gas recirculation cooler .

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5.3 Removing and installing exhaust gas recirculation temperature sensor - G98-

All procedures are described in ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust gas recirculation; Removing and installing exhaust gas recirculation temperature sensor - G98- .

6 Exhaust manifolds

⇒ "6.1 Exploded view - exhaust manifold", page 191
⇒ "6.2 Removing and installing exhaust manifolds", page 192

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6.1 Exploded view - exhaust manifold

WARNING

When working on all parts of the exhaust system:

- *Observe safety precautions when working on the exhaust system ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Safety precautions; Safety precautions when working on the exhaust system .*

Note

Illustration shows the exhaust manifold for cylinder bank 2 (left-side) as an example.

1 - Nut

- ❑ Tightening torques and installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust manifolds; Exploded view - exhaust manifold

2 - Exhaust manifold

- ❑ Removing and installing ⇒ page 192

3 - Gasket

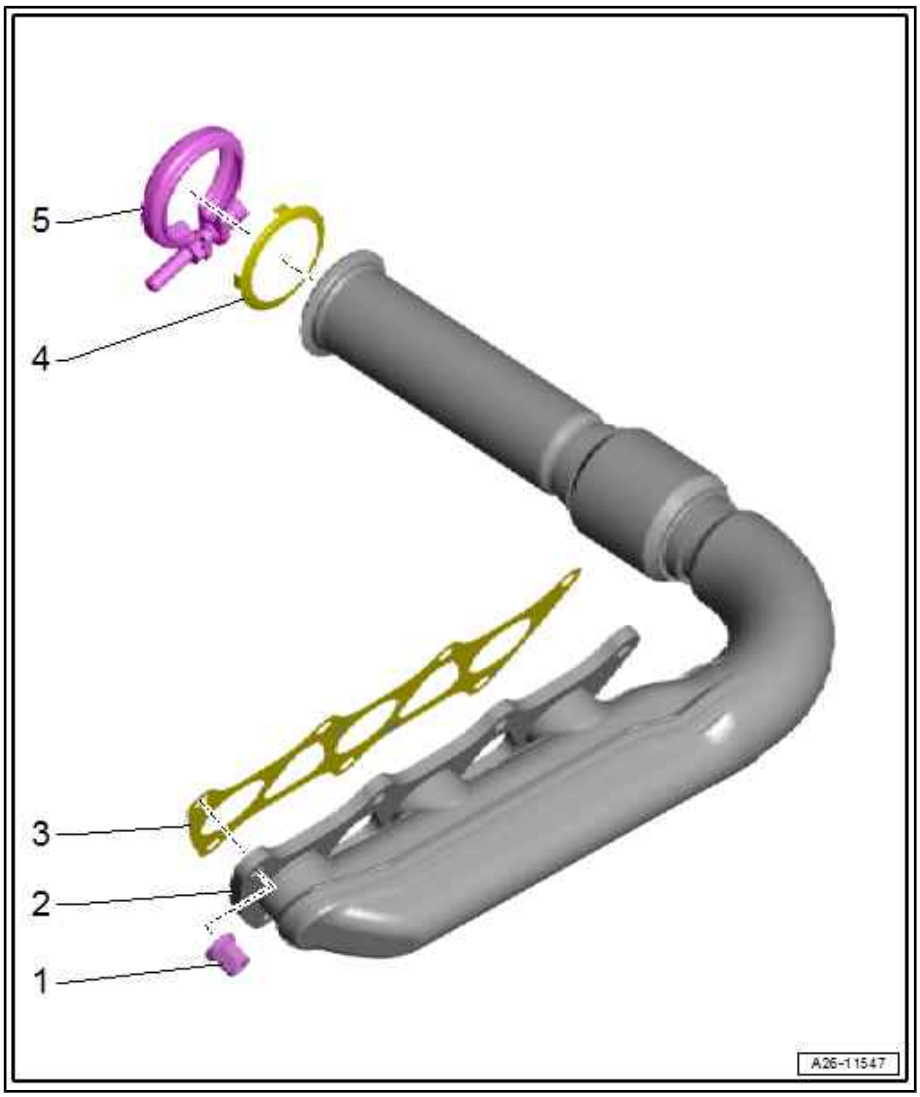
- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust manifolds; Exploded view - exhaust manifold

