

Workshop Manual

Octavia III 2013 ➤

Octavia III 2014 ➤

1.6/66; 77; 81; 2.0/105; 110; 135 kW TDI CR engine									
Engine ID	CLH A	CLH B	CKF B	CKF C	CRV C	CUP A	CRK B	CRM B	CUN A

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List of Workshop Manual Repair Groups

Repair Group

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

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



Contents

00 - Technical data	1
1 Identification	1
1.1 Engine number, engine data	1
2 Safety instructions	3
2.1 Safety precautions when working on fuel supply system	3
2.2 Safety measures for working on vehicles with start/stop system	5
3 Repair instructions	6
3.1 Rules of cleanliness	6
3.2 Foreign bodies in the engine	7
3.3 Contact corrosion	7
3.4 Cable routing and securing	7
3.5 Assembly of radiators and capacitors	7
3.6 Supplementary instructions and assembly work on vehicles with an air conditioning system	7
3.7 General instructions for charge air system	8
10 - Removing and installing engine	10
1 Removing and installing engine	10
1.1 Removing and installing engine trim panel	10
1.2 Removing engine	10
1.3 Securing the engine to the assembly stand	23
1.4 Installing engine	25
2 Assembly bracket	29
2.1 Assembly overview - assembly mountings	29
2.2 Support the engine in its installed position	31
2.3 Removing and installing engine mount	31
2.4 Removing and installing engine support	32
2.5 Removing and installing pendulum support	33
2.6 Checking and adjusting the assembly bracket	34
13 - Crankshaft group	36
1 Removing and installing a V-ribbed belt and a toothed belt	36
1.1 V-ribbed belt - Summary of components	36
1.2 Removing and installing poly V-belt	38
1.3 Removing and installing crankshaft-belt pulley	40
1.4 Removing and installing tensioning device for V-ribbed belt	40
1.5 Removing and installing bracket for auxiliary units	41
1.6 Summary of components - toothed belt guard	42
1.7 Assembly overview - toothed belt drive	44
1.8 Removing and installing top toothed belt guard	45
1.9 Removing and installing bottom toothed belt guard	48
1.10 Remove the toothed belt from the camshaft	49
1.11 Removing and installing toothed belt	52
2 Removing and installing sealing flange and flywheel	62
2.1 Summary of components - sealing flange belt pulley side	62
2.2 Removing and installing the sealing flange on the belt pulley side	63
2.3 Summary of components - gearbox side summary of components and flywheel	64
2.4 Removing and installing sealing flange on gearbox side	66
2.5 Removing and installing flywheel	73
3 Crankshaft, Piston and Conrod	75
3.1 Summary of components - crankshaft	75
3.2 Replace the needle bearing in the crankshaft	76



3.3	Assembly overview - piston and conrod	77
3.4	Removing and installing the piston	82
3.5	Checking piston projection in TDC	83
3.6	Separating new conrod	84
15	Cylinder head, valve gear	85
1	Removing and installing cylinder head	85
1.1	Assembly overview - cylinder head cover	85
1.2	Removing and installing cylinder head cover	86
1.3	Replacing gasket rings for injection units	89
1.4	Summary of components - cylinder head	90
1.5	Removing and installing cylinder head	93
1.6	Checking compression	102
2	Valve gear	104
2.1	Assembly overview - valve gear	104
2.2	Replacing camshaft gasket ring	107
2.3	Removing and installing N205 the camshaft adjustment valve 1	109
2.4	Removing and installing camshaft control	109
2.5	Removing and installing the camshaft adjusting valve	112
2.6	Removing and installing camshaft housing	114
2.7	Checking hydraulic balancing elements	118
2.8	Removing and installing valve stem seals	119
2.9	Valve dimensions	125
2.10	Checking valve guides	126
17	Lubrication	127
1	Removing and installing parts of the lubrication system	127
1.1	Parts of the lubrication system - Summary of components	127
1.2	Removing and installing oil level and oil temperature transmitter G266	129
1.3	Summary of components - oil filter holder	130
1.4	Removing and installing the oil filter holder with the engine oil cooler	132
1.5	Removing and installing oil sump	135
1.6	Removing and installing oil pump	138
1.7	Removing and installing oil pressure switch F1	139
1.8	Removing and installing oil pressure switch for reduced oil pressure F378	140
1.9	Removing and installing valve for oil pressure control N428	141
1.10	Testing oil pressure	142
19	Cooling	143
1	Cooling system	143
1.1	Connection diagram for coolant hoses	143
1.2	Draining and filling coolant	151
1.3	Checking cooling system for leaks	157
2	Coolant pump and coolant thermostat	159
2.1	Summary of components - coolant pump and coolant thermostat	159
2.2	Summary of components - coolant temperature transmitter	161
2.3	Summary of components - electric coolant pump	162
2.4	Removing and installing coolant pump	163
2.5	Removing and installing coolant thermostat	164
2.6	Removing and installing coolant valve for cylinder head N489	165
2.7	Testing coolant thermostat	166
2.8	Removing and installing coolant temperature transmitter G62	166
2.9	Removing and installing charge air cooler pump V188	167
2.10	Removing and installing the heating backup pump V488	168
3	Coolant pipes	170

3.1	Summary of components - coolant pipe	170
3.2	Removing and installing the front top coolant pipes	172
3.3	Removing and installing the front bottom coolant pipe	173
3.4	Removing and installing the front left coolant pipe	175
3.5	Removing and installing the front right coolant pipe	177
3.6	Remove and install the left coolant pipes	178
3.7	Removing and installing the rear coolant pipe	179
3.8	Removing and installing the rear right coolant pipe	180
4	Radiator and radiator fan	185
4.1	Parts of the cooling system fitted to body	185
4.2	Summary of components - fan shroud and radiator fan V7	190
4.3	Summary of components- fan shroud and radiator fan V7 and radiator fan 2 V177	191
4.4	Removing and installing radiator	191
4.5	Removing and installing fan shroud	195
4.6	Removing and installing radiator fans V7 and V177	196
20	Fuel supply system	197
1	Measures in case of misfuelling	197
1.1	Step 1, engine started with incorrect fuel	197
1.2	Step 2, the engine was not started with incorrect fuel	199
1.3	Step 3, metal swarfs are present in the fuel delivery unit and the fuel tank	200
1.4	Step 4, no metal swarfs are present in the fuel delivery unit and the fuel tank	201
1.5	Step 5, metal swarfs are present in the high pressure pump	202
1.6	Step 6: no metal swarfs are present in the high pressure pump	202
2	Removing and installing parts of the fuel supply system	204
2.1	Fuel tank with component parts - Summary of components	204
2.2	Fuel delivery unit - Summary of components	212
2.3	Fuel filter - Summary of components	217
2.4	Drain fuel filter	218
2.5	Removing and installing fuel filter	218
2.6	Fuel hoses in the engine compartment	222
2.7	Extract fuel from the fuel tank	223
2.8	Removing and installing fuel delivery unit	232
2.9	Removing and installing misfuelling protection	242
2.10	Deactivate misfuelling protection	244
2.11	Removing and installing the sender for fuel gauge display	245
2.12	Separating push-on couplings	249
2.13	Removing and installing the fuel tank	253
2.14	Removing and installing fuel pump control unit J538	263
2.15	Check the suction jet pump	265
2.16	Removing and installing suction jet pump	265
2.17	Inspecting fuel pump G6	273
2.18	Check sender for fuel gauge display G	285
3	Accelerator mechanism	288
3.1	Assembly overview - accelerator module	288
3.2	Removing and installing accelerator module	288
21	Turbocharging/supercharging	290
1	Charge-air system - exhaust gas turbocharger	290
1.1	Exhaust gas turbocharger with component parts - Summary of components	290
1.2	Removing and installing exhaust gas turbocharger	292
1.3	Replace vacuum positioning element for charge pressure regulation with position sender for charge pressure regulator G581	302
1.4	Connection diagram for vacuum hoses	306
1.5	Checking vacuum system	307
1.6	Hose connections with screw clamps	308



2	Charge-air system - radiator, leaktightness	309
2.1	Charge air cooling - Summary of components	309
2.2	Removing and installing charge pressure sender G31	311
2.3	Checking the charge-air system for leaktightness	311
23	Mixture preparation - injection	314
1	Diesel direct injection system - fitting location, system overview	314
1.1	Installation location overview - fuel injection system	314
1.2	Schematic overview - fuel system	320
1.3	Filling/bleeding the fuel system	321
1.4	Check the fuel system for tightness	322
2	Injection units/fuel distributor	323
2.1	Summary of components - injection units (injectors)	323
2.2	Fuel distributor - summary of components	325
2.3	Check injection units	326
2.4	Adjust the correction values for injection units	326
2.5	Check injection unit return quantity with engine running	326
2.6	Check injection unit return flow quantity at starter speed	329
2.7	Carry out the vacuum test of the injection units	330
2.8	Removing and installing the injection units	331
2.9	Removing and installing high pressure lines	334
2.10	Removing and installing the fuel distributor	336
3	High pressure pump	338
3.1	Summary of components - high pressure pump	338
3.2	Removing and installing the high pressure pump	339
4	Senders and sensors	342
4.1	Removing and installing intake air temperature transmitter G42 / charge air temperature transmitter after charge air cooler G811	342
4.2	Removing and installing fuel temperature transmitter G81	342
4.3	Removing and installing air flow mass meter G70	343
4.4	Check fuel pressure regulating valve N276	344
4.5	Replace fuel pressure regulating valve N276	346
4.6	Removing and installing fuel pressure sender G247	347
4.7	Removing and installing differential pressure transmitter G505	348
4.8	Removing and installing pressure sensor for exhaust gas 1 G450	349
5	Lambda probe	351
5.1	Lambda probe - Summary of components	351
5.2	Removing and installing Lambda probe G39	352
5.3	Removing and installing Lambda probe after catalytic converter G130	353
6	Intake manifold, air filter	355
6.1	Assembly overview - intake manifold	355
6.2	Removing and installing the throttle valve control unit J338	357
6.3	Removing and installing intake manifold	359
6.4	Summary of components - air filter	362
6.5	Removing and installing air filter	364
7	Engine control unit	366
7.1	Removing and installing engine control unit J623	366
8	Engine noise speaker	369
8.1	Removing and installing engine noise speaker	369
26	Exhaust system	370
1	Removing and installing exhaust pipes/silencers	370
1.1	Summary of components - front, middle and rear silencer	370
1.2	Removing and installing exhaust pipe	380
1.3	Removing and installing the exhaust flap control unit J883	381



1.4	Removing and installing rear silencer	381
1.5	Replacing middle or rear silencer	385
1.6	Aligning exhaust system free of stress	386
1.7	Align exhaust tailpipes	387
1.8	Inspecting the exhaust system for leaktightness	387
2	Cleansing exhaust emissions	388
2.1	Summary of components - exhaust gas cleaning	388
2.2	Removing and installing exhaust gas cleaning module	392
2.3	Removing and installing catalytic converter	400
3	Exhaust temperature regulation	402
3.1	Summary of components - exhaust temperature regulation	402
3.2	Removing and installing exhaust gas temperature transmitter	403
4	Exhaust gas recirculation system	408
4.1	Exhaust gas recirculation with radiator for exhaust gas recirculation - Summary of components	408
4.2	Control motor for exhaust gas recirculation V338 - Summary of components	412
4.3	Removing and installing control motor for exhaust gas recirculation V338	413
4.4	Removing and installing control motor 2 for exhaust gas recirculation V339	413
4.5	Removing and installing radiator for exhaust gas recirculation	415
28	Glow plug system	420
1	Glow Plug System	420
1.1	Summary of components - preheating system	420
1.2	Removing and installing glow plugs	421
1.3	Removing and installing automatic glow period control unit J179	423
1.4	Removing and installing Hall sender G40	423
1.5	Removing and installing engine speed transmitter G28	424



00 – Technical data

1 Identification

(SRL000718; Edition 07.2014)

⇒ **"1.1 Engine number, engine data", page 1**

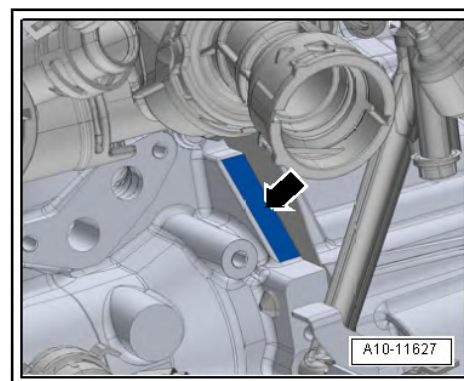
1.1 Engine number, engine data

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

In addition, a sticker with the "engine identification characters" and "serial number" is affixed to the timing belt guard.

The engine identification characters are also indicated on the vehicle data sticker.

- ◆ The engine identification characters have 4 digits starting with the letter "C".
- ◆ The first 3 digits of the engine identification characters refer to the displacement and the mechanical construction of the engine. They are type-punched in the cylinder block including the serial number.
- ◆ The 4th digit refers to the output and torque of the engine and depends upon the engine control unit.



Engine identification characters	CLHB	CLHA	CKFB	CKFC	CRVC	CUPA	CRKB	CRMB	CUNA
Manufactured	05.13 ►	11.12 ►	11.12 ►	11.12 ►	05.13 ►	05.13 ►	11.13 ►	08.14 ►	08.14 ►
Exhaust limit values conforming to	EU5	EU5	EU5	EU5	EU4	EU5	EU6	EU6	EU6
Capacity l	1,598	1,598	1,968	1,968	1,968	1,968	1,598	1,968	1,968
Output kW at rpm	66/2750...4800	77/3000...4000	105/3500...4000	110/3500...4000	105/3500...4000	135/3500...4000	81/3250...4000	110/4000	135/3500...4000
Torque Nm at rpm	230/1400...2700	250/1500...2750	320/1750...3000	320/1750...3000	320/1750...3000	380/1750...3250	250/1500...3000	340/1750...3000	380/1750...3000
Bore Ø mm	79,5	79,5	81,0	81,0	81,0	81,0	79,5	81,0	81,0
Stroke mm	80,5	80,5	95,5	95,5	95,5	95,5	80,5	95,5	95,5
Cylinder/valves per cylinder	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
Compression ratio	16,2	16,2	16,2	16,2	16,2	15,8	16,2	16,2	15,8
Firing order	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2
Catalytic converter	yes	yes	yes	yes	yes	yes	yes	yes	yes
Exhaust gas recirculation with radiator	yes	yes	yes	yes	yes	yes	yes	yes	yes
Turbocharging	yes	yes	yes	yes	yes	yes	yes	yes	yes
Charge air cooler	yes	yes	yes	yes	yes	yes	yes	yes	yes



Engine identification characters	CLHB	CLHA	CKFB	CKFC	CRVC	CUPA	CRKB	CRMB	CUNA
Diesel particle filter	yes	yes	yes	yes	no	yes	yes	yes	yes
Balancing shafts	no	no	no	no	no	yes	no	no	yes

2 Safety instructions

⇒ **"2.1 Safety precautions when working on fuel supply system", page 3**

⇒ **"2.2 Safety measures for working on vehicles with start/stop system", page 5**

2.1 Safety precautions when working on fuel supply system



WARNING

- ◆ *The fuel or the fuel lines in the fuel system can become very hot (risk of scalding)!*
- ◆ *The fuel system is under pressure!*
- ◆ *Wear safety goggles and safety clothing, in order to avoid injuries and skin contact with fuel.*
- ◆ *Place cleaning cloths around the connection point before detaching cable connections. Reduce pressure by carefully removing the wiring.*

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

- ◆ *Disconnect battery*

or

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

or

- ◆ *Disconnect the plug on the flange of the fuel delivery unit.*



Caution

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

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

**Caution**

- ◆ *Do not remove fuel hoses from the fuel filter.*
- ◆ *Pay attention to the notes*
⇒ ***"2.6 Fuel hoses in the engine compartment",***
page 222 .
- ◆ *Do not lever the connection fittings.*
- ◆ *This leads to leaks and damage to the fuel filter top part.*
- ◆ *Ensure that no diesel fuel gets onto other components in the engine compartment. If this happens, clean affected components immediately!*

**Caution**

- ◆ *Because of insufficient lubrication by diesel fuel, misfueling can cause irreversible damage to high pressure components, particularly the high pressure pump. Damage in the form of engine seizure and clogging by particles can be expected. These particles create a risk of further damage in the pressure control valve and injectors.*

**Caution**

In order to avoid the high pressure pump to run dry and to achieve a quick engine start after parts are replaced, the following points must be observed.

- ◆ *If parts of the fuel system have been removed or replaced, to bleed the fuel system it is necessary to perform the fuel system filling/bleeding process*
⇒ ***"1.3 Filling/bleeding the fuel system", page 321 .***
- ◆ *If the fuel pump, fuel line or fuel filter have been removed or replaced, the fuel system filling/bleeding process must be performed*
⇒ ***"1.3 Filling/bleeding the fuel system", page 321 .***
- ◆ *If the high pressure pump is removed or replaced, the initial fuel filling of the high pressure pump must be carried out before the first engine start*
⇒ ***"1.3 Filling/bleeding the fuel system", page 321 .***
- ◆ *If the high pressure system was opened, it must be checked for tightness*
⇒ ***"1.4 Check the fuel system for tightness", page 322 .***

When removing and installing the fuel gauge transmitter or the fuel delivery unit from a full or partly filled fuel tank, pay attention to the following points:

- ◆ The extraction hose of an exhaust extraction system which is switched on, must be positioned close to the assembly opening of the fuel tank in order to extract the released fuel vapours, even before the work is commenced. If no exhaust extraction system is available, a radial fan (motor not in air flow of fan) with a delivery volume of more than 15 m³/h must be used.
- ◆ Prevent skin contact with fuel! Wear fuel-resistant gloves!

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

- ◆ Always secure the test and measuring devices on the rear seat and have a second person operate them there.

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

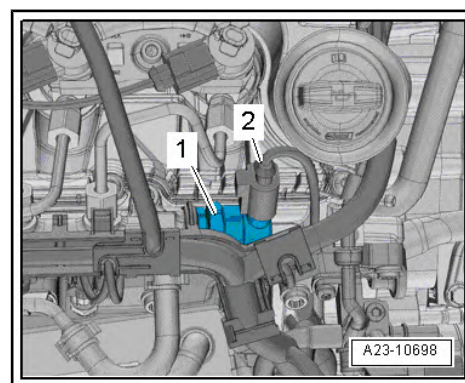


WARNING

Secure the diagnostic device to the rear seat and operate from that position.

Observe the following points to prevent injury to persons and/or damage to the injection and preheating system:

- ◆ People, who have a heart pacemaker implant, should not bend over the engine compartment when the engine is running, as the injection units generate an output high voltage pulse.
- ◆ No fuel lines must be opened when the engine is running.
- ◆ Disconnect and connect wires of the preheating and injection system as well as measuring device wires when the ignition is switched off.
- ◆ Do not carry out engine wash unless the ignition is switched off.
- ◆ If the engine must be operated at starter speed, without it starting, unplug the connector -2- at the fuel pressure regulating valve - N276- -Pos. 1-.
- ◆ Before disconnecting the battery determine the code of the radio fitted with anti-theft coding.
- ◆ Always switch off the ignition before disconnecting and re-connecting the battery. Otherwise the engine control unit may be damaged.
- ◆ After connecting the battery, carry out certain additional operations ⇒ Electrical System; Rep. gr. 27 .



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

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



WARNING

Risk of injury from automatic engine start on vehicles with start/stop system.

- ◆ ***In vehicles with an activated start-stop system (indicated by a message in the dash panel insert), the engine can start automatically if necessary.***
- ◆ ***You must therefore ensure that the start/stop system is deactivated (switch off the ignition, switch the ignition on again if necessary) when working on the vehicle.***



3 Repair instructions

⇒ ["3.1 Rules of cleanliness", page 6](#)

⇒ ["3.2 Foreign bodies in the engine", page 7](#)

⇒ ["3.3 Contact corrosion", page 7](#)

⇒ ["3.4 Cable routing and securing", page 7](#)

⇒ ["3.5 Assembly of radiators and capacitors", page 7](#)

⇒ ["3.6 Supplementary instructions and assembly work on vehicles with an air conditioning system", page 7](#)

⇒ ["3.7 General instructions for charge air system", page 8](#)

3.1 Rules of cleanliness

⇒ ["3.1.1 Regulations concerning cleanliness when working on the fuel supply/fuel injection system", page 6](#)

⇒ ["3.1.2 Regulations concerning cleanliness when working on the exhaust gas turbocharger", page 6](#)

3.1.1 Regulations concerning cleanliness when working on the fuel supply/fuel injection system

When working on the fuel supply and injection system, pay careful attention to the following "6 rules" for cleanliness:

- ◆ Thoroughly clean the connection points and their surroundings before releasing.
- ◆ Place removed parts on a clean surface and cover. Use only lint-free cloths!
- ◆ Carefully cover or close opened components if the repair is not completed immediately.
- ◆ Only install clean components: Remove spare parts from their wrapping immediately before fitting. Do not use any parts which have been stored unwrapped (e.g. on a shelf or in a tool box).
- ◆ When the system is open: Avoid using compressed air whenever possible. Avoid moving the vehicle.
- ◆ Also make sure no diesel fuel runs onto the coolant hoses. If this is the case clean the hoses immediately. Contaminated hoses must be replaced.

3.1.2 Regulations concerning cleanliness when working on the exhaust gas turbocharger

Carefully observe the following "5 rules" for cleanliness when working on the exhaust gas turbocharger:

- ◆ Thoroughly clean the connection points and their surroundings before releasing.
- ◆ Place removed parts on a clean surface and cover. Use only lint-free cloths!
- ◆ Carefully cover or close opened components if the repair is not completed immediately.
- ◆ Only install clean components: Remove spare parts from their wrapping immediately before fitting. Do not use any parts

which have been stored unwrapped (e.g. on a shelf or in a tool box).

- ◆ When the system is open: Avoid using compressed air whenever possible. Avoid moving the vehicle.

3.2 Foreign bodies in the engine

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

3.3 Contact corrosion

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

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

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

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

3.4 Cable routing and securing

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

3.5 Assembly of radiators and capacitors

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

3.6 Supplementary instructions and assembly work on vehicles with an air conditioning system



WARNING

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



Note

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

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

- Unscrew the holding clamp(s) on the refrigerent lines.



- Remove V-ribbed belt
⇒ [“1.2 Removing and installing poly V-belt”, page 38](#) .
- Remove AC compressor from the bracket for auxiliary units
⇒ [“1.1 V-ribbed belt - Summary of components”, page 36](#) .
- Mount the air conditioning compressor and the condenser in such a way that the refrigerant lines/hoses are not under tension.

3.7 General instructions for charge air system



Caution

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

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



Caution

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

- ◆ *Clean all oil lines.*
- ◆ *Change engine oil and oil filter.*
- ◆ *Check air filter housing, air filter element and charge air pipes as well as charge air hoses for soiling.*
- ◆ *Check all the air guides and the charge air cooler for foreign bodies.*

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

- ◆ The charge-air system must be tight, check
⇒ [“2.3 Checking the charge-air system for leaktightness”, page 311](#) .
- ◆ Replace the gaskets, the gasket rings and the self-locking nuts.
- ◆ Hose connections and hoses of the charge air system must be free of oil and grease before being installed. The gasket ring and the sealing surface must be slightly oiled only for push-fit couplings
⇒ [“1.6 Hose connections with screw clamps”, page 308](#) .
- ◆ Observe assembly markings on the hoses and components.
- ◆ All hose connections of the charge air system are secured with spring strap clamps or push-fit couplings.
- ◆ Only install approved clamps for securing the hose connections ⇒ ETKA - Electronic Catalogue of Original Parts .



- ◆ Hose clip pliers are recommended to install spring-type clips.
- ◆ Install hose connections with screw clamps
⇒ ["1.6 Hose connections with screw clamps", page 308](#) .
- ◆ Before screwing down the oil feed line, fill the exhaust turbocharger via the connection fitting with engine oil.
- ◆ After installing the turbocharger, run engine at idling speed for about 1 minute to ensure that oil is supplied to the turbocharger.



10 – Removing and installing engine

1 Removing and installing engine

⇒ [“1.1 Removing and installing engine trim panel”, page 10](#)

⇒ [“1.2 Removing engine”, page 10](#)

⇒ [“1.3 Securing the engine to the assembly stand”, page 23](#)

⇒ [“1.4 Installing engine”, page 25](#)

1.1 Removing and installing engine trim panel



Caution

When removing and installing the engine trim panel, where applicable, prevent a collision with the fuel return-flow line or prevent coming into contact with the lines by accident. In unfavourable situations, the outlets on the injectors may break off. This can cause leaks in the fuel system.

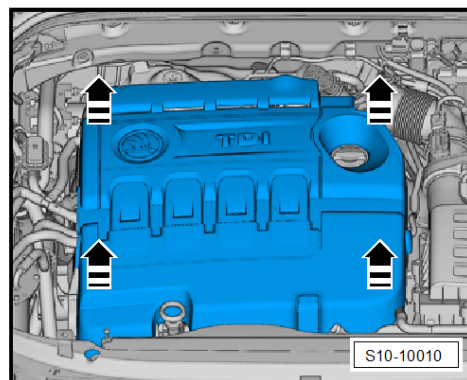
The brackets of the engine cover on the cylinder head cover can break off when they are incorrectly removed.

◆ *It is therefore necessary to remove the engine cover according to the following instruction.*

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

Install

- To avoid damage, do not strike the engine cover with the fist or a tool.
- Position the engine cover paying attention to the oil fill supports and dipstick.
- First press the engine cover into the rubber grommets on the left side, then into the rubber grommets on the right side.



1.2 Removing engine

Special tools and workshop equipment required

- ◆ Removal tool for inner lining of the door panel - MP8-602/1-
- ◆ Engine and gearbox jack - V.A.G 1383 A-
- ◆ Double ladder
- ◆ Screw plug set for engine - VAS 6122-
- ◆ Catch pan , e.g. -VAS 6208-
- ◆ Hose clip pliers - VAS 6362-
- ◆ Locking pin - T10060 A-
- ◆ Engine mount - T10497- with bolts -T10497/1-
- ◆ Protective goggles
- ◆ Protective gloves

Work procedure



Note

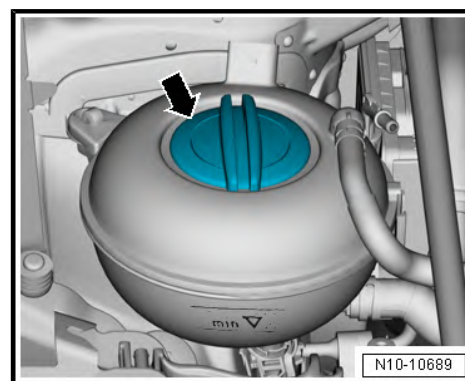
- ◆ If the stripped engine is replaced after engine removal, the tightening of the injection unit clamping claws on the new stripped engine must be checked. Specified torque: Position -8- ➔ ["2.1 Summary of components - injection units \(injectors\)"](#), [page 323](#).
- ◆ The engine is removed downwards together with the gearbox.
- ◆ Fit all cable straps on again in the same place when installing.
- ◆ Fit all heat protection sleeves on again in the same place when installing.



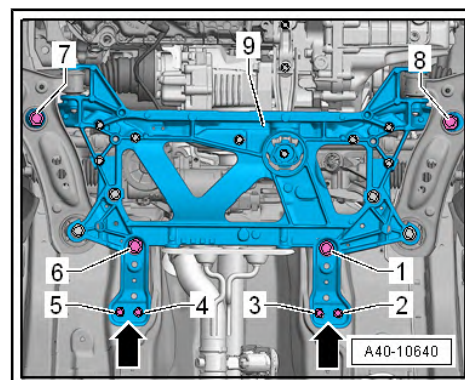
WARNING

Danger of scalding due to hot steam and hot coolant.

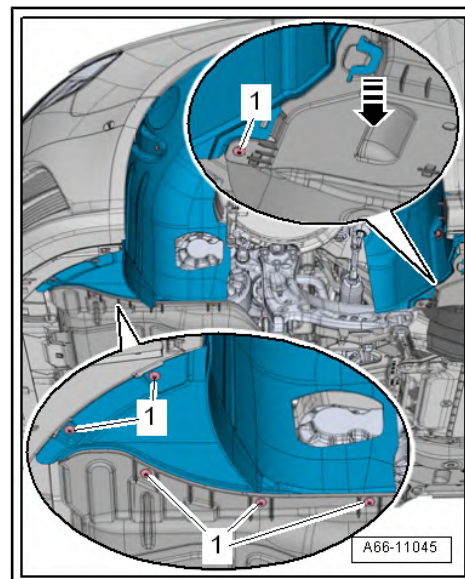
- ◆ When the engine is warm, the cooling system is under overpressure.
- ◆ Reduce excess pressure by covering the cap of the coolant expansion tank with a cloth and opening it carefully.



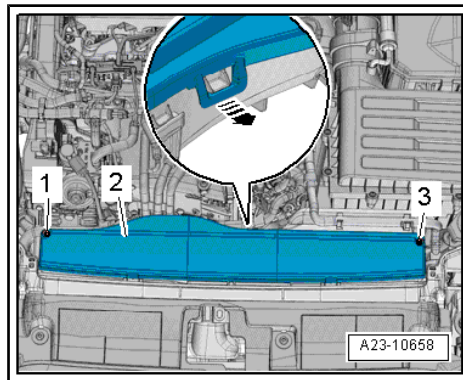
- Remove assembly bracket -9- without steering gear ➔ Chassis; Rep. gr. 40.



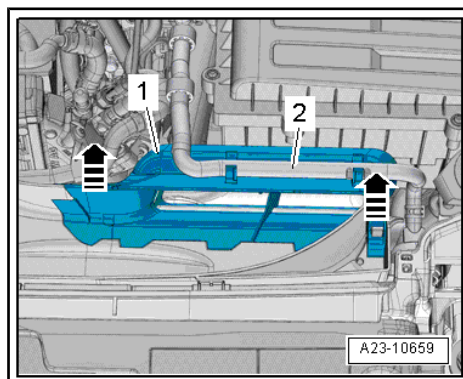
- Remove the front left and right wheelhouse liner ➔ Body Work; Rep. gr. 66.
- Drain coolant ➔ ["1.2 Draining and filling coolant"](#), [page 151](#).
- Remove engine cover ➔ ["1.1 Removing and installing engine trim panel"](#), [page 10](#).



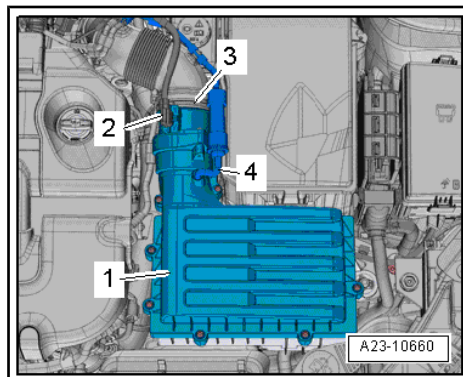
- Unscrew screws -1-, -3-.
- Unlock catch -arrows-, remove cover-2-.



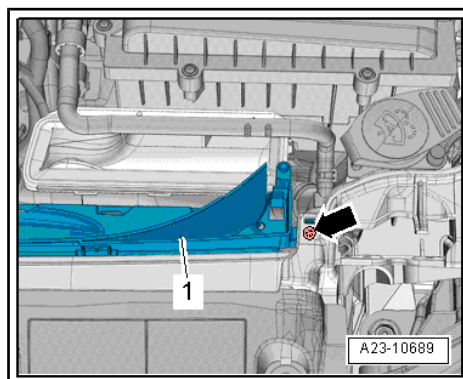
- Expose coolant hose -2-.
- Unlock catches -arrows-, remove top part-1- of air guide.



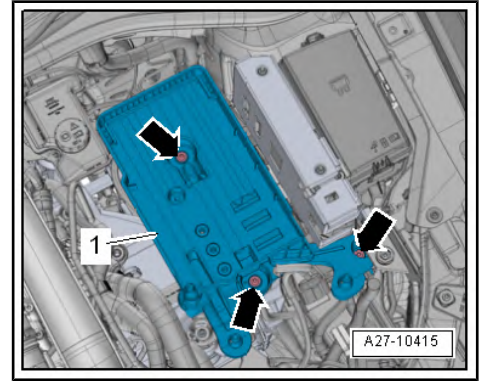
- Disconnect the plug connection -2- at the air mass meter -G70-.
- Disconnect vacuum hose -4-.
- Loosen hose clamp -3-, remove air guide hose.
- Remove radiator air filter housing -1-.



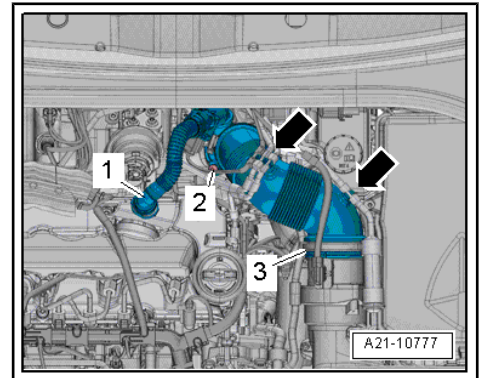
- Release screw left and right -arrow-.
- Unclip and remove bottom part -1- of air guide.



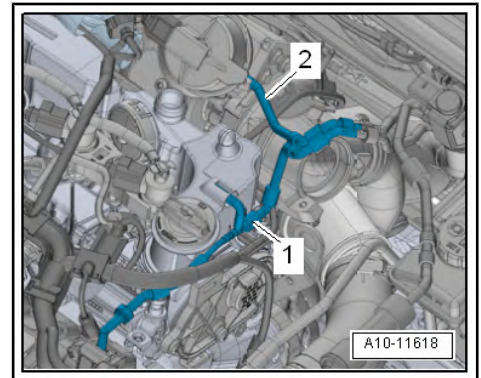
- Remove battery tray -1- ⇒ Electrical System; Rep. gr. 27 .



- Press release buttons on the hose -1- for crankcase ventilation, remove hose from cylinder head cover.
- Disconnect vacuum hoses on the air guide pipe -arrows-.
- Release screw -2-, swivel air guide pipe with inlet connection towards the rear and detach from exhaust gas turbocharger.



- Remove the vacuum hose -2- from the vacuum unit for charge pressure control.
- Disconnect the vacuum hose -1- at the T-piece.



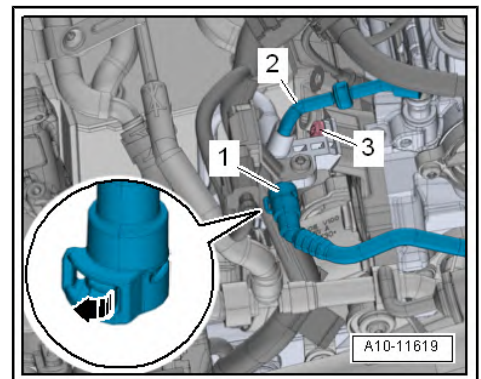
- Unlock catch -arrow-, remove vacuum hose -1-.



Note

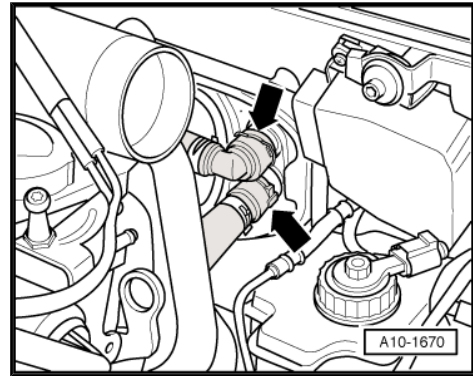
Place a cloth under heating heat exchanger to absorb escaping coolant.

- If installed: Remove heat protection sleeve.

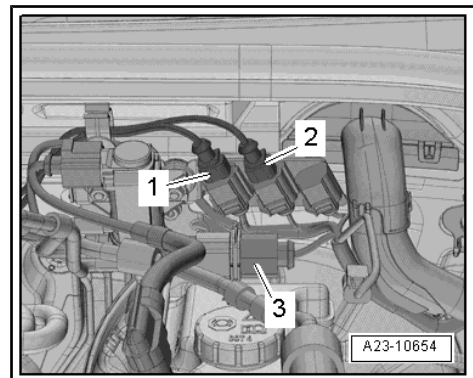




- Raise holding clamps -arrows-, remove coolant hoses from heat exchanger for heating.



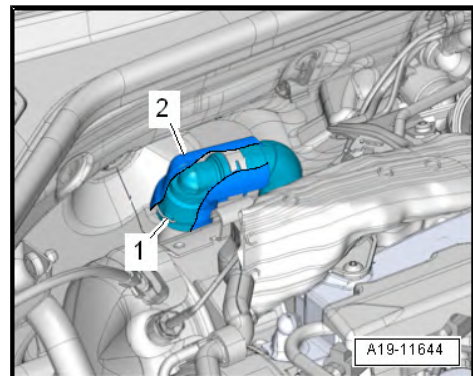
- Expose the following plug connections and electric cables:
 - 1 - for exhaust gas temperature transmitter 4 - G648-
 - 2 - for exhaust gas temperature transmitter 3 - G495-
- Take electrical plug connection-3- for lambda probe - G39- out of the holder, disconnect and expose electric cable.



Vehicles fitted with auxiliary heating

- Remove heat protection sleeve -2-.
- Loosen hose clamp -1-, remove coolant hose.

Continued for all vehicles



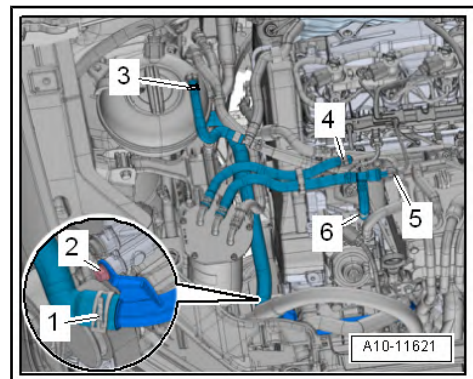
- Disconnect the plug connection -5- at the differential pressure transmitter - G81- .



WARNING

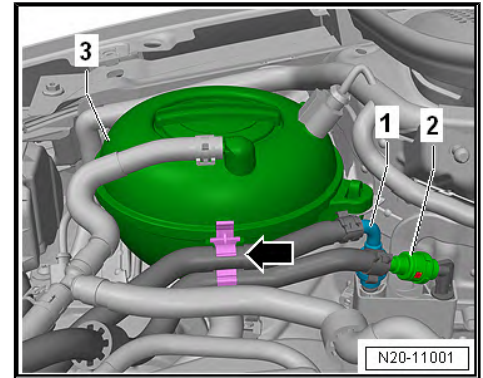
Risk of scalding by very hot fuel.

- ◆ *The temperature of the fuel lines and fuel can be up to 100 °C after switching off the engine in extreme cases. Let the fuel cool down before opening the fuel line connections, as otherwise there is a high risk of scalding.*
- ◆ *Wear protective gloves.*
- ◆ *Wear safety goggles.*



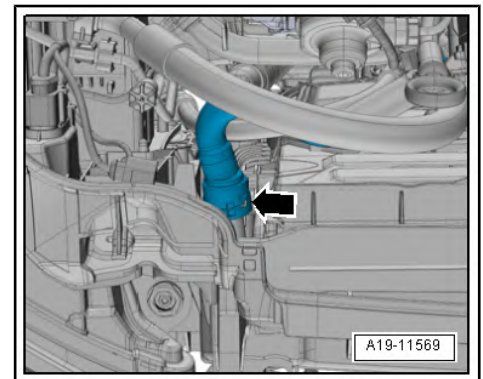
- Loosen hose clamps -4-, -6- remove fuel supply hose and return hose.
- Loosen hose clamps -1-, -3-, remove coolant hoses.
- Release screw -2-.

- Detach fuel return-flow line -2- and catch the fuel which flows out with a cleaning cloth
⇒ [“2.12 Separating push-on couplings”, page 249](#) .



Vehicles with radiator versions 1 and 2

- Raise holding clamp -arrow-, remove coolant hose right above radiator for charge air circuit.



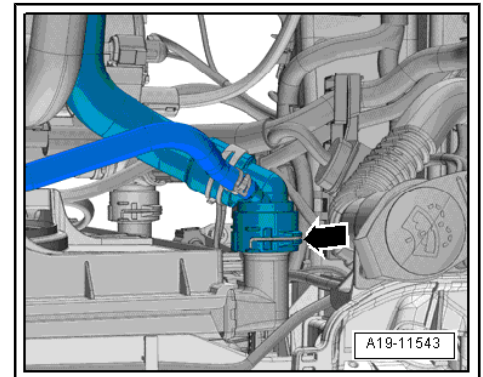
Continued for all vehicles

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

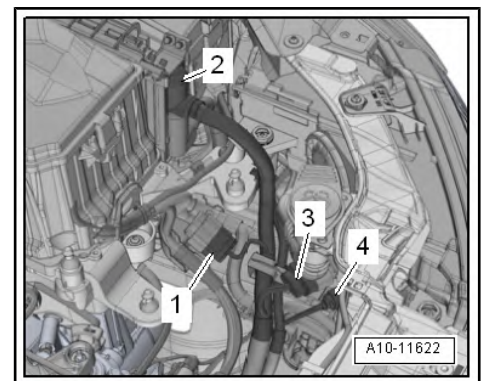


Note

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

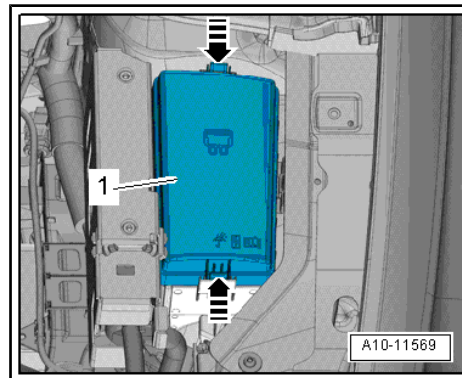


- Remove plug -2- at the engine control unit - J623-
⇒ [“7 Engine control unit”, page 366](#) .
- Take electrical plug connections -1-, -3-, -4- out of the holder and disconnect.
- Expose electric cables.

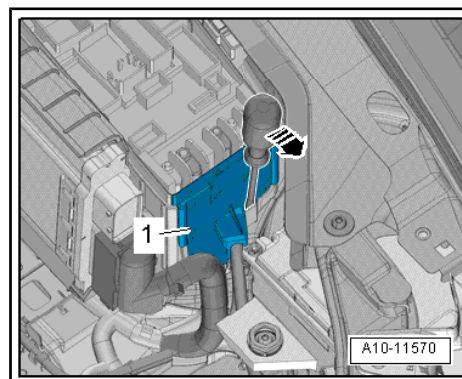




- Unlock catches -arrows-, remove cover-1- for engine compartment E-box.

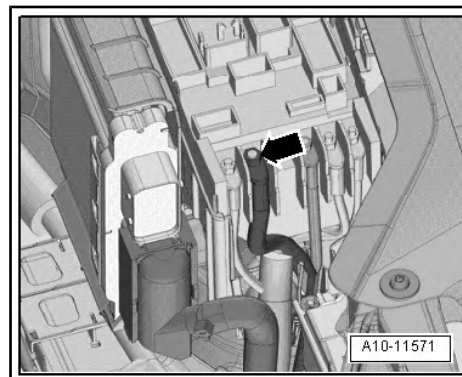


- Unlock catch with a screwdriver -arrow-, pull cover -1- for E-box engine compartment upwards.

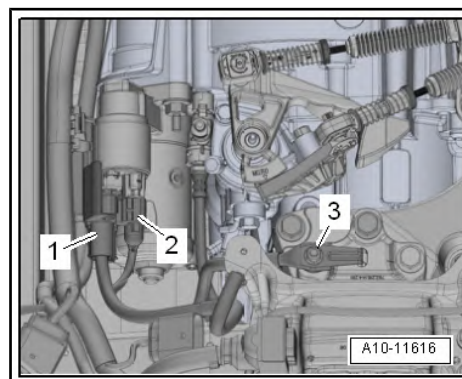


- Unscrew nut -arrow-, remove and expose electric cable.

Vehicles fitted with a manual gearbox



- Separate electrical plug connection -2-.
- Press back B+-pole protection -1- and unscrew B+-cable from the starter magnet switch.
- Release nuts -3-, remove earth cable.



- Disconnect front left electrical plug connections at the gearbox:

- 1 - Gearbox neutral position transmitter - G701-
- 2 - Reversing light switch - F4-

- Remove switching and selector linkage from gearbox, unscrew linkage support and lay aside with the linkages ⇒ Gearbox; Rep. gr. 34 .

Vehicles fitted with manual gearbox 0A4

- Remove clutch transmitter cylinder and lay to the side with connected pipe/hose line ⇒ Gearbox; Rep. gr. 30 .

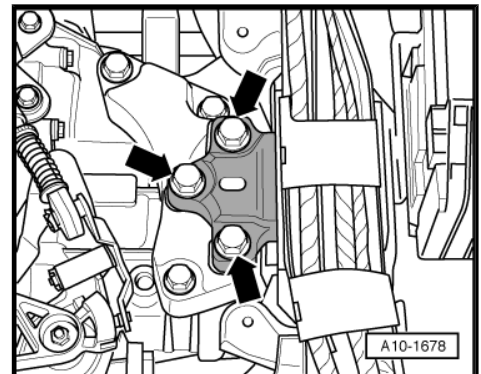
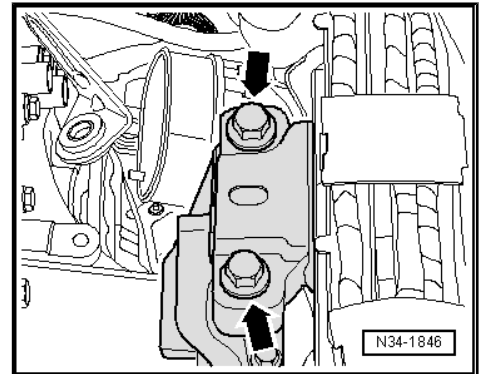
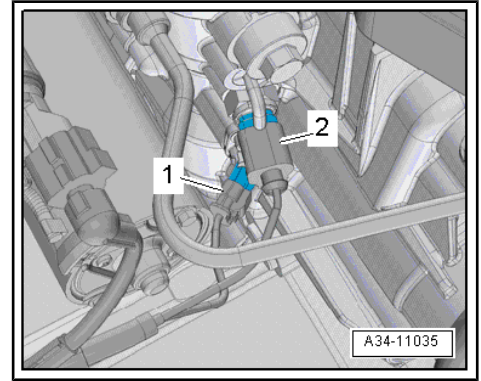
- Screw out screws -arrows- for gearbox mount by approximately 2 turns.

Vehicles fitted with manual gearbox 02Q

- Remove pressure line from breather/slave cylinder ⇒ Gearbox; Rep. gr. 30 .

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

Vehicles with dual clutch gearbox 0CW



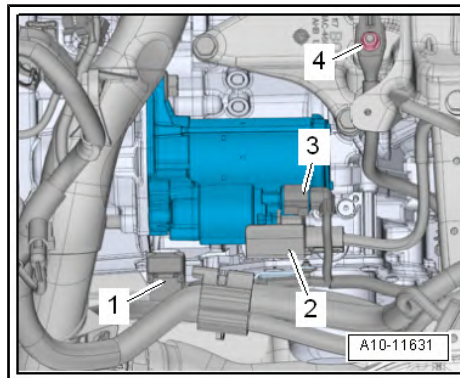


- Separate plug connection -3-.
- Press back B+-pole protection -2- and unscrew B+-cable from the starter magnet switch.
- Release nuts -4-, remove earth cable.

**Caution**

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

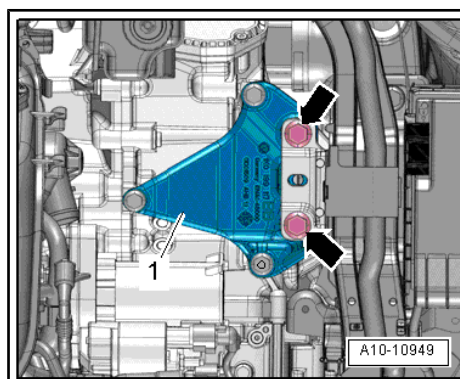
- ◆ ***Do not allow the gearbox plug contacts to come into contact with your hands.***



- To discharge any static electric charge built up on your body, touch the earth with your hand (without gloves).
- Disconnect electric plug connection -1- for dual clutch gearbox mechatronics - J743- , turn the turn lock anticlockwise.
- Remove selector lever linkage from gearbox, unscrew linkage support and strap up with selector lever linkage ⇒ Gearbox; Rep. gr. 34 .
- Screw out screws -arrows- for gearbox mount by approximately 2 turns.

Vehicles with dual clutch gearbox 0D9

- Remove selector lever linkage from gearbox and pull it out of the linkage support ⇒ Gearbox; Rep. gr. 34 .

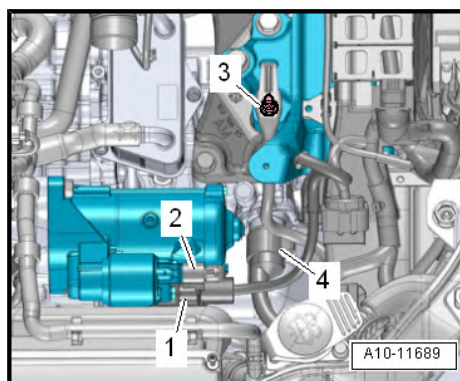


- Separate plug connection -2-.
- Press back B+-pole protection -1- and unscrew B+-cable from the starter magnet switch.
- Unscrew the earth cable on the body.

**Caution**

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

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



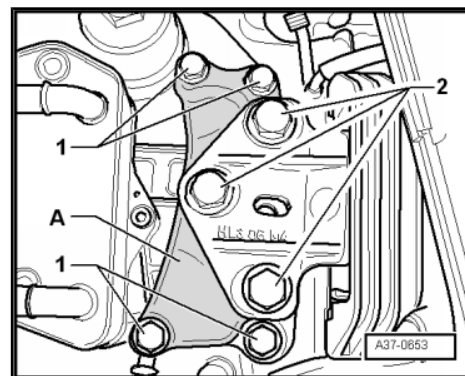
- To discharge any static electric charge built up on your body, touch the earth with your hand (without gloves).
- Disconnect electric plug connection -4- for dual clutch gearbox mechatronics - J743- , turn the turn lock anticlockwise.

Volkswagen Technical Site: <http://vwts.ru> <http://vwts.info>

огромный архив документации по автомобилям Volkswagen, Skoda, Seat, Audi

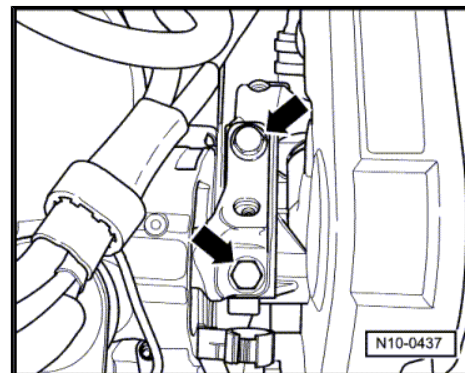
- Screw out gearbox mount screws -2- by approximately 2 turns.

Continued for all vehicles



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

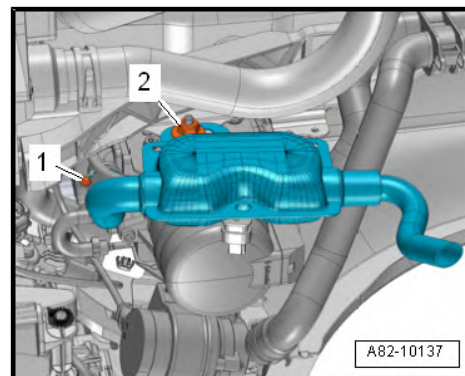
Vehicles fitted with auxiliary heating



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

Continued for all vehicles

- Remove the ribbed V-belt
⇒ ["1.2 Removing and installing poly V-belt", page 38](#) .





- Disconnect electric plug connection -1- on the control valve for the air conditioning system - N280- compressor.



Caution

Risk of damaging AC compressor, refrigerant lines and hoses.

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

- Unscrew screws -arrows-.

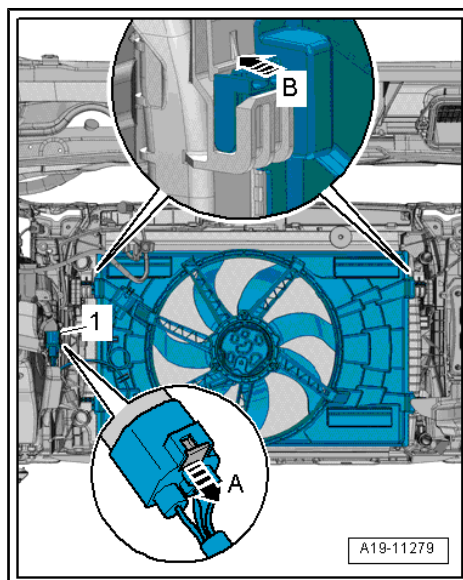
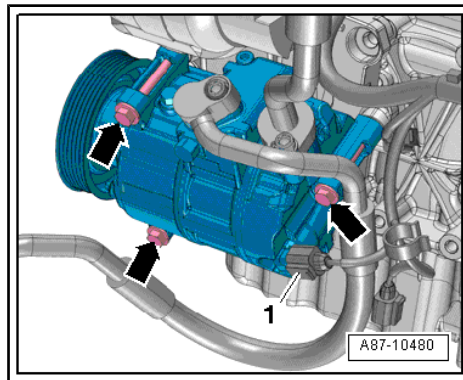


WARNING

Risk of injury through refrigerant.

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

- Remove AC compressor with connected refrigerant hoses from the holder and strap up to the right side.
- Remove plug -1- for radiator fan, for this purpose slide screw clamp backwards arrow -A- and press release button down.
- Press locking lugs for fan shroud left and right simultaneously arrow -B- and remove fan shroud downwards from the radiator.

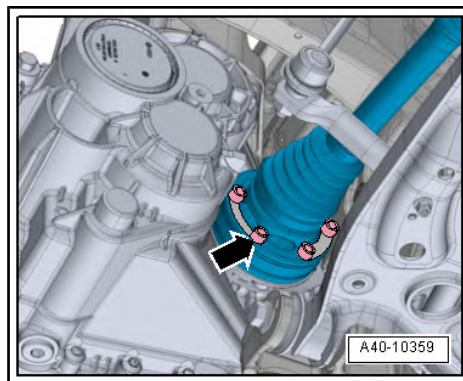


- Unscrew left and right cardan shaft -arrow- from the gearbox ➔ Chassis; Rep. gr. 40 and strap up towards the rear.

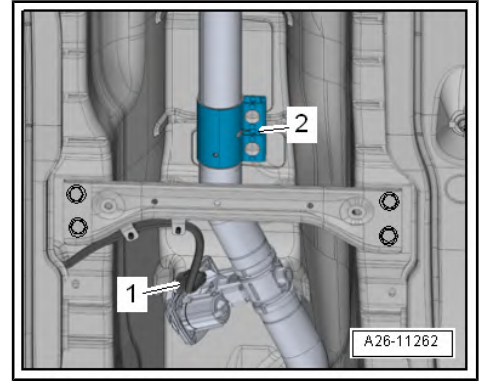


Note

Make sure that the surface protection of the cardan shaft is not damaged.



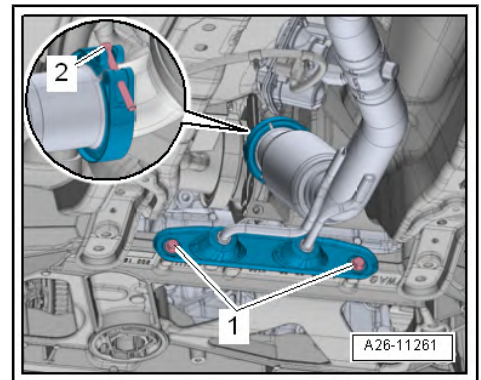
- Disconnect the plug connection -1- at the exhaust flap control unit - J883- .
- Slacken the clamping sleeve -2- and slide it backwards.



- Loosen screw -2- and remove clamping sleeve.
- Remove pre-exhaust pipe.

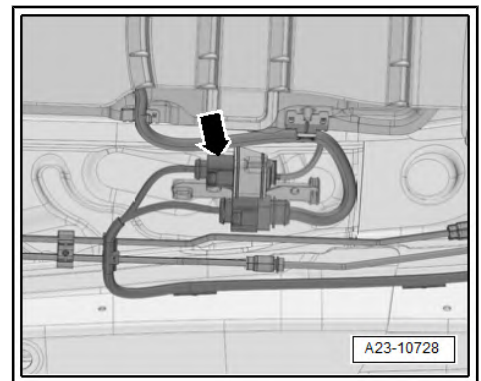
For vehicles with engine identification characters CRKB, CRMB, CUNA

- Undo the left underfloor trim panel in the middle in the direction of the exhaust pipe and press down ⇒ Body Work; Rep. gr. 50 .



- Take the electrical plug connection -arrow- for Lambda probe after catalytic converter - G130- out of its holder and disconnect, expose the electric cable.

Continued for all vehicles

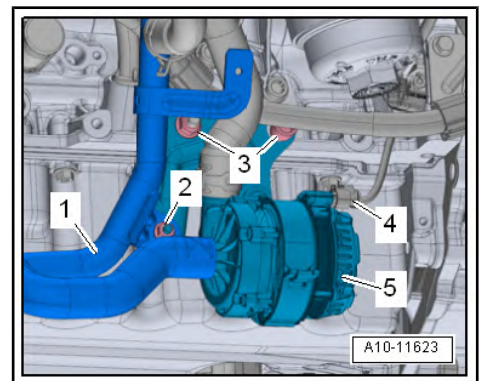


- Separate electrical plug connection -4-.
- Release nut -2- and screws -3-.
- Press coolant pipe -1- and pump for charge air cooler - V188- Pos. -5- to the side.



Note

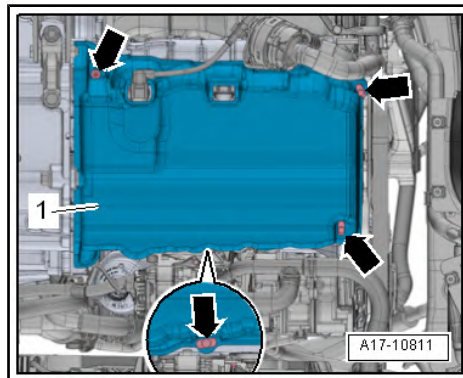
Different designs according to build version.



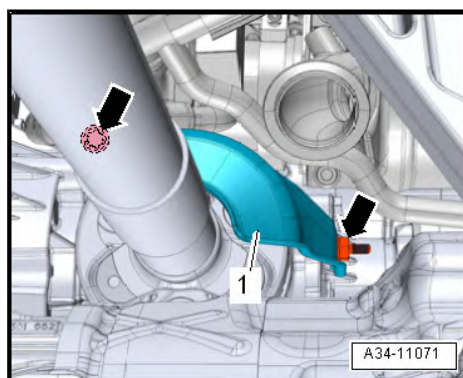


- Loosen clips -arrows-, remove noise insulation -1- for oil sump.

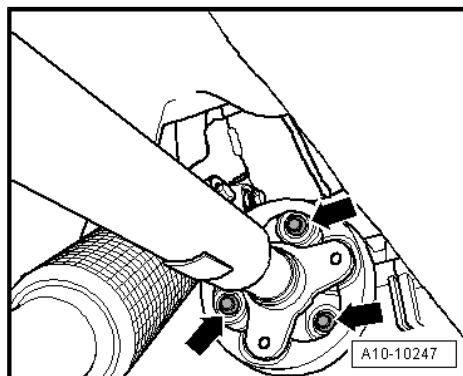
Vehicles with four-wheel drive



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



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



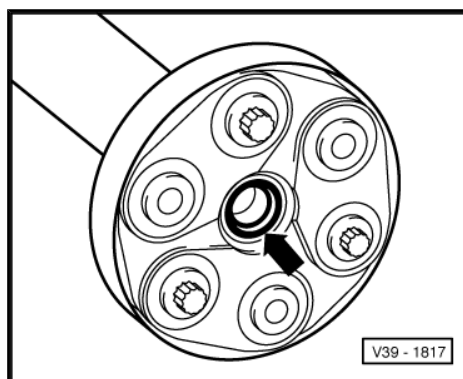
- Push engine/gearbox assembly slightly forward (towards the front of the body) and then pull off the propshaft from the angle gearbox.



Caution

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

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



Note

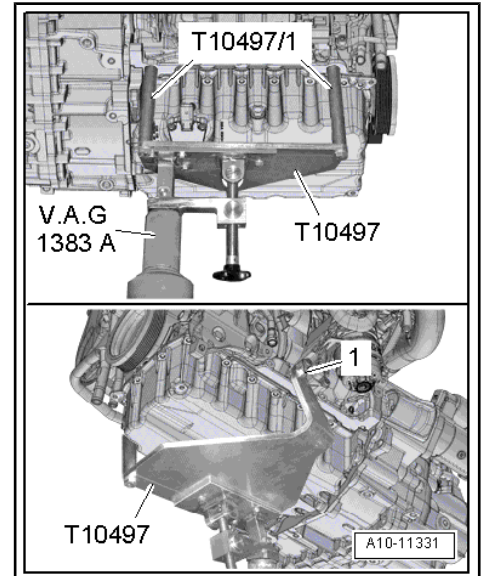
In case of damaged gasket ring the propshaft must be replaced.

Continued for all vehicles

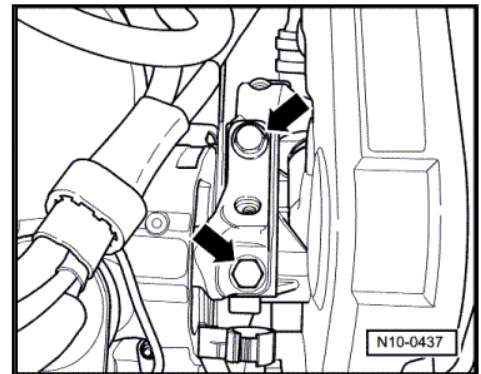
- Tighten engine mount - T10497- with bolt -T10497/1- with screw -1- to around 20 Nm at cylinder block. Use the upper elongated hole "A" to do so.
- Insert engine and gearbox jack - V.A.G 1383 A- at engine mount - T10497- and slightly raise the engine/gearbox unit.

i Note

Use double ladder to release the screws for the assembly bracket.



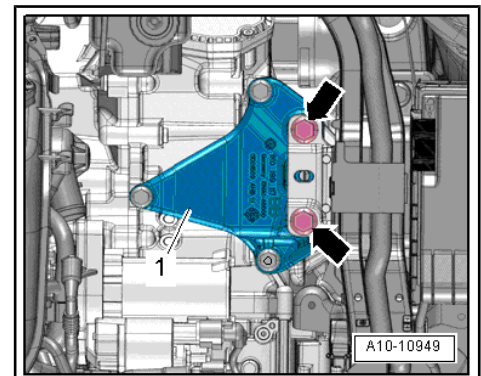
- Screw out engine mount screws -arrows- fully.



- Screw out gearbox mount screws -arrows- fully.

i Note

- ◆ 2 or 3 screws according to gearbox.
- ◆ The gearbox mount for a vehicle with dual clutch gearbox 0CW is shown as an example.



Caution

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

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

- Drain engine/gearbox unit.

1.3 Securing the engine to the assembly stand

Special tools and workshop equipment required

- ◆ Workshop crane , e.g. -VAS 6100-



- ◆ Engine and gearbox support - VAS 6095-
- ◆ Lifting device - MP 9-201 (2024A)-
- ◆ Engine and gearbox support - VW 540-

Precondition

- Separate engine from gearbox.



WARNING

Use securing pins on the hooks and rig pins to prevent release.

- Attach lifting device - MP 9-201 (2024A)- to engine and to workshop crane , e.g. -VAS 6100- .

Belt pulley side

- ◆ 2. Hole of the attachment in Position 1

Flywheel side

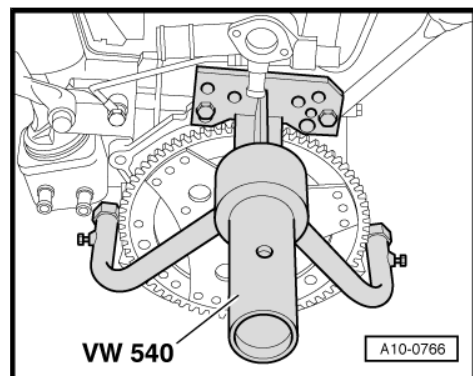
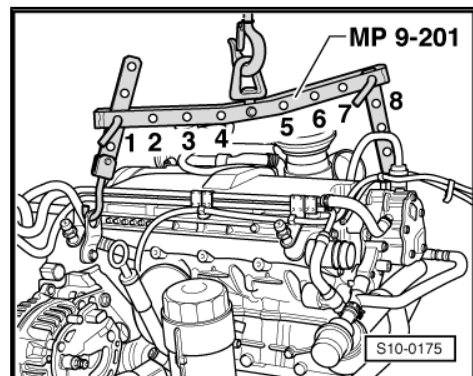
- ◆ 4. Hole of the attachment in Position 8



Note

The illustration shows a pump injector engine. The attachment for the Common Rail engine occurs in the same way.

- Lift engine down from engine mount -T10497- using workshop crane - VAS 6100- .
- Secure engine with the engine and gearbox mount - VW 540- at the engine and gearbox mount - VAS 6095- .



1.4 Installing engine

Work procedure



Note

- ◆ *Observe all safety measures and notes for assembly work on the fuel supply and injection system, at the charge air system and observe as well the rules for cleanliness
⇒ ["3 Repair instructions", page 6](#) .*
- ◆ *Replace screws which have been tightened firmly to a torquing angle.*
- ◆ *Replace self-locking nuts and screws as well as gasket rings, gaskets and O-rings.*
- ◆ *Hose connections and air guide pipes and hoses must be free of oil and grease before being installed.*
- ◆ *Secure all hose connections with spring-type clips that comply with the series design ⇒ ETKA - Electronic Catalogue of Original Parts .*
- ◆ *Fit all cable straps on again in the same place when installing.*



Caution

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

- ◆ *Lay lines of all kinds (for example, for fuel, hydraulic fluid, cooling fluid and refrigerant, brake fluid, vacuum) and electrical lines in such a way that the original line guide is re-established.*
- ◆ *To avoid damage to lines/wiring, ensure sufficient clearance to all moving or hot components.*

- Installing intermediate plate ⇒ [page 66](#) .



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

**Note**

A vehicle with manual gearbox is shown as an example.

Vehicles fitted with a manual gearbox

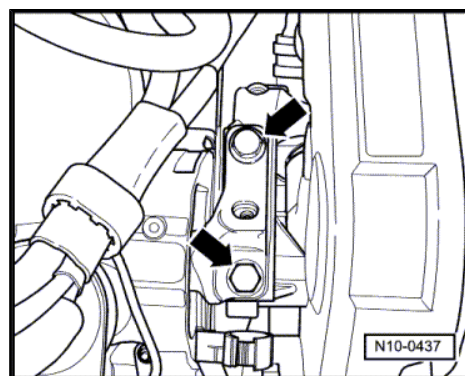
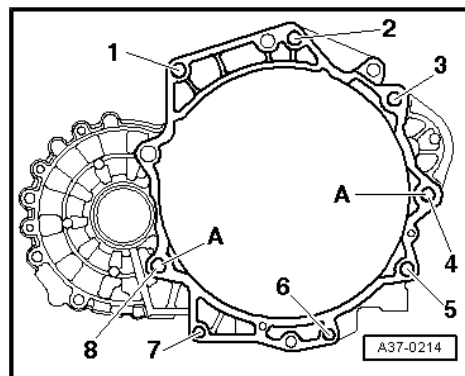
- If a needle bearing is installed in the crankshaft, remove the needle bearing
⇒ ["3.2 Replace the needle bearing in the crankshaft", page 76](#).
- If the clutch release bearing is worn, remove the clutch release bearing ⇒ Gearbox; Rep. gr. 30.
- Lightly grease the gearing of the gearbox drive shaft using lubricating grease for clutch disc spline ⇒ ETKA - Electronic Catalogue of Original Parts.
- Check the centering of the clutch disc.

Vehicles with dual clutch gearbox

- If no needle bearing is installed in the crankshaft, install needle bearing
⇒ ["3.2 Replace the needle bearing in the crankshaft", page 76](#).

Continued for all vehicles

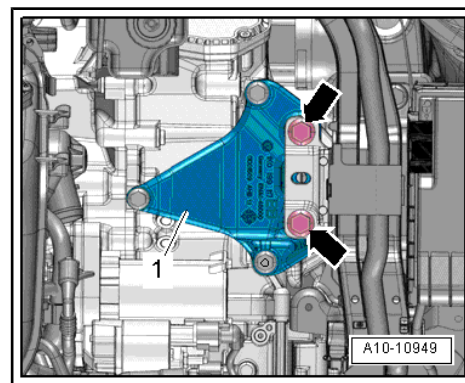
- Secure gearbox to engine.
- Install gearbox support bracket.
- Take up engine/gearbox unit with the engine mount -T10497-.
- Insert engine/gearbox unit into the body.
- Initially insert screws -arrows- for engine mount by hand as far as the stop.



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

i Note

- ◆ *The gearbox mount for a vehicle with dual clutch gearbox 0CW is shown as an example.*
- ◆ *The screws must not be permanently tightened until the assembly bracket is adjusted*
⇒ [“2.6 Checking and adjusting the assembly bracket”, page 34](#) .
- Remove engine mount -T10497- from engine.
- Install the starter motor ⇒ Electrical System; Rep. gr. 27 .
- Install pump for coolant recirculation - V188-
⇒ [“2.9 Removing and installing charge air cooler pump V188”, page 167](#) .
- Install air guide pipe
⇒ [“2.1 Charge air cooling - Summary of components”, page 309](#) .



Vehicles with dual clutch gearbox

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

Continued for all vehicles

- Install inlet connection
⇒ [“1.1 Exhaust gas turbocharger with component parts - Summary of components”, page 290](#) .
- Install front silencer
⇒ [“1.2 Removing and installing exhaust pipe”, page 380](#) .
- Install drive shafts ⇒ Chassis; Rep. gr. 40 .
- Install AC compressor ⇒ Heating, Air Conditioning; Rep. gr. 87 .
- Install the V-ribbed belt
⇒ [“1.2 Removing and installing poly V-belt”, page 38](#) .
- Install engine control unit
⇒ [“7 Engine control unit”, page 366](#) .
- Install differential pressure transmitter - G505-
⇒ [“4.7 Removing and installing differential pressure transmitter G505”, page 348](#) .
- Connect clutch transmitter cylinder ⇒ Gearbox; Rep. gr. 30 .
- Bleed clutch hydraulics ⇒ Gearbox; Rep. gr. 30 .
- Install linkages with linkage support ⇒ Gearbox; Rep. gr. 34 .
- Adjust the assembly bracket
⇒ [“2.6 Checking and adjusting the assembly bracket”, page 34](#) .
- Remove battery tray ⇒ Electrical System; Rep. gr. 27 .
- Electrical connections and proper routing ⇒ Electrical System; Rep. gr. 97 and ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Connect vacuum hoses
⇒ [“1.4 Connection diagram for vacuum hoses”, page 306](#) .



- Install air filter
⇒ [“6.4 Summary of components - air filter”, page 362](#) .
- Checking the oil level ⇒ Maintenance ; Booklet Octavia III .

**Caution**

Risk of damaging control units as a result of overvoltage.

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

- Venting air from the fuel system
⇒ [“1.3 Filling/bleeding the fuel system”, page 321](#) .
- Connect coolant hoses with quick coupling ⇒ [page 186](#) .
- Top up coolant ⇒ [page 153](#) .

**Note**

Do not re-used used coolant.

- Install the assembly carrier ⇒ Chassis; Rep. gr. 40 .
- Install front wheelhouse liners ⇒ Body Work; Rep. gr. 66 .

Tightening torques**Note**

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

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

- ◆ Assembly overview - assembly mountings
⇒ [“2.1 Assembly overview - assembly mountings”, page 29](#)
- ◆ Attachment of engine/gearbox ⇒ Gearbox; Rep. gr. 34 .

2 Assembly bracket

⇒ [“2.1 Assembly overview - assembly mountings”, page 29](#)

⇒ [“2.2 Support the engine in its installed position”, page 31](#)

⇒ [“2.3 Removing and installing engine mount”, page 31](#)

⇒ [“2.4 Removing and installing engine support”, page 32](#)

⇒ [“2.5 Removing and installing pendulum support”, page 33](#)

⇒ [“2.6 Checking and adjusting the assembly bracket”, page 34](#)

2.1 Assembly overview - assembly mountings

1 - Bolt

- ☐ replace after removal
- ☐ order of tightening
⇒ [page 30](#)

2 - Engine support bracket

- ☐ removing and installing
⇒ [“2.4 Removing and installing engine support”, page 32](#)

3 - Engine mounting

- ☐ with supporting arm
- ☐ removing and installing
⇒ [“2.3 Removing and installing engine mount”, page 31](#)

4 - Screw

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

5 - Screw

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

6 - Screw

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

7 - Screw

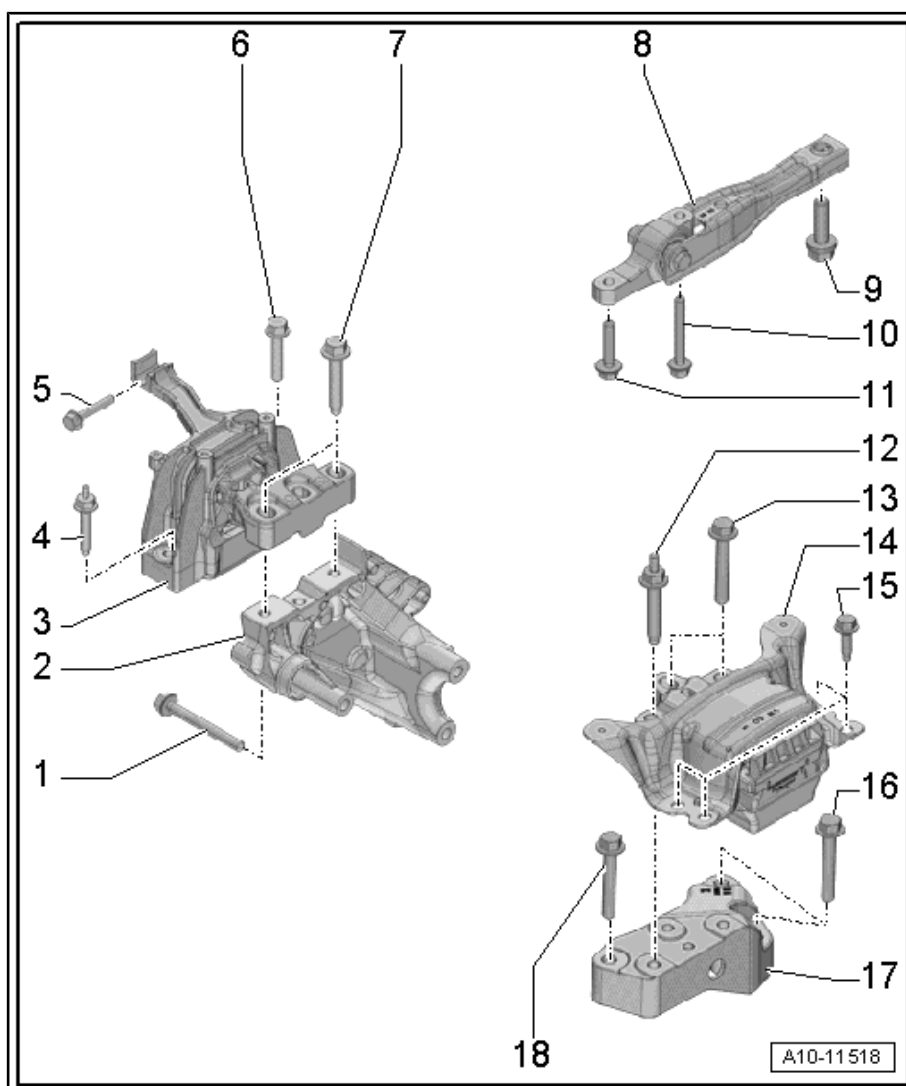
- ☐ replace after removal
- ☐ 60 Nm + torque a further 90° (1/4 turn)

8 - Pendulum support

- ☐ different designs; assignment ⇒ ETKA - Electronic Catalogue of Original Parts
- ☐ removing and installing ⇒ [“2.5 Removing and installing pendulum support”, page 33](#)

9 - Screw

- ☐ replace after removal
- ☐ Tightening torque and tightening order ⇒ [page 31](#)



**10 - Screw**

- ☐ replace after removal
- ☐ Tightening torque and tightening order ⇒ [page 31](#)

11 - Screw

- ☐ replace after removal
- ☐ Tightening torque and tightening order ⇒ [page 31](#)

12 - Screw

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

13 - Screw

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

14 - Gearbox mount

- ☐ with supporting arm

15 - Screw

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

16 - Bolt

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

17 - Gearbox support bracket

- ☐ for vehicles with manual gearbox

18 - Bolt

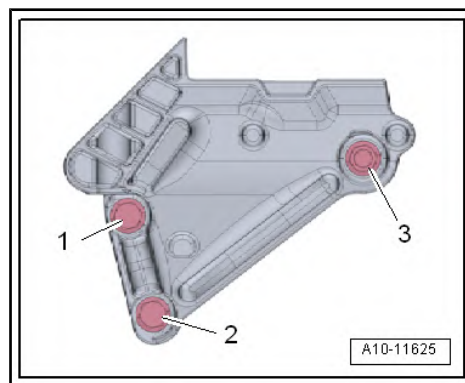
- ☐ Tightening torque ⇒ Gearbox; Rep. gr. 34

Engine support bracket - tightening torque and tightening order**Note**

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

– Tighten screws in steps in the given sequence:

Stage	Screws	Tightening torque/torquing angle
1.	-1 ... 3-	7 Nm
2.	-1 ... 3-	40 Nm
3.	-1 ... 3-	Turn 180° further



Install pendulum support

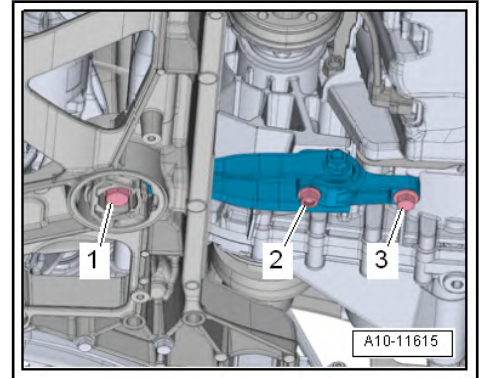


Note

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

- Tighten screws in steps in the given sequence:

Stage	Screws	Tightening torque/torquing angle
1.	-2-, -3-	50 Nm
2.	-1-	130 Nm
3.	-1 ... 3-	Turn 90° further



2.2 Support the engine in its installed position

Special tools and workshop equipment required

- ◆ Supporting device - T30099-
- ◆ Pressure screw - T30119-
- ◆ Supporting device - T40091/1-
- ◆ -T40091/3- from engine support basic set - T40091-
- ◆ Support - 10-222 A/31-
- ◆ Supporting device - MP9-200/10-
- ◆ Adapter - MP9-200/18 (10-222A/18)-

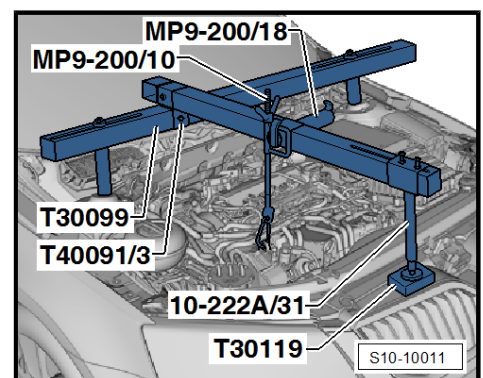
Work procedure

- Remove windscreen wiper arms -arrows- ⇒ Electrical System; Rep. gr. 92 .
- Remove plenum chamber cover -5- Body Work⇒ Body Work; Rep. gr. 50 .
- Remove engine cover
⇒ [“1.1 Removing and installing engine trim panel”, page 10](#) .
- Remove caps of the screw connections of the front suspension strut dome.
- Position the supporting device - T30099- with -T40091/3- with the adapters as shown.
- Support engine on right eye and slightly release load from assembly mounting by turning spindle.

Install

Install in the reverse order of removal. When doing this, note the following:

- Install the plenum chamber cover ⇒ Body Work; Rep. gr. 50 .
- Install windscreen wiper arms ⇒ Electrical System; Rep. gr. 92 .

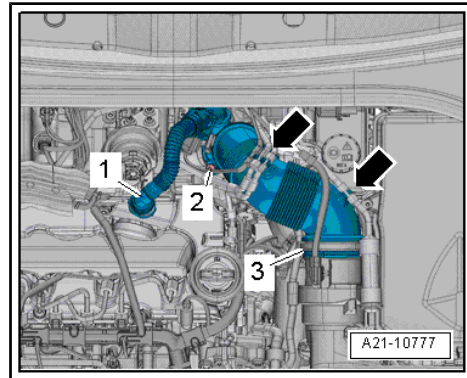


2.3 Removing and installing engine mount

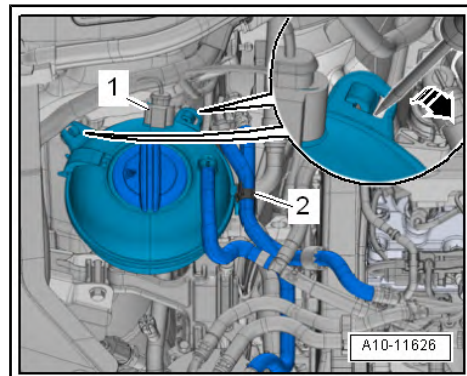
Removing

- Remove engine cover
⇒ [“1.1 Removing and installing engine trim panel”, page 10](#) .

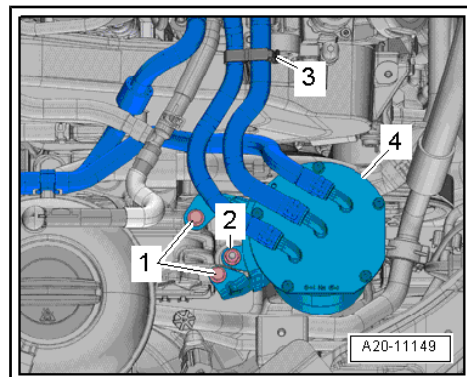
- Press release buttons on the hose -1- for crankcase ventilation, remove hose from cylinder head cover.
- Disconnect vacuum hoses on the air guide pipe -arrows-.
- Slacken hose clamp -3-, remove air guide pipe from air mass meter - G70- .
- Release screw -2-, swivel air guide pipe with inlet connection towards the rear and detach from exhaust gas turbocharger.



- Separate electrical plug connection -1-.
- Remove bracket -2- with fuel hoses.
- Unlock catches using a screwdriver -arrow-, lay coolant expansion tank to the side.



- Expose bracket -3- with fuel hoses.
- Release nut -2- and screws -1-.
- Lay fuel filter -4- to the side.
- Support the engine in its installed position
⇒ [“2.2 Support the engine in its installed position”, page 31](#) .



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

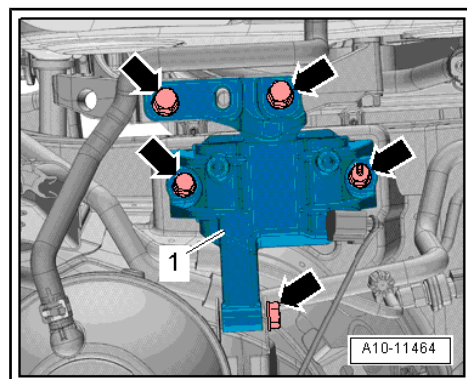
Install

Install in the reverse order of removal. When doing this, note the following:

- Check assembly bracket setting
⇒ [“2.6 Checking and adjusting the assembly bracket”, page 34](#) .

Tightening torques

- ♦ ⇒ [“2.1 Assembly overview - assembly mountings”, page 29](#)
- ♦ ⇒ [“1.1 Exhaust gas turbocharger with component parts - Summary of components”, page 290](#)
- ♦ ⇒ [“2.3 Fuel filter - Summary of components”, page 217](#)



2.4 Removing and installing engine support

Removing

- Remove engine mounts
⇒ [“2.3 Removing and installing engine mount”, page 31](#) .

- Remove top toothed belt guard
⇒ [“1.8 Removing and installing top toothed belt guard”, page 45](#).
- Use the spindle - MP9-200/10- for raising and lowering until all screws are accessible.

i Note

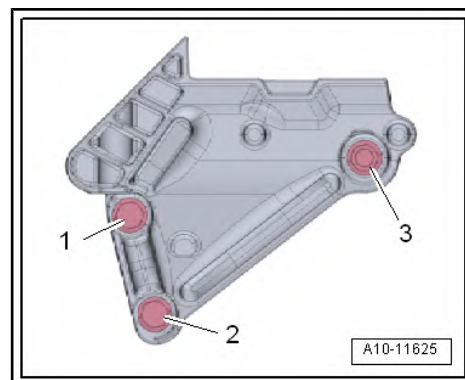
Remove the screw -2- together with the engine support.

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

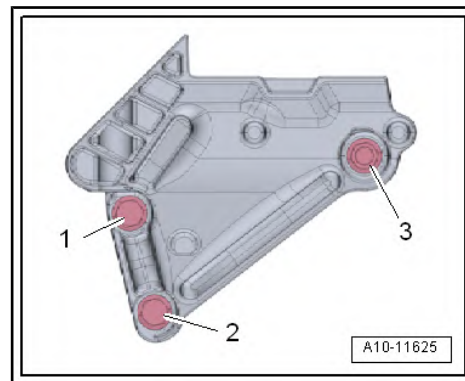
Install

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

- Install the fixing screw -2- together with the engine support.



- Tighten the fixing screws in the sequence -1-, -2-, -3- by hand initially.
- Tighten all bolts fully in the specified sequence
⇒ [Fig. ““Engine support bracket - tightening torque and tightening order””, page 30](#).
- Install top toothed belt guard
⇒ [“1.8 Removing and installing top toothed belt guard”, page 45](#).
- Install engine mount
⇒ [“2.3 Removing and installing engine mount”, page 31](#).



2.5 Removing and installing pendulum support

Removing

- Remove the sound dampening system ⇒ Body Work; Rep. gr. 50.
- Undo screws -1-, -2-, -3- and remove the pendulum support.

i Note

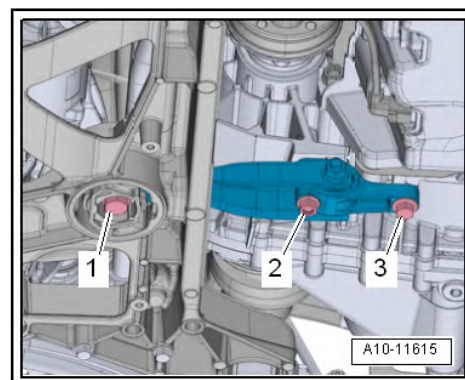
A vehicle with manual gearbox 02Q is shown as an example.

Install

Installation is carried out in the reverse order.

Tightening torques

- ◆ ⇒ [Fig. ““Install pendulum support””, page 31](#).
- ◆ Summary of components - sound dampening system ⇒ Body Work; Rep. gr. 50



2.6 Checking and adjusting the assembly bracket

Checking the assembly bracket

Work procedure

The following dimensions must be reached:

- A distance of -a- = 10 mm must be present between engine support -2- and engine mount -1-.
- The cast edge on the engine support must be parallel with the engine mount supporting arm.
- Dimension -b- = dimension -b-.



Note

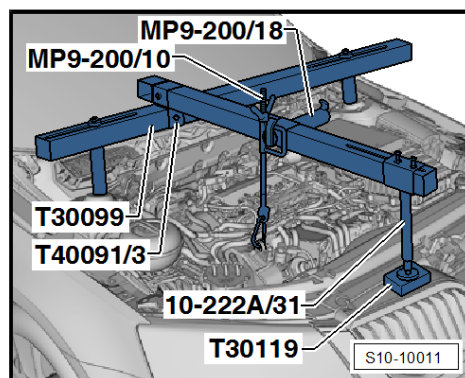
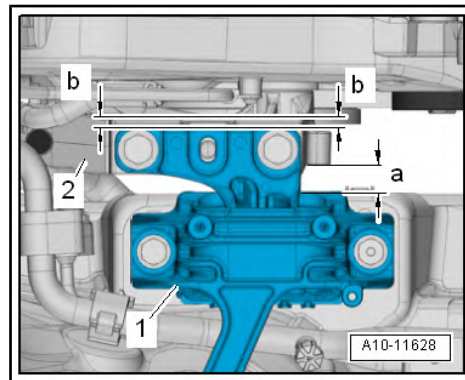
The distance -a- = 10 mm can be checked, for example with suitable round bars.

- If the measured distance is too great or too small, adjust the assembly bracket ⇒ [page 34](#) .

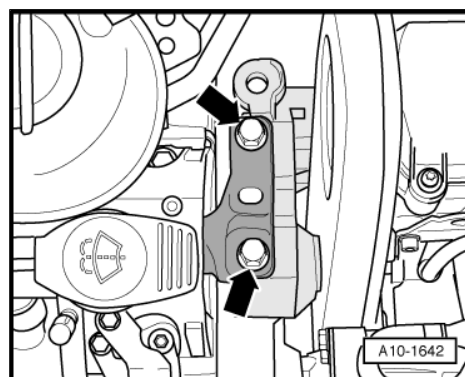
Adjusting the assembly bracket

Work procedure

- Support the engine in its installed position
⇒ [“2.2 Support the engine in its installed position”, page 31](#) .
- Slightly pre-tension engine/gearbox unit with the spindle - MP9-200/10- , do not raise.



- Unscrew screws -arrows- for engine mount one after another and replace (if not already done during engine installation).
- Initially, loosely insert the screws.
- Move engine/gearbox unit with an assembly lever until the following dimensions are set:



- A distance of -a- = 10 mm must be present between engine support -2- and engine mount -1-.
- The cast edge on the engine support must be parallel with the engine mount supporting arm.
- Dimension -b- = dimension -b-.



Note

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

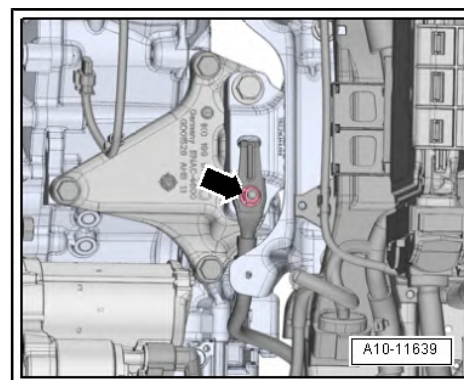
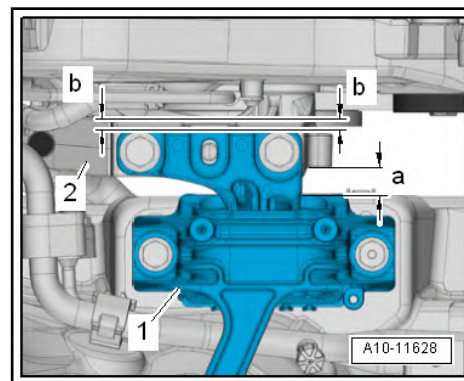
- Tighten engine mount screws.



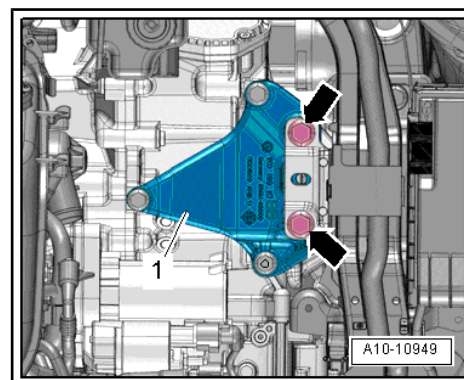
Note

A gearbox mount with 2 screwed connections is shown as an example.

- Unscrew nut -arrow-, expose earth cable.



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

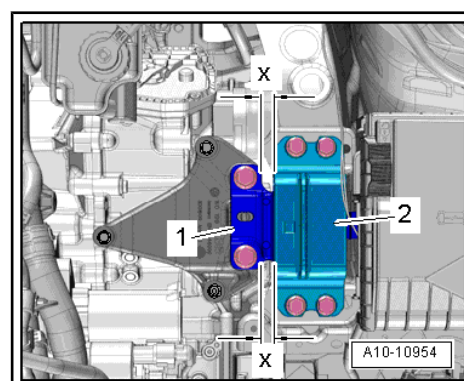


- Make sure that on the gearbox side the edges of the supporting arm -1- and gearbox mount -2- are parallel.
- Dimension -x- = dimension -x-.

Installation is carried out in the reverse order.

Tightening torques

- ◆ ⇒ [“2.1 Assembly overview - assembly mountings”, page 29](#)





13 – Crankshaft group

1 Removing and installing a V-ribbed belt and a toothed belt

⇒ [“1.1 V-ribbed belt - Summary of components”, page 36](#)

⇒ [“1.2 Removing and installing poly V-belt”, page 38](#)

⇒ [“1.3 Removing and installing crankshaft-belt pulley”, page 40](#)

⇒ [“1.4 Removing and installing tensioning device for V-ribbed belt”, page 40](#)

⇒ [“1.5 Removing and installing bracket for auxiliary units”, page 41](#)

⇒ [“1.6 Summary of components - toothed belt guard”, page 42](#)

⇒ [“1.7 Assembly overview - toothed belt drive”, page 44](#)

⇒ [“1.8 Removing and installing top toothed belt guard”, page 45](#)

⇒ [“1.9 Removing and installing bottom toothed belt guard”, page 48](#)

⇒ [“1.10 Remove the toothed belt from the camshaft”, page 49](#)

⇒ [“1.11 Removing and installing toothed belt”, page 52](#)

1.1 V-ribbed belt - Summary of components

1 - Poly V-belt

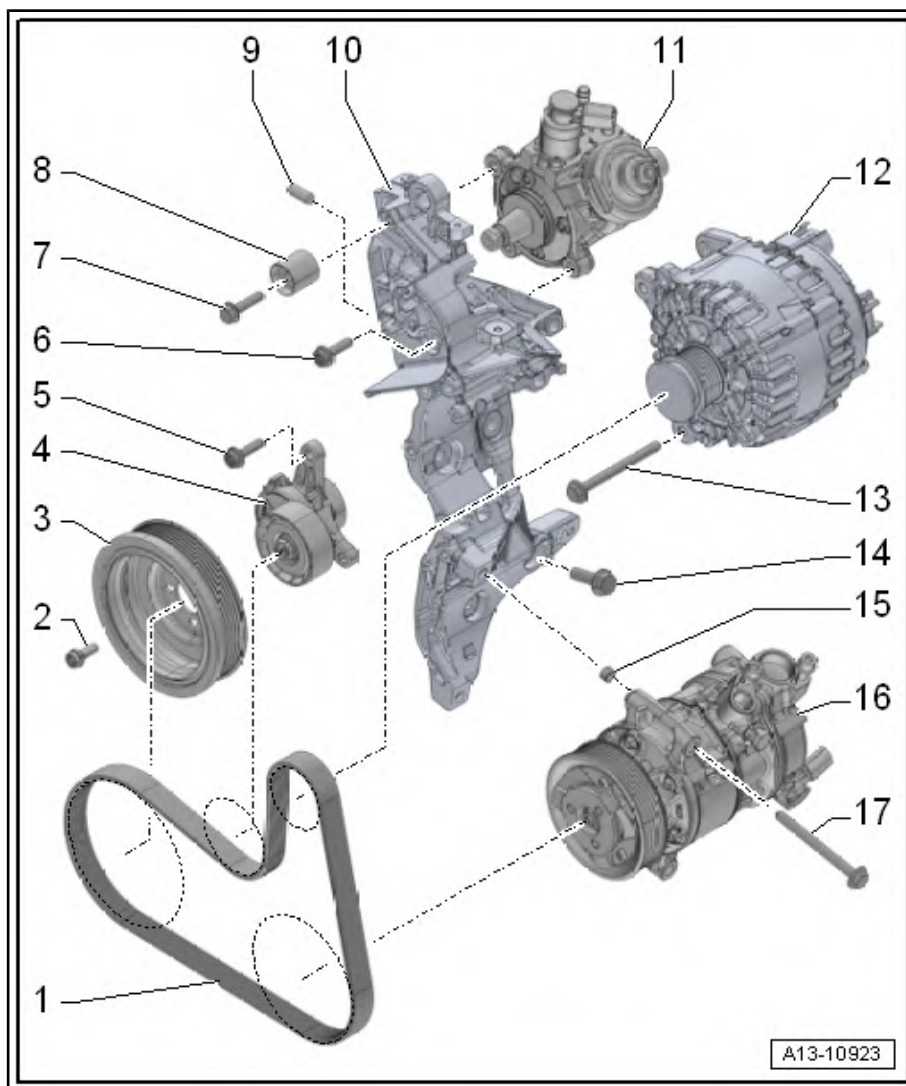
- ☐ check for wear
- ☐ mark the direction of rotation with chalk or a felt-tip pen before removing
- ☐ do not kink
- ☐ Routing of the ribbed V-belt ⇒ [page 39](#)
- ☐ removing and installing ⇒ ["1.2 Removing and installing poly V-belt", page 38](#)
- ☐ pay attention to the correct position on the belt pulley when installing it.

2 - Screw

- ☐ replace after removal
- ☐ Use only original screws ⇒ ETKA - Electronic Catalogue of Original Parts
- ☐ 10 Nm + torque a further 90° (1/4 turn)

3 - Crankshaft-belt pulley

- ☐ with vibration damper
- ☐ Fitting position: Bore in the vibration damper must be positioned above the elevation on the crankshaft toothed belt pulley
- ☐ removing and installing ⇒ ["1.3 Removing and installing crankshaft-belt pulley", page 40](#)



4 - Tensioning device for V-ribbed belt

- ☐ removing and installing ⇒ ["1.4 Removing and installing tensioning device for V-ribbed belt", page 40](#)

5 - Screw

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

6 - Screw

- ☐ Tightening torque Pos. -2- ⇒ ["3.1 Summary of components - high pressure pump", page 338](#)

7 - Screw

- ☐ Tightening torque Pos. -12- ⇒ [Item 12 \(page 44\)](#)

8 - Guide pulley

9 - Fitting sleeve

- ☐ pay attention to correct fit in the bracket for auxiliary units

10 - Bracket for auxiliary units

- ☐ removing and installing ⇒ ["1.5 Removing and installing bracket for auxiliary units", page 41](#)

11 - High pressure pump

- ☐ Summary of components ⇒ ["3.1 Summary of components - high pressure pump", page 338](#)

12 - Generator

- ☐ Summary of components ⇒ Electrical system; Rep. gr. 27

13 - Screw

- ❑ Tightening torque ⇒ Electrical system; Rep. gr. 27

14 - Screw

- ❑ different lengths ⇒ [page 38](#)
- ❑ Tightening torque and tightening order ⇒ [page 38](#)

15 - Fitting sleeve

- ❑ pay attention to correct fit in the AC compressor

16 - Air conditioner compressor

- ❑ Summary of components ⇒ Heating, Air Conditioning; Rep. gr. 87

17 - Screw

- ❑ Tightening torques ⇒ Heating, Air Conditioning; Rep. gr. 87

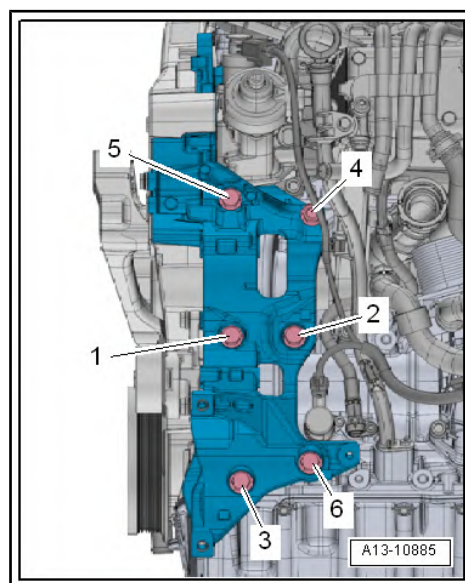
Bracket for auxiliary units - tightening torques and tightening order

Note

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

- Set screws as follows:
 - ◆ Screws -1-, -2-, -3-, -6- M10 x 35.
 - ◆ Screw -4- M10 x 115.
 - ◆ Screw -5- M10 x 175.
- Tighten screws in steps in the given sequence:

Stage	Screws	Tightening torque/torqueing angle
1.	-1 ... 6-	by hand as far as the stop
2.	-1 ... 6-	40 Nm
3.	-4- and -5-	Turn 180° further
4.	-1-, -2-, -3-, -6-	Turn 45° further



1.2 Removing and installing poly V-belt

Special tools and workshop equipment required

- ◆ Locking pin - T10060 A-

Removing

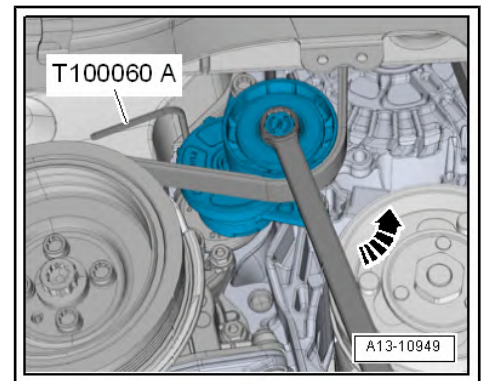
- Remove the sound dampening system ⇒ Body Work; Rep. gr. 50 .



Caution

When installing, risk of damage through reversing the rotation direction of an already used V-ribbed belt.

- ◆ *If the V-ribbed belt is re-installed, mark the direction of rotation with chalk or a felt-tip pen before removing it.*



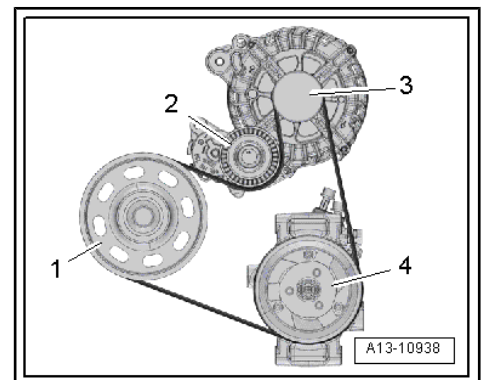
- To release the tension of the V-ribbed belt, use the ring spanner to swivel the tensioning device anticlockwise -arrow-.
- Lock tensioning device with locking pin - T10060 A- .
- Remove poly V-belt.

Install

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

- Lay the V-ribbed belt onto the V-ribbed belt pulleys:

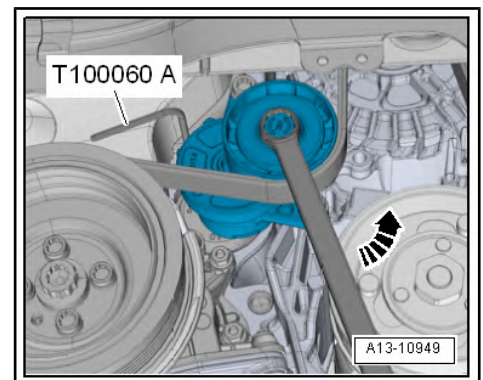
- 1 - Crankshaft-belt pulley
- 2 - Tensioning roller
- 3 - Generator
- 4 - Air conditioner compressor



- Hold the tensioning element with the ring spanner and pull out the locking pin - T10060 A- .
- Release pressure on tensioning device.
- Check correct positioning of the V-ribbed belt.
- Start engine and check ribbed V-belt run.

Tightening torques

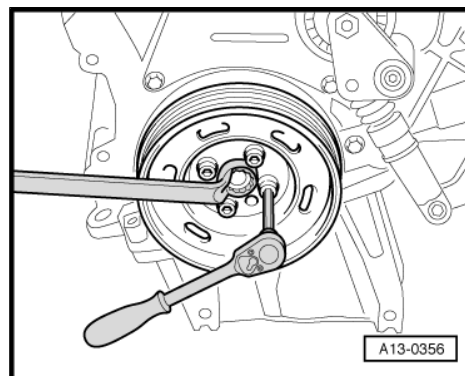
- ◆ Sound dampening system - Summary of components ⇒ Body Work; Rep. gr. 50 .



1.3 Removing and installing crankshaft-belt pulley

Removing

- Remove V-ribbed belt
⇒ [“1.2 Removing and installing poly V-belt”, page 38](#) .
- Loosen screws of the crankshaft-belt pulley. To do so, press on the crankshaft-belt pulley screw with the ring spanner.
- Release screws and remove crankshaft-belt pulley.



Install

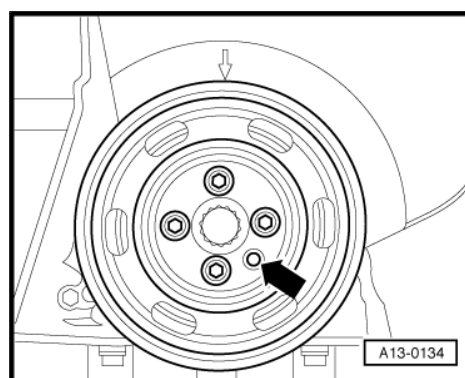
Installation is performed in the reverse order, pay attention to the following points:



Note

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

- Fitting position: The hole -arrow- in the crankshaft belt pulley must be positioned above the elevation on the crankshaft timing belt sprocket.
- Install the V-ribbed belt
⇒ [“1.2 Removing and installing poly V-belt”, page 38](#) .



Tightening torques

- ♦ ⇒ [“1.1 V-ribbed belt - Summary of components”, page 36](#)

1.4 Removing and installing tensioning device for V-ribbed belt

Removing

- Remove V-ribbed belt
⇒ [“1.2 Removing and installing poly V-belt”, page 38](#) .
- Release screws -arrows- and remove tensioning device for V-ribbed belt.

Install

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



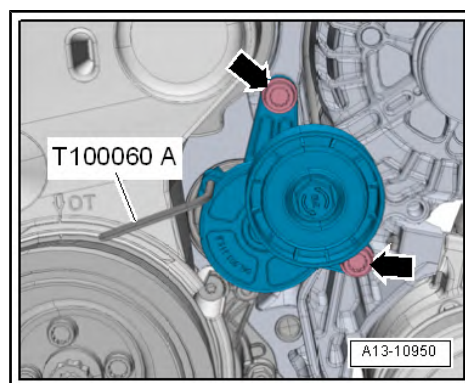
Note

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

- Install the V-ribbed belt
⇒ [“1.2 Removing and installing poly V-belt”, page 38](#) .

Tightening torques

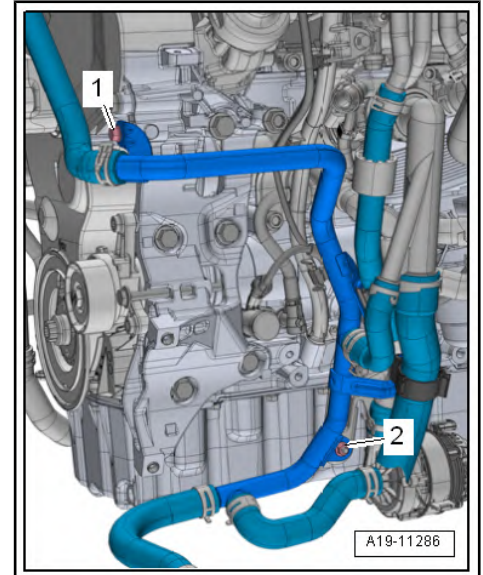
- ♦ ⇒ [“1.1 V-ribbed belt - Summary of components”, page 36](#)



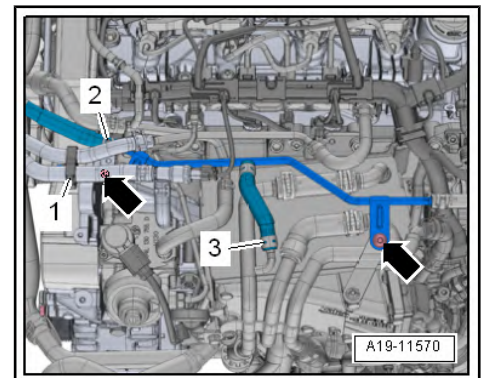
1.5 Removing and installing bracket for auxiliary units

Removing

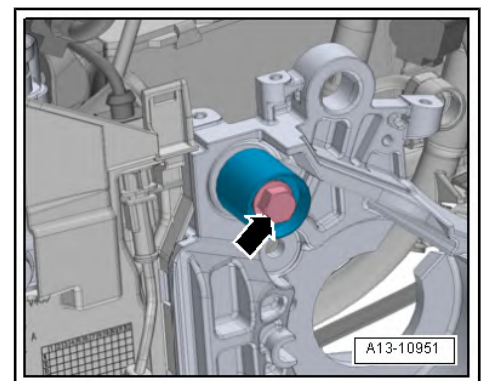
- Remove the generator ⇒ Electrical System; Rep. gr. 27 .
- Wymontować pompę wysokociśnieniową
⇒ [“3.2 Removing and installing the high pressure pump”, page 339](#) .
- Release nut -2- and screw -1-, push front right coolant pipe forwards slightly.



- Unclip bracket -1- with fuel hoses.
- Unscrew screws -arrows-.



- Release screw -arrow-, remove guide pulley.





- Release the screws in the order -6...1-.
- Unscrew screws, remove bracket for auxiliary units.

Install

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



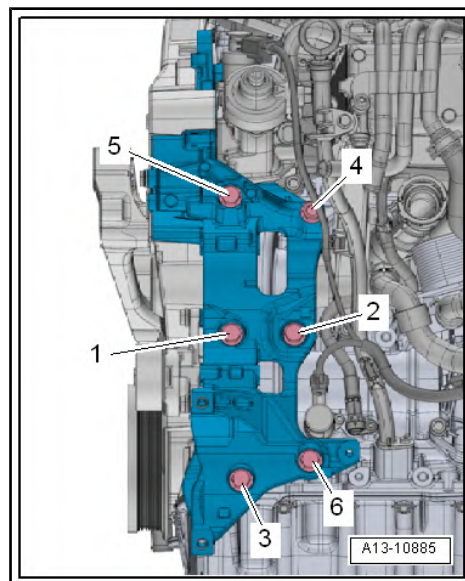
Note

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

- Check that a dowel sleeve is inserted between the bracket for the auxiliary units and the cylinder block.

Tightening torques

- ♦ ⇒ [Fig. “Bracket for auxiliary units - tightening torques and tightening order”](#), page 38
- ♦ ⇒ [“1.7 Assembly overview - toothed belt drive”](#), page 44
- ♦ ⇒ [“3.1 Summary of components - coolant pipe”](#), page 170
- ♦ ⇒ [“3.1 Summary of components - high pressure pump”](#), page 338
- ♦ Summary of components - generator ⇒ Electrical System; Rep. gr. 27



1.6 Summary of components - toothed belt guard

1 - Bottom toothed belt guard

- ☐ removing and installing
⇒ ["1.9 Removing and installing bottom toothed belt guard", page 48](#)

2 - Screw

- ☐ with collar
- ☐ inserted in the bottom toothed belt guard such that it cannot be lost
- ☐ 12 Nm

3 - Support

- ☐ for coolant lines

4 - Screw

- ☐ 5 Nm

5 - Pipeline

- ☐ to differential pressure transmitter - G505-

6 - Clip

7 - Screw

- ☐ 5 Nm

8 - Support

- ☐ for coolant lines

9 - Heat shield

10 - Screw

- ☐ 5 Nm

11 - Bracket

12 - Top toothed belt guard

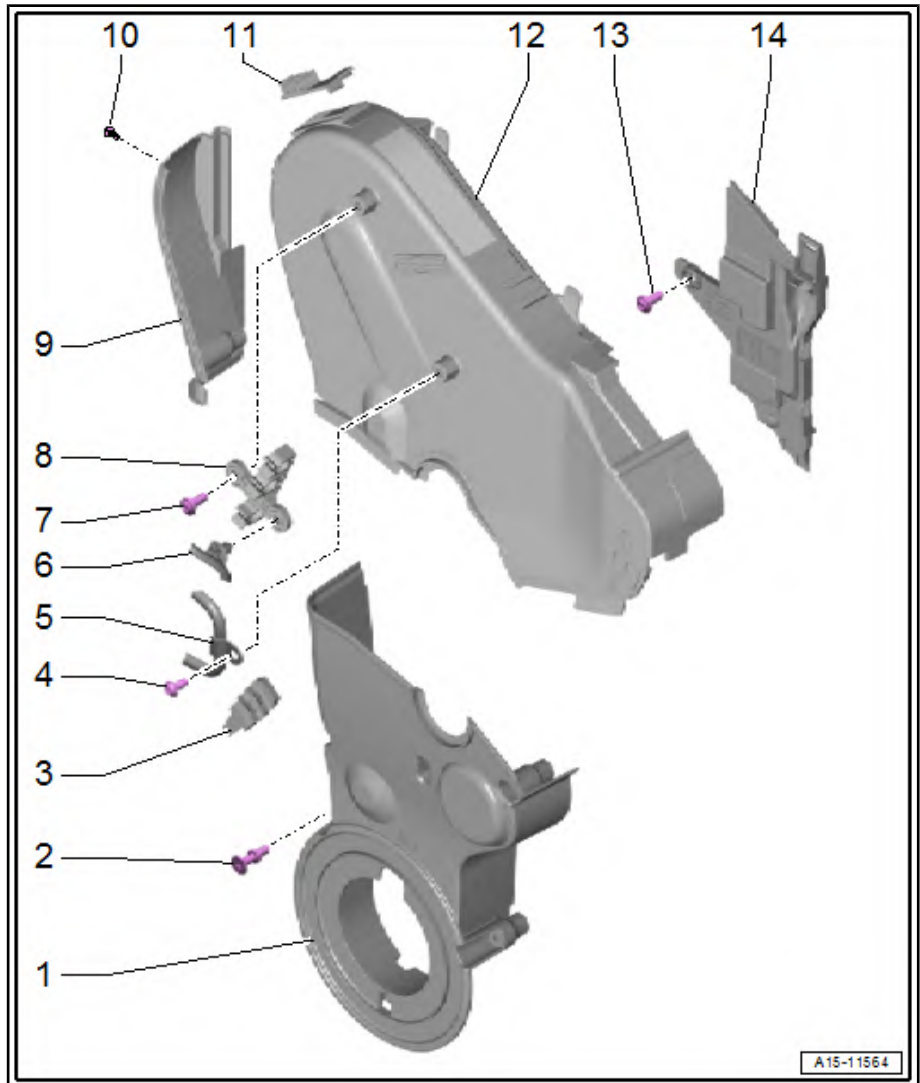
- ☐ removing and installing
⇒ ["1.8 Removing and installing top toothed belt guard", page 45](#)

13 - Screw

- ☐ Insert with safety agent ⇒ ETKA - Electronic Catalogue of Original Parts
- ☐ 12 Nm

14 - Rear toothed belt guard

- ☐ to remove, remove coolant pump ⇒ ["2.4 Removing and installing coolant pump", page 163](#)





1.7 Assembly overview - toothed belt drive

1 - Screw

- ☐ replace after removal
- ☐ Release and tighten using counterholder - T30004 (3415)-
- ☐ Do not additionally oil threads and collar
- ☐ Further rotation can be done across several stages, e.g. 90° + 45°
- ☐ 180 Nm + 135° further

2 - Crankshaft - toothed belt sprocket

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

3 - Nuts

- ☐ 20 Nm

4 - Guide pulley

5 - Nuts

- ☐ replace after removal
- ☐ 20 Nm + torque a further 45° (1/8 turn)

6 - Tensioning roller

7 - Toothed belt

- ☐ mark the direction of rotation with chalk or a felt-tip pen before removing
- ☐ check for wear
- ☐ removing ⇒ ["1.11 Removing and installing toothed belt", page 52](#)
- ☐ install (set the timing) ⇒ [page 54](#)

8 - Screw

- ☐ to release and tighten use counterholder - T10172- with adapters -T10172/11-
- ☐ Do not additionally oil threads and collar
- ☐ 100 Nm

9 - Fixing screw

- ☐ 9 Nm

10 - Camshaft toothed belt pulley

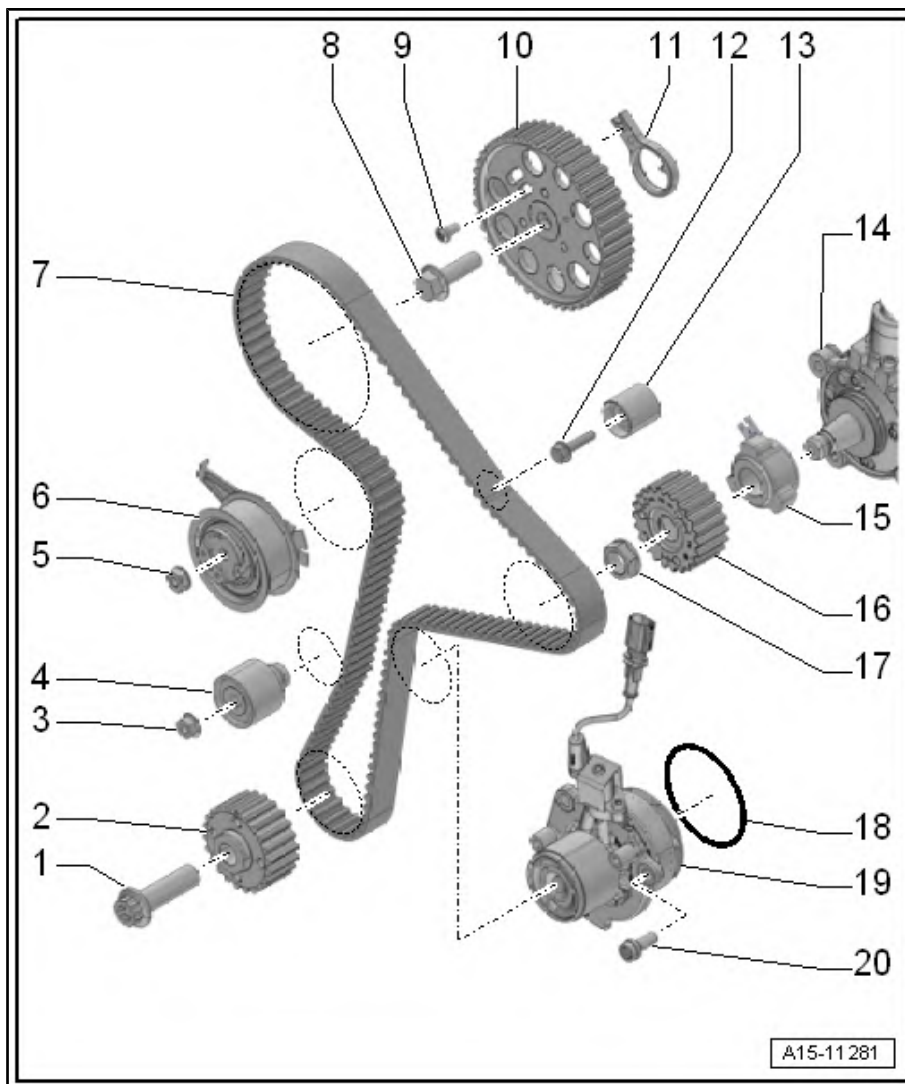
- ☐ There must not be any oil present on the contact surface between the toothed belt pulley and the camshaft

11 - Camshaft driver

- ☐ removing and installing ⇒ ["2.6 Removing and installing camshaft housing", page 114](#)

12 - Screw

- ☐ 20 Nm



Volkswagen Technical Site: <http://vwts.ru> <http://vwts.info>

огромный архив документации по автомобилям Volkswagen, Skoda, Seat, Audi

13 - Guide pulley

14 - High pressure pump

- ☐ Summary of components ⇒ [“3.1 Summary of components - high pressure pump”, page 338](#)

15 - Hub

- ☐ for high pressure pump
- ☐ Summary of components ⇒ [“3.1 Summary of components - high pressure pump”, page 338](#)
- ☐ There must not be any oil present between the lock hub and the toothed belt pulley

16 - Toothed belt pulley high pressure pump

- ☐ Summary of components ⇒ [“3.1 Summary of components - high pressure pump”, page 338](#)
- ☐ There must not be any oil present between the lock hub and the toothed belt pulley

17 - Nut

- ☐ Do not additionally oil threads and collar
- ☐ Tightening torque Pos. -4- ⇒ [“3.1 Summary of components - high pressure pump”, page 338](#)

18 - O-ring

- ☐ replace after removal
- ☐ Moisten with coolant

19 - Coolant pump

- ☐ removing and installing ⇒ [“2.4 Removing and installing coolant pump”, page 163](#)

20 - Screw

- ☐ Tightening torque Pos. -11-
⇒ [“2.1 Summary of components - coolant pump and coolant thermostat”, page 159](#)

1.8 Removing and installing top toothed belt guard

Special tools and workshop equipment required

- ◆ Extension SW 17 from the set of tools - T10395-

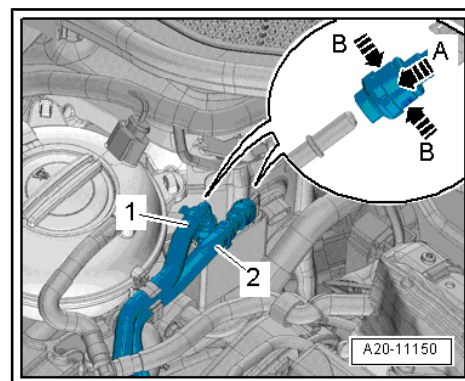


Note

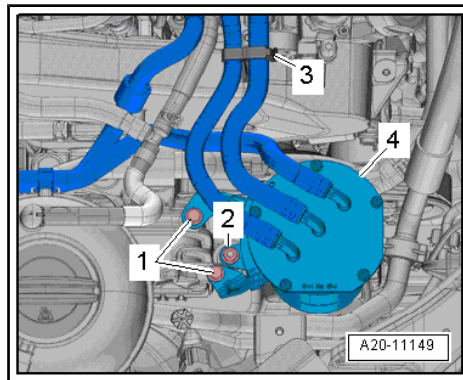
Observe rules for cleanliness
⇒ [“3.1 Rules of cleanliness”, page 6](#) .

Removing

- Remove engine cover
⇒ [“1.1 Removing and installing engine trim panel”, page 10](#) .
- Disconnect fuel lines -1-, -2-, to do so, first press hose coupling downwards arrow -A-, then press release buttons down arrow -B- ⇒ [“2.12 Separating push-on couplings”, page 249](#) .
- Remove hose coupling with pressed release buttons.

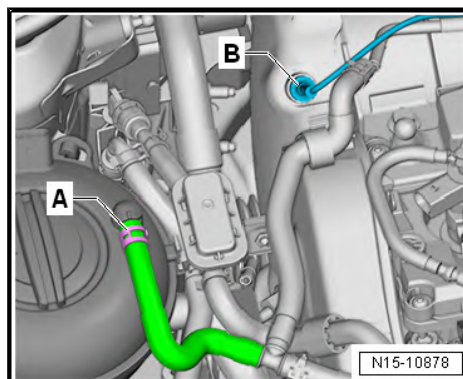


- Unclip bracket -3- with fuel hoses.
- Release nut -2- and screws -1-.
- Lay fuel filter -4- to the side.

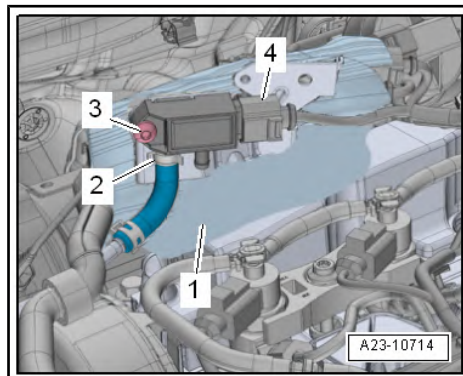


- Unscrew exhaust temperature transmitter 3 - G495- -B- with a tool from the tool set SW 17 - T10395- .
- Open clamp -A-, pull off coolant hose and push to the side.

For vehicles with engine identification characters CLHA, CLHB, CKFB, CKFC, CRVC, CUPA

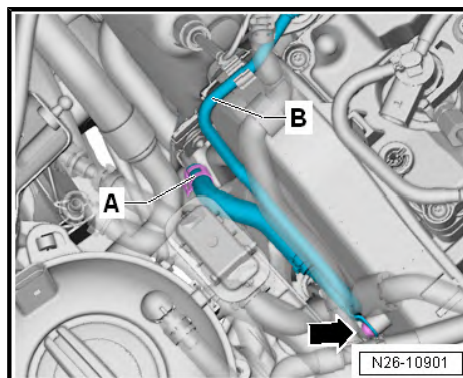


- Open heat protection sleeve -1-.
- Disconnect plug connection -4-.
- Unscrew screw -3-, remove differential pressure transmitter - G505- from the holder.

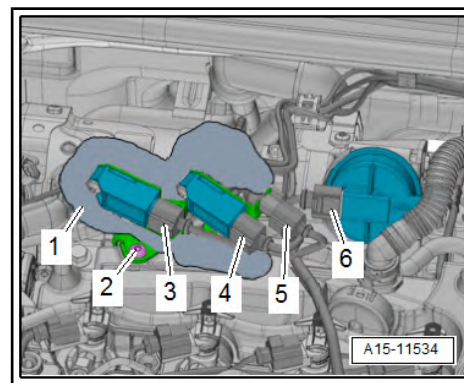


- Release screw -arrow-.
- Open clamp -A-, pull out hose, unclip pipeline -B- and remove with the differential pressure transmitter - G505- .

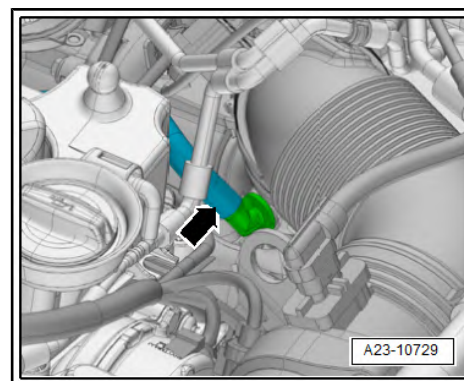
For vehicles with engine identification characters CRKB, CRMB, CUNA



- Open heat protection sleeve -1-.
- Disconnect electrical plug connection -3- and put the electric cable to one side.
- Release screw -2-.
- Separate electrical plug connection -4-.

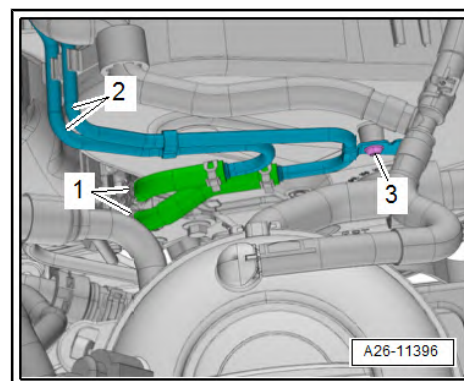


- Detach vacuum hose -arrow- and put to one side.



- Release screw -3-.
- Loosen hose clamps -1-, remove hoses.
- Lay pipelines -2- to one side.

Continued for all vehicles



- Unlock catches -arrows-, unhook and remove top toothed belt guard -1-.

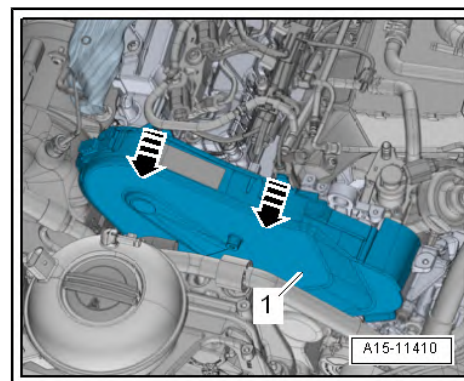
Install

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

- Venting air from the fuel system
⇒ [“1.3 Filling/bleeding the fuel system”, page 321](#) .

Tightening torques

- ◆ ⇒ [“3.1 Summary of components - exhaust temperature regulation”, page 402](#)
- ◆ ⇒ [“2.3 Fuel filter - Summary of components”, page 217](#)
- ◆ ⇒ [“1.6 Summary of components - toothed belt guard”, page 42](#)





1.9 Removing and installing bottom toothed belt guard

Removing



Note

- ◆ *To simplify the production process in manufacturing plants, the bottom toothed belt guard is fitted with a guide, which reaches into the sealing flange. To remove the bottom toothed belt guard although the engine support is installed, this guide in the toothed belt guard must be destroyed.*

- ◆ *Note different versions!*

- Remove crankshaft-belt pulley
⇒ [“1.3 Removing and installing crankshaft-belt pulley”](#),
[page 40](#) .



Caution

Risk of engine damage if the toothed belt is damaged.

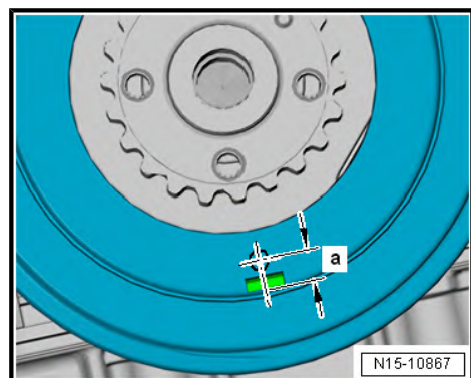
- ◆ ***Perform following work step very carefully!***

- For a toothed belt guard of an expiring series, set bores to the following dimensions:

- ◆ Dimension -a-: 10 mm

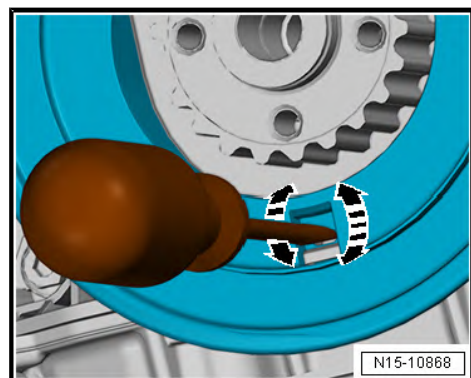
- ◆ Ø 8 mm

- Guide the screwdriver through the hole and break off the guide peg of the toothed belt guard towards the rear.



- For a newer toothed belt guard version, put a screwdriver into the guide peg slot.

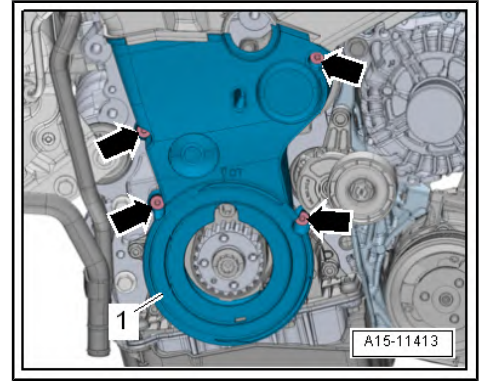
- By turning the screwdriver in -direction of arrow-, break off the guide peg.



- Unscrew screws -arrows-.
- Unhook bottom toothed belt guard -1- upwards and remove.

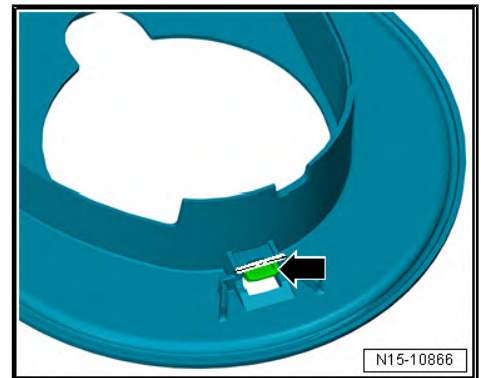
Install

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



Note

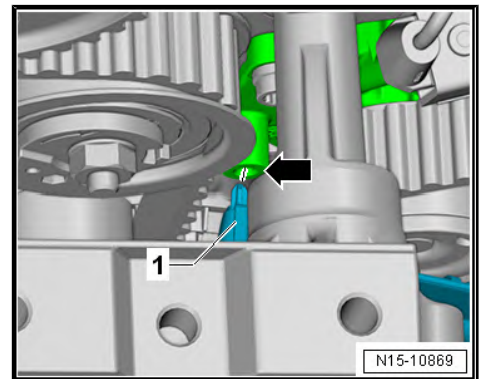
When a new toothed belt guard is being installed the guide peg -arrow- must be disconnected before installation.



- Position the toothed belt guard, pay attention to fit pin -arrow- while doing so.

Tightening torques

- ◆ ⇒ [“1.6 Summary of components - toothed belt guard”, page 42](#)



1.10 Remove the toothed belt from the camshaft

Special tools and workshop equipment required

- ◆ Rig pin for the diesel injection pump - 3359-
- ◆ Counterholder - T10051-
- ◆ Counterholder - T10172- with adapters -T10172/11-
- ◆ Offset screwdriver - T10264-
- ◆ Rig tool - T10265-
- ◆ Crankshaft arrester - T10490-
- ◆ Rig pin - T10492-

Removing

- Remove top toothed belt guard
⇒ [“1.8 Removing and installing top toothed belt guard”, page 45](#) .



- Remove crankshaft-belt pulley
⇒ [“1.3 Removing and installing crankshaft-belt pulley”, page 40](#).

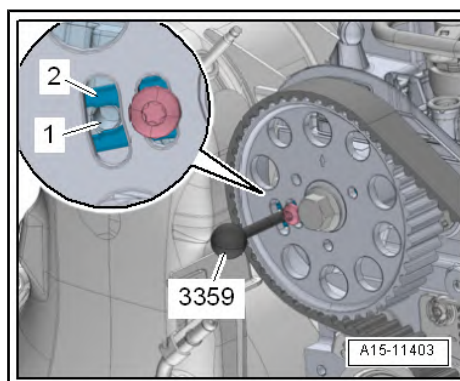


Caution

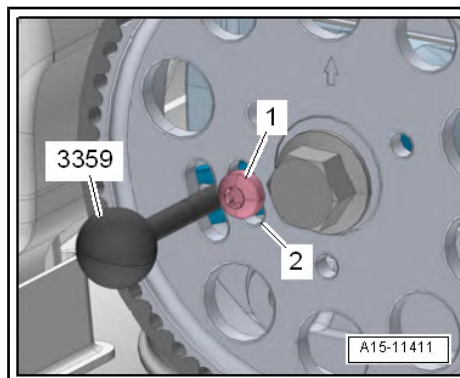
Risk of destruction as a result of the toothed belt pulley jumping.

- ◆ *Only rotate the crankshaft in the direction of rotation of the engine!*

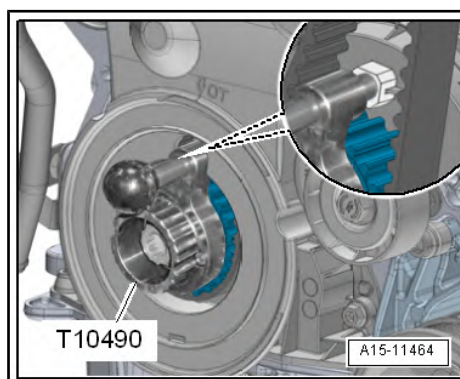
- Turn the crankshaft at the screw for toothed belt pulley until the camshaft toothed belt pulley is positioned on “TDC”.
- Lock hub of the camshaft using the diesel injection pump rig pin - 3359- ; to do so, insert the rig pin into fork -2- of the driver and into the bore behind it -1- in the cylinder head.



- Loosen fixing screw -1- in the camshaft sprocket by half a turn but do not release it.



- Lock the crankshaft toothed belt pulley using the crankshaft arrester - T10490- .
- The studs of the crankshaft arrester - T10490- must reach into the threaded bores of the toothed belt pulley.
- The rig pin of the crankshaft arrester - T10490- must reach into the bores at the sealing flange.

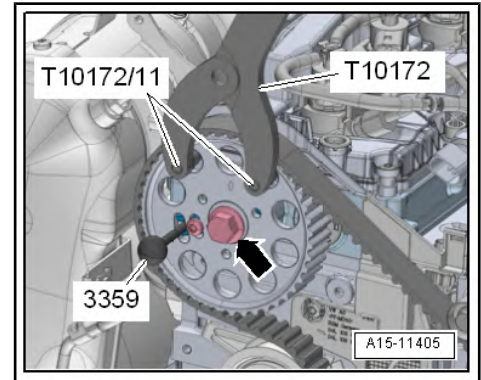


Caution

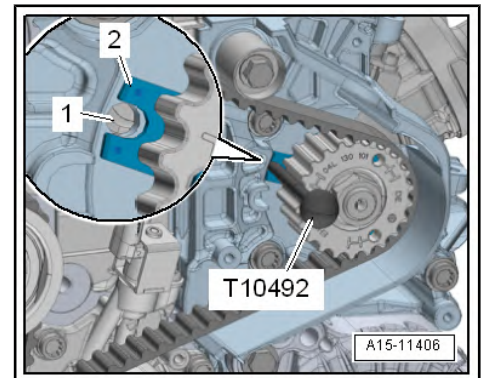
Risk of engine damage.

- ◆ *The diesel injection pump rig pin - 3359- must not be used as a counterholder for loosening the camshaft toothed belt pulley.*

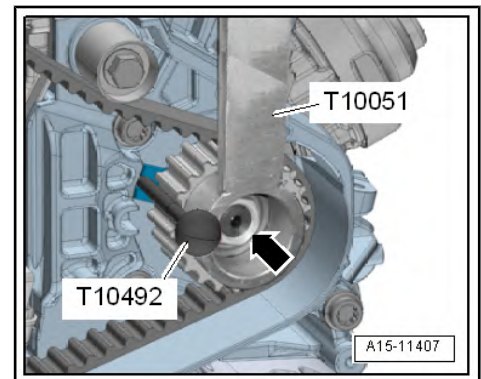
- Loosen screw -arrow- for camshaft toothed belt pulley; to do so, use counterholder - T10172- with adapters -T10172/11- .



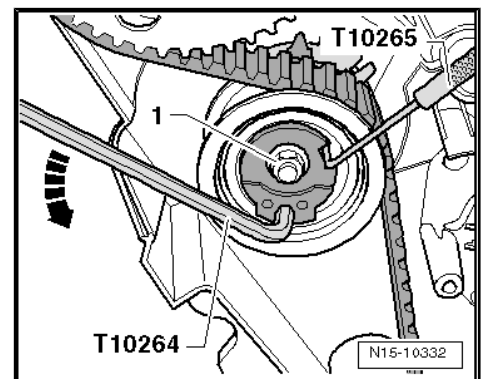
- Lock hub of the high pressure pump using the rig pin - T10492- ; to do so, insert the rig pin into fork -2- of the hub and into the bore behind it -1- in the auxiliary units bracket.



- Loosen nut -arrow- for high pressure pump toothed belt pulley by approximately 90°, use counterholder - T10051- to do so.



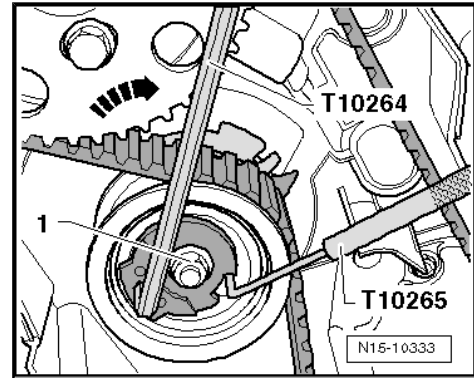
- Loosen nut -1- for tensioning pulley.
- Carefully turn eccentric of the tensioning pulley with offset screwdriver - T10264- clockwise -arrow- until the tensioning pulley can be interlocked with the rig tool - T10265- .





- Then turn the eccentric of the tensioning pulley with the offset screwdriver - T10264- clockwise -arrow- up to the stop and tighten nut -1- by hand.
- Remove the toothed belt from the camshaft toothed belt pulley.

Installing (set the timing) ⇒ [page 54](#)



1.11 Removing and installing toothed belt

Special tools and workshop equipment required

- ◆ Rig pin for the diesel injection pump - 3359-
- ◆ Counterholder - T10051-
- ◆ Counterholder - T10172- with adapters -T10172/11-
- ◆ Offset screwdriver - T10264-
- ◆ Rig tool - T10265-
- ◆ Crankshaft arrester - T10490-
- ◆ Rig pin - T10492-

Removing

- Remove engine support
⇒ [“2.4 Removing and installing engine support”, page 32](#) .
- Remove top toothed belt guard
⇒ [“1.8 Removing and installing top toothed belt guard”, page 45](#) .
- Remove bottom toothed belt guard
⇒ [“1.9 Removing and installing bottom toothed belt guard”, page 48](#) .

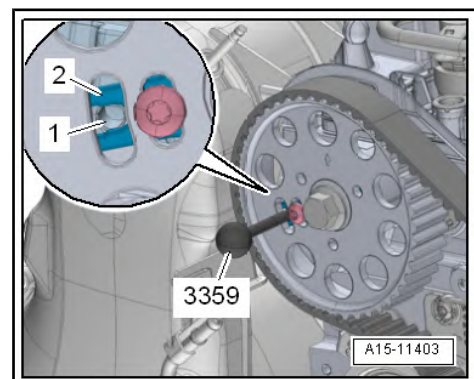


Caution

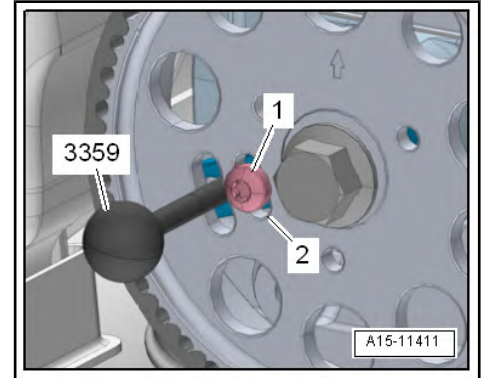
Risk of destruction as a result of the toothed belt pulley jumping.

- ◆ **Only rotate the crankshaft in the direction of rotation of the engine!**

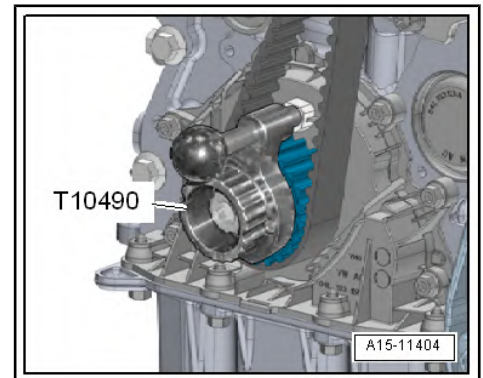
- Turn the crankshaft at the screw for toothed belt pulley until the camshaft toothed belt pulley is positioned on “TDC”.
- Lock hub of the camshaft using the diesel injection pump rig pin - 3359- ; to do so, insert the rig pin into fork -2- of the driver and into the bore behind it -1- in the cylinder head.



- Loosen fixing screw -1- in the camshaft sprocket by half a turn but do not release it.



- Lock the crankshaft toothed belt pulley using the crankshaft arrester - T10490- .
- The studs of the crankshaft arrester - T10490- must reach into the threaded bores of the toothed belt pulley.
- The rig pin of the crankshaft arrester - T10490- must reach into the bores at the sealing flange.

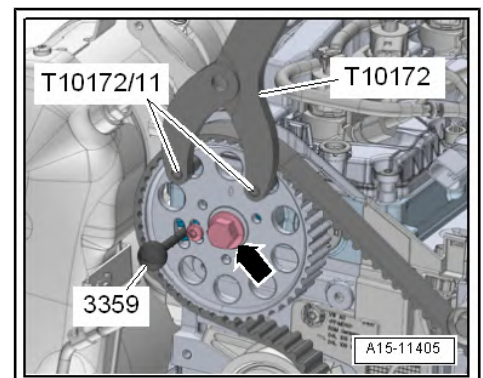


Caution

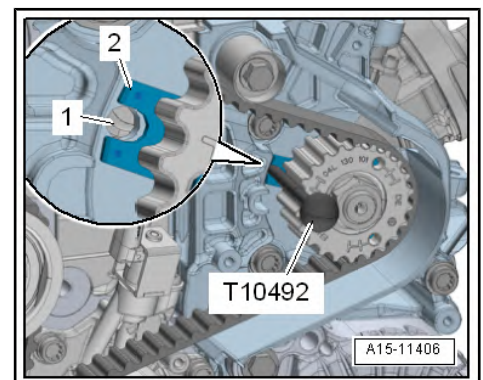
Risk of engine damage.

- ◆ *The diesel injection pump rig pin - 3359- must not be used as a counterholder for loosening the camshaft toothed belt pulley.*

- Remove rig pin and partially undo the screws for the camshaft sprocket. Before removing fully, peg back the rig pin.
- Loosen screw -arrow- for camshaft toothed belt pulley; to do so, use counterholder - T10172- with adapters -T10172/11- .

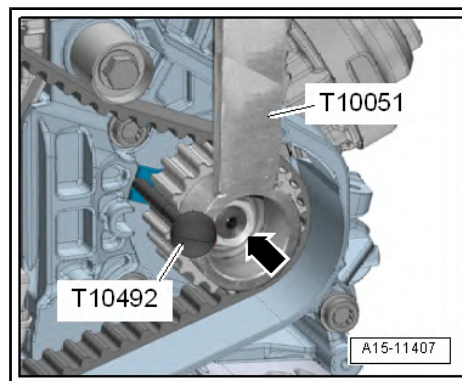


- Lock hub of the high pressure pump using the rig pin - T10492- ; to do so, insert the rig pin into fork -2- of the hub and into the bore behind it -1- in the auxiliary units bracket.
- Unscrew the rig pin and partially unscrew the nuts for the high pressure pump toothed belt. Before removing fully, peg back the rig pin.

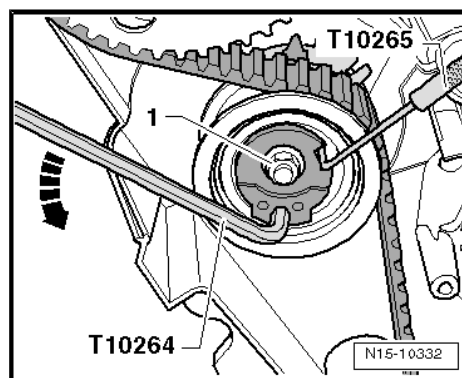




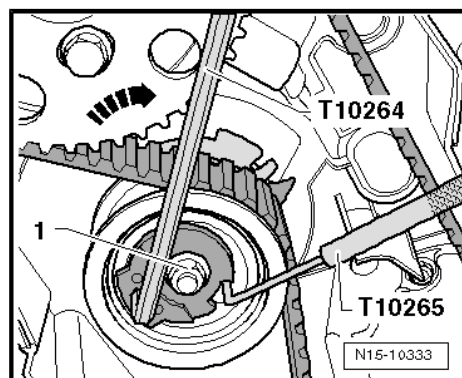
- Loosen nut -arrow- for high pressure pump toothed belt pulley by approximately 90°, use counterholder - T10051- to do so.



- Loosen nut -1- for tensioning pulley.
- Carefully turn eccentric of the tensioning pulley with offset screwdriver - T10264- clockwise -arrow- until the tensioning pulley can be interlocked with the rig tool - T10265- .



- Then turn the eccentric of the tensioning pulley with the offset screwdriver - T10264- clockwise -arrow- up to the stop and tighten nut -1- by hand.

**Caution**

Risk of damage through reversing the rotation direction of an already used toothed belt.

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

- First remove the toothed belt from the coolant pump and then from the remaining toothed belt gears.

Installing (set the timing)**Note**

The engine must be cold for performing installation work on the toothed belt.

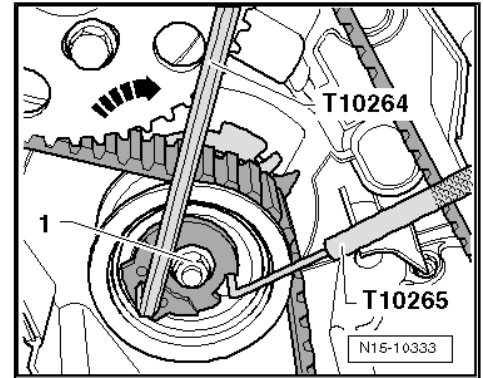
**Caution**

Risk of damage to valves and piston crowns.

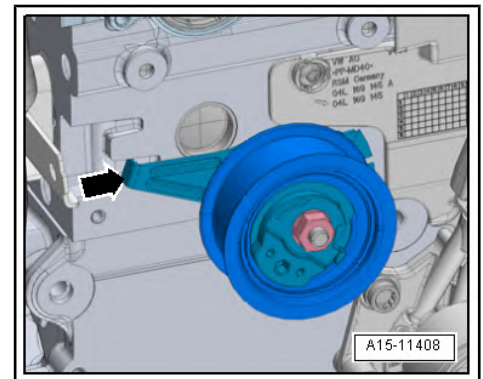
- ◆ *When rotating the camshaft, the crankshaft must not be positioned at "TDC" with any one piston.*

Requirements:

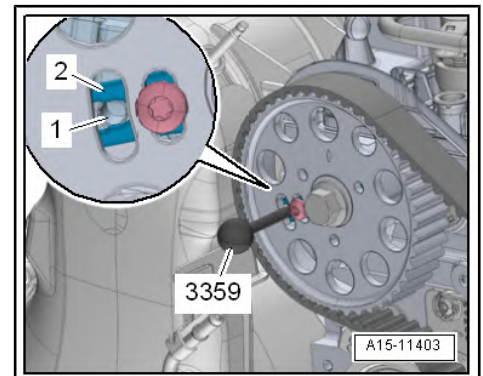
- Tensioning pulley locked with rig tool - T10265- and fixed with nut -1- up to right stop.



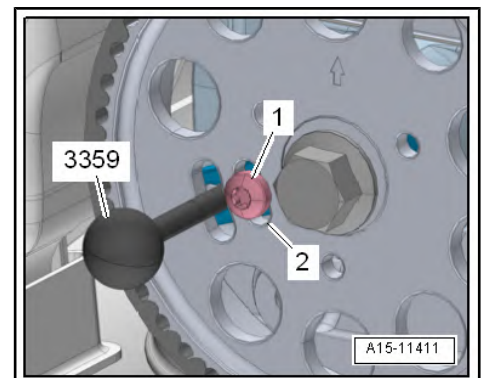
- Sheet peg -arrow- of the tensioning pulley must engage in the cast iron recess of the cylinder head.



- Lock the hub of the camshaft with the rig pin for diesel injection pump - 3359- .
- Screw loosely inserted.
- It must still be possible to just turn the camshaft toothed belt pulley, however it must not tilt.

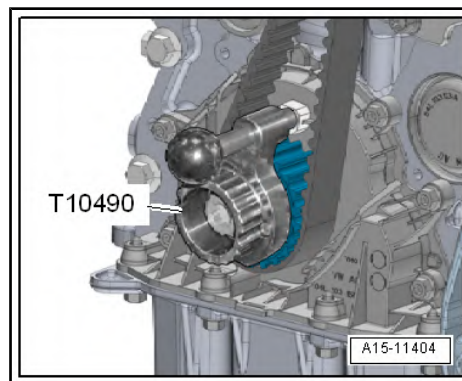


- Fixing screw -1- of the driver loosened by one half turn, positioned in the centre position in the elongated hole -2-.

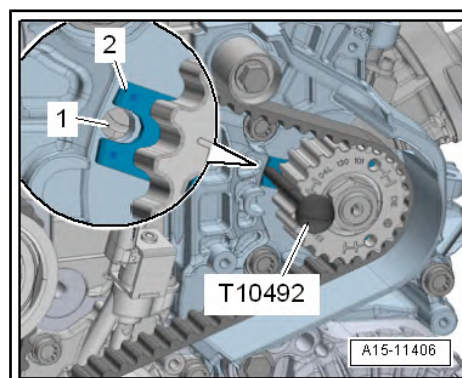




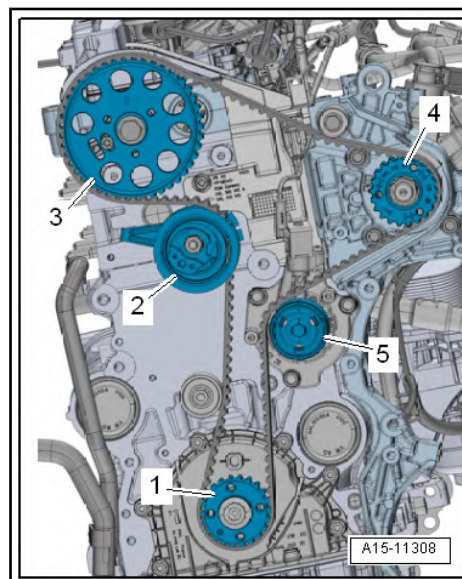
- Interlock crankshaft with crankshaft arrester - T10490- .



- Lock hub of high pressure pump with rig pin - T10492- .
- Nut loosely inserted.
- It must still be possible to just turn the toothed belt pulley of the high pressure pump, however it must not tilt.



- Turn the camshaft toothed belt pulley and high pressure pump toothed belt pulley in their elongated holes clockwise as far as the stop.
- Fit the toothed belt in the following order:
 - 1 - Crankshaft - toothed belt sprocket
 - 2 - Tensioning roller
 - 3 - Camshaft toothed belt pulley
 - 4 - Toothed belt pulley high pressure pump
 - 5 - Coolant pump toothed belt pulley



- Loosen nut -1- for tensioning pulley and remove rig tool - T10265- .

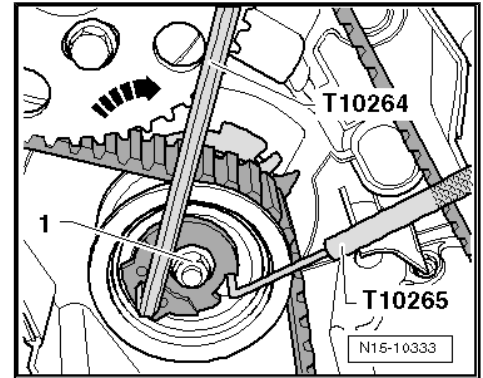
i Note

- ◆ *Sheet peg of the tensioning pulley must engage in the cast iron recess of the cylinder head.*
- ◆ *Ignore -arrow-.*

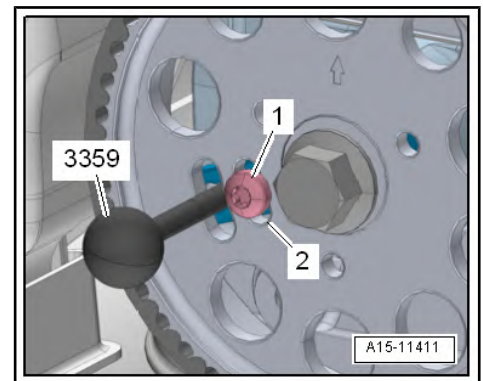


Caution

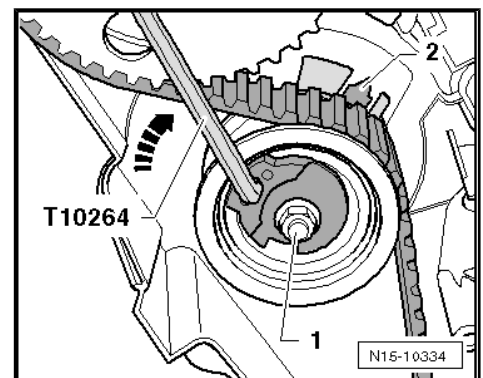
The locking screw -1- is not allowed to rest at the bottom stop -2- of the elongated hole after the camshaft sprocket is tightened.



- Check whether the locking screw -1- is located between the centre elongated hole and the bottom stop -2-, where necessary correct the position of the camshaft sprocket by one tooth in a clockwise direction and put the toothed belt back into position.



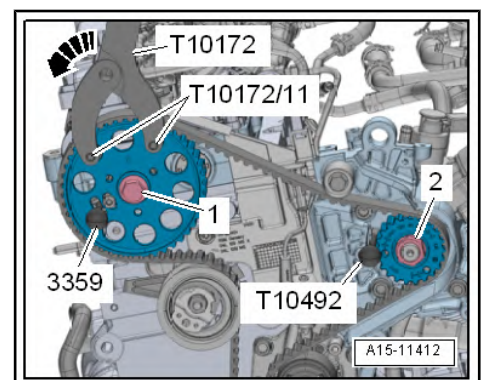
- Turn the eccentric of the tensioning pulley carefully with the offset screwdriver - T10264- clockwise -arrow- until the pointer -2- is in the centre of the base plate in front of the gap.
- The nut -1- must not turn along.
- Hold tensioning pulley in this position and tighten nut.



- Position counterholder - T10172- with -T10172/11- adapters at the camshaft toothed belt pulley, as shown in the illustration.
- Push the counterholder anticlockwise -arrow- and keep it pre-tensioned.
- In this position, tighten screw -1- for camshaft toothed belt pulley and nut -2- for high pressure pump toothed belt pulley.
- ◆ Specified torque: 10 Nm

i Note

The toothed belt gear on the high pressure pump can only be twisted to a limited extent. It is therefore crucial to check that the toothed belt gear does not lie against the »stop« of the twisting range after tightening.





- Make sure that the marking on the toothed belt gear is not flush with the rig pin. You may need to correct the position of the toothed belt gear of the high pressure pump by a tooth clockwise and put the toothed belt back into position.
- Remove the rig pins -3359- , -T10492- and crankshaft arrester - T10490- and test the timing ➔ [page 58](#) .

Checking valve timing



Caution

Risk of destruction of the engine as a result of the toothed belt pulley jumping.

- ◆ **Only rotate the crankshaft in the direction of rotation of the engine!**

- Turn the crankshaft at the screw for timing belt gear 2 turns in the direction of running of the engine until the crankshaft is positioned shortly before "TDC".
- Position again the crankshaft arrester - T10490- on the crankshaft timing belt sprocket.
- Turn the crankshaft in the direction of rotation of the engine until the stud -arrow- of the crankshaft arrester engages during this rotary movement in the sealing flange.

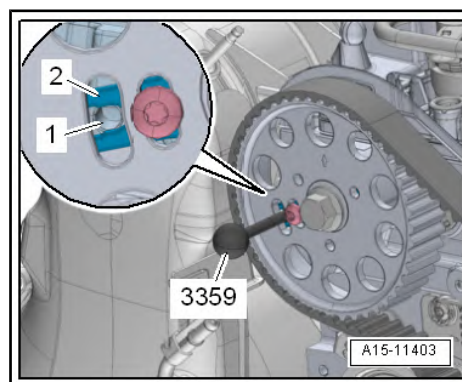
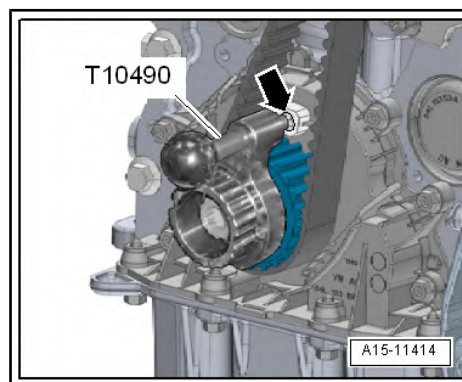
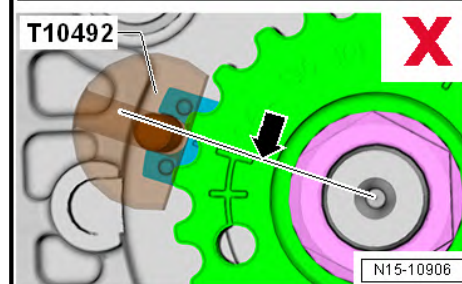
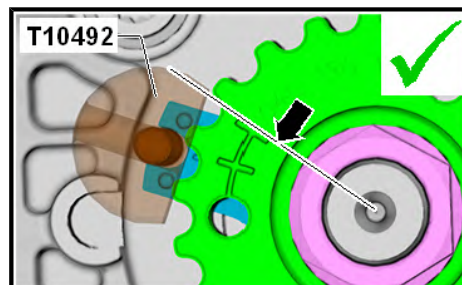


Caution

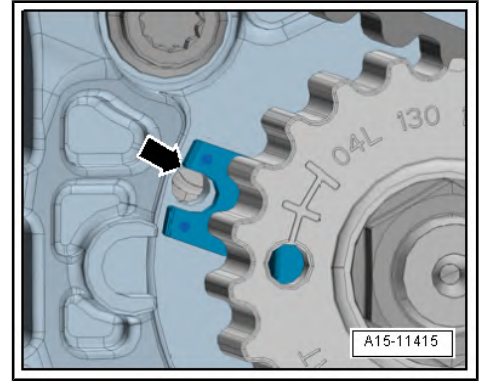
Adjustment error as a result of inaccurate "TDC" setting.

- ◆ **If rotated out via "TDC": Rotate crankshaft again by 2 turns until it is again positioned shortly before "TDC". Then lock the crankshaft from the direction of rotation using the crankshaft arrester - T10490- .**

- The hub of the camshaft must be locked with the rig pin for diesel injection pump - 3359- .



- The locking point of the hub of the high pressure pump is always difficult to find again. A slight difference -arrow- does not influence the engine running.



- The tensioning pulley pointer -2- must be positioned in the centre between the pegs -1- and -3- of the base plate.



Note

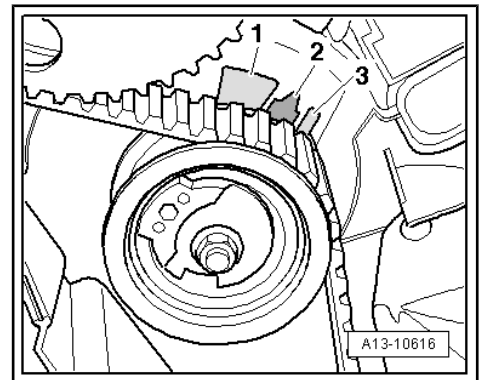
A lateral offset of a maximum of 5 mm is permitted.

If the conditions are met, continue if timing is set correctly
⇒ [page 60](#) .

If the conditions are not met, correct timing ⇒ [page 59](#) .

Correct timing

- If the hub of the camshaft cannot be locked, pull back the crankshaft arrester - T10490- until the stud disconnects from the bore.
- Turn the crankshaft slightly against the running direction of the engine over the "TDC".
- Now turn the crankshaft slowly in the running direction of the engine until the hub of the camshaft can be locked.
- After locking, loosen camshaft toothed belt pulley screws.





A - Crankshaft arrester - T10490- stud is positioned to the left of the bore:

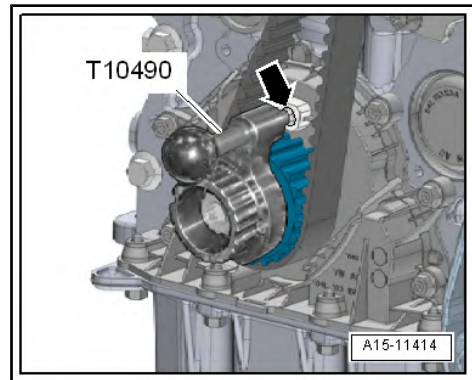
- Turn the crankshaft in the direction of rotation of the engine until the stud -arrow- of the crankshaft arrester engages during this rotary movement in the sealing flange.
- Tighten camshaft toothed belt pulley to 20 Nm.

B - Crankshaft arrester - T10490- stud is positioned to the right of the bore:

- First turn the crankshaft slightly against the running direction of the engine.
- Turn the crankshaft in the direction of rotation of the engine until the stud of the crankshaft arrester engages during this rotary movement in the sealing flange.
- Tighten camshaft toothed belt pulley to 20 Nm.

Continued if the timing is correctly set or has been corrected:

- Remove rig pins for diesel injection pump - 3359- and crankshaft arrester - T10490- .
- Turn the crankshaft at the screw for timing belt gear 2 turns in the direction of running of the engine until the crankshaft is positioned shortly before "TDC".
- Repeat timing test ➔ [page 58](#) .

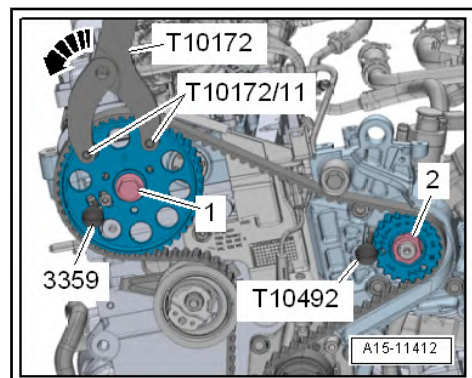


Caution

Risk of engine damage.

- ♦ *The diesel injection pump rig pin - 3359- must not be used as a counterholder for tightening the camshaft toothed belt pulley.*

- If it is now possible to lock the camshaft hub, tighten screws -1- for toothed belt pulley Pos. -8- ➔ ["1.7 Assembly overview - toothed belt drive", page 44](#) to the end position using counterholder - T10172- with adapters - T10172/11- .
- Tighten the nuts -2- for the toothed belt gear, high pressure pump Pos. -4- ➔ ["3.1 Summary of components - high pressure pump", page 338](#) to the end position, to do so, use the counterholder - T10051- .
- Repeat timing test ➔ [page 58](#) .



Assembling

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



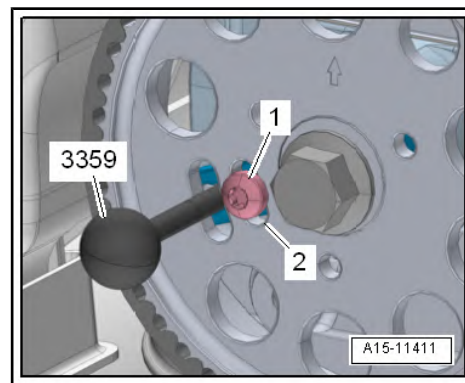
Note

- ♦ *Replace gasket.*
- ♦ *Secure all hose connections with spring-type clips that comply with the series design ➔ ETKA - Electronic Catalogue of Original Parts .*

- Tighten fixing screw -1-.

Tightening torques

- ◆ ⇒ [“1.6 Summary of components - toothed belt guard”, page 42](#)
- ◆ ⇒ [“1.7 Assembly overview - toothed belt drive”, page 44](#)





2 Removing and installing sealing flange and flywheel

⇒ [“2.1 Summary of components - sealing flange belt pulley side”, page 62](#)

⇒ [“2.2 Removing and installing the sealing flange on the belt pulley side”, page 63](#)

⇒ [“2.3 Summary of components - gearbox side summary of components and flywheel”, page 64](#)

⇒ [“2.4 Removing and installing sealing flange on gearbox side”, page 66](#)

⇒ [“2.5 Removing and installing flywheel”, page 73](#)

2.1 Summary of components - sealing flange belt pulley side

1 - Sealing flange on the belt pulley side

- ☐ with shaft gasket ring for crankshaft
- ☐ replace after removal
- ☐ removing and installing
⇒ [“2.2 Removing and installing the sealing flange on the belt pulley side”, page 63](#)

2 - Screw

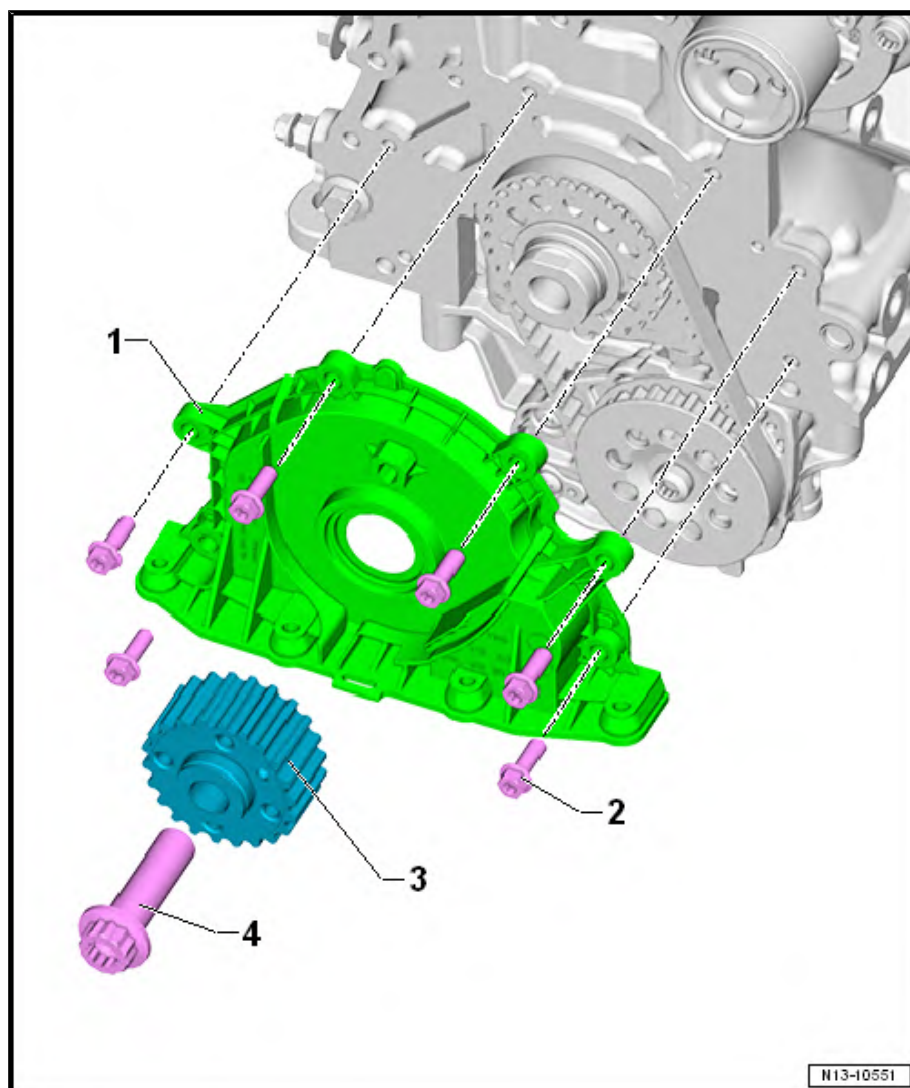
- ☐ Tightening torque and tightening order
⇒ [page 63](#)

3 - Crankshaft - toothed belt sprocket

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

4 - Screw

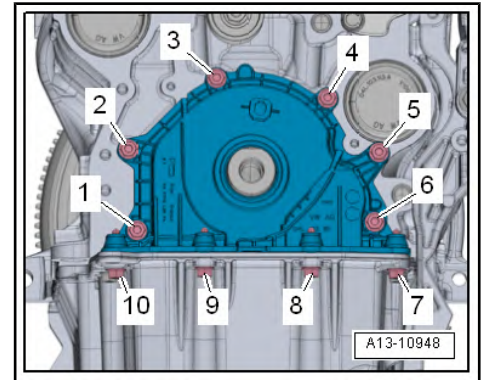
- ☐ Tightening torque Pos. -1-
⇒ [“1.7 Assembly overview - toothed belt drive”, page 44](#)



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

- Tighten screws in steps in the given sequence:

Stage	Screws	Tightening torque
1.	-1 ... 10-	by hand as far as the stop
2.	-1 ... 6-	crosswise in steps up to 13 Nm
3.	-7 ... 10-	13 Nm



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

Special tools and workshop equipment required

- ◆ Counterholder - T30004 (3415)- or counterholder for toothed belt sprocket - MP 1-310 (3099)-
- ◆ Assembly tool - T10053-
- ◆ Protective goggles and gloves
- ◆ Sealant remover gasket stripper (bearing code GST, bearing article no. R 34402), manufacturer Retech s.r.o.
- ◆ Cleaning and degreasing agent , e.g. -D 009 401 04-
- ◆ Silicone sealant ⇒ ETKA - Electronic catalogue of original parts

Removing

- Remove the front right wheelhouse liner ⇒ Body Work; Rep. gr. 66 .
- Removing toothed belt
⇒ [“1.11 Removing and installing toothed belt”, page 52](#) .
- Remove crankshaft - toothed belt sprocket, to this end lock toothed belt sprocket with counterholder - T30004 (3415)- or counterholder - MP 1-310- .
- Removing the oil pan
⇒ [“1.5 Removing and installing oil sump”, page 135](#) .
- Unscrew the remaining screws and carefully loosen the sealing flange from the bonding.

Install

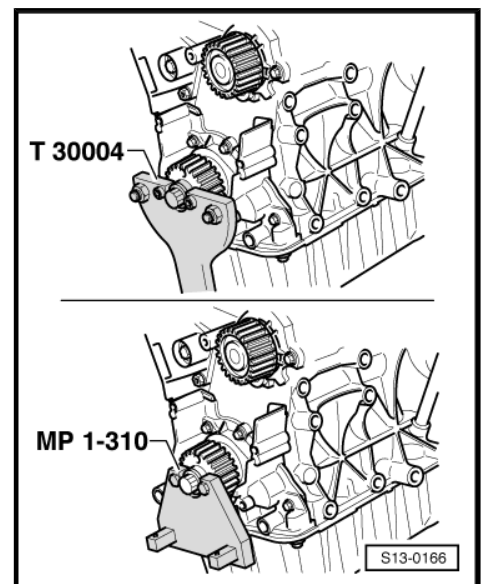
Install in the reverse order of removal. When doing this, note the following:



WARNING

Wear protective gloves when working with sealant and grease remover!

- Remove residual sealant from the sealing surfaces on sealing flange, cylinder block and on the oil pan with chemical sealant remover.
- Degrease the sealing surfaces.

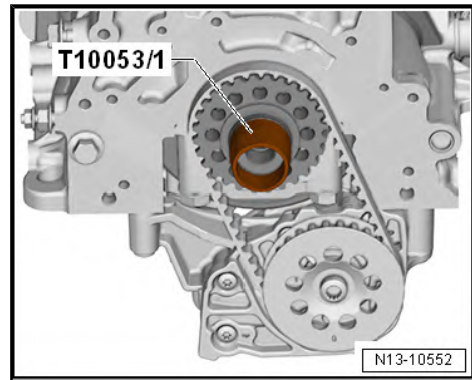




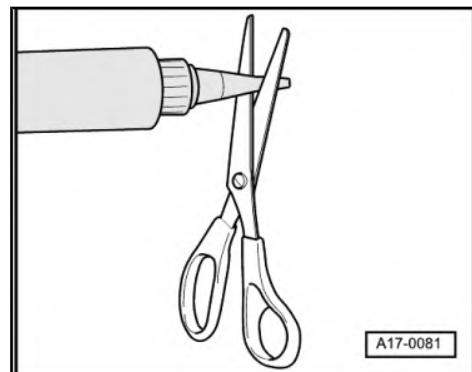
- Install -T10053/1- guide bushing on the crankshaft stub.

**Note**

Pay attention to the use by date on sealant.



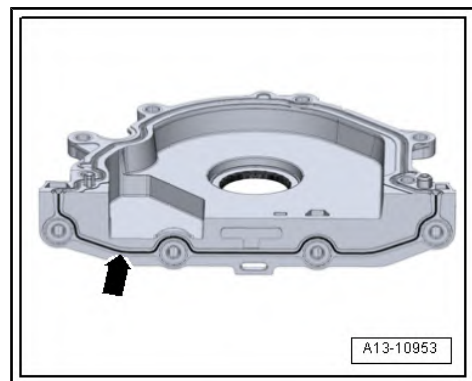
- Cut off nozzle on tube at front marking (\varnothing of nozzle approx. 2 mm).



- Apply sealant bead -arrow- onto the clean sealing surface of the sealing flange, as shown in the illustration.
- Thickness of sealant bead: 2 ... 3 mm.

**Note**

- ♦ *The sealant bead must not be thicker than 3 mm otherwise excess sealant may get into the oil pan and clogg the strainer in the oil suction pipe.*
- ♦ *The sealing flange must be installed within 5 minutes after applying the sealant.*



- Slide new sealing flange over the guide sleeve.
- The fit pins will engage with the bores in the cylinder block during this process.
- Remove guide bushing.
- Tighten sealing flange screws ⇒ [page 63](#) .
- Installing the oil pan
⇒ [“1.5 Removing and installing oil sump”, page 135](#) .
- install (set the timing) ⇒ [page 54](#) .

Tightening torques

- ♦ ⇒ [Fig. “Sealing flange on the belt pulley side - tightening torque and tightening order”, page 63](#)
- ♦ ⇒ [“1.7 Assembly overview - toothed belt drive”, page 44](#)
- ♦ Summary of components - front wheelhouse liner ⇒ Body Work; Rep. gr. 66

2.3 Summary of components - gearbox side summary of components and fly-wheel

1 - Screw

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

2 - Flywheel

- ☐ Inspect proper operation of two-mass flywheel ⇒ Vehicle diagnostic tester
- ☐ removing and installing ⇒ ["2.5 Removing and installing flywheel"](#), page 73
- ☐ can be installed only in one position
- ☐ Observe part number ⇒ ETKA - Electronic Catalogue of Original Parts

3 - Rotor

- ☐ for engine speed transmitter - G28-
- ☐ removing and installing ⇒ ["2.4 Removing and installing sealing flange on gearbox side"](#), page 66

4 - Engine speed transmitter - G28-

- ☐ Summary of components ⇒ ["1.1 Summary of components - preheating system"](#), page 420

5 - Screw

- ☐ 4.5 Nm

6 - Fit pin

- ☐ Qty. 2

7 - Intermediate plate

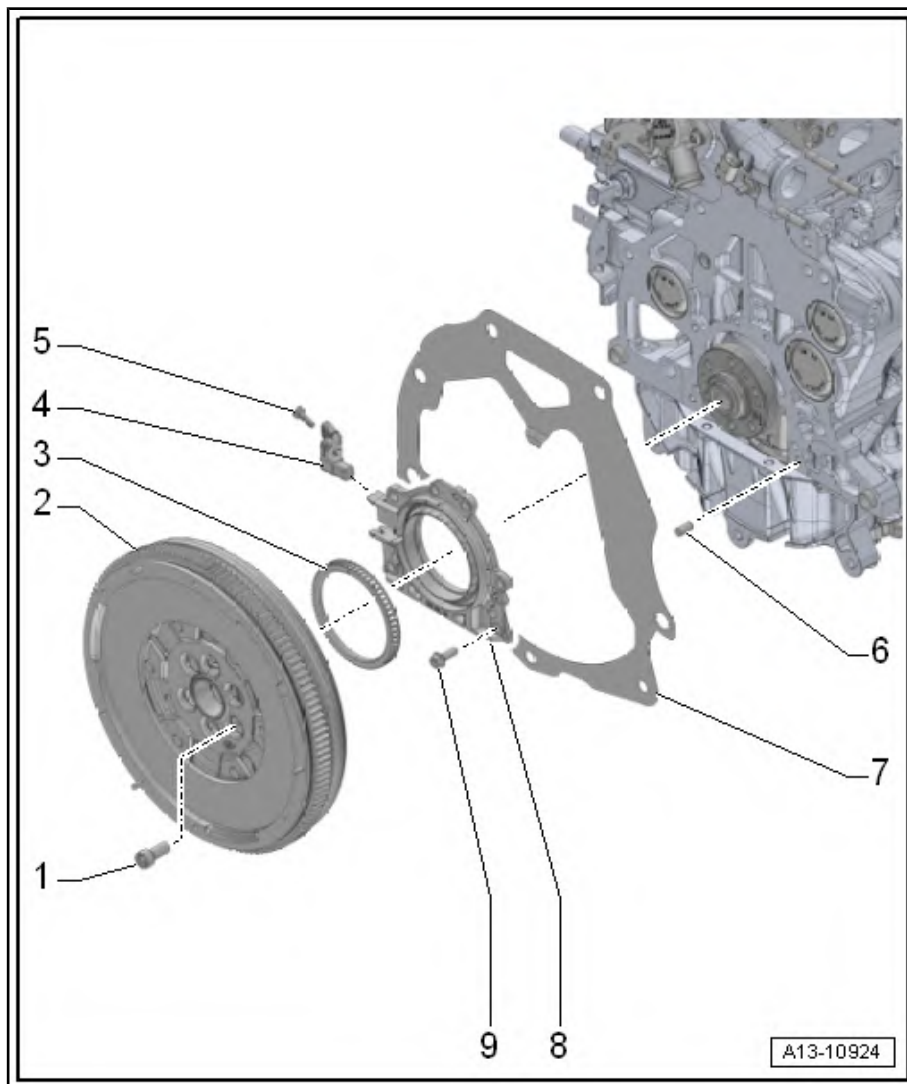
- ☐ do not damage or bend during assembly work
- ☐ installing ⇒ [page 66](#)

8 - Sealing flange on the gearbox side

- ☐ with gasket ring
- ☐ replace after removal ⇒ ["2.4 Removing and installing sealing flange on gearbox side"](#), page 66

9 - Bolt

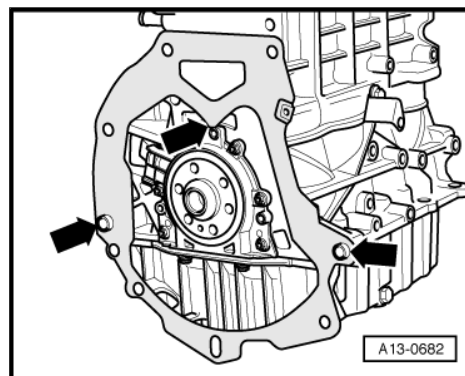
- ☐ Tightening torque and tightening order ⇒ [page 66](#)





Installing intermediate plate

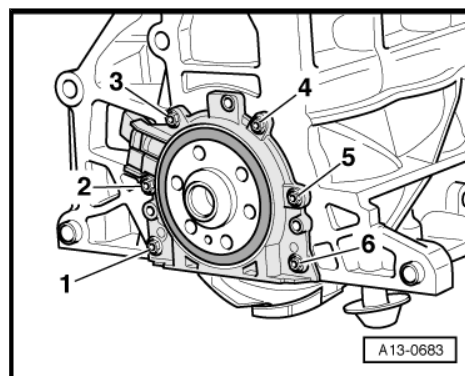
- Insert intermediate plate on sealing flange -top arrow- and push onto the dowel sleeves -bottom arrows-.



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

- Tighten screws in steps in the given sequence:

Stage	Screws	Tightening torque
1.	-1 ... 6-	by hand as far as the stop
2.	-1 ... 6-	crosswise in steps up to 13 Nm



2.4 Removing and installing sealing flange on gearbox side

Special tools and workshop equipment required

- ◆ Assembly tool - T10134-
- ◆ Depth gauges , e.g. -VAS 6082-
- ◆ 3x screw M6x35
- ◆ 2x screw M7x35

Press out sealing flange with rotor

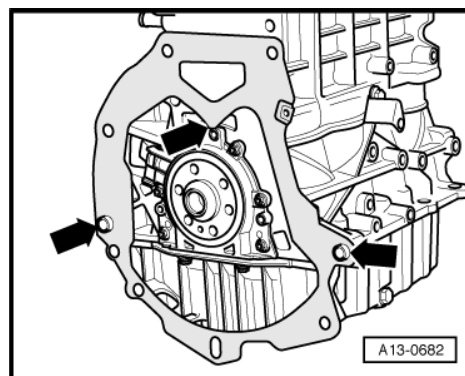
- Gearbox removed.
- Remove the flywheel
⇒ [“2.5 Removing and installing flywheel”, page 73](#) .



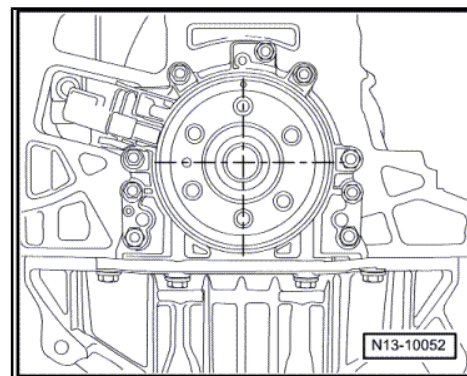
Note

For a clearer illustration, see the following work sequences while the engine is removed.

- Unhook intermediate plate at the sealing flange and dowel sleeves -arrows-.



- Turn the crankshaft at the screw for toothed belt pulley until the crankshaft is positioned on “TDC” as shown in the illustration.
- Removing the oil pan
⇒ “1.5 Removing and installing oil sump”, page 135 .
- Remove engine speed transmitter - G28-
⇒ “1.5 Removing and installing engine speed transmitter G28”, page 424 .

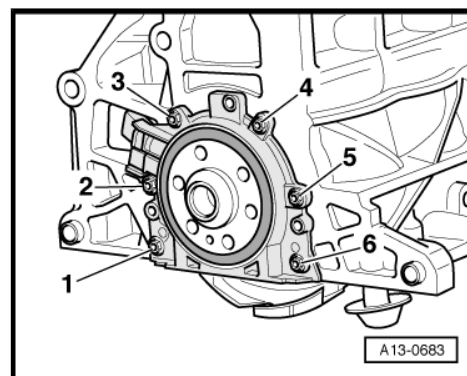


- Unscrew screws -1 ... 6- for sealing flange.



Note

The sealing flange is pressed together with the crankshaft rotor .



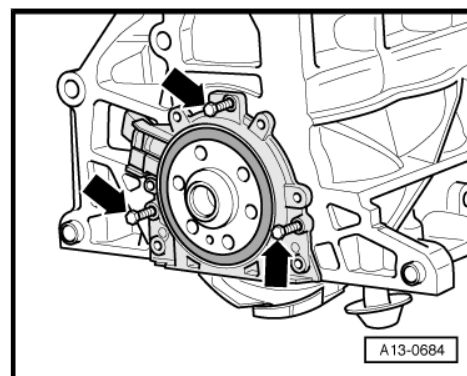
- To press out, insert 3 screws M6x35 -arrows- into the sealing flange alternately by a maximum of 1/2 turns each.
- Remove sealing flange with rotor

Press in sealing flange with rotor



Note

- ◆ *The sealing flange with a PTFE gasket ring is equipped with a sealing lip support ring. This support ring serves as a fitting sleeve and must not be removed prior to installation.*
- ◆ *Sealing flange and transmitter wheel must not be separated or turned after removal from packaging.*
- ◆ *The rotor is held in its installation position on the assembly device - T10134- by a locating pin.*
- ◆ *Sealing flange and gasket ring form one unit and must only be renewed together with the sender wheel.*
- ◆ *The assembly device - T10134- is held in its position relative to the crankshaft by a guide pin that is inserted into a hole in the crankshaft.*



Assembly of the assembly device - T10134-

- A - Clamping surface
- B - Hexagon nut
- C - Assembly housing
- D - Locating pin
- E - Hexagon socket head bolt
- F - Guide bolts (for diesel engines)
- G - Guide bolts (for petrol engines)

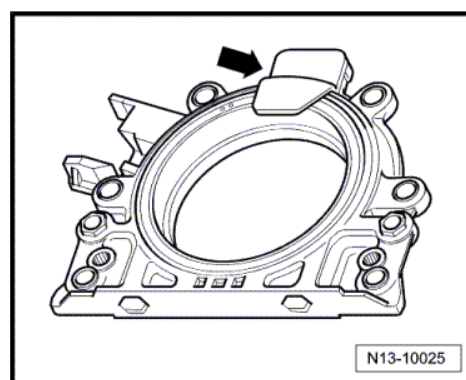
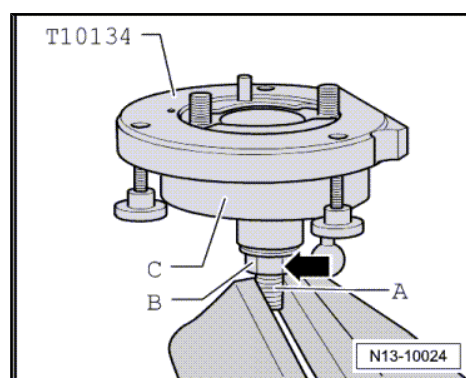
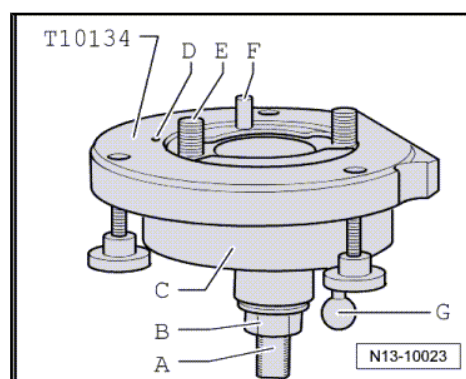
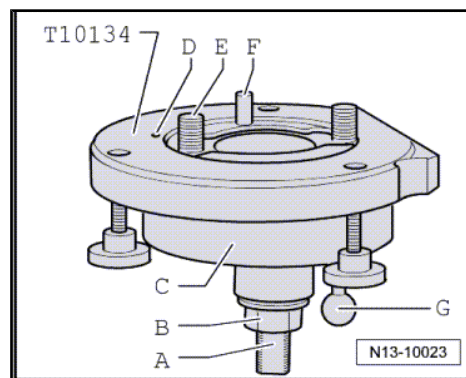
A - Mounting sealing flange with rotor on the assembly tool - T10134-

- Screw on hexagon nut -B- until just before it touches the clamping surface -A- of the threaded spindle.
- Grip assembly device - T10134- on clamping surface -A- of the threaded spindle in a vice.
- Push assembly cup -C- down so that it rests on the hexagon nut -B- -arrow-.
- The inside of the assembly device and assembly cup must be at the same level.
- Remove securing clip -arrow- from new sealing flange.

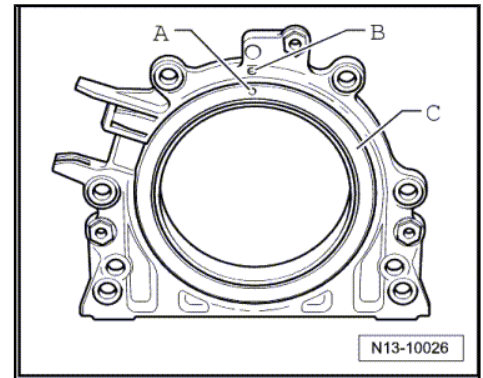


Note

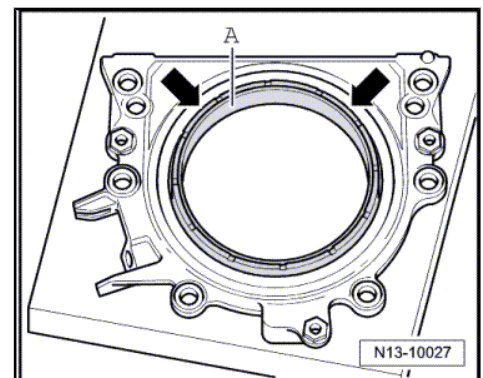
The sender wheel must not be taken out of the sealing flange or twisted.



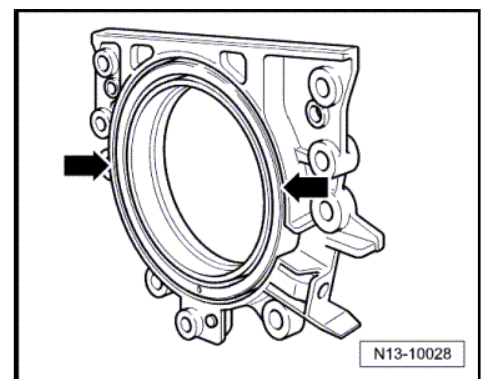
- Locating hole -A- on sender wheel -C- must align with marking -B- on sealing flange.
- Place sealing flange with front side facing down on a clean level surface.



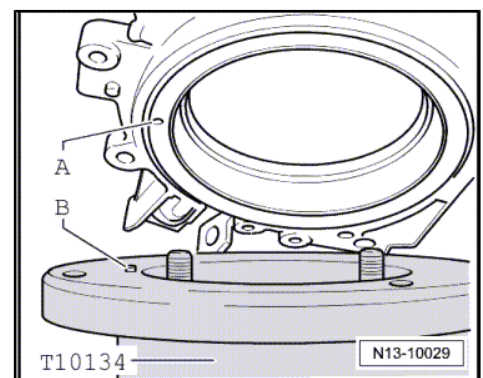
- Press the sealing lip supporting ring -A- down -arrows- until it rests on the level surface.



- Upper edge of sender wheel and front edge of sealing flange must align -arrows-.

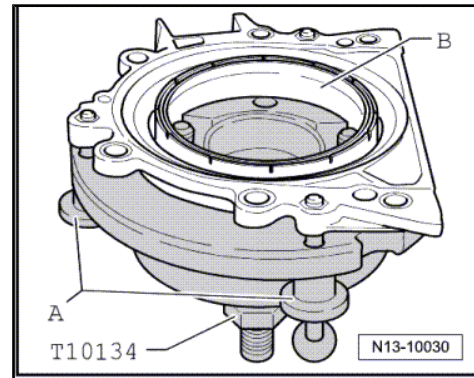


- Place sealing flange with front side facing downwards onto assembly tool - T10134- so that locating pin -B- can be inserted in sender wheel bore -A-.
- The sealing flange must lie flat on the assembly device.



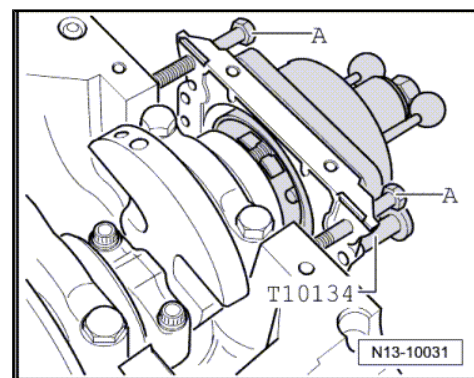
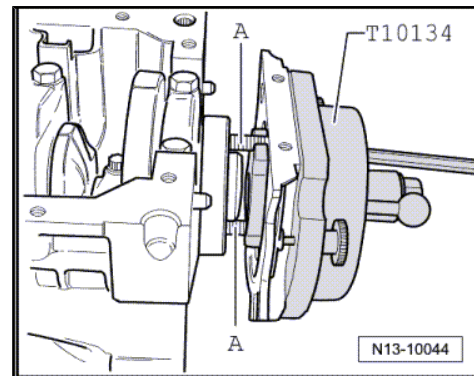
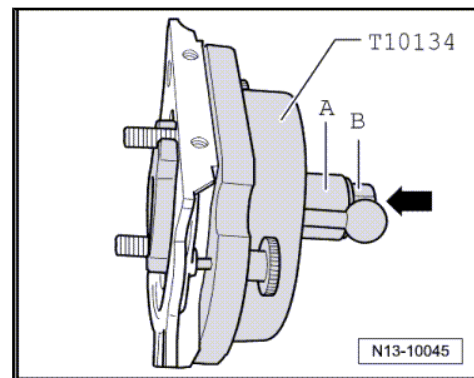


- When tightening the knurled screws -A- press the sealing flange and sealing lip supporting ring -B- on the surface of the assembly device - T10134- in such a way that the positioning pin can no longer slide out of the rotor hole.
- Only the two top right knurled screws - the left knurled screw does not fit into the sealing flange thread.
- The rotor must remain fixed in the assembly device while the sealing flange is being mounted.



B - Mounting the assembly tool - T10134- with sealing flange on the crankshaft flange

- Crankshaft flange free from oil and grease.
- Engine on "TDC".
- Screw hexagon nut -B- on until it reaches end of threaded spindle.
- Press the threaded spindle on the assembly tool - T10134- in -direction of arrow- until the hexagon nuts -B- rest against the assembly cup -A-.
- Align flat side of assembly housing to the cylinder block sealing surface on the oil sump side.
- Secure assembly device - T10134- to crankshaft flange - to do so insert hexagon socket head bolts -A- by approximately 5 threads at the crankshaft flange.
- Insert 2 screws M7x35 Pos. -A- into the cylinder block for the sealing flange guide.



C - Bolt assembly tool - T10134- onto the crankshaft flange:

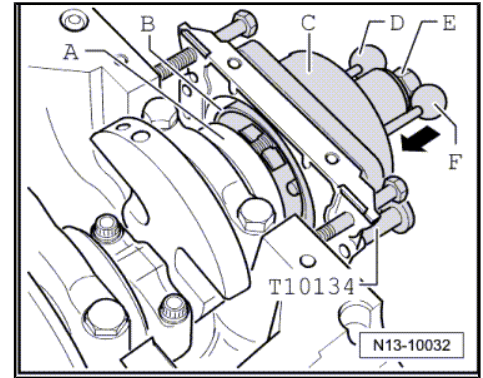
- Move the assembly cup -C- by hand in the -direction of the arrow- until the sealing lip supporting ring -B- rests on the crankshaft flange -A-.



Caution

Risk of mix-ups.

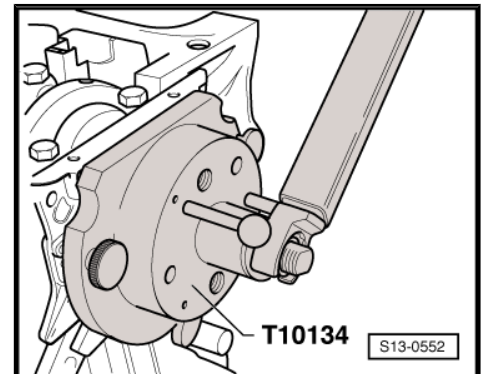
- ◆ *The guide pin for petrol engines -F- must not be inserted in threaded hole of crankshaft.*



- Push guide pin for diesel engines -D- into the crankshaft bore; this puts the rotor into the final installation position.
- Tighten both hexagon socket head bolts of the assembly device by hand.
- Screw hexagon nut -E- onto threaded spindle by hand until it lies against assembly housing -C-.

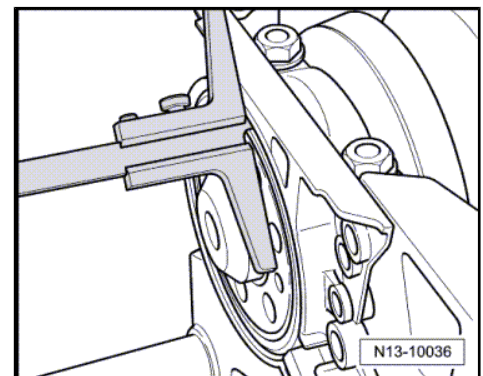
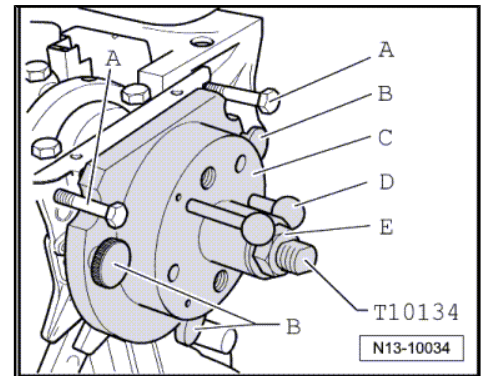
D - Press sender wheel onto crankshaft flange using assembly device - T10134-

- Tighten hexagon nut for the assembly device - T10134- to 35 Nm.
- After hexagon nut is tightened to 35 Nm, a small air gap must still be present between cylinder block and sealing flange.

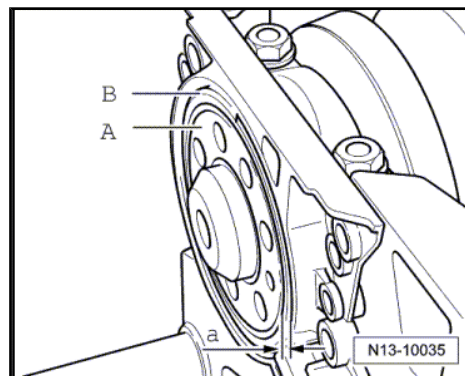


E - Inspect the installation position of the rotor on the crankshaft

- Screw in hexagon nut -E- up to the end of the threaded spindle.
- Release screws -A- from the cylinder block.
- Release knurled screws -B- from the sealing flange.
- Unscrew hexagon socket head bolts.
- Unscrew assembly device - T10134- from the crankshaft flange - to do so, unscrew the hexagon socket head bolts from the crankshaft flange.
- Remove assembly tool - T10134- .
- Remove sealing lip support ring.
- Mount depth gauge - VAS 6082- onto the crankshaft flange.

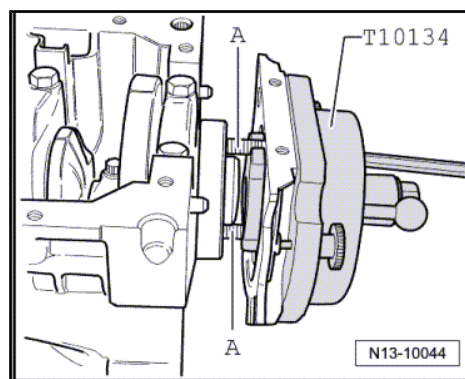


- Measure distance between crankshaft flange -A- and rotor -B-.
- Specified value: Dimension -a- = 0.5 mm
- If dimension -a- is too small, press rotor down ➔ [page 72](#) .
- When the specified value has been reached, perform the remaining assembly ➔ [page 73](#) .

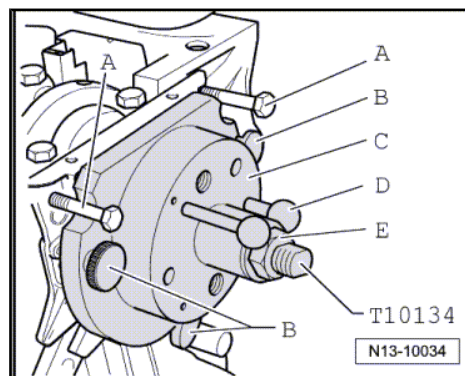


F - Pressing down the rotor

- Secure assembly device - T10134- to crankshaft flange - to do so tighten hexagon socket head bolts -A- by hand.
- Press the assembly tool against the sealing flange by hand.



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



- Tighten hexagon nut for the assembly device - T10134- to 40 Nm.
- Checking sender wheel installation position on crankshaft again ⇒ [page 71](#) .
- If dimension “a” is still too small, tighten assembly device - T10134- hexagon nut to 45 Nm.
- Checking sender wheel installation position on crankshaft again ⇒ [page 71](#) .

Assembling

Install in the reverse order of removal. When doing this, note the following:

- Installing the oil pan
⇒ [“1.5 Removing and installing oil sump”, page 135](#) .
- Installing intermediate plate ⇒ [page 66](#) .
- Install flywheel
⇒ [“2.5 Removing and installing flywheel”, page 73](#) .

Tightening torques

- ◆ ⇒ [Fig. ““Sealing flange on the gearbox side - tightening torque and tightening order””, page 66](#)
- ◆ ⇒ [“1.1 Summary of components - preheating system”, page 420](#)

2.5 Removing and installing flywheel

Special tools and workshop equipment required

- ◆ Counterholder - MP1-223 (3067)-

Removing

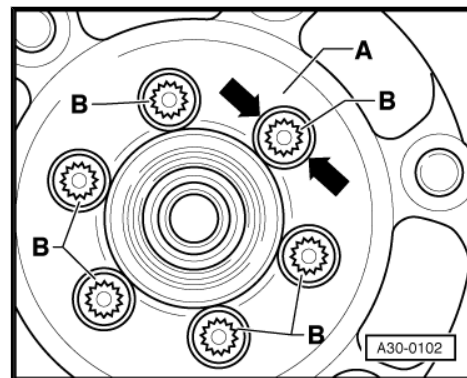
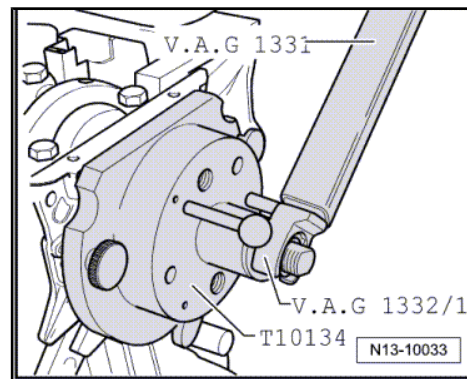
- Gearbox removed.