4 - Gasket

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust manifolds; Exploded view - exhaust manifold

5 - Clamp

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Exploded view - turbocharger



❑ Mark position of screw-type clip prior to removal

6.2 Removing and installing exhaust manifolds

⇒ "6.2.1 Removing and installing exhaust manifold (left-side)", page 192

⇒ "6.2.2 Removing and installing exhaust manifold (right-side)", page 193

6.2.1 Removing and installing exhaust manifold (left-side)

Removing

WARNING

When working on all parts of the exhaust system:

- *Observe safety precautions when working on the exhaust system ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Safety precautions; Safety precautions when working on the exhaust system .*

– Remove front wheel (left-side) ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .

– Remove emission control module ⇒ page 175 .

– Detach poly V-belt from air conditioner compressor pulley ⇒ page 49 .

– Remove air conditioner compressor from bracket and tie up to left side ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Detaching and attaching air conditioner compressor at bracket .

– Unscrew nuts -1, 3- and remove cover -2- for drive shaft.

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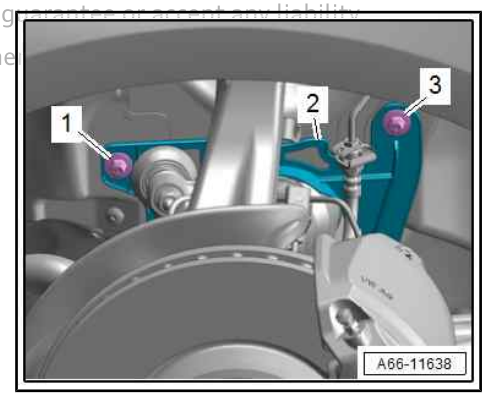
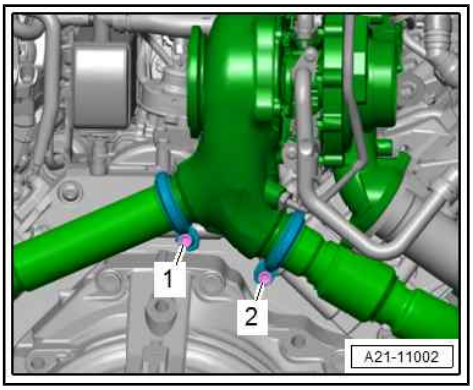


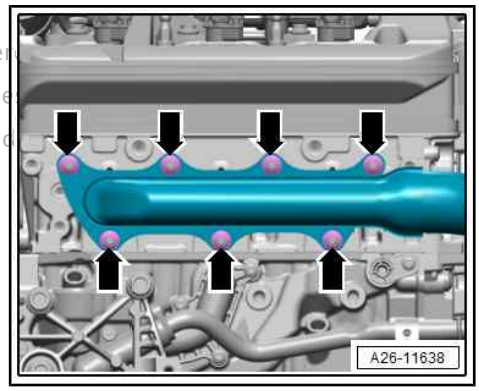
– Use a felt-tip pen to mark installation position of screw-type clip -1-.
– Release clip -1- and slide it onto intake funnel of turbocharger.



Note

Disregard -item 2-.

– Remove nuts -arrows- and detach exhaust manifold towards rear.



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Installing

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

Note

- *Renew gaskets, seals, self-locking nuts and screw-type clip after removal.*
- *If installation positions have been marked, pay attention to these when installing parts.*

– Install emission control module ⇒ page 175 .
– Install poly V-belt ⇒ page 49 .

Tightening torques

- ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust manifolds; Exploded view - exhaust manifold
- ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Exploded view - air conditioner compressor drive unit
- ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Exploded view - wheel housing liner (front)
- ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres

6.2.2 Removing and installing exhaust manifold (right-side)

Removing

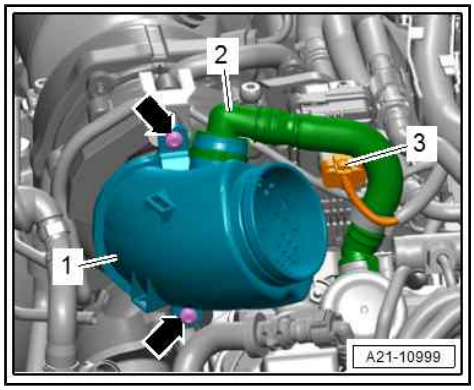
WARNING

When working on all parts of the exhaust system:

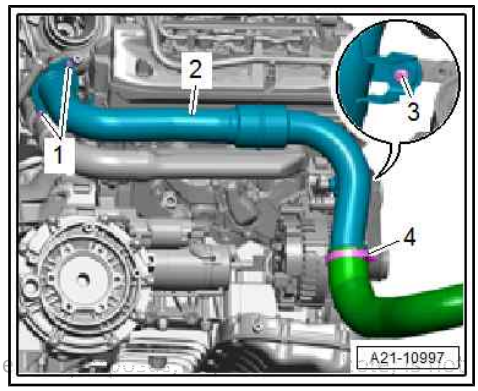
- ***Observe safety precautions when working on the exhaust system ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 00 ; Safety precautions; Safety precautions when working on the exhaust system .***

– Remove emission control module ⇒ page 175 .
– Remove air cleaner housing ⇒ page 136 .
– Unbolt coolant pipe (front) and detach from map-controlled engine cooling system thermostat - F265- ⇒ page 101 .

– Press release tabs on both sides and disconnect crankcase breather hose -2-.
– Unplug electrical connector -3- and move wiring clear.
– Unscrew bolts -arrows- and detach intake connecting pipe -1-.



– Remove bolts -1, 3- and press air pipe -2- to one side.



Note

Disregard -item 4-.

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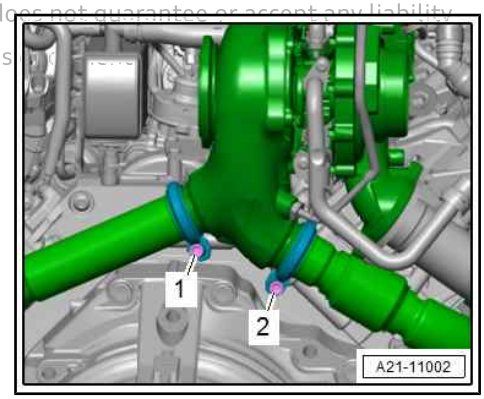
– Use a felt-tip pen to mark installation position of screw-type clip -2-.
– Release clip -2- and slide it onto intake funnel of turbocharger.

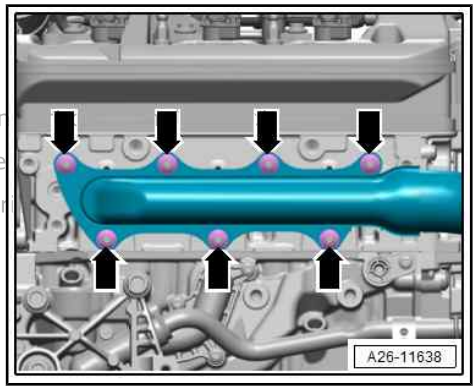


Note

Disregard -item 1-.

– Remove engine support (right-side) ⇒ page 50 .

– Remove nuts -arrows- and detach exhaust manifold towards rear.



Installing

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

Note

- *Renew O-ring, bolts and screw-type clips after removal.*
- *If installation positions have been marked, pay attention to these when installing parts.*

– Install engine support ⇒ page 50 .

– Install coolant pipe (front) ⇒ page 101 .

– Install air cleaner housing ⇒ page 136 .

– Install emission control module ⇒ page 175 .

Tightening torques

- ⇒ “2.1 Exploded view - charge air system”, page 123
- ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 21 ; Turbocharger; Exploded view - turbocharger
- ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 26 ; Exhaust manifolds; Exploded view - exhaust manifold