Caution

Risk of destruction of the flywheel.

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





- Insert counterholder - MP1-223 (3067)- into the bore on the cylinder block Pos. -B-, loosen flywheel screws.
- Release screws and remove flywheel.

Install

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



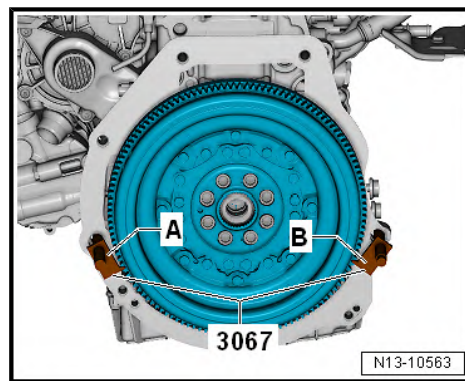
Note

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

- Insert counterholder - MP1-223 (3067)- into the bore on the cylinder block Pos. -A-.

Tightening torques

- ♦ ⇒ [“2.3 Summary of components - gearbox side summary of components and flywheel”, page 64](#)



3 Crankshaft, Piston and Conrod

⇒ [“3.1 Summary of components - crankshaft”, page 75](#)

⇒ [“3.2 Replace the needle bearing in the crankshaft”, page 76](#)

⇒ [“3.3 Assembly overview - piston and conrod”, page 77](#)

⇒ [“3.4 Removing and installing the piston”, page 82](#)

⇒ [“3.5 Checking piston projection in TDC”, page 83](#)

⇒ [“3.6 Separating new conrod”, page 84](#)

3.1 Summary of components - crankshaft



Note

- ◆ The summary of components refers exclusively to engines without balancing shafts.
- ◆ On engines with balancing shafts, the crankshaft must not be removed. The balancing shaft system must not be disassembled.

1 - Cylinder block

2 - Bearing shell

- ☐ for cylinder block with lubricating groove
- ☐ replace used bearing shells

3 - Toothed belt pulley

- ☐ for oil pump drive
- ☐ not available individually as a spare part

4 - Bearing shell

- ☐ for bearing cap without lubricating groove
- ☐ replace used bearing shells

5 - Screw

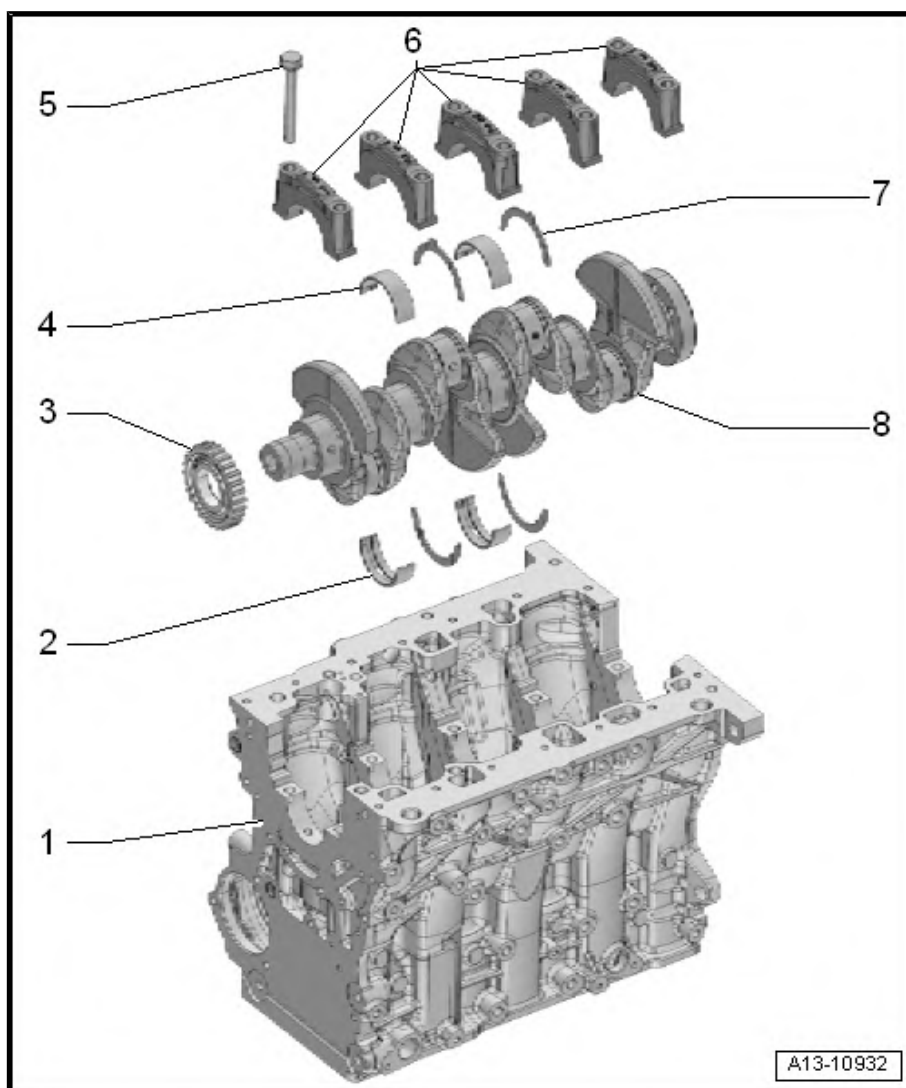
- ☐ replace after removal
- ☐ 65 Nm + torque a further 90° (1/4 turn)

6 - Bearing caps

- ☐ Bearing cover 1: Belt pulley side
- ☐ bearing cap 3 with recesses for thrust washers
- ☐ Fitting position: retaining lugs of the bearing shells in the cylinder block/bearing cap must be on top of one another

7 - Thrust washer

- ☐ for bearing 3
- ☐ different version for cylinder block and bearing cap
- ☐ pay attention to locating element





8 - Crankshaft

- ☐ for vehicles with manual gearbox, no needle bearing must be installed; remove needle bearing if necessary ⇒ ["3.2 Replace the needle bearing in the crankshaft", page 76](#)
- ☐ for vehicles with dual clutch gearbox, needle bearing must be installed in the crankshaft; install needle bearing if necessary ⇒ ["3.2 Replace the needle bearing in the crankshaft", page 76](#)
- ☐ New axial clearance: 0.07...0.17 mm

Wear limit: 0.37 mm

- ☐ Crankshaft bearing journals \varnothing 54.00 mm
- ☐ Rod bearing journals (1.6 l engine): \varnothing 47.80 mm
- ☐ Rod bearing journals (2.0 l engine): \varnothing 50.90 mm

3.2 Replace the needle bearing in the crankshaft

Special tools and workshop equipment required

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



Note

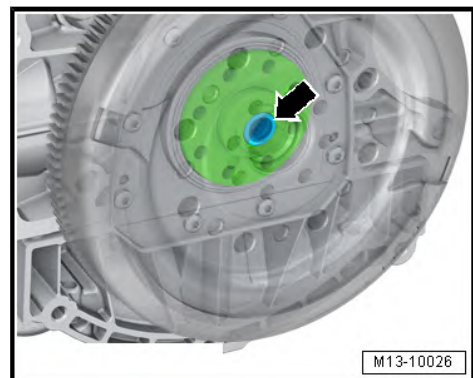
- ◆ *For vehicles with manual gearbox, no needle bearing must be installed.*
- ◆ *For vehicles with dual clutch gearbox, needle bearing must be installed in the crankshaft; ⇒ ETKA - Electronic Catalogue of Original Parts .*

Precondition

- If the engine and transmission were separated, always replace the needle bearing -arrow-.
- The leading edges of the internal extractor must not have broken out.

Removing

- Gearbox removed.



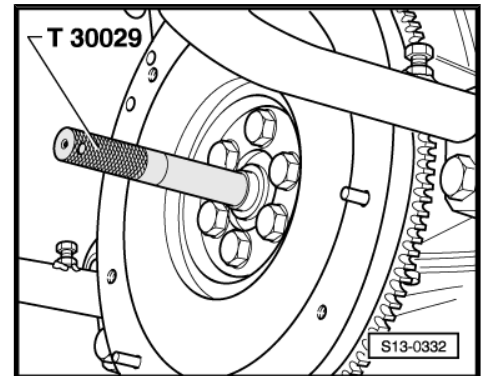
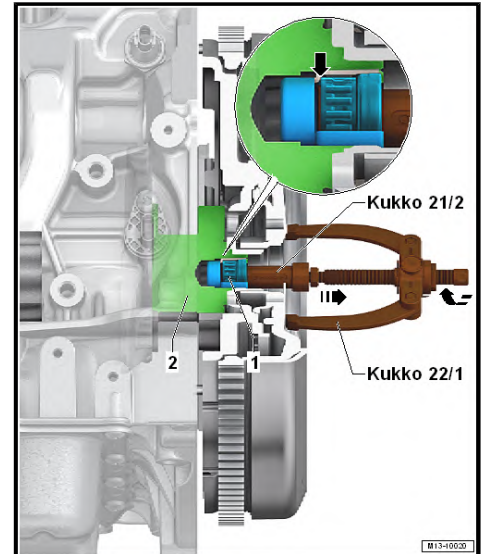
- Attach interior extractor to the needle bearing edge -arrow-.
- Pull out needle bearing with interior extractor - Kukko 21/2- and countersupport - Kukko 22/1- .

Install

Note

Labelled side of needle bearing must be legible in the installed condition.

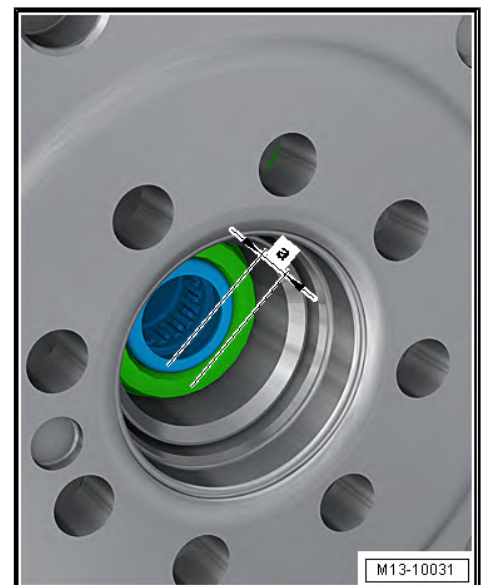
- Clean the bearing pedestal in the crankshaft and apply a thin coat of grease.
- Drive in the needle bearing using the centering pin - T30029 (3176)- .



Installation depth: Dimension -a- = 2 mm

Note

If the needle bearing is accidentally driven in too deep it will need replacing as it is damaged when it is pulled back out.



3.3 Assembly overview - piston and conrod



1 - Screw

- ☐ replace after removal
- ☐ Oil threads and contact surface.
- ☐ 30 Nm + torque a further 90° (1/4 turn)

2 - Conrod bearing cap

- ☐ Check fitting position
- ☐ as a result of the conrods separated in the cracking process, the conrod bearing cap fits only in one position and only to the relevant conrod
- ☐ Mark assignment to the cylinder in colour -B-
- ☐ Fitting position: markings -A- point toward belt pulley side

3 - Bearing shells

- ☐ Fitting position
⇒ [page 81](#)
- ☐ replace used bearing shells
- ☐ Pay attention to version: top bearing shell (towards the piston) must be in long wearing material. Distinguishing feature of new bearing shells: black marking on contact surface near the separation point
- ☐ pay attention to correct position

4 - Conrod

- ☐ Renew as set only.
- ☐ Mark assignment to the conrod bearing cap and to the cylinder in colour -B-
- ☐ Fitting position: markings -A- towards belt pulley side
- ☐ with cracked conrod bearing cap
- ☐ separate new conrod ⇒ ["3.6 Separating new conrod", page 84](#)
- ☐ Axial play wear limit: 0.37 mm

5 - Pressure relief valve

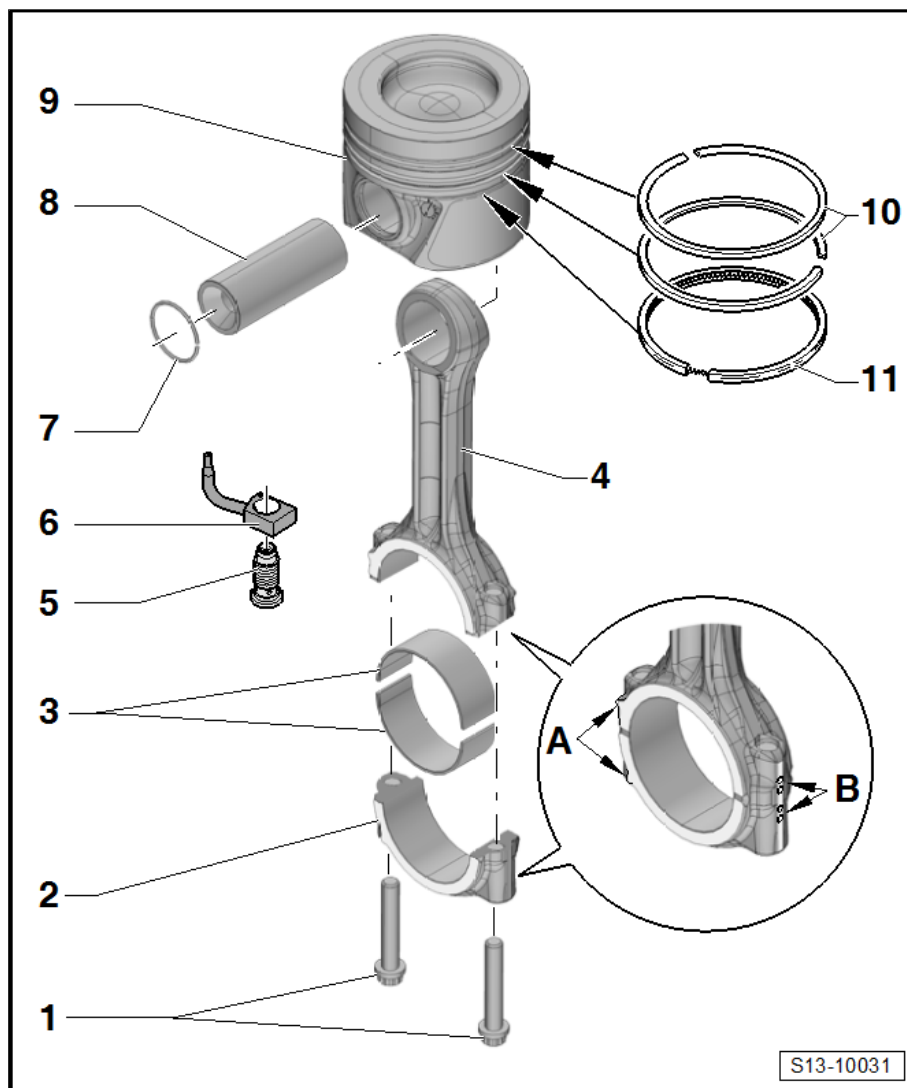
- ☐ replace without sealant
- ☐ removing and installing ⇒ [page 82](#)
- ☐ 27 Nm

6 - Oil injection nozzle

- ☐ for piston cooling
- ☐ removing and installing ⇒ [page 82](#)

7 - Circlip

- ☐ Qty. 2
- ☐ replace after removal



8 - Piston pin

- ☐ removing and installing ⇒ [“3.4 Removing and installing the piston”, page 82](#)

9 - Piston

- ☐ with combustion chamber
- ☐ replace piston if there is any sign of crack formation on the piston crown or piston body
- ☐ Mark the installation position and the assignment to cylinder ⇒ [page 81](#)
- ☐ removing and installing ⇒ [“3.4 Removing and installing the piston”, page 82](#)
- ☐ Check piston and cylinder bore ⇒ [page 80](#)
- ☐ Measure piston projection in “TDC” ⇒ [“3.5 Checking piston projection in TDC”, page 83](#)
- ☐ Observe part number ⇒ ETKA - Electronic Catalogue of Original Parts

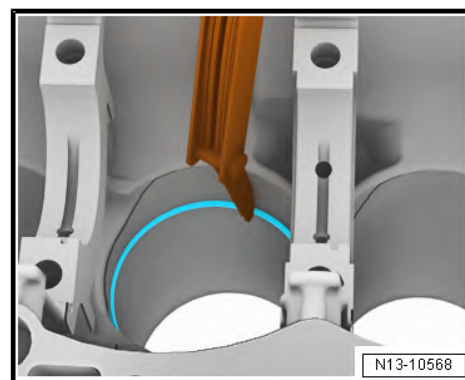
10 - Compression rings

- ☐ Measure end gap ⇒ [page 79](#)
- ☐ Measure vertical gap ⇒ [page 80](#)
- ☐ use commercially available piston ring pliers for removing and installing
- ☐ Fitting position: Identification “TOP” or labelled side for piston crown
- ☐ Offset gaps by 120°.

11 - Oil scraper ring

- ☐ Measure end gap ⇒ [page 79](#)
- ☐ Measure vertical gap ⇒ [page 80](#)
- ☐ use piston ring pliers for removing and installing
- ☐ Fitting position: Identification “TOP” or labelled side for piston crown
- ☐ Offset joint 120° to bottom compression ring

Checking piston ring gap



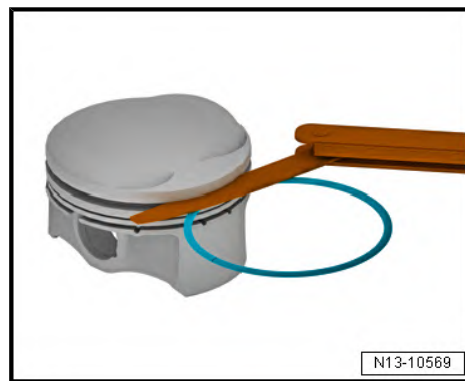
Special tools and workshop equipment required

- ◆ Feeler gauges
- Push the piston ring into the bottom cylinder opening at right angles to the cylinder wall from above to about 15 mm from the cylinder edge. To insert, use a piston without piston ring.

Piston ring (dimensions in mm)	New	Wear limit
1. Compression ring	0,30 ... 0,40	0,55
2. Compression ring	0,20 ... 0,45	0,95
Oil scraper ring	0,25 ... 0,50	0,75



Checking ring-to-groove clearance



Special tools and workshop equipment required

- ◆ Feeler gauges
- Clean before inspecting the annular grooves of the piston.

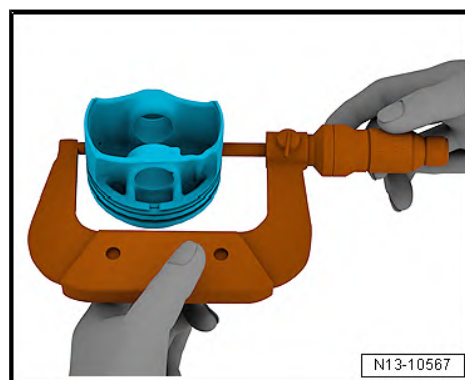
Piston ring (dimensions in mm)	Wear limit
1. Compression ring	0,08
2. Compression ring	0,08
Oil scraper ring	0,08

Checking piston

Special tools and workshop equipment required

- ◆ External micrometer
- Measure about 15 mm from the lower edge, offset at right angles to the piston pin shaft.
- Maximum deviation from nominal dimension: 0.04 mm.
- Check piston for cracks, wear of the coating on the piston body and oil coking.

Ø piston mm		
Nominal dimension	1.6 l	79,42 ¹⁾
	2.0 ltr.	80,92 ¹⁾
<ul style="list-style-type: none"> • ¹⁾ Dimensions with coating (thickness 0.02 mm). The coating wears off. 		



Checking cylinder bores

Special tools and workshop equipment required

- ◆ Internal precision measuring instrument

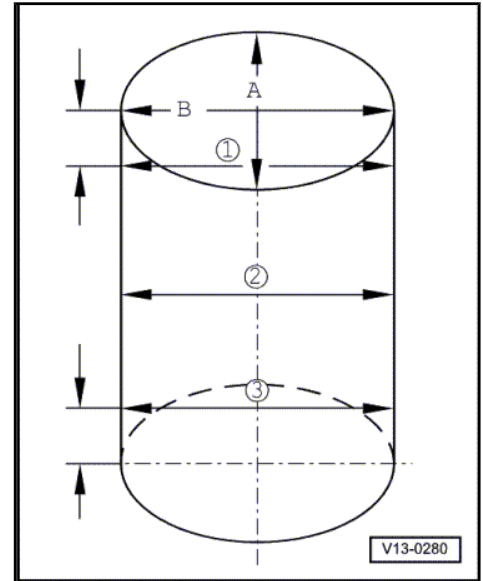
- Measure cylinder at 3 points crosswise in transverse direction -A- and lengthwise -B-.
- Maximum deviation from nominal dimension: 0.10 mm.
- Check cylinder bore for wear of the honing surface, scratches and other abnormalities.

Ø cylinder mm		
Nominal dimension	1.6 l	79,5
	2.0 ltr.	81,0



Note

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



Fitting position of piston and assignment of piston to cylinder

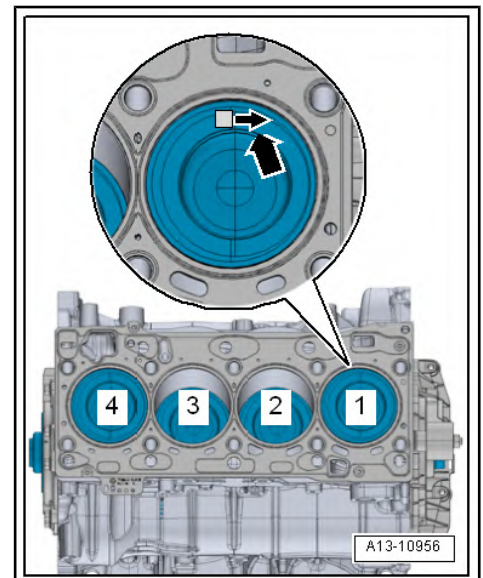


Caution

Risk of damaging the piston crown.

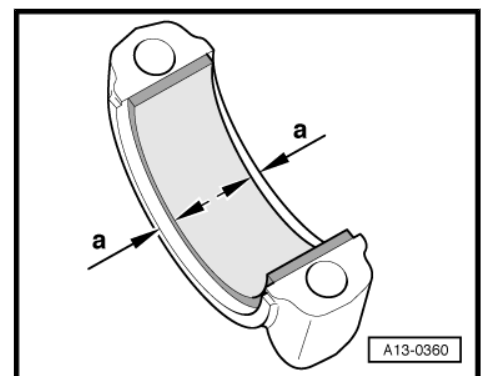
- ◆ *For re-installation, mark the assignment in colour on the piston crown of cylinders that have already been used. Piston crown not by centre punch, scratch, nick or similar mark.*

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



Installation position of the bearing shells in the conrods

- Insert bearing shells centrally in the conrod and conrod bearing cap.
- Dimension -a- = 2.5 mm





Oil spray nozzle and pressure relief valve

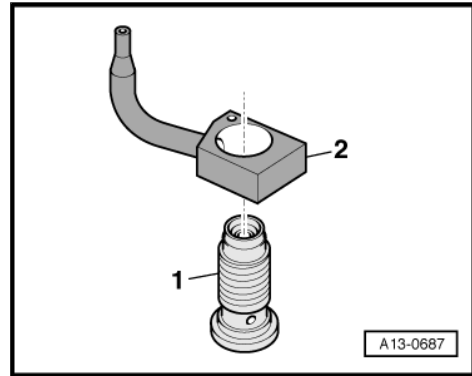
- 1 - Screw with pressure relief valve, 27 Nm
 - 2 - Oil spray nozzle (for cooling piston)
- Fitting position: Align the guide edge of the oil injection nozzle to the area of the cylinder block being worked on.



Caution

Risk of damaging the oil injection nozzles.

- ◆ *Do not bend oil injection nozzles.*
- ◆ *Check oil injection nozzles after reinstalling the pistons.*
- ◆ *Replace the oil injection nozzles if they are bent.*



3.4 Removing and installing the piston

Special tools and workshop equipment required

- ◆ Drift - VW 222 A-
- ◆ Piston ring tensioning strap

Removing

- Engine secured to engine and gearbox mount
⇒ ["1.3 Securing the engine to the assembly stand", page 23](#) .
- Remove cylinder head
⇒ ["1.5 Removing and installing cylinder head", page 93](#) .
- Remove oil pump
⇒ ["1.6 Removing and installing oil pump", page 138](#) .
- For re-installation, mark the installation position and assignment of the conrod bearing cap to the cylinder head and to the conrod Pos. -2-
⇒ ["3.3 Assembly overview - piston and conrod", page 77](#) .
- Unscrew the conrod bearing cap.
- Pull out the piston with conrod upwards.



Note

In case of tightness of the piston pin, heat piston to approximately 60 °C.

- Remove the circlip from the bore of the piston pin.
- Drive off piston pin with a drift - VW 222 A- .

Install

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



Note

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

- Oil the contact surfaces of the bearing shells.

- Install piston with piston ring tensioning strap.

Fitting position:

- Piston ⇒ [page 81](#) .
- Bearing shells in the conrods ⇒ [page 81](#) .
- Install the conrod bearing cap according to marking.
- Install oil pump
⇒ [“1.6 Removing and installing oil pump”, page 138](#) .
- Install cylinder head
⇒ [“1.5 Removing and installing cylinder head”, page 93](#) .

Tightening torques

- ◆ ⇒ [“3.3 Assembly overview - piston and conrod”, page 77](#)

3.5 Checking piston projection in TDC



Note

When installation a new piston or engine part, you must check the piston protrusion in the “TDC”.

Special tools and workshop equipment required

- ◆ Measuring tool for liner pretension - MP 1-107-

Test procedure

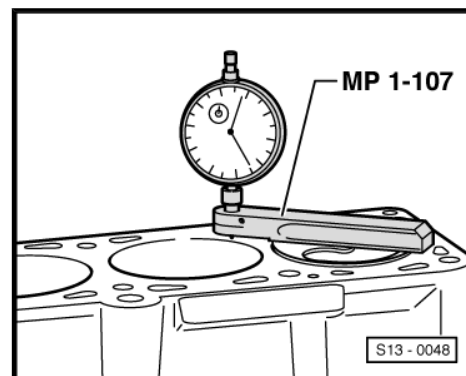
- Secure measuring device for bushing pretensioning - MP 1-107- to the cylinder block as shown in the illustration.
- Measure the projection for each cylinder at 2 points.

When fitting new pistons or a partial engine, check the piston projection in TDC on all pistons.

If different values are measured during the projection measurement of the piston, the greatest dimension applies for the seal assignment.

Depending on the piston projection fit the relevant cylinder head seal in accordance with the table below.

Piston projection over cylinder block top side mm	Identification Holes
0,91 ... 1,00	1
1,01 ... 1,10	2
1,11 ... 1,20	3





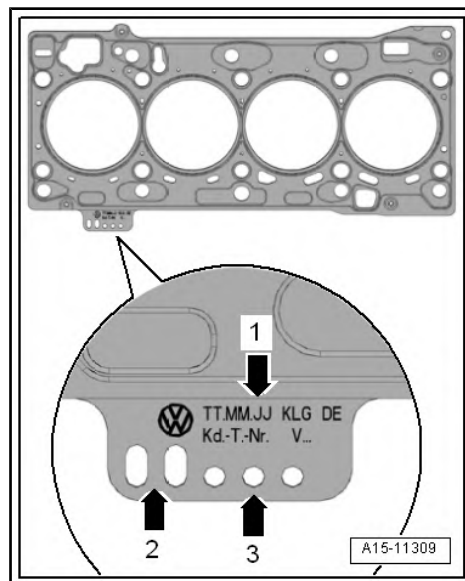
Identification of the cylinder head gasket

- ◆ Part number = arrow -1-
- ◆ Bores arrow -2- (ignore)
- ◆ Bores arrow -3-



Note

If different values are measured during the projection measurement of the piston, the greatest dimension applies for the seal assignment.



3.6 Separating new conrod

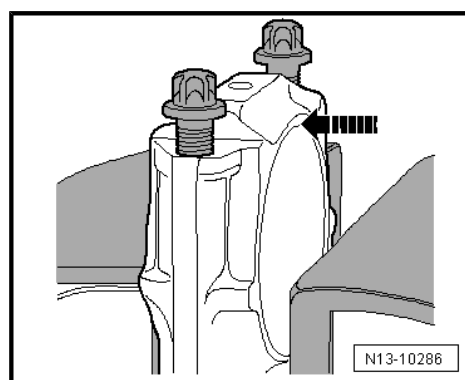
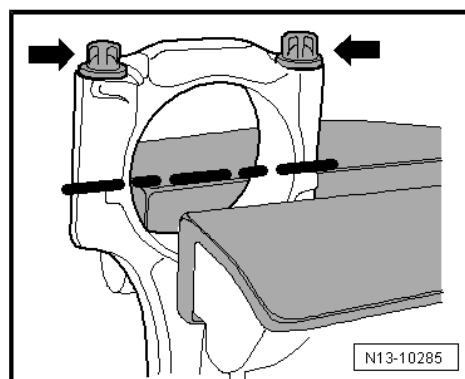
It can happen that on new conrods, the provided separation point is not completely cracked. If the conrod bearing cap cannot be removed by hand, then proceed as follows:

- Tension the conrod slightly in a vice fitted with an aluminium protective jaw, as shown in the illustration.



Note

- ◆ *Only tension the conrod slightly in order to avoid damage on the conrod.*
- ◆ *The conrod is clamped below the broken line.*
- Unscrew both screws -arrows- by approx. 5 turns.
- Carefully knock against the conrod bearing cap with a plastic hammer in -direction of arrow- in order to loosen it.



15 – Cylinder head, valve gear

1 Removing and installing cylinder head

⇒ [“1.1 Assembly overview - cylinder head cover”, page 85](#)

⇒ [“1.2 Removing and installing cylinder head cover”, page 86](#)

⇒ [“1.3 Replacing gasket rings for injection units”, page 89](#)

⇒ [“1.4 Summary of components - cylinder head”, page 90](#)

⇒ [“1.5 Removing and installing cylinder head”, page 93](#)

⇒ [“1.6 Checking compression”, page 102](#)

1.1 Assembly overview - cylinder head cover

1 - Seal

- ☐ replace if damaged or leaking

2 - Cylinder head cover

- ☐ removing and installing
⇒ [“1.2 Removing and installing cylinder head cover”, page 86](#)

3 - O-ring

- ☐ replace after removal

4 - Plug

5 - Bracket

- ☐ for electrical cables

6 - Screw

- ☐ 8 Nm

7 - Grommet

- ☐ in the cylinder head cover

8 - Clamping claw

9 - Bolt

- ☐ Tightening torque Pos. -8-
⇒ [“2.1 Summary of components - injection units \(injectors\)”, page 323](#)

10 - O-ring

- ☐ replace after removal

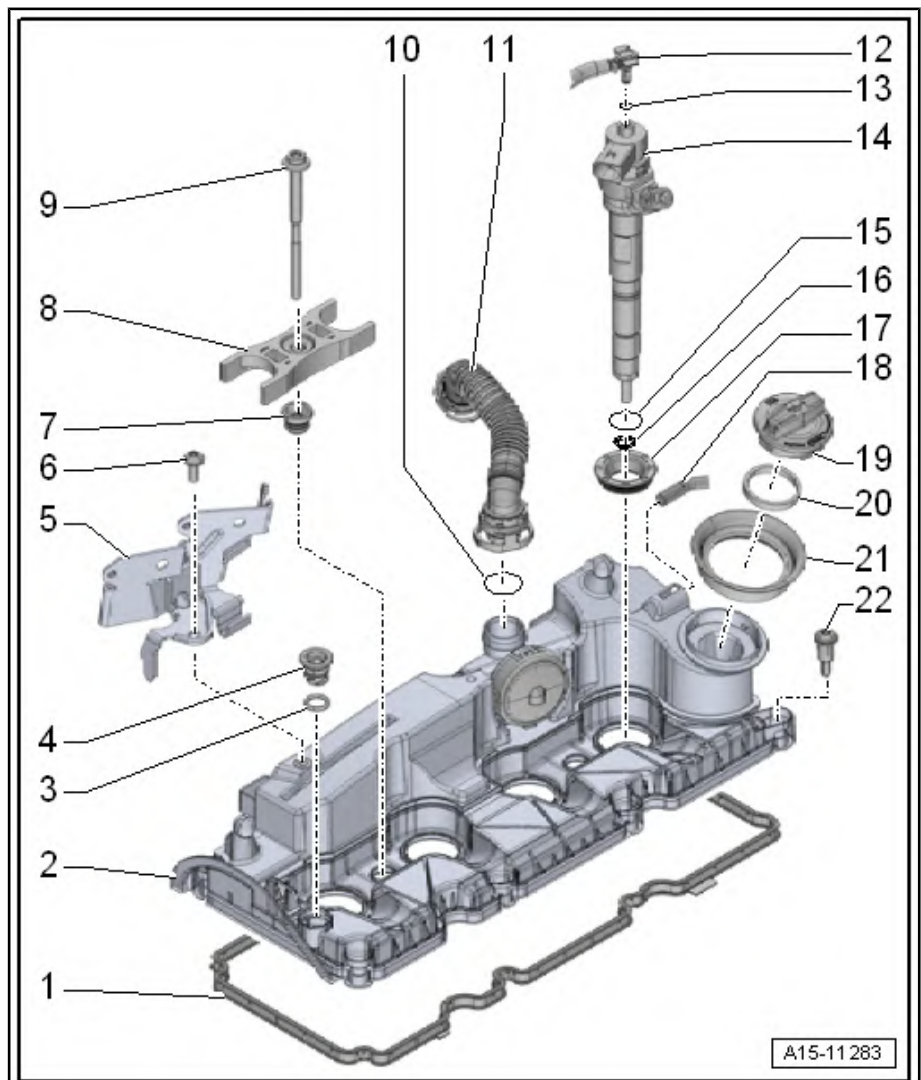
11 - Hose

- ☐ for crankcase ventilation
- ☐ to remove, press release buttons

12 - Fuel return-flow line

13 - O-ring

- ☐ replace after removal



**14 - Injection unit**

- ☐ Observe rules for cleanliness ⇒ [“3.1 Rules of cleanliness”, page 6](#)
- ☐ Summary of components ⇒ [“2.1 Summary of components - injection units \(injectors\)”, page 323](#)

15 - O-ring

- ☐ replace after removal

16 - Heat-protection seal

- ☐ replace after removal

17 - Gasket ring

- ☐ for injection unit
- ☐ replace after removal ⇒ [“1.3 Replacing gasket rings for injection units”, page 89](#)

18 - Vacuum hose**19 - Screw cap****20 - Seal**

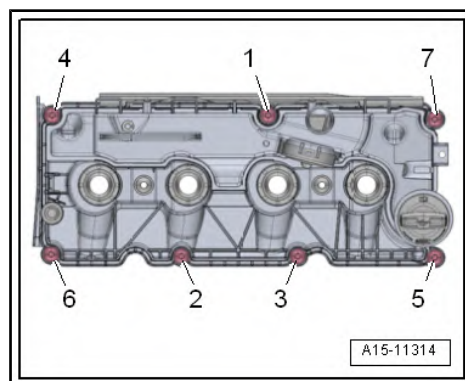
- ☐ for cap

21 - Sealing sleeve**22 - Bolt**

- ☐ replace if the seal has been damaged
- ☐ Tightening torque and tightening order ⇒ [page 86](#)

Cylinder head cover - tightening torque and tightening order

- Tighten the screws for the cylinder head cover in the sequence -1...7- to 9 Nm.



1.2 Removing and installing cylinder head cover

Special tools and workshop equipment required

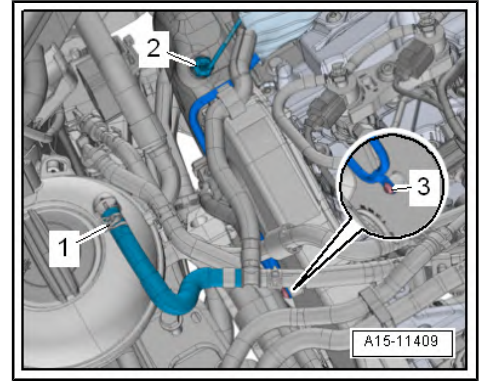
- ◆ Extension SW 17 from the set of tools - T10395-

Removing**Note**

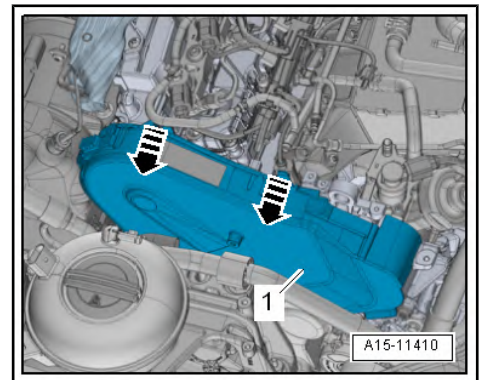
Fit the heat protection sleeve on again in the same place when installing.

- Remove engine cover
⇒ [“1.1 Removing and installing engine trim panel”, page 10](#) .

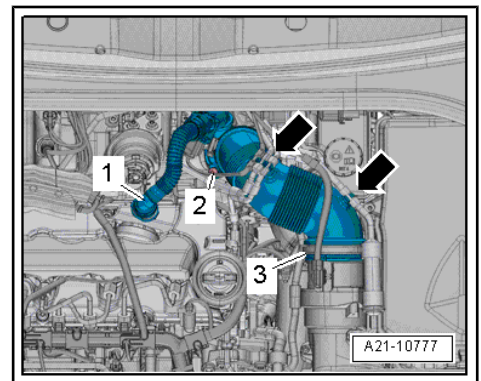
- Unscrew exhaust temperature transmitter 3 - G495- Pos. -2- with a tool from the tool set SW 17 - T10395- and a suitable tool insert.
- Unscrew screw -3-, expose the pipeline and push it to the side.



- Unlock catches -arrows-, unhook and push top toothed belt guard -1- to the right side
- Remove the injection units
⇒ [“2.8 Removing and installing the injection units”, page 331](#) .



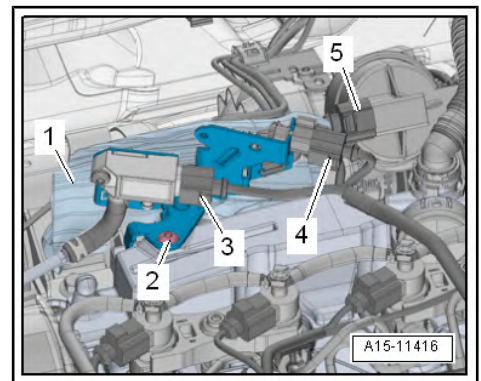
- Press release buttons on the hose -1- for crankcase ventilation, remove hose from cylinder head cover.
- Disconnect vacuum hoses on the air guide pipe -arrows-.
- Slacken hose clamp -3-, remove air guide pipe from air mass meter - G70- .
- Release screw -2-, swivel air guide pipe with inlet connection towards the rear and detach from exhaust gas turbocharger.



For vehicles with engine identification characters CLHA, CLHB, CKFB, CKFC, CRVC, CUPA

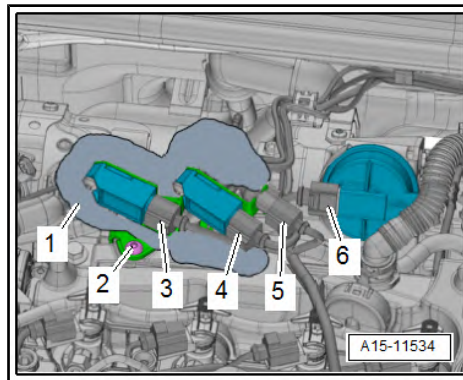
- Open heat protection sleeve -1-.
- Disconnect electrical plug connections -3-, -4-, -5-, expose electric wiring loom.
- Unscrew screw -2-, lay bracket with differential pressure transmitter - G505- to the rear.

For vehicles with engine identification characters CRKB, CRMB, CUNA



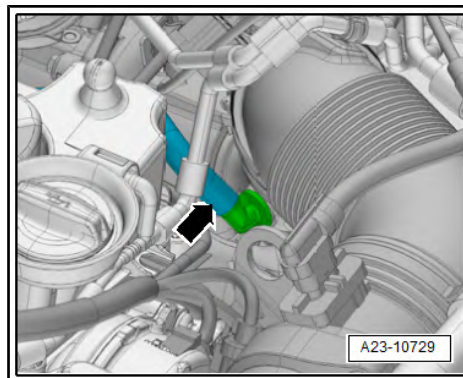


- Open heat protection sleeve -1-.
- Disconnect electrical plug connections -3-, -5-, -6- expose electric wiring loom.
- Release screw -2-.
- Separate electrical plug connection -4-.

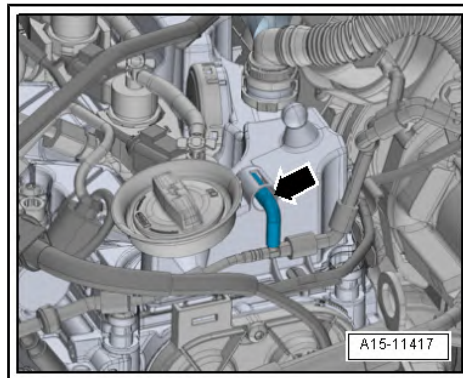


- Detach vacuum hose -arrow- and put to one side.
- Place the bracket with the differential pressure transmitter to the rear.

Continued for all vehicles



- Detach vacuum hose -arrow-.



- Slacken the screws for the cylinder head cover in the sequence -7 ... 1- and release them.
- Remove cylinder head cover.

Install

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



Note

- ◆ *Renew O-ring.*
- ◆ *Replace gasket and screws for cylinder head cover if damaged or leaking.*
- Connect vacuum hose
⇒ [“1.4 Connection diagram for vacuum hoses”, page 306](#) .

Tightening torques

- ◆ ⇒ [Fig. “Cylinder head cover - tightening torque and tightening order”](#), page 86
- ◆ ⇒ [“1.6 Summary of components - toothed belt guard”, page 42](#)
- ◆ ⇒ [“1.1 Exhaust gas turbocharger with component parts - Summary of components”, page 290](#)
- ◆ ⇒ [“3.1 Summary of components - exhaust temperature regulation”, page 402](#)
- ◆ ⇒ [“2.1 Summary of components - injection units \(injectors\)”, page 323](#)

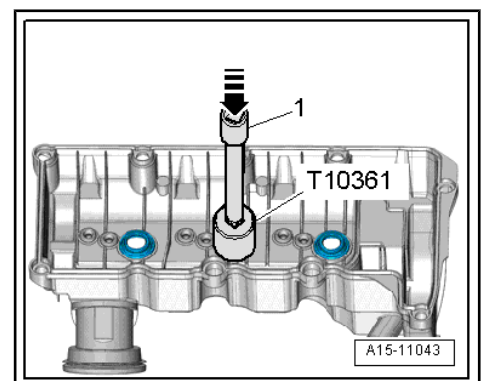
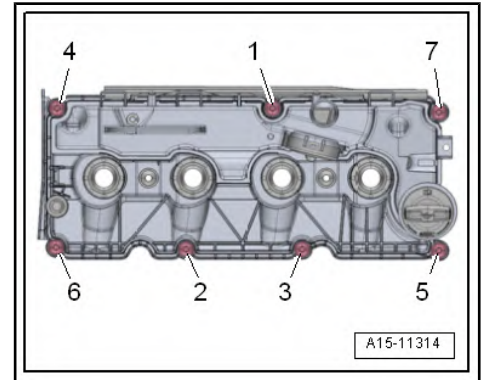
1.3 Replacing gasket rings for injection units

Special tools and workshop equipment required

- ◆ Driver - 3390-
- ◆ Tool set for FSI engines - T10133C-
- ◆ Gasket ring extractor - T40195-

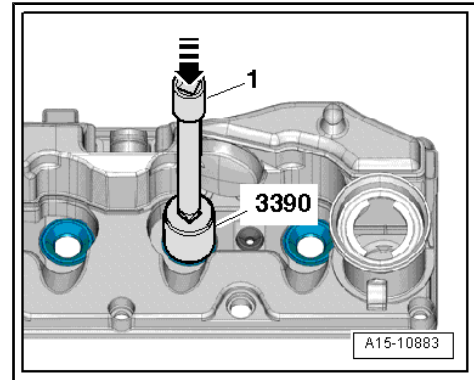
Work procedure

- Remove injection unit concerned
⇒ [“2.8 Removing and installing the injection units”, page 331](#) .
- Insert gasket ring extractor - T40195- into the gasket ring -1-.
- Position hammer -T10133/3- with the adapter -T10133/2- at the gasket ring extractor, as shown in the illustration, and pull out upwards.





- Press in the new gasket ring for the injection unit using the driver - 3390- and a short extension -1- from the outside of the cover up to the stop.



1.4 Summary of components - cylinder head



Note

- ◆ *Cylinder heads with cracks between the valve seats may continue to be used without any reduction in the life time provided the cracks are slight and max. 0.5 mm wide.*
- ◆ *It is not permissible to rework the cylinder heads of diesel engines.*
- ◆ *Replace self-locking nuts, gasket rings, gaskets and O-rings.*
- ◆ *Replace cylinder head bolts and screws which have been tightened to a torquing angle.*
- ◆ *Oil contact surfaces between the roller rocker finger and cam slideway.*
- ◆ *Secure all hose connections with spring-type clips that comply with the series design ⇒ ETKA - Electronic Catalogue of Original Parts .*
- ◆ *If the cylinder head or the cylinder head gasket is replaced, the system must be completely filled with fresh coolant ⇒ ["1.2 Draining and filling coolant", page 151](#) .*

1 - Cylinder block

2 - Cylinder head gasket

- ☐ replace after removal
⇒ ["1.5 Removing and installing cylinder head", page 93](#)
- ☐ Identification of the cylinder head gasket
⇒ [page 92](#)
- ☐ change coolant and engine oil after replacement
- ☐ Observe part number ⇒ ETKA - Electronic Catalogue of Original Parts

3 - Cylinder head

- ☐ removing and installing
⇒ ["1.5 Removing and installing cylinder head", page 93](#)
- ☐ lay removed cylinder head on a foam pad only, otherwise the glow plugs may be damaged
- ☐ check for distortion
⇒ [page 92](#)
- ☐ must not be reworked
- ☐ before installing, check whether both dowel sleeves for centering the cylinder head at the cylinder block are present
- ☐ change coolant and engine oil after replacement

- ☐ Observe part number ⇒ ETKA - Electronic Catalogue of Original Parts

4 - Fit pin

- ☐ for camshaft housing

5 - Bolt

- ☐ replace after removal
- ☐ Loosening order ⇒ [page 100](#)
- ☐ Tightening torque and tightening order ⇒ [page 93](#)

6 - Screw

- ☐ 20 Nm

7 - Engine suspension eye

8 - Distance ring

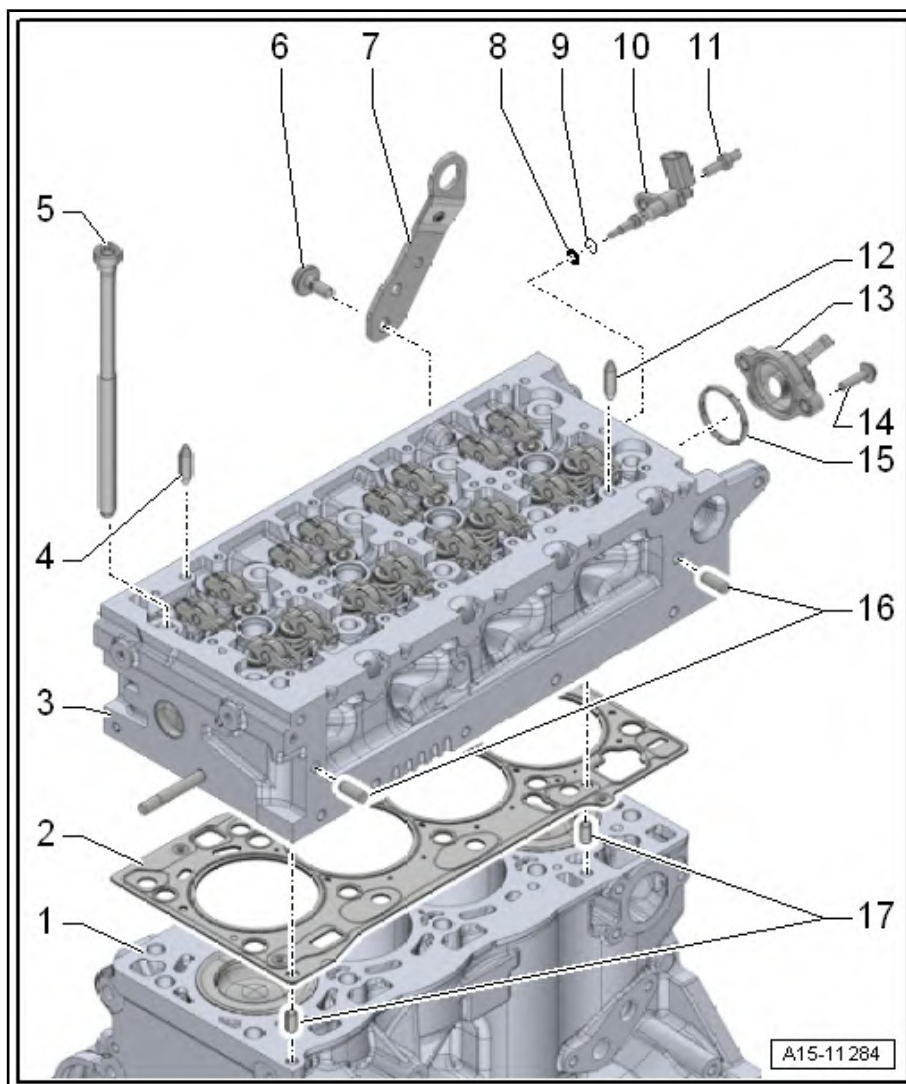
- ☐ replace if damaged

9 - O-ring

- ☐ replace after removal
- ☐ Moisten with coolant

10 - Coolant temperature transmitter - G62-

- ☐ removing and installing
⇒ ["2.8 Removing and installing coolant temperature transmitter G62", page 166](#)



11 - Double screw

- ☐ Tightening torque Pos. -4-
⇒ ["2.2 Summary of components - coolant temperature transmitter", page 161](#)

12 - Fit pin

- ☐ for camshaft housing

13 - Inlet connections

- ☐ for coolant hoses

14 - Screw

- ☐ 10 Nm

15 - Gasket ring

- ☐ replace after removal

16 - Fit pin

- ☐ for intake manifold with charge air cooler

17 - Dowel sleeves

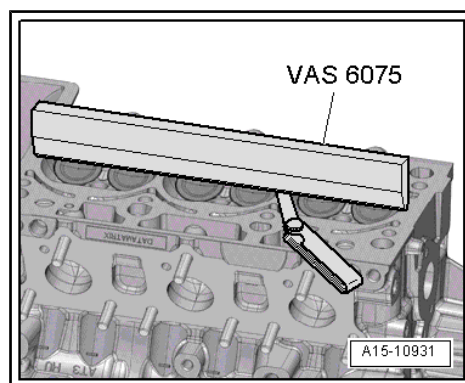
Checking cylinder head for distortion

- Inspect cylinder head at several points for distortion using a 500 mm knife-edge straightedge - VAS 6075- and feeler gauge.
- Maximum permitted distortion: 0.1 mm.



Note

Cylinder heads for TDI engines must not be reworked.



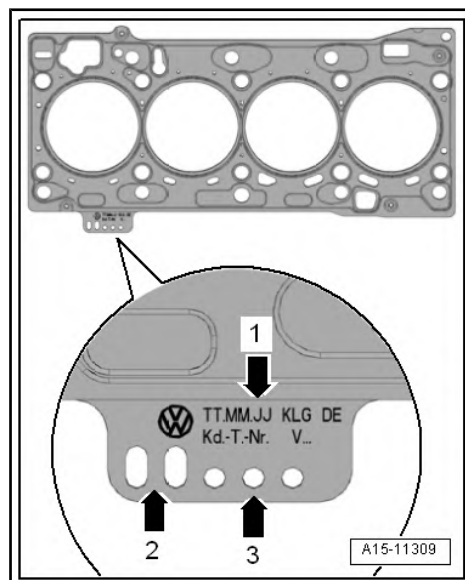
Identification of the cylinder head gasket

- ◆ Part number = arrow -1-
- ◆ Bores arrow -2- (ignore)
- ◆ Bores arrow -3-



Note

Differing thicknesses of cylinder head gaskets are inserted according to the piston projection
⇒ ["3.5 Checking piston projection in TDC", page 83](#) . If only the cylinder head gasket is replaced, install a new cylinder head gasket with the same identification.



Cylinder head - tightening torque and tightening order

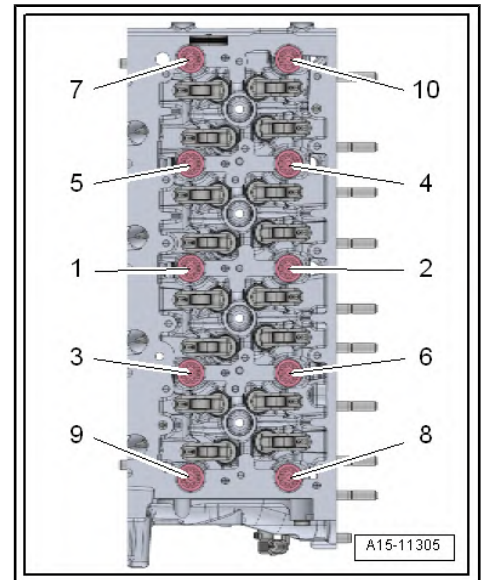


Note

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

- Tighten screws in steps in the given sequence:

Stage	Screws	Tightening torque/torquing angle
1.	-1 ... 10-	30 Nm
2.	-1 ... 10-	65 Nm
3.	-1 ... 10-	Turn 90° further
4.	-1 ... 10-	Turn 90° further



1.5 Removing and installing cylinder head

Special tools and workshop equipment required

- ◆ Removal tool for inner lining of the door panel - MP8-602/1-
- ◆ Hose clip pliers - VAS 6362-
- ◆ Sealant remover gasket stripper (bearing code GST, bearing article no. R 34402), manufacturer Retech s.r.o.
- ◆ Protective goggles and gloves

Removing

Requirements

- Engine temperature should not exceed 35°, because the cylinder head could be twisted when slackening the screws.
- The pistons must not be in TDC.



Caution

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

- ◆ Lay lines of all kinds (for example, for fuel, hydraulic fluid, cooling fluid and refrigerant, brake fluid, vacuum) and electrical lines in such a way that the original line guide is re-established.
- ◆ To avoid damage to lines/wiring, ensure sufficient clearance to all moving or hot components.
- ◆ Fit all heat protection sleeves on again in the same place when installing.

Observe all safety measures and notes for assembly work on the fuel supply and injection system, at the charge air system and observe as well the rules for cleanliness

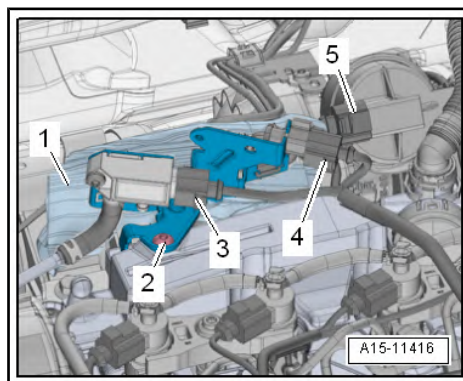
⇒ ["3 Repair instructions", page 6](#) .

- Remove engine cover
⇒ ["1.1 Removing and installing engine trim panel", page 10](#) .

- Remove front top coolant pipe
⇒ ["3.2 Removing and installing the front top coolant pipes", page 172](#) .
- Remove rear coolant pipe
⇒ ["3.7 Removing and installing the rear coolant pipe", page 179](#) .
- Remove left coolant pipe
⇒ ["3.6 Remove and install the left coolant pipes", page 178](#) .
- Remove the front silencer
⇒ ["1.2 Removing and installing exhaust pipe", page 380](#) .
- Remove the toothed belt from the camshaft
⇒ ["1.10 Remove the toothed belt from the camshaft", page 49](#) .

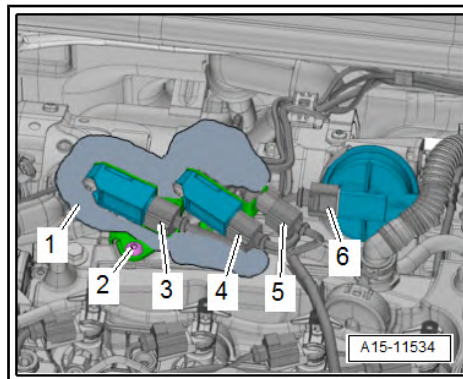
For vehicles with engine identification characters CLHA, CLHB, CKFB, CKFC, CRVC, CUPA

- Open heat protection sleeve -1-.
- Take electrical plug connection-4 - out of the holder, disconnect and expose electric cable.
- Disconnect electrical plug connections -3-, -5-, expose electric wiring loom:
- Unscrew screw -2-, lay bracket with differential pressure transmitter - G505- to the rear.



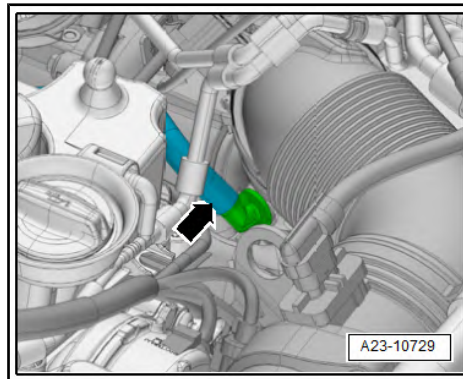
For vehicles with engine identification characters CRKB, CRMB, CUNA

- Open heat protection sleeve -1-.
- Disconnect electrical plug connections -3-, -5-, -6- expose electric wiring loom.
- Release screw -2-.
- Separate electrical plug connection -4-.

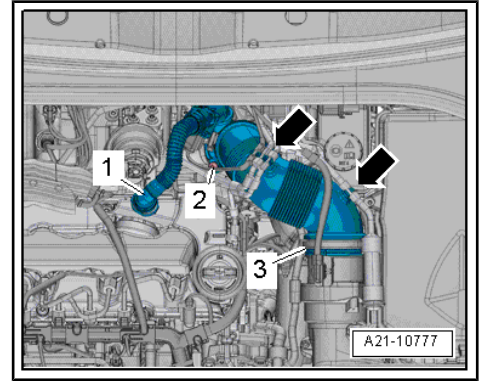


- Detach vacuum hose -arrow- and put to one side.
- Place the bracket with the differential pressure transmitter to the rear.

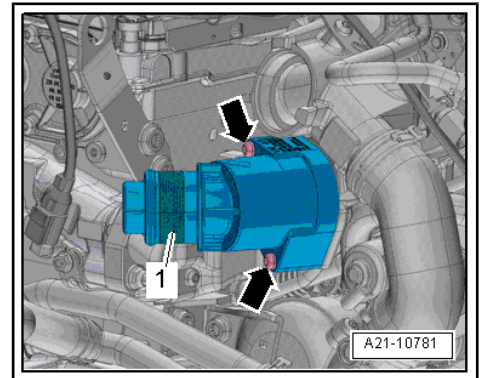
Continued for all vehicles



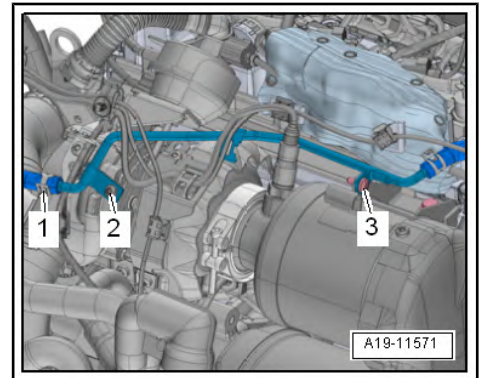
- Press release buttons on the hose -1- for crankcase ventilation, remove hose from cylinder head cover.
- Disconnect vacuum hoses on the air guide pipe -arrows-.
- Release screw -2-, swivel air guide pipe with inlet connection towards the rear and detach from exhaust gas turbocharger.



- Release screws -arrows- and remove pre-volume tank -1-.



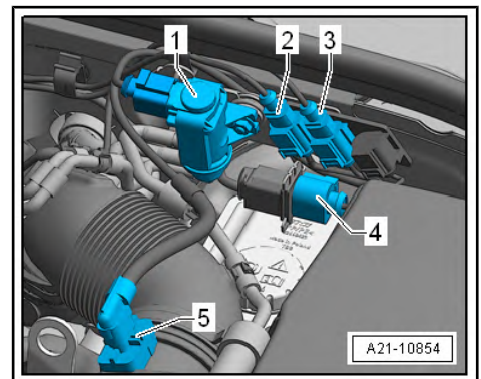
- Loosen hose clamp -1-, remove coolant hose.
- Unscrew screw -2-, remove screw -3- and swivel coolant line to the side.



- Expose the following plug connections and electric cables:
2 - for exhaust gas temperature transmitter 4 - G648-
3 - for exhaust gas temperature transmitter 3 - G495-
- Take electrical plug connection-4- for lambda probe - G39- out of the holder, disconnect and expose electric cable.

Vehicles with four-wheel drive

- Remove radiator for exhaust gas recirculation
⇒ [“4.5 Removing and installing radiator for exhaust gas recirculation”, page 415](#) .





Vehicles with front-wheel-drive

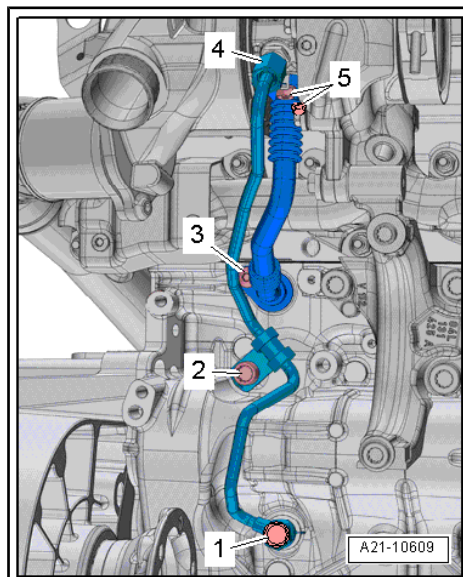
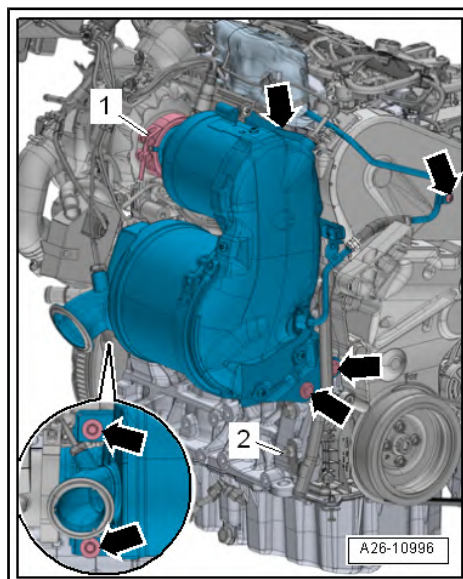
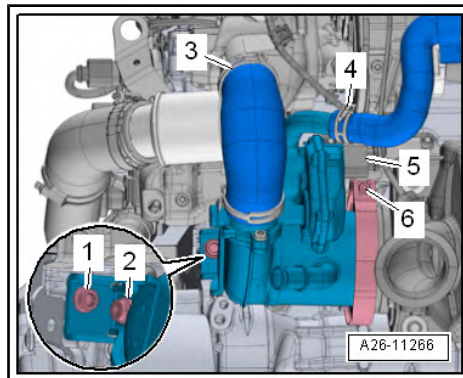
- Press heat protection sleeve to the side, disconnect electrical plug connection -5-.
- Loosen hose clamp -3-, remove air guide hose.
- Loosen hose clamp -4-, remove coolant hose.
- Unscrew screw -1-, loosen screw -2-.

Continued for all vehicles

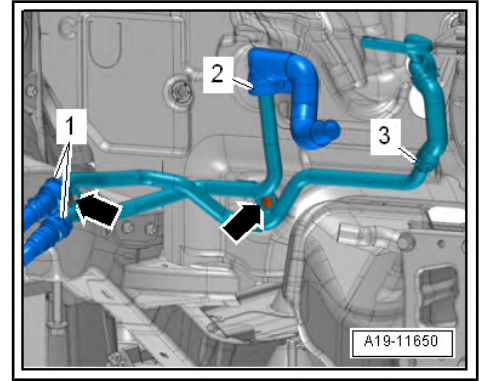
- Loosen screw -1- and remove clamping sleeve.
- Slacken the double screw -2-, press coolant pipe backwards slightly.
- Unscrew screws -arrows-, push exhaust gas cleaning module backwards - do the same to the exhaust gas recirculation cooler on vehicles with front-wheel-drive.

- Release nut -2- and remove union nut -4-.
- Release screws -3-, -5-, remove oil return pipe.

Vehicles fitted with auxiliary heating

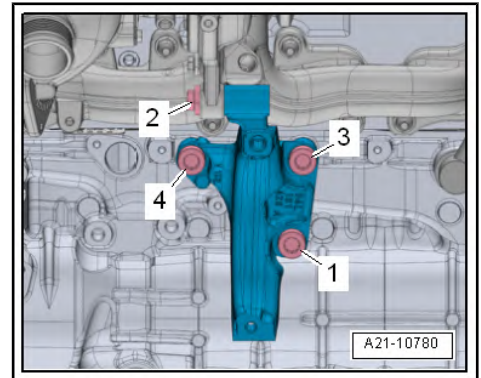


- Raise holding clamps -1- and undo hose clamp -3-, remove coolant hoses.
- Release nuts -arrows-, remove coolant pipe.



Continued for all vehicles

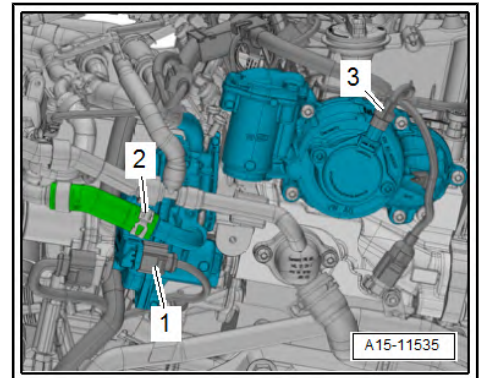
- Unscrew screw -2-, loosen screws -1-, -3-, -4- only.



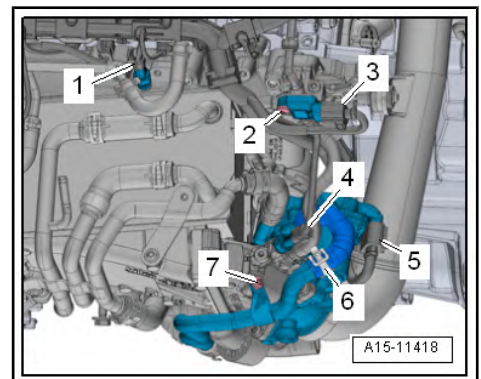
For vehicles with engine identification characters CRKB, CRMB, CUNA

- Separate electrical plug connections -1-, -3-.
- Loosen hose clamp -2-.

Continued for all vehicles



- Disconnect and expose electrical plug connections:
1 - for charge air temperature transmitter after charge air cooler - G811-
3 - for charge pressure sender - G31-
4 - for intake air temperature transmitter - G42-
5 - for throttle valve control unit - J338-
- Unscrew hose clamps -2-, -7-, remove coolant hose -6-.



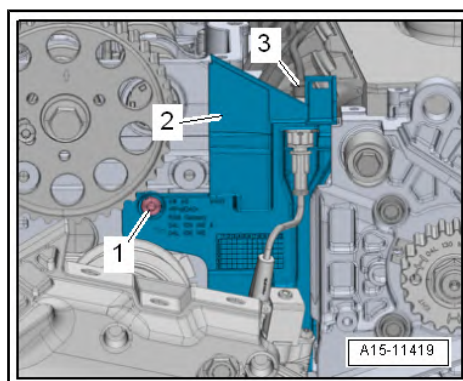
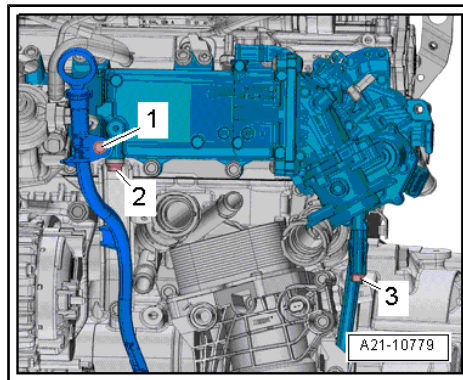
- Release screw -1- for guide pipe for oil dipstick.
- Unscrew screws -2-, -3- for intake manifold holder.

For vehicles with engine identification characters CRKB, CRMB, CUNA

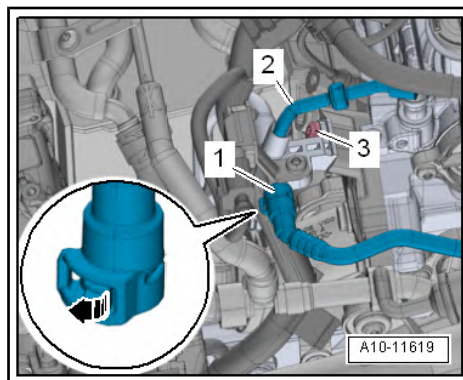
- Remove throttle valve module - J338-
⇒ [“6.2 Removing and installing the throttle valve control unit J338”, page 357](#) .

Continued for all vehicles

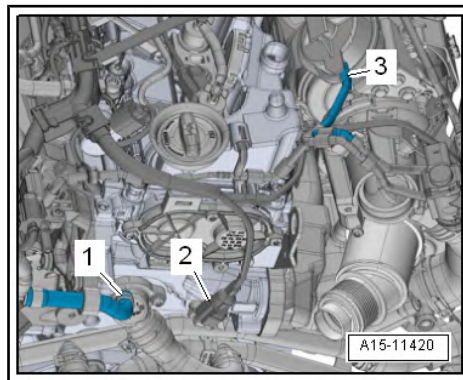
- Remove the camshaft housing
⇒ [“2.6 Removing and installing camshaft housing”, page 114](#) .
- Disconnect electrical plug connection -3- and remove from cover -2-.
- Unscrew screw -1-, remove cover.



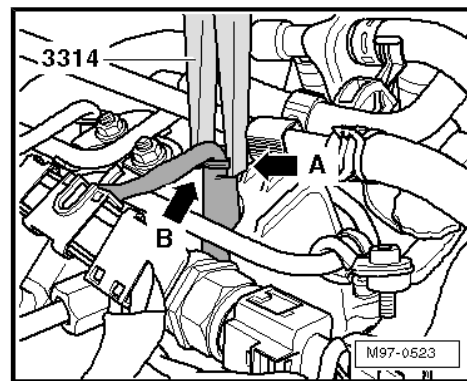
- Unlock catch -arrow-, remove vacuum hose -1-.
- Disconnect vacuum hose -2-.
- Release screw -3-.



- Disconnect the electrical plug connection -2- for coolant temperature transmitter - G62- .
- Loosen hose clamp -1-, remove coolant hose.
- Disconnect vacuum hose -3-.



- Disconnect electrical plug connections at the glow plugs
⇒ ["1.2 Removing and installing glow plugs", page 421](#) .
- Lay electrical wiring loom to the side.





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

**Note**

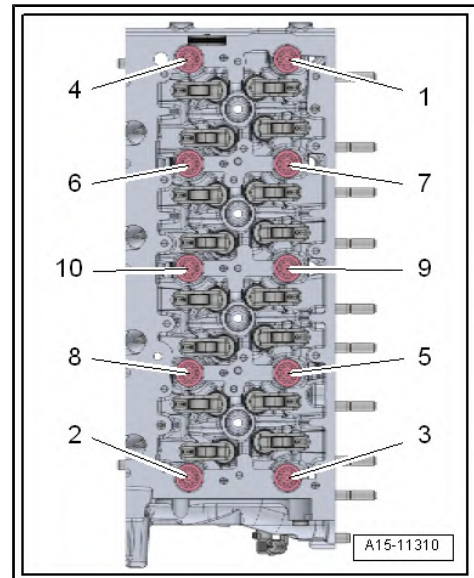
A 2nd mechanic is required for removing the cylinder head.

- Swivel the cylinder head to the left out of the rear toothed belt guard and simultaneously remove the tensioning pulley.
- Make sure that the oil return-flow line for exhaust gas turbo-charger is not damaged.
- Place the cylinder head so that the oil return-flow line is not bent. If necessary, put a piece of wood under the exhaust manifold.

**Caution**

Risk of damage to the glow plugs when turning the cylinder head.

- ◆ ***If the cylinder head is removed with installed glow plugs, do not place it down on the sealing surface since the glow plugs protrude slightly beyond the sealing surface.***

**Install****Note**

- ◆ *There must not be any oil or coolant present in the blind holes for the cylinder head bolts.*
- ◆ *Replace cylinder head bolts.*
- ◆ *Renew self-locking nuts.*
- ◆ *Replace screws which have been tightened to torquing angle.*
- ◆ *Always replace gasket rings and seals.*
- ◆ *Remove the new cylinder head gasket from its wrapping immediately before fitting.*
- ◆ *Treat the seal with the utmost care. Damage to the silicone layer and in the area of the bead results in leakages.*
- ◆ *When installing an exchange cylinder head with the camshafts installed, it is necessary to oil the contact surfaces between the roller arms and the cams after installing the cylinder head.*
- ◆ *Secure all hose connections with spring-type clips that comply with the series design ➔ ETKA - Electronic Catalogue of Original Parts .*
- ◆ *To ensure that no valve is set during starting, turn the crankshaft carefully by at least 2 turns.*

**WARNING**

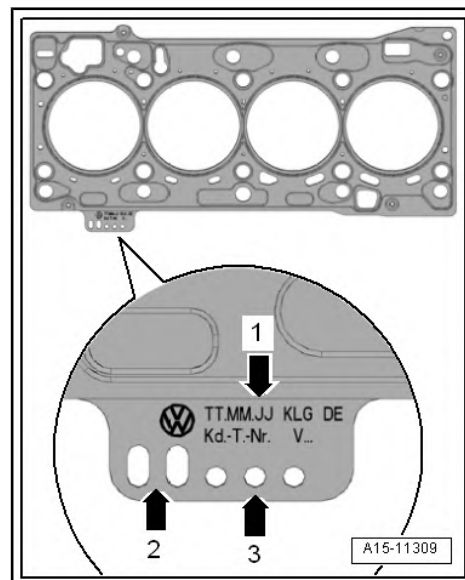
Wear protective gloves when working with sealant and grease remover!

- Make sure that when cleaning the cylinder head and cylinder block no foreign bodies can get into the cylinder or into the oil and coolant galleries.

- Carefully remove old sealant residue from the cylinder head and cylinder block using a chemical sealant remover.
- Remove the crankshaft arrester - T10490- before fitting on the cylinder head and turn back the crankshaft in the opposite direction of rotation of the engine until all the pistons are almost evenly at "TDC".
- If there are no dowel sleeves are available for centering the cylinder block and cylinder head, insert dowel sleeves.
- Pay attention to the identification of the cylinder head gasket:
 - ◆ Part number = arrow -1-
 - ◆ Bores arrow -2- (ignore)
 - ◆ Bores arrow -3-

i Note

- ◆ If the cylinder head gasket or cylinder head has been replaced, select the new head cylinder head gasket according to the number of holes of the old cylinder head gasket.
- ◆ If parts of the crankshaft drive were replaced, you must redefine the new cylinder head gasket by measuring the protrusion of the piston in the "TDC"
⇒ "3.5 Checking piston projection in TDC", page 83.

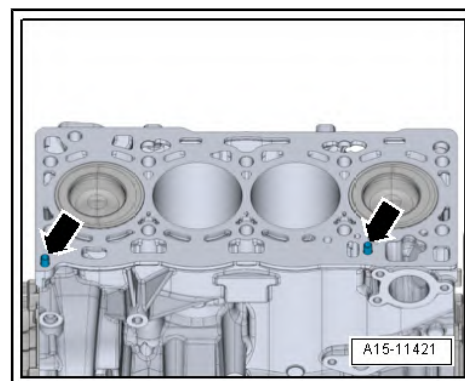


- Place cylinder head gasket on the dowel sleeves -arrows- in the cylinder block.
- Fitting position of the cylinder head gasket: Identification "top" or part number for cylinder head

i Note

The assistance of a 2nd mechanic is required for fitting on the cylinder head.

- Insert the cylinder head.
- Insert screws for cylinder head and tighten ⇒ page 93.



i Note

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



- Turn the crankshaft in the direction of rotation of the engine until the stud -arrow- of the crankshaft arrester engages - T10490- during this rotary movement in the sealing flange.
- install (set the timing) ⇒ [page 54](#) .

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

- Install exhaust gas cleaning module
⇒ [“2.2 Removing and installing exhaust gas cleaning module”, page 392](#) .
- Install front silencer
⇒ [“1.2 Removing and installing exhaust pipe”, page 380](#) .
- Install the left coolant pipe
⇒ [“3.6 Remove and install the left coolant pipes”, page 178](#) .
- Install the rear coolant pipe
⇒ [“3.7 Removing and installing the rear coolant pipe”, page 179](#) .
- Install the front top coolant pipe
⇒ [“3.2 Removing and installing the front top coolant pipes”, page 172](#) .
- Electrical connections and proper routing ⇒ Electrical System; Rep. gr. 97 and ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Change engine oil ⇒ Maintenance ; Booklet Octavia III .
- Replace coolant ⇒ [page 153](#) .

Tightening torques

- ◆ ⇒ [“1.4 Summary of components - cylinder head”, page 90](#)
- ◆ ⇒ [“1.1 Parts of the lubrication system - Summary of components”, page 127](#)
- ◆ ⇒ [“1.1 Exhaust gas turbocharger with component parts - Summary of components”, page 290](#)
- ◆ ⇒ [“6.1 Assembly overview - intake manifold”, page 355](#)
- ◆ ⇒ [“4.1 Exhaust gas recirculation with radiator for exhaust gas recirculation - Summary of components”, page 408](#)

1.6 Checking compression

Special tools and workshop equipment required

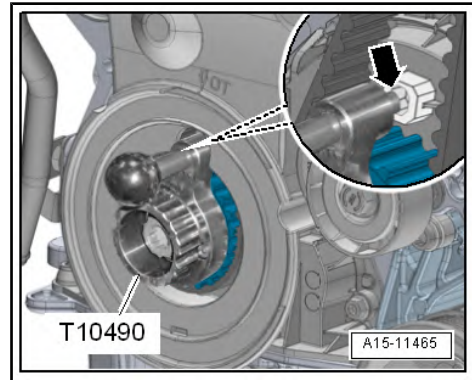
- ◆ Flexible-head wrench SW 10 - 3220-
- ◆ Compression tester , e.g. -V.A.G 1763-
- ◆ Adapter - V.A.G 1763/8-

Test prerequisite

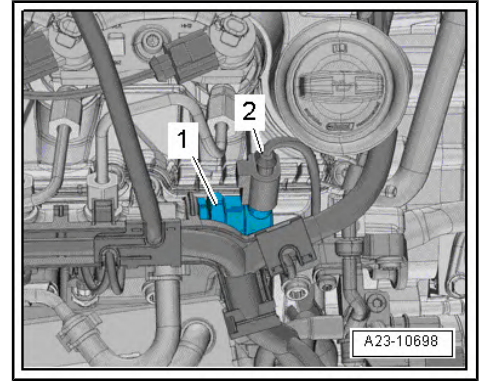
- Engine oil temperature approx. 80 C.
- Battery voltage at least 12.5 V

Test procedure

- Remove engine cover
⇒ [“1.1 Removing and installing engine trim panel”, page 10](#) .



- Disconnect electrical plug connection at the fuel pressure control valve - N276- Pos. -2-.
- To relieve the fuel pressure in the high pressure accumulator, start engine for a short time.
- Remove all glow plugs
⇒ [“1.2 Removing and installing glow plugs”, page 421](#) .



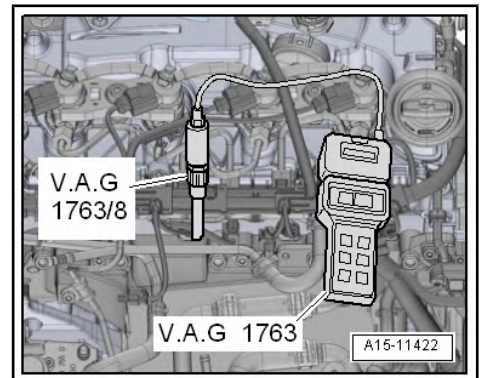
- Screw in adapter - V.A.G 1763/8- in place of the respective glow plug and connect compression tester - V.A.G 1763- .



Note

Use of the compression tester - V.A.G 1763- ⇒ Operating instructions .

- The 2nd mechanic operates the starter until the tester no longer indicates a pressure rise.
- Repeat the procedure for each cylinder.



Compression readings	Pressure
New part	2,5 ... 3.1 MPa (25.0 ... 31.0 bar)
Wear limit	1.9 MPa (19.0 bar)
Maximum difference between cylinders	0.5 MPa (5.0 bar)

Assembling

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

- Install the glow plug for the relevant cylinder
⇒ [“1.2 Removing and installing glow plugs”, page 421](#) .
- Interrogating and erasing fault memory of engine control unit
⇒ Vehicle diagnostic tester.

2 Valve gear

- ⇒ ["2.1 Assembly overview - valve gear", page 104](#)
- ⇒ ["2.2 Replacing camshaft gasket ring", page 107](#)
- ⇒ ["2.3 Removing and installing N205 the camshaft adjustment valve 1", page 109](#)
- ⇒ ["2.4 Removing and installing camshaft control", page 109](#)
- ⇒ ["2.5 Removing and installing the camshaft adjusting valve", page 112](#)
- ⇒ ["2.6 Removing and installing camshaft housing", page 114](#)
- ⇒ ["2.7 Checking hydraulic balancing elements", page 118](#)
- ⇒ ["2.8 Removing and installing valve stem seals", page 119](#)
- ⇒ ["2.9 Valve dimensions", page 125](#)
- ⇒ ["2.10 Checking valve guides", page 126](#)

2.1 Assembly overview - valve gear

1 - Screw

- ❑ Tightening torque
⇒ ["1.1 Summary of components - preheating system", page 420](#)

2 - Hall sender - G40-

- ❑ Summary of components
⇒ ["1.1 Summary of components - preheating system", page 420](#)

3 - O-ring

- ❑ replace after removal

4 - Screw cap

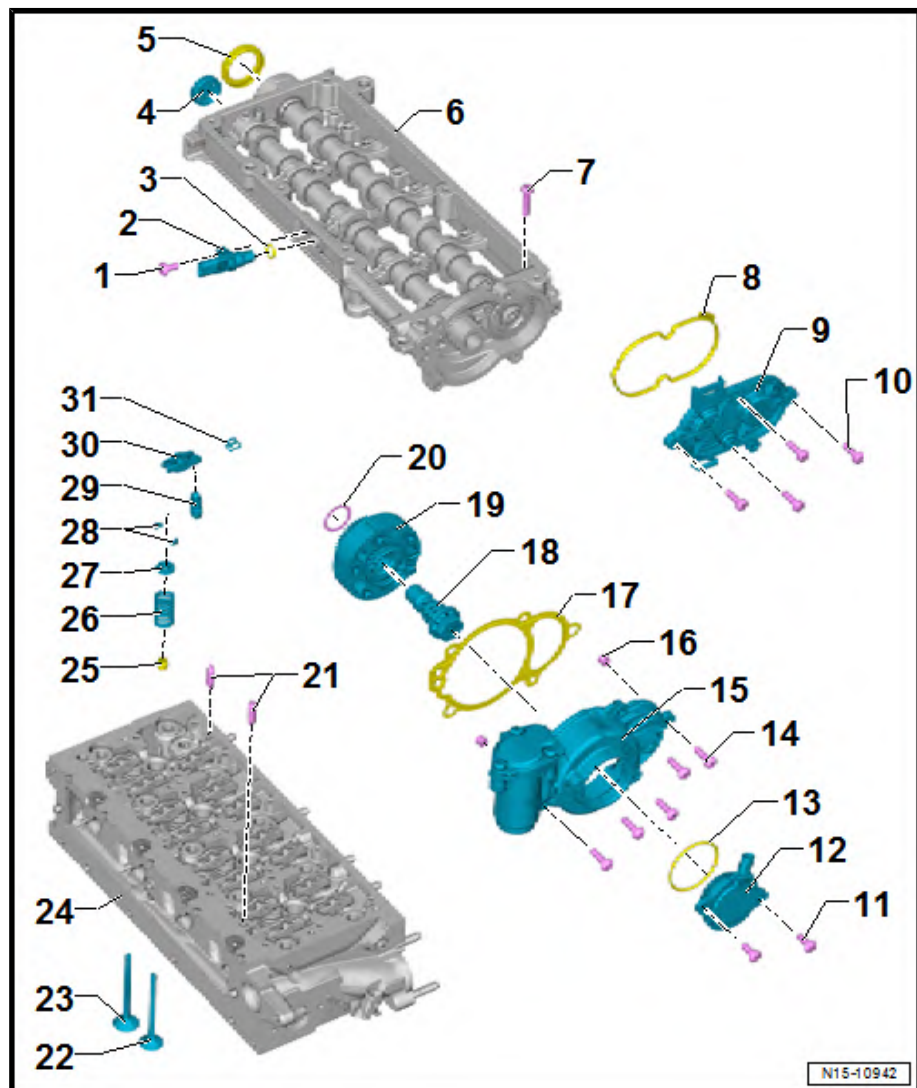
- ❑ replace after removal
- ❑ removing: In cases where there is a built-in camshaft housing, insert a punch at the side of the cover and lever out
- ❑ Installing: Without sealant with a suitable pressure bushing drive in driver - 3390- until flush

5 - Gasket ring for camshaft

- ❑ Renew.
⇒ ["2.2 Replacing camshaft gasket ring", page 107](#)

6 - Camshaft housing

- ❑ with integrated camshaft
- ❑ removing and installing
⇒ ["2.6 Removing and installing camshaft housing", page 114](#)



7 - Screw

- ☐ Loosening order ⇒ [page 116](#)
- ☐ Tightening torque and tightening order ⇒ [page 107](#)

8 - Gasket ring

- ☐ replace after removal

9 - Cover

10 - Screw

- ☐ 8 Nm

11 - Screw

- ☐ only for vehicles with engine identification characters CRKB, CRMB, CUNA
- ☐ 8 Nm

12 - Inlet camshaft control valve 1 - N205-

- ☐ only for vehicles with engine identification characters CRKB, CRMB, CUNA
- ☐ removing and installing
⇒ [“2.3 Removing and installing N205 the camshaft adjustment valve 1”, page 109](#)

13 - Gasket ring

- ☐ only for vehicles with engine identification characters CRKB, CRMB, CUNA
- ☐ replace after removal

14 - Screw

- ☐ only for vehicles with engine identification characters CRKB, CRMB, CUNA
- ☐ Tightening torque and tightening order ⇒ [page 107](#)

15 - Bush

- ☐ only for vehicles with engine identification characters CRKB, CRMB, CUNA
- ☐ for camshaft control

16 - Fitting sleeve

- ☐ only for vehicles with engine identification characters CRKB, CRMB, CUNA

17 - Gasket

- ☐ only for vehicles with engine identification characters CRKB, CRMB, CUNA
- ☐ replace after removal

18 - Adjusting valve

- ☐ only for vehicles with engine identification characters CRKB, CRMB, CUNA
- ☐ removing and installing ⇒ [“2.5 Removing and installing the camshaft adjusting valve”, page 112](#)
- ☐ 50 Nm



19 - Camshaft adjuster



Caution

A thrust washer Pos. -20- is installed between camshaft adjuster and camshaft for secure connection

⇒ [Item 20 \(page 106\)](#) . Before assembly, you must ensure that this thrust washer is in the camshaft adjuster. Otherwise, the camshaft adjuster can become loose when the engine is running and damage to the engine may occur.

- ☐ only for vehicles with engine identification characters CRKB, CRMB, CUNA
- ☐ removing and installing ⇒ [“2.4 Removing and installing camshaft control”, page 109](#)

20 - Thrust washer

- ☐ only for vehicles with engine identification characters CRKB, CRMB, CUNA
- ☐ check presence before assembling the camshaft adjusted

21 - Fit pin

- ☐ for camshaft housing

22 - Exhaust valve

- ☐ do not rework, only grinding in is permissible
- ☐ mark the fitting position for re-installation
- ☐ wymiary zaworu ⇒ [“2.9 Valve dimensions”, page 125](#)
- ☐ inspecting valve guides ⇒ [“2.10 Checking valve guides”, page 126](#)

23 - Inlet valve

- ☐ do not rework, only grinding in is permissible
- ☐ mark the fitting position for re-installation
- ☐ wymiary zaworu ⇒ [“2.9 Valve dimensions”, page 125](#)
- ☐ inspecting valve guides ⇒ [“2.10 Checking valve guides”, page 126](#)

24 - Cylinder head

- ☐ the valve seats must not be reworked because of the narrow tolerances

25 - Valve stem seal

- ☐ Renew. ⇒ [“2.8 Removing and installing valve stem seals”, page 119](#) .

26 - Valve spring

27 - Valve spring plate

28 - Valve collets

29 - Hydraulic balancing element

- ☐ check ⇒ [“2.7 Checking hydraulic balancing elements”, page 118](#)
- ☐ mark the fitting position for re-installation
- ☐ oil the contact surfaces before installing

30 - Roller rocker finger

- ☐ removing and installing ⇒ [“2.6 Removing and installing camshaft housing”, page 114](#)
- ☐ mark the fitting position for re-installation
- ☐ inspect roller bearings for smooth operation

- ☐ oil the contact surfaces before installing

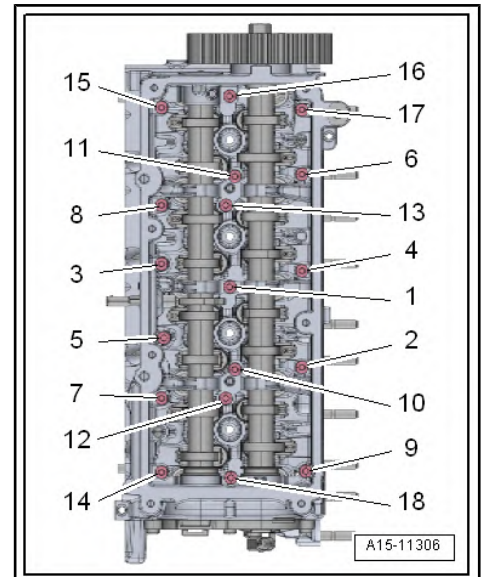
31 - Locking clip

- ☐ for hydraulic balancing element

Camshaft housing - tightening torque and tightening order

- Tighten screws in steps in the given sequence:

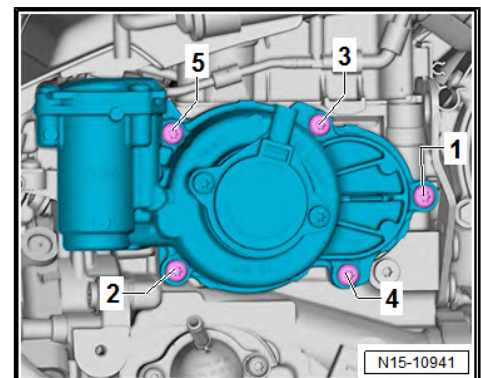
Stage	Screws	Tightening torque/torqueing angle
1.	-1 ... 18-	by hand as far as the stop <ul style="list-style-type: none"> • The camshaft housing must rest on the cylinder head with its complete contact surface.
2.	-1 ... 18-	8 Nm
3.	-1 ... 18-	90° (torque a further 90° (1/4 turn))



Camshaft housing - tightening torque and tightening order

- Tighten screws in steps in the given sequence:

Stage	Screws	Tightening torque
1.	-1 ... 5-	by hand as far as the stop
2.	-1 ... 5-	8 Nm



2.2 Replacing camshaft gasket ring

Special tools and workshop equipment required

- ◆ Extractor - T10443-
- ◆ Assembly tool - T10493-

Work procedure

- Remove the toothed belt from the camshaft
⇒ "1.10 Remove the toothed belt from the camshaft",
[page 49](#) .

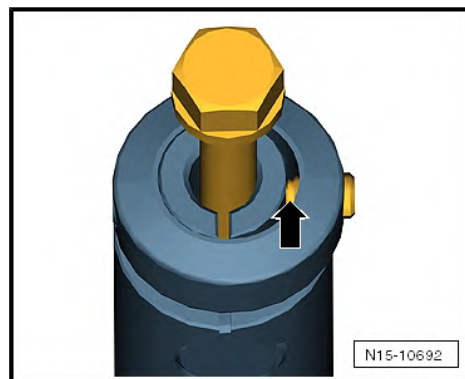


Caution

- ◆ *If it is turned back too much, the inner pressure plate loosens -T10443- from the pressure screw. The pressure plate must then be pressed onto the pressure screw once again.*



- Carefully turn back set screw -arrow- of the extractor -T10443- until a slight resistances noticeable.

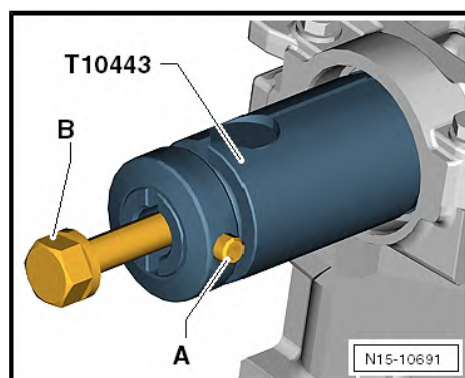


- Place extractor - T10443- straight, as shown in the illustration, and lock by tightening the set screw -A-.
- Screw in the pressure screw -B- until the gasket ring is pulled out.
- Clean the contact and sealing surfaces.



Note

The sealing lip of the shaft gasket ring must neither be oiled nor greased additionally.

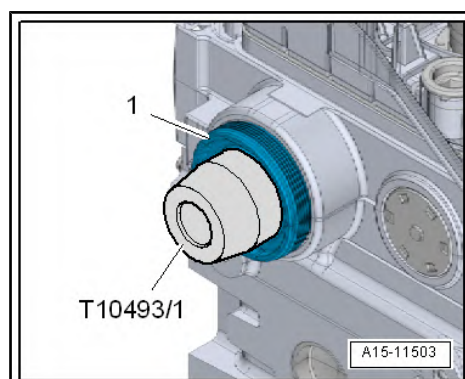


- Fit the guide bushing -T10493/1- onto the camshaft, as shown in the illustration.
- Carefully slide the shaft gasket ring -1- over the guide bushing onto the camshaft.

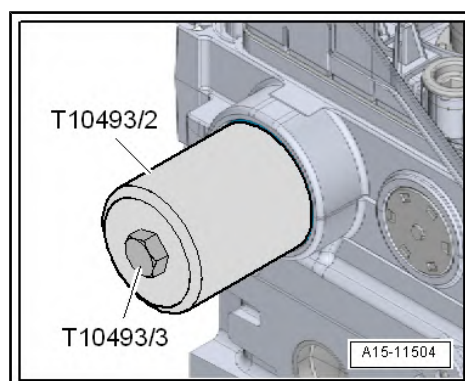


Note

The guide bushing remains fitted on the camshaft as a stop while the oil seal is being pressed in.



- Press in the gasket ring with pressure bushing -T10493/2- and screw -T10493/3- up to the stop.
- install (set the timing) ➔ [page 54](#) .



2.3 Removing and installing - N205- the camshaft adjustment valve 1

Removing

- Remove air filter
⇒ [“6.5 Removing and installing air filter”, page 364](#) .
- Separate electrical plug connection -2-.
- Unscrew screw -1-, remove camshaft control valve 1 - N205- .

Install

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

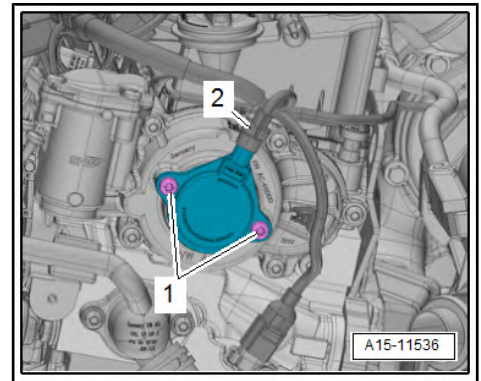


Note

Renew O-ring.

Tightening torques

- ◆ ⇒ [“2.1 Assembly overview - valve gear”, page 104](#)
- ◆ ⇒ [“6.4 Summary of components - air filter”, page 362](#)



2.4 Removing and installing camshaft control

Special tools and workshop equipment required

- ◆ Rig pin for the diesel injection pump - 3359-
- ◆ Rig pin - T10492-

Removing

- Remove top toothed belt guard
⇒ [“1.8 Removing and installing top toothed belt guard”, page 45](#) .
- Remove the sound dampening system ⇒ Body Work; Rep. gr. 50 .



Caution

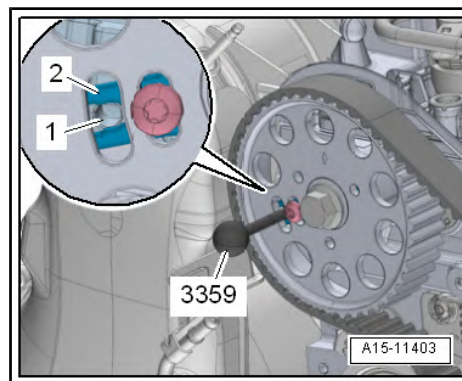
Risk of destruction as a result of the toothed belt pulley jumping.

- ◆ *Only rotate the crankshaft in the direction of rotation of the engine!*

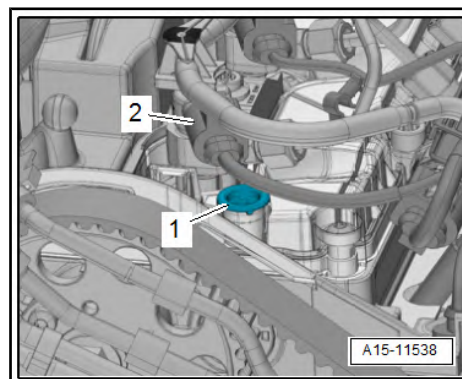
- Turn the crankshaft using the screw on the toothed belt gear until the camshaft sprocket is in the “TDC” position.



- Lock hub of the camshaft using the diesel injection pump rig pin - 3359- ; to do so, insert the rig pin into fork -2- of the driver and into the bore behind it -1- in the cylinder head.



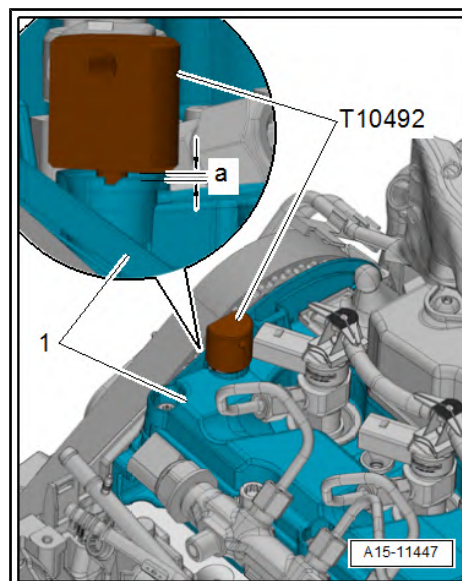
- Disconnect the electrical plug connection -2- from the injection unit for cylinder 1.
- On the cylinder head cover, unlock and remove screw plug -1- by turning it to the left.



- Lock the inlet camshaft with rig pin - T10492- . Please note the following when doing so:

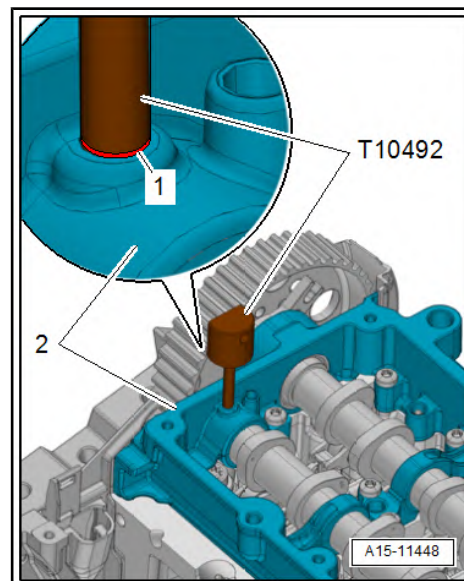
The cylinder head cover -1- is installed:

- The distance -a- is approx. 1 mm.



the cylinder head cover is removed:

- The groove -1- on the rig pin - T10492- must line up with the camshaft housing -2-.
- Remove air filter
⇒ ["6.5 Removing and installing air filter", page 364](#) .