28 – Glow plug system

1 Glow plug system

⇒ “1.1 Exploded view - glow plug system”, page 196

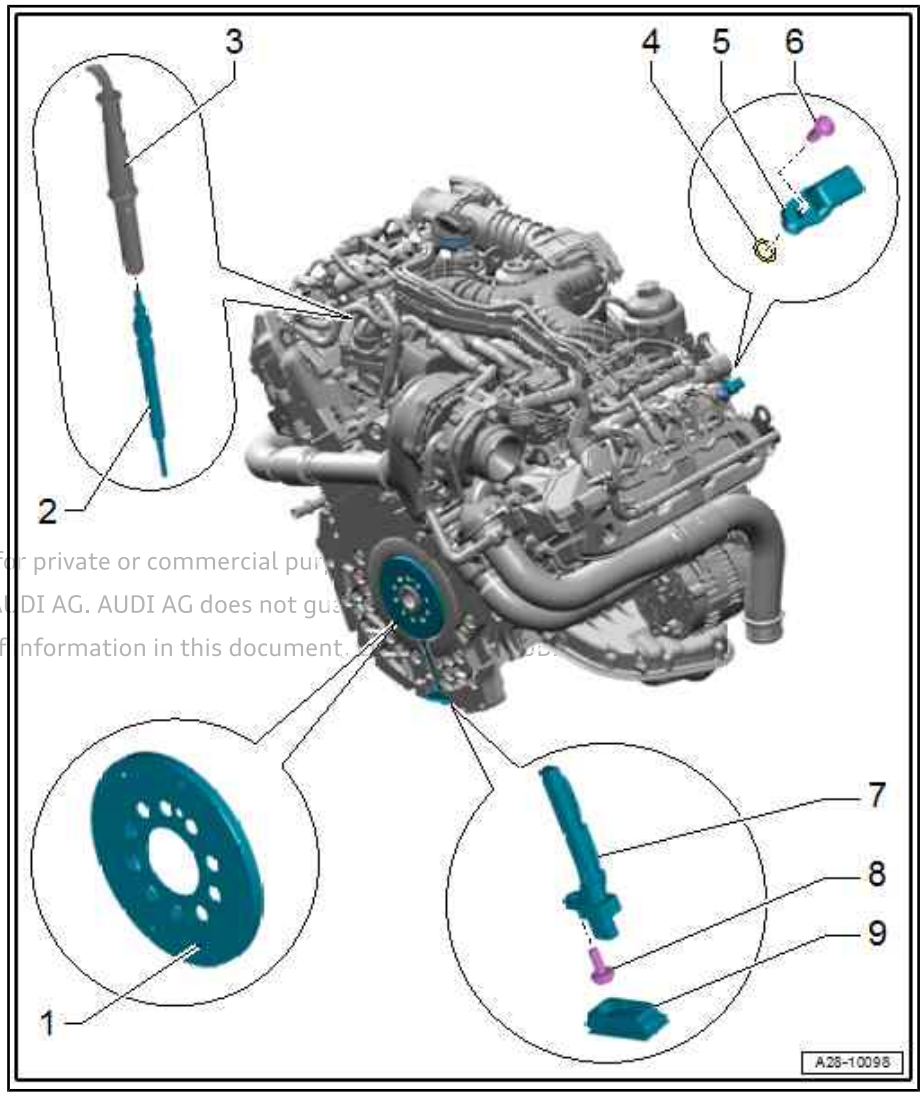
⇒ “1.2 Removing and installing glow plug”, page 197

⇒ “1.3 Removing and installing automatic glow period control unit J179 ”, page 197

⇒ “1.4 Removing and installing Hall sender G40 ”, page 198

⇒ “1.5 Removing and installing engine speed sender G28 ”, page 198

1.1 Exploded view - glow plug system



1 - Sender wheel

- ❑ For engine speed sender - G28-
- ❑ Removing and installing ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 13 ; Crankshaft; Removing and installing sender wheel

2 - Glow plug

- ❑ Cylinder bank 1 (right-side):
- ♦ Glow plug 1 - Q10-
- ♦ Glow plug 2 - Q11-
- ♦ Glow plug 3 - Q12-
- ❑ Cylinder bank 2 (left-side):
- ♦ Glow plug 4 - Q13-
- ♦ Glow plug 5 - Q14-
- ♦ Glow plug 6 - Q15-
- ❑ Removing and installing ⇒ page 197
- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 28 ; Glow plug system; Exploded view - glow plug system

3 - Electrical connector

4 - O-ring

- ❑ Installation instructions ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 28 ; Glow plug system; Exploded view - glow plug system