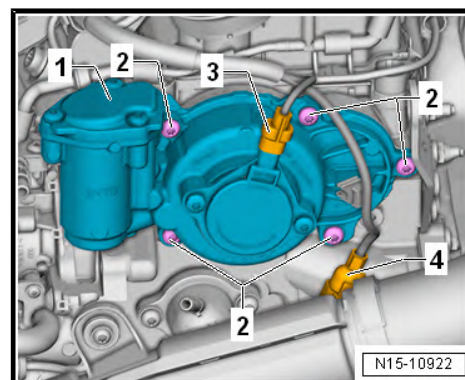


- Separate electrical plug connections -3- and -4-. Remove the clip from the housing.
- Release screws -2-, remove housing -1-.



Caution

Before removing the adjusting valve, check the small pistons in the middle of the adjusting valve for freedom of movement. Press a finger on the piston and check whether it can be pressed in before moving into the end position. Replace the adjusting valve if the piston jams. Otherwise damage to the engine may arise.



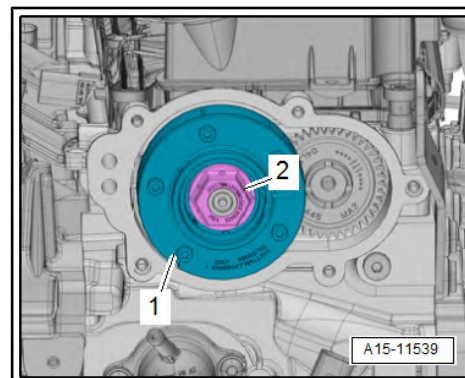
- Unscrew adjusting valve -2-, remove camshaft adjuster -1-.

Install



Caution

A diamond disk is installed between camshaft adjuster and camshaft for secure connection. Before assembly, you must ensure that this diamond disk is in the camshaft adjuster. Otherwise, the camshaft adjuster can become loose when the engine is running and damage to the engine may occur.



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

- Install top toothed belt guard
⇒ ["1.8 Removing and installing top toothed belt guard", page 45](#) .

Tightening torques

- ◆ ⇒ ["2.1 Assembly overview - valve gear", page 104](#)
- ◆ Sound dampening system - Summary of components ⇒ Body Work; Rep. gr. 50 .



2.5 Removing and installing the camshaft adjusting valve



Note

If the adjusting valve Pos. -18-
⇒ ["2.1 Assembly overview - valve gear", page 104](#) for camshaft adjustment is defective, the camshaft adjuster can be installed and only the adjusting valve has to be replaced.

Special tools and workshop equipment required

- ◆ Rig pin for the diesel injection pump - 3359-
- ◆ Rig pin - T10492-

Removing

- Remove top toothed belt guard
⇒ ["1.8 Removing and installing top toothed belt guard", page 45](#).
- Remove the sound dampening system ⇒ Body Work; Rep. gr. 50.

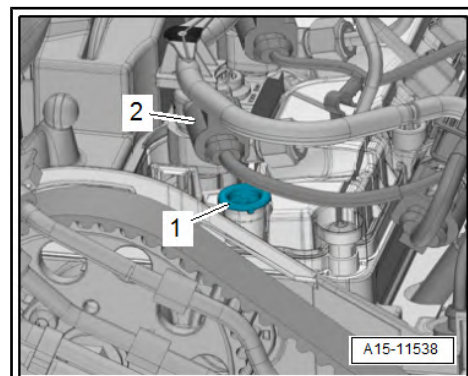
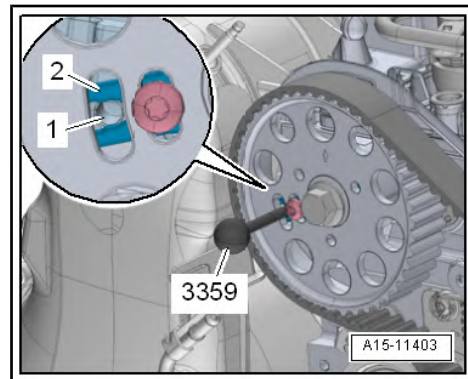


Caution

Risk of destruction as a result of the toothed belt pulley jumping.

- ◆ *Only rotate the crankshaft in the direction of rotation of the engine!*

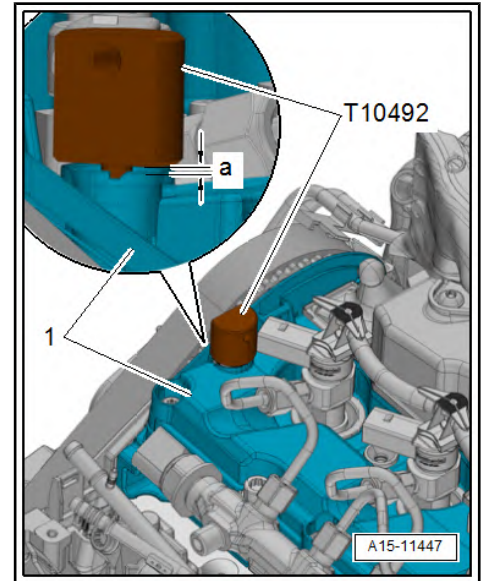
- Turn the crankshaft using the screw on the toothed belt gear until the camshaft sprocket is in the "TDC" position.
- Lock hub of the camshaft using the diesel injection pump rig pin - 3359-; to do so, insert the rig pin into fork -2- of the driver and into the bore behind it -1- in the cylinder head.
- Disconnect the electrical plug connection -2- from the injection unit for cylinder 1.
- On the cylinder head cover, unlock and remove screw plug -1- by turning it to the left.



- Lock the inlet camshaft with rig pin - T10492- . Please note the following when doing so:

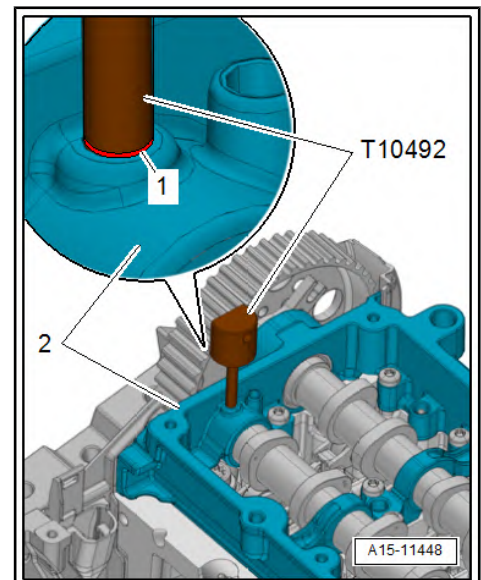
The cylinder head cover -1- is installed:

- The distance -a- is approx. 1 mm.



the cylinder head cover is removed:

- The groove -1- on the rig pin - T10492- must line up with the camshaft housing -2-.
- Remove air filter
⇒ [“6.5 Removing and installing air filter”, page 364](#) .

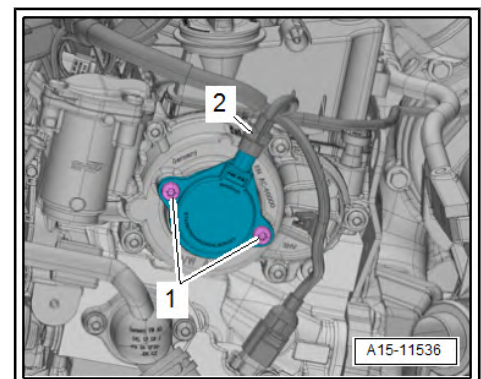


- Separate electrical plug connection -2-.
- Unscrew screw -1-, remove camshaft control valve 1 - N205- .



Note

The adjusting valve -2- and the camshaft adjuster -1- are shown without the housing in the illustration for the sake of clarity.





- Unscrew adjusting valve -2-.

Install

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



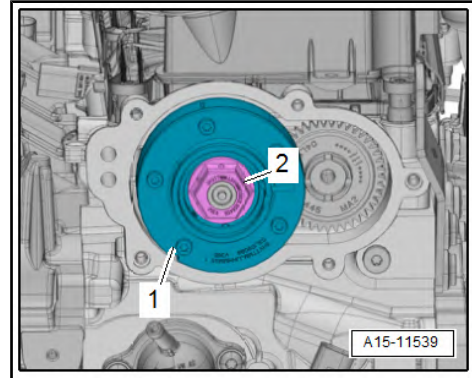
Note

Replace gasket ring.

- Install top toothed belt guard
⇒ [“1.8 Removing and installing top toothed belt guard”, page 45](#).

Tightening torques

- ♦ ⇒ [“2.1 Assembly overview - valve gear”, page 104](#)
- ♦ Sound dampening system - Summary of components ⇒ Body Work; Rep. gr. 50.



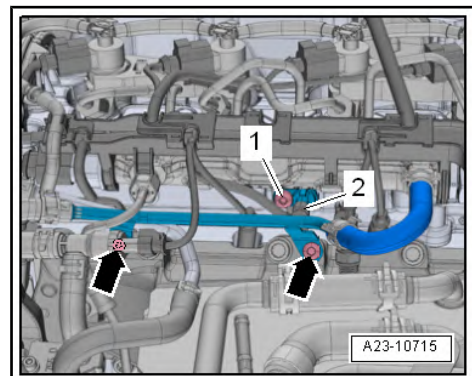
2.6 Removing and installing camshaft housing

Special tools and workshop equipment required

- ♦ Silicone sealant ⇒ ETKA - Electronic Catalogue of Original Parts
- ♦ Sealant remover gasket stripper (bearing code GST, bearing article no. R 34402), manufacturer Retech s.r.o.
- ♦ Cleaning and degreasing agent , e.g. -D 009 401 04-
- ♦ Protective goggles and gloves

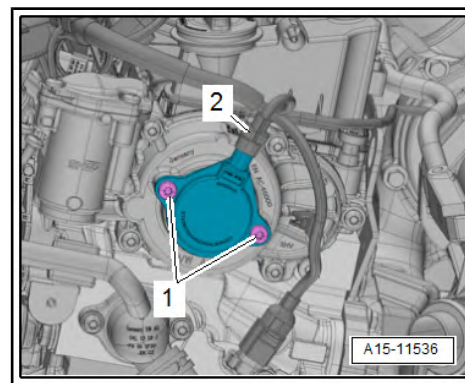
Removing

- Cylinder head fitted.
- Remove the toothed belt from the camshaft
⇒ [“1.10 Remove the toothed belt from the camshaft”, page 49](#).
- Remove cylinder head cover
⇒ [“1.2 Removing and installing cylinder head cover”, page 86](#).
- Remove fuel distributor
⇒ [“2.10 Removing and installing the fuel distributor”, page 336](#).
- Remove left coolant pipe
⇒ [“3.6 Remove and install the left coolant pipes”, page 178](#).
- Release screws -arrows-, push the right charge air pipe slightly to the side.
- Disconnect the plug connection -2- for hall sender - G40-.



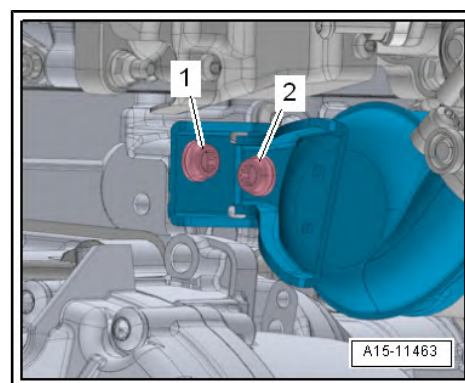
For vehicles with engine identification characters CRKB, CRMB, CUNA

- Separate electrical plug connection -2-.

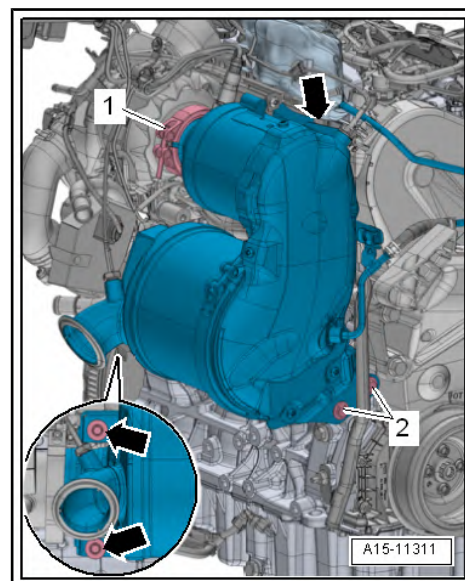


Continued for all vehicles

- Unscrew screw -1-, loosen screw -2-.



- Loosen screw -1- and remove clamping sleeve.
- Loosen screws -2-, unscrew screws -arrows-.
- Push exhaust gas cleaning module back slightly.



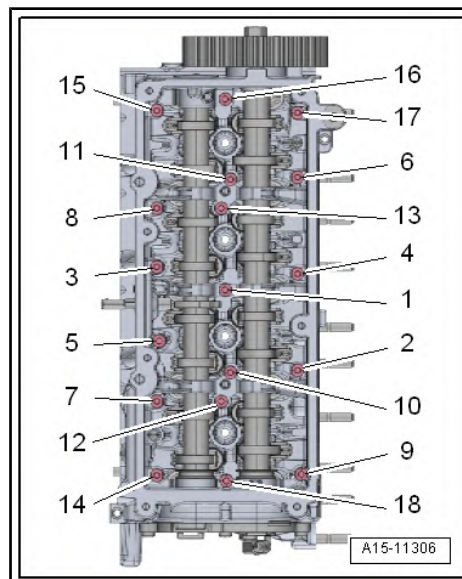


- Loosen screws for camshaft housing in the sequence -18 ... 1-.
- Unscrew the screws and carefully loosen the camshaft housing and remove from the bonding.

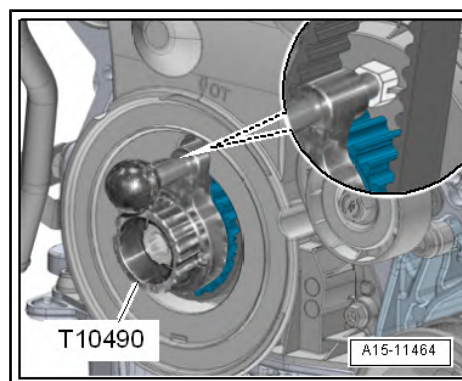
Install

Requirements:

- Interlock crankshaft with crankshaft arrester - T10490- .



- Lock the hub of the camshaft with the rig pin for diesel injection pump - 3359- .
- Screw loosely inserted.



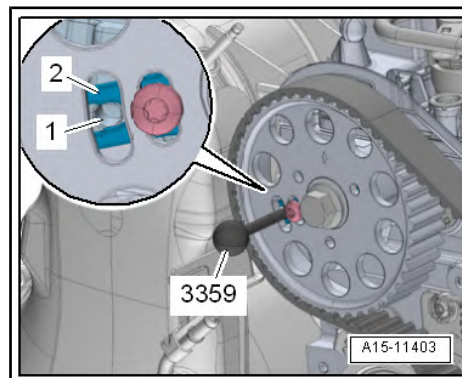
Caution

*Risk of contamination of the lubrication system and bearing.
Cover opened engine parts.*



WARNING

Wear protective gloves when working with sealant and grease remover!



- Remove residual sealant on the bearing frame and cylinder head using a chemical sealant remover.
- Clean sealing surfaces, they must be free of oil and grease.



Note

Pay attention to the use by date on sealant.

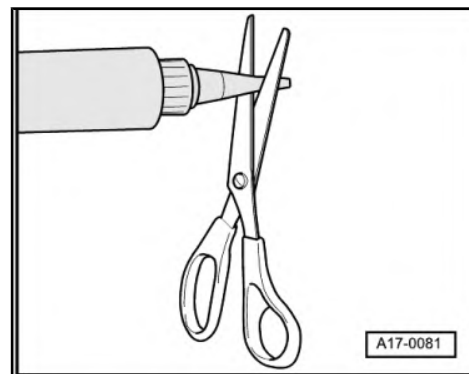
- Cut off nozzle on tube at front marking (\varnothing of nozzle approx. 1.5 mm).



Caution

Risk of contamination of the camshaft bearings through excess sealant.

- ◆ ***Do not apply thicker sealant beads than indicated.***





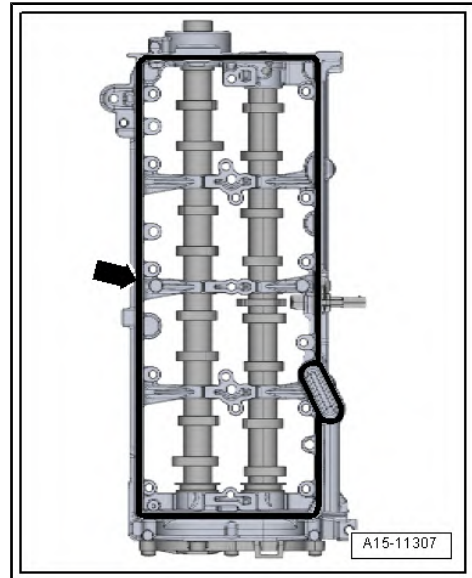
- Apply sealant beads -arrow- onto the clean sealing surfaces of the cylinder head as shown in the illustration.
- Thickness of sealant bead: 2 mm.

**Note**

- ◆ *After applying the sealant, the camshaft housing must be installed within 5 minutes.*
- ◆ *After installing the camshaft housing, allow the sealant to dry for about 30 minutes.*
- Carefully place the camshaft housing on the cylinder head, pay attention to fit pins when doing so.
- Tighten camshaft housing screws ⇒ [page 107](#) .

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

- Install exhaust gas cleaning module
⇒ [“2.2 Removing and installing exhaust gas cleaning module”, page 392](#) .
- Install camshaft gasket ring
⇒ [“2.2 Replacing camshaft gasket ring”, page 107](#) .
- Install cylinder head cover
⇒ [“1.2 Removing and installing cylinder head cover”, page 86](#) .
- install (set the timing) ⇒ [page 54](#) .

**Caution**

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

- ◆ *Because hydraulic compensation elements must be set, the engine must not be started until approximately 30 minutes after camshaft installation.*
- ◆ *To ensure that no valve is set during starting, turn the crankshaft carefully by at least 2 turns.*

Tightening torques

- ◆ ⇒ [Fig. “Camshaft housing - tightening torque and tightening order”, page 107](#)
- ◆ ⇒ [“3.1 Summary of components - coolant pipe”, page 170](#)
- ◆ ⇒ [“2.2 Fuel distributor - summary of components”, page 325](#)

2.7 Checking hydraulic balancing elements**Note**

- ◆ *The hydraulic balancing elements cannot be repaired.*
- ◆ *Irregular valve noises when starting engine are normal.*

Special tools and workshop equipment required

- ◆ Feeler gauges

Test procedure

- Start engine and allow to run until the radiator fan has cut in once.
- Increase engine speed to about 2500 rpm for 2 minutes and conduct a test drive if necessary.



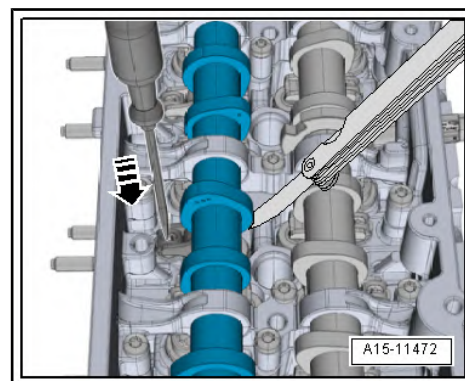
Note

*If the irregular valve noises disappear but occurs regularly during short journeys, the oil backstop must be replaced. Installation location of oil backstop in the oil filter housing Pos. -9-
⇒ ["1.3 Summary of components - oil filter holder", page 130](#) .*

- If the hydraulic balancing elements are still loud, determine which is the faulty balancing element as follows:
- Remove cylinder head cover
⇒ ["1.2 Removing and installing cylinder head cover", page 86](#) .
- Rotate crankshaft on the toothed belt pulley screw until the cam of the compensating element being checked is positioned at the top.
- To determine the clearance between cam and roller rocker finger, press the roller rocker finger down - Arrow - .
- If a feeler gauge can be moved by 0.20 mm between the cam and the roller rocker finger, change the hydraulic compensating element
⇒ ["2.6 Removing and installing camshaft housing", page 114](#) .

Install

- Install cylinder head cover
⇒ ["1.2 Removing and installing cylinder head cover", page 86](#) .



2.8 Removing and installing valve stem seals

⇒ ["2.8.1 Removing and installing valve stem seals with cylinder head installed", page 119](#)

⇒ ["2.8.2 Removing and installing valve stem seals with cylinder head removed", page 122](#)

2.8.1 Removing and installing valve stem seals with cylinder head installed

Special tools and workshop equipment required

- ◆ Valve stem seal extractor - MP 1-230 (3364)-
- ◆ Valve stem seal fitting tool - MP 1-233 (3365)-
- ◆ Disassembly and assembly device for valve collets - VAS 5161- with sealing bolts -VAS 5161/29-2- , guide plate -VAS 5161 A/31- and sleeve -VAS 5161 A/31-1-

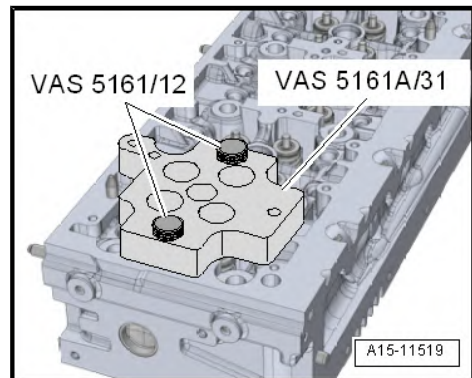
Work procedure

- Remove all glow plugs
⇒ ["1.2 Removing and installing glow plugs", page 421](#) .

- Remove the camshaft housing
⇒ [“2.6 Removing and installing camshaft housing”, page 114](#).
- When installing again, mark the assignment of the roller rocker arms and the hydraulic clearance compensation elements.
- Remove the roller rocker arms together with the hydraulic balancing elements and lay aside on a clean surface.
- Put the piston of the relevant cylinder at “bottom dead centre”.

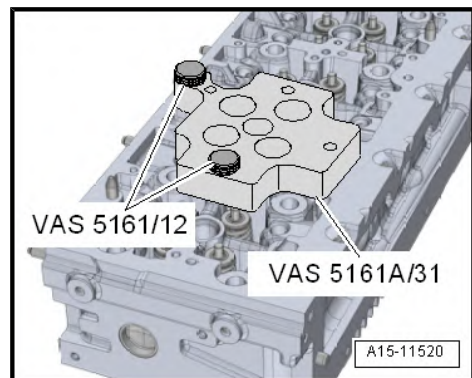
Cylinders 1, 3, 4

- Position the guide plate -VAS 5161 A/31- onto the cylinder head.
- Labelling -A- points to the turbocharger side
- Labelling - E - points to intake manifold side
- Tighten guide plate with knurled screws -VAS 5161/12- by hand.
- Position of the knurled screws, as shown in the illustration



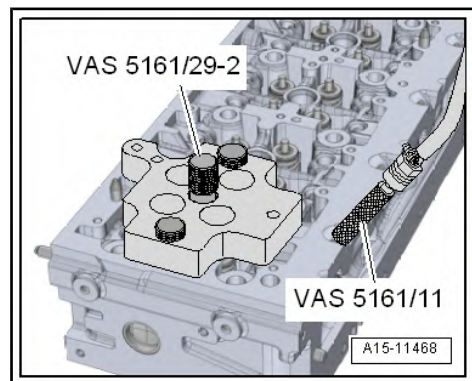
Cylinder 2

- Position the guide plate -VAS 5161 A/31- onto the cylinder head.
- Labelling -A- points to the turbocharger side
- Labelling - E - points to intake manifold side
- Tighten guide plate with knurled screws -VAS 5161/12- by hand.
- Position of the knurled screws, as shown in the illustration

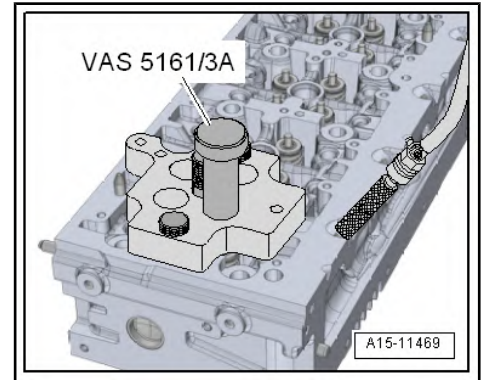


Continued for all cylinders

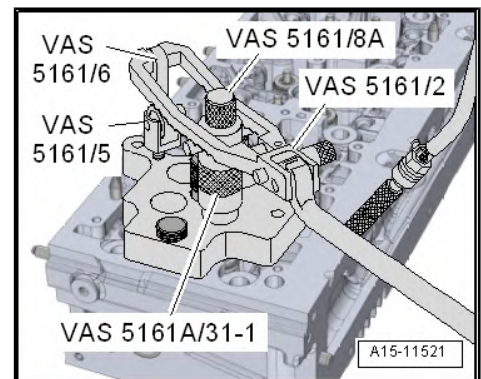
- Screw the sealing bolt -VAS 5161/29-2- into the guide plate.
- Screw the adapter -VAS 5161/11- into the relevant pencil type glow plug thread by hand.



- Insert the impact drift -VAS 5161/3A- into the guide plate and knock off the tightly fitted valve collets using a plastic hammer.



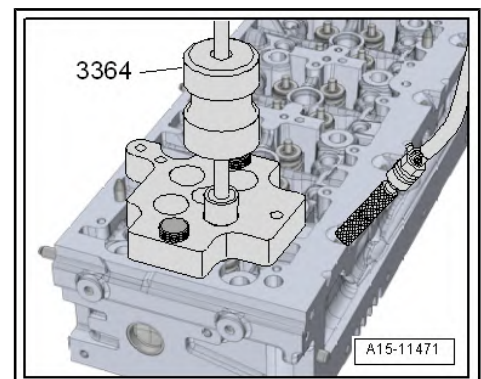
- Screw the detent part -VAS 5161/6- with the interlocking fork -VAS 5161/5- into the guide plate.
- Insert assembly cartridge -VAS 5161/8- with sleeve mounted -VAS 5161 A/31-1- into the guide plate.
- Connect the adapter to the compressed air with a commercially available intermediate piece and apply constant pressure.
- Minimum pressure: 0.6 MPa (6 bar) overpressure.
- Hook the pressure fork -VAS 5161/2- onto the detent part and push the assembly cartridge downwards.
- Turn simultaneously the knurled screw of the assembly cartridge to the right, until the tips click into the valve collets.
- Rotate the knurled screw to the left and to the right, by doing so the valve collets are pressed apart and are installed in the assembly cartridge.
- Release the pressure fork.
- Remove assembly cartridge with sleeve.
- Remove the valve spring with the valve spring retainer.
- Pull off valve stem seal with extractor for valve stem seal -3364- .



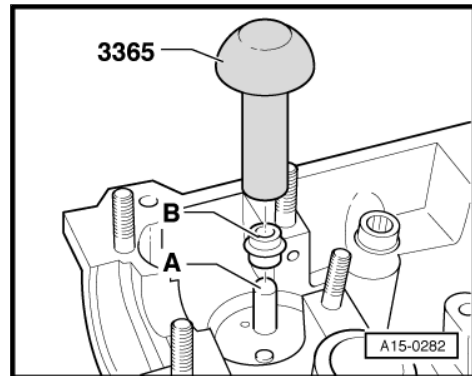
WARNING

Risk of damage when installing the valve stem seals.

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

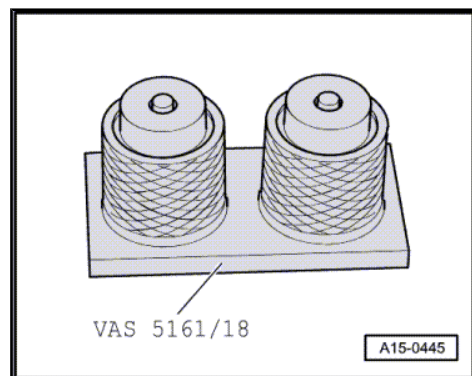


- Lightly oil sealing lip of the valve stem seal.
- Slide the valve stem seal onto the plastic bushing.
- Carefully press the valve stem seal with the valve stem seal insertion tool - 3365- onto the valve guide.
- Remove plastic sleeve.

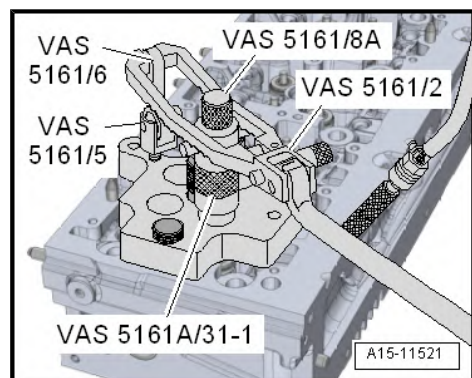


If the valve collets were removed from the assembly cartridge, first of all they must be inserted into the insertion device for valve collets -VAS 5161/18- .

- The large diameter of the valve collets points to the top.
- Insert the valve spring and the valve spring retainer.
- Press the assembly cartridge from the top onto the insertion device for valve collets and lift up the valve collets.



- Re-insert the assembly cartridge into the guide plate -VAS 5161 A/31- .
- Press down the pressure fork and turn the knurled screw to the left and to the right while pulling it upwards, by doing so the valve collets are inserted.
- Release the pressure fork on tightened knurled screw.
- Repeat the procedure for each valve.



Assembling

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

- Ensure that all the roller arms are correctly positioned on the valve stem ends and are clipped in place on the relevant hydraulic balancing elements.
- Install camshaft housing
⇒ ["2.6 Removing and installing camshaft housing", page 114](#) .
- Install glow plugs
⇒ ["1.2 Removing and installing glow plugs", page 421](#) .

2.8.2 Removing and installing valve stem seals with cylinder head removed

Special tools and workshop equipment required

- ◆ Valve stem seal extractor - MP 1-230 (3364)-
- ◆ Valve stem seal fitting tool - MP 1-233 (3365)-
- ◆ Disassembly and assembly device for valve collets - VAS 5161- with guide plate -VAS 5161 A/31- and sleeve -VAS 5161 A/31-1-
- ◆ Engine and gearbox support - VAS 6095-

◆ Cylinder head tensioning device - VAS 6419-

Work procedure

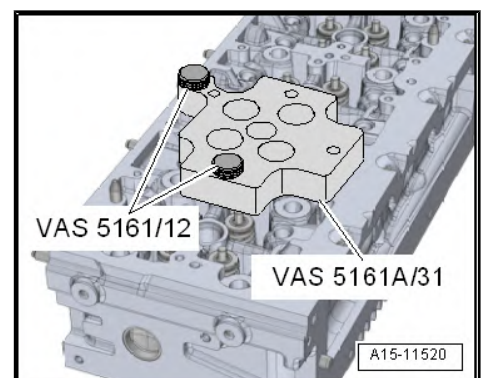
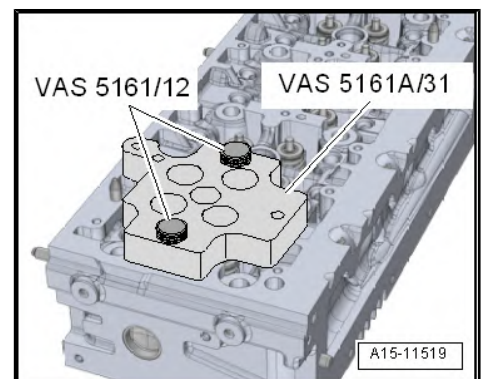
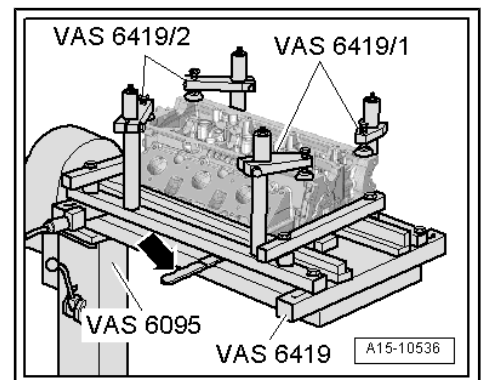
- Remove the camshaft housing
⇒ ["2.6 Removing and installing camshaft housing"](#),
[page 114](#) .
- When installing again, mark the assignment of the roller rocker arms and the hydraulic clearance compensation elements.
- Remove the roller rocker arms together with the hydraulic balancing elements and lay aside on a clean surface.
- Insert the cylinder head tensioning device - VAS 6419- into the engine and gearbox jack - VAS 6095- .
- Tension the cylinder head in the cylinder head tensioning device, as shown in the illustration.
- Connect cylinder head tensioning device to compressed air.
- Adjust the air bellows with the lever -arrow- below the combustion chamber on which the valve stem seals should be removed.
- Allow just enough air to flow into the air bag so that it applied to the valve disc.

Cylinders 1, 3, 4

- Position the guide plate -VAS 5161 A/31- onto the cylinder head.
- Labelling -A- points to the turbocharger side
- Labelling - E - points to intake manifold side
- Tighten guide plate with knurled screws -VAS 5161/12- by hand.
- Position of the knurled screws, as shown in the illustration

Cylinder 2

- Position the guide plate -VAS 5161 A/31- onto the cylinder head.
- Labelling -A- points to the turbocharger side
- Labelling - E - points to intake manifold side
- Tighten guide plate with knurled screws -VAS 5161/12- by hand.
- Position of the knurled screws, as shown in the illustration





Continued for all cylinders

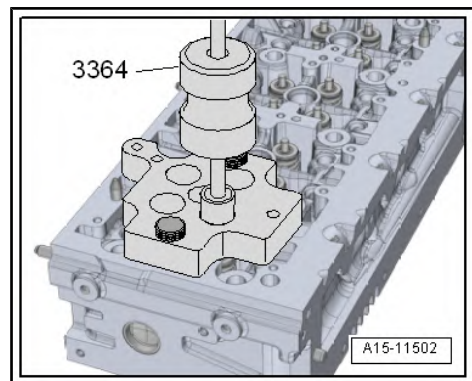
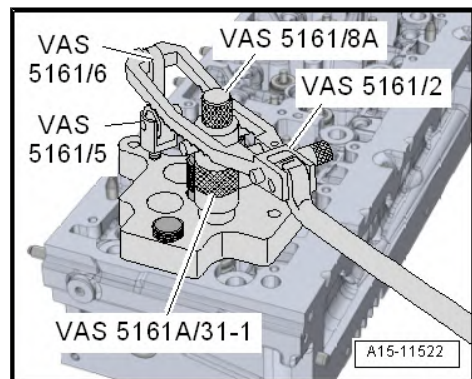
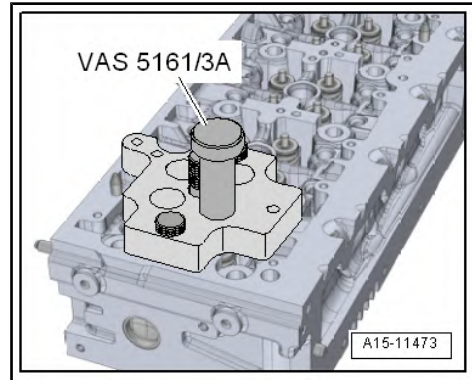
- Insert the impact drift -VAS 5161/3A- into the guide plate and knock off the tightly fitted valve collets using a plastic hammer.
- Screw the detent part -VAS 5161/6- with the interlocking fork -VAS 5161/5- into the guide plate.
- Insert assembly cartridge -VAS 5161/8- with sleeve mounted -VAS 5161 A/31-1- into the guide plate.
- Hook the pressure fork -VAS 5161/2- onto the detent part and push the assembly cartridge downwards.
- Turn simultaneously the knurled screw of the assembly cartridge to the right, until the tips click into the valve collets.
- Rotate the knurled screw to the left and to the right, by doing so the valve collets are pressed apart and are installed in the assembly cartridge.
- Release the pressure fork.
- Remove assembly cartridge with sleeve.
- Remove the valve spring with the valve spring retainer.
- Pull off valve stem seal with extractor for valve stem seal - 3364- .



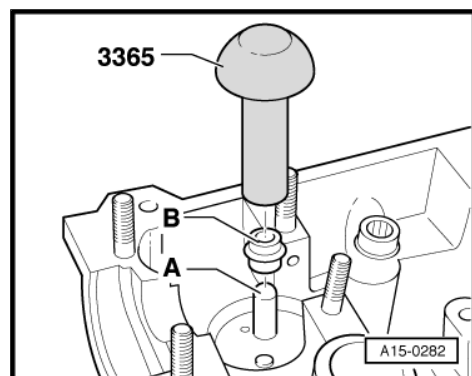
Caution

Risk of damage when installing the valve stem seals.

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

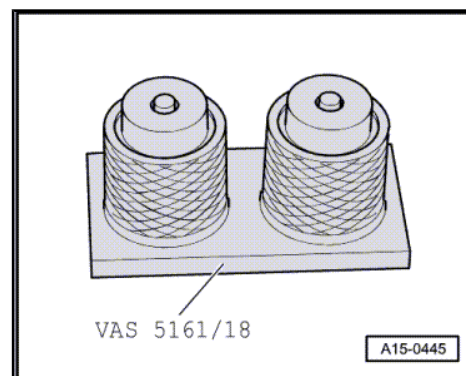


- Lightly oil sealing lip of the valve stem seal.
- Slide the valve stem seal onto the plastic bushing.
- Carefully press the valve stem seal with the valve stem seal insertion tool - 3365- onto the valve guide.
- Remove plastic sleeve.



If the valve collets were removed from the assembly cartridge, first of all they must be inserted into the insertion device for valve collets -VAS 5161/18- .

- The large diameter of the valve collets points to the top.
- Press the assembly cartridge from the top onto the insertion device for valve collets and lift up the valve collets.
- Insert the valve spring and the valve spring retainer.

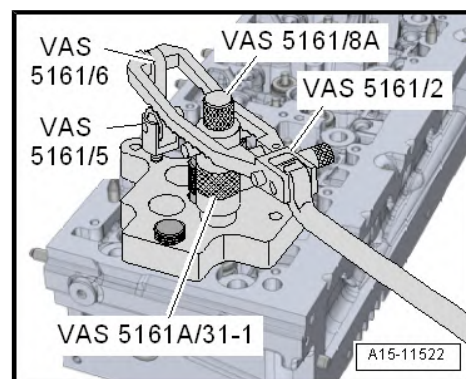


- Re-insert the assembly cartridge into the guide plate -VAS 5161 A/31- .
- Press down the pressure fork and turn the knurled screw to the left and to the right while pulling it upwards, by doing so the valve collets are inserted.
- Release the pressure fork on tightened knurled screw.
- Repeat the procedure for each valve.

Assembling

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

- Ensure that all the roller arms are correctly positioned on the valve stem ends and are clipped in place on the relevant hydraulic balancing elements.
- Install camshaft housing
⇒ ["2.6 Removing and installing camshaft housing", page 114](#) .



2.9 Valve dimensions



Note

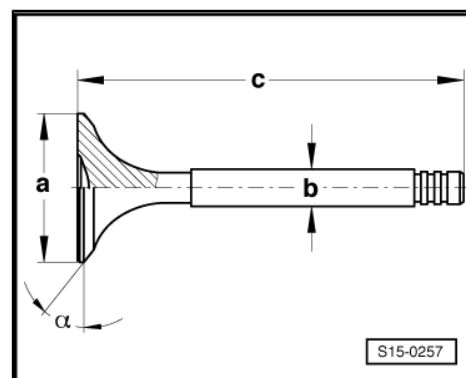
Inlet and exhaust valves must not be reworked. Only lapping-in is permitted.

For 1.6l engines

Dimension		Inlet valve	Exhaust valve
Ø a	mm	26,60	24,50
Ø b	mm	5,975	5,965
c	mm	99,30	99,10
α	∠°	45	45

For 2.0l engines

Dimension		Inlet valve	Exhaust valve
Ø a	mm	28,10	26,00
Ø b	mm	5,975	5,965
c	mm	99,30	99,10
α	∠°	45	45





2.10 Checking valve guides

Special tools and workshop equipment required

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

Test procedure



Note

- ◆ *If the valve is to be renewed as part of a repair, use a new valve for the measurement.*
- ◆ *Because of the different stem diameters only use inlet valve in inlet guide or outlet valve in outlet guide.*
- Secure dial gauge to the cylinder head using the universal dial gauge bracket - MP 3-447 (VW 387)- .



Note

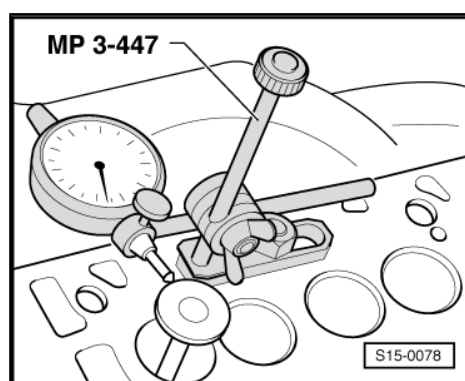
If the valves are replaced when carrying out repair work, use new valves for the measurement.

- Insert valve into valve guide. The end of the valve stem must be flush with the guide.
- Valve rock: maximum 1.0 mm



Note

If the wear limit is exceeded, repeat measurement with new valves. If the wear limit is again exceeded, replace cylinder head. The valve guides cannot be replaced.



17 – Lubrication

1 Removing and installing parts of the lubrication system

⇒ [“1.1 Parts of the lubrication system - Summary of components”, page 127](#)

⇒ [“1.2 Removing and installing oil level and oil temperature transmitter G266”, page 129](#)

⇒ [“1.3 Summary of components - oil filter holder”, page 130](#)

⇒ [“1.4 Removing and installing the oil filter holder with the engine oil cooler”, page 132](#)

⇒ [“1.5 Removing and installing oil sump”, page 135](#)

⇒ [“1.6 Removing and installing oil pump”, page 138](#)

⇒ [“1.7 Removing and installing oil pressure switch F1”, page 139](#)

⇒ [“1.8 Removing and installing oil pressure switch for reduced oil pressure F378”, page 140](#)

⇒ [“1.9 Removing and installing valve for oil pressure control N428”, page 141](#)

⇒ [“1.10 Testing oil pressure”, page 142](#)

1.1 Parts of the lubrication system - Summary of components



Note

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

Check the engine oil, amount of oil and oil specification:

- ◆ ⇒ Maintenance ; Booklet Octavia III .

**1 - Screw**

- ☐ self-locking
- ☐ replace after removal
- ☐ 8 Nm

2 - Oil level and oil temperature transmitter - G266-

- ☐ removing and installing
⇒ ["1.2 Removing and installing oil level and oil temperature transmitter G266", page 129](#)

3 - Gasket ring

- ☐ replace after removal

4 - Oil drain plug

- ☐ with integrated gasket ring
- ☐ replace
- ☐ 30 Nm

5 - Gasket ring

- ☐ Component part of the drain plug

6 - Bolt

- ☐ Tightening torque and tightening order
⇒ [page 129](#)

7 - Oil sump

- ☐ removing and installing
⇒ ["1.5 Removing and installing oil sump", page 135](#)

8 - O-ring

- ☐ replace after removal

9 - Screw

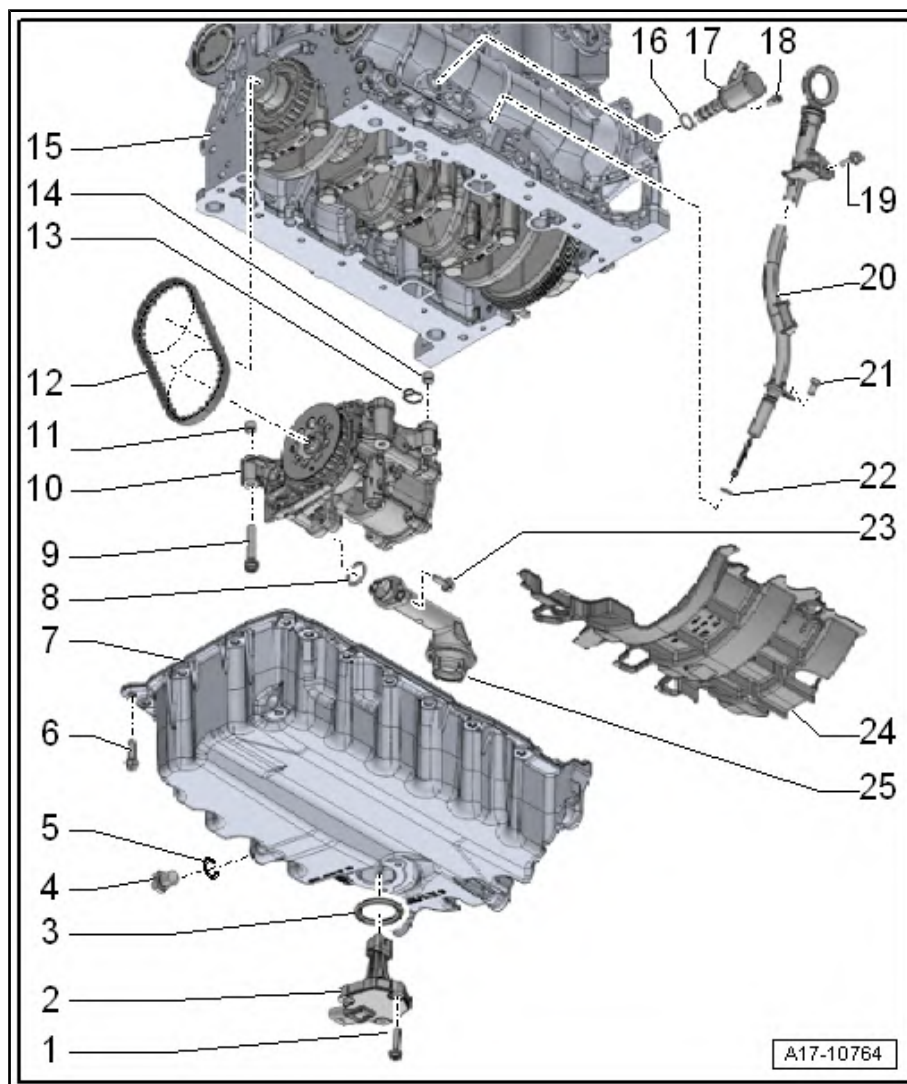
- ☐ replace after removal
- ☐ 10 Nm + torque a further 180° (1/2 turn)

10 - Oil pump

- ☐ with vacuum pump
- ☐ removing and installing ⇒ ["1.6 Removing and installing oil pump", page 138](#)

11 - Fitting sleeve**12 - Toothed belt**

- ☐ removing:
 - Remove oil pump ⇒ ["1.6 Removing and installing oil pump", page 138](#)
 - Remove sealing flange on the belt pulley side
⇒ ["2.2 Removing and installing the sealing flange on the belt pulley side", page 63](#)

**Caution**

Do not kink or twist the toothed belt or damage it with sharp edges.

13 - Seal

- ☐ replace after removal

14 - Fitting sleeve

15 - Cylinder block

16 - O-ring

- ☐ replace after removal

17 - Oil pressure control valve - N428-

- ☐ removing and installing
⇒ ["1.9 Removing and installing valve for oil pressure control N428 ", page 141](#)

18 - Screw

- ☐ 8 Nm

19 - Screw

- ☐ 8 Nm

20 - Guide tube for oil dipstick

21 - Screw

- ☐ 8 Nm

22 - O-ring

- ☐ replace after removal

23 - Screw

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

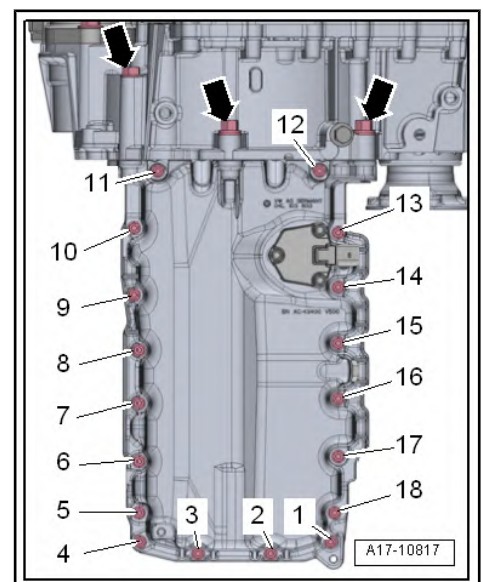
24 - Baffle

25 - Oil suction pipe

Oil sump - tightening torque and tightening order

– Tighten screws in steps as follows:

Stage	Screws	Tightening torque
1.	-1 ... 18-	crosswise 5 Nm
2.	-Arrows-	40 Nm
3.	-1 ... 18-	crosswise in steps up to 13 Nm



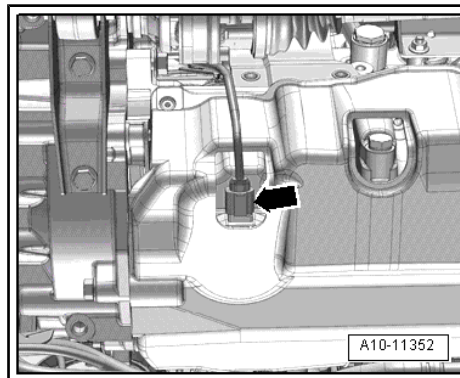
1.2 Removing and installing oil level and oil temperature transmitter - G266-

Removing

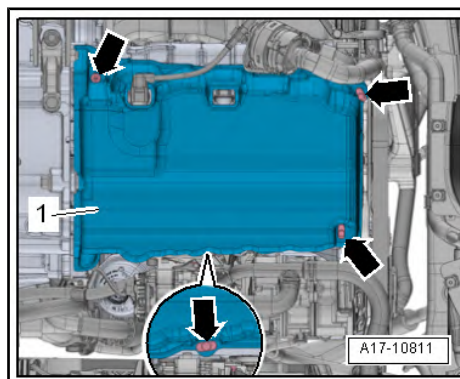
- Engine oil drained ⇒ Maintenance ; Booklet Octavia III .



- Disconnect electrical plug connection -arrow- at the oil level and temperature transmitter - G266- .



- Loosen clips -arrows-, remove noise insulation -1- for oil sump.



- Release screws -1- and remove oil level and oil temperature transmitter - G266- Pos. -4-.

Install

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



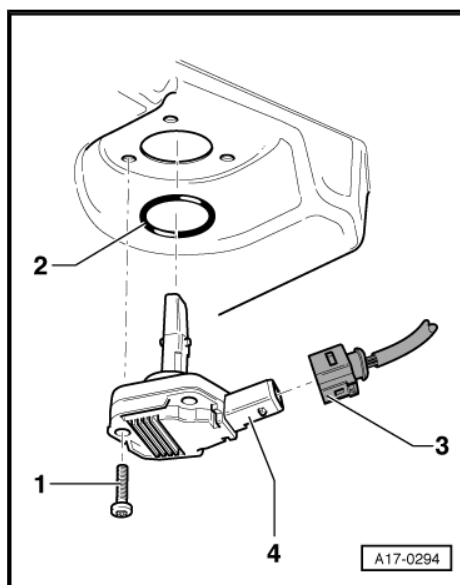
Note

Replace the gasket ring -2- and the self-locking screws -1-.

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

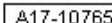
Tightening torques

- ♦ ➔ [“1.1 Parts of the lubrication system - Summary of components”, page 127](#)



1.3 Summary of components - oil filter holder

- ❑ removing and installing
⇒ “1.8 Removing and installing oil pressure switch for reduced oil pressure F378”, page 140





☐ 20 Nm

14 - Gasket ring

☐ captive, replace if the oil pressure switch has leaks

Oil filter housing - tightening torque and tightening order

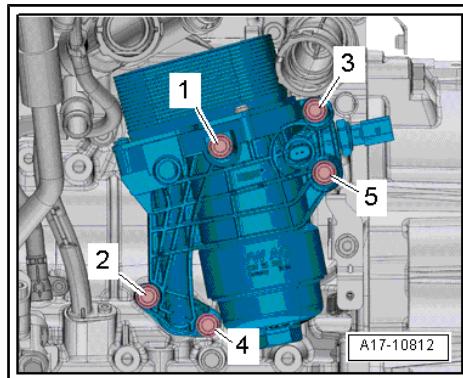


Note

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

- Attach the top left and bottom right screws first.
- Tighten screws in steps in the given sequence:

Stage	Screws	Tightening torque/torqueing angle
1.	-1 ... 5-	20 Nm
2.	-1 ... 5-	Turn 90° further



1.4 Removing and installing the oil filter holder with the engine oil cooler

Special tools and workshop equipment required

- ♦ Hose binding claw - VAS 6362-



Note

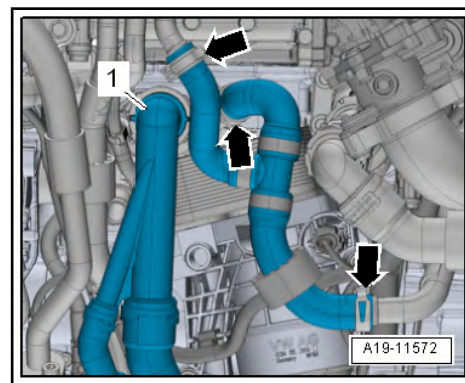
The engine oil cooler must not be disconnected from the oil filter housing. In the event of a defect, the engine oil cooler must be replaced by the oil filter holder.

⇒ "1.4 Removing and installing the oil filter holder with the engine oil cooler", page 132 .

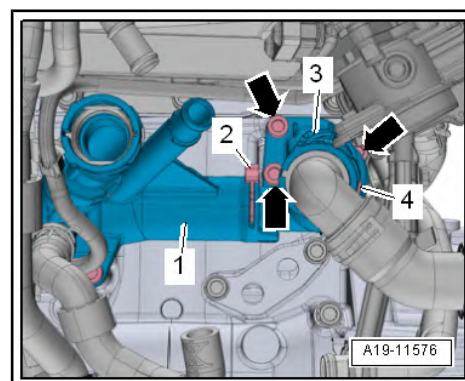
Removing

- Remove air filter
⇒ "6.5 Removing and installing air filter", page 364 .
- Remove fan shroud for radiator fan
⇒ "4.5 Removing and installing fan shroud", page 195 .
- Remove the front left coolant pipe
⇒ "3.4 Removing and installing the front left coolant pipe", page 175 .
- Remove the front right coolant pipe
⇒ "3.5 Removing and installing the front right coolant pipe", page 177 .

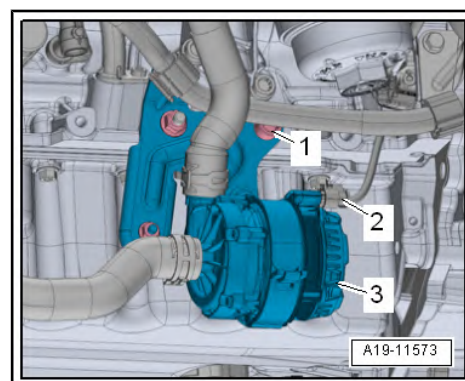
- Loosen hose clamps -arrows- and remove coolant hose.



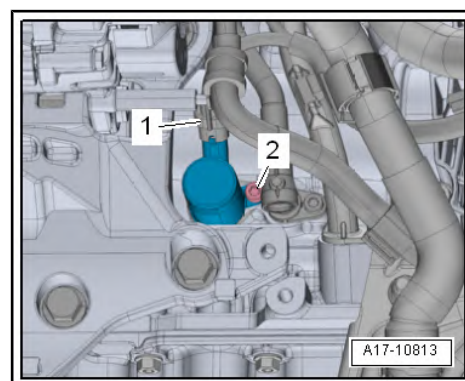
- Raise holding clamp -4-, remove coolant connection fittings.



- Separate electrical plug connection -2-.
- Unscrew screws -1- and push pump for charge air cooler - V188- Pos. -3- to the side.

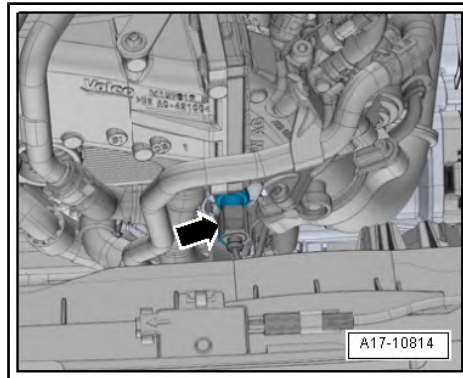


- Disconnect electrical plug connection -1- at the - N428- oil pressure control.

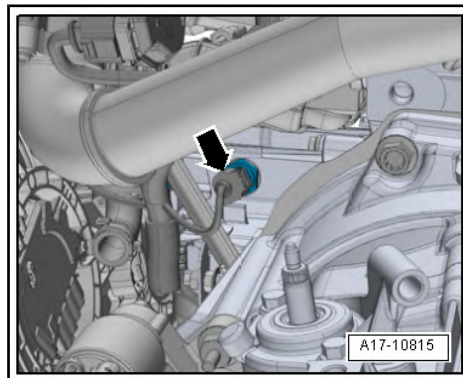




- Disconnect electrical plug connection -arrow- at the oil pressure switch - F1- .



- Disconnect electrical plug connection -arrow- at the oil pressure switch for reduced oil pressure - F378- .





Note

Place a cloth underneath to absorb escaping engine oil.

- Unscrew screws in the order -5 ... 1-, remove oil filter housing together with the engine oil cooler.

Install

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



Note

- ◆ *Replace gasket and O-ring.*
- ◆ *Secure all hose connections with spring-type clips that comply with the series design → ETKA - Electronic Catalogue of Original Parts .*
- Install front right coolant pipe
⇒ [“3.5 Removing and installing the front right coolant pipe”, page 177 .](#)
- Install front left coolant pipe
⇒ [“3.4 Removing and installing the front left coolant pipe”, page 175 .](#)
- Install fan shroud for radiator fan
⇒ [“4.5 Removing and installing fan shroud”, page 195 .](#)
- Connect coolant hose with quick coupling ⇒ [page 186 .](#)
- Top up coolant ⇒ [page 153 .](#)

Tightening torques

- ◆ ⇒ [“1.3 Summary of components - oil filter holder”, page 130](#)
- ◆ ⇒ [“2.3 Summary of components - electric coolant pump”, page 162](#)
- ◆ ⇒ [“6.4 Summary of components - air filter”, page 362](#)

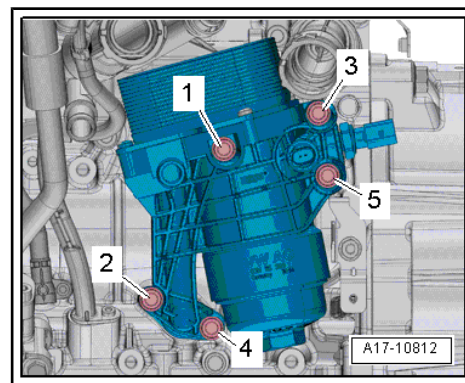
1.5 Removing and installing oil sump

Special tools and workshop equipment required

- ◆ Flexible-head wrench SW 10 - 3185-
- ◆ Allen key, long reach - T10058-
- ◆ Silicone sealant ⇒ ETKA - Electronic Catalogue of Original Parts
- ◆ Sealant remover gasket stripper (bearing code GST, bearing article no. R 34402), manufacturer Retech s.r.o.
- ◆ Cleaning and degreasing agent , e.g. -D 009 401 04-
- ◆ Protective goggles and gloves

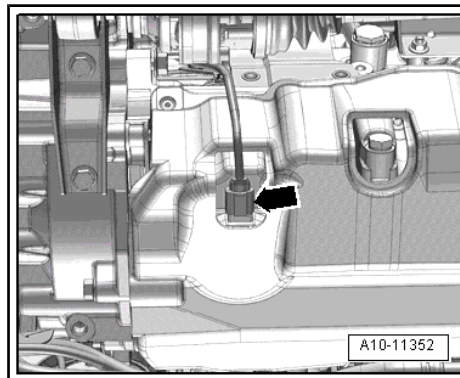
Removing

- Engine oil drained ⇒ Maintenance ; Booklet Octavia III .

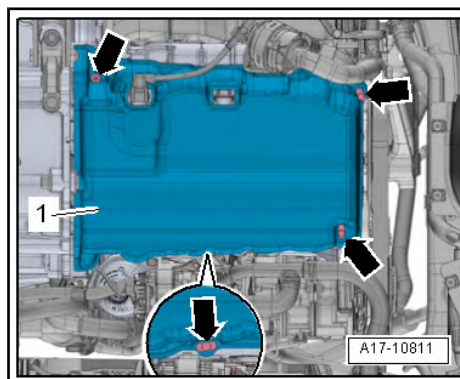




- Disconnect electrical plug connection -arrow- at the oil level and temperature transmitter - G266- .



- Loosen clips -arrows-, remove noise insulation -1- for oil sump.



- Screw out screws -arrows- of oil pan/gearbox.
- Loosen bolts -1 ... 18- crosswise and release.
- Loosening oil sump carefully from the bonding.



Note

A vehicle with manual gearbox 02Q is shown as an example.

Install

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



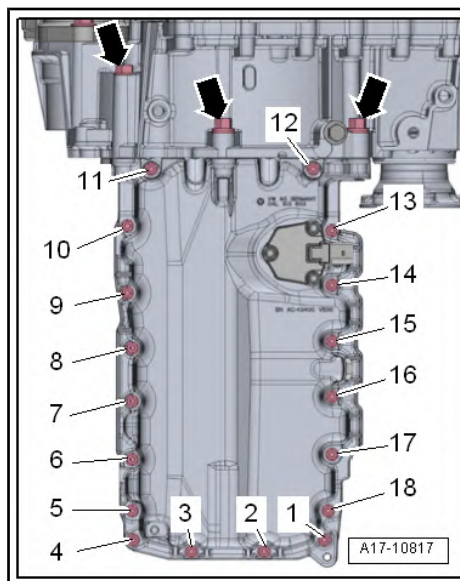
Caution

***Risk of contamination of the lubrication system and bearing.
Cover opened engine parts.***



WARNING

Wear protective gloves when working with sealant and grease remover!



- Remove residual sealant from the sealing surfaces on the cylinder block and on the oil pan with chemical sealant remover.
- Degrease the sealing surfaces.

i Note

Pay attention to the use by date on sealant.

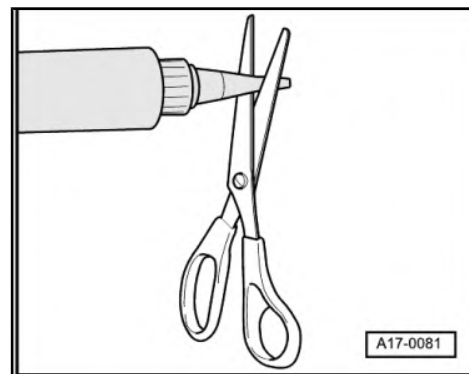
- Cut off nozzle tube at the front marking (\varnothing of nozzle approx. 2 ... 3 mm).



Caution

There is risk of blockage of the lubrication system through excess sealant.

Do not apply thicker sealant strips than indicated.



When the sealing flange on the belt pulley side was not replaced

i Note

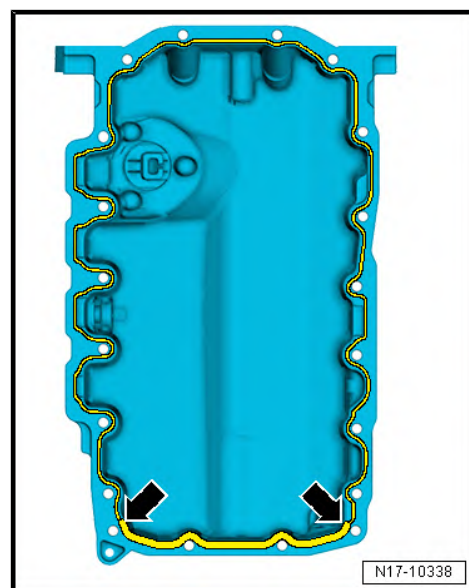
The bottom surface of the sealing flange on the belt pulley side has a displacement of approx. 1 mm to the bottom cylinder block surface after removing the old silicone seal, which must be compensated for by applying the required sealant on the corresponding area of the oil pan sealing surface.

- Apply sealant bead onto the clean sealing surfaces of the oil sump, as shown in the illustration.
- ◆ In the area of the sealing surface of the sealing flange on the belt pulley side between -arrows-: 3 ... 4 mm
- ◆ In the area of the sealing surfaces of the cylinder block and the sealing flange on the gearbox side: 2 ... 3 mm
- The sealant strips must be replaced in the area of the sealing flange on the belt pulley side with the sealant bead equal to the height and width of the silicone seal.

i Note

After applying the sealant, the oil separator must be installed within 5 minutes.

When the sealing flange on the belt pulley side was not replaced





- Apply sealant bead onto the clean sealing surfaces of the oil sump, as shown in the illustration.

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

**Note**

- ♦ *Take particular care when applying sealant bead in the area of the sealing flange.*
- ♦ *After applying the sealant, the oil separator must be installed within 5 minutes.*

Continue as follows for both procedures

- Insert baffle.
- Position oil sump and tighten screws ➔ [page 129](#) .
- The oil pan must be flush to the gearbox flange at the intermediate plate.

**Note**

- ♦ *When installing the oil pan with the engine removed you must ensure that the oil sump is flush with the cylinder block at the flywheel side.*
- ♦ *After installing the oil pan, allow the sealant to dry for about 30 minutes. Only then fill with engine oil.*
- Fill with engine oil and check the oil level ➔ Maintenance ; Booklet Octavia III .

Tightening torques

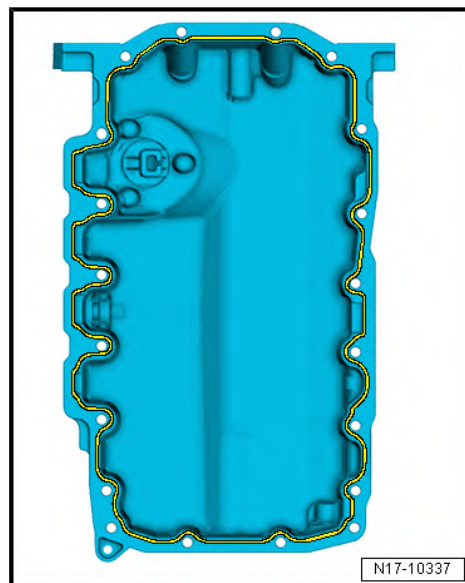
- ♦ ➔ [Fig. “Oil sump - tightening torque and tightening order”](#) , [page 129](#)

1.6 Removing and installing oil pump**Removing**

- Removing the oil pan
➔ [“1.5 Removing and installing oil sump”, page 135](#) .

**Caution**

Do not kink or twist the toothed belt or damage it with sharp edges.



- Release screws -arrows- and remove oil pump -1-.



Caution

The screw at the pump wheel must not be released.

Install

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

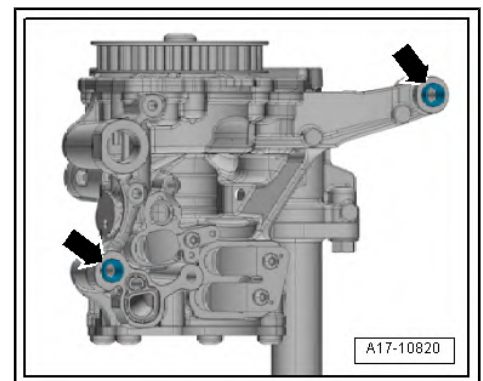
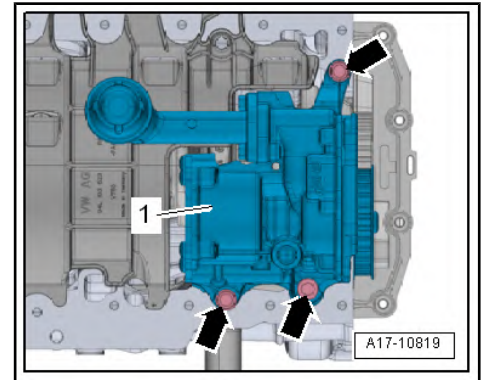


Note

- ◆ *Replace gasket.*
- ◆ *Replace screws which have been tightened firmly to a torquing angle.*
- If no dowel sleeves -arrows- are present in the oil pump, insert dowel sleeves.
- Installing the oil pan
⇒ [“1.5 Removing and installing oil sump”, page 135](#) .

Tightening torques

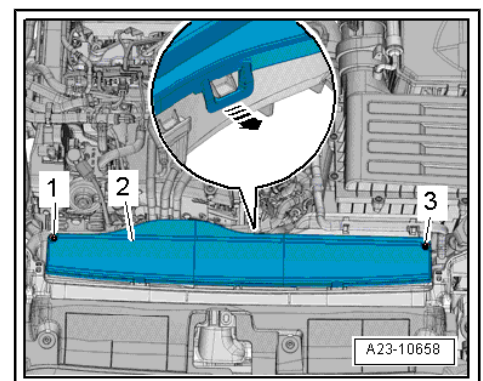
- ◆ ⇒ [“1.1 Parts of the lubrication system - Summary of components”, page 127](#)



1.7 Removing and installing oil pressure switch - F1-

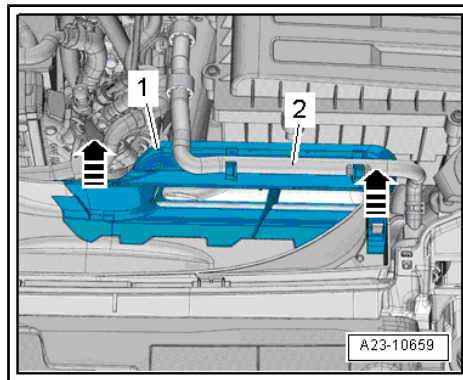
Removing

- Remove engine cover
⇒ [“1.1 Removing and installing engine trim panel”, page 10](#) .
- Unscrew screws -1-, -3-.
- Unlock catch -arrows-, remove cover-2-.

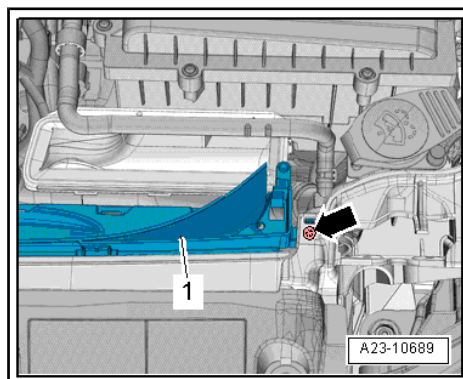




- Expose coolant hose -2-.
- Unlock catches -arrows-, remove top part-1- of air guide.



- Release screw left and right -arrow-.
- Unclip and remove bottom part -1- of air guide.



- Disconnect plug connection -arrow-.



Note

Place a cloth underneath to absorb escaping engine oil.

- Screw out oil pressure switch - F1- .

Install

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



Note

Replace gasket ring.

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

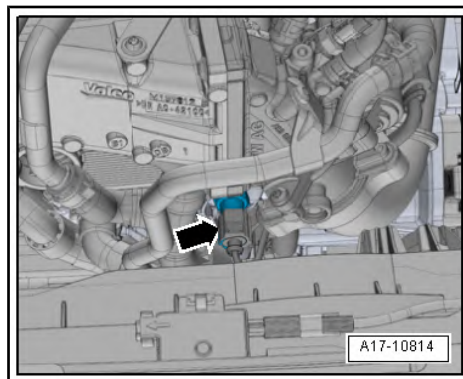
Tightening torques

- ♦ ⇒ ["1.3 Summary of components - oil filter holder", page 130](#)
- ♦ ⇒ ["6.4 Summary of components - air filter", page 362](#)

1.8 Removing and installing oil pressure switch for reduced oil pressure - F378-

Removing

- Remove air filter
⇒ ["6.5 Removing and installing air filter", page 364](#) .



- Disconnect plug connection -arrow-.



Note

Place a cloth underneath to absorb escaping engine oil.

- Unscrew oil pressure switch for reduced oil pressure - F378- .

Install

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



Note

Replace gasket ring.

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

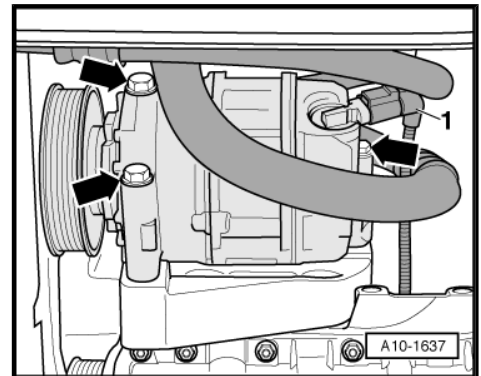
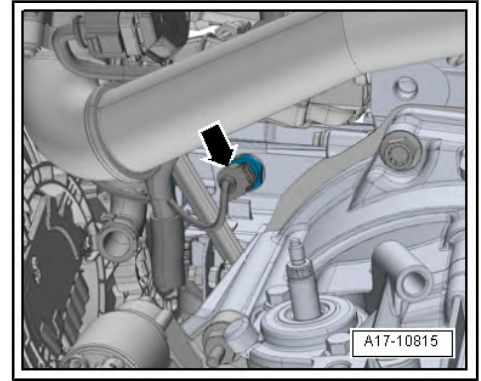
Tightening torques

- ◆ ⇒ [“1.3 Summary of components - oil filter holder”, page 130](#)
- ◆ ⇒ [“6.4 Summary of components - air filter”, page 362](#)

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

Removing

- Remove V-ribbed belt
⇒ [“1.2 Removing and installing poly V-belt”, page 38](#) .
- Remove AC compressor with connected refrigerant hoses from the holder ⇒ Heating, Air Conditioning; Rep. gr. 87 and strap up to the right side.





- Separate electrical plug connection -1-.

**Note**

Place a cloth underneath to absorb escaping engine oil.

- Unscrew screws -2- and remove oil pressure control valve - N428- .

Install

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

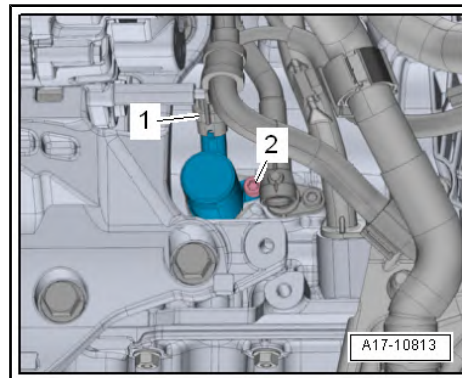
**Note**

Renew O-ring.

- Install the V-ribbed belt
⇒ [“1.2 Removing and installing poly V-belt”, page 38](#) .
- Checking the oil level ⇒ Maintenance ; Booklet Octavia III .

Tightening torques

- ♦ ⇒ [“1.1 Parts of the lubrication system - Summary of components”, page 127](#)
- ♦ Removing and installing AC compressor ⇒ Heating, Air Conditioning; Rep. gr. 87 .



1.10 Testing oil pressure

**Note**

Because of the clutch guard speed, not all of the oil pressure control steps can be set when the vehicle is stationary. For this reason, the oil pressure must be test with the vehicle diagnosis tester.

- Connect vehicle diagnosis tester and switch on ignition system.
- Perform the following procedure to test the oil pressure:

Drive unit

01 - 4 cylinder diesel engine Bosch -J623

17 - Lubrication

Subsystems, boundary conditions

Testing oil pressure

19 – Cooling

1 Cooling system

⇒ [“1.1 Connection diagram for coolant hoses”, page 143](#)

⇒ [“1.2 Draining and filling coolant”, page 151](#)

⇒ [“1.3 Checking cooling system for leaks”, page 157](#)

1.1 Connection diagram for coolant hoses

⇒ [“1.1.1 Connection diagram for coolant hoses \(engine identification characters CLHA, CLHB, CKFB, CKFC\)”, page 143](#)

⇒ [“1.1.2 Connection diagram for coolant hoses \(engine identification character CUPA\)”, page 146](#)

⇒ [“1.1.3 Connection diagram for coolant hoses \(engine identification characters CRKB, CRVC, CRMB, CUNA\)”, page 149](#)

1.1.1 Connection diagram for coolant hoses (engine identification characters CLHA, CLHB, CKFB, CKFC)

Vehicles without auxiliary heating



Note

- ◆ *Blue = large coolant circuit.*
- ◆ *Red = small coolant circuit.*
- ◆ *Lilac = coolant circuit for charge air cooler.*
- ◆ *Brown = heating circuit.*
- ◆ *The arrows point in the coolant flow direction.*



1 - Cooler for charge air circuit

- ☐ fill with fresh coolant after replacing

2 - Charge air cooler

- ☐ fill with fresh coolant after replacing

3 - Non-return valve

4 - Coolant pump

5 - Cylinder head and cylinder block

- ☐ fill with fresh coolant after replacing

6 - Coolant expansion tank

7 - Screw cap

- ☐ for coolant expansion tank
- ☐ Check pressure relief valve ➤ [page 157](#)

8 - Heating backup pump - V488-

9 - Heat exchanger of heating system

- ☐ fill with fresh coolant after replacing

10 - Radiator for exhaust gas recirculation

- ☐ fill with fresh coolant after replacing

11 - Coolant temperature transmitter - G62-

12 - Choke

- ☐ integrated into the coolant hose, not visible from the outside
- ☐ The fitting position is not defined, therefore the coolant hose must not be unclipped with the hose clamp (Risk of damage!)

13 - Coolant connection

14 - Gearbox oil cooler

- ☐ Equipment variants

15 - Coolant thermostat

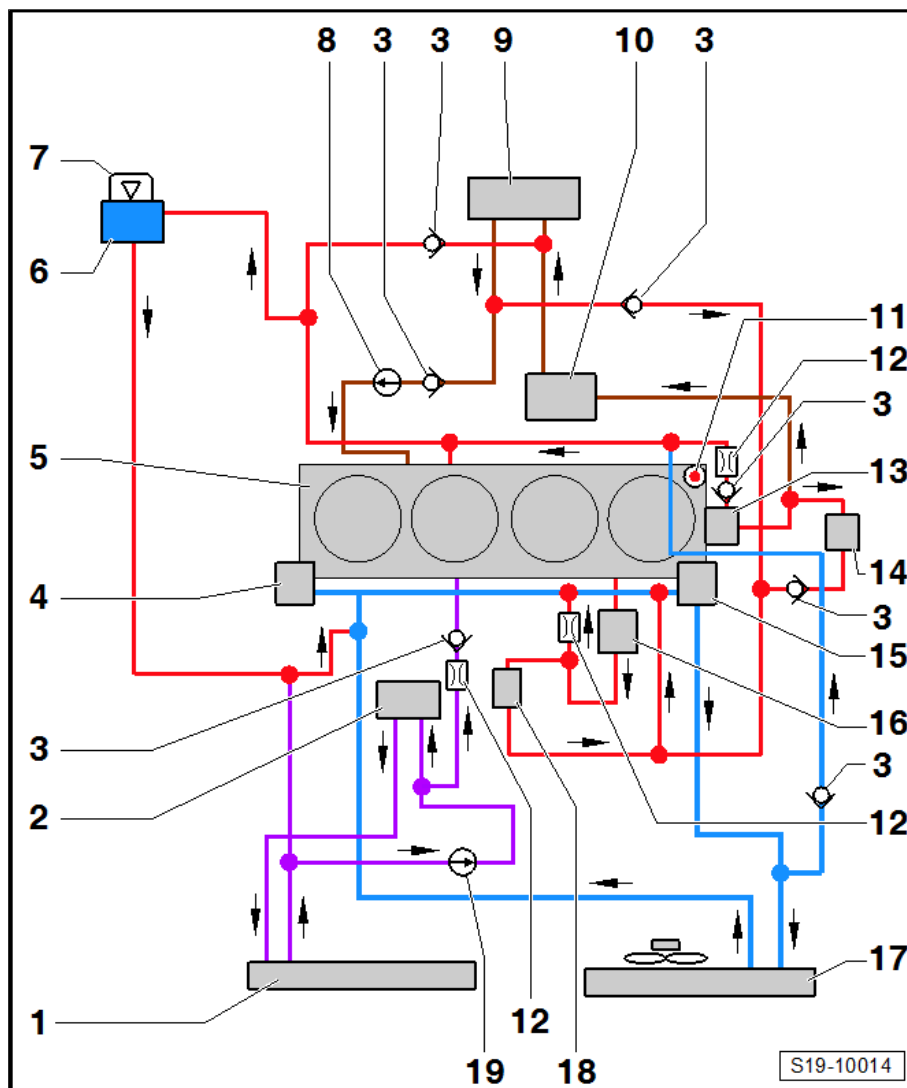
16 - Engine oil cooler

17 - Coolant radiator

- ☐ fill with fresh coolant after replacing

18 - Throttle valve module - J338-

19 - Charge air cooler pump - V188-



Vehicles fitted with auxiliary heating

Note

- ◆ Blue = large coolant circuit.
- ◆ Red = small coolant circuit.
- ◆ Lilac = coolant circuit for charge air cooler.
- ◆ Brown = heating circuit.
- ◆ The arrows point in the coolant flow direction.

1 - Cooler for charge air circuit

- ☐ fill with fresh coolant after replacing

2 - Charge air cooler

- ☐ fill with fresh coolant after replacing

3 - Non-return valve

4 - Coolant pump

5 - Cylinder head and cylinder block

- ☐ fill with fresh coolant after replacing

6 - Auxiliary heating

- ☐ Equipment variants

7 - Coolant expansion tank

8 - Screw cap

- ☐ for coolant expansion tank
- ☐ Check pressure relief valve ⇒ [page 157](#)

9 - Heating backup pump - V488-

- ☐ According to build version

10 - Heat exchanger of heating system

- ☐ fill with fresh coolant after replacing

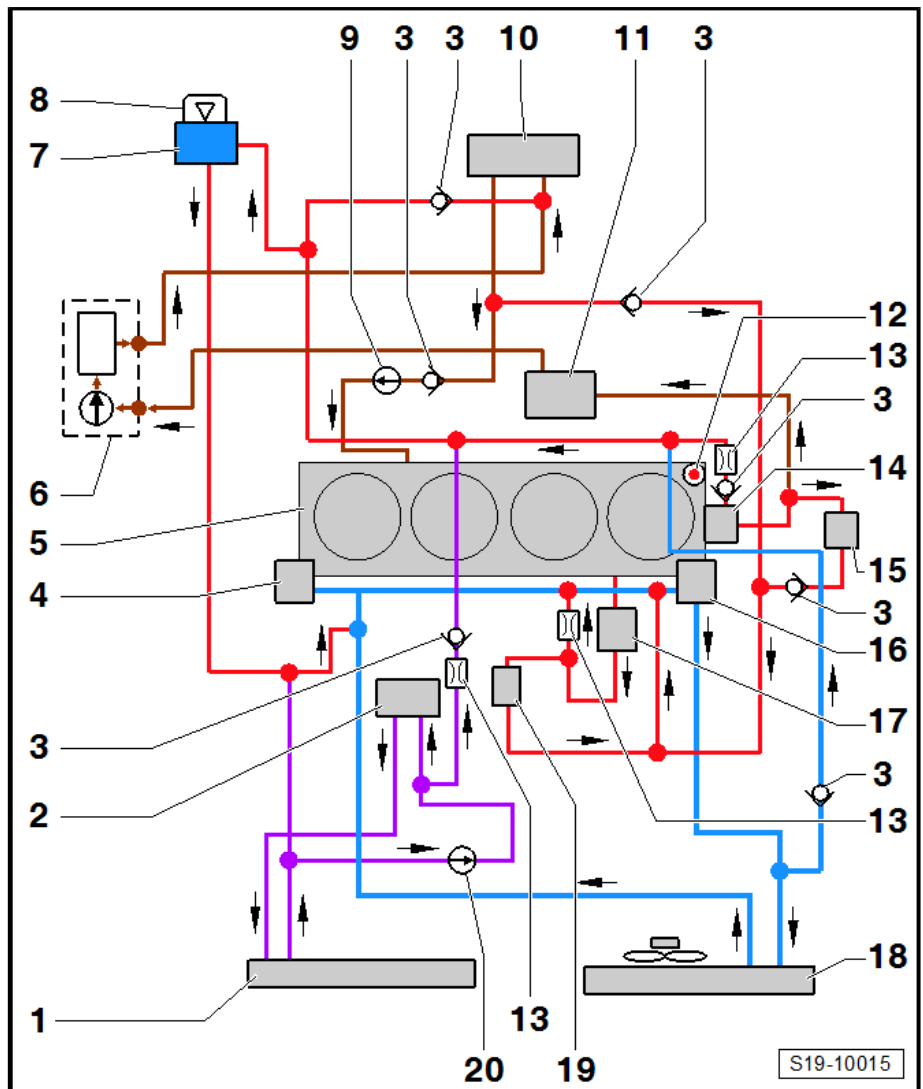
11 - Radiator for exhaust gas recirculation

- ☐ fill with fresh coolant after replacing

12 - Coolant temperature transmitter - G62-

13 - Choke

- ☐ integrated into the coolant hose, not visible from the outside
- ☐ The fitting position is not defined, therefore the coolant hose must not be unclipped with the hose clamp (Risk of damage!)





14 - Coolant connection

15 - Gearbox oil cooler

☐ Equipment variants

16 - Coolant thermostat

17 - Engine oil cooler

18 - Coolant radiator

☐ fill with fresh coolant after replacing

19 - Throttle valve module - J338-

20 - Charge air cooler pump - V188-

1.1.2 Connection diagram for coolant hoses (engine identification character CUPA)



Note

- ◆ *Blue = large coolant circuit.*
- ◆ *Red = small coolant circuit.*
- ◆ *Lilac = coolant circuit for charge air cooler.*
- ◆ *Brown = heating circuit.*
- ◆ *The arrows point in the coolant flow direction.*

Vehicles without auxiliary heating

1 - Cooler for charge air circuit

- ☐ fill with fresh coolant after replacing

2 - Charge air cooler

- ☐ fill with fresh coolant after replacing

3 - Non-return valve

4 - Coolant pump

5 - Cylinder head and cylinder block

- ☐ fill with fresh coolant after replacing

6 - Coolant expansion tank

7 - Screw cap

- ☐ for coolant expansion tank
- ☐ Check pressure relief valve ⇒ [page 157](#)

8 - Heating backup pump - V488-

9 - Heat exchanger of heating system

- ☐ fill with fresh coolant after replacing

10 - Radiator for exhaust gas recirculation

- ☐ fill with fresh coolant after replacing

11 - Coolant temperature transmitter - G62-

12 - Choke

- ☐ integrated into the coolant hose, not visible from the outside
- ☐ The fitting position is not defined, therefore the coolant hose must not be unclipped with the hose clamp (Risk of damage!)

13 - Coolant connection

14 - Gearbox oil cooler

- ☐ Equipment variants

15 - Coolant thermostat

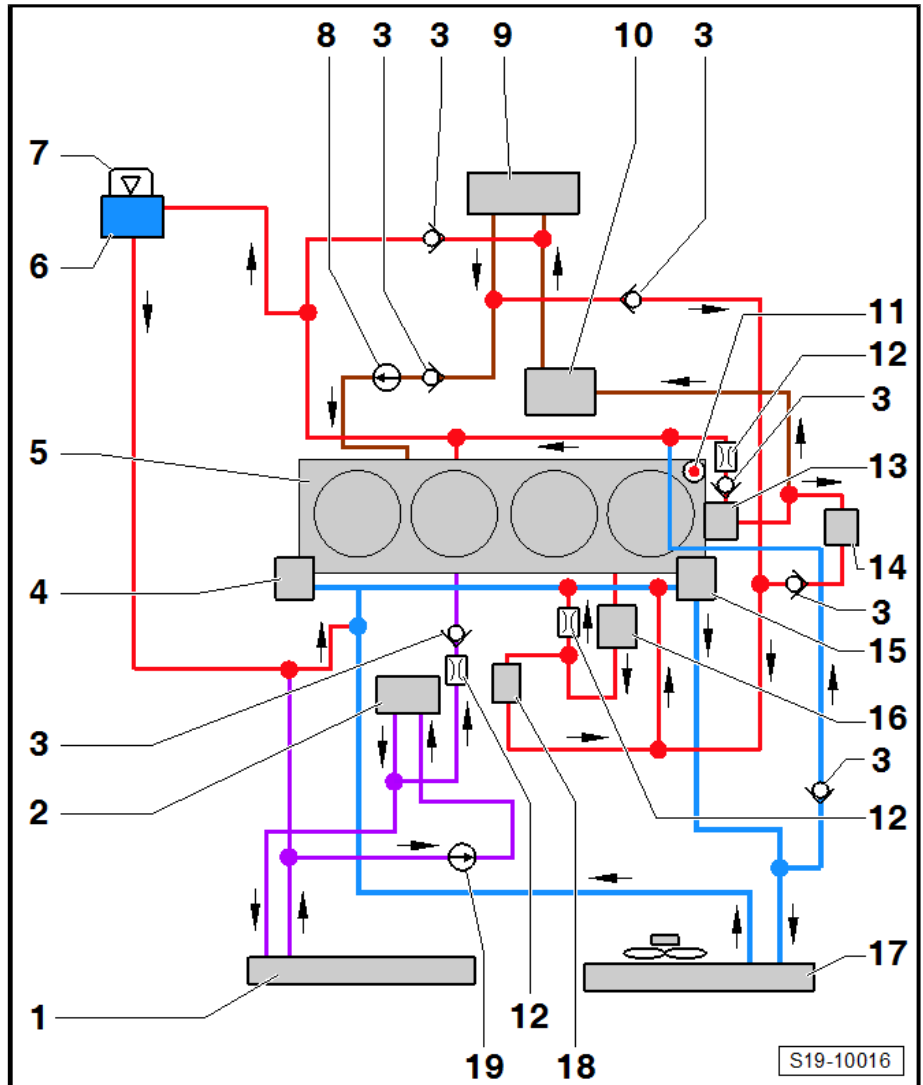
16 - Engine oil cooler

17 - Coolant radiator

- ☐ fill with fresh coolant after replacing

18 - Throttle valve module - J338-

19 - Charge air cooler pump - V188-



Vehicles fitted with auxiliary heating



1 - Cooler for charge air circuit

- ☐ fill with fresh coolant after replacing

2 - Charge air cooler

- ☐ fill with fresh coolant after replacing

3 - Non-return valve

4 - Coolant pump

5 - Cylinder head and cylinder block

- ☐ fill with fresh coolant after replacing

6 - Auxiliary heating

- ☐ Equipment variants

7 - Coolant expansion tank

8 - Screw cap

- ☐ for coolant expansion tank
- ☐ Check pressure relief valve ➔ [page 157](#)

9 - Heating backup pump - V488-

- ☐ According to build version

10 - Heat exchanger of heating system

- ☐ fill with fresh coolant after replacing

11 - Radiator for exhaust gas recirculation

- ☐ fill with fresh coolant after replacing

12 - Coolant temperature transmitter - G62-

13 - Choke

- ☐ integrated into the coolant hose, not visible from the outside
- ☐ The fitting position is not defined, therefore the coolant hose must not be unclipped with the hose clamp (Risk of damage!)

14 - Coolant connection

15 - Gearbox oil cooler

- ☐ Equipment variants

16 - Coolant thermostat

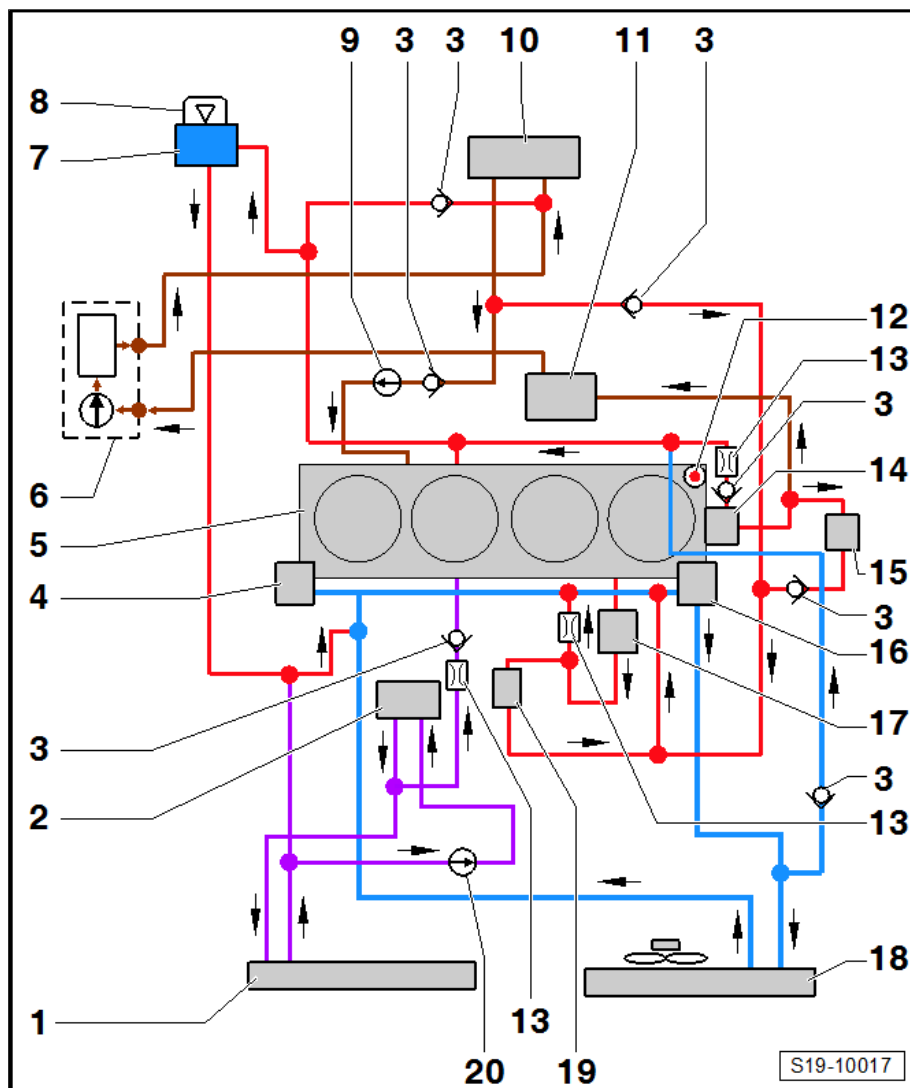
17 - Engine oil cooler

18 - Coolant radiator

- ☐ fill with fresh coolant after replacing

19 - Throttle valve module - J338-

20 - Charge air cooler pump - V188-



1.1.3 Connection diagram for coolant hoses (engine identification characters CRKB, CRVC, CRMB, CUNA)

Note

- ◆ Blue = large coolant circuit.
- ◆ Red = small coolant circuit.
- ◆ Lilac = coolant circuit for charge air cooler.
- ◆ Brown = heating circuit.
- ◆ The arrows point in the coolant flow direction.

Vehicles without auxiliary heating system

1 - Cooler for charge air circuit

- ☐ fill with fresh coolant after replacing

2 - Charge air cooler

- ☐ fill with fresh coolant after replacing

3 - Non-return valve

4 - Coolant pump

5 - Cylinder head and cylinder block

- ☐ fill with fresh coolant after replacing

6 - Coolant expansion tank

7 - Screw cap

- ☐ for coolant expansion tank
- ☐ Check pressure relief valve ⇒ [page 157](#)

8 - Heating backup pump - V488-

9 - Heat exchanger of heating system

- ☐ fill with fresh coolant after replacing

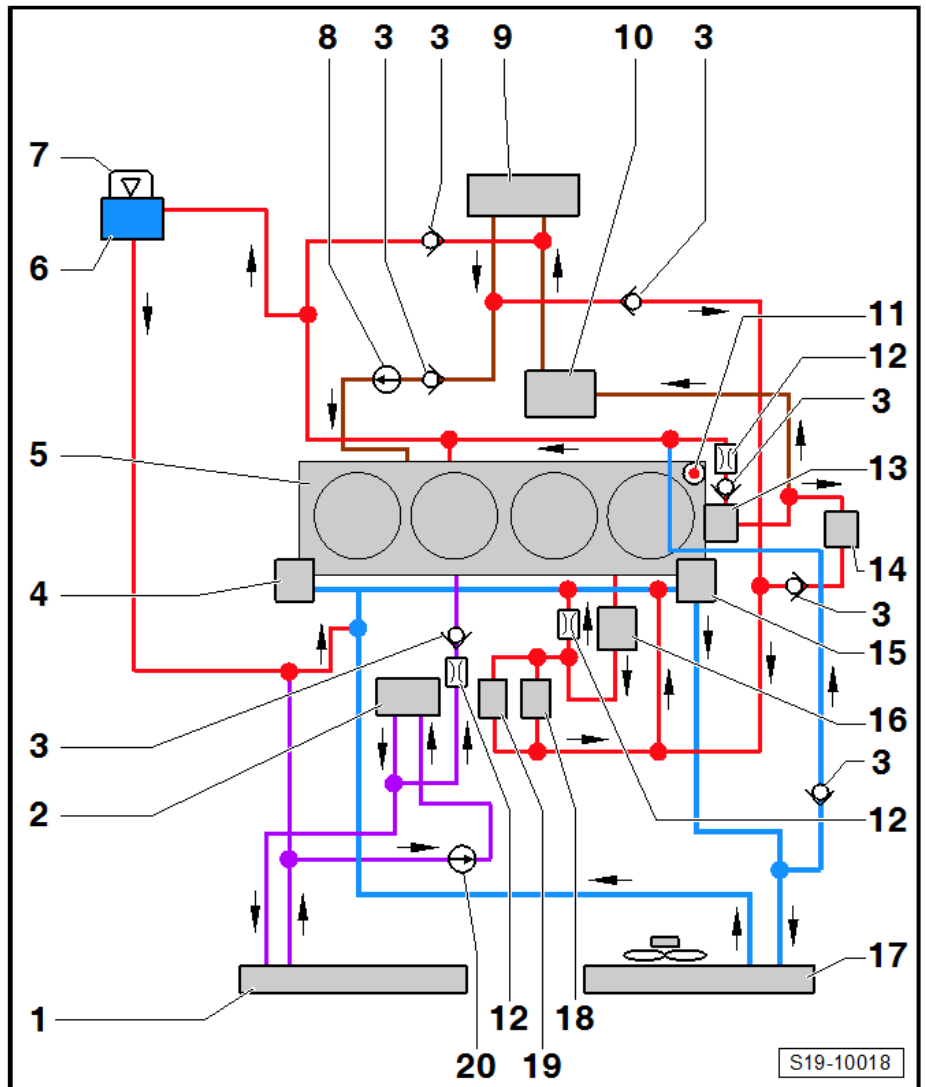
10 - Radiator for exhaust gas recirculation

- ☐ fill with fresh coolant after replacing

11 - Coolant temperature transmitter - G62-

12 - Choke

- ☐ integrated into the coolant hose, not visible from the outside
- ☐ The fitting position is not defined, therefore the coolant hose must not be unclipped with the hose clamp (Risk of damage!)



**13 - Coolant connection****14 - Gearbox oil cooler**

- ☐ Equipment variants

15 - Coolant thermostat**16 - Engine oil cooler****17 - Coolant radiator**

- ☐ fill with fresh coolant after replacing

18 - Throttle valve module - J338-**19 - EGR control motor - V338-****20 - Charge air cooler pump - V188-****Vehicles fitted with auxiliary heating****1 - Cooler for charge air circuit**

- ☐ fill with fresh coolant after replacing

2 - Charge air cooler

- ☐ fill with fresh coolant after replacing

3 - Non-return valve**4 - Coolant pump****5 - Cylinder head and cylinder block**

- ☐ fill with fresh coolant after replacing

6 - Auxiliary heating

- ☐ Equipment variants

7 - Coolant expansion tank**8 - Screw cap**

- ☐ for coolant expansion tank
- ☐ Check pressure relief valve ➔ [page 157](#)

9 - Heating backup pump - V488-

- ☐ According to build version

10 - Heat exchanger of heating system

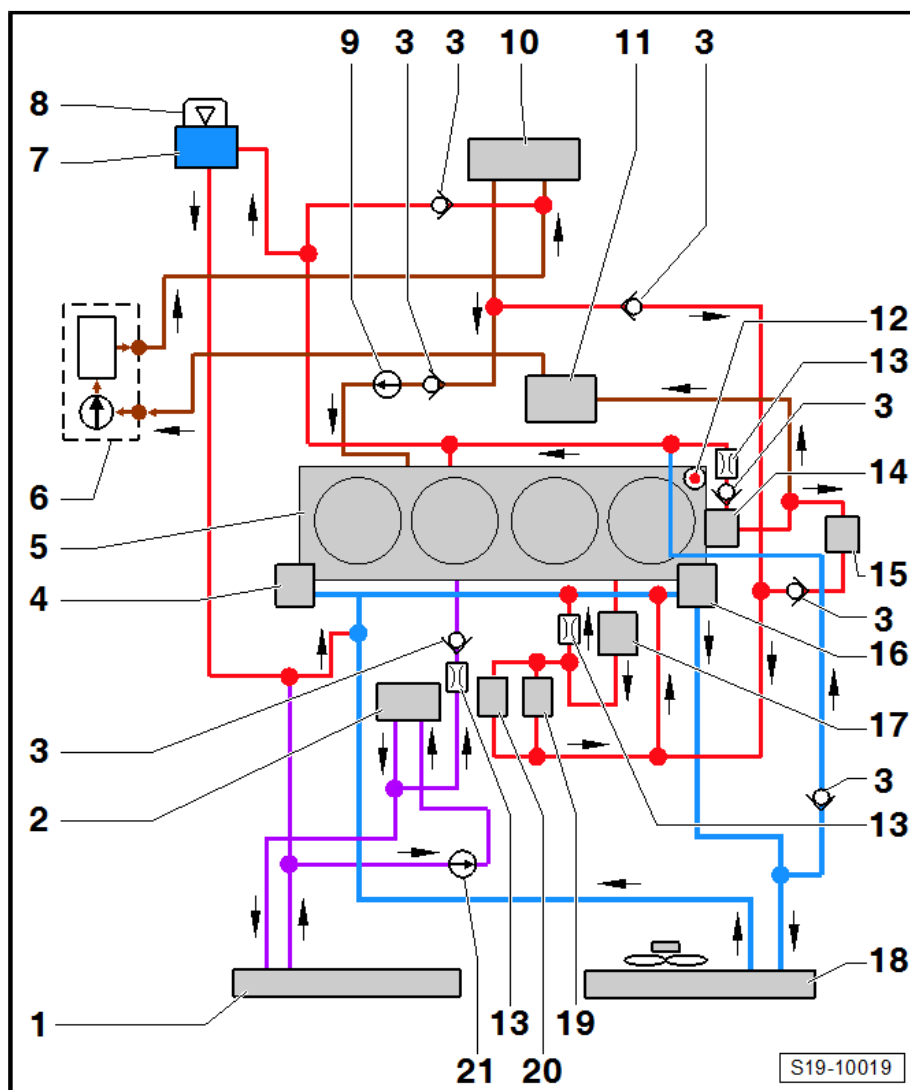
- ☐ fill with fresh coolant after replacing

11 - Radiator for exhaust gas recirculation

- ☐ fill with fresh coolant after replacing

12 - Coolant temperature transmitter - G62-**13 - Choke**

- ☐ integrated into the coolant hose, not visible from the outside



- ☐ The fitting position is not defined, therefore the coolant hose must not be unclipped with the hose clamp (Risk of damage!)

14 - Coolant connection

15 - Gearbox oil cooler

- ☐ Equipment variants

16 - Coolant thermostat

17 - Engine oil cooler

18 - Coolant radiator

- ☐ fill with fresh coolant after replacing

19 - Throttle valve module - J338-

20 - EGR control motor - V338-

21 - Charge air cooler pump - V188-

1.2 Draining and filling coolant

Special tools and workshop equipment required

- ◆ Adapter for cooling system tester - V.A.G 1274/8-
- ◆ Cooling system charge unit - VAS 6096-
- ◆ Catch pan , e.g. -VAS 6208-
- ◆ Hose clip pliers - VAS 6362-
- ◆ Refractometer
- ◆ Protective goggles
- ◆ Protective gloves

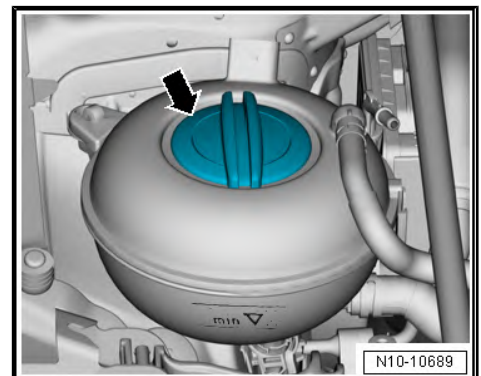
Draining



WARNING

Hot steam or hot coolant may escape when the compensation bottle is opened. Cover the cap with a cloth and open carefully.

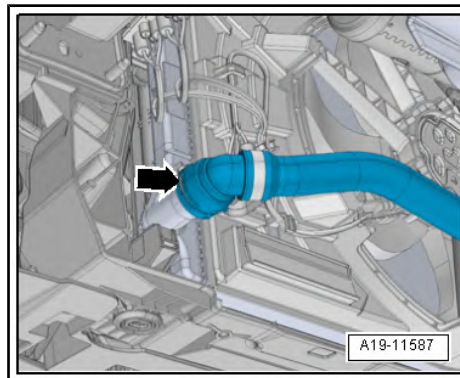
- Open cap -arrow- for coolant expansion tank.
- Remove the sound dampening system ⇒ Body Work; Rep. gr. 50 .
- Place a catch pan - VAS 6208- under the radiator.



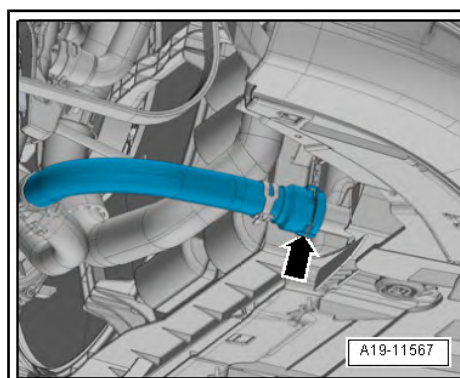


Vehicles with radiator version 1

- Raise holding clamp -arrow-, remove bottom left coolant hose from radiator, allow coolant to drain.

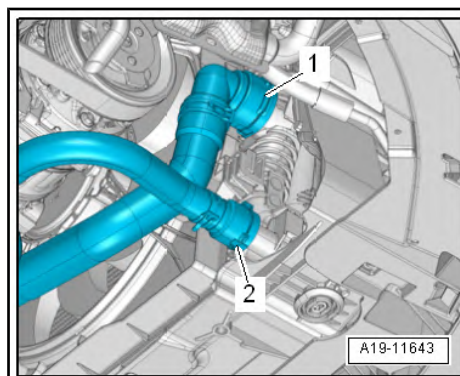


- Raise holding clamp -arrow-, remove bottom right coolant hose from radiator, allow coolant to drain.



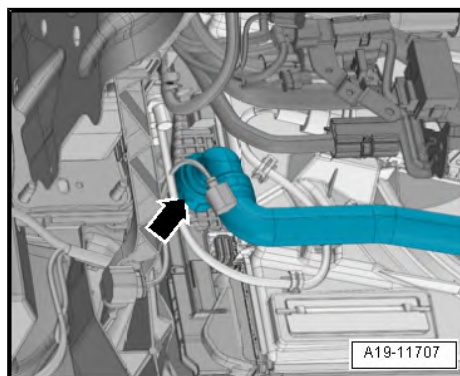
Vehicles with radiator version 2

- Raise holding clamp -1-, remove bottom right coolant hose from radiator, allow coolant to drain.
- Raise holding clamp -2-, remove bottom right coolant hose from radiator, allow coolant to drain.

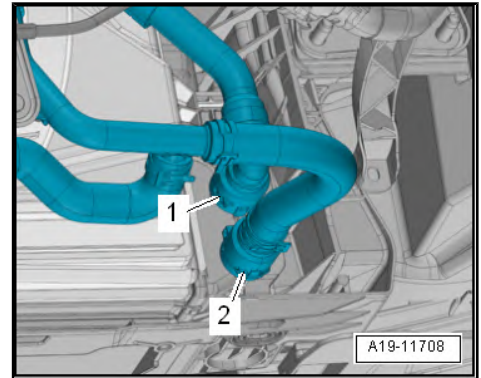


Vehicles with radiator version 3

- Raise holding clamp -arrow-, remove bottom left coolant hose from radiator, allow coolant to drain.



- Raise holding clamps -1-, -2-, remove coolant hoses from charge air circuit cooler, allow coolant to drain.



Continued for all vehicles

- Loosen hose clamp -arrow-, remove bottom coolant hose to heating backup pump - V488- , allow coolant to drain.

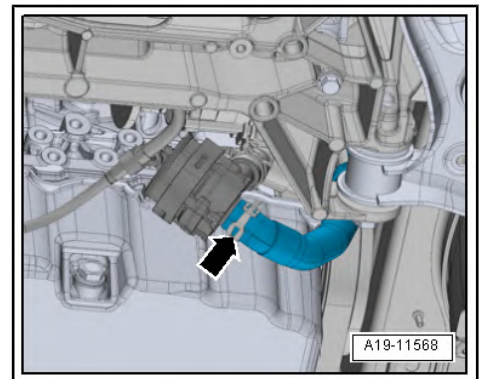
Filling up



Caution

Risk of engine damage if the cooling system is not filled/bled correctly.

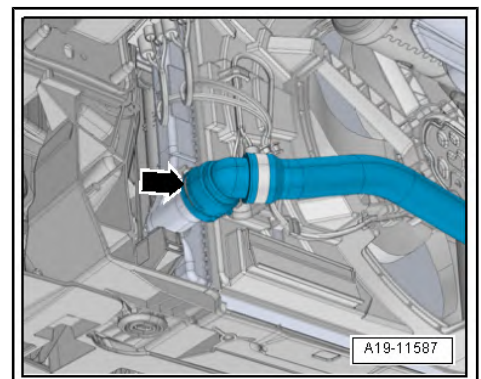
After filling, the cooling system must be bled ⇒ Vehicle diagnostic tester.



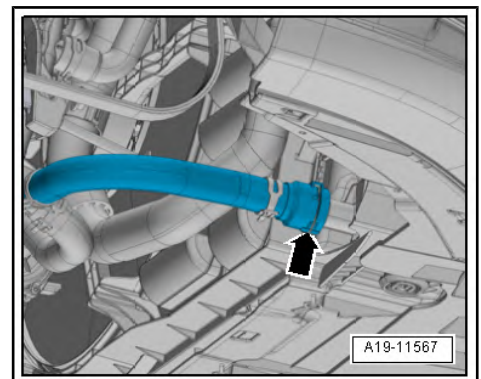
Work procedure

Vehicles with radiator version 1

- Connect coolant hose with quick coupling -arrow- to radiator bottom left ⇒ [page 186](#) .

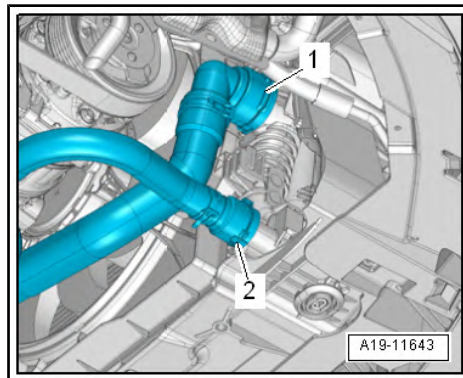


- Connect coolant hose with quick coupling -arrow- to charge air circuit cooler bottom right ⇒ [page 186](#) .



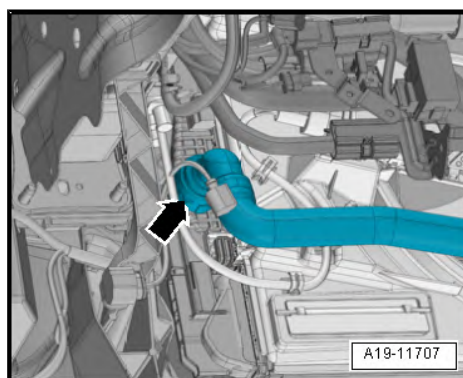
Vehicles with radiator version 2

- Connect coolant hose with quick coupling -1- to radiator bottom right ➤ [page 186](#) .
- Connect coolant hose with quick coupling -2- to charge air circuit cooler bottom right ➤ [page 186](#) .

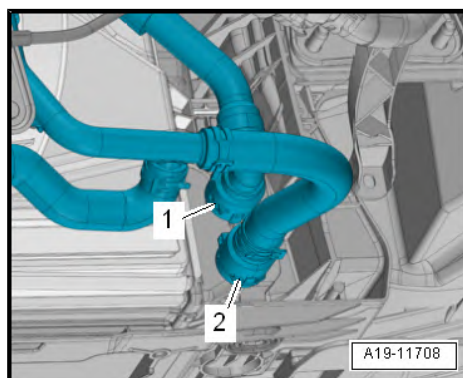


Vehicles with radiator version 3

- Connect coolant hose with quick coupling -arrow- to radiator bottom left ➤ [page 186](#) .

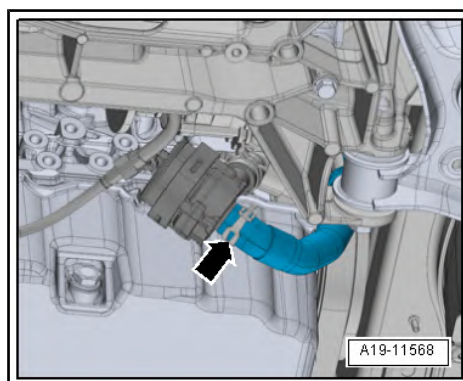


- Connect coolant hoses with quick coupling -1-, -2- to charge air circuit cooler ➤ [page 186](#) .



Continued for all vehicles

- Connect coolant hose with hose clamp -arrow- bottom to the heating backup pump - V488- .
- Fill up the coolant reservoir -VAS 6096- with at least 8 litres of pre-mixed coolant mixed to the correct ratio:
- ♦ ➤ Maintenance ; Booklet Octavia III .



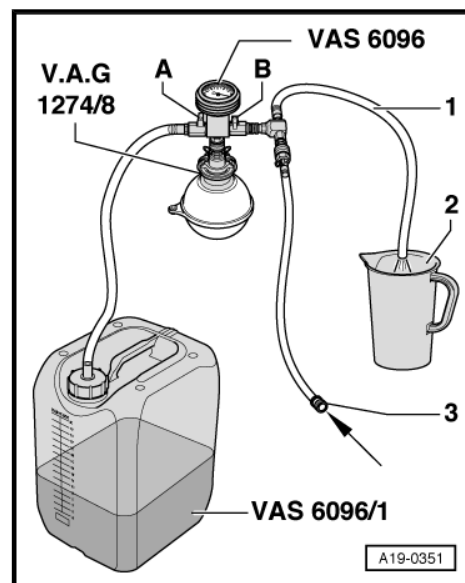
- Screw the adapter for cooling system testing device - V.A.G 1274/8- to the coolant expansion tank.
- Assemble cooling system charge unit - VAS 6096- onto the adapter -V.A.G 1274/8- .
- Lead the air hose -1- into a small container -2-.



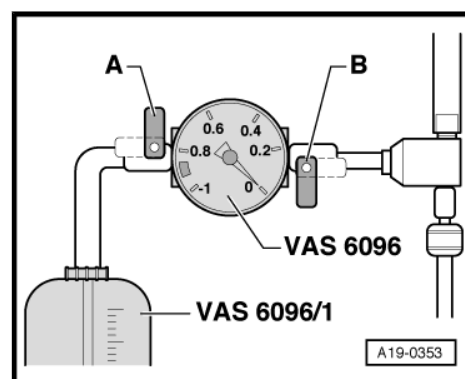
Note

A small amount of coolant, which is entrained with the exhaust air, must be collected.

- Close the valves -A- and -B-, while doing so turn the lever at right angles to the direction of flow.
- Connect hose -3- to compressed air.
- Pressure: 0.6...1.0 MPa (6...10 bar)



- Open the valve -B-, while doing so turn the lever in the direction of flow.
- A vacuum pump is created in the cooling system by the vacuum pump; the display instrument pointer must move into the green area.
- In addition, briefly open the valve -A- by turning the lever in the direction of flow, so that the hose of the coolant expansion bottle is -VAS 6096- filled with coolant.
- Close the valve -A- again.
- Leave the valve -B- open a further 2 minutes.
- A vacuum pump is created in the cooling system by the vacuum pump; the display instrument pointer must remain in the green area.
- Close the valve -B-.
- If the display instrument pointer remains in the green area the vacuum in the cooling system is sufficient for subsequent filling.

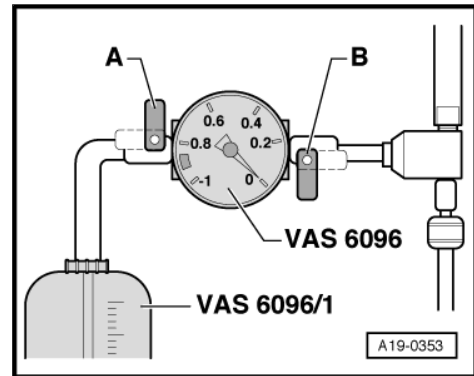


Note

- ◆ *If the pointer is below the green area, repeat the process.*
- ◆ *If the vacuum drops, you must check the cooling system for leak points.*
- Disconnect pneumatic hose.



- Open valve -A-.
- The vacuum pump in the cooling system draws the coolant out of the coolant reservoir -VAS 6096- and fills the cooling system.
- Remove the cooling system charge unit - VAS 6096- from the coolant expansion tank.

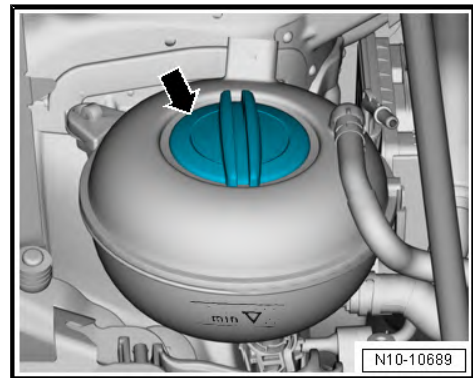


- Fill up coolant up to “Max” marking.

**Note**

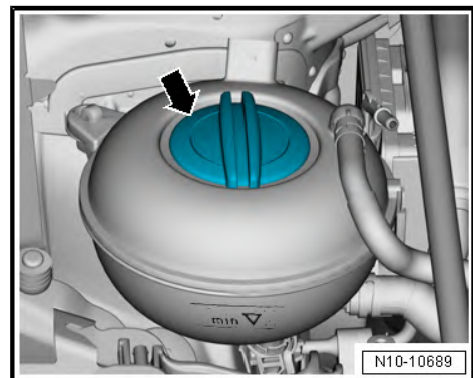
Hose connections and air guide pipes and hoses must be free of oil and grease before being installed.

- Install the noise insulation ⇒ Body Work; Rep. gr. 50 .
- For vehicles with auxiliary heating, switch it on for approximately 30 seconds.
- Set temperature to “HI”.
- Switch off AC compressor. Press **AC** button to do so.
- The LED in the button must not illuminate.
- Fill and bleed coolant circuit ⇒ Vehicle diagnostic tester, Targeted Functions, coolant circuit filling.
- Allow the engine to warm up until the thermostat has opened or the radiator fan has been activated once.
- Allow engine to cool down.
- Check coolant level.
- Top up coolant to approximately 5 mm above the “Max” marking.

**Note**

During driving, any residual air quantities are discharged via the permanent vent lines.

- Check coolant level.
- If the engine is cold the coolant level must be between the “Min” and “Max” marking.
- When the engine is at operating temperature the coolant level may be at the “Max” marking.
- If necessary, top up with coolant.



1.3 Checking cooling system for leaks

Special tools and workshop equipment required

- ◆ Cooling system tester - V.A.G 1274 B-
- ◆ Adapter for cooling system tester - V.A.G 1274/8-
- ◆ Adapter for cooling system tester - V.A.G 1274/9-

Test prerequisite

- Engine must be warm.

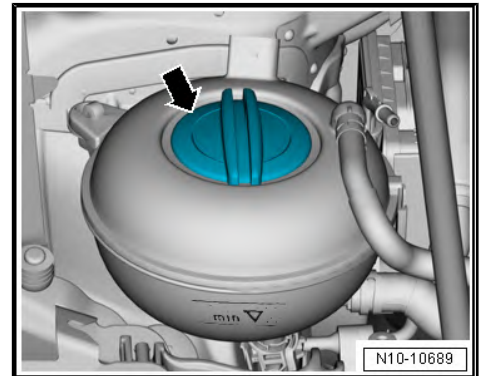
Test procedure



WARNING

Steam may escape when expansion tank is opened. Cover the cap with a cloth and open carefully.

- Open cap -arrow- for coolant expansion tank.



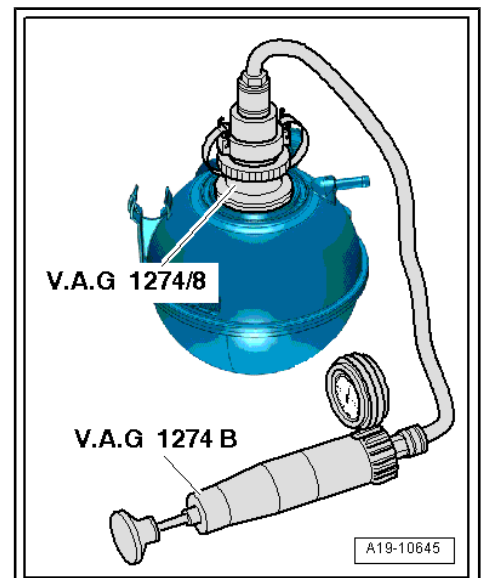
- Fit the cooling system testing device - V.A.G 1274 B- with adapter -V.A.G 1274/8- onto the coolant expansion tank.
- Build up a pressure of approximately 0.1 MPa (1.0 bar) using hand pump on cooling system tester.



WARNING

Risk of scalding!

- ◆ *Before the cooling system testing device -V.A.G 1274 B- is separated from the connecting hose or the connecting piece -V.A.G 1274 B/1- , the existing pressure must absolutely be released.*
- ◆ *For this step, press the pressure relief valve on the cooling system testing device -V.A.G 1274 B- and hold it pressed until the pressure gauge indicates the value »0«.*



If pressure drops:

- Search position of the leak and repair fault.

Testing the pressure relief valve in the cap

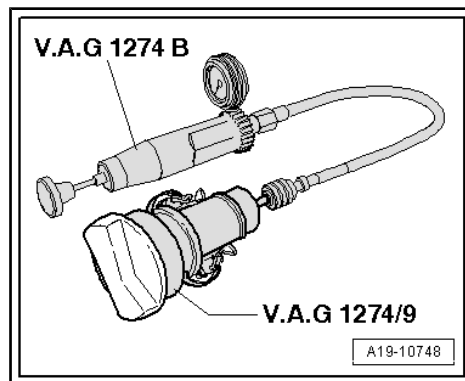
- Screw the screw cap into the adapter for the cooling system testing device -V.A.G 1274/9- .
- Connect the connecting piece -V.A.G 1274 B/1- to the adapter for the cooling system testing device -V.A.G 1274/9- .



- Connect the connecting piece -V.A.G 1274 B/1- via the delivered connecting hose to the cooling system testing device - V.A.G 1274 B- .
- Operate the handpump.
- The pressure relief valve should open at a pressure of 0.14 ... 0.16 MPa (1.4 ... 1.6 bar).

If the pressure relief valve opens too early or too late:

- Renew cap.



2 Coolant pump and coolant thermostat

⇒ [“2.1 Summary of components - coolant pump and coolant thermostat”, page 159](#)

⇒ [“2.2 Summary of components - coolant temperature transmitter”, page 161](#)

⇒ [“2.3 Summary of components - electric coolant pump”, page 162](#)

⇒ [“2.4 Removing and installing coolant pump”, page 163](#)

⇒ [“2.5 Removing and installing coolant thermostat”, page 164](#)

⇒ [“2.6 Removing and installing coolant valve for cylinder head N489”, page 165](#)

⇒ [“2.7 Testing coolant thermostat”, page 166](#)

⇒ [“2.8 Removing and installing coolant temperature transmitter G62”, page 166](#)

⇒ [“2.9 Removing and installing charge air cooler pump V188”, page 167](#)

⇒ [“2.10 Removing and installing the heating backup pump V488”, page 168](#)

2.1 Summary of components - coolant pump and coolant thermostat

**1 - O-rings**

- ☐ replace after removal
- ☐ Moisten with coolant

2 - Inlet connections**3 - O-ring**

- ☐ replace after removal
- ☐ Moisten with coolant

4 - Coolant pipe - front bottom

- ☐ removing and installing
⇒ ["3.3 Removing and installing the front bottom coolant pipe"](#),
[page 173](#)

5 - Gasket ring

- ☐ replace after removal

6 - O-ring

- ☐ replace after removal
- ☐ Moisten with coolant

7 - Coolant pump

- ☐ removing and installing
⇒ ["2.4 Removing and installing coolant pump"](#),
[page 163](#)

8 - O-rings

- ☐ replace after removal
- ☐ Moisten with coolant

9 - Screw

- ☐ 8 Nm

10 - Coolant valve for cylinder head - N489-

- ☐ removing and installing
⇒ ["2.6 Removing and installing coolant valve for cylinder head N489"](#), [page 165](#)

11 - Screw

- ☐ replace after removal
- ☐ 20 Nm + torque a further 45° (1/8 turn)

12 - Retaining clip

- ☐ check for firm seating

13 - Retaining clip

- ☐ check for firm seating

14 - O-ring

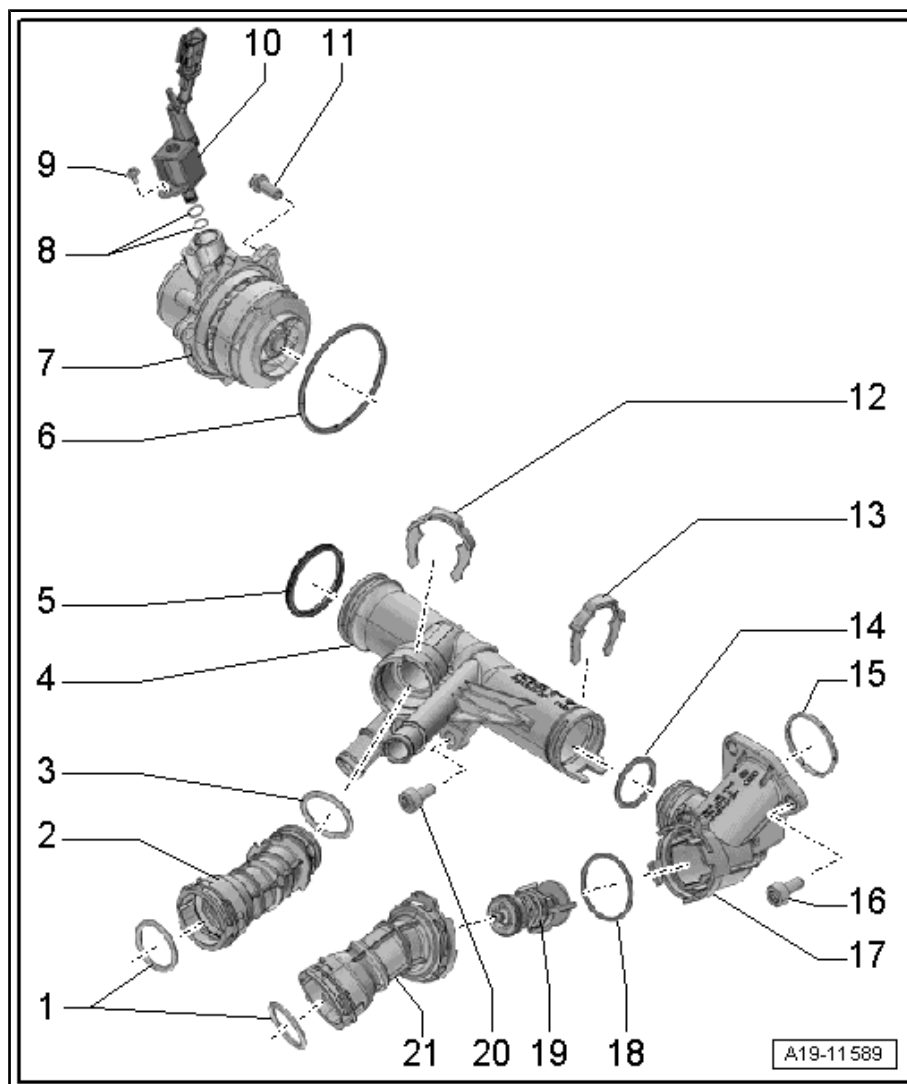
- ☐ replace after removal
- ☐ Moisten with coolant

15 - Gasket ring

- ☐ replace after removal

16 - Screw

- ☐ 20 Nm



17 - Coolant thermostat housing

18 - O-ring

- ☐ replace after removal
- ☐ Moisten with coolant

19 - Coolant thermostat

- ☐ removing and installing ⇒ [“2.5 Removing and installing coolant thermostat”, page 164](#)

20 - Screw

- ☐ 20 Nm

21 - Inlet connections

2.2 Summary of components - coolant temperature transmitter

1 - Coolant temperature transmitter - G62-

- ☐ removing and installing
⇒ [“2.8 Removing and installing coolant temperature transmitter G62”, page 166](#)

2 - Distance ring

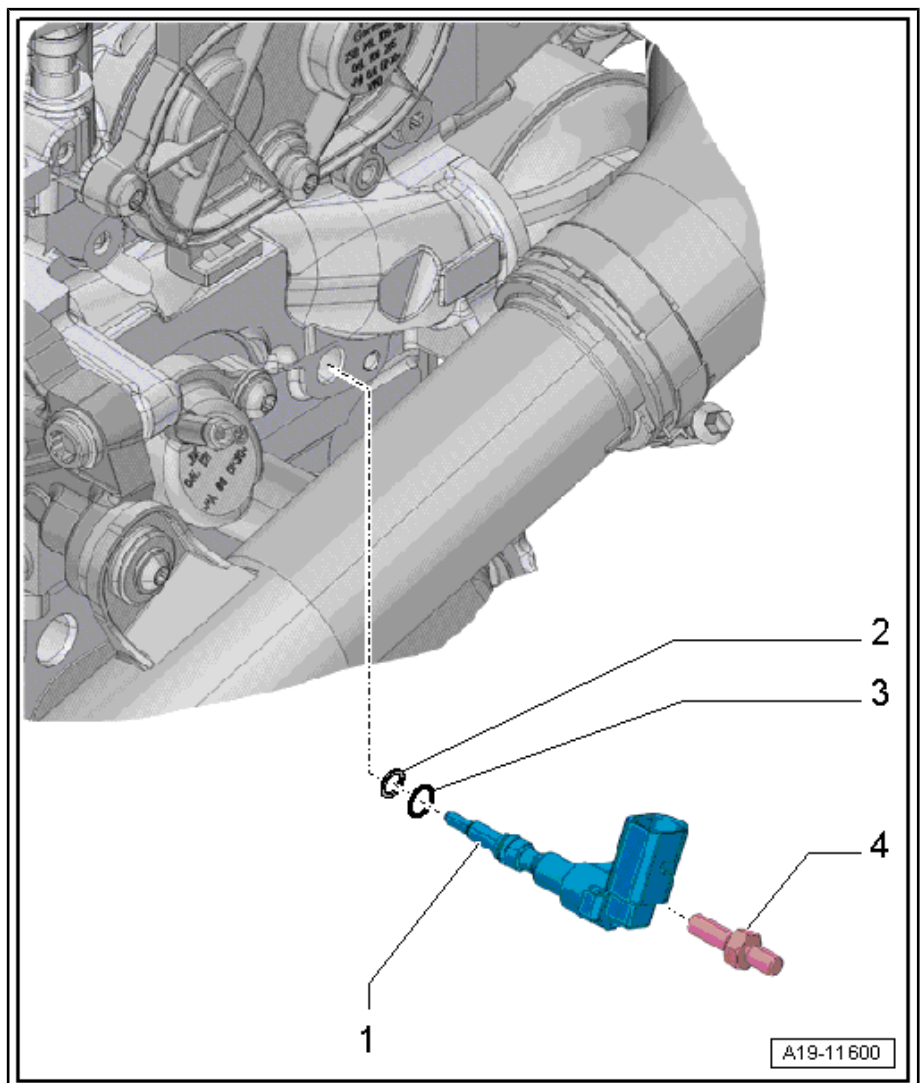
- ☐ replace if damaged.

3 - O-ring

- ☐ replace after removal
- ☐ Moisten with coolant

4 - Double screw

- ☐ 8 Nm



2.3 Summary of components - electric coolant pump

Charge air cooler pump - V188- Version 1, heating backup pump
- V488-

1 - Charge air cooler pump - V188-

- ☐ removing and installing
⇒ [“2.9 Removing and installing charge air cooler pump V188”](#),
page 167

2 - Coolant hose

3 - Coolant hose

4 - Screw

- ☐ 40 Nm

5 - Screw

- ☐ 40 Nm

6 - Heating backup pump - V488-

- ☐ removing and installing
⇒ [“2.10 Removing and installing the heating backup pump V488”](#),
page 168

7 - Coolant hose

8 - Coolant hose

9 - Bracket

- ☐ for heating backup pump - V488-

10 - Brackets

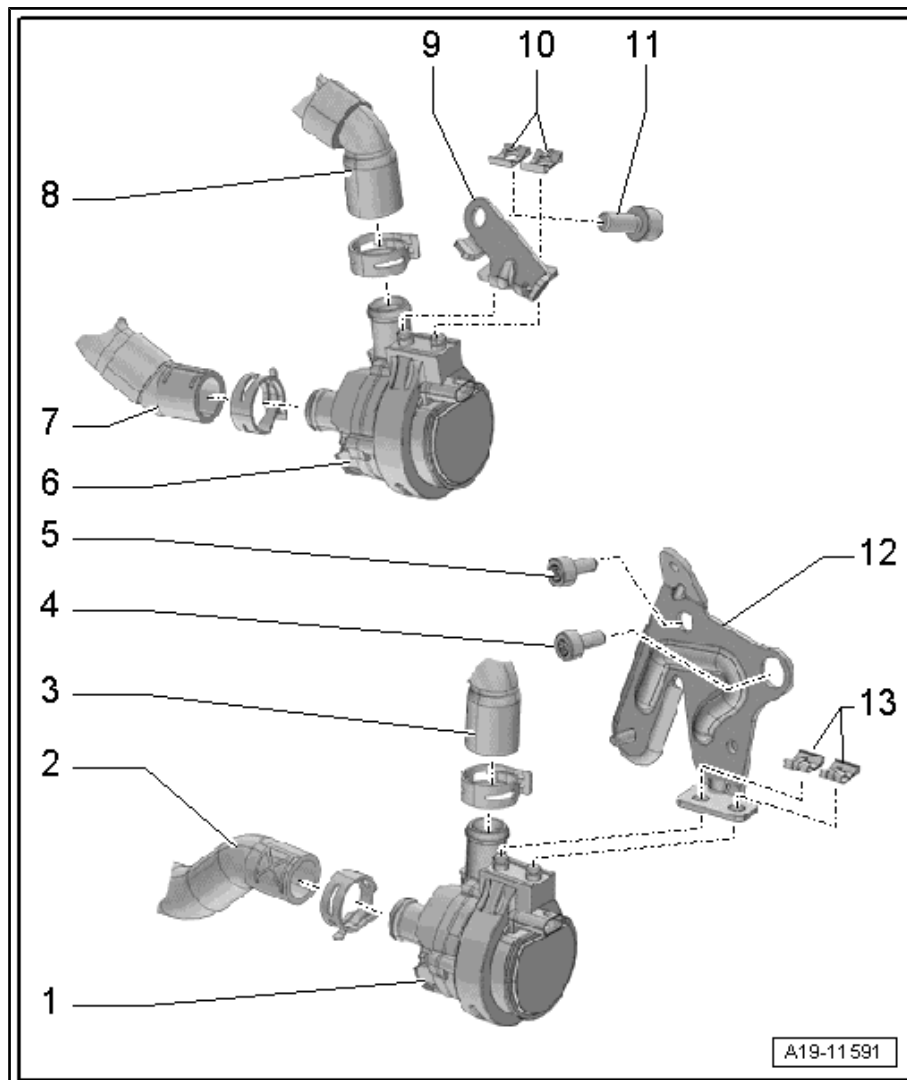
11 - Screw

- ☐ 40 Nm

12 - Bracket

- ☐ for charge air cooler pump - V188-

13 - Brackets



Charge air cooler pump - V188- Version 2

1 - Clamp

2 - Screw

□ 23 Nm

3 - Charge air cooler pump - V188-

□ removing and installing
⇒ [“2.9 Removing and installing charge air cooler pump V188”](#),
[page 167](#)

4 - Coolant hose

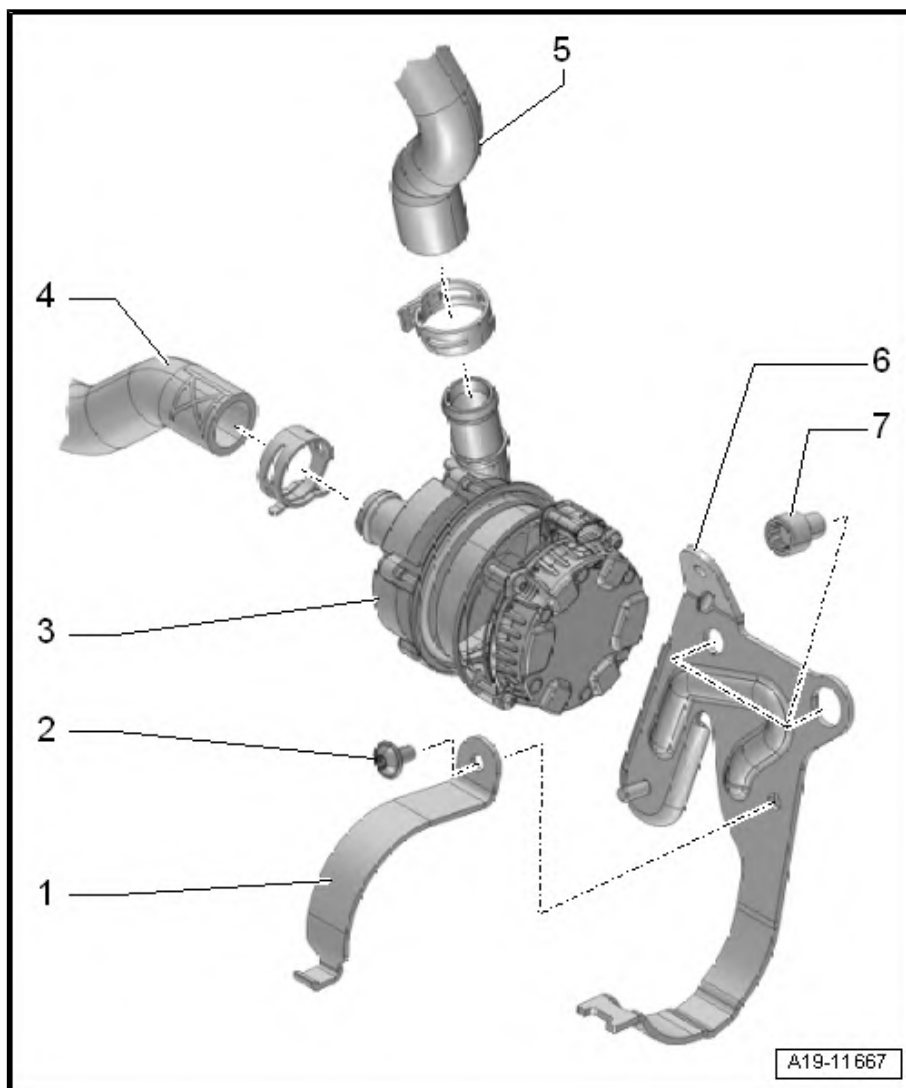
5 - Coolant hose

6 - Bracket

□ for charge air cooler pump - V188-

7 - Screw

□ 40 Nm



2.4 Removing and installing coolant pump

Removing

- Drain coolant ⇒ [“1.2 Draining and filling coolant”](#), [page 151](#) .
- Removing toothed belt
⇒ [“1.11 Removing and installing toothed belt”](#), [page 52](#) .



- Disconnect electrical plug connection -2-, expose electric cable.
- Unscrew screws -arrows-, remove coolant pump -1-.

Install

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



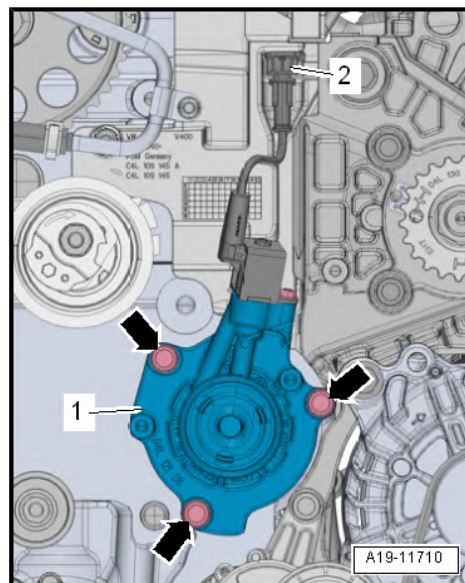
Note

Replace O-rings.

- Clean and smooth O-ring sealing surfaces.
- Moisten O-rings with coolant.
- install (set the timing) ⇒ [page 54](#) .
- Top up coolant ⇒ [page 153](#) .

Tightening torques

- ♦ ⇒ [“2.1 Summary of components - coolant pump and coolant thermostat”, page 159](#)

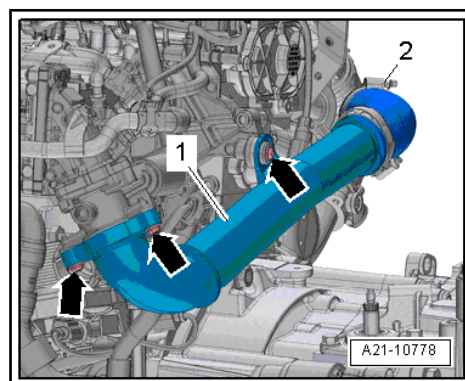


2.5 Removing and installing coolant thermostat

Removing

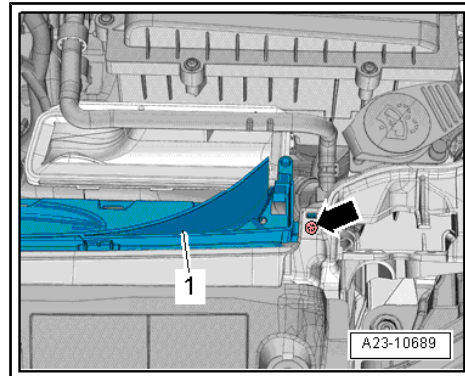
- Drain coolant ⇒ [“1.2 Draining and filling coolant”, page 151](#) .
- Remove air filter
⇒ [“6.5 Removing and installing air filter”, page 364](#) .
- Release screws -arrows-.
- Loosen hose clamp -2-, remove air guide pipe -1-.

For vehicles with engine identification characters CRKB, CRMB, CUNA



- Remove screws left and right -arrow-.
- Unscrew and remove the air guide pipe bottom - 1 -.

Continued for all vehicles



- Unlock catch peg in direction of arrow -B- (from the top using a screwdriver).
- Turn and pull off connection fittings -1- in arrow direction -A-.
- Remove thermostat.

Install

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



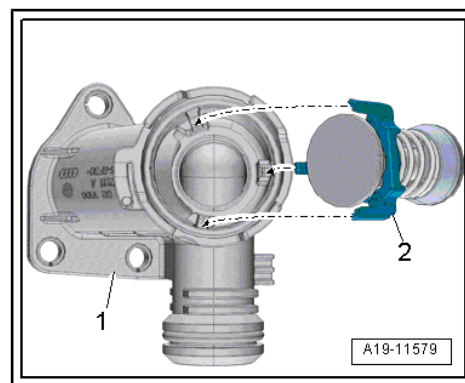
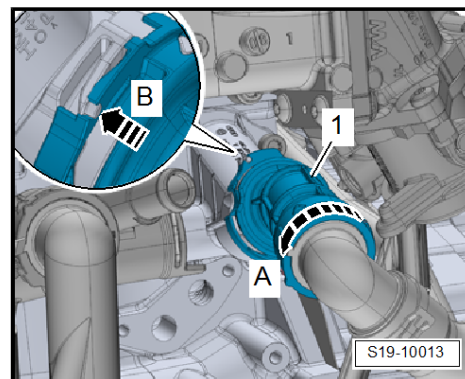
Note

Renew O-ring.

- Clean and smooth O-ring sealing surfaces.
- Moisten O-ring with coolant.
- Insert -2- into the coolant thermostat housing.
- The retaining lugs must engage in the guides -arrows-.
- Top up coolant ⇒ [page 153](#) .

Tightening torques

- ◆ ⇒ [“2.1 Summary of components - coolant pump and coolant thermostat”, page 159](#)
- ◆ ⇒ [“2.1 Charge air cooling - Summary of components”, page 309](#)
- ◆ ⇒ [“6.4 Summary of components - air filter”, page 362](#)



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

Removing

- Remove top toothed belt guard
⇒ [“1.8 Removing and installing top toothed belt guard”, page 45](#) .
- Disconnect electrical plug connection -2-, expose electric cable.
- Unscrew screw -3-, pull off coolant valve for cylinder head - N489- Pos. -1-.

Install

Install in the reverse order of removal. When doing this, note the following:



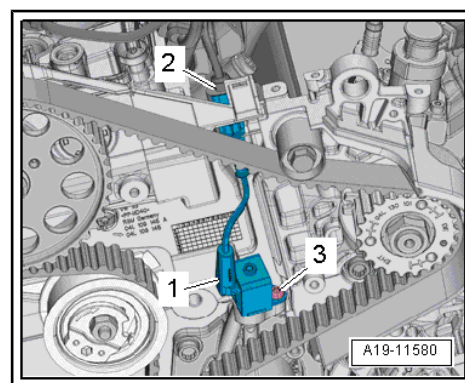
Note

Replace O-rings.

- Install top toothed belt guard
⇒ [“1.8 Removing and installing top toothed belt guard”, page 45](#) .

Tightening torques

- ◆ ⇒ [“2.1 Summary of components - coolant pump and coolant thermostat”, page 159](#)



2.7 Testing coolant thermostat

- Heat up the removed coolant regulator in a water bath.

Start of opening	End of opening	Opening stroke
87 ± 2 °C	approximately 102 °C ¹⁾	min. 9 mm
<ul style="list-style-type: none"> • ¹⁾ Cannot be tested. 		

2.8 Removing and installing coolant temperature transmitter - G62-

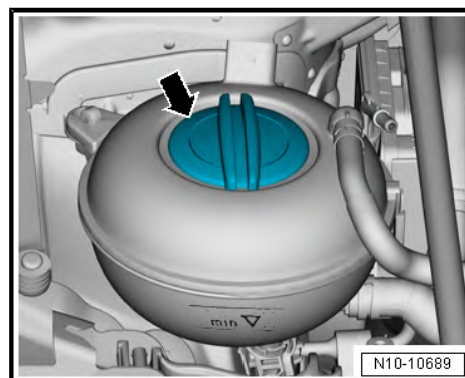
Removing

Test prerequisite

- Engine cold.

Work procedure

- Briefly open the cap -arrow- for the coolant expansion reservoir in order to remove the remaining pressure in the coolant system.
- Remove air filter
⇒ ["6.5 Removing and installing air filter", page 364](#) .

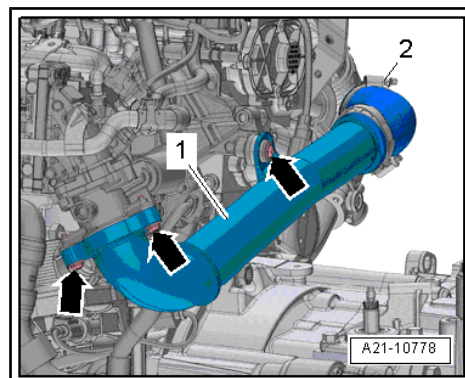


- Release screws -arrows-.
- Loosen hose clamp -2-, remove air guide pipe -1-.

Vehicles fitted with a manual gearbox

- Remove switching and selector linkage from gearbox, unscrew linkage support and lay aside with the linkages ⇒ Gearbox; Rep. gr. 34 .

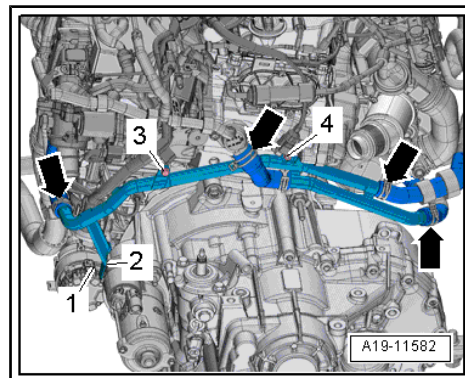
Continued for all vehicles



- Expose electric wiring loom -1-.
- Release nut -4- and screws -2-, -3-.
- Push coolant pipes slightly to the left.

Note

- ♦ *The left coolant pipes of version 1 are shown as an example.*
- ♦ *-Ignore arrows-.*



- Separate electrical plug connection -1-.
- Unscrew double screw -2-, remove coolant temperature transmitter - G62- .



Note

Use a wire to pull out any O-ring or distance ring that has remained stuck inside the cylinder head.

Install

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



Note

- ◆ Replace O-rings.
- ◆ Replace distance ring if it is damaged.
- Install the left coolant pipe
⇒ [“3.6 Remove and install the left coolant pipes”, page 178](#) .
- Check coolant level ⇒ [page 156](#) .

Tightening torques

- ◆ ⇒ [“1.4 Summary of components - cylinder head”, page 90](#)
- ◆ ⇒ [“6.4 Summary of components - air filter”, page 362](#)
- ◆ ⇒ [“6.1 Assembly overview - intake manifold”, page 355](#)
- ◆ Summary of components - gearshift mechanism ⇒ Gearbox; Rep. gr. 34

2.9 Removing and installing charge air cooler pump - V188-

Special tools and workshop equipment required

- ◆ Hose clamps up to Ø 25 mm - MP7-602 (3094)-
- ◆ Hose clip pliers - VAS 6362-

Removing

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

Vehicles with charge air cooler pump - V188- Version 1

- Separate electrical plug connection -3-.

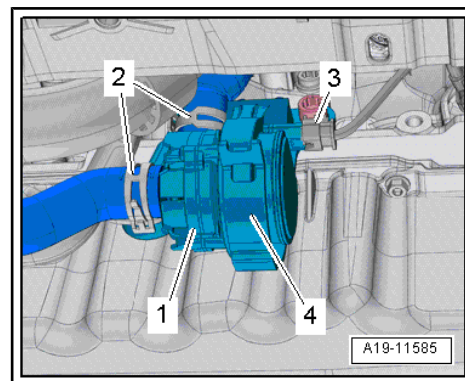
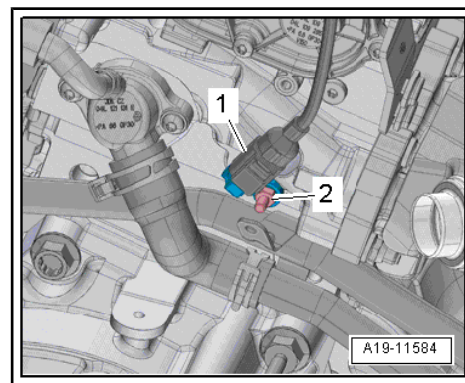


Note

Place a cloth below to catch any leaking coolant.

- Disconnect coolant hoses with hose clamps -MP7-602 (3094)- .
- Loosen hose clamps -2-, remove coolant hoses.
- Unhook charge air cooler pump - V188- Pos. -1- out of the retaining strap -4-.

Vehicles with charge air cooler pump - V188- Version 2



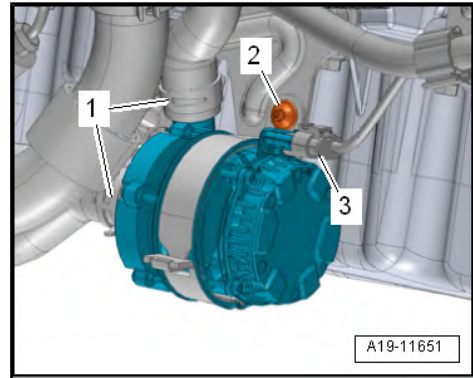


- Disconnect plug connection -3-.

**Note**

Place a cloth below to absorb leaking coolant.

- Disconnect coolant hoses with hose clamps -MP7-602 (3094)- .
- Loosen hose clamps -1-, remove coolant hoses.
- Unscrew screw -2- and remove charge air cooler pump - V188- .

**Install**

Install in the reverse order of removal. When doing this, note the following:

**Note**

Secure all hose connections with spring-type clips that comply with the series design ⇒ ETKA - Electronic Catalogue of Original Parts .

- Check coolant level ⇒ [page 156](#) .

Tightening torques

- ♦ ⇒ [“2.3 Summary of components - electric coolant pump”, page 162](#)
- ♦ Summary of components - sound damping system ⇒ Body Work; Rep. gr. 50

2.10 Removing and installing the heating backup pump - V488-

Special tools and workshop equipment required

- ♦ Hose clamps up to Ø 25 mm - MP7-602 (3094)-
- ♦ Hose binding claw - VAS 6362-

Removing

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

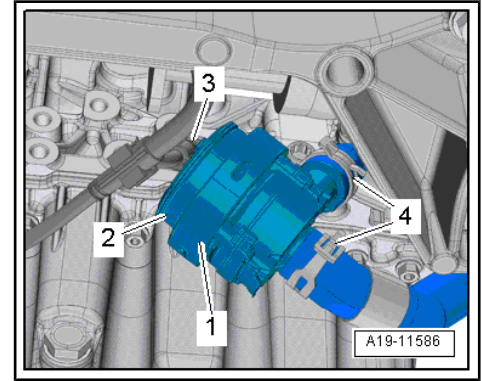
- Separate electrical plug connection -3-.



Note

Place a cloth below to catch any leaking coolant.

- Disconnect coolant hoses with hose clamps -MP7-602 (3094)- .
- Loosen hose clamps -4-, remove coolant hoses.
- Unhook heating backup pump cooler - V488- Pos. -2- out of the retaining strap -1-.



Install

Install in the reverse order of removal. When doing this, note the following:



Note

Secure all hose connections with spring-type clips that comply with the series design ⇒ ETKA - Electronic Catalogue of Original Parts .

- Check coolant level ⇒ [page 156](#) .

Tightening torques

- ◆ Summary of components - sound damping system ⇒ Body Work; Rep. gr. 50



3 Coolant pipes

⇒ [“3.1 Summary of components - coolant pipe”, page 170](#)

⇒ [“3.2 Removing and installing the front top coolant pipes”, page 172](#)

⇒ [“3.3 Removing and installing the front bottom coolant pipe”, page 173](#)

⇒ [“3.4 Removing and installing the front left coolant pipe”, page 175](#)

⇒ [“3.5 Removing and installing the front right coolant pipe”, page 177](#)

⇒ [“3.6 Remove and install the left coolant pipes”, page 178](#)

⇒ [“3.7 Removing and installing the rear coolant pipe”, page 179](#)

⇒ [“3.8 Removing and installing the rear right coolant pipe”, page 180](#)

3.1 Summary of components - coolant pipe



Note

The arrows on the coolant pipes and the coolant hose ends must stand opposite to each other.

1 - Nut

- ☐ 10 Nm

2 - Coolant pipe - front right

- ☐ removing and installing
⇒ [“3.5 Removing and installing the front right coolant pipe”, page 177](#)

3 - Screw

- ☐ 10 Nm

4 - Screw

- ☐ 10 Nm

5 - Coolant pipe - front top

- ☐ different designs; assignment ⇒ ETKA - Electronic Catalogue of Original Parts
- ☐ removing and installing
⇒ [“3.2 Removing and installing the front top coolant pipes”, page 172](#)

6 - Coolant pipe - bottom right

- ☐ removing and installing
⇒ [“3.8 Removing and installing the rear right coolant pipe”, page 180](#)

7 - O-ring

- ☐ replace after removal
- ☐ Moisten with coolant

8 - Screw

- ☐ 10 Nm

9 - Screw

- ☐ 23 Nm

10 - Nut

- ☐ 10 Nm

11 - The coolant pipe at the rear

- ☐ removing and installing ⇒ [“3.7 Removing and installing the rear coolant pipe”, page 179](#)

12 - Screw

- ☐ 10 Nm

13 - Screw

- ☐ 10 Nm

14 - Screw

- ☐ 10 Nm

15 - Coolant pipe - front left.

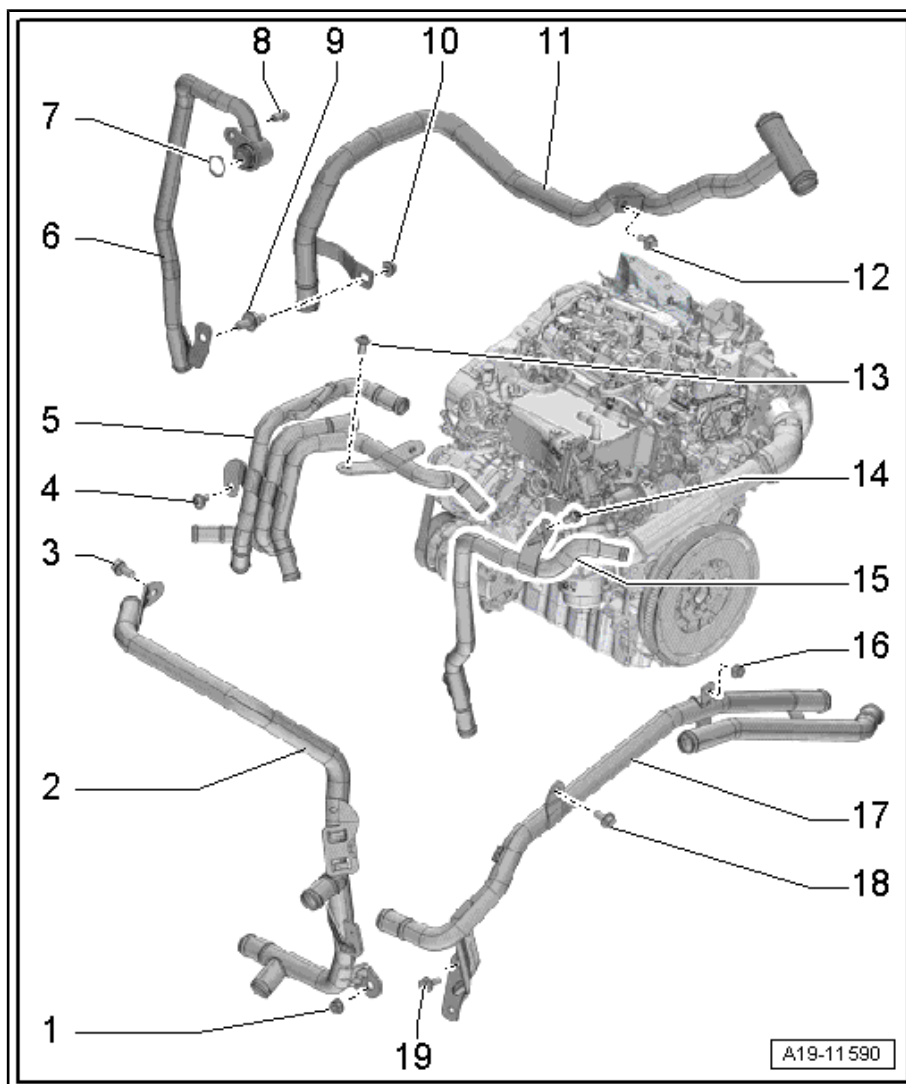
- ☐ removing and installing ⇒ [“3.4 Removing and installing the front left coolant pipe”, page 175](#)

16 - Nut

- ☐ 10 Nm

17 - Coolant pipe - left

- ☐ different designs; assignment ⇒ ETKA - Electronic Catalogue of Original Parts





- ❑ removing and installing ⇒ [“3.6 Remove and install the left coolant pipes”, page 178](#)

18 - Screw

- ❑ 8 Nm

19 - Screw

- ❑ 8 Nm

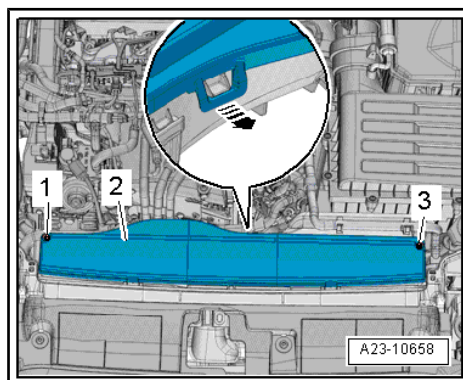
3.2 Removing and installing the front top coolant pipes

Special tools and workshop equipment required

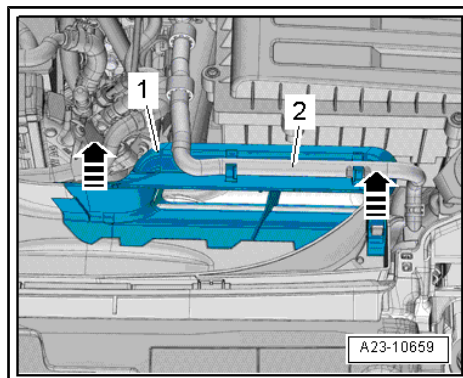
- ◆ Hose clip pliers - VAS 6362-

Removing

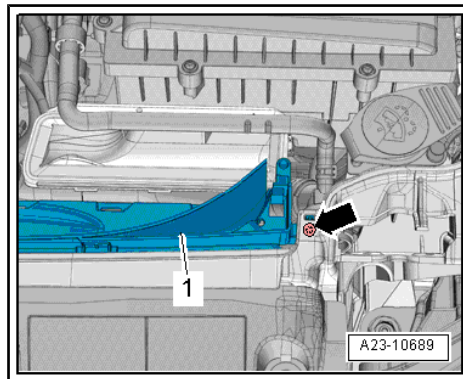
- Remove engine cover
⇒ [“1.1 Removing and installing engine trim panel”, page 10](#) .
- Drain coolant ⇒ [“1.2 Draining and filling coolant”, page 151](#) .
- Unscrew screws -1-, -3-.
- Unlock catch -arrows-, remove cover-2-.



- Expose coolant hose -2-.
- Unlock catches -arrows-, remove top part-1- of air guide.

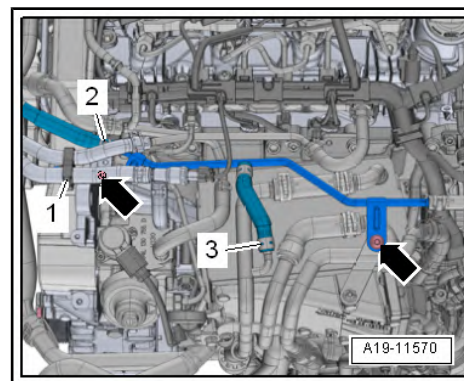


- Release screw left and right -arrow-.
- Unclip and remove bottom part -1- of air guide.



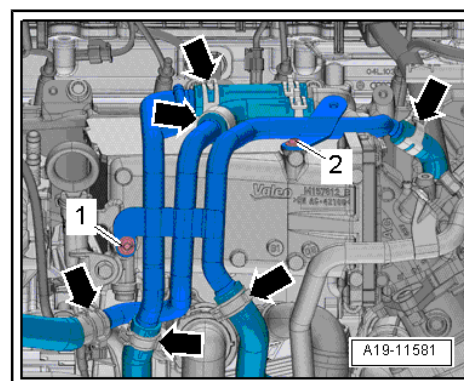
- Unclip bracket -1- with fuel hoses.
- Unscrew screws -arrows-.
- Loosen hose clamp -3-, remove coolant hose.

For vehicles with engine identification characters CLHA, CLHB, CKFB, CKFC, CUPA, CRVC



- Unscrew screws -1-, -2-.
- Loosen hose clamps -arrows-, remove coolant hoses.
- Install the front top coolant pipes.

For vehicles with engine identification characters CRKB, CRMB, CUNA



- Unscrew screws -1-, -2-.
- Loosen hose clamps -arrows-, remove coolant hoses.
- Install the front top coolant pipes.

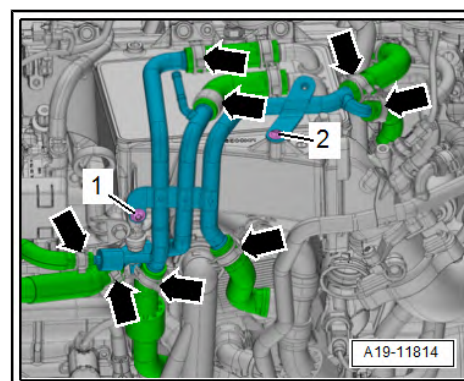
Install

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



Note

Secure all hose connections with spring-type clips that comply with the series design ⇒ ETKA - Electronic Catalogue of Original Parts .



- Top up coolant ⇒ [page 153](#) .

Tightening torques

- ◆ ⇒ [“3.1 Summary of components - coolant pipe”, page 170](#)
- ◆ ⇒ [“6.4 Summary of components - air filter”, page 362](#)

3.3 Removing and installing the front bottom coolant pipe

Special tools and workshop equipment required

- ◆ Hose clip pliers - VAS 6362-

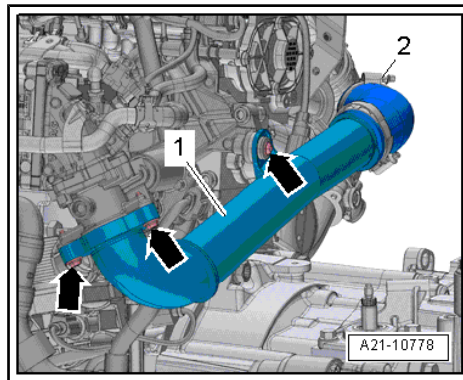
Removing

- Remove oil filter holder
⇒ [“1.4 Removing and installing the oil filter holder with the engine oil cooler”, page 132](#) .



- Unscrew screws -arrows-.
- Loosen hose clamp -2-, remove air guide pipe -1-.

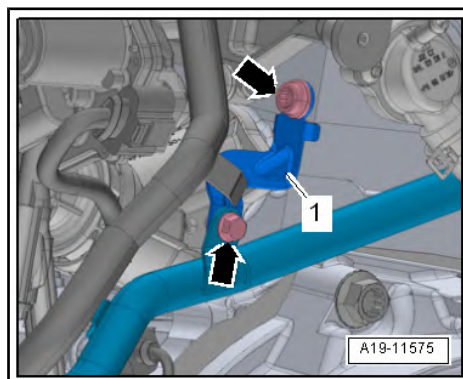
For vehicles with engine identification characters CLHA, CLHB, CKFB, CKFC, CUPA, CRVC



- Release screws -arrows-, push the holder -1- with electric wiring loom slightly to the side.

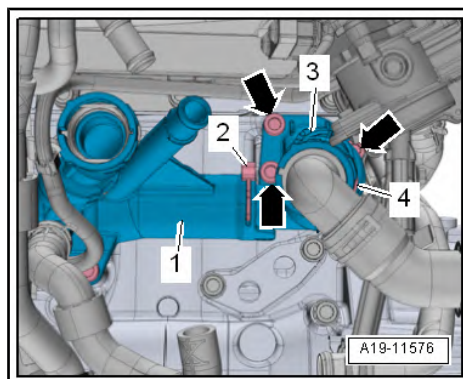
For vehicles with engine identification characters CRKB, CRMB, CUNA

- Remove throttle valve module - J338-
⇒ [“6.2 Removing and installing the throttle valve control unit J338”, page 357](#).



Continued for all vehicles

- Raise hose clamp -4-, remove coolant hose.
- Unscrew screws -arrows-.
- Pull off locking clip -2-, pull off coolant thermostat housing -3- from bottom front -1- and remove.



- Loosen hose clamp -1-, remove coolant hose.
- Release screw -4-.
- Pull off coolant pipe bottom front -3- and remove, do not damage the vacuum line -2- when doing so.

Install

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



Note

- ◆ Replace gaskets and O-rings.
- ◆ Secure all hose connection ends with spring-type clips that comply with the series design ➔ ETKA - Electronic Catalogue of Original Parts .
- Clean and smooth gasket and O-ring sealing surfaces.
- Moisten gaskets and O-rings with coolant.
- Install oil filter holder
➔ [“1.4 Removing and installing the oil filter holder with the engine oil cooler”, page 132](#) .
- Connect coolant hose with quick coupling ➔ [page 186](#) .
- Top up coolant ➔ [page 153](#) .

Tightening torques

- ◆ ➔ [“2.1 Summary of components - coolant pump and coolant thermostat”, page 159](#)
- ◆ ➔ [“6.1 Assembly overview - intake manifold”, page 355](#)

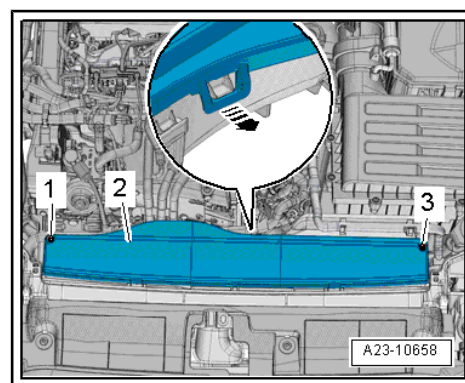
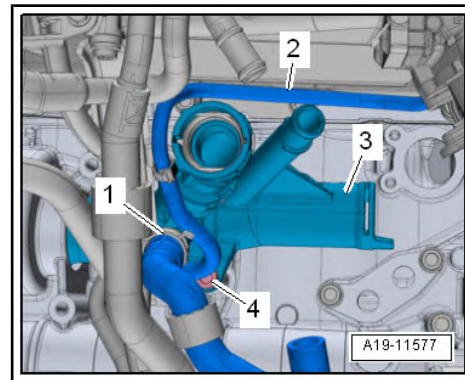
3.4 Removing and installing the front left coolant pipe

Special tools and workshop equipment required

- ◆ Hose clip pliers - VAS 6362-

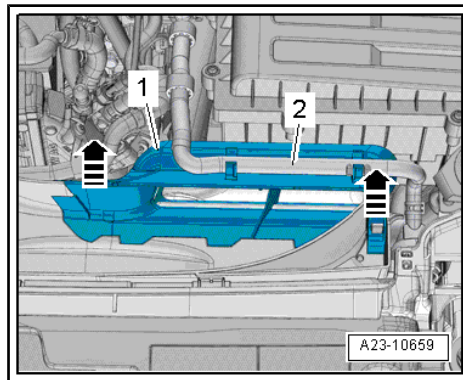
Removing

- Remove engine cover
➔ [“1.1 Removing and installing engine trim panel”, page 10](#) .
- Drain coolant ➔ [“1.2 Draining and filling coolant”, page 151](#) .
- Unscrew screws -1-, -3-.
- Unlock catch -arrows-, remove cover-2-.



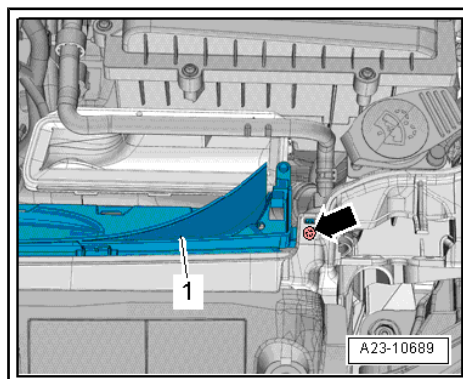


- Expose coolant hose -2-.
- Unlock catches -arrows-, remove top part-1- of air guide.



- Release screw left and right -arrow-.
- Unclip and remove bottom part -1- of air guide.

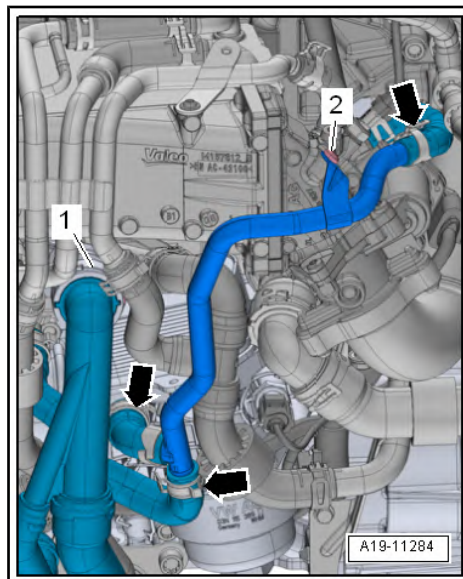
For vehicles with engine identification characters CLHA, CLHB, CKFB, CKFC, CUPA, CRVC



- Raise holding clamp -1-, remove coolant connection fittings.
- Release screw -2-.
- Loosen hose clamps -arrows-, remove coolant hoses.
- Remove the front left coolant pipe.

For vehicles with engine identification characters CRKB, CRMB, CUNA

- Remove air filter
⇒ ["6.5 Removing and installing air filter", page 364](#) .



- Raise holding clamp -1-, remove coolant connection fittings.
- Release screw -2-.
- Loosen hose clamps -arrows-, remove coolant hoses.
- Remove the front left coolant pipe.

Install

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



Note

Secure all hose connections with spring-type clips that comply with the series design ⇒ ETKA - Electronic Catalogue of Original Parts .

- Top up coolant ⇒ [page 153](#) .

Tightening torques

- ◆ ⇒ [“3.1 Summary of components - coolant pipe”, page 170](#)
- ◆ ⇒ [“6.4 Summary of components - air filter”, page 362](#)

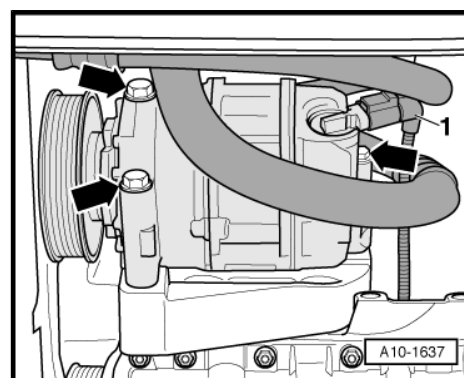
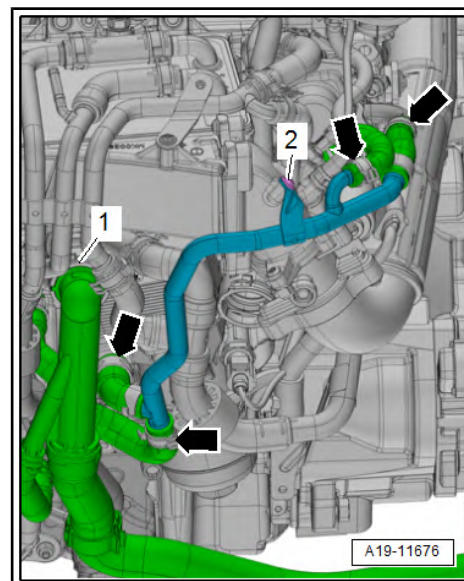
3.5 Removing and installing the front right coolant pipe

Special tools and workshop equipment required

- ◆ Hose clip pliers - VAS 6340-
- ◆ Hose clip pliers - VAS 6362-

Removing

- Drain coolant ⇒ [“1.2 Draining and filling coolant”, page 151](#) .
- Remove V-ribbed belt
⇒ [“1.2 Removing and installing poly V-belt”, page 38](#) .
- Remove AC compressor with connected refrigerant hoses from the holder ⇒ Heating, Air Conditioning; Rep. gr. 87 and strap up to the right side.





- Loosen hose clamps -1-, -4-, -6-, remove coolant hoses.
- Release nut -5- and screw -2-.
- Expose coolant hoses -3-, remove front right coolant hose.

Install

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



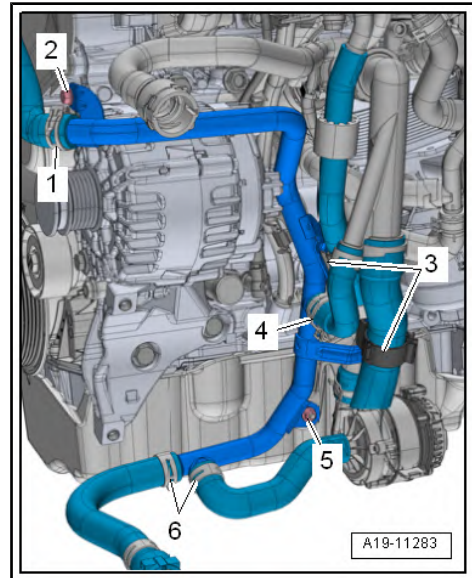
Note

Secure all hose connections with spring-type clips that comply with the series design ⇒ ETKA - Electronic Catalogue of Original Parts .

- Install the V-ribbed belt
⇒ [“1.2 Removing and installing poly V-belt”, page 38](#) .
- Top up coolant ⇒ [page 153](#) .

Tightening torques

- ♦ ⇒ [“3.1 Summary of components - coolant pipe”, page 170](#)
- ♦ Removing and installing AC compressor ⇒ Heating, Air Conditioning; Rep. gr. 87 .



3.6 Remove and install the left coolant pipes

Special tools and workshop equipment required

- ♦ Hose clip pliers - VAS 6340-

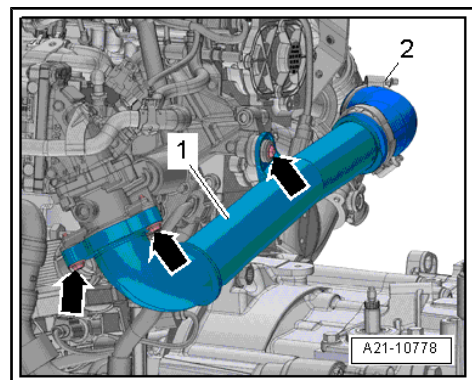
Removing

- Drain coolant ⇒ [“1.2 Draining and filling coolant”, page 151](#) .
- Remove air filter
⇒ [“6.5 Removing and installing air filter”, page 364](#) .
- Unscrew screws -arrows-.
- Loosen hose clamp -2-, remove air guide pipe -1-.

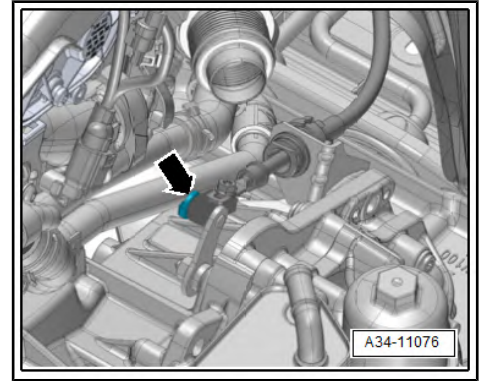
Vehicles fitted with manual gearbox 02Q

- Remove switching and selector linkage from gearbox, unscrew linkage support and lay aside with the linkages ⇒ Gearbox; Rep. gr. 34 .

Vehicles with dual clutch gearbox 0D9

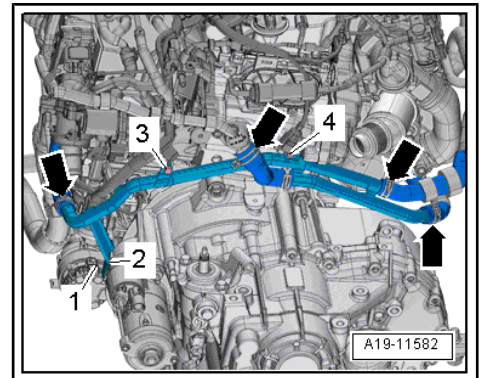


- remove lock washer -arrow-.



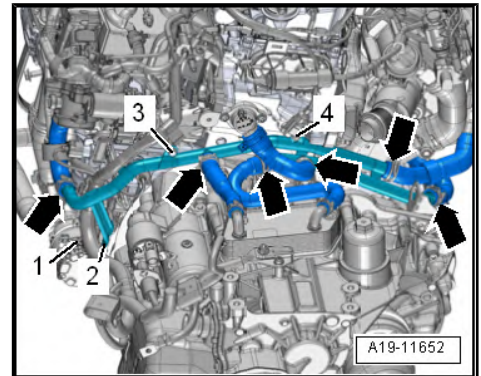
Vehicles with coolant hoses left version 1

- Expose electric wiring loom -1-.
- Release nut -4- and screws -2-, -3-.
- Loosen hose clamps -arrows-, remove coolant hoses.
- Remove the left coolant pipes.



Vehicles with coolant hoses left version 2

- Expose electric wiring loom -1-.
- Release nut -4- and screws -2-, -3-.
- Loosen hose clamps -arrows-, remove coolant hoses.
- Remove the left coolant pipes.



Install

Install in the reverse order of removal. When doing this, note the following:



Note

Secure all hose connections with spring-type clips that comply with the series design ⇒ ETKA - Electronic Catalogue of Original Parts .

- Top up coolant ⇒ [page 153](#) .

Tightening torques

- ◆ ⇒ [“1.6 Hose connections with screw clamps”, page 308](#)
- ◆ ⇒ [“3.1 Summary of components - coolant pipe”, page 170](#)
- ◆ ⇒ [“6.4 Summary of components - air filter”, page 362](#)
- ◆ ⇒ [“6.1 Assembly overview - intake manifold”, page 355](#)
- ◆ Summary of components - actuation linkages ⇒ Gearbox; Rep. gr. 34

3.7 Removing and installing the rear coolant pipe

Special tools and workshop equipment required



- ◆ Catch pan , e.g. -VAS 6208-
- ◆ Hose clip pliers - VAS 6340-
- ◆ Hose clip pliers - VAS 6362-

Removing

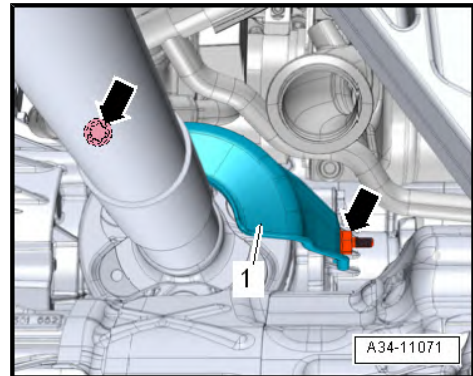
- Remove the sound dampening system ⇒ Body Work; Rep. gr. 50 .

Vehicles with four-wheel drive

- Remove pre-exhaust pipe
⇒ [“1.2 Removing and installing exhaust pipe”, page 380](#) .
- Release screws -arrow-, remove heat shield -1-.

Continued for all vehicles

- Place catch pan - VAS 6208- underneath.



- Loosen hose clamp-4-, remove coolant hose, allow coolant to drain.
- Loosen hose clamps -1-, remove coolant hoses.
- Release nut -3- and screw -2-, remove rear coolant pipe.

Install

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



Note

Secure all hose connections with spring-type clips that comply with the series design ⇒ ETKA - Electronic Catalogue of Original Parts .

- Top up coolant ⇒ [page 153](#) .

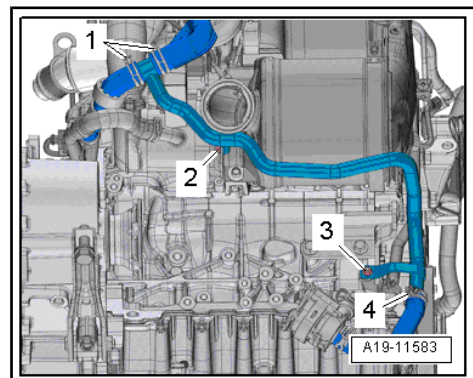
Tightening torques

- ◆ ⇒ [“3.1 Summary of components - coolant pipe”, page 170](#)
- ◆ Summary of components - sound dampening system ⇒ Body Work; Rep. gr. 50

3.8 Removing and installing the rear right coolant pipe

Special tools and workshop equipment required

- ◆ Hose clip pliers - VAS 6362-



Removing



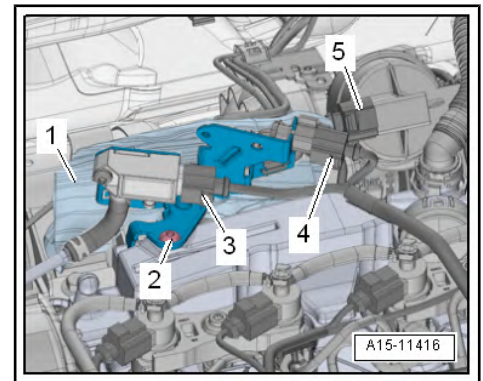
Note

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

- Remove engine cover
⇒ [“1.1 Removing and installing engine trim panel”, page 10](#) .
- Drain coolant ⇒ [“1.2 Draining and filling coolant”, page 151](#) .
- Remove rear coolant pipe
⇒ [“3.7 Removing and installing the rear coolant pipe”, page 179](#) .
- Remove left coolant pipe
⇒ [“3.6 Remove and install the left coolant pipes”, page 178](#) .
- Remove the front silencer
⇒ [“1.2 Removing and installing exhaust pipe”, page 380](#) .

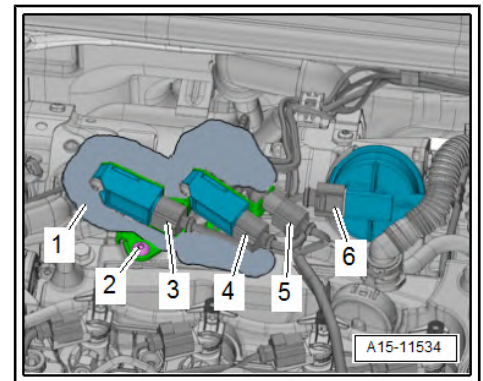
For vehicles with engine identification characters CLHA, CLHB, CKFB, CKFC, CUPA, CRVC

- Open heat protection sleeve -1-.
- Take electrical plug connection-4 - out of the holder, disconnect and expose electric cable.
- Disconnect electrical plug connections -3-, -5-, expose electric wiring loom.
- Unscrew screw -2-, lay bracket with differential pressure transmitter - G505- to the rear.



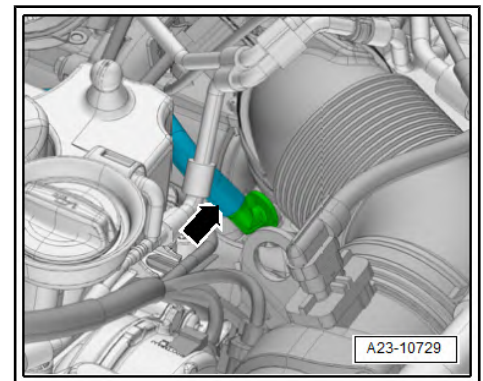
For vehicles with engine identification characters CRKB, CRMB, CUNA

- Open heat protection sleeve -1-.
- Disconnect electrical plug connections -3-, -4-, -5-, -6- expose electric wire harness.
- Release screw -2-.



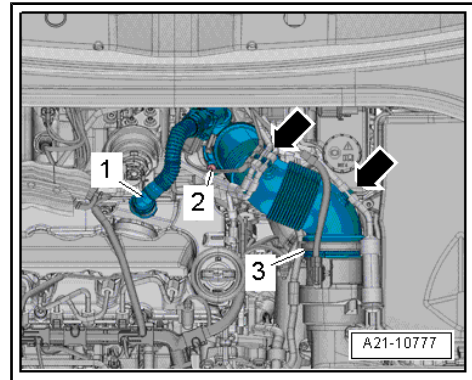
- Detach vacuum hose -arrow- and put to one side.
- Place the bracket with the differential pressure transmitter to the rear.

Continued for all vehicles

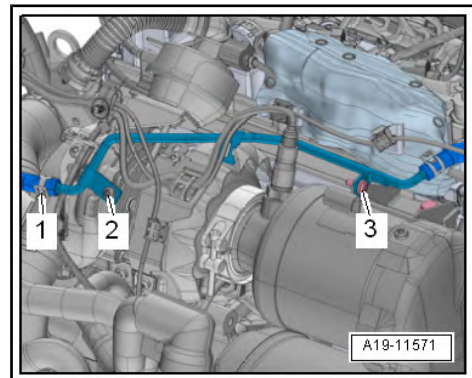




- Press release buttons on the hose -1- for crankcase ventilation, remove hose from cylinder head cover.
- Disconnect vacuum hoses on the air guide pipe -arrows-.
- Release screw -2-, swivel air guide pipe with inlet connection towards the rear and detach from exhaust gas turbocharger.



- Loosen hose clamp -1-, remove coolant hose.
- Unscrew screw -2-, remove screw -3- and swivel coolant line to the side.

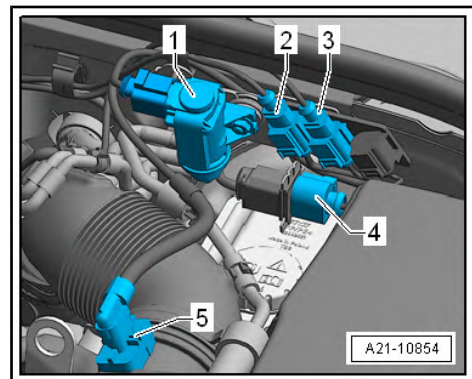


- Expose the following plug connections and electric cables:

2 - for exhaust gas temperature transmitter 4 - G648-

3 - for exhaust gas temperature transmitter 3 - G495-

4 - for lambda probe - G39-



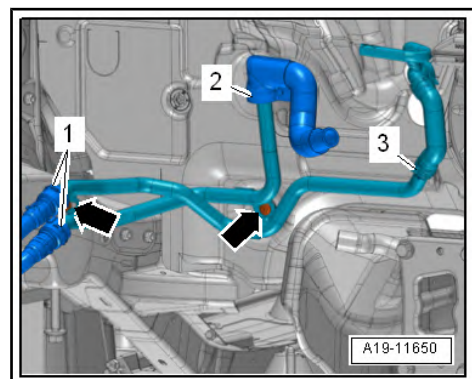
Vehicles fitted with auxiliary heating

- Release screws -arrows-, push the coolant pipe slightly to the side.

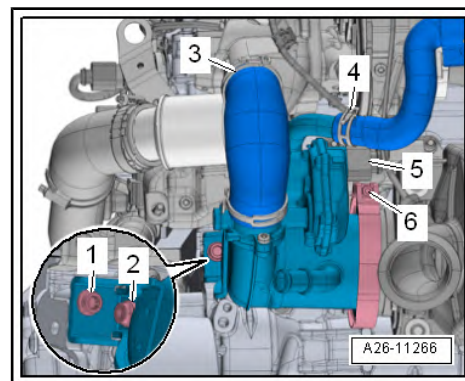
Vehicles with four-wheel drive

- Remove the right driveshaft from the angle gearbox ⇒ Suspension; Rep. gr. 40 .

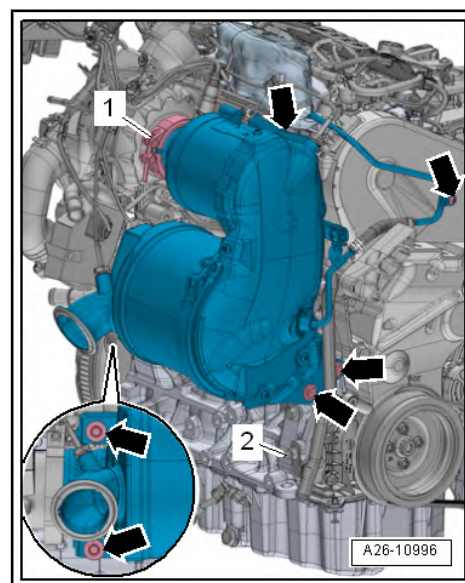
Continued for all vehicles



- Press heat protection sleeve to the side, disconnect electrical plug connection -5-.
- Loosen hose clamp -3-, remove air guide hose.
- Loosen hose clamp -4-, remove coolant hose.
- Unscrew screw -1-, loosen screw -2-.



- Loosen screw -1- and remove clamping sleeve.
- Slacken the double screw -2-, press coolant pipe backwards slightly.
- Unscrew screws -arrows-, push exhaust gas cleaning module and exhaust gas recirculation cooler backwards.





- Loosen hose clamp -1-, remove coolant hose.
- Unscrew double screw -2- and screw -3-, remove rear right coolant pipe.

Install

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

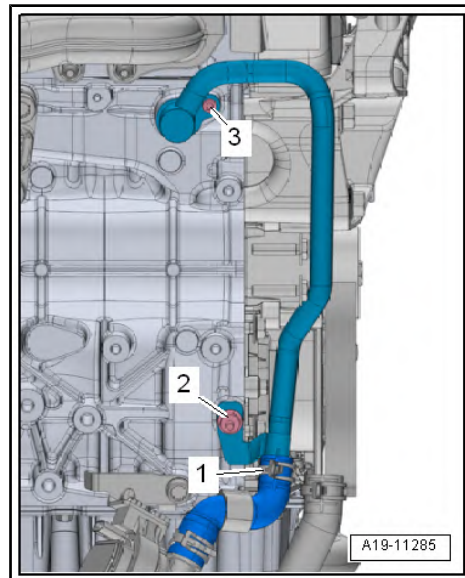


Note

- ◆ *Replace O-ring after disassembly.*
- ◆ *Secure all hose connections with spring-type clips that comply with the series design ⇒ ETKA - Electronic Catalogue of Original Parts .*
- Install exhaust gas cleaning module
⇒ [“2.2 Removing and installing exhaust gas cleaning module”, page 392](#) .
- Install front silencer
⇒ [“1.2 Removing and installing exhaust pipe”, page 380](#) .
- Install the rear coolant pipe
⇒ [“3.7 Removing and installing the rear coolant pipe”, page 179](#) .
- Install the left coolant pipe
⇒ [“3.6 Remove and install the left coolant pipes”, page 178](#) .
- Top up coolant ⇒ [page 153](#) .

Tightening torques

- ◆ ⇒ [“3.1 Summary of components - coolant pipe”, page 170](#)
- ◆ ⇒ [“1 Removing and installing exhaust pipes/silencers”, page 370](#)
- ◆ Summary of components - cardan shaft ⇒ Chassis; Rep. gr. 40



4 Radiator and radiator fan

⇒ [“4.1 Parts of the cooling system fitted to body”, page 185](#)

⇒ [“4.2 Summary of components - fan shroud and radiator fan V7”, page 190](#)

⇒ [“4.3 Summary of components- fan shroud and radiator fan V7 and radiator fan 2 V177”, page 191](#)

⇒ [“4.4 Removing and installing radiator”, page 191](#)

⇒ [“4.5 Removing and installing fan shroud”, page 195](#)

⇒ [“4.6 Removing and installing radiator fans V7 and V177”, page 196](#)

4.1 Parts of the cooling system fitted to body

⇒ [“4.1.1 Radiator version 1”, page 185](#)

⇒ [“4.1.2 Radiator version 2”, page 187](#)

⇒ [“4.1.3 Radiator version 3”, page 188](#)

4.1.1 Radiator version 1

1 - Coolant radiator

- ☐ removing and installing
⇒ [“4.4 Removing and installing radiator”, page 191](#)
- ☐ fill with fresh coolant after replacing

2 - Coolant hose

- ☐ to remove, raise holding clamps
- ☐ connect ⇒ [page 186](#)

3 - Not installed

4 - Not installed

5 - Not installed

6 - O-ring

- ☐ replace after removal
- ☐ Moisten with coolant

7 - Coolant hose

- ☐ to remove, raise holding clamps
- ☐ connect ⇒ [page 186](#)

8 - O-ring

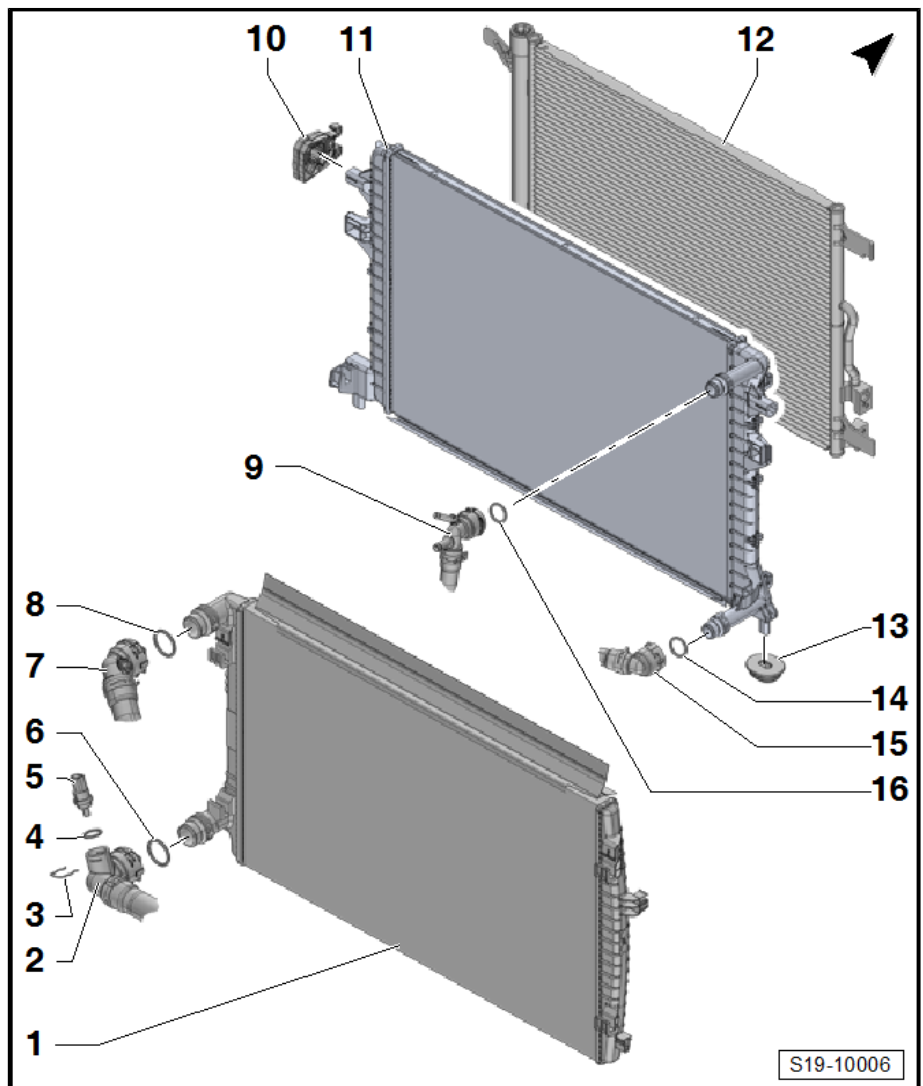
- ☐ replace after removal
- ☐ Moisten with coolant

9 - Coolant hose

- ☐ to remove, raise holding clamps
- ☐ connect ⇒ [page 186](#)

10 - Radiator bearing

- ☐ if the fuse breaks, replace it with a special screw, see ⇒ ETKA - Electronic Catalogue of Original Parts



**11 - Cooler for charge air circuit**

- ☐ removing and installing ⇒ [“4.4 Removing and installing radiator”, page 191](#)

12 - Condenser

- ☐ removing and installing ⇒ Heating, Air Conditioning; Rep. gr. 87

13 - Rubber bearing

- ☐ for radiator

14 - O-ring

- ☐ replace after removal
- ☐ Moisten with coolant

15 - Coolant hose

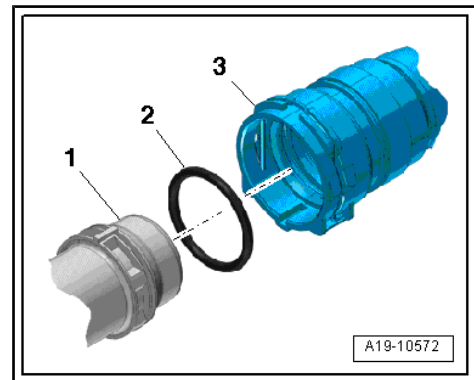
- ☐ to remove, raise holding clamps
- ☐ connect ⇒ [page 186](#)

16 - O-ring

- ☐ replace after removal
- ☐ Moisten with coolant

Connect coolant hose with quick coupling

- Remove old O-ring -2- in coolant hose -3-.
- Moisten new O-ring with coolant and insert into coolant hose.
- Press coolant hose onto connection -1- until there is an audible click.
- Press coolant hose down again and check by pulling that the plug-in connector is fully engaged.



4.1.2 Radiator version 2

1 - Coolant radiator

- ☐ removing and installing
⇒ ["4.4 Removing and installing radiator"](#),
[page 191](#)
- ☐ fill with fresh coolant after replacing

2 - Coolant hose

- ☐ to remove, raise holding clamps
- ☐ connect ⇒ [page 188](#)

3 - O-ring

- ☐ replace after removal
- ☐ Moisten with coolant

4 - Coolant hose

- ☐ to remove, raise holding clamps
- ☐ connect ⇒ [page 188](#)

5 - O-ring

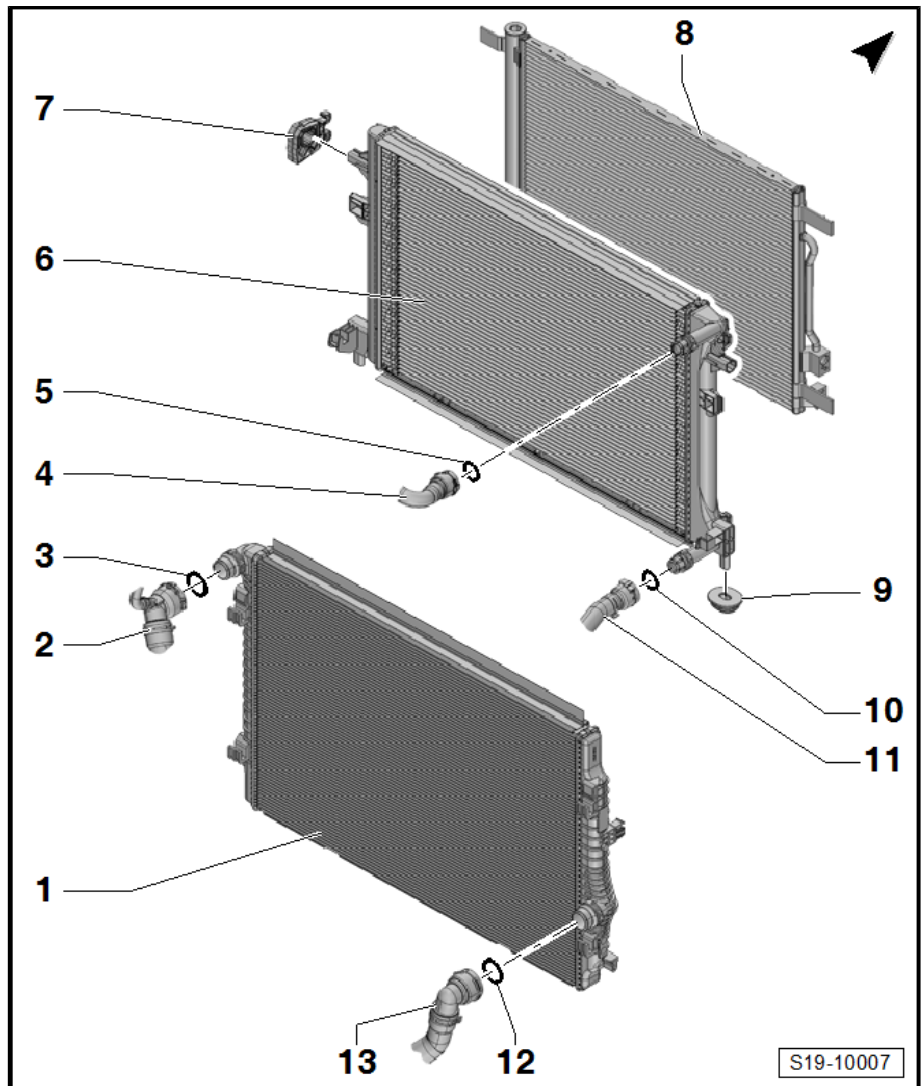
- ☐ replace after removal
- ☐ Moisten with coolant

6 - Cooler for charge air circuit

- ☐ removing and installing
⇒ ["4.4 Removing and installing radiator"](#),
[page 191](#)

7 - Radiator bearing

- ☐ if the fuse breaks, replace it with a special screw, see ⇒ ETKA - Electronic Catalogue of Original Parts



8 - Condenser

- ☐ removing and installing ⇒ Heating, Air Conditioning; Rep. gr. 87

9 - Rubber bearing

- ☐ for radiator

10 - O-ring

- ☐ replace after removal
- ☐ Moisten with coolant

11 - Coolant hose

- ☐ to remove, raise holding clamps
- ☐ connect ⇒ [page 188](#)

12 - O-ring

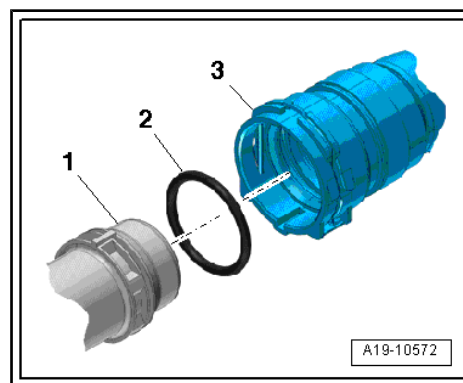
- ☐ replace after removal
- ☐ Moisten with coolant

13 - Coolant hose

- ☐ to remove, raise holding clamps
- ☐ connect ⇒ [page 188](#)

Connect coolant hose with quick coupling

- Remove old O-ring -2- in coolant hose -3-.
- Moisten new O-ring with coolant and insert into coolant hose.
- Press coolant hose onto connection -1- until there is an audible click.
- Press coolant hose down again and check by pulling that the plug-in connector is fully engaged.