5 - Hall sender - G40-

- ❑ Removing and installing ⇒ page 198

6 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 28 ; Glow plug system; Exploded view - glow plug system

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7 - Engine speed sender - G28-

- ❑ Removing and installing ⇒ page 198

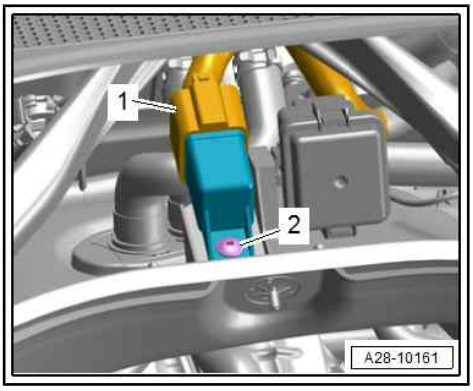
8 - Bolt

- ❑ Tightening torques ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 28 ; Glow plug system; Exploded view - glow plug system

9 - Cover

Automatic glow period control unit - J179- - tightening torque

– Tighten bolt -2- to 4.5 Nm.



1.2 Removing and installing glow plug

All procedures are described in ⇒ Servicing 6-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

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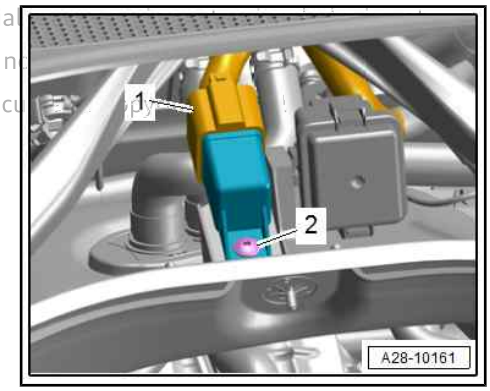
– Pull off seal and lift plenum chamber cover slightly.

– Remove bolt -arrow-.

– Unplug electrical connector -1- and detach automatic glow period control unit - J179- .



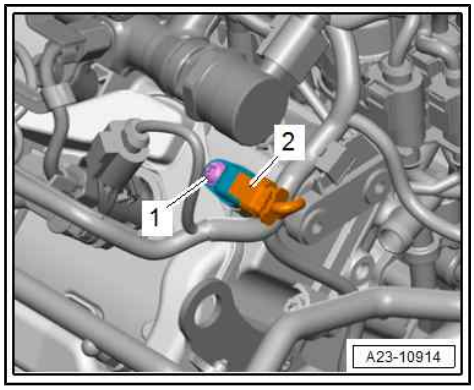
Installing

Installation is carried out in reverse sequence.

Tightening torques

- ◆ ⇒ Fig. “” Automatic glow period control unit -J179- - tightening torque”“ , page 197

1.4 Removing and installing Hall sender - G40-



Removing

– Remove engine cover panel ⇒ page 45 .

– Unplug electrical connector -2-.

– Unscrew bolt -1- and remove Hall sender - G40- .

Installing

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

Note

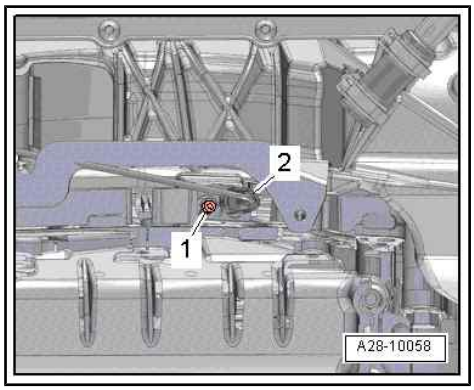
Renew O-ring after removal.

– Install engine cover panel ⇒ page 45 .

Tightening torques

◆ ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 28 ; Glow plug system; Exploded view - glow plug system

1.5 Removing and installing engine speed sender - G28-



Removing

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

– Unplug electrical connector -2-.

– Unscrew bolt -1- and detach engine speed sender - G28- .

Installing

Installation is carried out in reverse sequence.

Tightening torques

◆ ⇒ Servicing 6-cylinder TDI engine, common rail; Rep. gr. 28 ; Glow plug system; Exploded view - glow plug system

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

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