4.1.3 Radiator version 3

1 - Coolant hose

- ☐ to remove, raise holding clamps
- ☐ connect ⇒ [page 189](#)

2 - O-ring

- ☐ replace after removal
- ☐ Moisten with coolant

3 - Cooler for charge air circuit

- ☐ removing and installing
⇒ ["4.4 Removing and installing radiator",
page 191](#)

4 - Coolant hose

- ☐ to remove, raise holding clamps
- ☐ connect ⇒ [page 189](#)

5 - O-ring

- ☐ replace after removal
- ☐ Moisten with coolant

6 - Coolant hose

- ☐ to remove, raise holding clamps
- ☐ connect ⇒ [page 189](#)

7 - O-ring

- ☐ replace after removal
- ☐ Moisten with coolant

8 - Coolant radiator

- ☐ removing and installing
⇒ ["4.4 Removing and installing radiator",
page 191](#)

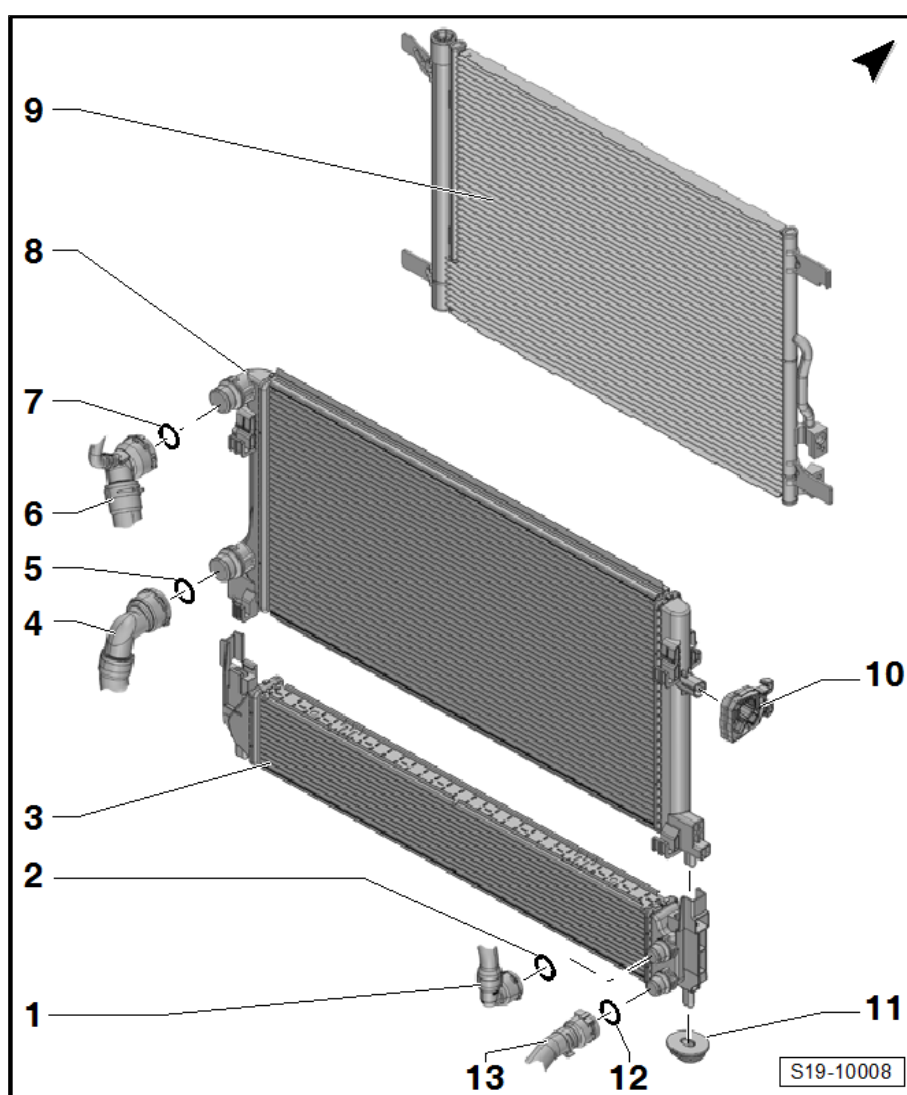
- ☐ fill with fresh coolant after replacing

9 - Condenser

- ☐ removing and installing ⇒ Heating, Air Conditioning; Rep. gr. 87

10 - Radiator bearing

- ☐ if the fuse breaks, replace it with a special screw, see ⇒ ETKA - Electronic Catalogue of Original Parts



11 - Rubber bearing

- ☐ for radiator

12 - O-ring

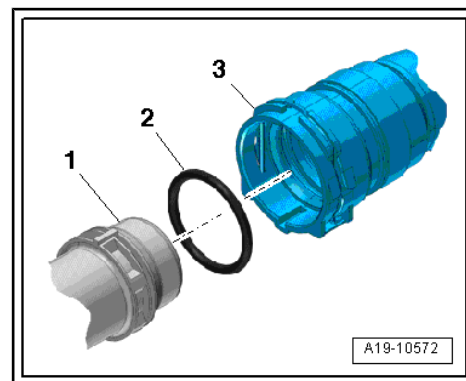
- ☐ replace after removal
- ☐ Moisten with coolant

13 - Coolant hose

- ☐ to remove, raise holding clamps
- ☐ connect ➔ [page 189](#)

Connect coolant hose with quick coupling

- Remove old O-ring -2- in coolant hose -3-.
- Moisten new O-ring with coolant and insert into coolant hose.
- Press coolant hose onto connection -1- until there is an audible click.
- Press coolant hose down again and check by pulling that the plug-in connector is fully engaged.





4.2 Summary of components - fan shroud and radiator fan - V7-

1 - Screw

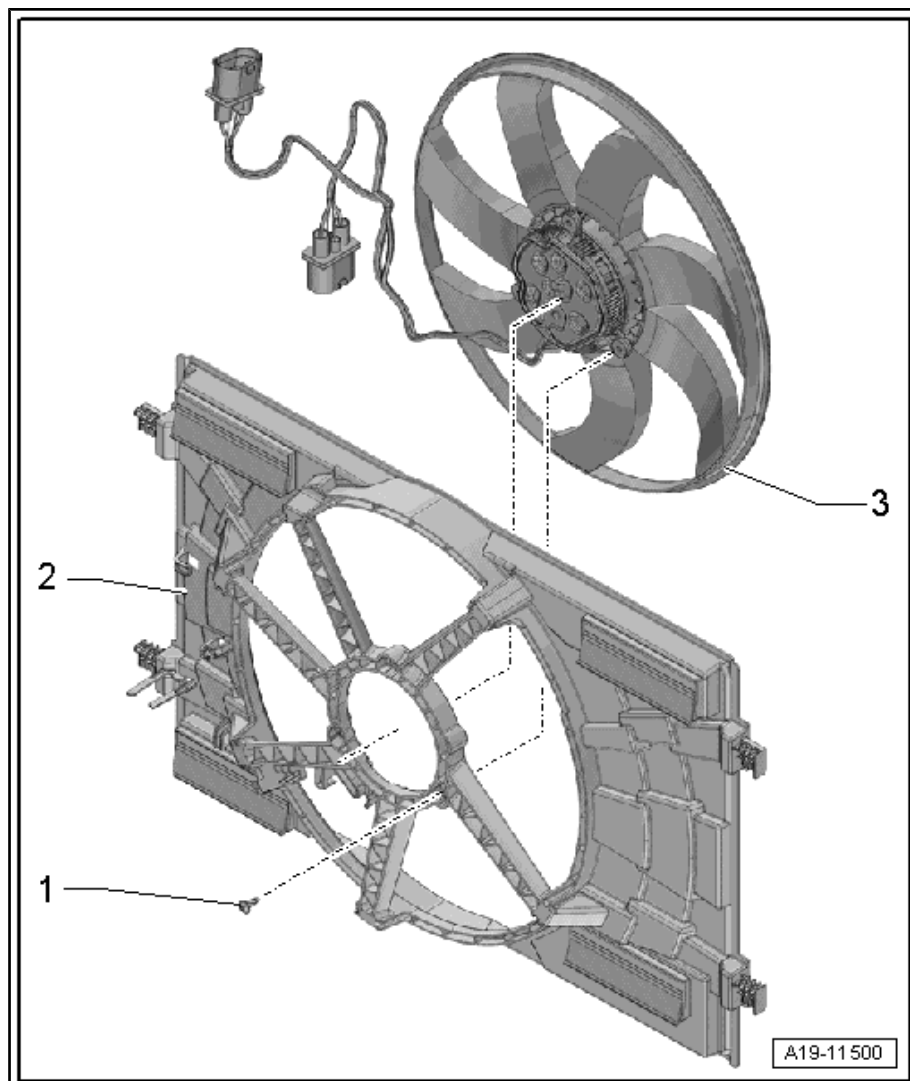
- 5 Nm

2 - Fan shroud

- removing and installing
⇒ ["4.5 Removing and installing fan shroud"](#),
[page 195](#)

3 - Radiator fan - V7-

- removing and installing
⇒ ["4.6 Removing and installing radiator fans V7 and V177"](#), [page 196](#)



4.3 Summary of components- fan shroud and radiator fan - V7- and radiator fan 2 - V177-

1 - Screw

- 5 Nm

2 - Fan shroud

- removing and installing
⇒ [“4.5 Removing and installing fan shroud”](#),
[page 195](#)

3 - Screw

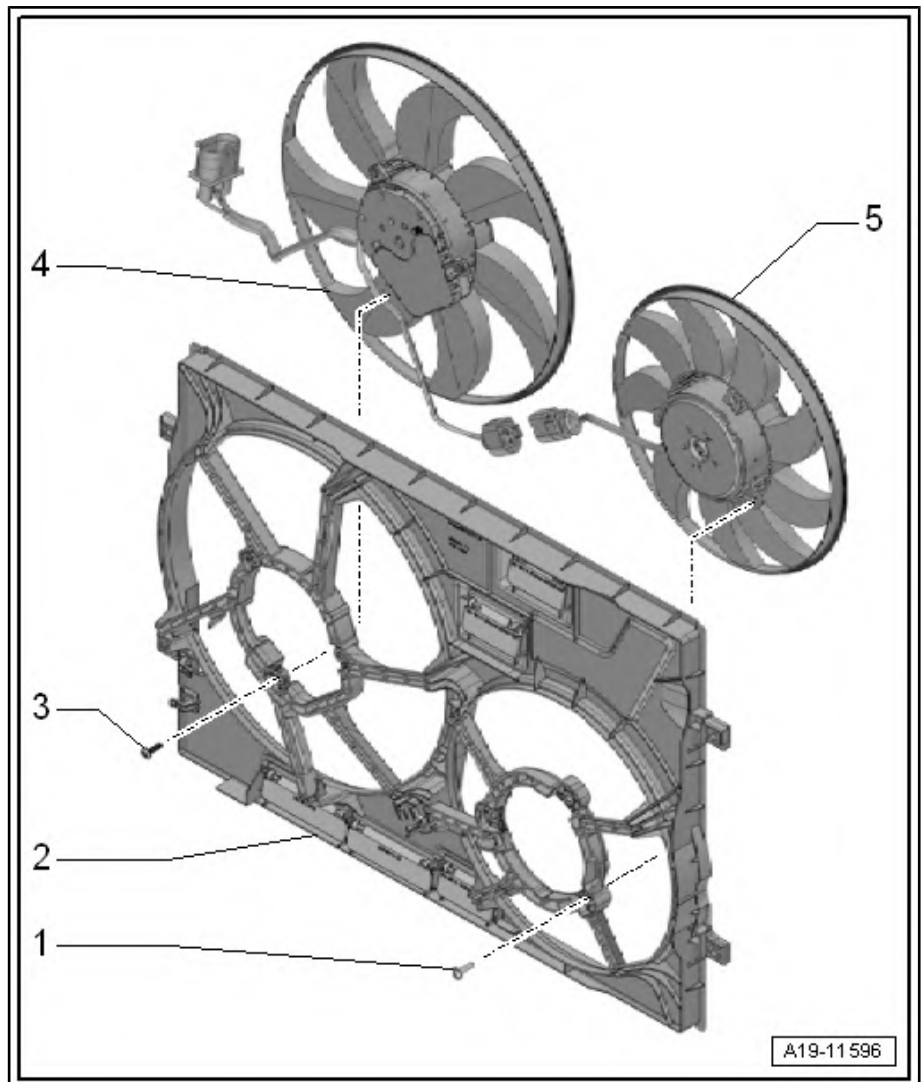
- 5 Nm

4 - Radiator fan - V7-

- removing and installing
⇒ [“4.6 Removing and installing radiator fans V7 and V177”](#), [page 196](#)

5 - Radiator fan 2 - V177-

- removing and installing
⇒ [“4.6 Removing and installing radiator fans V7 and V177”](#), [page 196](#)



4.4 Removing and installing radiator



Note

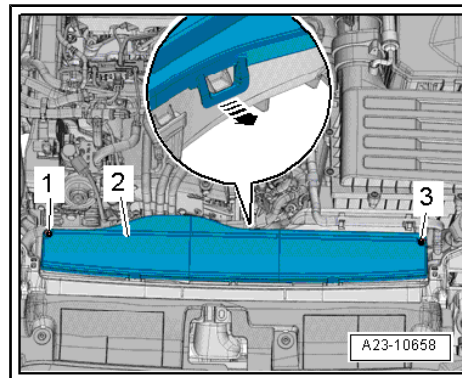
Coolant radiator and charge air circulation cooler are removed together.

Removing

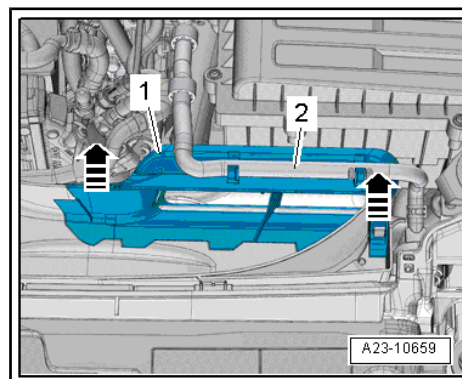
- Drain coolant ⇒ [“1.2 Draining and filling coolant”](#), [page 151](#) .
- Remove front bumper ⇒ Body Work; Rep. gr. 63 .



- Unscrew screws -1-, -3-.
- Unlock catch -arrows-, remove cover-2-.

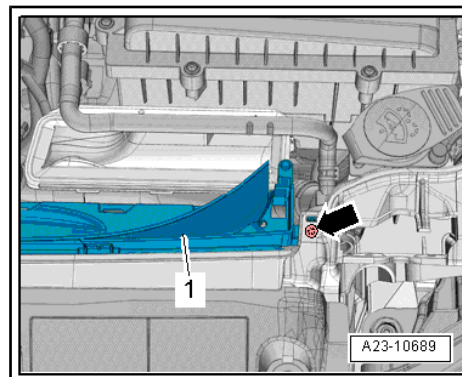


- Expose coolant hose -2-.
- Unlock catches -arrows-, remove top part-1- of air guide.



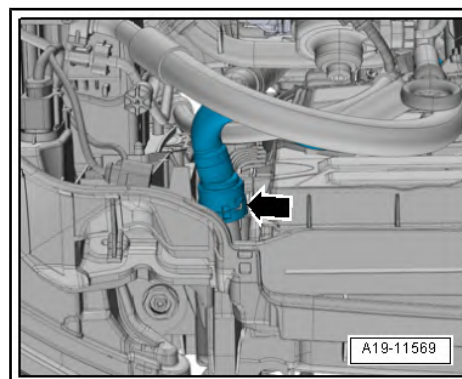
- Release screw left and right -arrow-.
- Unclip and remove bottom part -1- of air guide.
- Removing fan shroud
⇒ [“4.5 Removing and installing fan shroud”, page 195](#) .

Vehicles with radiator versions 1 and 2

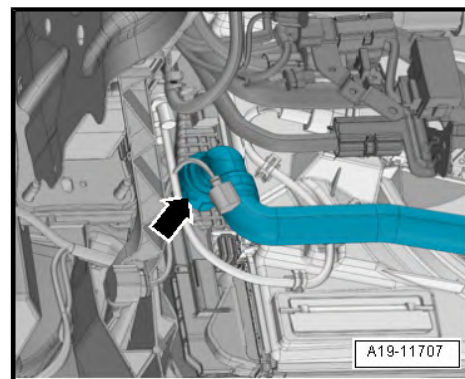


- Raise holding clamp -arrow-, remove coolant hose right above radiator for charge air circuit.

Vehicles with radiator version 3

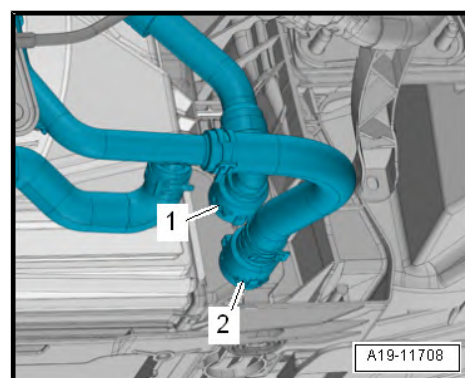


- Raise holding clamp -arrow-, remove bottom left coolant hose from radiator.

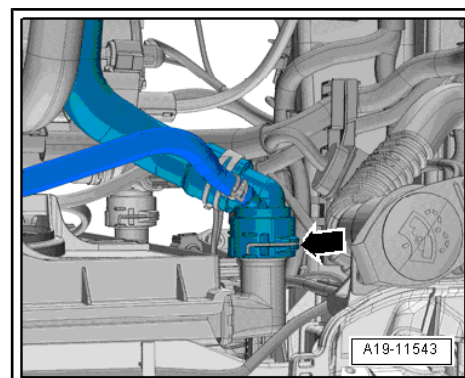


- Raise holding clamps -1-, -2-, remove coolant hoses from charge air circuit cooler.

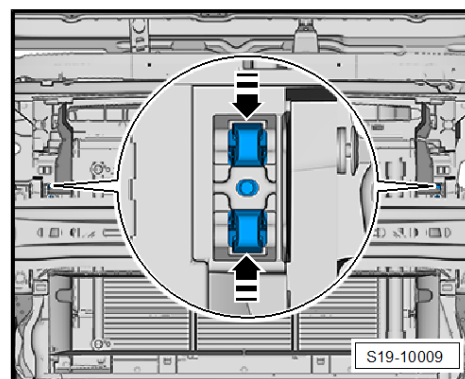
Continued for all vehicles



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



- Press catches left and right -arrows-, press coolant radiator slightly backwards.





Note

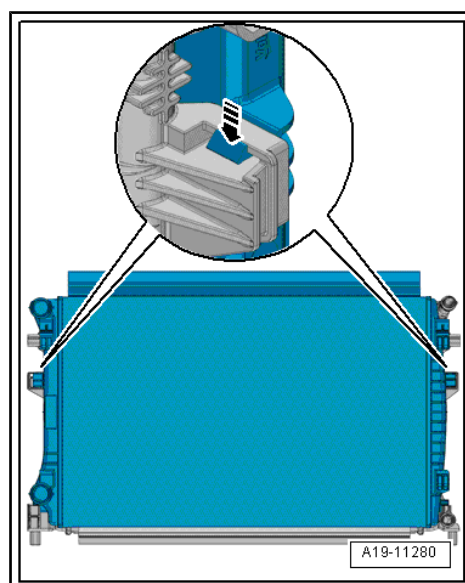
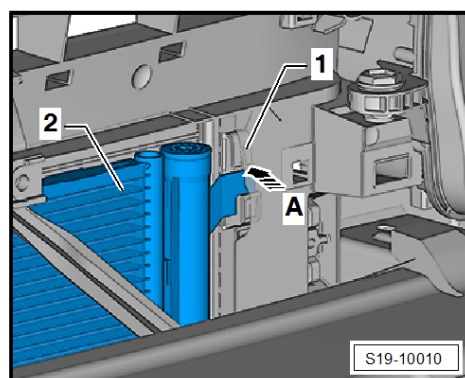
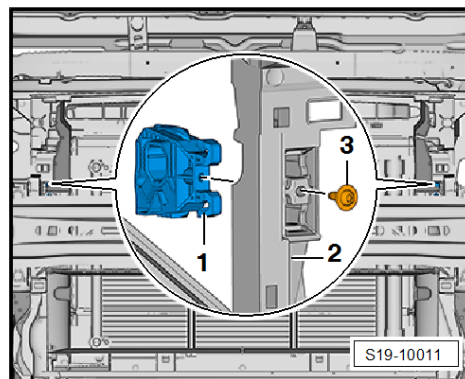
If the fuse breaks, you will not need to replace the radiator bearing -1-. Replace the fuse with a special fuse -3- ➔ ETKA - Electronic Catalogue of Original Parts .

- Unlock the latches left and right -arrow A- and raise the condenser -2-.
- Press the radiator downwards until the radiator bearing deflects at the bottom, to do so, unhook the condenser -2- from the radiator.
- Strap capacitor to the lock support.

Vehicles with radiator versions 1 and 2

- Press left and right radiator locking lugs simultaneously -arrow- and remove coolant radiator from the charge air circuit radiator.

Vehicles with radiator version 3



- Unlock catches on the radiator -1- for the charge air circuit arrows -A-
- Remove charge air circuit radiator from coolant radiator -2- arrow -B- and unhook arrow -C-.
- Remove both radiators.

Install

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



Note

Replace O-rings after disassembly.

- Install front bumper ⇒ Body Work; Rep. gr. 63 .
- Install fan shroud
⇒ [“4.5 Removing and installing fan shroud”, page 195](#) .
- Connect coolant hose with quick coupling ⇒ [page 186](#) .
- Top up coolant ⇒ [page 156](#) .



Note

If the radiator has been replaced you must change all the coolant.

Tightening torques

- ◆ ⇒ [“4.1 Parts of the cooling system fitted to body”, page 185](#)
- ◆ ⇒ [“6.4 Summary of components - air filter”, page 362](#)

4.5 Removing and installing fan shroud

Removing

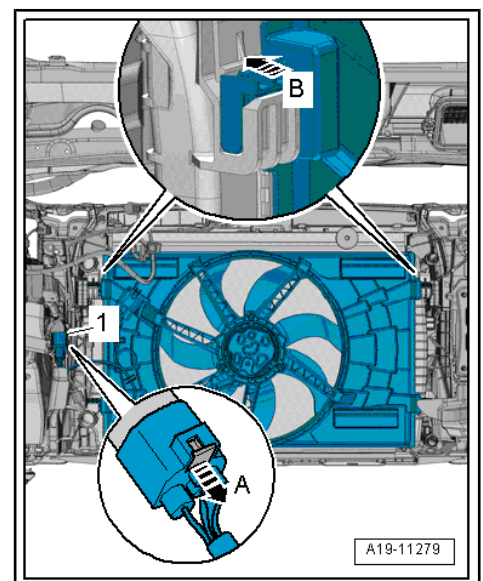
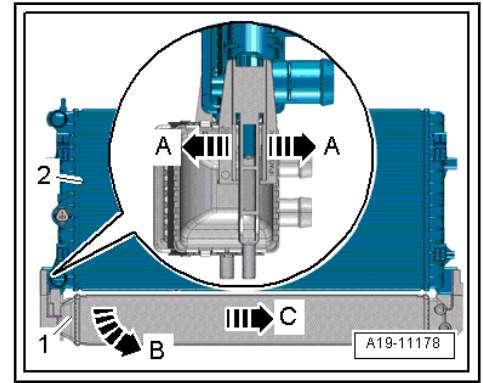
- Remove the sound dampening system ⇒ Body Work; Rep. gr. 50 .
- Remove plug -1- for radiator fan, for this purpose slide screw clamp backwards arrow -A- and press release button down.
- Press locking lugs for fan shroud left and right simultaneously arrow -B- and remove fan shroud downwards from the radiator.

Install

Installation is carried out in the reverse order.

Tightening torques

- ◆ Summary of components - sound damping system ⇒ Body Work; Rep. gr. 50





4.6 Removing and installing radiator fans - V7- and -V177-

Removing



Note

All cable straps should be fitted on again in the same place when installing.

- Removing fan shroud
⇒ [“4.5 Removing and installing fan shroud”, page 195](#) .

For vehicles with a fan

- Expose electric cable.
- Unscrew screws -arrows-, remove - V7- radiator fan.

For vehicles with two fans

- Disconnect plug connection -arrow-.
- Remove screws -1- and remove the radiator fan - V7- .
- Unscrew screws -2- and radiator fan 2 - V177- .

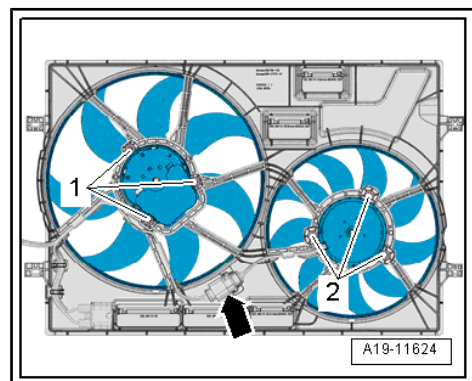
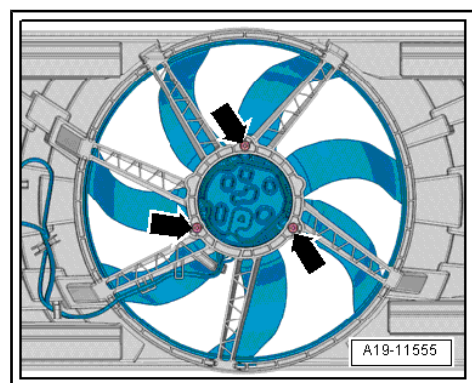
Install

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

- Install fan shroud
⇒ [“4.5 Removing and installing fan shroud”, page 195](#) .

Tightening torques

- ◆ ⇒ [“4.2 Summary of components - fan shroud and radiator fan V7 ”, page 190](#)
- ◆ ⇒ [“4.3 Summary of components- fan shroud and radiator fan V7 and radiator fan 2 V177 ”, page 191](#)



20 – Fuel supply system

1 Measures in case of misfuelling

Note

- ◆ *Fuel lines are secured with quick-release couplings
⇒ [“2.12 Separating push-on couplings”, page 249](#).*
- ◆ *Fuel hoses must only be secured with spring-type clips ⇒ ET-
KA - Electronic Catalogue of Original Parts.*
- ◆ *Use pliers for spring strap clips to fit the hose clamps.*

Observe safety measures ⇒ [“2 Safety instructions”, page 3](#).

Observe rules for cleanliness
⇒ [“3.1 Rules of cleanliness”, page 6](#).



Caution

Because of insufficient lubrication by diesel fuel, misfuelling can cause irreversible damage to high pressure components, particularly the high pressure pump.

- ◆ *Damage can be expected in the form of scoring and particle erosion.*
- ◆ *Thus, free metal particles contaminate the fuel system as well as the injection system, whereby further damage can be expected especially to the fuel pressure regulating valve and in the injection units.*
- ◆ *If there is uncertainty about the fuel quality, take a sample. Analyse the fuel using the fuel analyser - VAS 6774- ⇒ Operating manual. This analyser does not replace laboratory analysis in the event of warranty claims!*

Note

Operating instructions must be provided in the form of a flow chart taking account of the various factors through individual work sequences.

If the engine was started with incorrect fuel?

Yes

⇒ [“1.1 Step 1, engine started with incorrect fuel”, page 197](#)

No

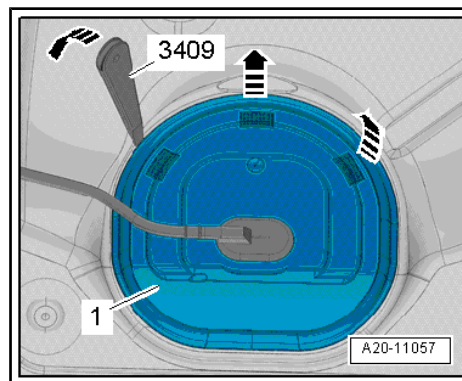
⇒ [“1.2 Step 2, the engine was not started with incorrect fuel”, page 199](#)

1.1 Step 1, engine started with incorrect fuel

- Empty fuel tank as far as possible through the filler neck using the fuel extraction device - VAS 5190-
⇒ [“2.7.2 Emptying fuel tank if it is more than 3/4 full”, page 224](#).
- Removing rear seat bench ⇒ Body Work; Rep. gr. 72.



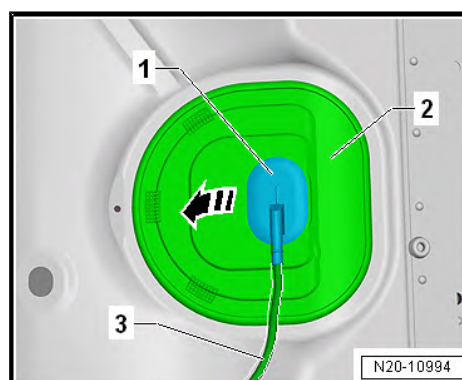
- Unclip cover -1- for closing flange with the disassembly wedge - 3409- on the retaining tabs -arrows-.



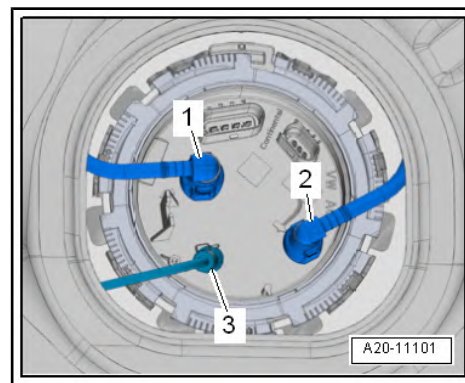
- Unclip sealing grommet -1- downwards from the cover -2-.
- Guide the cover -2- backward at the electric wiring loom -3-.

**WARNING**

Ensure that when the battery is connected the fuel pump cannot be activated by the opening door! Fuel can spill out when the system is open.



- Disconnect fuel return-flow line -2- at the closing flange
⇒ [“2.12 Separating push-on couplings”, page 249](#) .
- Connect connecting line - VAS 6551/1- of the pressure gauge to the fuel return-flow line.
- If necessary, extend the connecting line - VAS 6551/1- using the connecting nipple - VAS 6551/5-1- and a commercially available hose.
- Guide the free end of the line connecting line - VAS 6551/1- into a suitable container.
- Connect a vehicle diagnosis tester .
- Perform Targeted Functions `empty fuel tank`.



Note

The fuel pump is now activated.

- If necessary, repeat this procedure until the fuel tank is completely empty.

Remove fuel delivery unit

⇒ [“2.8 Removing and installing fuel delivery unit”, page 232](#) .

- Check the fuel tank for swarfs.
- Empty fuel pump reservoir of the fuel delivery unit.
- Carry out a visual inspection for coarse contamination and swarfs in the fuel pump reservoir and on the preliminary stage screen.

Are swarfs present?

Yes

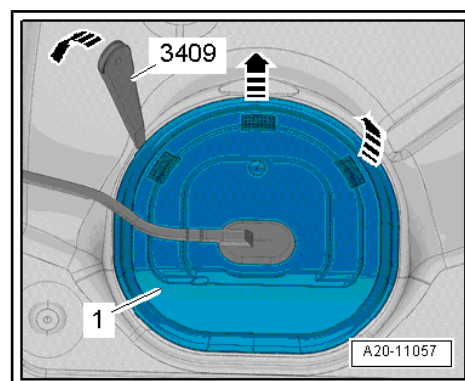
⇒ [“1.3 Step 3, metal swarfs are present in the fuel delivery unit and the fuel tank”, page 200](#)

No

⇒ [“1.4 Step 4, no metal swarfs are present in the fuel delivery unit and the fuel tank”, page 201](#)

1.2 Step 2, the engine was not started with incorrect fuel

- Empty fuel tank as far as possible through the filler neck using the fuel extraction device - VAS 5190-
⇒ [“2.7.2 Emptying fuel tank if it is more than 3/4 full”, page 224](#) .
- Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .
- Unclip cover -1- for closing flange with the disassembly wedge - 3409- on the retaining tabs -arrows-.

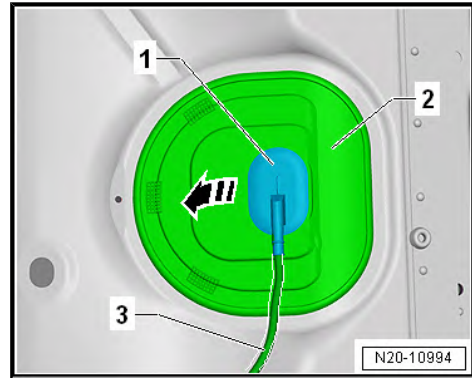




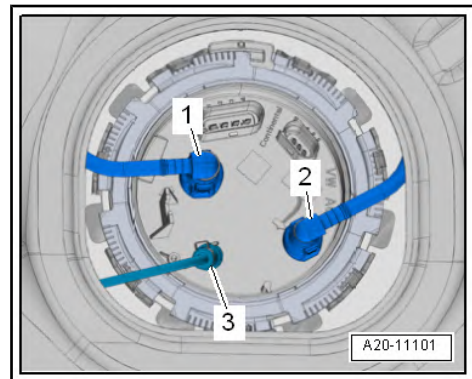
- Unclip sealing grommet -1- downwards from the cover -2-.
- Guide the cover -2- backward at the electric wiring loom -3-.

**Caution**

Ensure that when the battery is connected the fuel pump cannot be activated by the opening door! Fuel can spill out when the system is open.



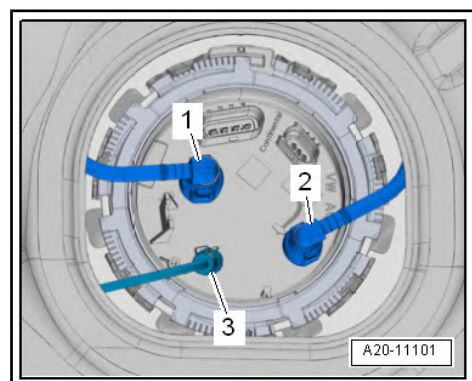
- Disconnect fuel return-flow line -2- at the closing flange
⇒ [“2.12 Separating push-on couplings”, page 249](#) .
- Connect connecting line - VAS 6551/1- of the pressure gauge to the fuel return-flow line.
- If necessary, extend the connecting line - VAS 6551/1- using the connecting nipple - VAS 6551/5-1- and a commercially available hose.
- Guide the free end of the line connecting line - VAS 6551/1- into a suitable container.
- Connect a vehicle diagnosis tester .
- Perform Targeted Functions `empty fuel tank`.

**Note**

The fuel pump is now activated.

- If necessary, repeat this procedure until the fuel tank is completely empty.
- Fill fuel tank with 5 litres of diesel fuel.
- Empty fuel tank again fully as described above.
- Reconnect the fuel return-flow line -2-.
- Replace the fuel filter
⇒ [“2.3 Fuel filter - Summary of components”, page 217](#) .
- Fill vehicle tank and take it for a test run.

End



1.3 Step 3, metal swarfs are present in the fuel delivery unit and the fuel tank

- Clean, for example using fuel delivery unit and fuel tank with diesel suction device -VAS 5226- .
- Install fuel delivery unit
⇒ [“2.8 Removing and installing fuel delivery unit”, page 232](#) .

Vehicles fitted with auxiliary heating

- Check the fuel line between the fuel tank and dosing pump - V54- for swarfs. Replace where necessary ⇒ Heating, Air Conditioning; Rep. gr. 82 .

Continued for all vehicles

- Fill fuel tank with 5 litres of diesel fuel.
- Empty fuel tank again fully as described above
⇒ [“1.1 Step 1, engine started with incorrect fuel”, page 197](#) .
- Replace the following high pressure components:
 - ◆ High pressure pump
⇒ [“3.2 Removing and installing the high pressure pump”, page 339](#) .
 - ◆ High pressure lines
⇒ [“2.9 Removing and installing high pressure lines”, page 334](#) .
 - ◆ Fuel distributor including fuel pressure control valve - N276- and fuel pressure sender - G247-
⇒ [“2.10 Removing and installing the fuel distributor”, page 336](#) .
 - ◆ Injector
⇒ [“2.8 Removing and installing the injection units”, page 331](#) .
 - ◆ Fuel return-flow lines (waste fuel lines)
⇒ [“2.1 Summary of components - injection units \(injectors\)”, page 323](#) .
 - ◆ Fuel filter
⇒ [“2.3 Fuel filter - Summary of components”, page 217](#) .
- Fill vehicle tank.
- Venting air from the fuel system
⇒ [“1.3 Filling/bleeding the fuel system”, page 321](#) .
- Perform a test drive.

End

1.4 Step 4, no metal swarfs are present in the fuel delivery unit and the fuel tank

- Fill fuel tank with 5 litres of diesel fuel.
- Empty fuel tank again fully as described above
⇒ [“1.1 Step 1, engine started with incorrect fuel”, page 197](#) .



Caution

*When removing the fuel dosage valve from the high pressure pump, there is the risk that dirt may get into the pump whereby damage to the pump could occur. Therefore, clean the fuel dosage valve as well as the high pressure pump as thoroughly as possible before removing, while doing so observe the rules of cleanliness when working on the injection system
⇒ [“3.1 Rules of cleanliness”, page 6](#) .*

- Disconnect the plug from the valve.



- Unscrew the screws -arrows- and carefully remove the fuel dosage valve - N290- -A- from the high pressure pump.
- Check fuel dosing valve - N290- and high pressure pump for swarfs.

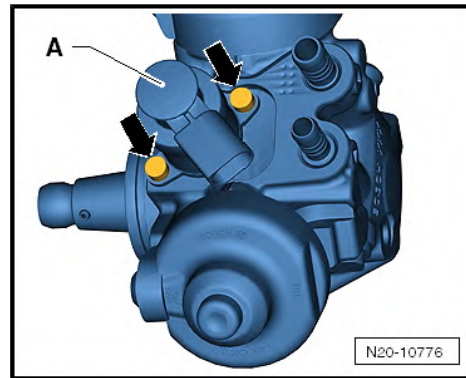
Are swarfs present?

Yes

⇒ [“1.5 Step 5, metal swarfs are present in the high pressure pump”, page 202](#)

No

⇒ [“1.6 Step 6: no metal swarfs are present in the high pressure pump”, page 202](#)



1.5 Step 5, metal swarfs are present in the high pressure pump

- Replace the following high pressure components:
 - ♦ High pressure pump
⇒ [“3.2 Removing and installing the high pressure pump”, page 339](#) .
 - ♦ High pressure lines
⇒ [“2.9 Removing and installing high pressure lines”, page 334](#) .
 - ♦ Fuel distributor including fuel pressure control valve - N276- and fuel pressure sender - G247-
⇒ [“2.10 Removing and installing the fuel distributor”, page 336](#) .
 - ♦ Injector
⇒ [“2.8 Removing and installing the injection units”, page 331](#) .
 - ♦ Fuel return-flow lines (waste fuel lines)
⇒ [“2.1 Summary of components - injection units \(injectors\)”, page 323](#) .
 - ♦ Fuel filter
⇒ [“2.3 Fuel filter - Summary of components”, page 217](#) .
- Fill vehicle tank.
- Venting air from the fuel system
⇒ [“1.3 Filling/bleeding the fuel system”, page 321](#) .
- Perform a test drive.

End

1.6 Step 6: no metal swarfs are present in the high pressure pump



Caution

Watch out for damages to gasket rings for fuel dosage valve - N290- . If a gasket ring is damaged, the high pressure pump must be replaced.

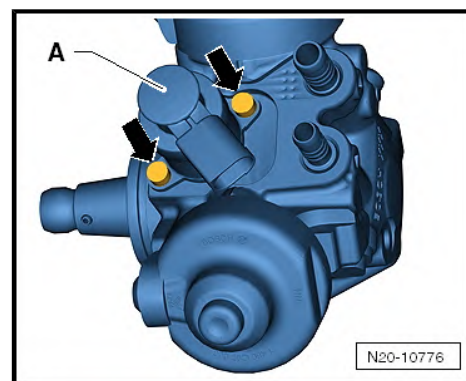
- Wet the lower gasket ring for fuel dosage valve - N290- with fuel.
- Slide the valve into the high pressure pump with light rotary movements.

- Screw in screws -arrows- only by hand.
- Tighten the screws in two stages:

Stage	Screws	Tightening torque
1.	-Arrows-	3 Nm
2.	-Arrows-	7 Nm

- Replace the fuel filter
⇒ [“2.3 Fuel filter - Summary of components”, page 217](#) .
- Venting air from the fuel system
⇒ [“1.3 Filling/bleeding the fuel system”, page 321](#) .
- Fill vehicle tank and take it for a test run.

End



2 Removing and installing parts of the fuel supply system

- ⇒ [“2.1 Fuel tank with component parts - Summary of components”, page 204](#)
- ⇒ [“2.2 Fuel delivery unit - Summary of components”, page 212](#)
- ⇒ [“2.3 Fuel filter - Summary of components”, page 217](#)
- ⇒ [“2.4 Drain fuel filter”, page 218](#)
- ⇒ [“2.5 Removing and installing fuel filter”, page 218](#)
- ⇒ [“2.6 Fuel hoses in the engine compartment”, page 222](#)
- ⇒ [“2.7 Extract fuel from the fuel tank”, page 223](#)
- ⇒ [“2.8 Removing and installing fuel delivery unit”, page 232](#)
- ⇒ [“2.9 Removing and installing misfuelling protection”, page 242](#)
- ⇒ [“2.10 Deactivate misfuelling protection”, page 244](#)
- ⇒ [“2.11 Removing and installing the sender for fuel gauge display”, page 245](#)
- ⇒ [“2.12 Separating push-on couplings”, page 249](#)
- ⇒ [“2.13 Removing and installing the fuel tank”, page 253](#)
- ⇒ [“2.14 Removing and installing fuel pump control unit J538 ”, page 263](#)
- ⇒ [“2.15 Check the suction jet pump”, page 265](#)
- ⇒ [“2.16 Removing and installing suction jet pump”, page 265](#)
- ⇒ [“2.17 Inspecting fuel pump G6 ”, page 273](#)
- ⇒ [“2.18 Check sender for fuel gauge display G ”, page 285](#)

2.1 Fuel tank with component parts - Summary of components

- ⇒ [“2.1.1 Fuel tank with attached parts, vehicles with front-wheel drive - Summary of components”, page 204](#)
- ⇒ [“2.1.2 Fuel tank with attached parts, vehicles with four-wheel drive - Summary of components”, page 209](#)

2.1.1 Fuel tank with attached parts, vehicles with front-wheel drive - Summary of components

For vehicles with multi-control arm rear axle

1 - Screw cap

- ☐ Pull until it can be heard clicking into place
- ☐ with securing to prevent any loss during tank fuel filler flap operation

2 - Earth connection

- ☐ for fuel filler neck
- ☐ for discharging the electrostatic charge
⇒ [page 208](#)

3 - Vent end piece

- ☐ Fitting position
⇒ [page 209](#)

4 - Screw

- ☐ replace after removal
- ☐ for attaching the fuel filler neck
- ☐ 8 Nm + torque a further 90° (1/4 turn)

5 - Lock ring

- ☐ 110 Nm

6 - Gasket ring

- ☐ replace
- ☐ use dry for fitting

7 - Fuel delivery unit

- ☐ Summary of components
⇒ [“2.2 Fuel delivery unit - Summary of components”, page 212](#)
- ☐ removing and installing
⇒ [“2.8 Removing and installing fuel delivery unit”, page 232](#)
- ☐ with sender for fuel gauge display - G-
- ☐ Removing and installing fuel gauge sender - G-
⇒ [“2.11 Removing and installing the sender for fuel gauge display”, page 245](#) .
- ☐ sprawdzenie pompy paliwa ⇒ [“2.17 Inspecting fuel pump G6”, page 273](#)
- ☐ zwrócić uwagę na położenie montażowe w zbiorniku paliwa ⇒ [page 209](#)

8 - Fuel tank

- ☐ removing and installing ⇒ [“2.13 Removing and installing the fuel tank”, page 253](#)

9 - Heat shield

- ☐ for fuel tank

10 - Circlip

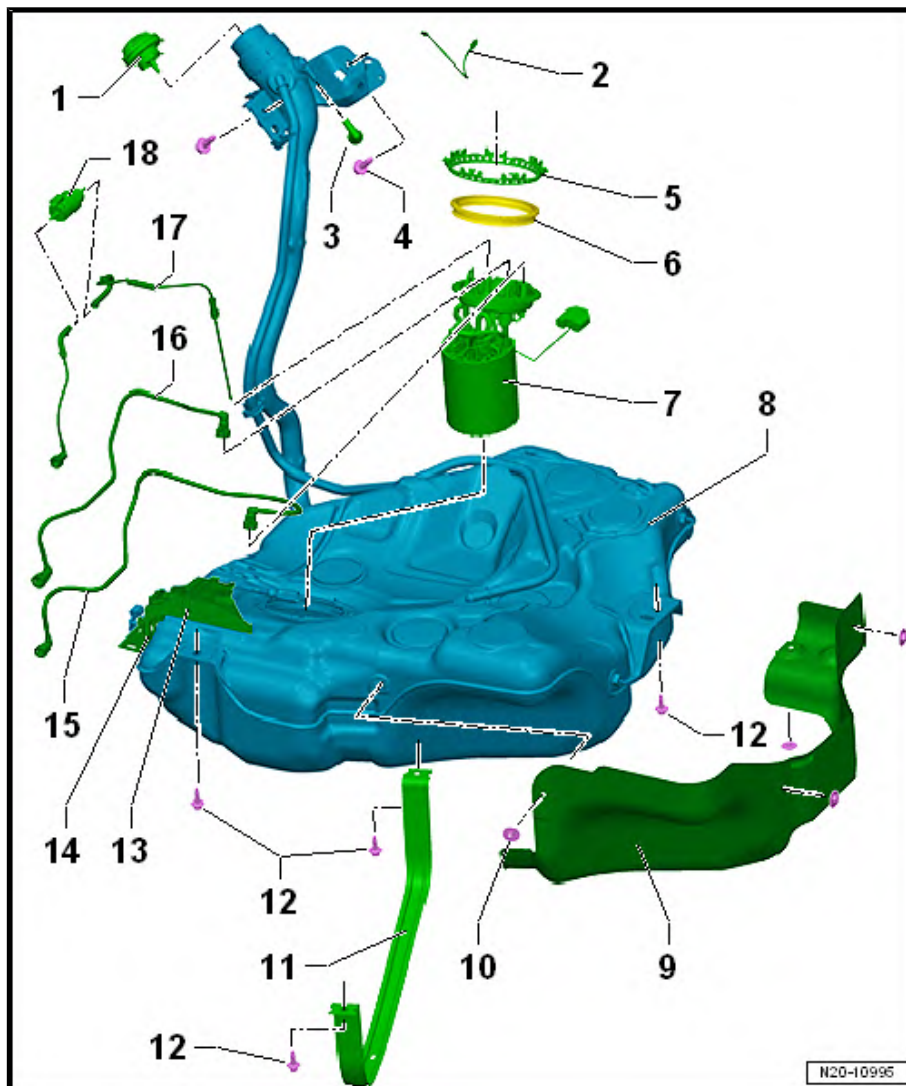
- ☐ for heat shield

11 - Tensioning strap

- ☐ Check fitting position
- ☐ before removing, mark running direction

12 - Screw

- ☐ replace after removal
- ☐ New screws for tensioning strap are longer, note the part number⇒ ETKA - Electronic Catalogue of Original Parts





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

13 - Bracket

- ☐ For fuel pump control unit - J538-
- ☐ Removing and installing fuel pump control unit - J538-
⇒ ["2.14 Removing and installing fuel pump control unit J538", page 263](#)

14 - Bracket

- ☐ for vehicles with auxiliary heating
- ☐ for dosing pump - V54-

15 - Fuel return-flow line

- ☐ of engine
- ☐ clipped in place on fuel tank
- ☐ check for firm seating
- ☐ do not kink
- ☐ Fit so that it can be heard clicking into place
- ☐ Unlock the quick coupling and disconnect ⇒ ["2.12 Separating push-on couplings", page 249](#) .

16 - Fuel feed line

- ☐ to fuel filter
- ☐ clipped in place on fuel tank
- ☐ check for firm seating
- ☐ do not kink
- ☐ Fit so that it can be heard clicking into place
- ☐ Unlock the quick coupling and disconnect ⇒ ["2.12 Separating push-on couplings", page 249](#) .

17 - Fuel line

- ☐ for vehicles with auxiliary heating from the dosing pump - V54-
- ☐ do not kink
- ☐ Fitting position ⇒ Heating, Air Conditioning; Rep. gr. 82
- ☐ check for firm seating

18 - Dosing pump - V54-

- ☐ for vehicles with auxiliary heating

For vehicles with torsion beam rear axle

1 - Screw cap

- ☐ Pull until it can be heard clicking into place
- ☐ with securing to prevent any loss during tank fuel filler flap operation

2 - Earth connection

- ☐ for fuel filler neck
- ☐ for discharging the electrostatic charge
⇒ [page 208](#)

3 - Screw

- ☐ replace after removal
- ☐ for attaching the fuel filler neck
- ☐ 8 Nm + torque a further 90° (1/4 turn)

4 - Vent end piece

- ☐ Fitting position
⇒ [page 209](#)

5 - Lock ring

- ☐ 110 Nm

6 - Gasket ring

- ☐ replace
- ☐ use dry for fitting

7 - Fuel delivery unit

- ☐ Summary of components
⇒ [“2.2 Fuel delivery unit - Summary of components”, page 212](#)
- ☐ removing and installing
⇒ [“2.8 Removing and installing fuel delivery unit”, page 232](#)
- ☐ with sender for fuel gauge display - G-
- ☐ Removing and installing fuel gauge sender - G-
⇒ [“2.11 Removing and installing the sender for fuel gauge display”, page 245](#)
- ☐ sprawdzenie pompy paliwa ⇒ [“2.17 Inspecting fuel pump G6”, page 273](#)
- ☐ zwrócić uwagę na położenie montażowe w zbiorniku paliwa ⇒ [page 209](#)

8 - Fuel tank

- ☐ removing and installing ⇒ [“2.13 Removing and installing the fuel tank”, page 253](#)

9 - Heat shield

- ☐ for fuel tank

10 - Circlip

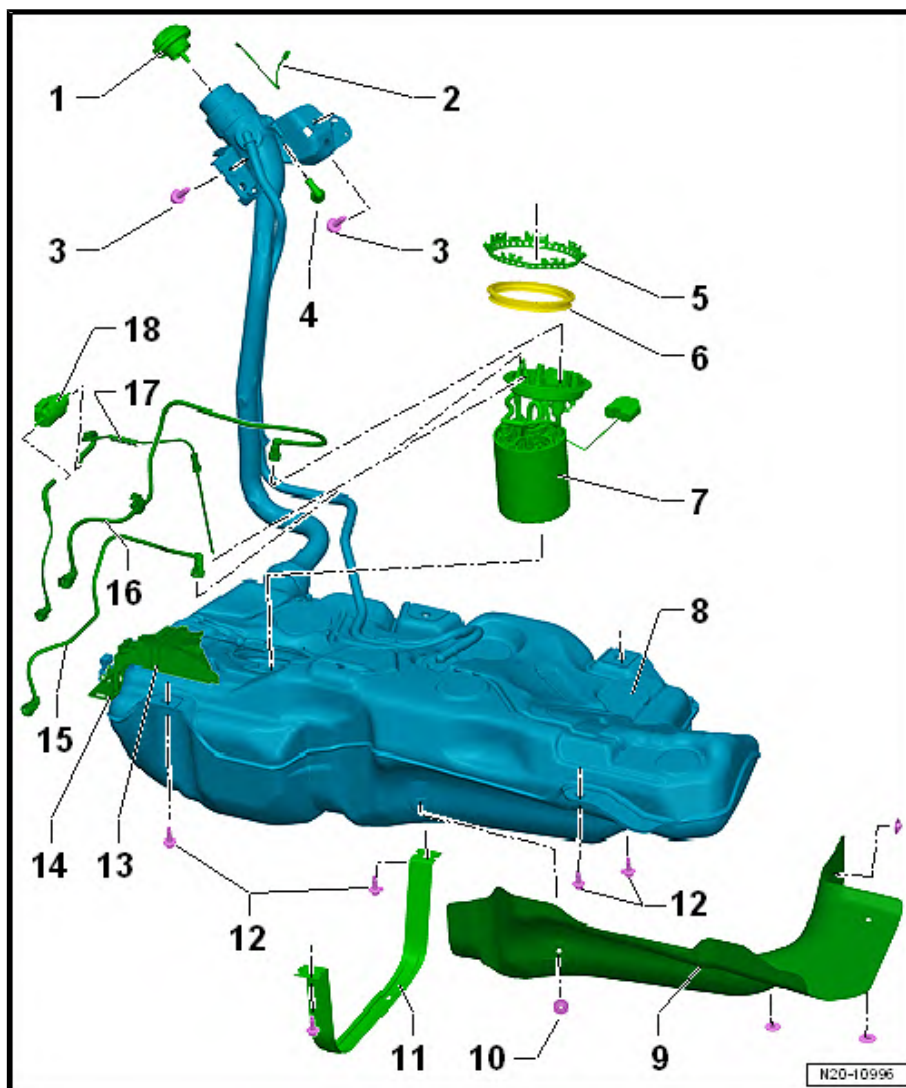
- ☐ for heat shield

11 - Tensioning strap

- ☐ Check fitting position
- ☐ before removing, mark running direction

12 - Screw

- ☐ replace after removal
- ☐ New screws for tensioning strap are longer, note the part number ⇒ ETKA - Electronic Catalogue of Original Parts





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

13 - Support

- ☐ For fuel pump control unit - J538-
- ☐ Removing and installing fuel pump control unit - J538-
⇒ ["2.14 Removing and installing fuel pump control unit J538", page 263](#)

14 - Support

- ☐ for vehicles with auxiliary heating
- ☐ for dosing pump - V54-
- ☐ Pay attention to correct fit of the dosing pump - V54- in the holder

15 - Fuel return-flow line

- ☐ of engine
- ☐ clipped in place on fuel tank
- ☐ check for firm seating
- ☐ do not kink
- ☐ Fit so that it can be heard clicking into place
- ☐ Unlock the quick coupling and disconnect ⇒ ["2.12 Separating push-on couplings", page 249](#) .

16 - Fuel feed line

- ☐ to fuel filter
- ☐ clipped in place on fuel tank
- ☐ check for firm seating
- ☐ do not kink
- ☐ Fit so that it can be heard clicking into place
- ☐ Unlock the quick coupling and disconnect ⇒ ["2.12 Separating push-on couplings", page 249](#) .

17 - Fuel line

- ☐ for vehicles with auxiliary heating from the dosing pump - V54-
- ☐ do not kink
- ☐ Fitting position ⇒ Heating, Air Conditioning; Rep. gr. 82
- ☐ check for firm seating

18 - Dosing pump - V54-

- ☐ for vehicles with auxiliary heating

Earth connection for fuel filler neck

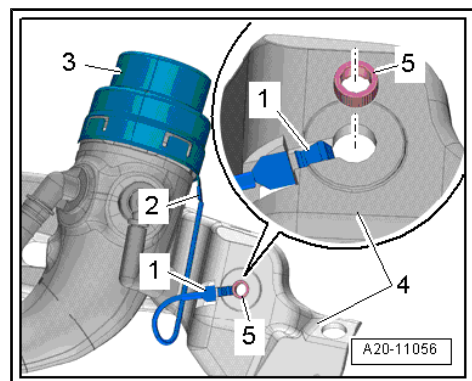
- Connect earth connection as shown in the illustration.
- Ensure the quick coupling fits tightly:
- ◆ Plug -2- of the earth connection on the threaded ring -3- of the fuel filler neck.
- Unhook contact peg -1- of the earth connection in the securing bore on the fuel tank -4- and press in the distance sleeve -5-.



WARNING

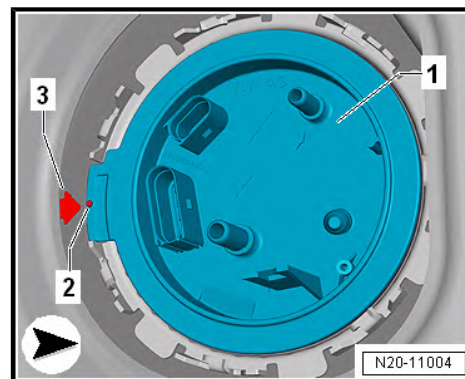
Risk from electrostatic charge.

- ◆ After installing, use an ohmmeter to test the electrical connection of the threaded ring on the fuel filler neck at a bare point on the body.
- Specified value approximately 0 Ω.



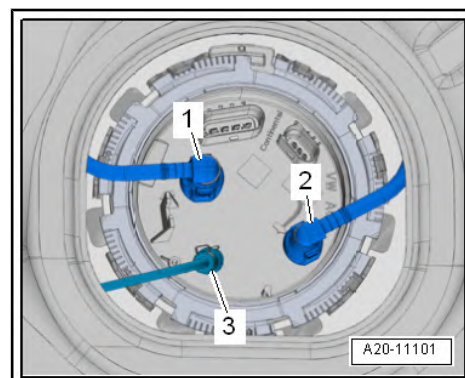
Fitting location of the fuel delivery unit

- Arrow -3- at the fuel tank must show marking -2- at the lock ring -1-



Fuel line at the fuel delivery unit

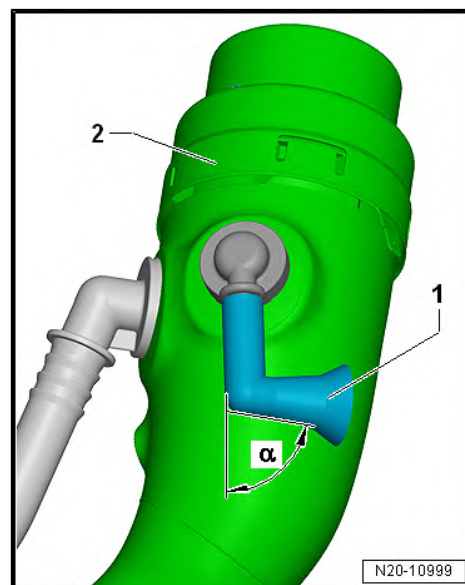
- 1 - Fuel feed line
- 2 - Fuel return-flow line
- 3 - Fuel line to the dosing pump - V54-



Installation position of the vent end piece

When installing the fuel tank -2-, note the installation position of the vent end piece -1-.

- Angle - α - must be 60°.



2.1.2 Fuel tank with attached parts, vehicles with four-wheel drive - Summary of components

**1 - Screw cap**

- ☐ close by turning until it audibly locks into place
- ☐ with securing to prevent any loss during tank fuel filler flap operation

2 - Screw

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

3 - Earth connection

- ☐ for fuel filler neck
- ☐ for discharging the electrostatic charge
⇒ [page 211](#)

4 - Vent end piece

- ☐ Fitting position
⇒ [page 212](#)

5 - Fuel delivery unit

- ☐ Summary of components
⇒ [“2.2 Fuel delivery unit - Summary of components”, page 212](#)
- ☐ removing and installing
⇒ [“2.8 Removing and installing fuel delivery unit”, page 232](#)
- ☐ with sender for fuel gauge display - G-
- ☐ Removing and installing fuel gauge sender - G-
⇒ [“2.11 Removing and installing the sender for fuel gauge display”, page 245](#)
- ☐ sprawdzenie pompy paliwa ⇒ [“2.17 Inspecting fuel pump G6”, page 273](#)
- ☐ zwrócić uwagę na położenie montażowe w zbiorniku paliwa ⇒ [page 211](#)

6 - Rubber buffer

- ☐ between fuel tank and bodyshell
- ☐ pay attention to correct position

7 - Screw

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

8 - Guide**9 - Fuel tank**

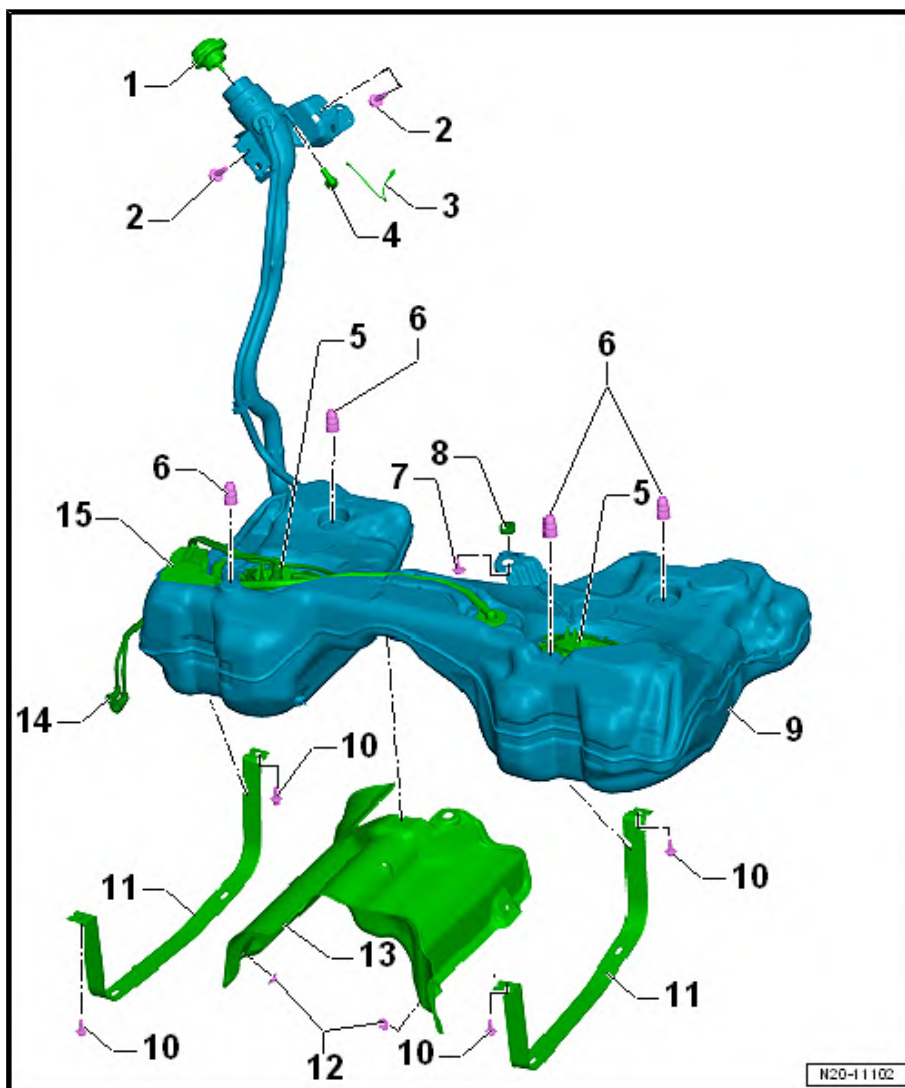
- ☐ removing and installing ⇒ [“2.13 Removing and installing the fuel tank”, page 253](#)

10 - Screw

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

11 - Tensioning strap

- ☐ Check fitting position



12 - Circlip

- ☐ for heat shield

13 - Heat shield

- ☐ check for firm seating

14 - Connected fuel hoses

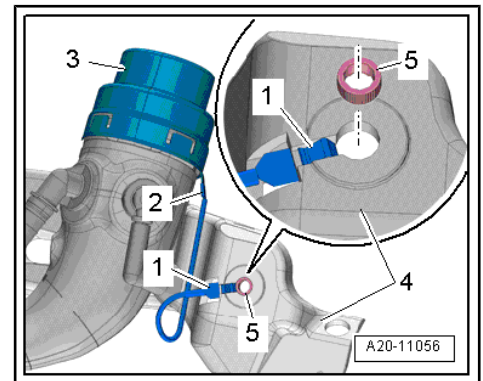
- ☐ do not kink
- ☐ Unlock the quick coupling and disconnect ⇒ [“2.12 Separating push-on couplings”, page 249](#) .
- ☐ observe the arrow direction (feed or return line) on the closing flange when installing
- ☐ clipped in place on fuel tank

15 - Support

- ☐ For fuel pump control unit - J538-
- ☐ Removing and installing fuel pump control unit - J538-
⇒ [“2.14 Removing and installing fuel pump control unit J538 ”, page 263](#)

Earth connection for fuel filler neck

- Connect earth connection as shown in the illustration.
- Ensure the quick coupling fits tightly:
- ◆ Plug -2- of the earth connection on the threaded ring -3- of the fuel filler neck.
- Unhook contact peg -1- of the earth connection in the securing bore on the fuel tank -4- and press in the distance sleeve -5-.



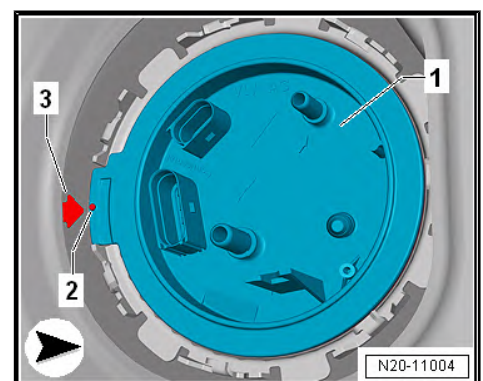
WARNING

Risk from electrostatic charge.

- ◆ *After installing, use an ohmmeter to test the electrical connection of the threaded ring on the fuel filler neck at a bare point on the body.*
- *Specified value approximately 0 Ω.*

Fitting location of the fuel delivery unit

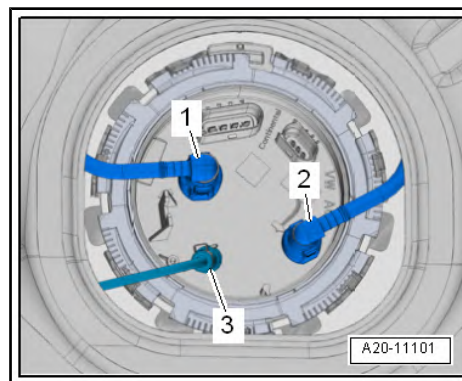
- Arrow -3- at the fuel tank must show marking -2- at the lock ring -1-





Fuel line at the fuel delivery unit

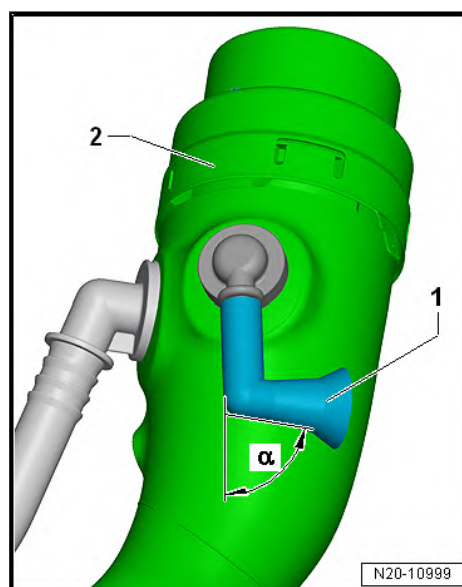
- 1 - Fuel feed line
- 2 - Fuel return-flow line
- 3 - Fuel line to the dosing pump - V54-



Installation position of the vent end piece

When installing the fuel tank -2-, note the installation position of the vent end piece -1-.

- Angle α must be 60° .



2.2 Fuel delivery unit - Summary of components

⇒ ["2.2.1 Fuel delivery unit, vehicles with front-wheel drive - Summary of components", page 212](#)

⇒ ["2.2.2 Fuel delivery unit, vehicles with four-wheel drive - Summary of components", page 214](#)

2.2.1 Fuel delivery unit, vehicles with front-wheel drive - Summary of components

1 - Fuel delivery unit

- ☐ With fuel system pressurisation pump - G6-
- ☐ electrical testing of the fuel pump in Targeted fault finding ⇒ Vehicle diagnostic tester
- ☐ sprawdzenie pompy paliwa
⇒ ["2.17 Inspecting fuel pump G6", page 273](#)
- ☐ removing and installing
⇒ ["2.8 Removing and installing fuel delivery unit", page 232](#)
- ☐ Fill the vehicle with at least 5 litres of fuel after installing
- ☐ after installing a new fuel delivery unit it will be necessary to unscrew the screw plug from the connection on the fuel delivery unit in order to connect the fuel line of the auxiliary heating

2 - Gasket ring

- ☐ replace
- ☐ install when dry

3 - Lock ring

- ☐ loosen and/or tighten using wrench - T30101 (3087)-



Note

Ensure that the fuel delivery unit is not damaged when loosening and tightening the lock ring of the holder on the flange.

- ☐ 110 Nm

4 - Fuel feed line

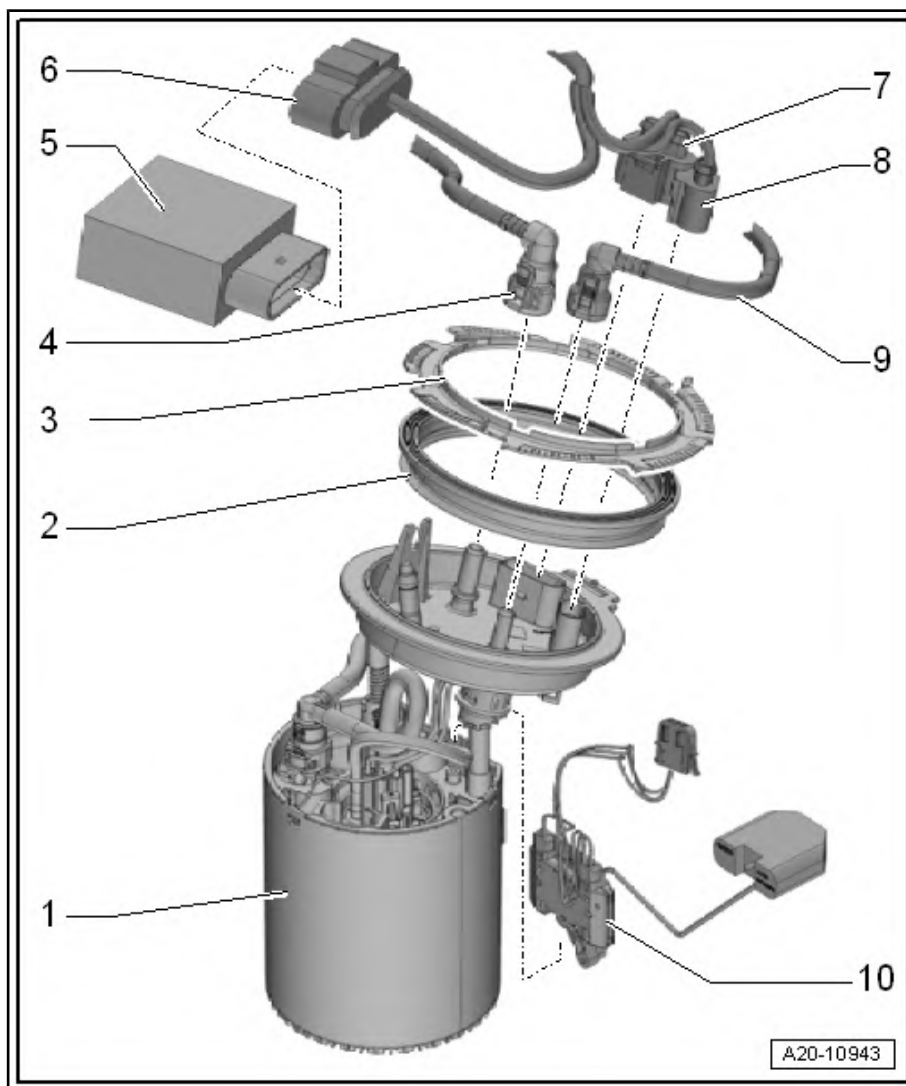
- ☐ to fuel filter
- ☐ pushed into the fuel tank
- ☐ do not kink
- ☐ to remove, press release button at connecting piece
- ☐ Unlock the quick coupling and disconnect ⇒ ["2.12 Separating push-on couplings", page 249](#) .
- ☐ observe the arrow direction (feed or return line) on the closing flange when installing
- ☐ Fit so that it can be heard clicking into place
- ☐ Press down again and check by pulling that the plug-in connector is fully engaged.

5 - Fuel pump control unit - J538-

- ☐ check in Targeted fault finding ⇒ Vehicle diagnostic tester
- ☐ removing and installing ⇒ ["2.14 Removing and installing fuel pump control unit J538", page 263](#)

6 - Electrical plug connection

- ☐ For fuel pump control unit - J538-





7 - Electrical plug connection

- ☐ for fuel system pressurisation pump - G6-

8 - Electrical plug connection

- ☐ for sender for fuel gauge display - G-

9 - Fuel return-flow line

- ☐ of engine
- ☐ pushed into the fuel tank
- ☐ do not kink
- ☐ to remove, press release button at connecting piece
- ☐ Unlock the quick coupling and disconnect ⇒ [“2.12 Separating push-on couplings”, page 249](#) .
- ☐ observe the arrow direction (feed or return line) on the closing flange when installing
- ☐ Fit so that it can be heard clicking into place
- ☐ Press down again and check by pulling that the plug-in connector is fully engaged.

10 - Fuel gauge sender - G-

- ☐ Check resistance values ⇒ [“2.18 Check sender for fuel gauge display G ”, page 285](#)
- ☐ removing and installing ⇒ [“2.11 Removing and installing the sender for fuel gauge display ”, page 245](#)

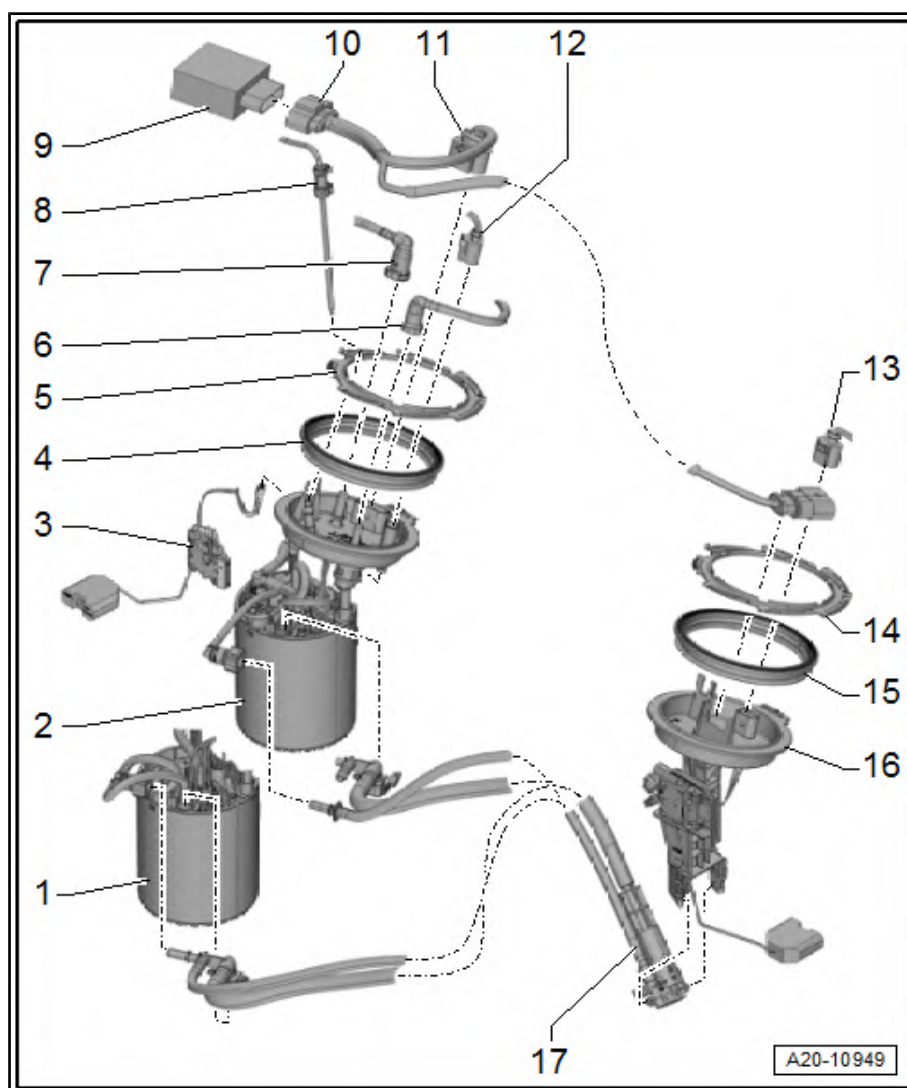
2.2.2 Fuel delivery unit, vehicles with four-wheel drive - Summary of components

1 - Fuel delivery unit

- ☐ Equipment variant without auxiliary heating system
- ☐ with fuel pump for pre-delivery - G6-
- ☐ removing and installing ⇒ [“2.8 Removing and installing fuel delivery unit”, page 232](#)
- ☐ electrical testing of the fuel pump in Targeted fault finding ⇒ Vehicle diagnostic tester
- ☐ Fill the vehicle with at least 5 litres of fuel after installing
- ☐ Fitting position ⇒ [page 211](#)

2 - Fuel delivery unit

- ☐ Equipment variant with auxiliary heating system
- ☐ with fuel pump for pre-delivery - G6-
- ☐ removing and installing ⇒ [“2.8 Removing and installing fuel delivery unit”, page 232](#)
- ☐ electrical testing of the fuel pump in Targeted fault finding ⇒ Vehicle diagnostic tester
- ☐ Fill the vehicle with at least 5 litres of fuel after installing



- ☐ after installing a new fuel delivery unit it will be necessary to unscrew the screw plug from the connection on the fuel delivery unit in order to connect the fuel line of the auxiliary heating
- ☐ Observe the fitting position of the fuel discharge line for auxiliary heating ⇒ Heating, Air Conditioning; Rep. gr. 82
- ☐ Fitting position ⇒ [page 211](#)

3 - Fuel gauge sender - G-

- ☐ check ⇒ Vehicle diagnostic tester
- ☐ removing and installing ⇒ ["2.11 Removing and installing the sender for fuel gauge display", page 245](#)

4 - Gasket ring

- ☐ replace if damaged
- ☐ install when dry

5 - Lock ring

- ☐ loosen and/or tighten using wrench - T30101 (3087)-



Note

Ensure that the fuel delivery unit is not damaged when loosening and tightening the lock ring of the holder on the flange.

- ☐ 110 Nm

6 - Fuel return-flow line

- ☐ of engine
- ☐ pushed into the fuel tank
- ☐ do not kink
- ☐ Unlock the quick coupling and disconnect ⇒ ["2.12 Separating push-on couplings", page 249](#) .
- ☐ observe the arrow direction (feed or return line) on the closing flange when installing
- ☐ Fit so that it can be heard clicking into place
- ☐ Press down again and check by pulling that the plug-in connector is fully engaged.

7 - Fuel feed line

- ☐ to fuel filter
- ☐ pushed into the fuel tank
- ☐ do not kink
- ☐ Unlock the quick coupling and disconnect ⇒ ["2.12 Separating push-on couplings", page 249](#) .
- ☐ observe the arrow direction (feed or return line) on the closing flange when installing
- ☐ Fit so that it can be heard clicking into place
- ☐ Press down again and check by pulling that the plug-in connector is fully engaged.

8 - Fuel line

- ☐ for vehicles with auxiliary heating
- ☐ for the dosing pump of the auxiliary heating
- ☐ Observe the fitting position of the fuel discharge line for auxiliary heating ⇒ Heating, Air Conditioning; Rep. gr. 82

9 - Fuel pump control unit - J538-

- ☐ check in [Targeted fault finding](#) ⇒ Vehicle diagnostic tester
- ☐ removing and installing ⇒ ["2.14 Removing and installing fuel pump control unit J538", page 263](#)

10 - Electrical plug connection

- ☐ For fuel pump control unit - J538-

11 - Electrical plug connection

- ☐ for fuel system pressurisation pump - G6-

**12 - Electrical plug connection**

- ☐ for sender for fuel gauge display - G-

13 - Electrical plug connection

- ☐ for Fuel gauge sender 2 - G169-

14 - Lock ring

- ☐ loosen and/or tighten using wrench - T30101 (3087)-

**Note**

When loosening and tightening the lock ring of the holder on the flange fuel gauge sender 2 - G169- is not damaged when loosening and tightening the lock ring.

- ☐ 110 Nm

15 - Gasket ring

- ☐ replace if damaged
- ☐ install when dry

16 - Fuel gauge sender 2 - G169-

- ☐ check ⇒ Vehicle diagnostic tester
- ☐ removing and installing ⇒ [“2.11 Removing and installing the sender for fuel gauge display”, page 245](#)

17 - Suction spray pump

- ☐ check ⇒ [“2.15 Check the suction jet pump”, page 265](#)
- ☐ removing and installing ⇒ [“2.16 Removing and installing suction jet pump”, page 265](#)

2.3 Fuel filter - Summary of components

1 - Fuel filter - bottom part with integrated bracket

- ☐ removing and installing
⇒ [“2.5 Removing and installing fuel filter”, page 218](#)
- ☐ Observe the instructions for fuel hoses in the engine compartment
⇒ [“2.6 Fuel hoses in the engine compartment”, page 222](#)

2 - Fuel filter element

- ☐ Pay attention to change intervals:

◆ ⇒ Maintenance ; Booklet Octavia III

3 - Fuel filter - top part

- ☐ with connections
- ☐ removing and installing
⇒ [“2.5 Removing and installing fuel filter”, page 218](#)
- ☐ Observe the instructions for fuel hoses in the engine compartment
⇒ [“2.6 Fuel hoses in the engine compartment”, page 222](#)

4 - Screw

- ☐ Qty. 5
- ☐ 5 Nm

5 - Drain valve

- ☐ not fitted to all versions
- ☐ drain ⇒ [“2.4 Drain fuel filter”, page 218](#)

6 - Hose clamps

- ☐ loosen with hose clip pliers - V.A.G 1921-

7 - Fuel intake hose

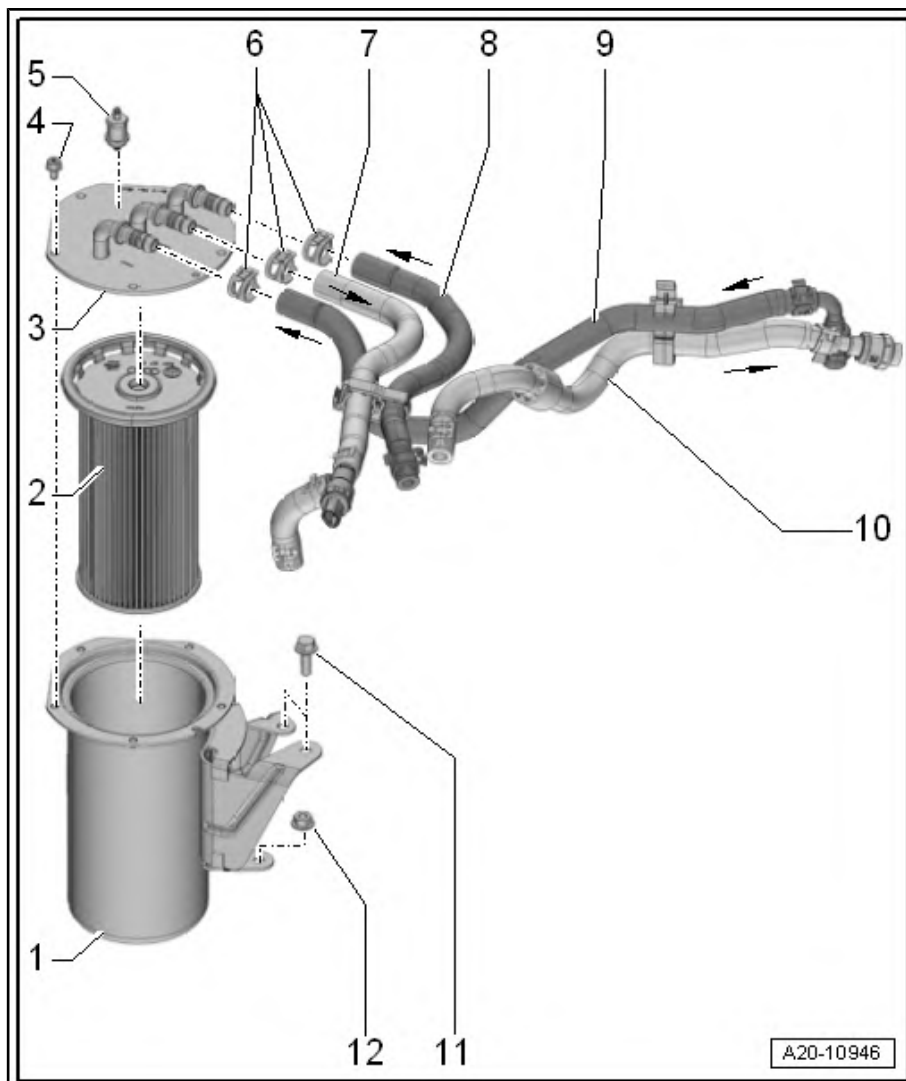
- ☐ to high pressure pump
- ☐ Observe the instructions for fuel hoses in the engine compartment
⇒ [“2.6 Fuel hoses in the engine compartment”, page 222](#)

8 - Fuel return-flow hose

- ☐ of engine
- ☐ Observe the instructions for fuel hoses in the engine compartment
⇒ [“2.6 Fuel hoses in the engine compartment”, page 222](#)

9 - Fuel intake hose

- ☐ from fuel tank
- ☐ Observe the instructions for fuel hoses in the engine compartment
⇒ [“2.6 Fuel hoses in the engine compartment”, page 222](#)
- ☐ Unlock the quick coupling and disconnect ⇒ [“2.12 Separating push-on couplings”, page 249](#) .



10 - Fuel return-flow hose

- ☐ Risk of damage to the fuel tank high pressure pump
- ☐ Observe the instructions for fuel hoses in the engine compartment
⇒ [“2.6 Fuel hoses in the engine compartment”, page 222](#)
- ☐ Unlock the quick coupling and disconnect ⇒ [“2.12 Separating push-on couplings”, page 249](#) .

11 - Screw

- ☐ Qty. 2
- ☐ 8 Nm

12 - Nut

- ☐ 8 Nm

2.4 Drain fuel filter

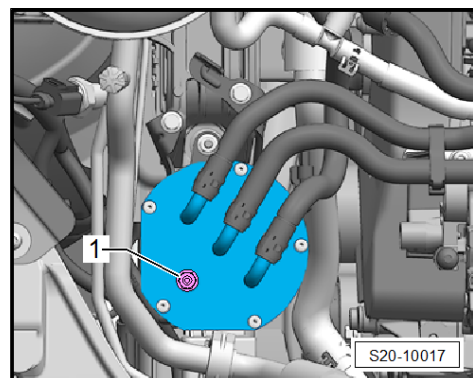
Special tools and workshop equipment required

- ◆ Fuel-resistant container
- ◆ Transparent hose



Note

- ◆ *Safety precautions when working on the fuel supply system*
⇒ [“2 Safety instructions”, page 3](#) .
- ◆ *Observe rules for cleanliness*
⇒ [“3.1 Rules of cleanliness”, page 6](#) .
- ◆ *Make sure no diesel fuel runs onto the coolant hoses. If necessary clean the hoses immediately!*
- ◆ *Observe the disposal instructions!*
- ◆ *The drain valve is not present in all versions.*
- Insert the transparent hose with a drain container onto the drain plug -1-.
- Start engine.
- Carefully undo the drain plug -1- by 1/4 turns.
- Drain off approx. 0.3 to 0.4 litres of fluid. Once clean diesel fuel discharges, seal the drain plug -1-.
- Switch off engine and remove the hose.



2.5 Removing and installing fuel filter

Special tools and workshop equipment required

- ◆ Hose clip pliers - V.A.G 1921-

Removing



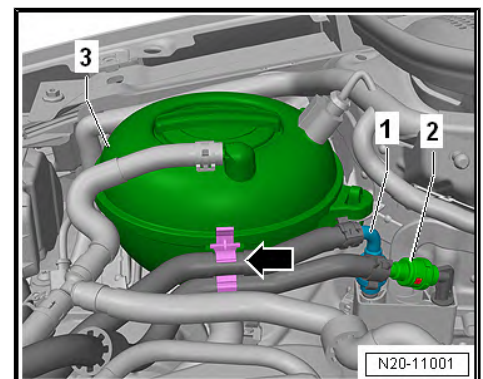
Note

- ◆ *Safety precautions when working on the fuel supply system*
⇒ *"2 Safety instructions", page 3*.
- ◆ *Observe rules for cleanliness*
⇒ *"3.1 Rules of cleanliness", page 6*.
- ◆ *Observe the instructions for the fuel hose in the engine compartment*
⇒ *"2.6 Fuel hoses in the engine compartment", page 222*.

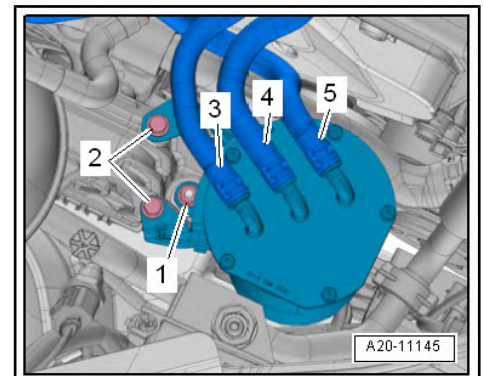
- Switch off ignition.

If the fuel filter has to be removed because of lack of space only

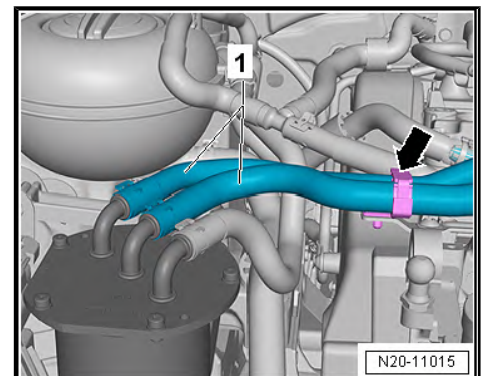
- Remove fuel hoses -1- and -2-
⇒ *"2.12 Separating push-on couplings", page 249*.
- Push fuel lines -1- and -2- out of the holder -arrow- at the coolant expansion tank -3-.



- Unscrew securing bolts -2-.
- Unscrew nut -1-.



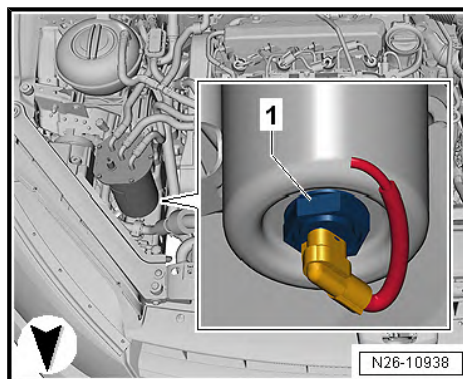
- Open holder -arrow- and push out fuel lines -1-.





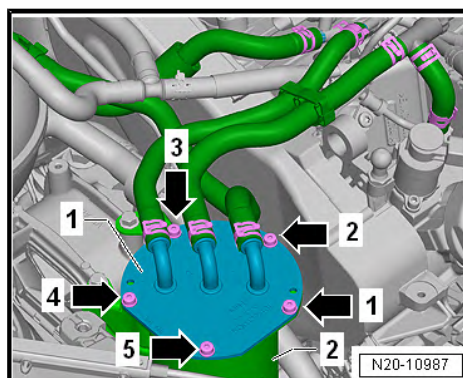
- Equipment variant with water level sender - G63- : Disconnect the electrical plug connection at the water level sender -1-.
- Then lay the fuel filter to the side.

If the fuel filter must be opened

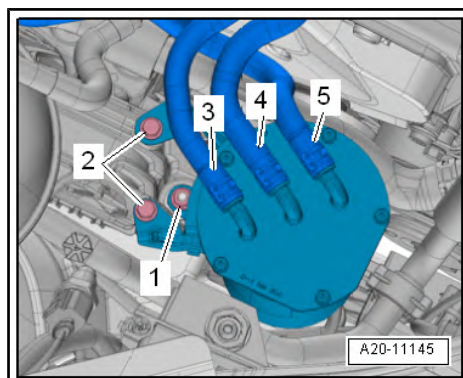


- Unscrew screws -1- to -5- -arrows- in the order shown.
- Collect any leaking fuel.
- Remove fuel filter top part -1- from fuel filter housing -2-.
- Lay fuel filter top part -1- to the side with the fuel lines connected.

If the fuel filter must be replaced



- Pull off fuel hoses -3- to -5-.
- To do so, loosen hose clamps with pliers for spring strap clips.
- Release screws -2-.
- Unscrew nut -1-.



- Equipment variant with water level sender - G63- : Disconnect the electrical plug connection at the water level sender -1-.
- Remove fuel filter.
- Collect any leaking fuel.

Install

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

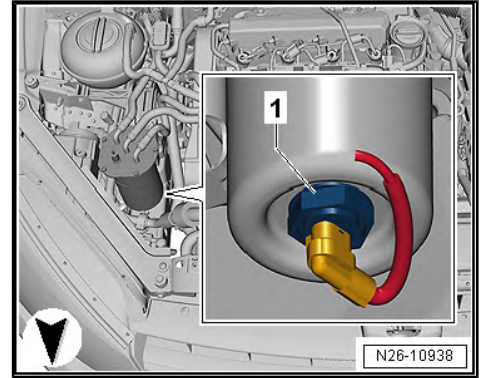


Note

- ◆ *Observe the instructions for the fuel hose in the engine compartment*
⇒ *[“2.6 Fuel hoses in the engine compartment”, page 222](#)* .
- ◆ *Secure all hose connections with specified clamps* ⇒ *ETKA - Electronic Catalogue of Original Parts* .
- Filling and bleeding the fuel system
⇒ *[“1.3 Filling/bleeding the fuel system”, page 321](#)* .

Tightening torques

- ◆ ⇒ *[“2.3 Fuel filter - Summary of components”, page 217](#)*



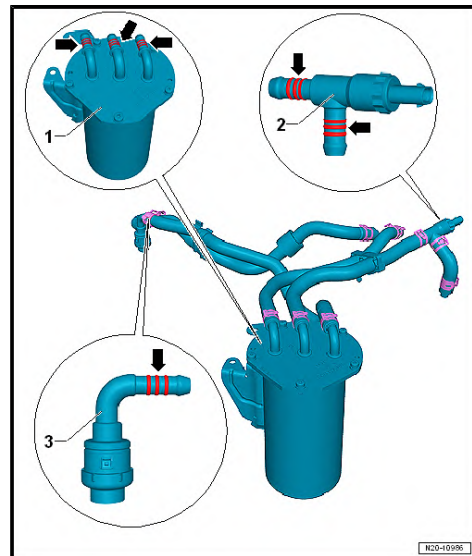


2.6 Fuel hoses in the engine compartment



Note

- ◆ Fuel hose supports at fuel filter -1-, at fuel temperature transmitter -2- and push-on couplings are equipped with twin shaft profile -arrows- and edge.
- ◆ In this way, the tightness of the fuel system is improved.
- ◆ The ultra-thin barrier layer on the inside of the fuel hoses will be damaged when the fuel hoses are removed.
- ◆ This damage is not visible to the eye.
- ◆ After a time it leads to fuel system leakage.
- ◆ If the fuel filter must only be removed for space reasons, leave fuel hoses on the fuel filter and high pressure pump if possible. Lay fuel filter with connected hoses on the engine to avoid any unnecessary replacement of hoses.
- ◆ For disconnection, use other fuel system connection points in the engine compartment ➔ [page 218](#) .
- ◆ Unlock the quick coupling and disconnect ➔ ["2.12 Separating push-on couplings", page 249](#) .



Caution

After fuel hoses are removed from the nozzle with twin shaft profile and biting edge, these fuel hoses must be replaced.

If a fuel hose cannot be disconnected from the hose nozzle by hand



Caution

Never push a screwdriver or a similar tool between the hose and the hose nozzle!

Risk of damage to hose nozzle - the component must be replaced.

- Turn fuel hose with suitable pliers and remove it.

If a fuel hose still cannot be disconnected from the hose nozzle

- Cut into the hose only as far as the textile layer of the hose lengthwise and detach the hose.
- Do not cut through the inner rubber layer. If the nozzle is damaged, it is necessary to replace the complete component.



Note

- ◆ Before fitting the new fuel hose, thoroughly clean the hose nozzle from grease, oil and dirt. To do so, do not use any metal tools that could damage the hose nozzle.
- ◆ Fit the fuel hose on the nozzle without lubricant and secure with spring strap clamp.

2.7 Extract fuel from the fuel tank

⇒ [“2.7.1 Emptying fuel tank when fuel pump is intact”, page 223](#)

⇒ [“2.7.2 Emptying fuel tank if it is more than 3/4 full”, page 224](#)

⇒ [“2.7.3 Empty the fuel tank if less than 3/4 full, vehicles with front-wheel drive”, page 225](#)

⇒ [“2.7.4 Empty the fuel tank if less than 3/4 full, vehicles with four-wheel drive”, page 228](#)

2.7.1 Emptying fuel tank when fuel pump is intact

Special tools and workshop equipment required

- ◆ Fuel extraction device , e. g. -VAS 5190-
- ◆ Adapter for fuel extraction - VAS 5190 /2-



Note

If the fuel extraction device - VAS 5190- is still fitted with an extraction hose with a fixed tip, replace it by the version with a screw-type tip.

- Unscrew tip -1- from extraction hose of fuel extraction unit - VAS 5190- .
- Screw fuel extraction adapter - VAS 5190 /2- from fuel extraction adapter set - VAS 5190 /10- onto extraction hose.

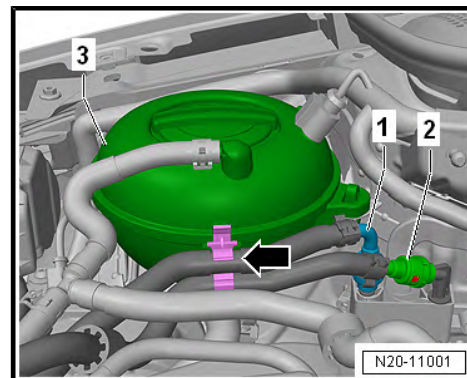
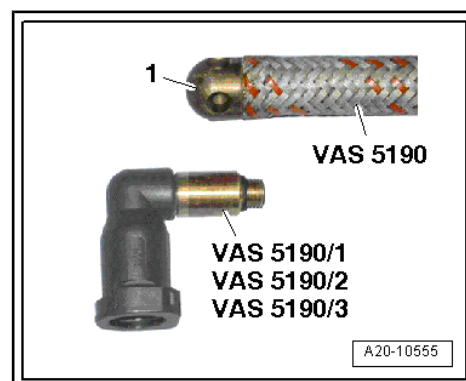
Carry out the following work procedure:

Removing



Note

- ◆ *Safety precautions when working on the fuel supply system*
⇒ [“2 Safety instructions”, page 3](#) .
- ◆ *Observe rules for cleanliness*
⇒ [“3.1 Rules of cleanliness”, page 6](#) .
- Switch off ignition.
- Pull out the fuel feed line -1- and catch the fuel which flows out with a cleaning cloth
⇒ [“2.12 Separating push-on couplings”, page 249](#) .



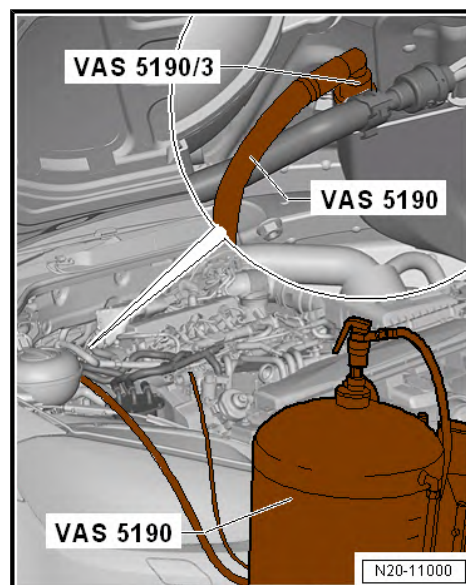


- Connect the fuel extraction device - VAS 5190- with the adapter for the fuel extraction - VAS 5190 /3- to the fuel feed line.
- Connect ⇒ Vehicle diagnostic tester.
- Perform Targeted Functions `empty fuel tank`.
- Repeat the operation if necessary.

**Note**

The fuel pump is now activated.

- Open shut-off valve at the fuel extraction device - VAS 5190- until the fuel tank is empty.



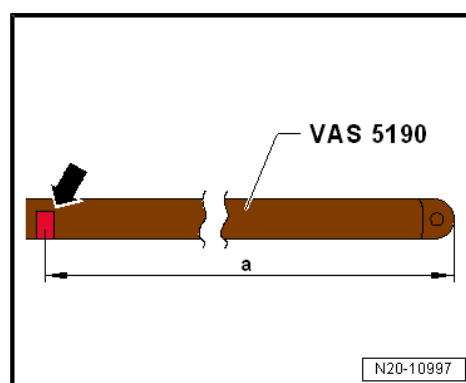
2.7.2 Emptying fuel tank if it is more than $\frac{3}{4}$ full

Special tools and workshop equipment required

- ♦ Fuel extraction device , e. g. -VAS 5190-

**Note**

- ♦ *Safety precautions when working on the fuel supply system*
⇒ *"2 Safety instructions", page 3* .
- ♦ *Observe rules for cleanliness*
⇒ *"3.1 Rules of cleanliness", page 6* .
- In distance -a- from the end of the extraction hose make a marking -arrow- on the hose.
- Use insulating tape for this purpose.



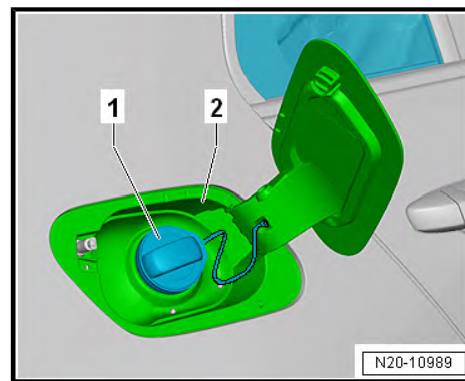
Rear axle	Distance a in mm
Vehicles with multi-control arm rear axle	945 mm
Vehicles with torsion beam rear axle	1010 mm

- Open tank flap unit -2-.
- Clean the area around the fuel filler neck.
- Unscrew the cap -1- for the fuel filler neck.
- Remove the misfuelling protection device if present
⇒ [“2.9 Removing and installing misfuelling protection”, page 242](#).



Caution

Secure the earth cable of the fuel extraction device to a bare metal part of the body.



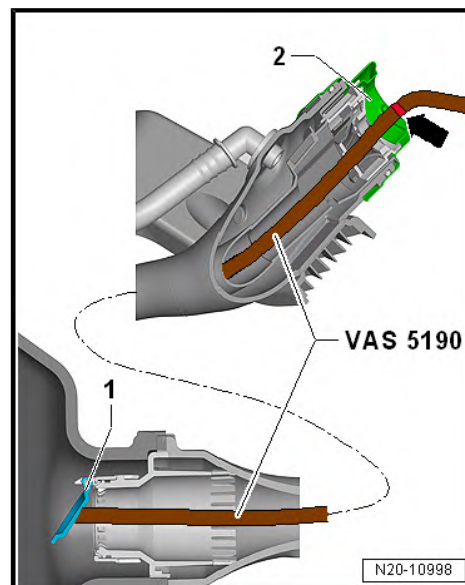
- Push the extraction hose of the fuel extraction device as far into the fuel tank holder as necessary until the previously applied marking -arrow- terminates with the filler neck -2-.
- Drain the fuel tank through the filler neck as much as possible.



Note

- ◆ *In the fuel tank there is a flap -1- on the lower end of the filler neck, which must not be damaged by the extraction hose of the fuel extraction device. Therefore, the hose must only be pushed in up to the previously made marking -arrow-.*
- ◆ *If the extraction hose becomes stuck to the check valve while being pulled out, do not pull the extraction hose violently.*
- ◆ *If this is the case, remove the fuel delivery unit and hold the check valve open by hand. Make sure that your arm does not come in contact with fuel.*

- Carefully pull out the extraction hose.



Note

- ◆ *When no more fuel is extracted, the tank is emptied just enough for the sender flange to be opened without danger.*
- ◆ *When working on the fuel delivery unit or on the sender for fuel gauge display, proceed as follows
⇒ [“2.7.3 Empty the fuel tank if less than 3/4 full, vehicles with front-wheel drive”, page 225](#).*

2.7.3 Empty the fuel tank if less than $\frac{3}{4}$ full, vehicles with front-wheel drive

Special tools and workshop equipment required

- ◆ Fuel extraction device, e. g. -VAS 5190-
- ◆ Wrench for union nut - T30101 (3087)-
- ◆ Disassembly wedge - 3409-

**Caution**

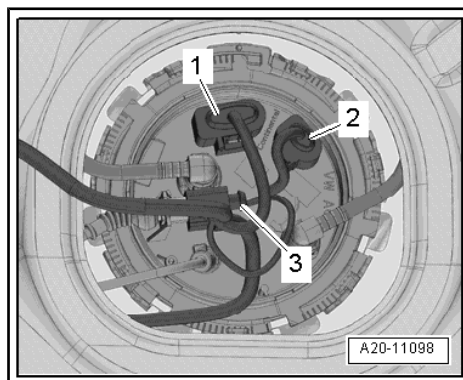
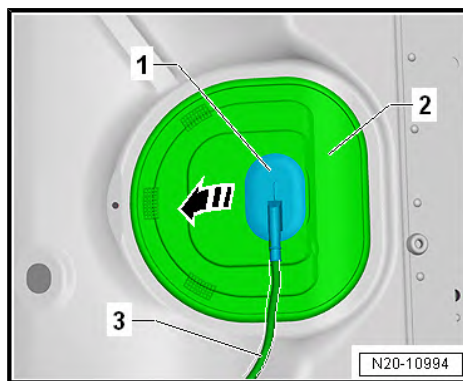
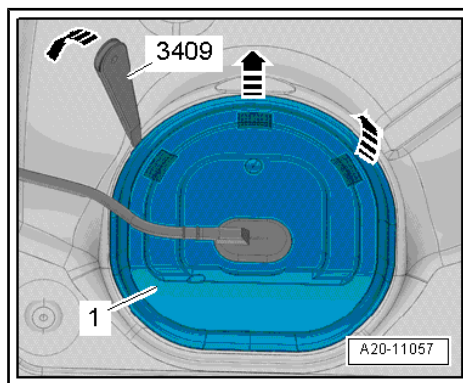
To prevent large quantities of fuel from leaking when removing the fuel delivery unit, the fuel tank must not be filled to more than a maximum of $\frac{1}{3}$.

**Note**

- ◆ *Safety precautions when working on the fuel supply system*
⇒ *"2 Safety instructions", page 3*.
- ◆ *Observe rules for cleanliness*
⇒ *"3.1 Rules of cleanliness", page 6*.
- Removing rear seat bench ⇒ Body Work; Rep. gr. 72.
- Unclip cover -1- for the right closing flange with the disassembly wedge - 3409- on the retaining tabs -arrows-.
- Unclip sealing grommet -1- downwards from the cover -2-.
- Guide the cover -2- backward at the electric wiring loom -3-.
- Unlock electrical plug connections -1- and -2- on the closing flange and remove them.

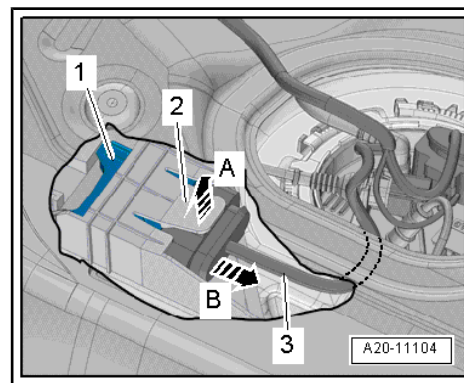
Vehicles fitted with auxiliary heating

- Unhook plug connection -3- for the dosing pump - V54- from the closing flange.
- Unlock plug connection -3- for the dosing pump - V54- and remove it.



Continued for all vehicles

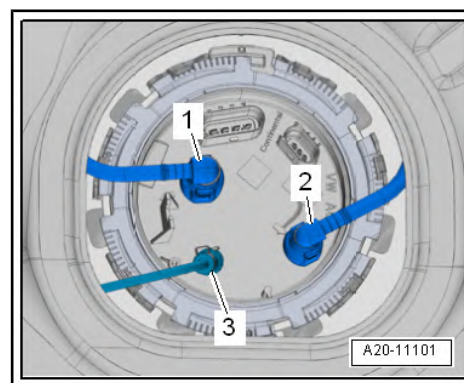
- Push up catch -2- in arrow direction -A-.
- To do so, reach between bottom plate and fuel tank with a finger.
- At the same time, carefully pull the fuel pump control unit - J538- -1- carefully at the electrical wiring loom -3- out of the uptake in arrow direction -B-.
- Take out fuel pump control unit - J538- inwards between fuel tank and bottom plate.
- Put fuel pump control unit - J538- to one side together with the electrical wiring harness.



- Disconnect fuel line -1- at the closing flange
⇒ [“2.12 Separating push-on couplings”, page 249](#)
- Disconnect fuel return-flow line -2- at the closing flange
⇒ [“2.12 Separating push-on couplings”, page 249](#).

Vehicles fitted with auxiliary heating

- Remove fuel line -3- to the dosing pump - V54- for the auxiliary heating at the closing flange.
- To do so, open the bottom clamp.
- Carefully pull out fuel line -3-.



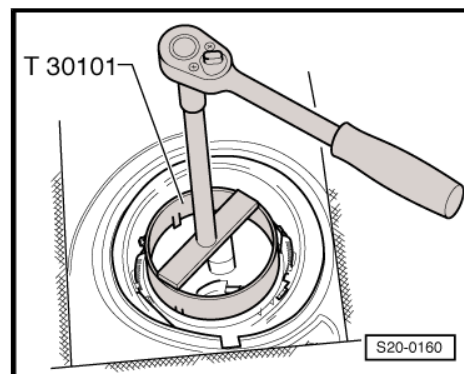
Continued for all vehicles



Note

Ensure that the fuel delivery unit is not damaged when loosening the lock ring of the holder on the flange.

- Open locking ring using union nut wrench - T30101 (3087)- .





- Carefully lift out fuel delivery unit flange -3-.
- Remove gasket -1- and raise the fuel delivery unit flange slightly higher.

**Caution**

Secure the earth cable of the fuel extraction device to a bare metal part of the body.

- Insert suction hose of fuel extractor - VAS 5190- as far as possible into fuel tank.
- Extract fuel using the fuel extraction device - VAS 5190- .

If fuel tank needs only to be emptied, re-install the fuel delivery unit

⇒ [“2.8 Removing and installing fuel delivery unit”, page 232](#) .

Tightening torques

♦ ⇒ [“2.2 Fuel delivery unit - Summary of components”, page 212](#)

♦ ⇒ Heating, Air conditioning; Rep. gr. 82

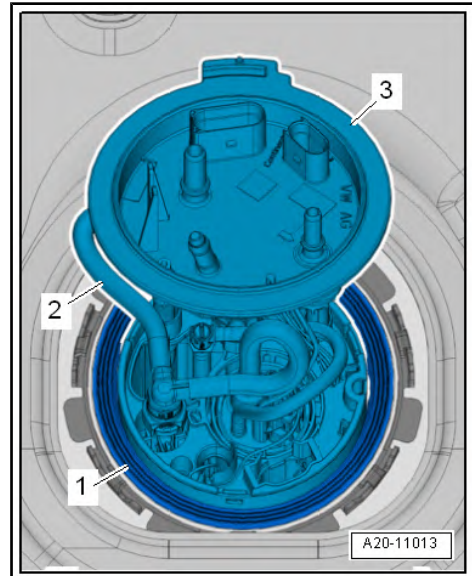
2.7.4 Empty the fuel tank if less than $\frac{3}{4}$ full, vehicles with four-wheel drive

Special tools and workshop equipment required

- ♦ Fuel extraction device , e. g. -VAS 5190-
- ♦ Wrench for union nut - T30101 (3087)-
- ♦ Disassembly wedge - 3409-

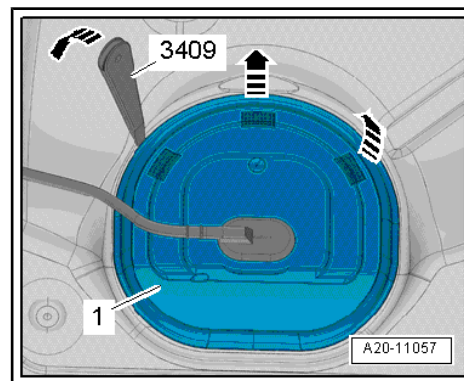
**Caution**

To prevent large quantities of fuel from leaking when removing the fuel delivery unit, the fuel tank must not be filled to more than a maximum of $\frac{1}{3}$.

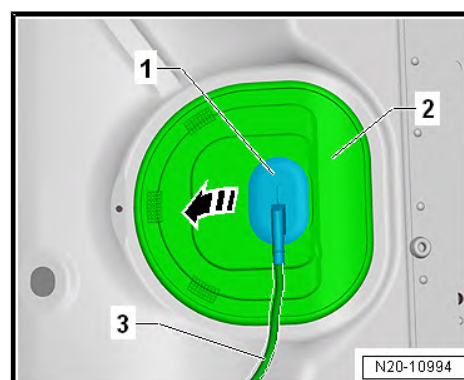
**Note**

- ♦ *Safety precautions when working on the fuel supply system*
⇒ [“2 Safety instructions”, page 3](#) .
- ♦ *Observe rules for cleanliness*
⇒ [“3.1 Rules of cleanliness”, page 6](#) .
- Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

- Unclip cover -1- for the right closing flange with the disassembly wedge - 3409- on the retaining tabs -arrows-.



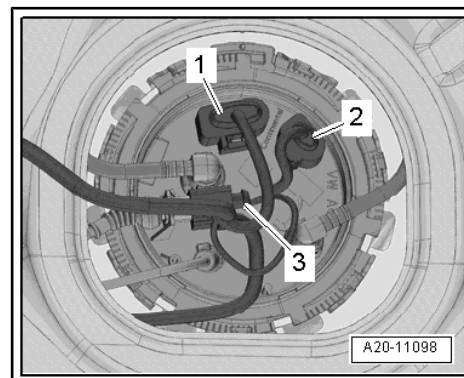
- Unclip sealing grommet -1- downwards from the cover -2-.
- Guide the cover -2- backward at the electric wiring loom -3-.



- Unlock electrical plug connections -1- and -2- on the closing flange and remove them.

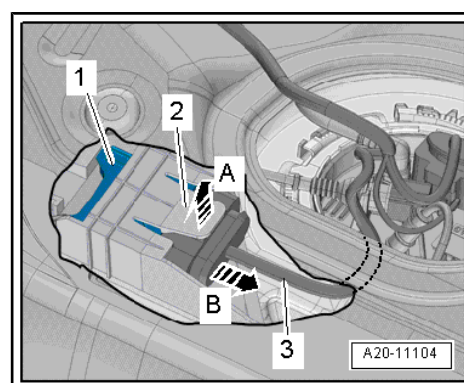
Vehicles fitted with auxiliary heating

- Unhook plug connection -3- for the dosing pump - V54- from the closing flange.
- Unlock plug connection -3- for the dosing pump - V54- and remove it.



Continued for all vehicles

- Push up catch -2- in arrow direction -A-.
- To do so, reach between bottom plate and fuel tank with a finger.
- At the same time, carefully pull the fuel pump control unit - J538- -1- carefully at the electrical wiring loom -3- out of the uptake in arrow direction -B-.
- Take out fuel pump control unit - J538- inwards between fuel tank and bottom plate.
- Put fuel pump control unit - J538- to one side together with the electrical wiring harness.



- Disconnect fuel line -1- at the closing flange
⇒ "2.12 Separating push-on couplings", page 249
- Disconnect fuel return-flow line -2- at the closing flange
⇒ "2.12 Separating push-on couplings", page 249 .

Vehicles fitted with auxiliary heating

- Remove fuel line -3- to the dosing pump - V54- for the auxiliary heating at the closing flange.
- To do so, open the bottom clamp.
- Carefully pull out fuel line -3-.

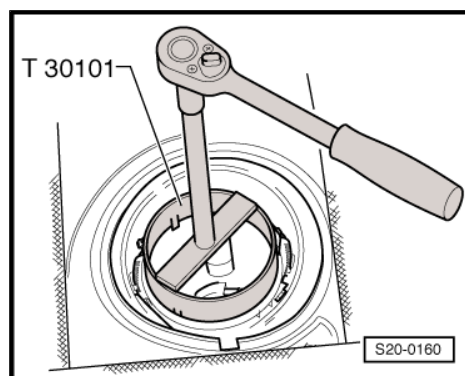
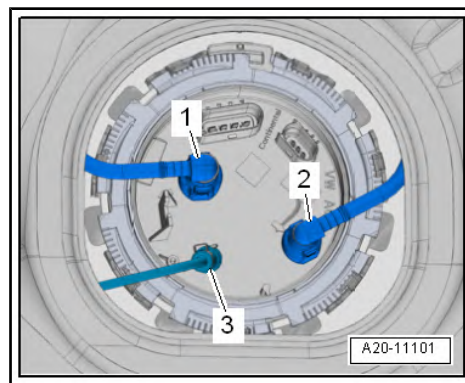
Continued for all vehicles



Note

Ensure that the fuel delivery unit is not damaged when loosening the lock ring of the holder on the flange.

- Open locking ring using union nut wrench - T30101 (3087)- .



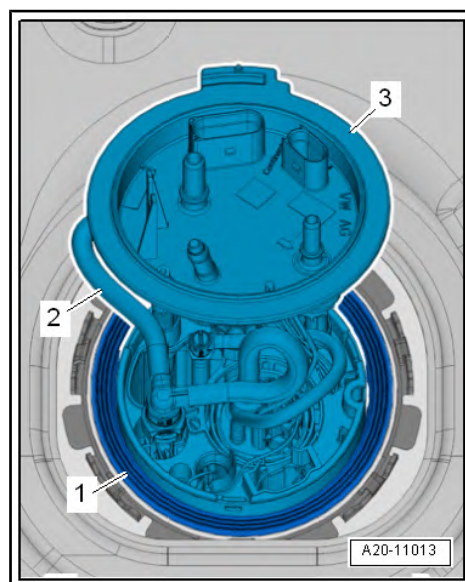
- Carefully lift out fuel delivery unit flange -3-.
- Remove gasket -1- and raise the fuel delivery unit flange slightly higher.



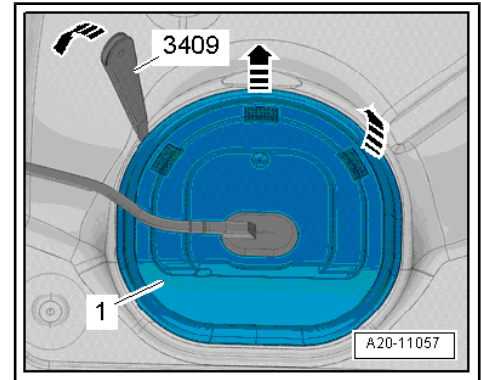
Caution

Secure the earth cable of the fuel extraction device to a bare metal part of the body.

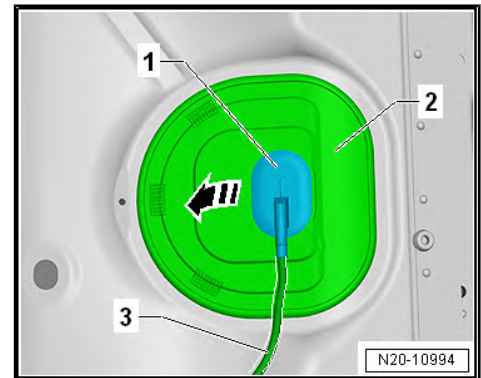
- Insert suction hose of fuel extractor - VAS 5190- as far as possible into fuel tank.
- Extract fuel using the fuel extraction device - VAS 5190- .



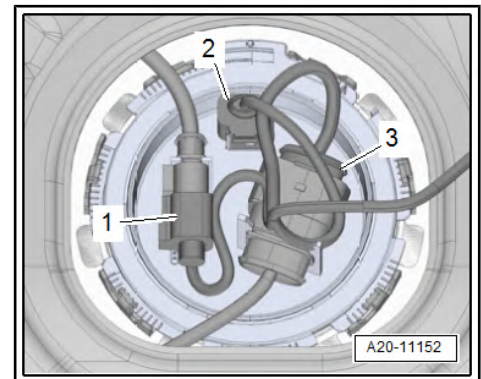
- Unclip cover -1- at retaining tabs -arrows-, using removal wedge - 3409- .



- Unclip sealing grommet -1- downwards from the cover -2-.
- Guide the cover -2- backward at the electric wiring loom -3-.



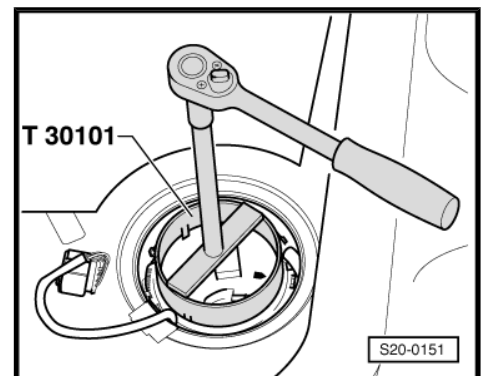
- Unlock electrical plug connections -2- from left closing flange, and remove.
- Unlock electrical plug connections -1- and -3- from closing flange, and disconnect.
- Unclip electrical plug connections -1- and -3- from the uptakes on the closing flange.



i Note

Ensure that the fuel delivery unit is not damaged when loosening and tightening the lock ring of the holder on the flange.

- Open lock ring with the wrench - T30101 (3087)- .





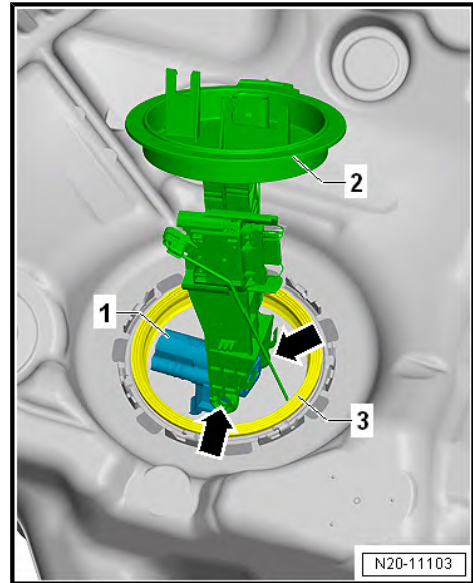
- Carefully remove the closing flange -2- on the left together with the suction jet pump -1- from the fuel tank opening a little.
- Insert suction hose of fuel extractor - VAS 5190- as far as possible into fuel tank.
- Extract fuel using the fuel extraction device - VAS 5190- .

When only emptying the fuel tank:

- Reinstall the fuel delivery unit
⇒ [“2.8 Removing and installing fuel delivery unit”, page 232](#) .
- Install the fuel gauge sender 2 - G169- again
⇒ [“2.11 Removing and installing the sender for fuel gauge display”, page 245](#) .

Tightening torques

- ◆ ⇒ [“2.2 Fuel delivery unit - Summary of components”, page 212](#)
- ◆ ⇒ Heating, Air conditioning; Rep. gr. 82



2.8 Removing and installing fuel delivery unit

⇒ [“2.8.1 Removing and installing the fuel delivery unit, vehicles with front-wheel drive”, page 232](#)

⇒ [“2.8.2 Removing and installing the fuel delivery unit, vehicles with four-wheel drive”, page 236](#)

2.8.1 Removing and installing the fuel delivery unit, vehicles with front-wheel drive

Special tools and workshop equipment required

- ◆ Disassembly wedge - 3409-
- ◆ Key - T30101 (3087)-

Precondition

- The fuel tank must not be more than $\frac{1}{3}$ full.

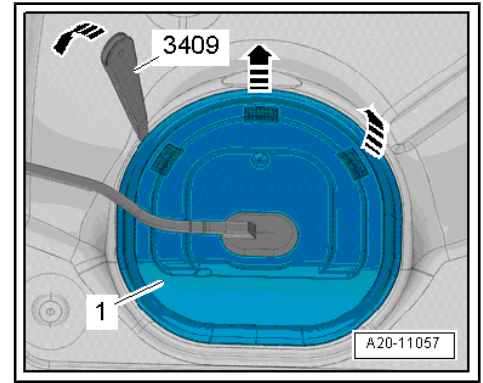
Removing



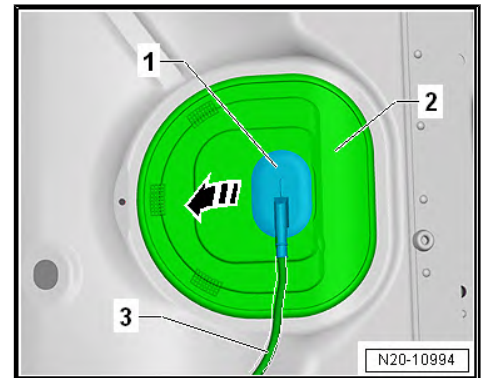
Note

- ◆ *If necessary drain the fuel tank*
⇒ [“2.7 Extract fuel from the fuel tank”, page 223](#) .
- ◆ *Safety precautions when working on the fuel supply system*
⇒ [“2 Safety instructions”, page 3](#) .
- ◆ *Observe rules for cleanliness*
⇒ [“3.1 Rules of cleanliness”, page 6](#) .
- Move front seats all the way forward.
- Switch off ignition.
- Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

- Unclip cover -1- for the right closing flange with the disassembly wedge - 3409- on the retaining tabs -arrows-.



- Unclip sealing grommet -1- downwards from the cover -2-.
- Guide the cover -2- backward at the electric wiring loom -3-.

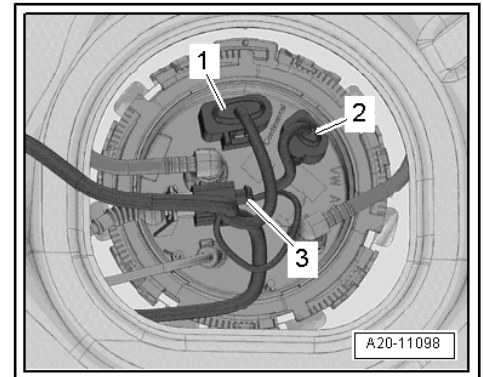


- Unlock electrical plug connections -1-, -2- on closing flange to unlock the connector lock.

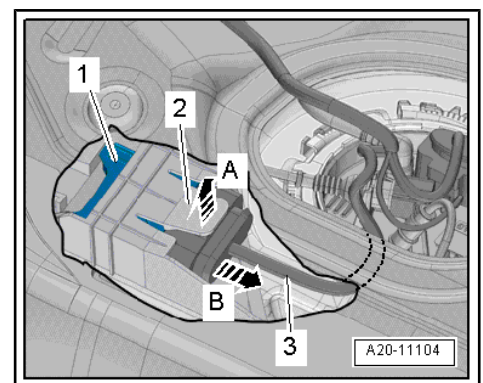
Vehicles fitted with auxiliary heating

- Unhook the electrical plug connection -3- for dosing pump of the auxiliary heating - V54- on the closing flange.
- Unlock the connector -3- for dosing pump of the auxiliary heating - V54- and remove.

Continued for all vehicles



- Push up fixing catch -2- with a finger between the bottom plate and the fuel tank arrow -A-.
- Simultaneously pull the fuel pump control unit - J538- -1- at the electric wiring loom -3- carefully out of the uptake -arrow B-.
- Take out fuel pump control unit - J538- inwards between fuel tank and bottom plate.
- Expose the fuel pump control unit - J538- together with the electrical wiring harness.





- Remove fuel return line -1-, -2- from the closing flange
⇒ [“2.12 Separating push-on couplings”, page 249](#) .

Vehicles fitted with auxiliary heating

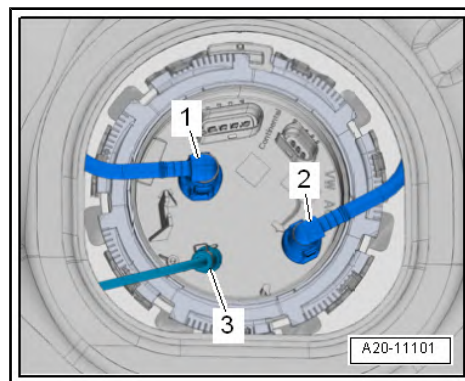
- Loosen hose clamp, fuel line -3- to the dosing pump for the auxiliary heating from the closing flange.

Continued for all vehicles

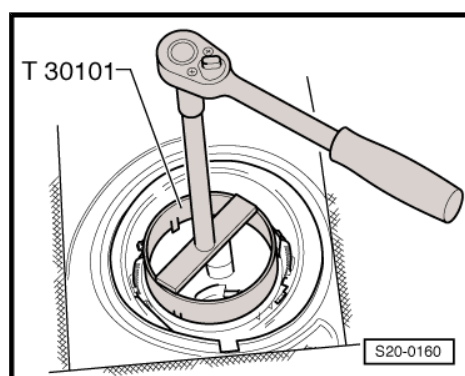


Note

Ensure that the fuel delivery unit is not damaged when loosening the lock ring of the holder on the flange.



- Open lock ring with the wrench - T30101 (3087)- .



- Pull sealing flange -3- slightly out of the fuel tank opening.
- Remove gasket ring -1- from fuel tank opening.
- Pull sealing flange -2- carefully out of the fuel tank opening.



Caution

There is a risk of fuel flowing out of the fuel delivery unit which is still full.

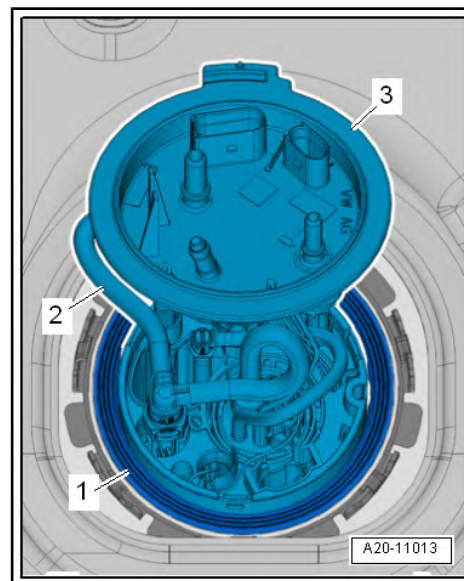
- ◆ ***Put cleaning cloth underneath to collect fuel.***

- Pull fuel delivery unit with sender for fuel gauge display - G- carefully out of the fuel tank opening, turning and tilting as appropriate.



Note

When removing the fuel delivery unit, ensure that the float arm of the fuel gauge sender - G- is not bent.



Note

- ◆ ***The old delivery unit must be emptied before disposing of it if it should be replaced.***
- ◆ ***You must be compliance with the environmental regulations when disposing of it.***
- ◆ ***Check fuel tank for contaminations.***

Install

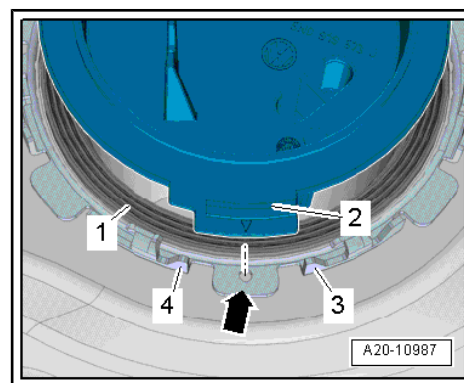
Installation is carried out in the reverse order. Pay attention to the following:



Note

- ◆ ***Note the fitting position of all parts.***
- ◆ ***Replace damaged gasket ring.***
- ◆ ***When inserting the fuel delivery unit, ensure that the float arm of the fuel gauge sender - G- is not bent.***

- Install new seal -1- for closing flange while dry.
- Coat inner side of gasket ring -1- with fuel.
- Insert fuel delivery unit with sender for fuel gauge display - G- carefully through the fuel tank opening.
- Press down the closing flange against the spring force and bring it into the installation position.





- The peg -2- at the closing flange -1- must be located against arrow -3- at the fuel tank.

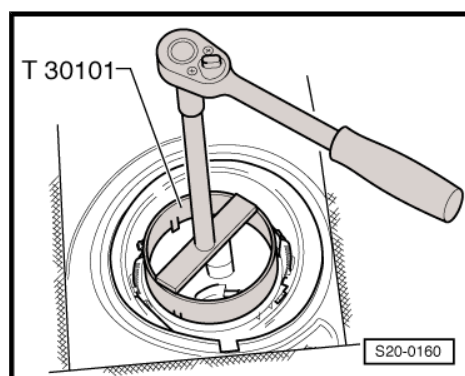
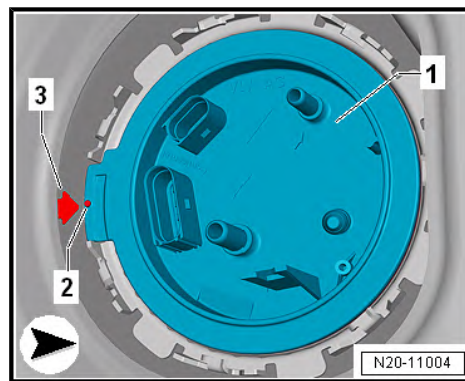
**Caution****Risk of leakage.**

- ♦ **The gasket ring must not get damaged or squashed when inserting the sealing flange.**

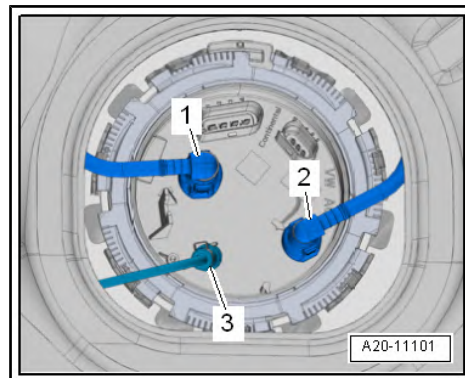
**Note**

Ensure that the fuel delivery unit is not damaged when tightening the lock ring of the holder on the flange.

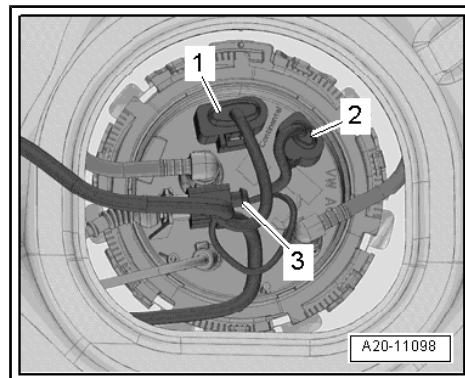
- Insert lock ring and tighten using the wrench - T30101 (3087)- .



- Fit fuel lines -1- and -2- so that they can be heard clicking into place.
- If present, install the fuel line -3- for the dosing pump of the auxiliary heating - V54- at the closing flange ⇒ Heating, Air Conditioning; Rep. gr. 82 .
- Press fuel lines down again and check by pulling that the plug-in connector is fully engaged.



- Connect connectors -1- and -2-.
- If present, unhook the electrical plug connection -3- for dosing pump of the auxiliary heating - V54- on the closing flange.
- Check the connector for firm seating by pulling in the opposite direction!
- After installing the fuel delivery unit, refuel the vehicle with at least 5 litres of fuel.

**Tightening torques**

- ♦ ⇒ [“2.2 Fuel delivery unit - Summary of components”, page 212](#) .

2.8.2 Removing and installing the fuel delivery unit, vehicles with four-wheel drive

Special tools and workshop equipment required

- ◆ Disassembly wedge - 3409-
- ◆ Key - T30101 (3087)-

Precondition

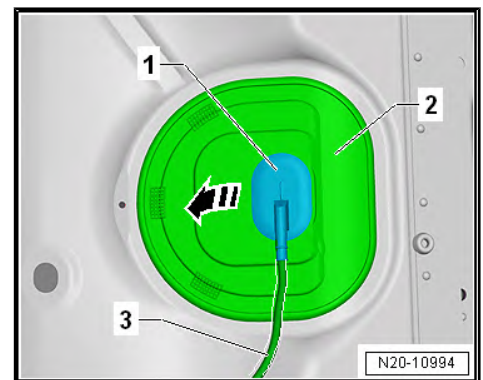
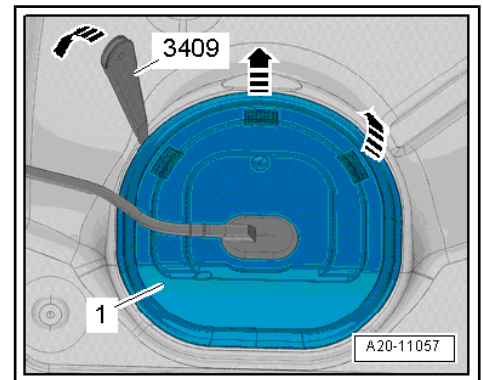
- The fuel tank must not be more than $\frac{1}{3}$ full.

Removing



Note

- ◆ *If necessary drain the fuel tank*
⇒ *"2.7 Extract fuel from the fuel tank", page 223 .*
- ◆ *Safety precautions when working on the fuel supply system*
⇒ *"2 Safety instructions", page 3 .*
- ◆ *Observe rules for cleanliness*
⇒ *"3.1 Rules of cleanliness", page 6 .*
- Move front seats all the way forward.
- Switch off ignition.
- Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .
- Unclip cover -1- for the right closing flange with the disassembly wedge - 3409- on the retaining tabs -arrows-.
- Unclip sealing grommet -1- downwards from the cover -2-.
- Guide the cover -2- backward at the electric wiring loom -3-.



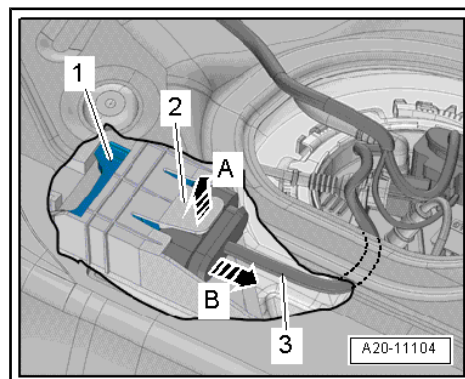
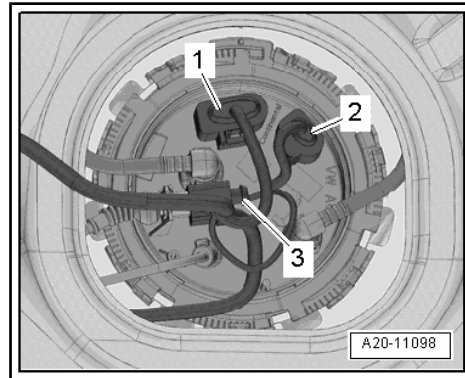
- Unlock electrical plug connections -1-, -2- on closing flange to unlock the connector lock.

Vehicles fitted with auxiliary heating

- Unhook the electrical plug connection -3- for dosing pump of the auxiliary heating - V54- on the closing flange.
- Unlock the connector -3- for dosing pump of the auxiliary heating - V54- and remove.

Continued for all vehicles

- Push up fixing catch -2- with a finger between the bottom plate and the fuel tank arrow -A-.
- Simultaneously pull the fuel pump control unit - J538- -1- at the electric wiring loom -3- carefully out of the uptake -arrow B-.
- Take out fuel pump control unit - J538- inwards between fuel tank and bottom plate.
- Expose the fuel pump control unit - J538- together with the electrical wiring harness.



- Remove fuel return line -1-, -2- from the closing flange
⇒ ["2.12 Separating push-on couplings", page 249](#) .

Vehicles fitted with auxiliary heating

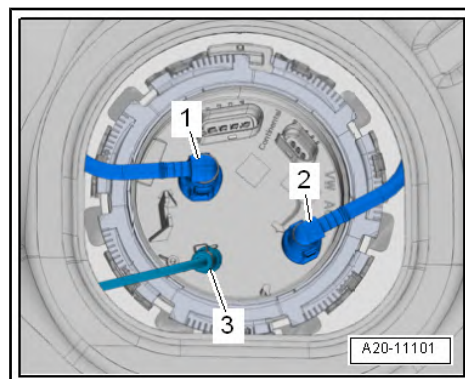
- Loosen hose clamp, remove fuel line -3- to the dosing pump for the auxiliary heating - V54- from the closing flange.

Continued for all vehicles



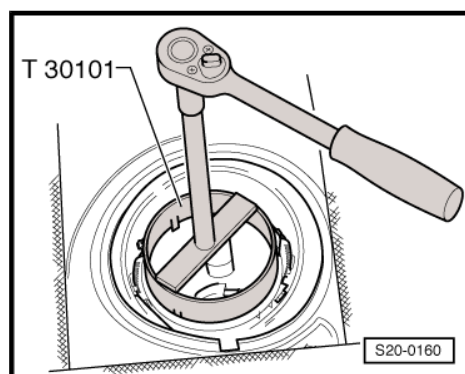
Note

Ensure that the fuel delivery unit is not damaged when loosening the lock ring of the holder on the flange.

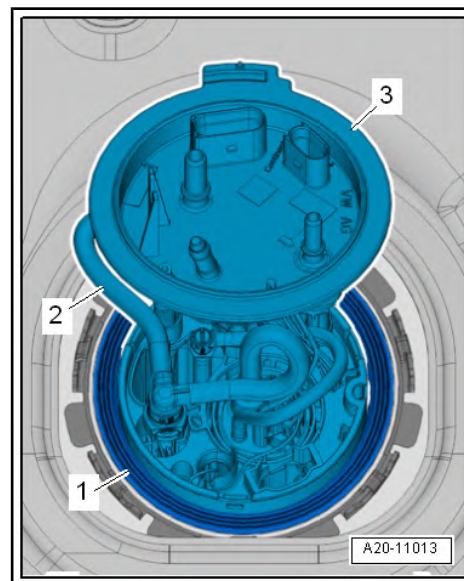


- Open lock ring with the wrench - T30101 (3087)- .

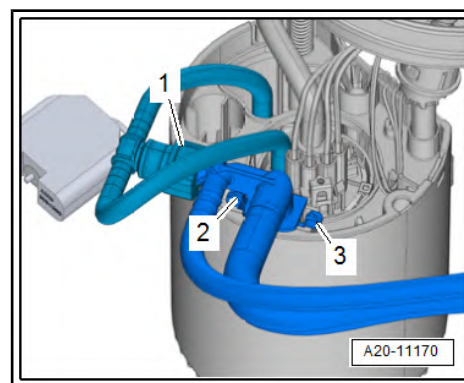
Vehicles without auxiliary heating system



- Pull sealing flange -3- slightly out of the fuel tank opening.
- Remove gasket ring -1- from fuel tank opening.
- Pull closing flange with fuel line -2- carefully out of the fuel tank opening.



- Reach into the fuel tank through the opening, remove the drive jet line -1-, while doing so, press the release at the connection ⇒ [“2.12 Separating push-on couplings”, page 249](#) .
- Remove the pressure line for suction jet pump from the fuel delivery unit.
- Press the catches -2- and -3- and remove the line.



Caution

There is a risk of fuel flowing out of the fuel delivery unit which is still full.

◆ *Put cleaning cloth underneath to collect fuel.*

- Pull fuel delivery unit with sender for fuel gauge display - G- carefully out of the fuel tank opening, turning and tilting as appropriate.



Note

When removing the fuel delivery unit, ensure that the float arm of the fuel gauge sender - G- is not bent.

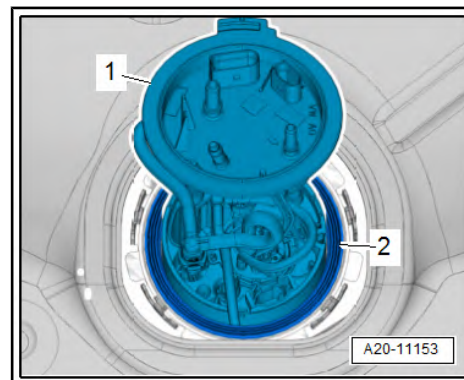
Vehicles fitted with auxiliary heating

- Pull sealing flange -1- slightly out of the fuel tank opening.
- Remove gasket ring -2- from fuel tank opening.
- Pull closing flange with fuel line and electrical lines carefully out of the fuel tank opening as far as possible.



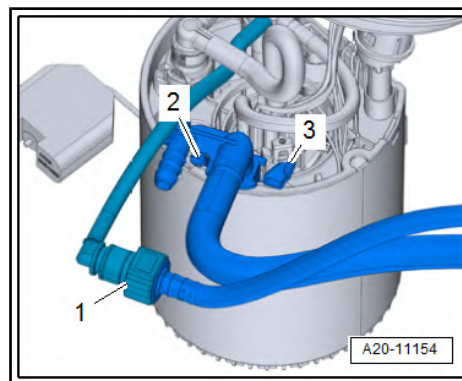
Note

When removing the fuel delivery unit, ensure that you do not bend the float arm of the sender for the fuel gauge display.





- Reach into the fuel tank through the opening, unlock the delivery unit from the locking mechanisms -2- and -3- and remove from the fuel delivery unit.



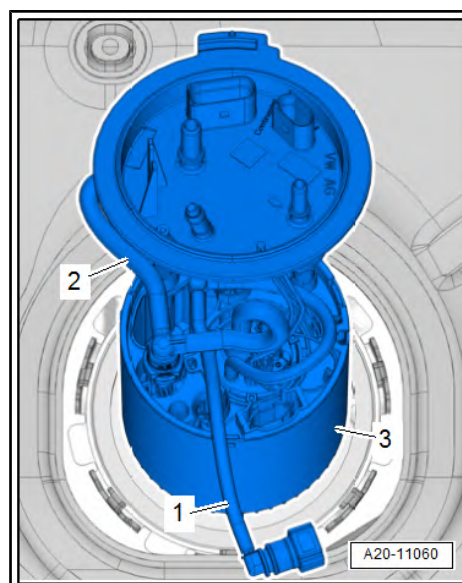
- Remove and disconnect the drive jet line -1-; to do so, press the release at the connection
⇒ [“2.12 Separating push-on couplings”, page 249](#) .
- Carefully remove the fuel lines -1- and -2- from the fuel tank opening.

**Caution**

There is a risk of fuel flowing out of the fuel delivery unit which is still full.

- ◆ *Put cleaning cloth underneath to collect fuel.*

- Pull fuel delivery unit -3- with the fuel gauge sender - G- carefully out of the fuel tank opening by turning and tilting as appropriate.



Continued for all vehicles

**Note**

- ◆ *The old delivery unit must be emptied before disposing of it if it should be replaced.*
- ◆ *You must be compliance with the environmental regulations when disposing of it.*
- ◆ *Check fuel tank for contaminations.*

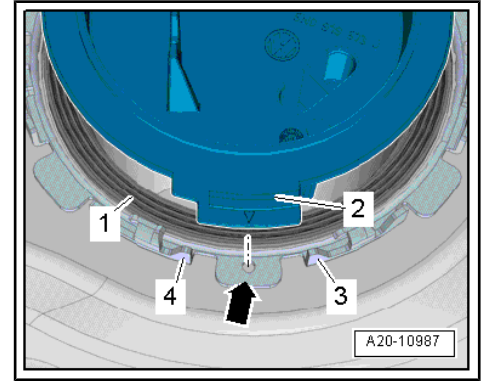
Install

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

**Note**

- ◆ *Note the fitting position of all parts.*
- ◆ *Replace damaged gasket ring.*
- ◆ *When inserting the fuel delivery unit, ensure that the float arm of the fuel gauge sender - G- is not bent.*

- Install new gasket ring -1- for closing flange while dry.
- Coat inner side of gasket ring -1- with fuel.
- Insert fuel delivery unit with sender for fuel gauge display - G- carefully through the fuel tank opening.
- Press down the closing flange against the spring force and bring it into the installation position.



- The peg -2- at the closing flange -1- must be located against arrow -3- at the fuel tank.



Caution

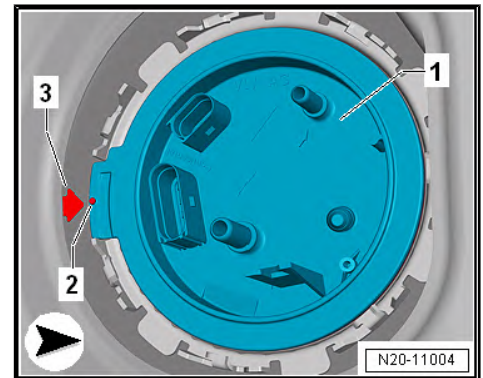
Risk of leakage.

- ♦ *The gasket ring must not get damaged or squashed when inserting the sealing flange.*

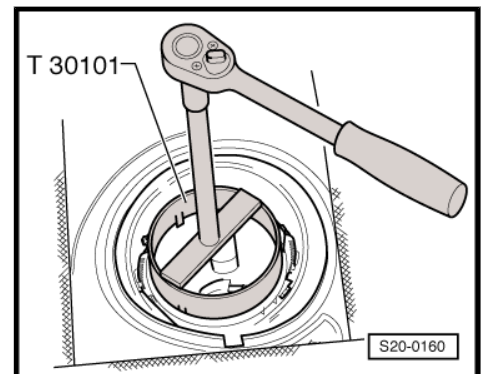


Note

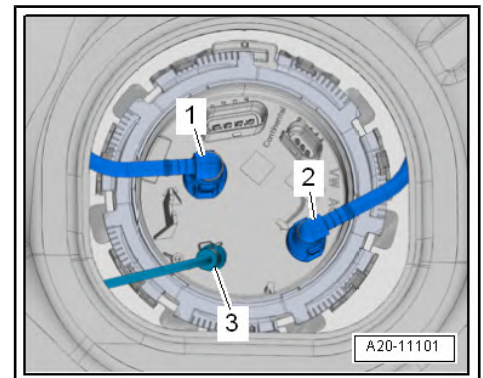
Ensure that the fuel delivery unit is not damaged when tightening the lock ring of the holder on the flange.



- Insert lock ring and tighten using the wrench - T30101 (3087)- .



- Fit fuel lines -1- and -2- so that they can be heard clicking into place.
- If present, install the fuel line -3- for the dosing pump of the auxiliary heating - V54- at the closing flange ⇒ Heating, Air Conditioning; Rep. gr. 82 .
- Press fuel lines down again and check by pulling that the plug-in connector is fully engaged.

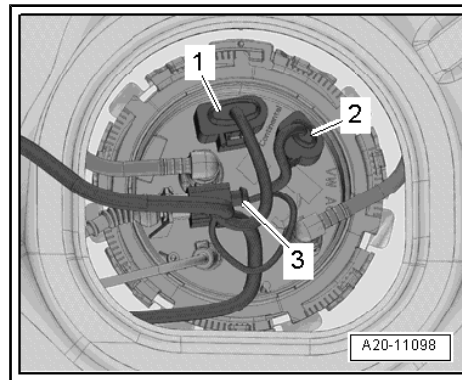




- Connect connectors -1- and -2-.
- If present, unhook the electrical plug connection -3- for dosing pump of the auxiliary heating - V54- on the closing flange.
- Check the connector for firm seating by pulling in the opposite direction!
- After installing the fuel delivery unit, refuel the vehicle with at least 5 litres of fuel.

Tightening torques

- ♦ ⇒ [“2.2 Fuel delivery unit - Summary of components”, page 212](#)



2.9 Removing and installing misfuelling protection

Special tools and workshop equipment required

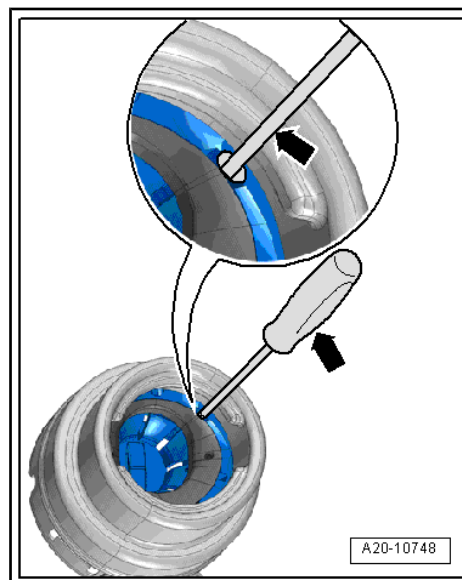
- ♦ Circlip pliers

Removing

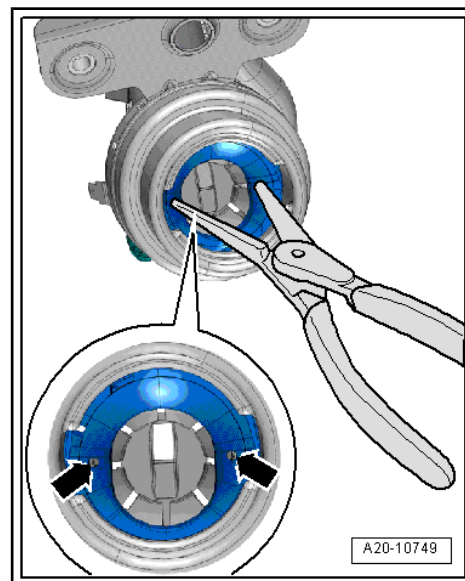


Note

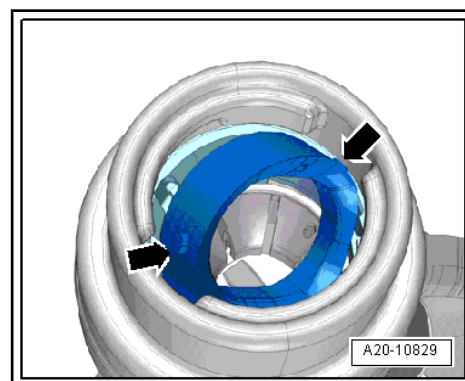
- ♦ *Safety precautions when working on the fuel supply system*
⇒ [“2 Safety instructions”, page 3](#).
- ♦ *Observe rules for cleanliness*
⇒ [“3.1 Rules of cleanliness”, page 6](#).
- Clean the area around the fuel filler neck.
- Unscrew the cap from the fuel filler neck.
- Unlock catch for lock ring with Torx screwdriver -arrow-.



- Insert circlip pliers into both lock ring openings -arrow-.
- Turn locking ring anticlockwise by approximately 25°.



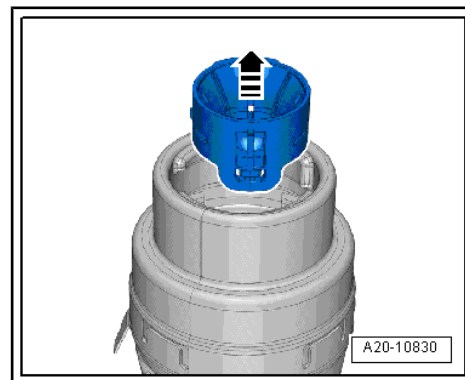
- Tilt lock ring out of the fuel filler neck and remove through the opening -arrows- for the cap.



- Pull misfuelling protection out of the fuel filler neck -arrow-, use circlip pliers if necessary.

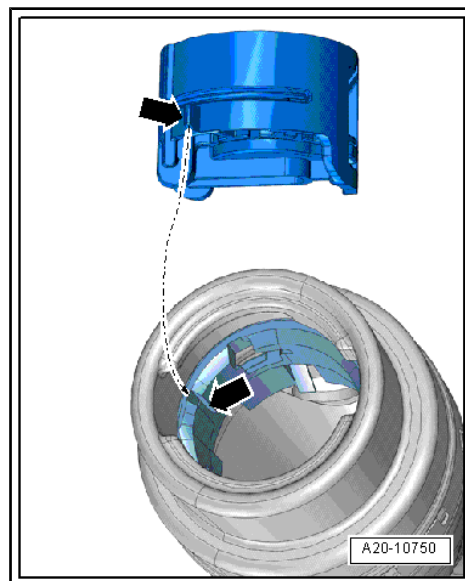
Install

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

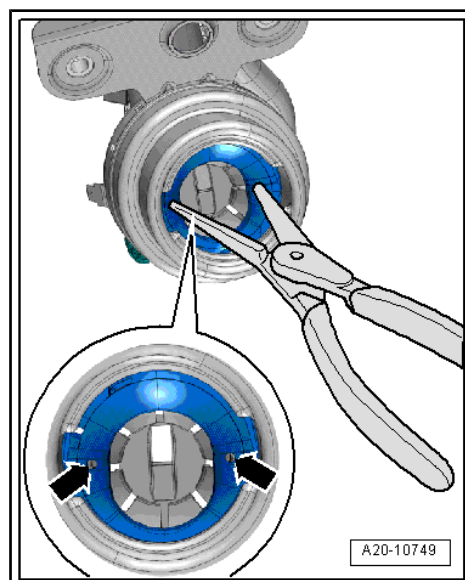




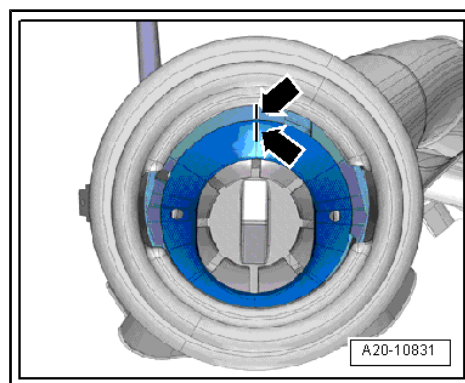
- Place misfuelling protection in the fuel filler neck.
- The peg at the misfuelling protection must reach into the groove on the fuel filler neck -arrows-.



- Install lock ring with circlip pliers - to do so, turn the locking ring clockwise by 25°.



- When installation is correct the markings on the lock ring and fuel filler neck must be opposite to each other -arrows-.



2.10 Deactivate misfuelling protection

Work procedure

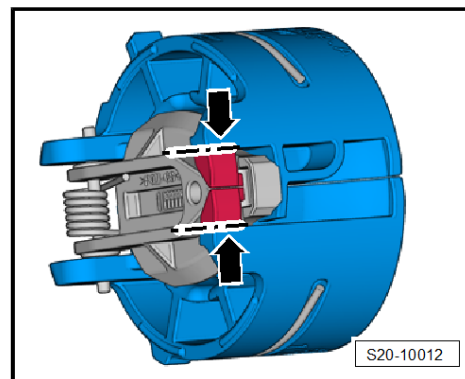
- Remove misfuelling protection
 ⇒ [“2.9 Removing and installing misfuelling protection”, page 242](#) .

- Remove the catches marked in red at the marked positions -arrows-.

i Note

It must be possible to open misfuelling protection closing flap of misfuelling without it becoming hooked.

- Install misfuelling protection
⇒ [“2.9 Removing and installing misfuelling protection”, page 242](#) .



2.11 Removing and installing the sender for fuel gauge display

⇒ [“2.11.1 Removing and installing the sender for fuel gauge display G”, page 245](#)

⇒ [“2.11.2 Removing and installing fuel gauge sender 2 G169”, page 246](#)

2.11.1 Removing and installing the sender for fuel gauge display - G-

Removing

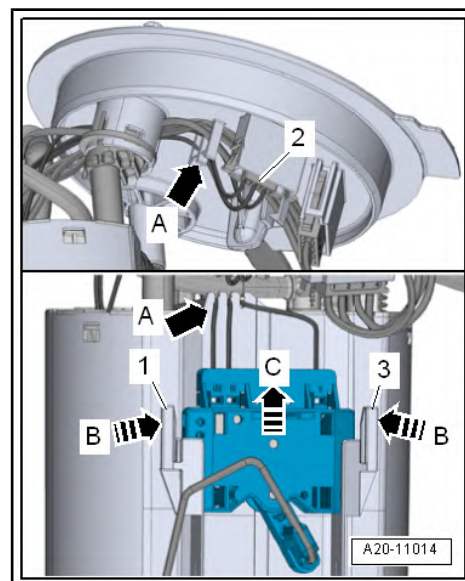
i Note

- ♦ *Safety precautions when working on the fuel supply system*
⇒ [“2 Safety instructions”, page 3](#) .
- ♦ *Observe rules for cleanliness*
⇒ [“3.1 Rules of cleanliness”, page 6](#) .
- Remove fuel delivery unit
⇒ [“2.8 Removing and installing fuel delivery unit”, page 232](#) .
- Disconnect electrical plug connections -2- on the closing flange, thereby unlocking the plug lock.
- Unhook the electric cable from the holder arrows -A- and expose it.
- Unlock catches -1-, -3- arrows -B- and push out the sender for fuel gauge display - G- upwards arrow -C-.

Install

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

- Installation instructions
⇒ [“2.2 Fuel delivery unit - Summary of components”, page 212](#)
- Insert the sender for fuel gauge display - G- in the guides at the fuel delivery unit and press downwards until it latches into position.
- Check the connector for firm seating by pulling in the opposite direction!
- Connect electric cables to fuel delivery unit and fit.
- Install fuel delivery unit
⇒ [“2.8 Removing and installing fuel delivery unit”, page 232](#) .



2.11.2 Removing and installing fuel gauge sender 2 - G169-

Special tools and workshop equipment required

- ◆ Disassembly wedge - 3409-
- ◆ Wrench for union nut - T30101 (3087)-
- The fuel tank must not be more than $\frac{1}{3}$ full.

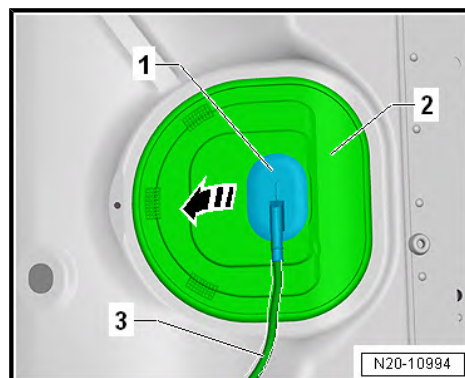
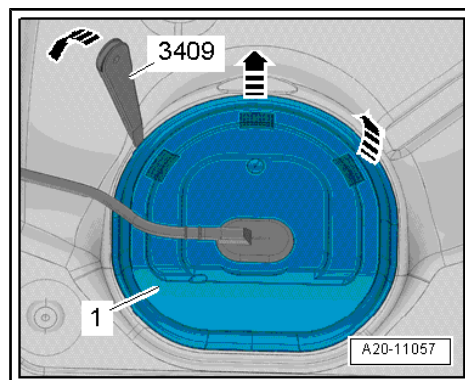


Note

- ◆ *If necessary drain the fuel tank*
⇒ *"2.7 Extract fuel from the fuel tank", page 223* .
- ◆ *Safety precautions when working on the fuel supply system*
⇒ *"2 Safety instructions", page 3* .
- ◆ *Observe the regulations concerning cleanliness when working on the fuel supply/injection system*
⇒ *"3.1 Rules of cleanliness", page 6* .
- ◆ *Make sure that the sender for fuel gauge display is not bent.*

Removing

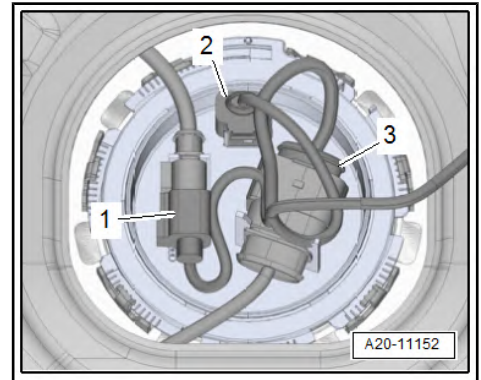
- Move front seats all the way forward.
- Switch off ignition.
- Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .
- Unclip cover -1- at retaining tabs -arrows-, using removal wedge - 3409- .
- Unclip sealing grommet -1- downwards from the cover -2-.
- Guide the cover -2- backward at the electric wiring loom -3-.



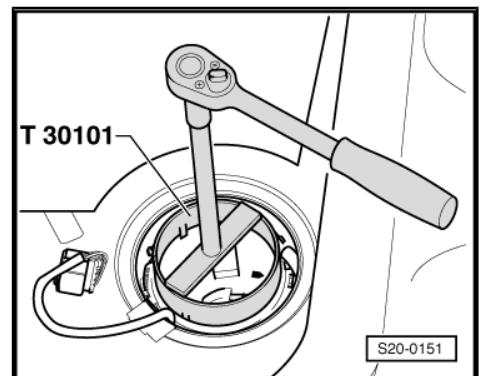
- Unlock electrical plug connections -2- from left closing flange, and remove.
- Unlock electrical plug connections -1- and -3- from closing flange, and disconnect.
- Unclip electrical plug connections -1- and -3- from the uptakes on the closing flange.

i Note

Ensure that the fuel delivery unit is not damaged when loosening and tightening the lock ring of the holder on the flange.



- Open lock ring with the wrench - T30101 (3087)- .



- Carefully raise closing flange -2- and remove it from the fuel tank opening.

i Note

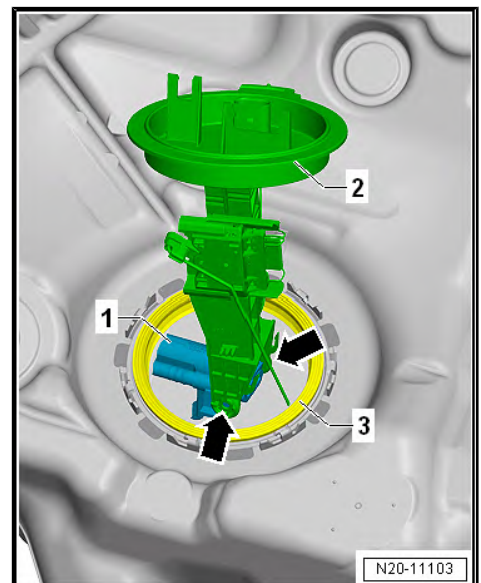
Remove gasket ring -3- from fuel tank opening.

- Remove the suction jet pump -1- from the fuel gauge sender 2 - G169- . To do so, carefully bend the retaining lugs -arrows- outwards.



Caution

Place a cleaning cloth underneath in order to collect the fuel.



- Remove the fuel gauge sender 2 - G169- carefully out of the fuel tank opening. Turn and tilt accordingly to do so.

i Note

Make sure that the float arm of the fuel gauge sender 2 - G169- is not bent.



- Unlock and detach the connector -3- at unit -2-.
- Thread out the electrical cables.
- Unlock the fuel gauge sender 2 - G169- -1- from the unit -2-. To do so, carefully bend the guide lugs -arrows-.
- Detach the fuel gauge sender 2 - G169- in -direction of arrow-.



Note

- ◆ *You must be compliance with the environmental regulations when disposing of it.*
- ◆ *Check fuel tank for contaminations.*

Install

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



Note

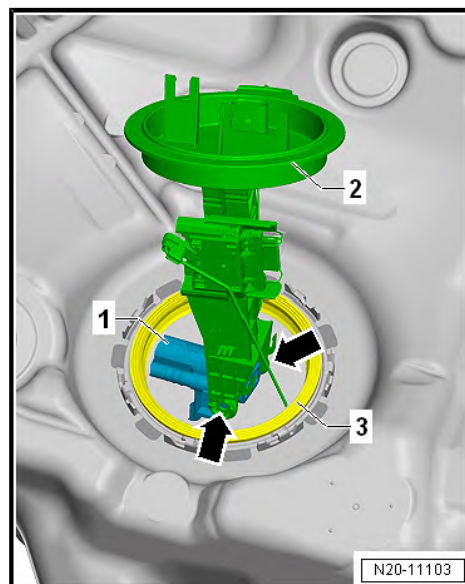
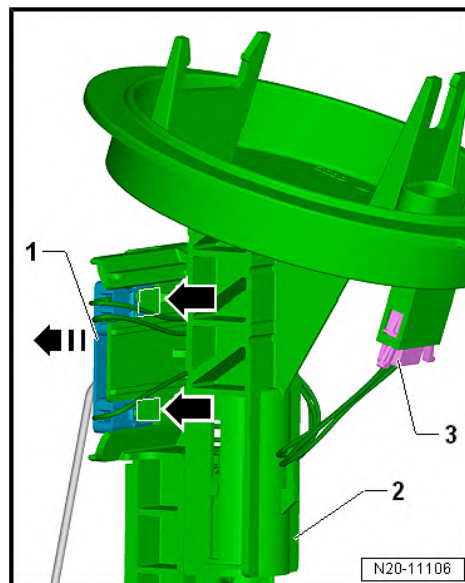
- ◆ *Note the fitting position of all parts.*
- ◆ *Replace damaged gasket ring.*
- ◆ *Correctly place the electrical lines into the uptakes.*
- Check the fuel gauge sender 2 - G169- for firm seating by pulling in the opposite direction.
- Coat inner side of gasket ring -3- with fuel.
- Install the suction jet pump -1-.



Note

When inserting the fuel delivery unit 2 - G169- , ensure that the float arm of the fuel gauge sender is not bent.

- Press the closing flange against the spring force and bring it into the installation position.



- Arrow -3- at the fuel tank must point to marking -2- on the closing flange -1-.



Caution

Risk of leakage.

- ◆ *The gasket ring must not get damaged or squashed when inserting the sealing flange.*



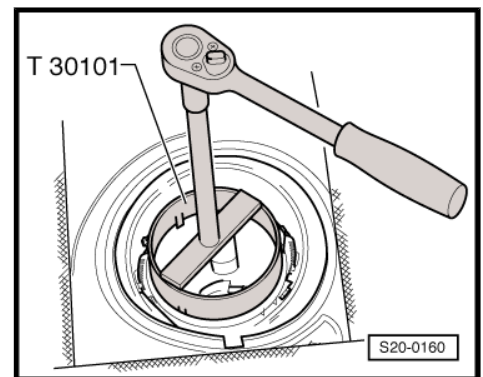
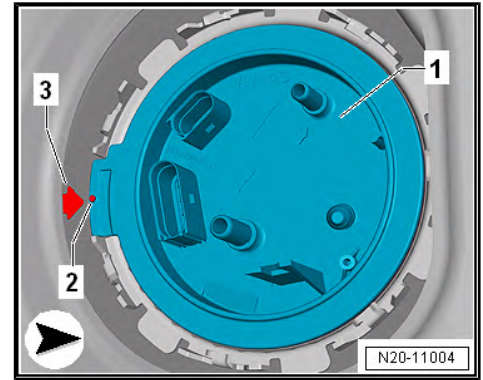
Note

Ensure that the fuel delivery unit is not damaged when tightening the lock ring of the holder on the flange.

- Tighten the lock ring with socket wrench - T30101 (3087)- .
- Check the connector for firm seating by pulling in the opposite direction!

Tightening torques

- ◆ [⇒ "2.2 Fuel delivery unit - Summary of components", page 212](#)



2.12 Separating push-on couplings

Special tools and workshop equipment required

- ◆ Lever - T10468-

Assign quick couplings



Note

- ◆ *Quick couplings of fuel, vacuum and ventilation lines are colour marked. Either the colour point at the quick coupling or the release button has the corresponding colour.*
- ◆ *The push-fit couplings must »audibly« click in place when securing it.*
- ◆ *Check the quick couplings for firm seating by pulling in the opposite direction!*

Push-on coupling	Colour code on connector
Fuel feed line	Black
Fuel return-flow line	Blue
Bleeding	White, beige
Vacuum	Green

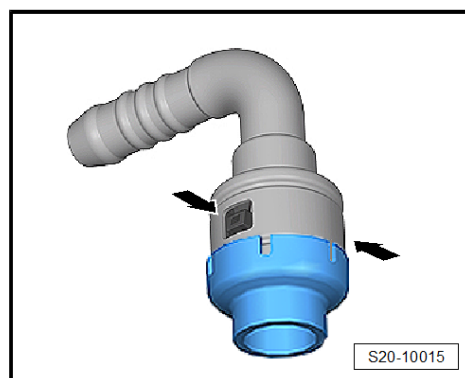
**WARNING**

Fuel supply line is pressurised. Wear safety goggles and safety clothing, in order to avoid injuries and skin contact with fuel. Place cleaning cloths around the connection point before detaching hose connections. Reduce pressure by carefully removing the hose.

Variant 1**Note**

When the push-fit coupling is fitted with a plastic circlip, leave it inserted when removing and installing the quick release.

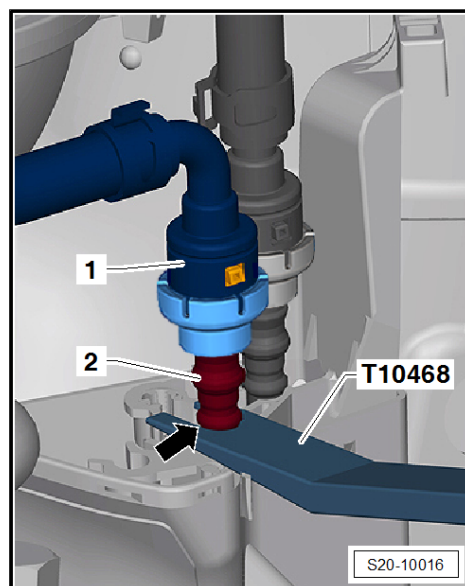
Quick coupling with release buttons -arrows- on right and left.



The separation point -1- in the engine compartment must be held.

- Insert the lever - T10468- between the heat shield and the stop -arrow- of the fuel feed line -2- and hold it.

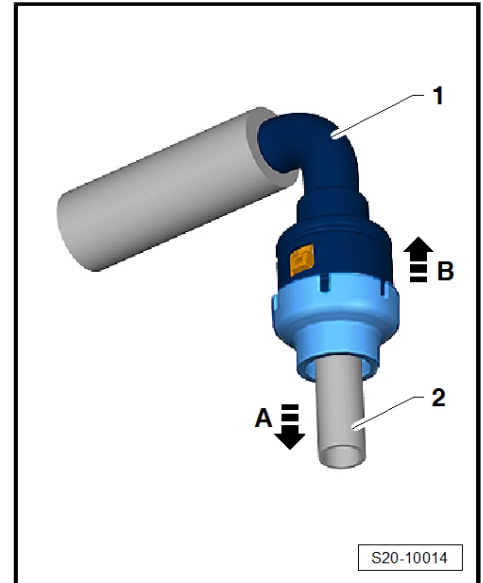
Continued for all separation points



- Press the push-fit coupling -1- in direction of arrow -A-.
- Press the release buttons and remove the push-fit coupling -1- from the fuel line -2- in direction of the arrow -B-.

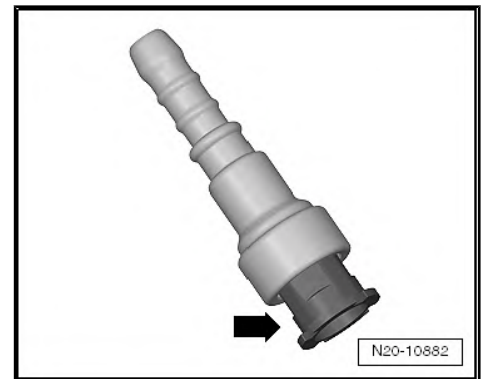
Pay attention to the colour assignment when installing
⇒ [page 249](#) .

- Check the quick couplings for firm seating by pulling in the opposite direction!



Variant 2

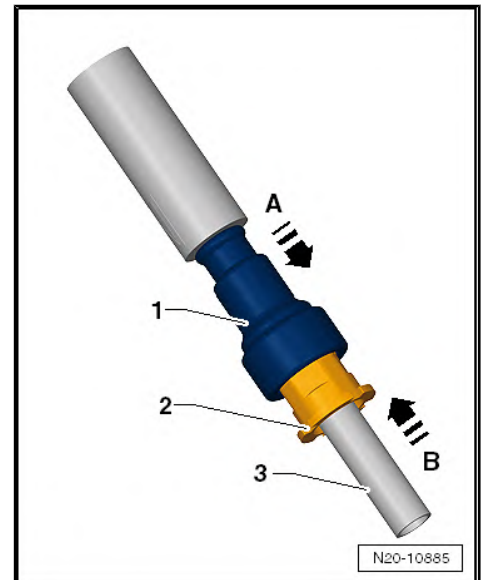
Quick coupling with pull release -arrow-.



- Press the push-fit coupling -1- in direction of arrow -A-.
- Pull pull-release mechanism -2- in direction of arrow -B-.
- Remove the push-fit coupling -1- from the fuel line -3- in direction of the arrow -B-.

Pay attention to the colour assignment when installing
⇒ [page 249](#) .

- Check the quick couplings for firm seating by pulling in the opposite direction!



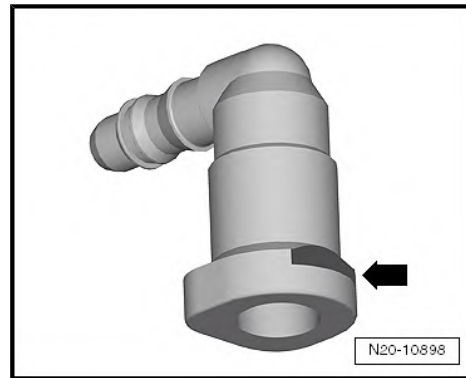
Variant 3

Quick coupling with front release button -arrow-.

- Press release button -arrow- and pull push-on connectors off.

Pay attention to the colour assignment when installing
⇒ [page 249](#) .

- Check the quick couplings for firm seating by pulling in the opposite direction!



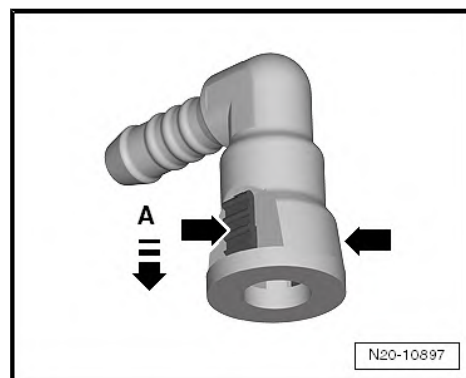
Variant 4

Quick coupling with release buttons -arrows- on right and left.

- Press the push-fit coupling in direction of arrow -A-.
- Press release buttons -arrows- and pull push-on coupling off.

Pay attention to the colour assignment when installing
⇒ [page 249](#) .

- Check the quick couplings for firm seating by pulling in the opposite direction!



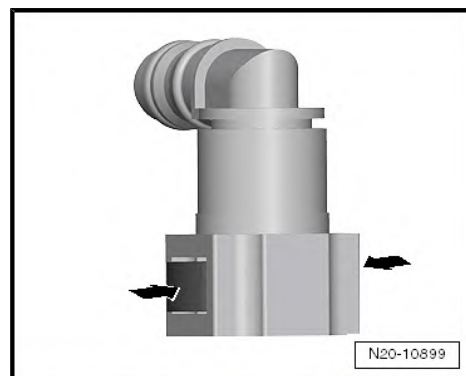
Variant 5

Quick coupling with release buttons -arrows- on right and left.

- Press release buttons -arrows- and pull push-on coupling off.

Pay attention to the colour assignment when installing
⇒ [page 249](#) .

- Check the quick couplings for firm seating by pulling in the opposite direction!



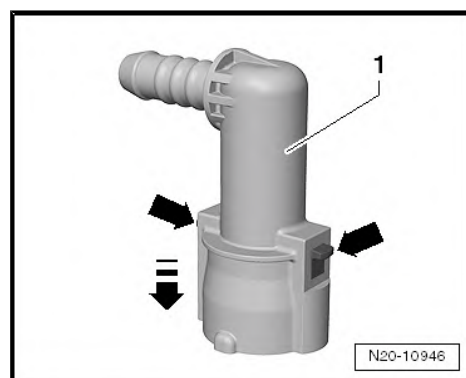
Variant 6

Quick coupling with release buttons -arrows- on right and left.

- Press push-on coupling -1- in -direction of arrow- and hold pressed.
- Press release buttons -arrows- and pull push-on coupling off.

Pay attention to the colour assignment when installing
⇒ [page 249](#) .

- Check the quick couplings for firm seating by pulling in the opposite direction!



Variant 7

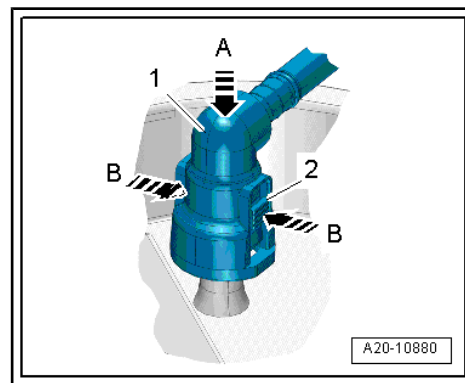
Quick coupling -1- with release buttons -2- right and left.

- Press push-on coupling -1- in direction of arrow -A- and hold pressed.
- Press the release buttons -2- in direction of arrow -B- and remove the push-fit coupling -1-.

Pay attention to the colour assignment when installing
⇒ [page 249](#) .

The quick coupling must be heard to click into place.

- Check the quick couplings for firm seating by pulling in the opposite direction!



2.13 Removing and installing the fuel tank

⇒ [“2.13.1 Removing and installing the fuel delivery unit, vehicles with front-wheel drive”](#), [page 253](#)

⇒ [“2.13.2 Removing and installing the fuel delivery unit, vehicles with four-wheel drive”](#), [page 258](#)

2.13.1 Removing and installing the fuel delivery unit, vehicles with front-wheel drive

Special tools and workshop equipment required

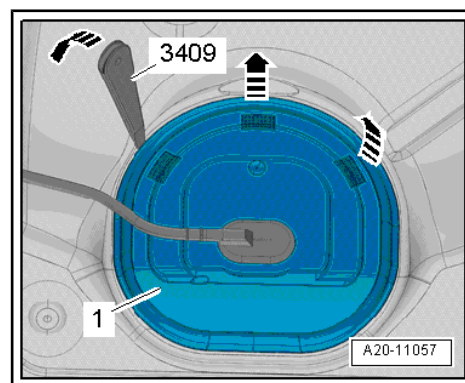
- ◆ Disassembly wedge - 3409-
- ◆ Engine and gearbox jack , e.g. -V.A.G 1383 A-

Removing



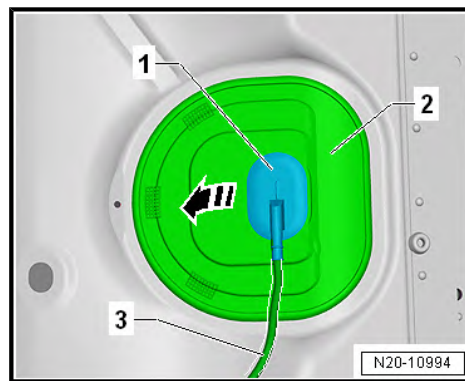
Note

- ◆ *Drain the fuel tank*
⇒ [“2.7 Extract fuel from the fuel tank”](#), [page 223](#) .
- ◆ *Safety precautions when working on the fuel supply system*
⇒ [“2 Safety instructions”](#), [page 3](#) .
- ◆ *Observe rules for cleanliness*
⇒ [“3.1 Rules of cleanliness”](#), [page 6](#) .
- Switch off ignition and pull out ignition key.
- Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .
- Unclip cover -1- at retaining tabs -arrows-, using removal wedge - 3409- .

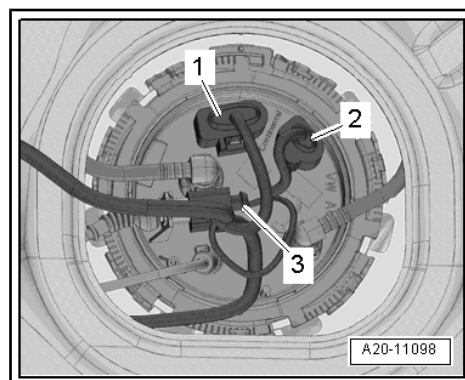




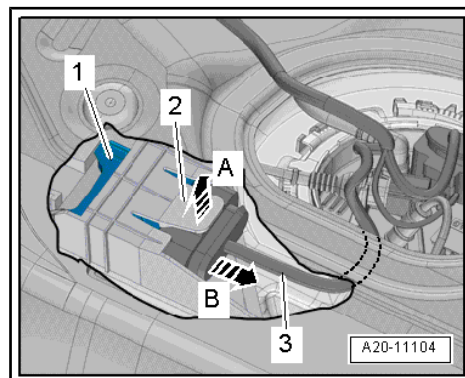
- Unclip sealing grommet -1- downwards from the cover -2-.
- Guide the cover -2- backward at the electric wiring loom -3-.



- Unlock electrical plug connections -1-, -2- on closing flange to unlock the connector lock.
- If present, disconnect electrical plug connection -3- for auxiliary heating dosing pump - V54- , thereby unlocking the connector lock.



- Push up fixing catch -2- with a finger between the bottom plate and the fuel tank arrow -A-.
- Simultaneously pull the fuel pump control unit - J538- Pos. -1- at the electric wiring loom -3- carefully out of the uptake arrow -B-.
- Take out fuel pump control unit - J538- inwards between fuel tank and bottom plate.
- Clean the area around the fuel filler neck.
- Unscrew the cap from the fuel filler neck.

**Note**

Close the opening of the fuel filler neck with a clean cloth so that no dirt can penetrate.

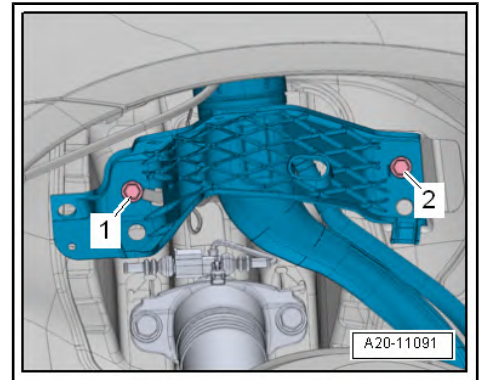
- Remove tank flap unit ⇒ Body Work; Rep. gr. 55 .
- Unscrew right rear wheel ⇒ Chassis; Rep. gr. 44 .
- Remove the rear right wheelhouse liner ⇒ Body Work; Rep. gr. 66 .

Vehicles with torsion beam axle

- Remove the rear wheel brake calliper and store to on side ⇒ Suspension; Rep. gr. 46 .
- Disconnect the plug connection from the ABS speed sensor, right rear wheel, and undo the line from the mounting brackets at the rear axle ⇒ Suspension; Rep. gr. 45 .

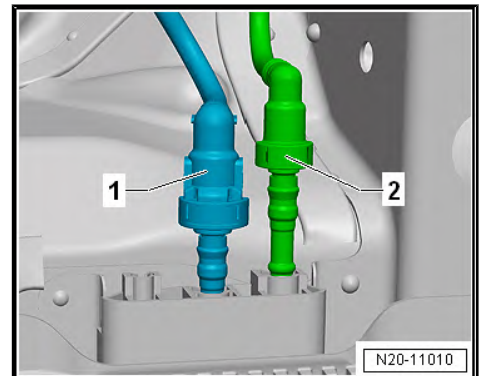
Continued for all vehicles

- Unscrew screws -1-, -2- for fuel filler neck.
- Remove the rear silencer
⇒ [“1.4 Removing and installing rear silencer”, page 381](#) .



- Detach the fuel feed line -1- and the fuel return-flow line -2-
⇒ [“2.12 Separating push-on couplings”, page 249](#) .

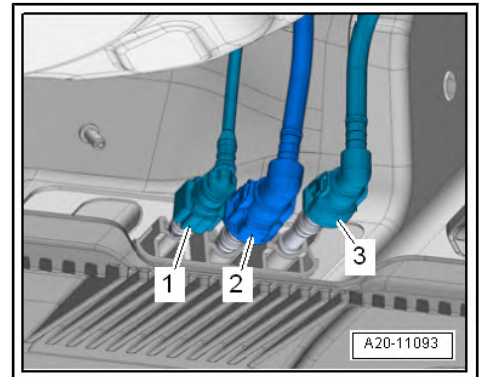
Vehicles fitted with auxiliary heating



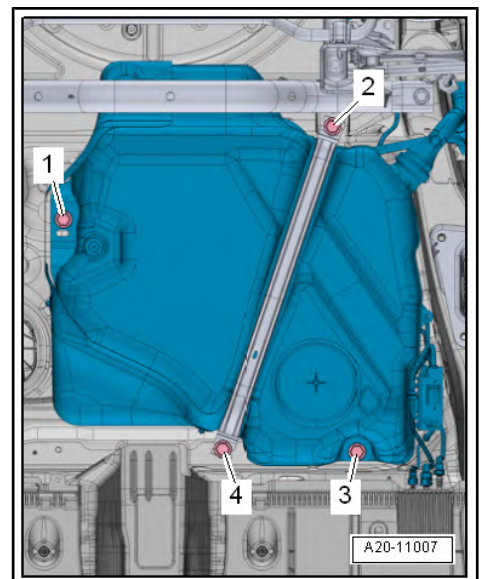
- Remove auxiliary heating fuel line -1-
⇒ [“2.12 Separating push-on couplings”, page 249](#) .

Vehicles with multi-link suspension

- Mark movement direction on the tensioning strap.

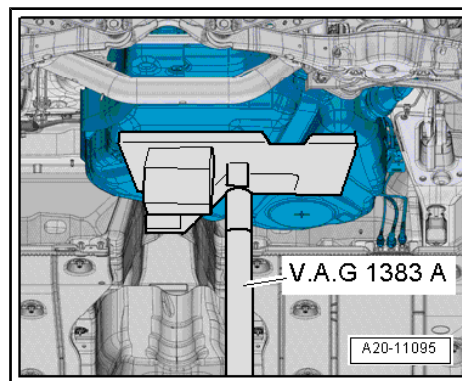


- Release screw -4-.
- Remove suspension/exhaust system.
- Unscrew screw -2- and remove tensioning strap.





- As shown in the illustration, place the engine and gearbox jack - V.A.G 1383 A- under the vehicle for support purposes and support the fuel tank.



- Unscrew screws -1- and -3-.

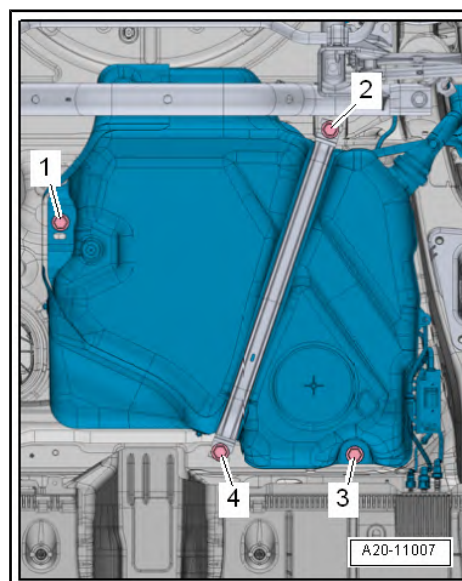


Note

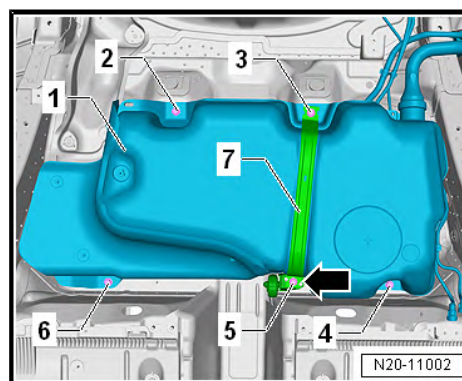
- ♦ *To provide a clearer illustration, the fuel tank is shown without the engine and gearbox jack - V.A.G 1383 A- .*
- ♦ *The aid of a 2nd mechanic is required to remove the fuel tank.*
- Lower fuel tank with engine and gearbox jack - V.A.G 1383 A- .
- Lower fuel tank by pivoting it in the side downwards.
- Pull the filler tube through between the rear axle and body-shell.

Vehicles with torsion beam axle

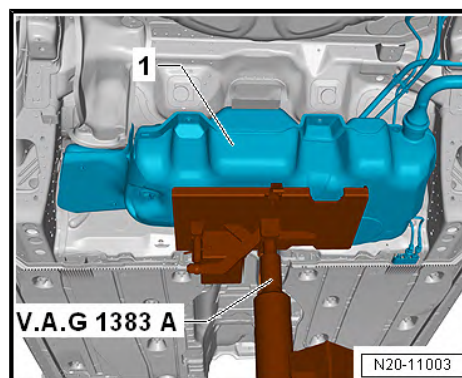
- Mark movement direction on the tensioning strap.



- Release screw -5-.
- Remove suspension/exhaust system -arrow-.
- Unscrew screws -3- and remove tensioning strap -7-.



- As shown in the illustration, place the engine and gearbox jack - V.A.G 1383 A- under the vehicle for support purposes and support the fuel tank -1-.

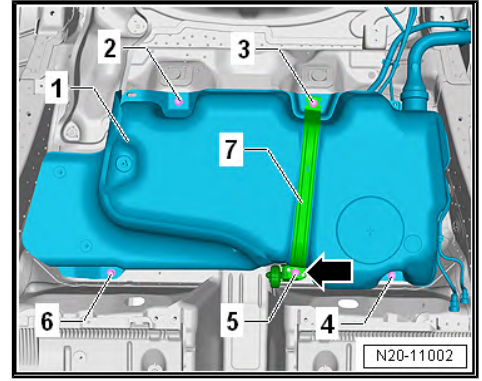


- Unscrew screws -2-, -4- and -6-.



Note

- ◆ *To provide a clearer illustration, the fuel tank is shown without the engine and gearbox jack - V.A.G 1383 A- .*
- ◆ *The aid of a 2nd mechanic is required to remove the fuel tank.*
- Lower fuel tank with engine and gearbox jack - V.A.G 1383 A- .
- Lower fuel tank by pivoting it in the side downwards.
- Pull the filler tube through between the rear axle and body-shell.



Install

- ◆ Tightening torques, assembly instructions
⇒ [“2.1 Fuel tank with component parts - Summary of components”, page 204](#) .



Note

- ◆ *Replace gasket rings.*
- ◆ *Ensure that catches are secure when connecting the electrical plug connections.*
- Check installation position of the vent end piece
⇒ [“2.1 Fuel tank with component parts - Summary of components”, page 204](#) .
- Check the earth strap for corrosion, remove any corrosion.

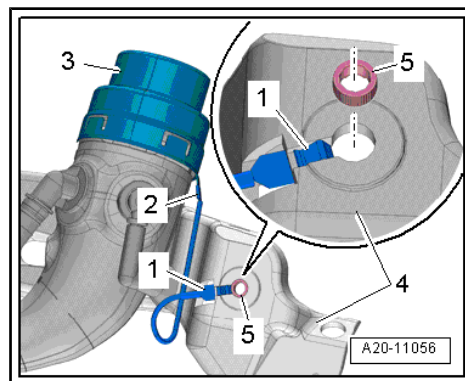


- Ensure the plug connection fits tightly:
- The plug -2- on the metal plate ring -3- must be pushed on firmly.
- The contact peg -1- must be hung on the fuel tank -4- and secured with the spacer bush -5-.

**WARNING**

Risk from electrostatic charge.

- ◆ **After installing, use an ohmmeter to test the electrical connection of the threaded ring on the fuel filler neck at a bare point on the body.**
- **Specified value approximately 0 Ω.**



- Check that the fuel lines are clipped to the fuel tank.
- Position fuel tank with tensioning straps with the engine and gearbox jack - V.A.G 1383 A- at the vehicle underside.
- When positioning the fuel tank, ensure that the fuel filler neck is inserted correctly into the opening on the body.

**Note**

New screws for tensioning strap are longer than series screws, note the part number⇒ ETKA - Electronic Catalogue of Original Parts

Further installation occurs in reverse order.

2.13.2 Removing and installing the fuel delivery unit, vehicles with four-wheel drive

Special tools and workshop equipment required

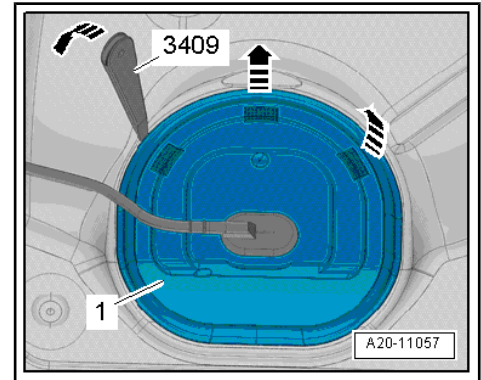
- ◆ Disassembly wedge - 3409-
- ◆ Engine and gearbox jack , e.g. -V.A.G 1383 A-

Removing

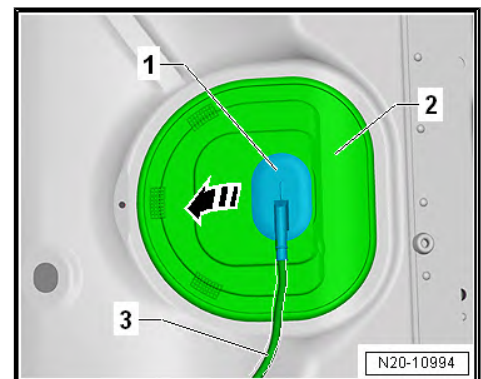
**Note**

- ◆ *Drain the fuel tank*
⇒ ["2.7 Extract fuel from the fuel tank", page 223](#) .
- ◆ *Safety precautions when working on the fuel supply system*
⇒ ["2 Safety instructions", page 3](#) .
- ◆ *Observe rules for cleanliness*
⇒ ["3.1 Rules of cleanliness", page 6](#) .
- Switch off ignition and pull out ignition key.
- Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .

- Unclip cover -1- at retaining tabs -arrows-, using removal wedge - 3409- .



- Unclip sealing grommet -1- downwards from the cover -2-.
- Guide the cover -2- backward at the electric wiring loom -3-.

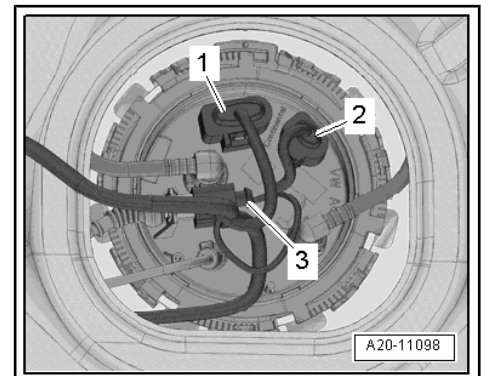


- Unlock electrical plug connection -2- from closing flange, and remove.

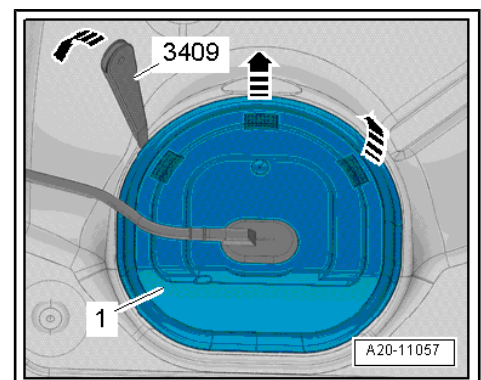
Vehicles fitted with auxiliary heating

- Unlock the electrical plug connection -3- for dosing pump - V54- and disconnect.

Continued for all vehicles

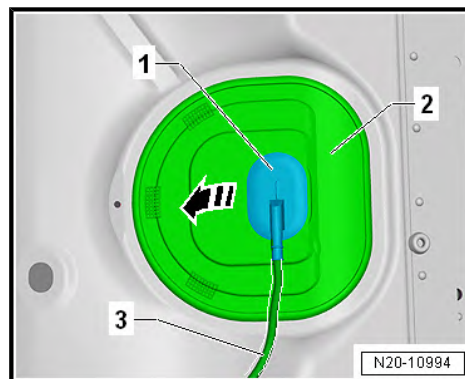


- Unclip cover -1- at retaining tabs -arrows-, using removal wedge - 3409- .

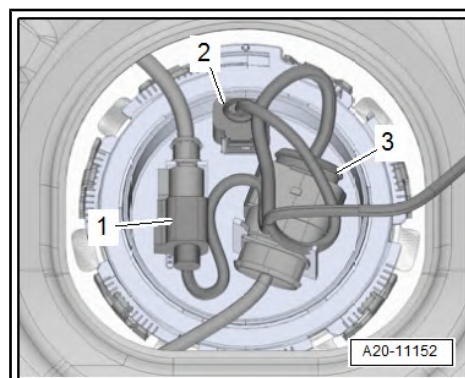




- Unclip sealing grommet -1- downwards from the cover -2-.
- Guide the cover -2- backward at the electric wiring loom -3-.



- Unlock electrical plug connections -2- from left closing flange, and remove.
- Unlock electrical plug connections -1- and -3- from closing flange, and disconnect.
- Unclip electrical plug connections -1- and -3- from the uptakes on the closing flange.



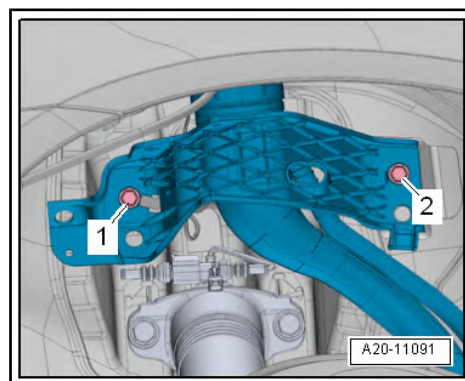
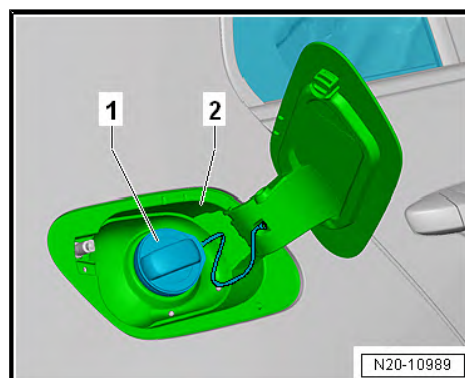
- Open tank flap unit -2-.
- Clean the area around the fuel filler neck.
- Unscrew the cap -1- for the fuel filler neck.



Note

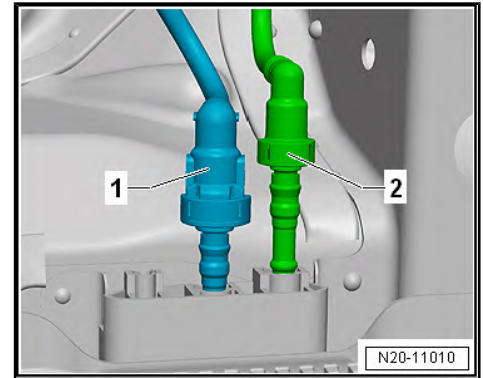
Close the opening of the fuel filler neck with a clean cloth so that no dirt can penetrate.

- Remove tank flap unit ⇒ Body Work; Rep. gr. 55 .
- Remove right rear wheel ⇒ Chassis; Rep. gr. 44 .
- Remove the rear right wheelhouse liner ⇒ Body Work; Rep. gr. 66 .
- Unscrew screws -1- -2- for fuel filler neck.
- Remove the rear silencer
⇒ ["1.4 Removing and installing rear silencer", page 381](#) .



- Detach the fuel feed line -1- and the fuel return-flow line -2-
⇒ [“2.12 Separating push-on couplings”, page 249](#) .

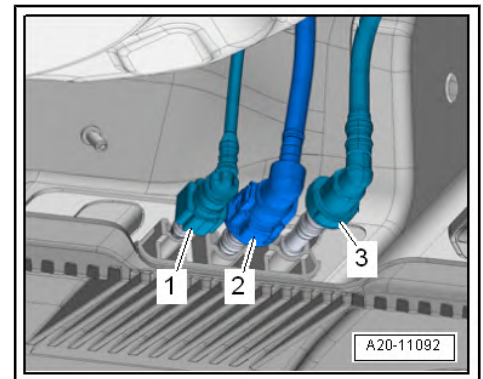
Vehicles fitted with auxiliary heating



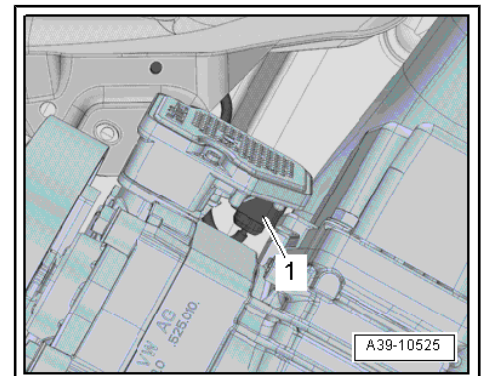
- Remove auxiliary heating fuel line -1-
⇒ [“2.12 Separating push-on couplings”, page 249](#) .

Continued for all vehicles

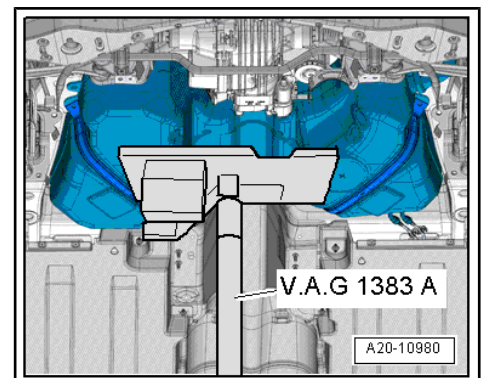
- Remove propshaft ⇒ Gearbox; Rep. gr. 39 .



- Unlock the electrical plug connection -1- for Haldex coupling and disconnect.



- As shown in the illustration, place the engine and gearbox jack - V.A.G 1383 A- under the vehicle for support purposes and support the fuel tank.





- Unscrew the screws -1- to -5-.

**Note**

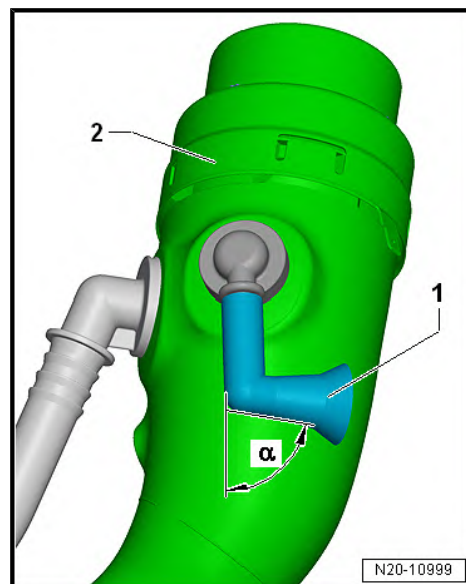
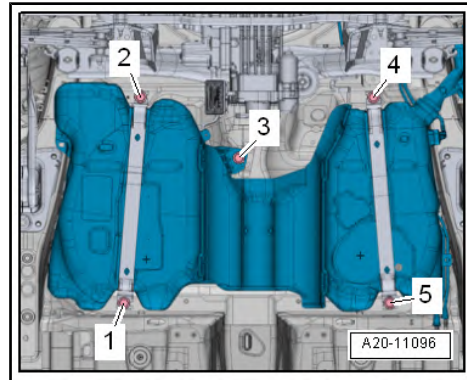
- ♦ *To provide a clearer illustration, the fuel tank is shown without the engine and gearbox jack - V.A.G 1383 A- .*
- ♦ *The aid of a 2nd mechanic is required to remove the fuel tank.*
- The second mechanic must support the fuel tank at the rear edge with one hand.
- Lower fuel tank with engine and gearbox jack - V.A.G 1383 A- .
- Lower fuel tank by pivoting it in the side downwards.
- Pull the filler tube through between the rear axle and body-shell.
- The second mechanic must support the fuel filler neck at the longitudinal swing arm with one hand.

Install

Install in the reverse order of removal. When doing this, note the following:

Observe the fitting position of the ventilation end piece -1- at the fuel tank -2-.

- Angle - α - must be 60°.
- Lay the vent and fuel hoses without any kinks.
- Make sure the stop buffer Pos. -6- is seated correctly
⇒ [“2.1.2 Fuel tank with attached parts, vehicles with four-wheel drive - Summary of components”, page 209](#) .
- Pull the filler tube through between the rear axle and body-shell.
- If present, check the dosing pump - V54- for firm seating.
- Make sure the fuel filler neck correctly engages in the opening in the bodyshell.
- Position fuel tank with tensioning strap with the engine and gearbox jack - V.A.G 1383 A- at the underbody.
- Pay attention to correct fit of the mounting bracket for the exhaust system
⇒ [“1.1 Summary of components - front, middle and rear silencer”, page 370](#) .
- Pay attention to the position of the tensioning strap.
- Make sure the line connections fit tightly.
- Check that the fuel lines are clipped to the fuel tank.
- Take fitting position of earth connection into account.
- Check the earth strap for corrosion, remove any corrosion.



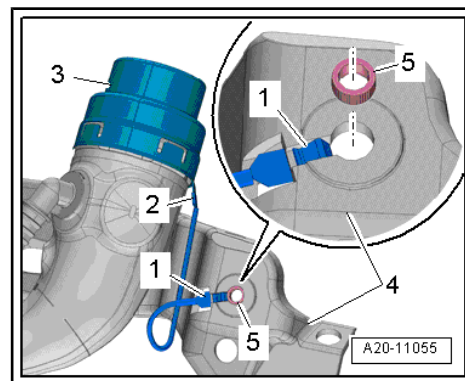
- The plug -2- on the metal plate ring -3- must be pushed on firmly.
- The contact peg -1- must be hung on the fuel tank -4- and secured with the spacer bush -5-.



WARNING

Risk from electrostatic charge.

- ◆ *After installing, use an ohmmeter to test the electrical connection of the plate ring on the fuel filler neck at a bare point on the body.*
- *Specified value approximately 0 Ω.*



- ◆ Tightening torques, assembly instructions
⇒ ["2.1 Fuel tank with component parts - Summary of components", page 204](#).

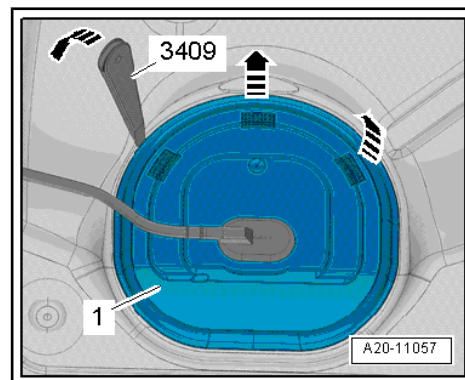
2.14 Removing and installing fuel pump control unit - J538-

Special tools and workshop equipment required

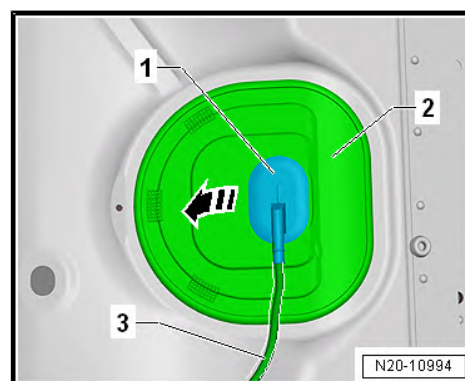
- ◆ Disassembly wedge - 3409-

Removing

- Move front seats all the way forward.
- Switch off ignition.
- Removing rear seat bench ⇒ Body Work; Rep. gr. 72.
- Unclip cover -1- for closing flange using the disassembly wedge - 3409- from the uptake -arrows-.



- Unclip sealing grommet -1- downwards from the cover -2-.
- Guide the cover -2- backward at the electric wiring loom -3-.



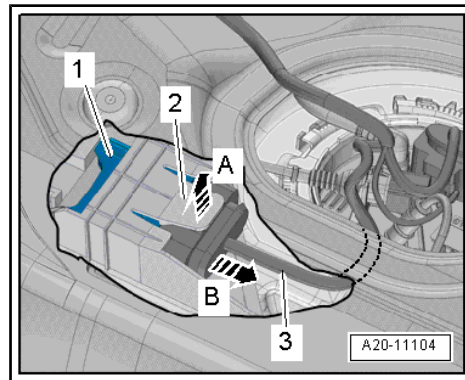


- Push up fixing catch -2- with a finger between the bottom plate and the fuel tank arrow -A-.
- Simultaneously pull the fuel pump control unit - J538- Pos. -1- at the electric wiring loom -3- carefully out of the uptake arrow -B-.
- Take out fuel pump control unit - J538- inwards between fuel tank and bottom plate.
- Remove electrical plug connection and fuel pump control unit - J538- .

Install

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

- Connect the electrical wiring harness to the fuel pump control unit - J538- .
- Check the connector for firm seating by pulling in the opposite direction!
- Push fuel pump control unit - J538- into the uptake and push in until there is an audible click.
- Check the fuel pump control unit - J538- for firm seating by pulling in the opposite direction.



2.15 Check the suction jet pump

The fuel tank consists of a left and right chamber. In order to pump the fuel out of the left chamber -3- of the fuel tank into the right chamber to the housing of the fuel delivery unit -2-, a suction jet pump -1- is required.

Function of the suction jet pump

Suction jet pump functions according to a basic physical principle: Drive jet from the electric fuel pump is pushed through the nozzle in the suction jet pump and is thus accelerating. This acceleration causes the take-up of the surrounding fuel and the latching to the delivery chamber of the fuel delivery unit.

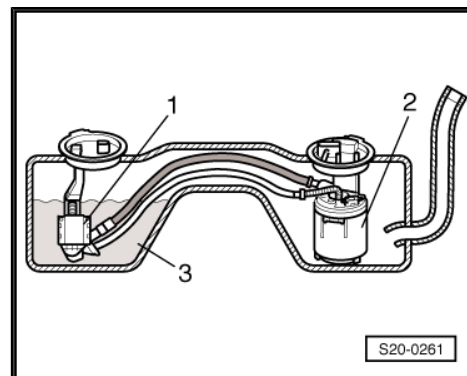
Fault caused by faulty ejector pump



Caution

Vehicle breakdown due to faulty suction jet pump.

In the event of a fault to the suction jet pump, the vehicle may brake down due to a lack of fuel even if the fuel tank is up to 1/4 full.



If the suction jet pump fails to work, up to 15 l of fuel (up to approx. 1/4 content of the tank) will remain in the left-hand area of the fuel tank from where the fuel delivery unit is not draw fuel.

If the vehicle remains broken down due to a lack of fuel with a fuel tank up to approx. 1/4 full, proceed as follows:

- Check the fuel pump with Targeted fault finding ⇒ Vehicle diagnostic tester

When the fuel pump is OK and the fuel is not drawn in:

- Add around 5 litres of fuel.
- Start engine.

if the engine starts up:

- Replace the suction jet pump
⇒ ["2.16 Removing and installing suction jet pump"](#),
[page 265](#) .

2.16 Removing and installing suction jet pump

Special tools and workshop equipment required

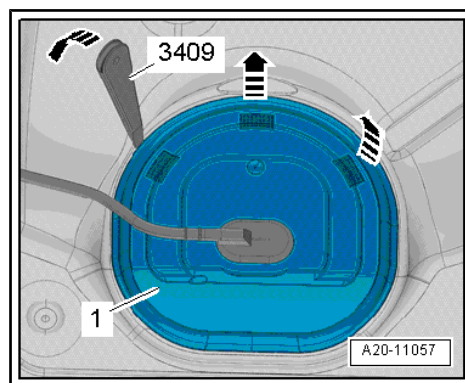
- ◆ Disassembly wedge - 3409-
- ◆ Wrench for union nut - T30101 (3087)-
- The fuel tank must not be more than 1/3 full.

**Note**

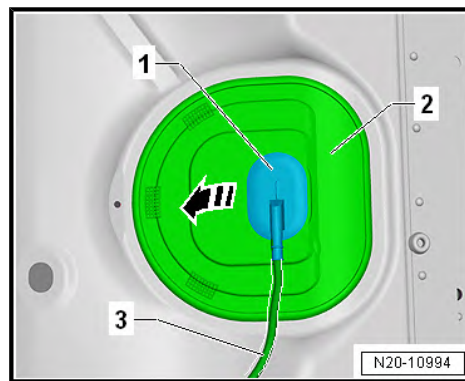
- ♦ *If necessary drain the fuel tank*
⇒ *[“2.7 Extract fuel from the fuel tank”, page 223](#)* .
- ♦ *Safety precautions when working on the fuel supply system*
⇒ *[“2 Safety instructions”, page 3](#)* .
- ♦ *Observe the regulations concerning cleanliness when working on the fuel supply/injection system*
⇒ *[“3.1 Rules of cleanliness”, page 6](#)* .
- ♦ *Make sure that the sender for fuel gauge display is not bent.*

Removing

- Switch off ignition and pull out ignition key.
- Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .
- Unclip cover -1- for the right closing flange with the disassembly wedge - 3409- on the retaining tabs -arrows-.



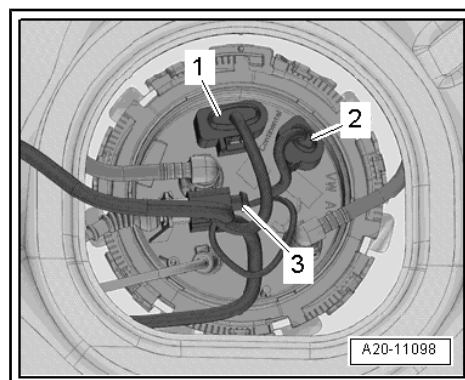
- Unclip sealing grommet -1- downwards from the cover -2-.
- Guide the cover -2- backward at the electric wiring loom -3-.



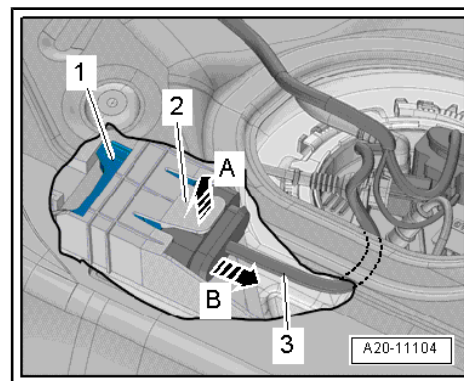
- Disconnect the electrical plug connections -1- and -2- from closing flange.

Vehicles fitted with auxiliary heating

- Unhook the electrical plug connection -3- for dosing pump - V54- on the closing flange.
- Unlock plug connection -3- for the dosing pump - V54- and remove it.

Continued for all vehicles

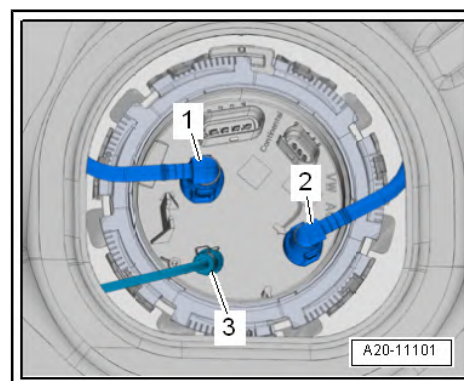
- Push up catch -2- in arrow direction -A- - to do so, reach between bottom plate and fuel tank with a finger..
- At the same time, carefully pull the fuel pump control unit - J538- -1- carefully at the electrical wiring loom -3- out of the uptake in arrow direction -B-.
- Take out fuel pump control unit - J538- inwards between fuel tank and bottom plate.
- Expose the fuel pump control unit - J538- together with the electrical wiring harness.



- Remove the fuel lines -1-, -2- from the closing flange, to do so press the release button
⇒ [“2.12 Separating push-on couplings”, page 249](#) .

Vehicles fitted with auxiliary heating

- Remove fuel line -3- to the dosing pump - V54- for the auxiliary heating at the closing flange.
- To do so, open the bottom clamp.
- Carefully pull out fuel line -3-.



Continued for all vehicles

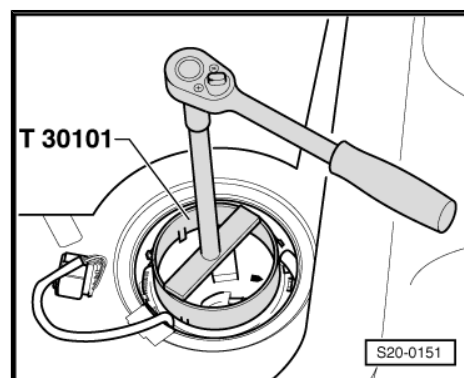


Note

Ensure that the fuel delivery unit is not damaged when loosening and tightening the lock ring of the holder on the flange.

- Open lock ring with the wrench - T30101 (3087)- .

Vehicles without auxiliary heating system

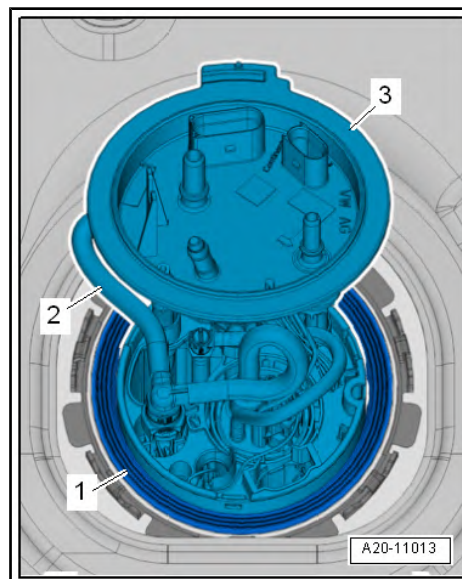




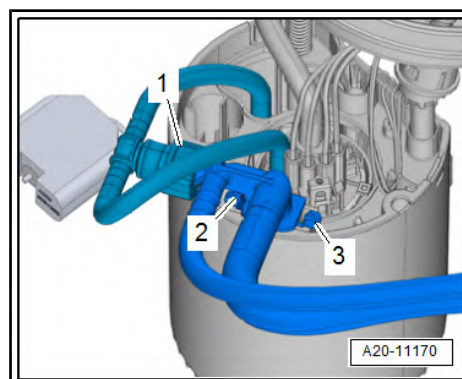
- Lift the closing flange -3- carefully out of the fuel tank opening.
- Remove gasket ring -1- from fuel tank opening.
- Pull closing flange with fuel line -2- carefully out of the fuel tank opening.

**Note**

When removing the fuel delivery unit, ensure that you do not bend the float arm of the sender for the fuel gauge display.



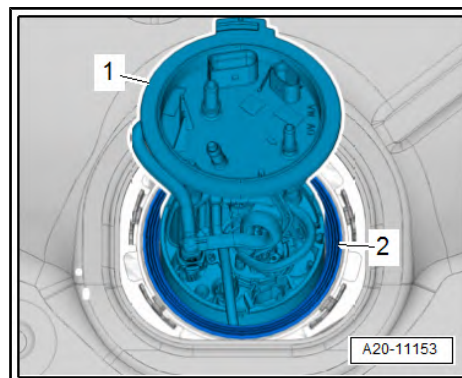
- Reach into the fuel tank through the opening, remove the drive jet line -1-, while doing so, press the release at the connection ⇒ ["2.12 Separating push-on couplings", page 249](#) .
- Remove the pressure line for the suction jet pump from the fuel delivery unit, to do so press catches -2- and -3- and remove the cable.

Vehicles fitted with auxiliary heating

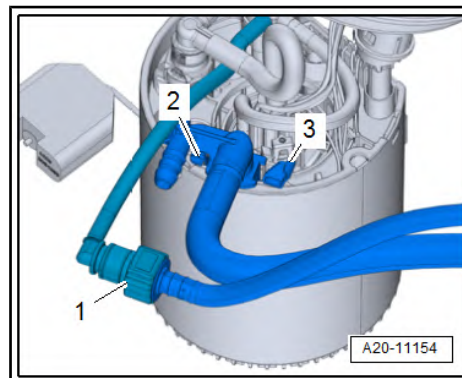
- Pull sealing flange -1- slightly out of the fuel tank opening.
- Remove gasket ring -2- from fuel tank opening.
- Pull closing flange with fuel line and electrical lines carefully out of the fuel tank opening as far as possible.

**Note**

When removing the fuel delivery unit, ensure that you do not bend the float arm of the sender for the fuel gauge display.

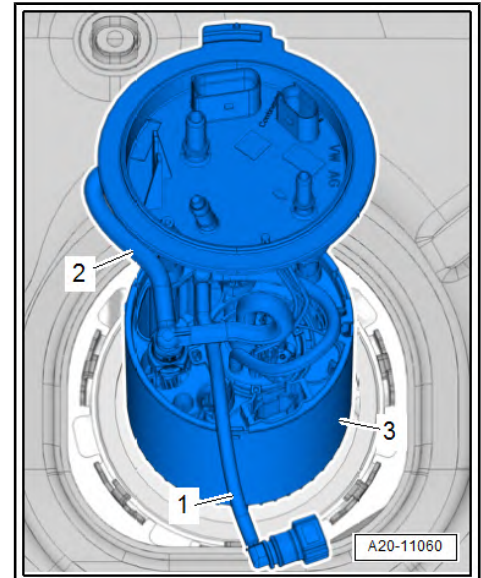


- Reach into the fuel tank through the opening, unlock the delivery unit from the locking mechanisms -2- and -3- and remove from the fuel delivery unit.

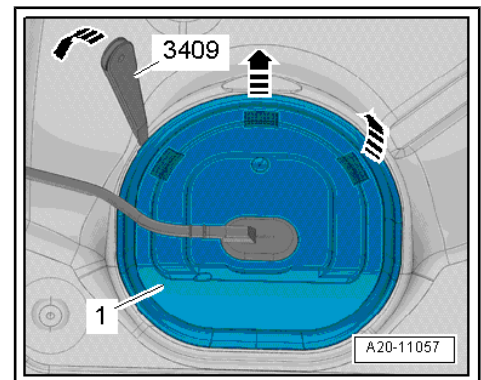


- Remove and disconnect the drive jet line -1-; to do so, press the release at the connection
⇒ [“2.12 Separating push-on couplings”, page 249](#) .

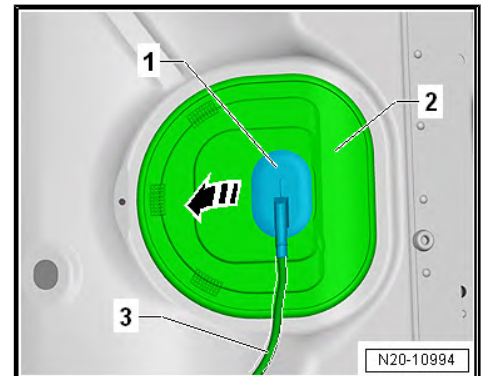
Continued for all vehicles



- Unclip cover -1- for left closing flange at retaining tabs -arrows-, using removal wedge - 3409- .



- Unclip sealing grommet -1- downwards from the cover -2-.
- Guide the cover -2- backward at the electric wiring loom -3-.

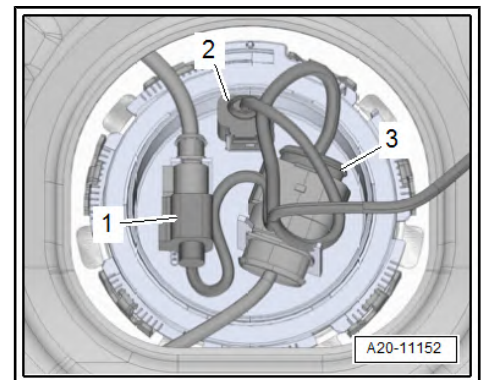


- Unlock electrical plug connections -2- from closing flange, and remove.
- Unlock electrical plug connections -1- and -3- from closing flange, and disconnect.
- Unclip electrical plug connections -1- and -3- from the uptakes on the closing flange.



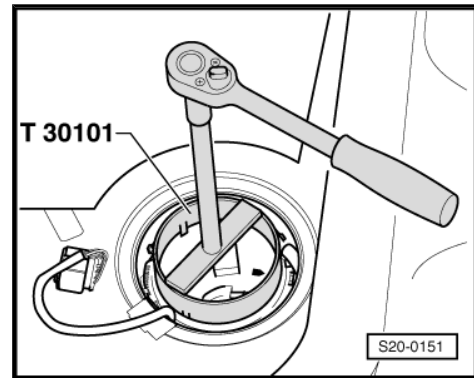
Note

Ensure that the fuel delivery unit is not damaged when loosening and tightening the lock ring of the holder on the flange.





- Open lock ring with the wrench - T30101 (3087)- .



- Carefully raise closing flange -2- and remove it from the fuel tank opening.

i Note

Remove gasket ring -3- from fuel tank opening.

- Remove the suction jet pump -1- from the fuel gauge sender 2 - G169-. To do so, carefully bend the retaining lugs -arrows- outwards.



Caution

Place a cleaning cloth underneath in order to collect the fuel.

- Remove the fuel gauge sender 2 - G169- carefully out of the fuel tank opening. Turn and tilt accordingly to do so.

i Note

Make sure that the float arm of the fuel gauge sender 2 - G169- is not bent.

- Pull the suction jet pump through the opening for the fuel gauge sender 2 - G169- on the fuel tank.

i Note

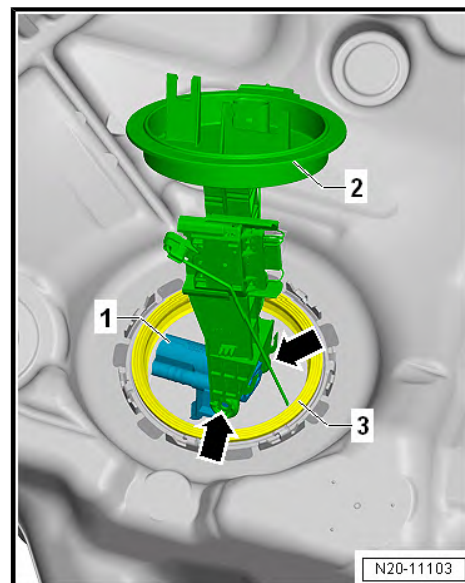
- ♦ *You must be compliance with the environmental regulations when disposing of it.*
- ♦ *Check fuel tank for contaminations.*

Install

Installation occurs in reverse order to removal. Pay attention to the following:

i Note

- ♦ *Note the fitting position of all parts.*
- ♦ *Replace damaged gasket rings.*
- Slide in the suction jet pump with the fuel gauge sender 2 - G169- into the fuel tank through the left opening.
- Guide the suction jet pump to the fuel delivery unit.
- Reach into the fuel tank through the opening and press the pressure line onto the fuel delivery unit until it audibly locks into place.
- Slide the drive jet line in until there is an audible click.
- Check that the connector and lines at the fuel delivery unit are seated firmly by pulling in the opposite direction.



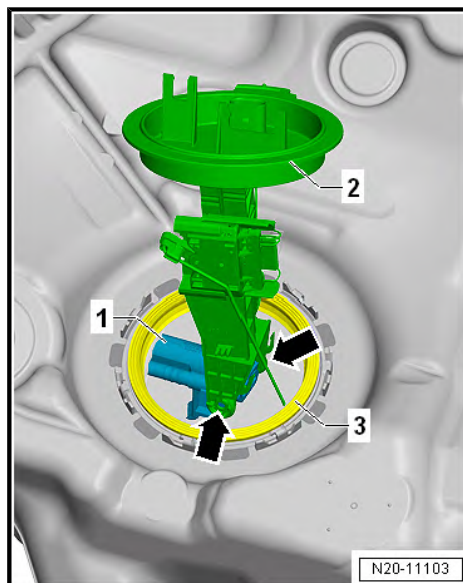


- Fit the suction jet pump to the fuel gauge sender 2 - G169- , to do so, bend the retaining lugs -arrows- one after the other, and insert the suction jet pump.
- Check for firm seating by pulling in the opposite direction.
- Insert dry gasket ring of the fuel delivery unit into the opening of the fuel tank.

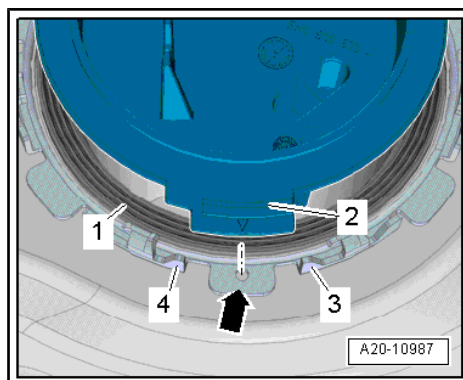


Note

When inserting the fuel delivery unit and fuel gauge sender 2 - G169- , ensure that the float arm of the fuel gauge sender is not bent.



- Coat inner side of gasket rings -1- with fuel.
- Push closing flange -2- downwards against spring force on both sides.
- Bring the two closing flanges -2- into the fitting position.



- Arrow -3- at the fuel tank must point to marking -2- on the closing flange -1-.



Caution

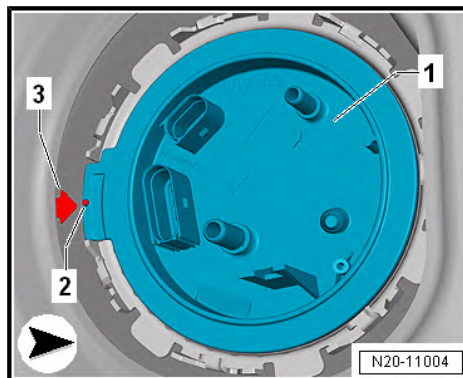
Risk of leakage.

- ◆ *The gasket ring must not get damaged or squashed when inserting the sealing flange.*



Note

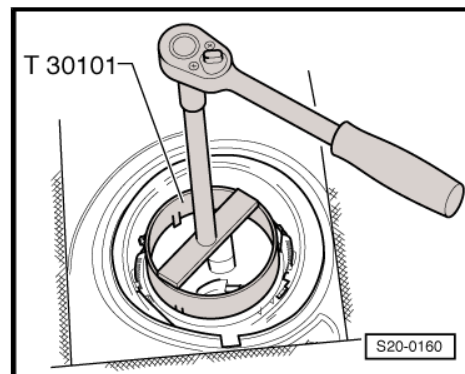
Ensure that the fuel delivery unit is not damaged when tightening the lock ring of the holder on the flange.



- Tighten lock ring with wrench - T30101 (3087)- to 110 Nm.
- Mount all fuel lines and connectors to the closing flanges on both sides.
- Check that the connector and lines at the fuel delivery unit are seated firmly by pulling in the opposite direction.

Vehicles fitted with auxiliary heating

- Observe the fitting position of the fuel discharge line for auxiliary heating ⇒ Heating, Air Conditioning; Rep. gr. 82 .
- ◆ Tightening torques, assembly instructions
⇒ ["2.2 Fuel delivery unit - Summary of components", page 212](#)



2.17 Inspecting fuel pump - G6-

⇒ ["2.17.1 Checking fuel pressure", page 273](#)

⇒ ["2.17.2 Checking fuel delivery rate", page 279](#)

2.17.1 Checking fuel pressure

Special tools and workshop equipment required

- ◆ Pressure gauge - VAS 6551-
- ◆ Adapter set - VAS 6551/5-
- ◆ Disassembly wedge - 3409-
- ◆ Hose binding claw - V.A.G 1921-



WARNING

Ensure that when the battery is connected the fuel pump cannot be activated by the opening door! Fuel can spill out when the system is open.

Test conditions

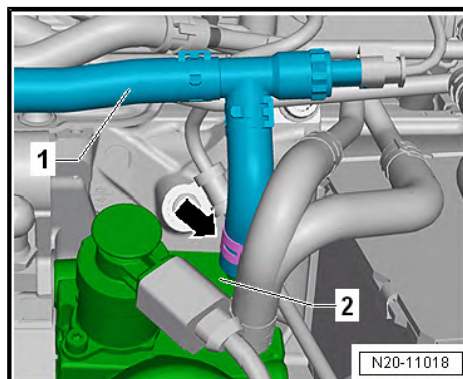
- Connect battery charger, the battery voltage must be at least 12.5 volts ⇒ Electrical System; Rep. gr. 27 .
- Fuses o.k. ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Fuel pump control unit - J538- OK ⇒ Vehicle diagnostic tester.
- Fuel filter o.k.
- Ensure level vehicle positioning.
- Fuel tank at least $\frac{1}{2}$ full.
- All electrical consumers such as the lights and rear window heater must be switched off.

**Note**

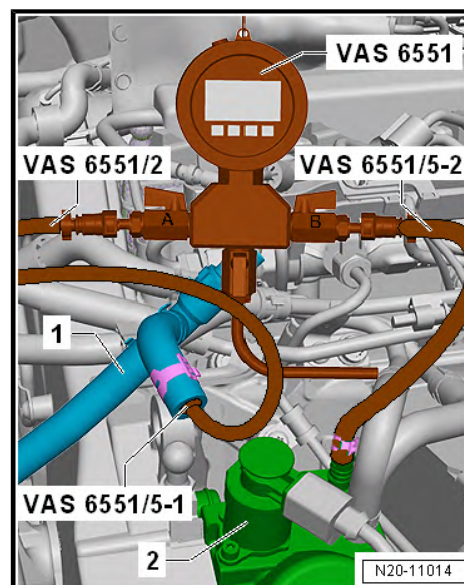
- ◆ *The vehicle must be refuelled with diesel fuel corresponding to the season. Summer diesel can sometimes coagulate at low winter temperatures.*
- ◆ *Diesel fuel sold in summer is guaranteed filterable to 0 °C.*
- ◆ *Diesel fuel sold during the transitional period is guaranteed filterable to -10 °C.*
- ◆ *Diesel fuel sold in winter is guaranteed filterable to -20 °C.*
- ◆ *If there is uncertainty in winter, take a sample.*
- ◆ *Expose the sample to approximately 1 hour of low outside temperature.*
- ◆ *If the fuel flocculates at temperatures to -20 °C, the diesel fuel is unsuitable for low temperatures. This flocculation can clog the strainer of the fuel delivery unit and the fuel filter.*

Test procedure**Note**

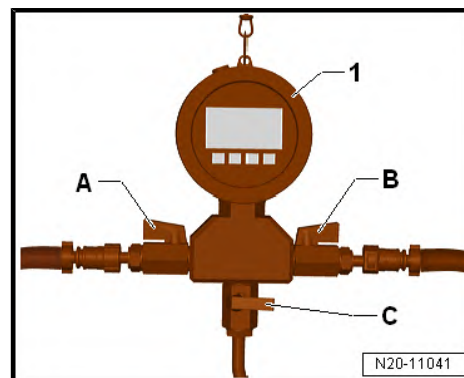
- ◆ *Safety precautions when working on the fuel supply system*
⇒ *"2 Safety instructions", page 3*.
- ◆ *Observe rules for cleanliness*
⇒ *"3.1 Rules of cleanliness", page 6*.
- Switch off ignition.
- Remove engine cover
⇒ *"1.1 Removing and installing engine trim panel", page 10*.
- Open clamp -arrow-.
- Pull fuel feed line -1- off the high pressure pump -2-.



- Insert connecting nipple - VAS 6551/5-1- in the feed line -1- and secure using a clamp.
- Connect the hose line - VAS 6551/2- between connecting nipple - VAS 6551/5-1- and connection -A- of the pressure gauge (Diesel) - VAS 6551- .
- Connect hose line - VAS 6551/5-2- between the connection -B- of the pressure gauge (Diesel) - VAS 6551- and the high pressure pump -2-.
- Secure hose line - VAS 6551/5-2- to the high pressure pump -2- using a clamp.
- Switch on the pressure gauge - VAS 6551- by pressing the button On/Off.



- Open shut-off taps -A- and -B- of the pressure gauge - VAS 6551- -1-.
- Make sure that the shut-off tap -C- is closed at the pressure gauge - VAS 6551- -1-.
- Connect a vehicle diagnosis tester .
- Select Targeted Function 01 activate fuel pump.
- Select function check fuel pump conveying pressure/quantity.
- Follow the instructions of the vehicle diagnosis tester .



Note

The fuel pump is now activated.

- Read fuel pressure on pressure gauge - VAS 6551- .
- The specified value is at least 0.45 MPa (4.5 bar):

If the specified value is not reached

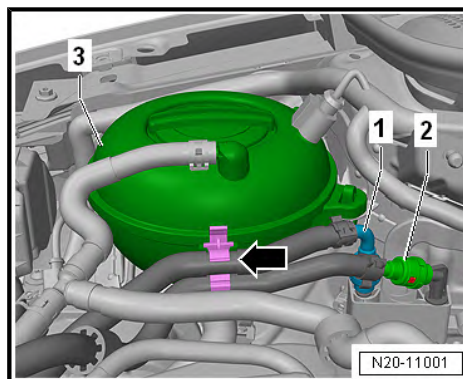
- Check fuel lines in the engine compartment for possible restrictions (kinks) or blockages and damage.
- Check the fuel lines in the engine compartment for tightness.

If no fault is found

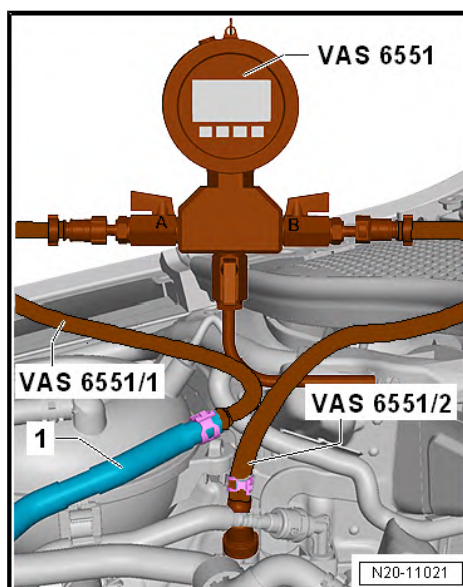
Check the fuel pressure before the fuel filter, to do so proceed as follows.

Check the fuel pressure before the fuel filter

- Remove fuel feed line -1-
⇒ [“2.12 Separating push-on couplings”, page 249](#) .



- Connect hose line - VAS 6551/2- between the fuel feed line from the fuel tank and connection -B- from the pressure gauge - VAS 6551- .
- Connect hose line - VAS 6551/1- between the connection -A- from the pressure gauge (Diesel) - VAS 6551- and the fuel line to the fuel filter -1-.
- Switch on the pressure gauge - VAS 6551- by pressing the button On/Off.



- Open shut-off taps -A- and -B- of the pressure gauge - VAS 6551- -1-.
- Make sure that the shut-off tap -C- is closed at the pressure gauge - VAS 6551- -1-.
- Repeat function check fuel pump conveying pressure/quantity ⇒ [page 275](#) .

If the specified value is now reached

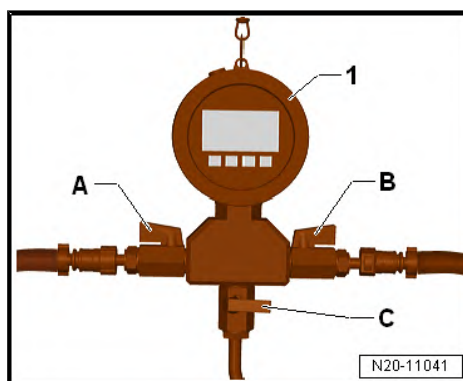
Check the fuel filter and replace it is necessary
⇒ [“2.3 Fuel filter - Summary of components”, page 217](#) .

If the specified value is not reached:

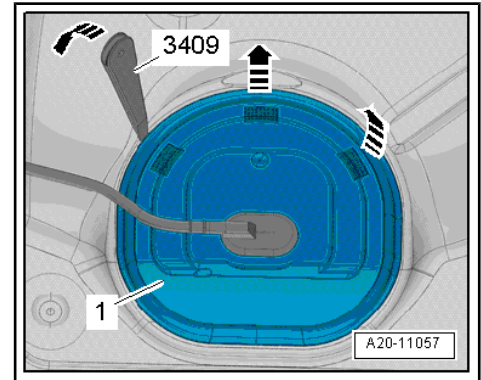
Proceed as follows to check fuel pressure at fuel delivery unit.

Check the fuel pressure at the fuel delivery unit

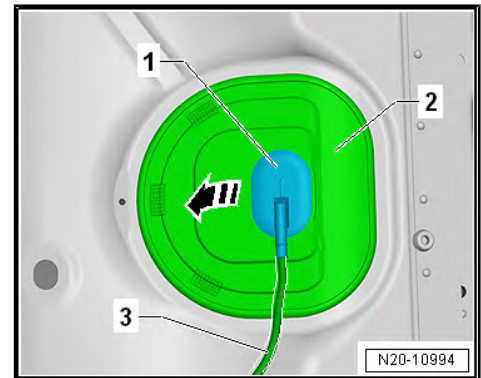
- Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .



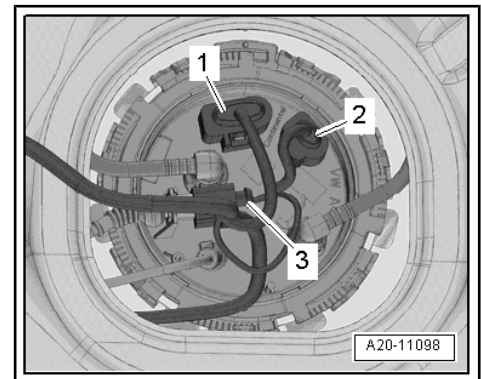
- Unclip cover -1- at retaining tabs -arrows-, using removal wedge - 3409- .



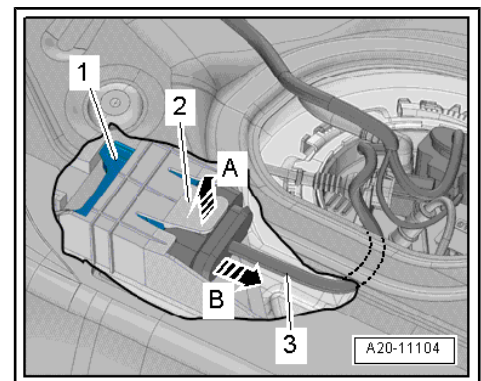
- Unclip sealing grommet -1- downwards from the cover -2-.
- Guide the cover -2- backward at the electric wiring loom -3-.



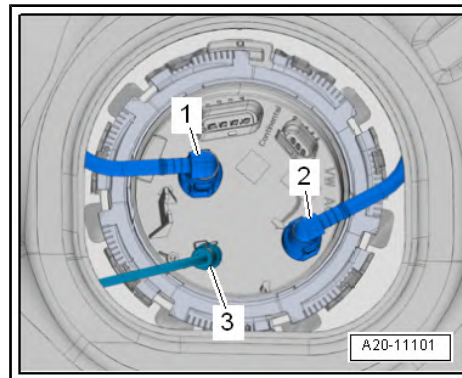
- Unhook the electrical plug connections -3- for the dosing pump - V54- at the fuel delivery unit.



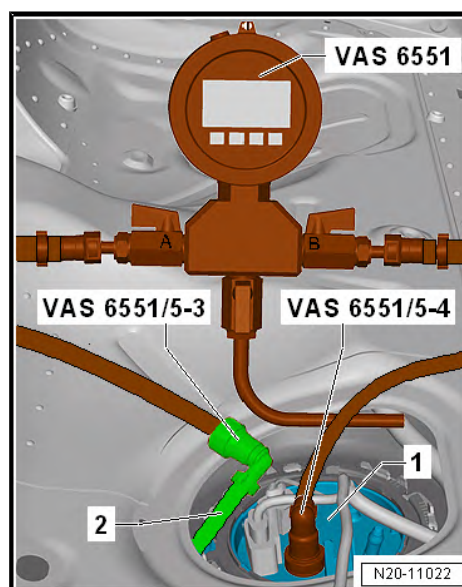
- Push up catch -2- in arrow direction -A- - to do so, reach between bottom plate and fuel tank with a finger..
- At the same time, carefully pull the fuel pump control unit - J538- -1- carefully at the electrical wiring loom -3- out of the uptake in arrow direction -B-.
- Take out fuel pump control unit - J538- inwards between fuel tank and bottom plate.



- Unlock fuel feed line -1- on closing flange and pull off
⇒ [“2.12 Separating push-on couplings”, page 249](#) .



- Connect connection line - VAS 6551/5-3- between the pressure gauge - VAS 6551- and the fuel feed line to the fuel filter -2-.
- Connect connection line - VAS 6551/5-4- between pressure gauge - VAS 6551- and fuel delivery unit-1-.



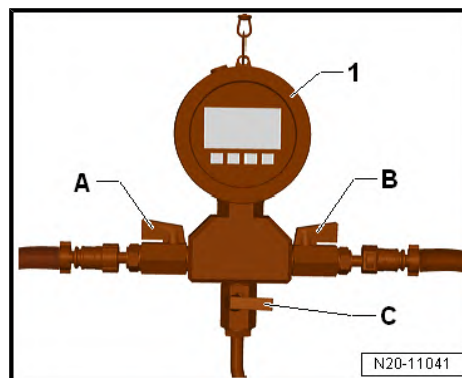
- The shut-off taps -A- and -B- must be open at the pressure gauge - VAS 6551- -1-.
- Make sure that the shut-off tap -C- is closed at the pressure gauge - VAS 6551- -1-.
- Repeat function check fuel pump conveying pressure/quantity ⇒ [page 275](#) .

If the specified value is reached

- Check fuel lines to the engine for possible restrictions (kinks) or blockages and damage.
- Test fuel lines for tightness.

If the specified value is not reached

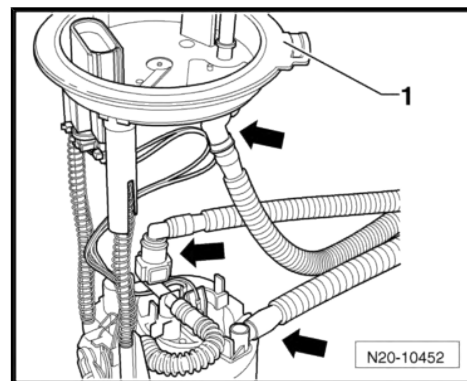
- Remove fuel delivery unit
⇒ [“2.8 Removing and installing fuel delivery unit”, page 232](#) .
- Check filter strainer for soiling.



- Check that all hose connections are connected -arrows-.

If no fault is found

- Replace fuel delivery unit
⇒ [“2.8 Removing and installing fuel delivery unit”, page 232](#) .



2.17.2 Checking fuel delivery rate

Special tools and workshop equipment required

- ◆ Pressure gauge - VAS 6551-
- ◆ Adapter set - VAS 6551/5-
- ◆ Disassembly wedge - 3409-
- ◆ Hose binding claw - V.A.G 1921-
- ◆ Pressure control valve - VAS 6551/6-
- ◆ Measuring container, capacity at least 3 litres



WARNING

Ensure that when the battery is connected the fuel pump cannot be activated by the opening door! Fuel can spill out when the system is open.

Test conditions

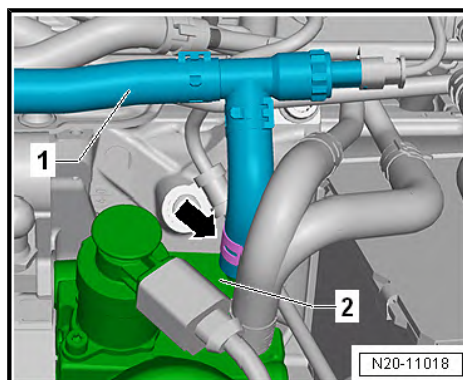
- Connect battery charger, the battery voltage must be at least 12.5 volts ⇒ Electrical System; Rep. gr. 27 .
- Fuses o.k. ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Fuel pump control unit - J538- OK ⇒ Vehicle diagnostic tester.
- Fuel filter o.k.
- Fuel tank at least $\frac{1}{2}$ full.
- Ensure level vehicle positioning.
- All electrical consumers such as the lights and rear window heater must be switched off.
- Fuel pressure OK
⇒ [“2.17.1 Checking fuel pressure”, page 273](#) .

**Note**

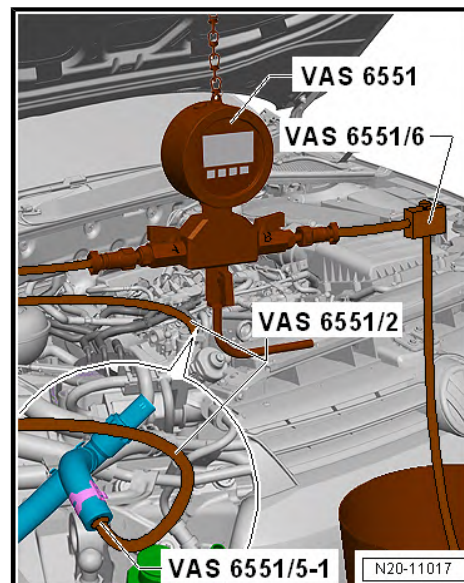
- ◆ *The vehicle must be refuelled with diesel fuel corresponding to the season. Summer diesel can sometimes coagulate at low winter temperatures.*
- ◆ *Diesel fuel sold in summer is guaranteed filterable to 0 °C.*
- ◆ *Diesel fuel sold during the transitional period is guaranteed filterable to -10 °C.*
- ◆ *Diesel fuel sold in winter is guaranteed filterable to -20 °C.*
- ◆ *If there is uncertainty in winter, take a sample if necessary. Expose the sample to approximately 1 hour of low outside temperature. If the fuel flocculates at temperatures to -20 °C, the diesel fuel is unsuitable for low temperatures. This flocculation can clog the strainer of the fuel delivery unit and the fuel filter.*

Work procedure**Note**

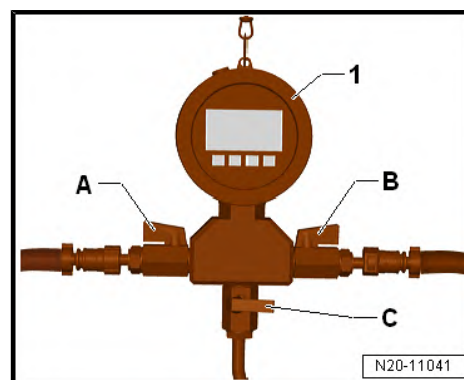
- ◆ *Safety precautions when working on the fuel supply system*
⇒ [“2 Safety instructions”, page 3](#) .
- ◆ *Observe rules for cleanliness*
⇒ [“3.1 Rules of cleanliness”, page 6](#) .
- Switch off ignition.
- Remove engine cover
⇒ [“1.1 Removing and installing engine trim panel”, page 10](#) .
- Move front right seat forward.
- Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .
- Open clamp -arrow- at the fuel feed line -1-.
- Pull fuel feed line -1- off the high pressure pump -2-.



- Insert connecting nipple - VAS 6551/5-1- into fuel feed line and secure using a clamp.
- Connect the hose line - VAS 6551/2- between connecting nipple - VAS 6551/5-1- and connection -A- of the pressure gauge (Diesel) - VAS 6551- .
- Connect pressure control valve - VAS 6551/6- to connection -B- of the pressure gauge - VAS 6551- .
- Hold the open end of the hose from the pressure control valve - VAS 6551/6- in a measuring vessel.
- Switch on the pressure gauge - VAS 6551- by pressing the button On/Off.



- Make sure that the shut-off tap -C- is closed at the pressure gauge - VAS 6551- -1-.
- The shut-off taps -A- and -B- must be open at the pressure gauge - VAS 6551- -1-.
- Connect a vehicle diagnosis tester .
- Select Targeted Function 01 activate fuel pump.
- Select function check fuel pump conveying pressure/quantity.
- Follow the instructions of the vehicle diagnosis tester .
- Using the pressure control valve - VAS 6551/6- , set pressure to 0.45 MPa (4.5 bar).





- Set primary pressure at setting wheel -arrow- by turning pressure control valve - VAS 6551/6- .
- Specified value: Pressure 0.45 MPa (4.5 bar)
- From this point no longer move position of the setting wheel -arrow-.
- Drain measuring container.
- Repeat function check fuel pump conveying pressure/quantity.

**Note**

The Die fuel system pressurisation pump - G6- is now activated for 30 seconds.

- Check fuel delivery quantity in the measuring vessel.
- Specified value: Minimum fuel flow rate 1100 cm³/30 s.

If the minimum fuel delivery volume is not reached

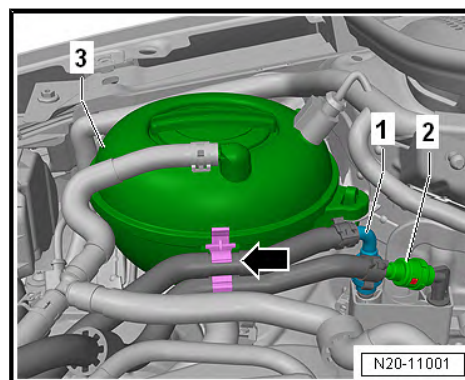
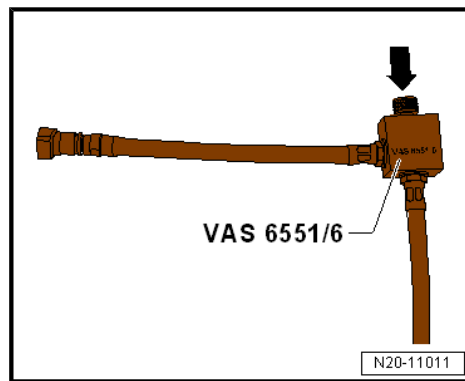
- Check fuel lines in the engine compartment for possible restrictions (kinks) or blockages and damage.
- Check the fuel lines in the engine compartment for tightness.

If no fault is found:

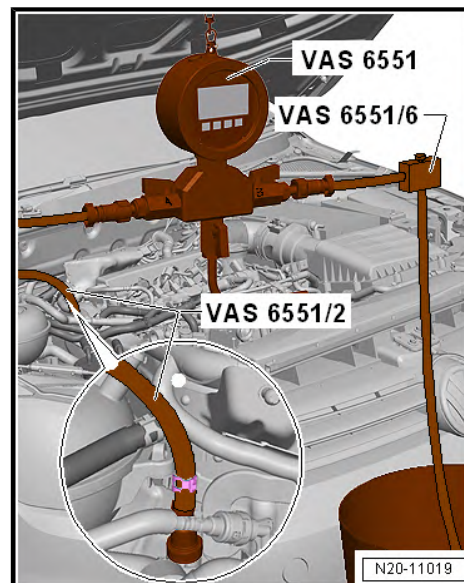
Check the fuel delivery quantity before the fuel filter, to do so proceed as follows:

Check the fuel flow rate before the fuel filter

- Remove fuel feed line -1-
⇒ ["2.12 Separating push-on couplings", page 249](#) .



- Connect hose line - VAS 6551/2- to the fuel feed line from the fuel tank.
- Connect the hose line - VAS 6551/2- at the connection -A- of the pressure gauge (Diesel) - VAS 6551- .
- Connect pressure control valve - VAS 6551/6- to connection -B- of the pressure gauge - VAS 6551- .
- Hold the open end of the hose from the pressure control valve - VAS 6551/6- in a measuring vessel.
- Switch on the pressure gauge - VAS 6551- by pressing the button **On/Off**.



- Make sure that the shut-off tap -C- is closed at the pressure gauge - VAS 6551- -1-.
- The shut-off taps -A- and -B- must be open at the pressure gauge - VAS 6551- -1-.
- Repeat function check fuel pump conveying pressure/quantity ⇒ [page 281](#) .

If the minimum fuel flow rate is now reached

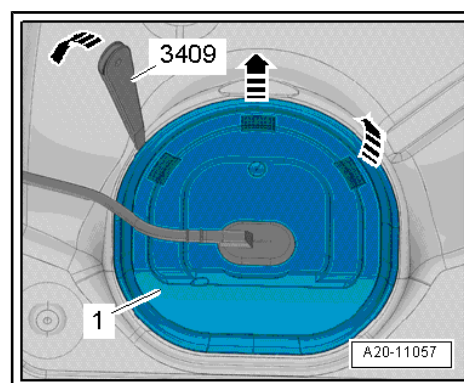
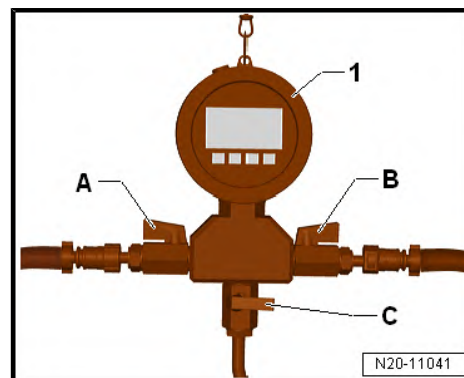
Check the fuel filter and replace it is necessary
⇒ [“2.3 Fuel filter - Summary of components”, page 217](#) .

If the specific value is still not reached

Proceed as follows to check fuel delivery rate at fuel delivery unit.

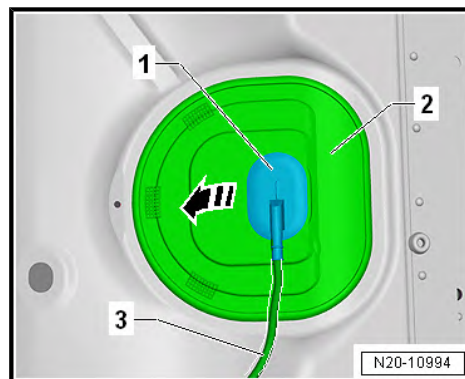
Check fuel delivery quantity at the fuel delivery unit

- Unclip cover -1- at retaining tabs -arrows-, using removal wedge - 3409- .

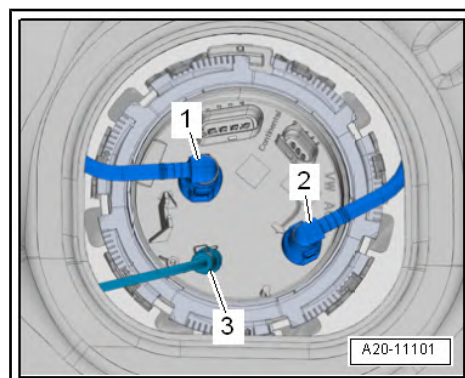




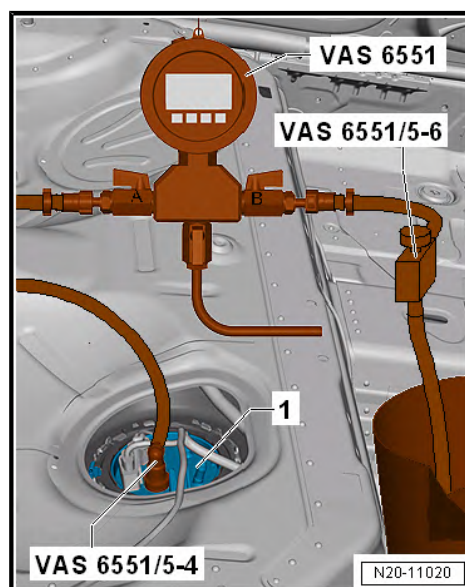
- Unclip sealing grommet -1- downwards from the cover -2-.
- Guide the cover -2- backward at the electric wiring loom -3-.



- Unlock fuel feed line -1- on closing flange and pull off
⇒ ["2.12 Separating push-on couplings", page 249](#) .



- Connect connection line - VAS 6551/5-4- to the fuel feed line connection on the fuel delivery unit -1-.
- Connect connection line - VAS 6551/5-4- to connection -A- from pressure gauge - VAS 6551- .
- Connect pressure control valve - VAS 6551/6- to connection -B- of the pressure gauge - VAS 6551- .
- Hold the open end of the hose from the pressure control valve - VAS 6551/6- in a measuring vessel.
- Switch on the pressure gauge - VAS 6551- by pressing the button **On/Off**.



- Make sure that the shut-off tap -C- is closed at the pressure gauge - VAS 6551- -1-.
- The shut-off taps -A- and -B- must be open at the pressure gauge - VAS 6551- -1-.
- Repeat function check fuel pump conveying pressure/quantity ⇒ [page 281](#) .

If the minimum fuel flow rate is now reached

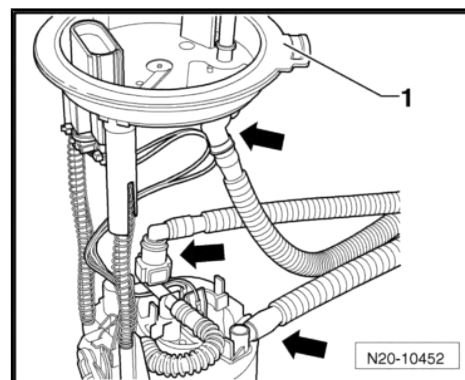
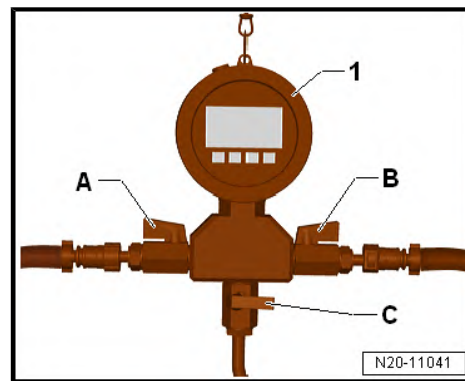
- Check fuel lines for possible restrictions (kinks) or blockages and damage.
- Test fuel lines for tightness.

If the specific value is still not reached

- Remove fuel delivery unit
⇒ [“2.8 Removing and installing fuel delivery unit”, page 232](#) .
- Check filter strainer for soiling.
- Check that all hose connections are connected -arrows-.

Only if no fault has yet been detected

- Replace fuel delivery unit
⇒ [“2.8 Removing and installing fuel delivery unit”, page 232](#) .



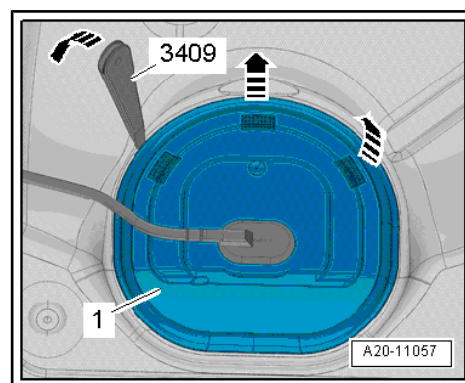
2.18 Check sender for fuel gauge display - G-

Special tools and workshop equipment required

- ◆ Multimeter , e.g. -V.A.G 1526E-
- ◆ Measuring tool set , e.g. -V.A.G 1594 C-
- ◆ Disassembly wedge - 3409-

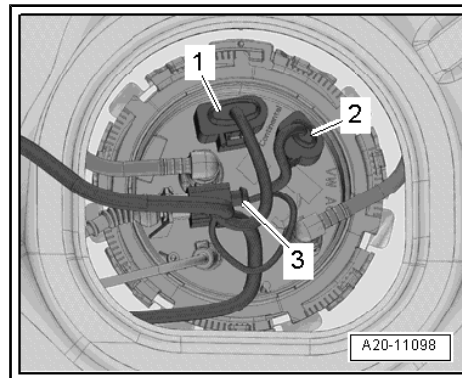
Work procedure

- Move front seats all the way forward.
- Switch off ignition.
- Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .
- Unclip cover -1- using the disassembly wedge - 3409- from the uptake -arrows-.





- Disconnect electrical plug connections -2- on the closing flange, thereby unlocking the plug lock.



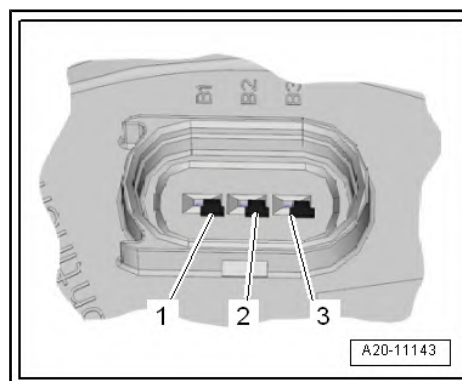
Sender for fuel gauge display - G- installed



Note

To achieve a precise indication of the resistance with a "full fuel tank" the fuel tank must be filled completely with the sender installed. After filling of the full fuel tank, drive at least 500 m so that any air bubbles can escape from the fuel tank. Then top up.

- Connect multimeter to resistance measurement between contacts -B1- and -B2-.
 - Fuel tank empty: approx. 270 Ω .
 - Fuel tank full: approx. 70 Ω .
- Connect multimeter to resistance measurement between contact -B1- and -B3-.
 - Fuel tank empty: approx. 70 Ω .
 - Fuel tank full: approx. 270 Ω .
- Connect multimeter to resistance measurement between contact -B2- and -B3-.
 - Any sender position: approx. 340 Ω .



Sender for fuel gauge display - G- removed



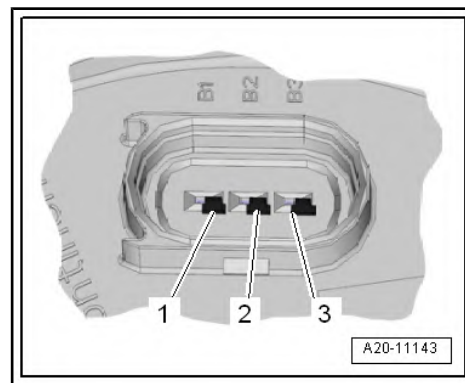
Note

- ◆ *When testing resistance values with “fuel tank full” or “fuel tank empty” the sender for fuel gauge display - G- must be removed and the float arm must be displaced to the top or bottom.*
- ◆ *Because of the large displacement of the float arm, the following values are reached when the sender for fuel gauge display is removed:*

- Connect multimeter to resistance measurement between contacts -B1- and -B2-.
- Fuel tank empty: approx. 300 Ω .
- Fuel tank full: approx. 52 Ω .
- Connect multimeter to resistance measurement between contact -B1- and -B3-.
- Fuel tank empty: approx. 52 Ω .
- Fuel tank full: approx. 300 Ω .
- Connect multimeter to resistance measurement between contact -B2- and -B3-.
- Any sender position: approx. 340 Ω .

The sender for fuel gauge display - G- is faulty if the following facts are established:

- ◆ Large variations of measured values.
- ◆ Measured value 0 Ω (short circuit).
- ◆ Measured value ∞ Ω (line break).
- ◆ No fault on electric cables.
- Install sender for fuel gauge display - G-
⇒ [“2.11 Removing and installing the sender for fuel gauge display”](#), page 245 .



3 Accelerator mechanism

⇒ [“3.1 Assembly overview - accelerator module”, page 288](#)

⇒ [“3.2 Removing and installing accelerator module”, page 288](#)

3.1 Assembly overview - accelerator module

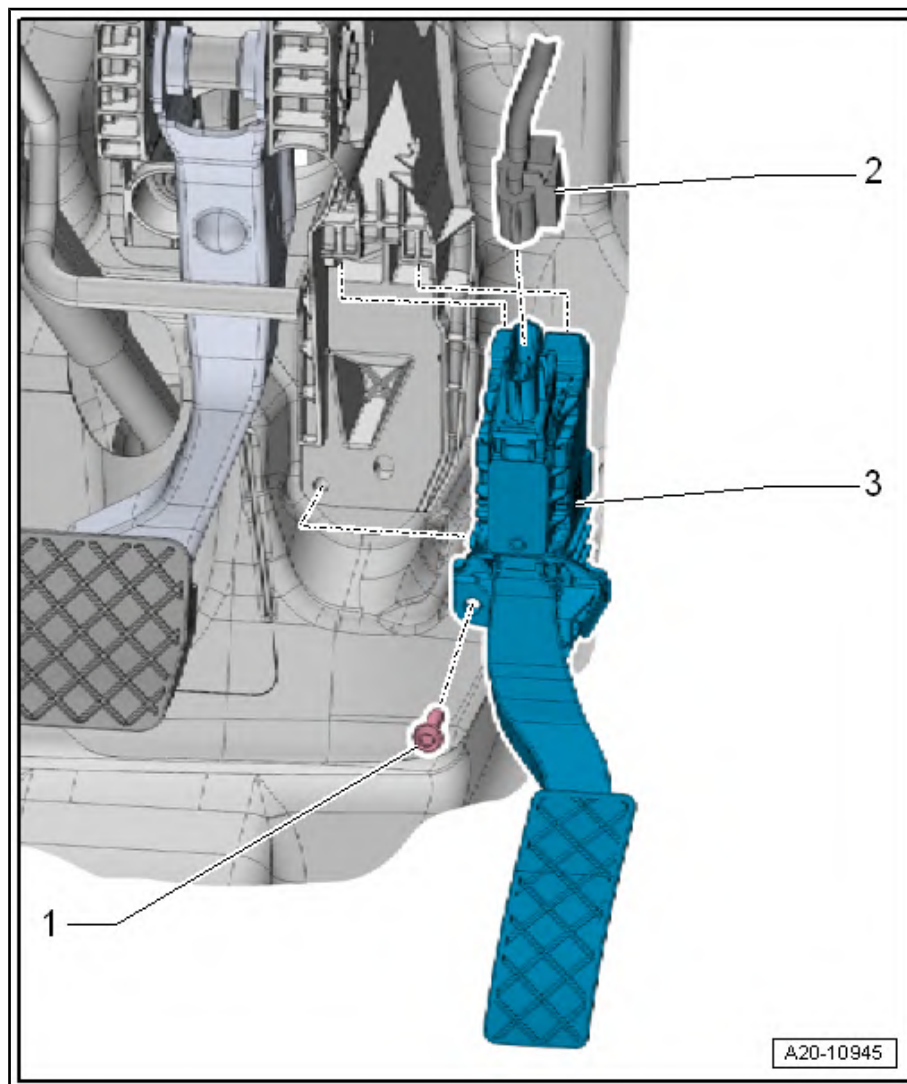
1 - Screw

- 6 Nm

2 - Connector

3 - Accelerator pedal module

- with accelerator pedal position sender - G79- and accelerator pedal position sender 2 - G185-
- removing and installing
⇒ [“3.2 Removing and installing accelerator module”, page 288](#)



3.2 Removing and installing accelerator module

Removing

- Bend up carpet cover for accelerator pedal.

- Disconnect electrical plug connections -2- on the accelerator pedal module, thereby pressing the release upwards.
- Release screw -1-.
- Remove accelerator module -3- from the uptake.

Install

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



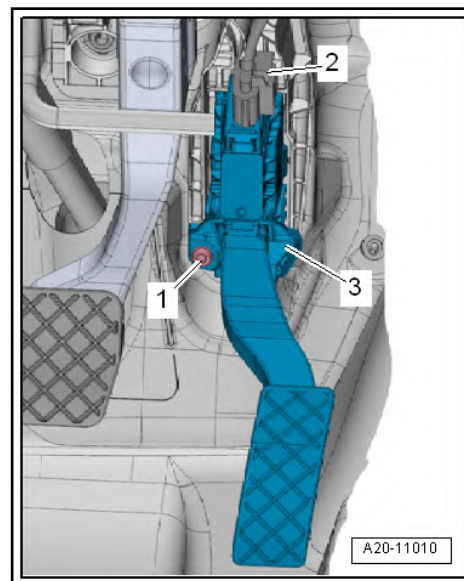
Caution

Risk of damage to knee airbag surface by mechanical stress.

- ◆ *After completion of assembly work with visual inspection, check that the knee airbag surface is not damaged.*

Tightening torque

- ◆ ⇒ [“3.1 Assembly overview - accelerator module”, page 288](#)





21 – Turbocharging/supercharging

1 Charge-air system - exhaust gas turbocharger

⇒ [“1.1 Exhaust gas turbocharger with component parts - Summary of components”, page 290](#)

⇒ [“1.2 Removing and installing exhaust gas turbocharger”, page 292](#)

⇒ [“1.3 Replace vacuum positioning element for charge pressure regulation with position sender for charge pressure regulator G581”, page 302](#)

⇒ [“1.4 Connection diagram for vacuum hoses”, page 306](#)

⇒ [“1.5 Checking vacuum system”, page 307](#)

⇒ [“1.6 Hose connections with screw clamps”, page 308](#)

1.1 Exhaust gas turbocharger with component parts - Summary of components

1 - Hollow screw

- ☐ 30 Nm

2 - Oil feed line

- ☐ check continuity
- ☐ before installing, fill the exhaust turbocharger on the connection fitting for the oil feed line with engine oil
- ☐ Observe part number ⇒ ETKA - Electronic Catalogue of Original Parts

3 - Screw

- ☐ 12 Nm

4 - Union nut

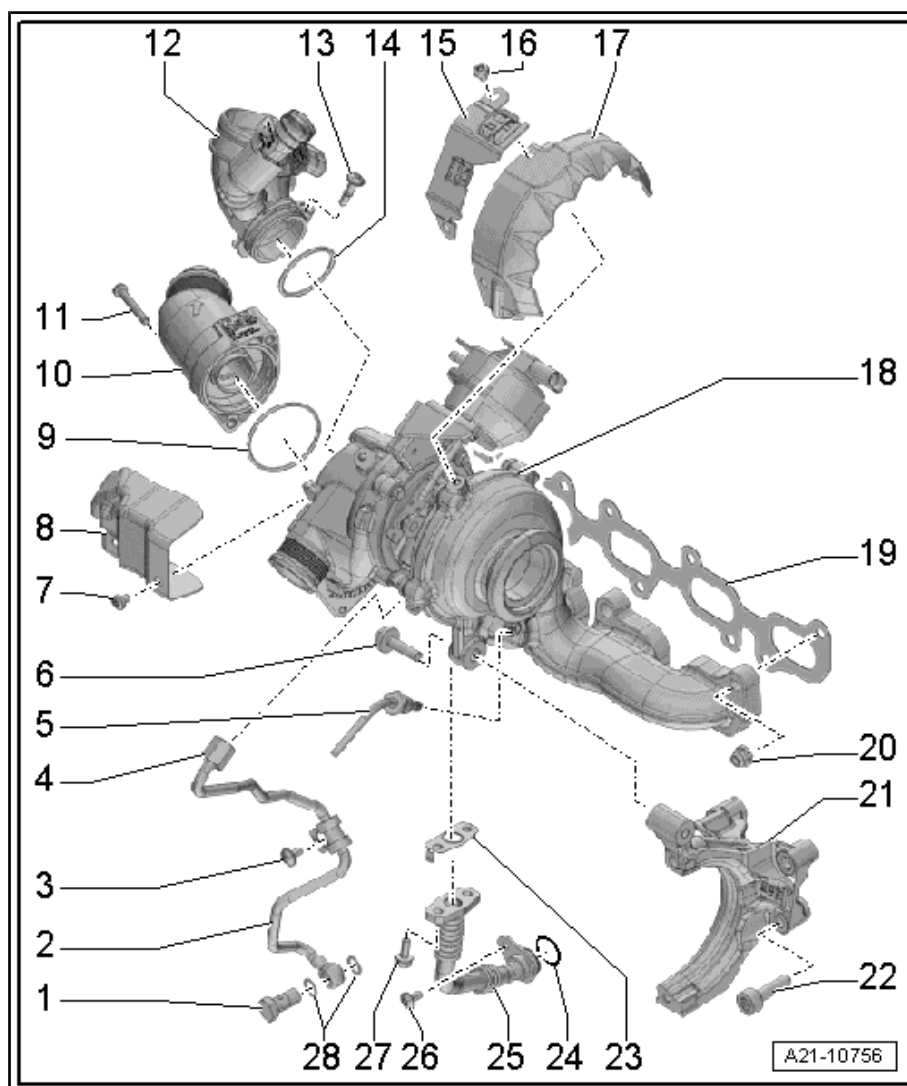
- ☐ 22 Nm

5 - Exhaust gas temperature transmitter 1 - G235-

- ☐ Summary of components
⇒ [“3.1 Summary of components - exhaust temperature regulation”, page 402](#)

6 - Screw

- ☐ for vehicles with exhaust gas cleaning module
⇒ [“2.1 Summary of components - exhaust gas cleaning”, page 388](#)
- ☐ Tightening torque and tightening order
⇒ [page 292](#)



7 - Screw

- ☐ 15 Nm

Volkswagen Technical Site: <http://vwts.ru> <http://vwts.info>

огромный архив документации по автомобилям Volkswagen, Skoda, Seat, Audi



8 - Heat shield

9 - O-ring

- ☐ replace after removal

10 - Pulsation dampener

- ☐ Observe part number ⇒ ETKA - Electronic Catalogue of Original Parts

11 - Screw

- ☐ 8 Nm

12 - Inlet connections

13 - Screw

- ☐ 8 Nm

14 - O-ring

- ☐ replace after removal

15 - Bracket

- ☐ for electrical cables

16 - Screw

- ☐ 15 Nm

17 - Heat shield

18 - Exhaust gas turbocharger

- ☐ removing and installing ⇒ ["1.2 Removing and installing exhaust gas turbocharger", page 292](#)
- ☐ For vehicles with engine identification characters CKFB, CKFC, CRVC, CUPA, CRMB, CUNA: Replace vacuum positioning element for charge pressure regulation with position sender for charge pressure regulator - G581-
⇒ ["1.3 Replace vacuum positioning element for charge pressure regulation with position sender for charge pressure regulator G581", page 302](#)
- ☐ Observe part number ⇒ ETKA - Electronic Catalogue of Original Parts

19 - Gasket

- ☐ replace after removal
- ☐ Observe part number ⇒ ETKA - Electronic Catalogue of Original Parts

20 - Nut

- ☐ replace after removal
- ☐ Tightening torque and tightening order ⇒ [page 292](#)

21 - Support

- ☐ for exhaust gas cleaning module ⇒ ["2.1 Summary of components - exhaust gas cleaning", page 388](#)
- ☐ Tightening torque and tightening order ⇒ [page 292](#)

22 - Screw

- ☐ for vehicles with exhaust gas cleaning module
⇒ ["2.1 Summary of components - exhaust gas cleaning", page 388](#)
- ☐ Tightening torque and tightening order ⇒ [page 292](#)

23 - Seal

- ☐ replace after removal

24 - O-ring

- ☐ replace after removal
- ☐ wet with engine oil

25 - Oil return-flow line

26 - Screw

- ☐ 10 Nm

**27 - Ribbed bolt**

- 14 Nm

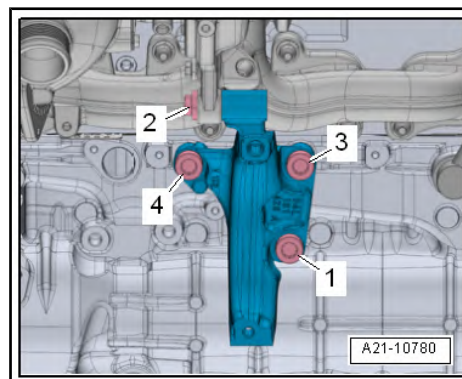
28 - Gasket rings

- replace after removal

Bracket for exhaust gas cleaning module - tightening torques and tightening order

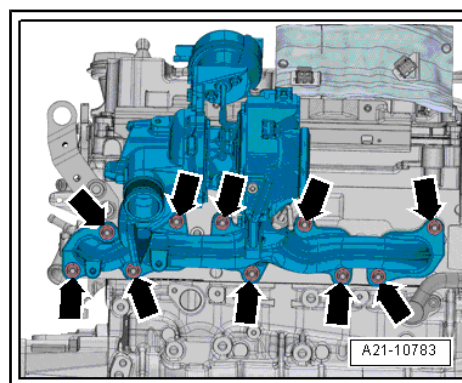
- Bring holder to installation position.
- Tighten screws in steps in the specified sequence:

Stage	Screws	Tightening torque
1.	-1-, -2-, -3-, -4-	by hand as far as the stop
2.	-2-	20 Nm
3.	-1-	40 Nm
4.	-3-, -4-	40 Nm

**Exhaust gas turbocharger - tightening torque and tightening order**

- Tighten screws in steps in the specified sequence:

Stage	Screws	Tightening torque
1.	-Arrows-	from inside to outside crosswise 11 Nm
2.	-Arrows-	from inside to outside crosswise 22 Nm
3.	-Arrows-	from inside to outside crosswise 22 Nm • This measure takes account of the settling behaviour of components

**1.2 Removing and installing exhaust gas turbocharger**

⇒ "1.2.1 Removing and installing exhaust gas turbocharger (engine identification characters CLHA, CLHB, CRKB, CKFB, CKFC, CUPA, CRMB, CUNA)", page 292

⇒ "1.2.2 Removing and installing exhaust gas turbocharger (engine identification characters CRVC)", page 298

1.2.1 Removing and installing exhaust gas turbocharger (engine identification characters CLHA, CLHB, CRKB, CKFB, CKFC, CUPA, CRMB, CUNA)**Special tools and workshop equipment required**

- ◆ Hose clip pliers - VAS 6362-
- ◆ Socket insert XZN 10 - T10501-



Caution

In case of mechanical damage to the exhaust gas turbocharger, e.g. damage of the compressor wheel, it is not sufficient to only replace the exhaust gas turbocharger. In order to prevent consequential damage to the engine, perform the following tasks:

- ◆ *Clean all oil lines.*
- ◆ *Change engine oil and oil filter.*
- ◆ *Check air filter housing, air filter element and charge air pipes as well as charge air hoses for soiling.*
- ◆ *Check all the air guides and the charge air cooler for foreign bodies.*

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



Note

- ◆ *Observe rules for cleanliness
⇒ ["3.1 Rules of cleanliness", page 6](#) .*
- ◆ *Observe general instructions for charge-air system
⇒ ["3 Repair instructions", page 6](#) .*

Removing



Note

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

- Remove engine cover
⇒ ["1.1 Removing and installing engine trim panel", page 10](#) .
- Remove the front silencer
⇒ ["1.2 Removing and installing exhaust pipe", page 380](#) .
- Drain coolant ⇒ ["1.2 Draining and filling coolant", page 151](#) .
- Remove rear coolant pipe
⇒ ["3.7 Removing and installing the rear coolant pipe", page 179](#) .
- Remove left coolant pipe
⇒ ["3.6 Remove and install the left coolant pipes", page 178](#) .

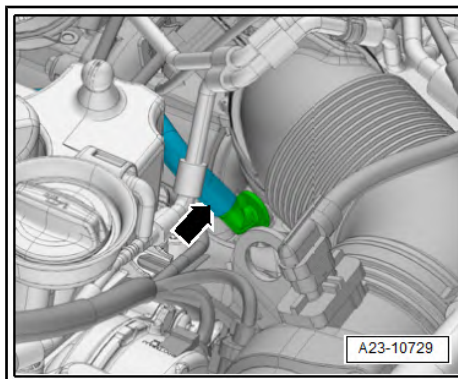
Right-hand drive

- Remove exhaust gas cleaning module ⇒ [page 392](#) .
- Continue for right-hand drive ⇒ [page 296](#) .

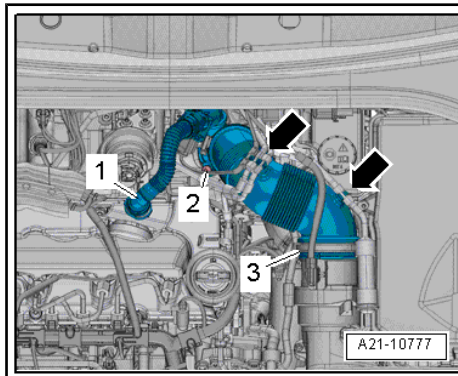


Left-hand drive

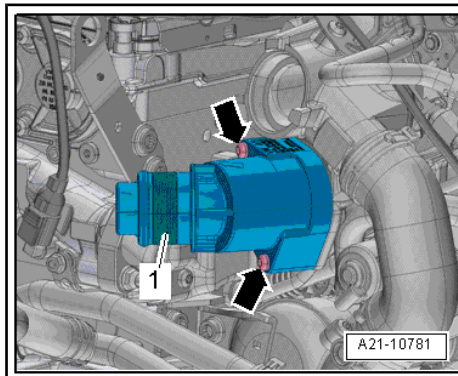
- if a vacuum hose is present: Remove it -arrow- and lay to the side.



- Press release buttons on the hose -1- for crankcase ventilation and remove from cylinder head cover.
- Disconnect vacuum hoses on the air guide pipe -arrows-.
- Release screw -2-, swivel air guide pipe with inlet connection towards the rear and detach from exhaust gas turbocharger.



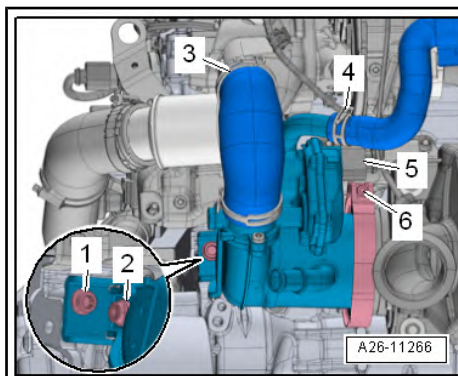
- Release screws -arrows- and remove pre-volume tank -1-.



- Press heat protection sleeve to the side, disconnect electrical plug connection -5-.
- Loosen hose clamp -3-, remove air guide hose.
- Loosen hose clamp -4-, remove coolant hose.
- Unscrew screw -1- using socket insert XZN 10 - T10501-, loosen screw -2-.

Vehicles with four-wheel drive

- Remove radiator for exhaust gas recirculation
⇒ [“4.5 Removing and installing radiator for exhaust gas recirculation”, page 415](#) .



Continued for left-hand drive vehicles

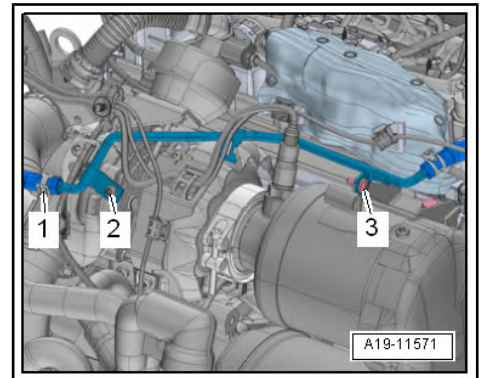
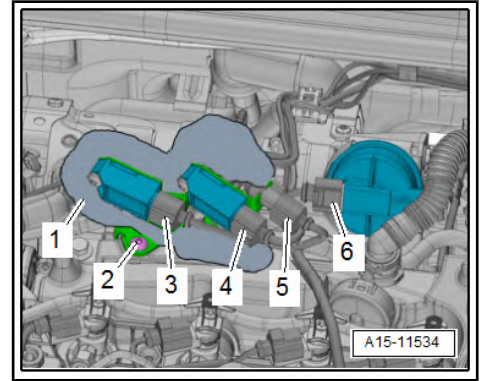
- Open heat protection sleeve -1-.
- Take electrical plug connection-5 - out of the holder, disconnect and expose electric cable.
- Disconnect electrical plug connections -3-, -6-, expose electric wiring loom.

For vehicles with engine identification characters CRKB, CRMB, CUNA

- Separate electrical plug connection -4-.

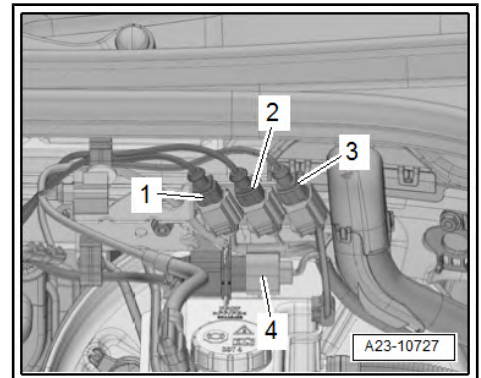
Continued for left-hand drive vehicles

- Unscrew screw -2-, lay bracket with differential pressure transmitter - G505- to the rear.
- Loosen hose clamp -1-, remove coolant hose.
- Unscrew screw -2-, remove screw -3- and swivel coolant line to the side.



- Expose the following plug connections and electric cables:
- 1 - for exhaust gas temperature transmitter 4 - G648-
- 2 - for exhaust gas temperature transmitter 3 - G495-
- 3 - for exhaust gas temperature transmitter 2 - G448- for vehicles with engine identification characters CRKB, CRMB, CUNA
- Take electrical plug connection-4- for lambda probe - G39- out of the holder, disconnect and expose electric cable.

Vehicles fitted with auxiliary heating



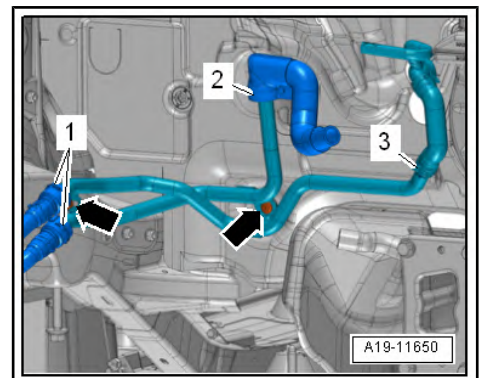
- Raise holding clamp -1- and loosen hose clamp -3-, remove coolant hoses.
- Release nuts -arrows-, remove coolant pipe.

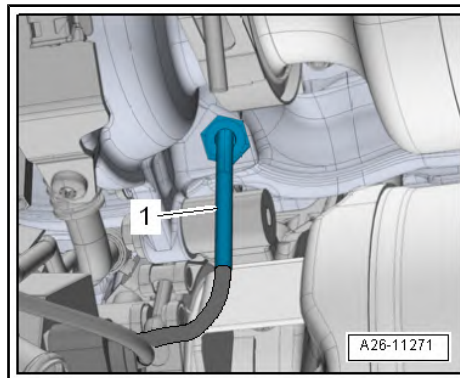
Continued for left-hand drive vehicles



Caution

When pressing out the exhaust gas cleaning module, take account of electric cable of exhaust gas temperature transmitter 1 - G235- -1-!





- Loosen screw -1- and remove screw clamp.
- Slacken the double screw -2-, lay coolant pipe backwards slightly.
- Unscrew screws -arrows-, push exhaust gas cleaning module and exhaust gas recirculation cooler backwards.

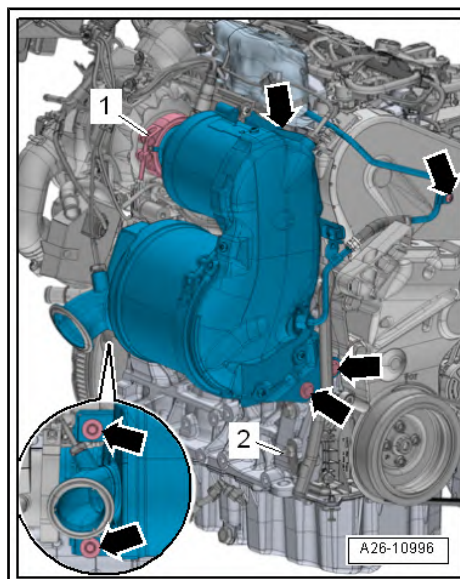


Caution

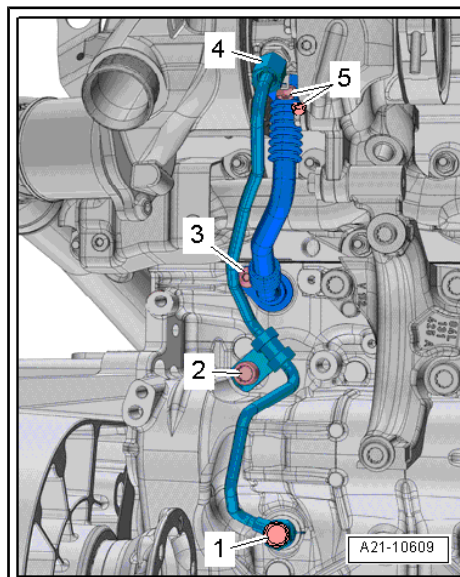
Risk of damage to oil feed line.

◆ *Do not bend oil feed line.*

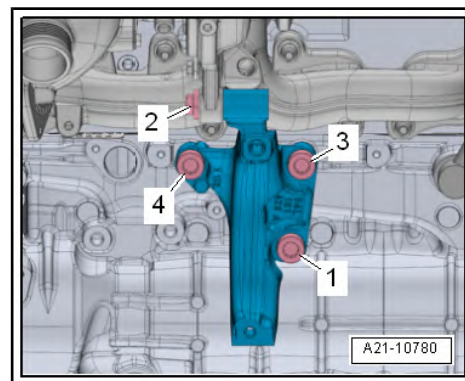
Continued for all vehicles



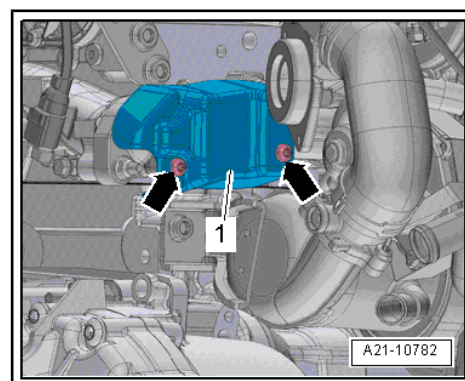
- Release hollow screw -1-, unscrew screw -2- and union nut -4-, remove oil feed line.
- Unscrew screws -3-, -5-, remove oil return-flow line.



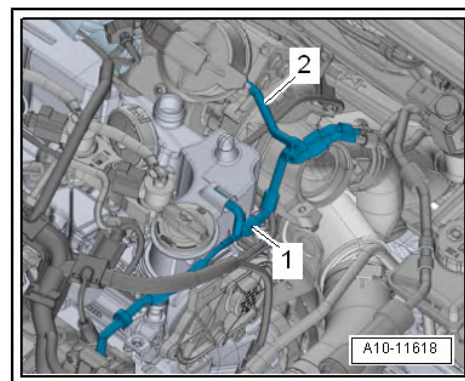
- Unscrew screws 1-...4- and remove bracket for diesel particle filter.



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



- Remove the vacuum hose -2- from the vacuum unit for charge pressure control.





- Unscrew nuts -arrows- and remove the exhaust gas turbo-charger with exhaust manifold from the cylinder head.

Install

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



Note

- ◆ *Replace gasket rings, gaskets, O-rings and the self-locking nuts after disassembly.*
- ◆ *Fill the exhaust turbocharger with engine oil at the connection fitting for the oil feed line.*
- ◆ *Observe the assembly instruction for hose connections with screw clamps*
⇒ [“1.6 Hose connections with screw clamps”, page 308](#) .
- ◆ *Hose connections and air guide pipes and hoses must be free of oil and grease before being installed.*
- ◆ *Secure all hose connections with spring-type clips that comply with the series design ⇒ ETKA - Electronic Catalogue of Original Parts .*
- ◆ *To ensure the oil supply to the exhaust gas turbocharger, leave the engine running for about 1 minute after installing the exhaust gas turbocharger; do not rev up immediately.*
- Electrical connections and proper routing ⇒ Electrical System; Rep. gr. 97 and ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Install exhaust gas cleaning module
⇒ [“2.2 Removing and installing exhaust gas cleaning module”, page 392](#) .
- Install the left coolant pipe
⇒ [“3.6 Remove and install the left coolant pipes”, page 178](#) .
- Install front silencer
⇒ [“1.2 Removing and installing exhaust pipe”, page 380](#) .
- Install the rear coolant pipe
⇒ [“3.7 Removing and installing the rear coolant pipe”, page 179](#) .
- Connect vacuum hose
⇒ [“1.4 Connection diagram for vacuum hoses”, page 306](#) .

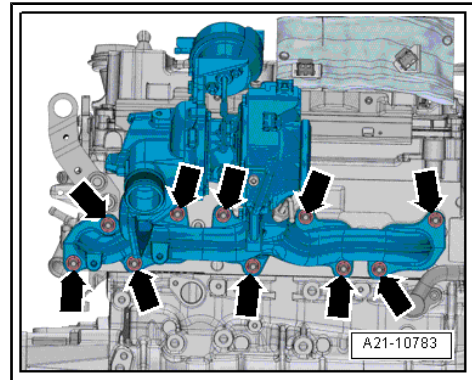
Tightening torques

- ◆ ⇒ [“1.1 Exhaust gas turbocharger with component parts - Summary of components”, page 290](#)
- ◆ ⇒ [Fig. “Bracket for exhaust gas cleaning module - tightening torques and tightening order”, page 292](#)
- ◆ ⇒ [“2.1 Summary of components - exhaust gas cleaning”, page 388](#)

1.2.2 Removing and installing exhaust gas turbocharger (engine identification characters CRVC)

Special tools and workshop equipment required

- ◆ Hose binding claw - VAS 6362-



◆ Socket insert XZN 10 - T10501-



Caution

In case of mechanical damage to the exhaust gas turbocharger, e.g. damage of the compressor wheel, it is not sufficient to only replace the exhaust gas turbocharger. In order to prevent consequential damage to the engine, perform the following tasks:

- ◆ *Clean all oil lines.*
- ◆ *Change engine oil and oil filter.*
- ◆ *Check air filter housing, air filter element and charge air pipes as well as charge air hoses for soiling.*
- ◆ *Check all the air guides and the charge air cooler for foreign bodies.*

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



Note

- ◆ *Observe rules for cleanliness*
⇒ "3.1 Rules of cleanliness", page 6 .
- ◆ *Observe general instructions for charge-air system*
⇒ "3 Repair instructions", page 6 .

Removing



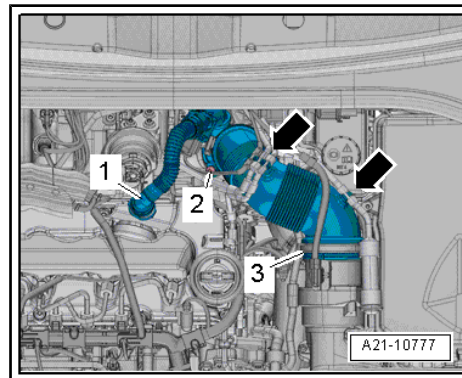
Note

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

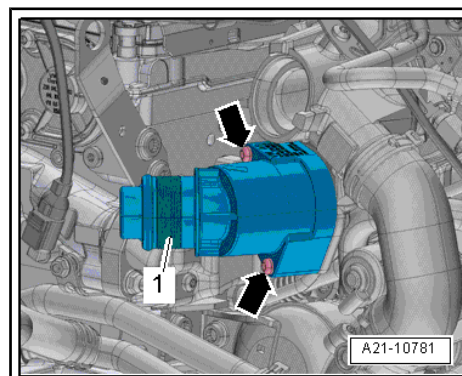
- Remove engine cover
⇒ "1.1 Removing and installing engine trim panel", page 10 .
- Drain coolant *⇒ "1.2 Draining and filling coolant", page 151 .*
- Remove pre-exhaust pipe
⇒ "1.2 Removing and installing exhaust pipe", page 380 .
- Remove rear coolant pipe
⇒ "3.7 Removing and installing the rear coolant pipe", page 179 .
- For vehicles with auxiliary heating, remove coolant hoses from front wall *⇒ Heating, Air Conditioning; Rep. gr. 82 .*



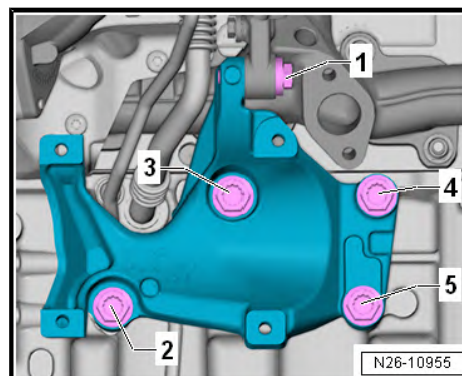
- Press release buttons on the hose -1- for crankcase ventilation and remove from cylinder head cover.
- Disconnect vacuum hoses on the air guide pipe -arrows-.
- Release screw -2-, swivel air guide pipe with inlet connection towards the rear and detach from exhaust gas turbocharger.



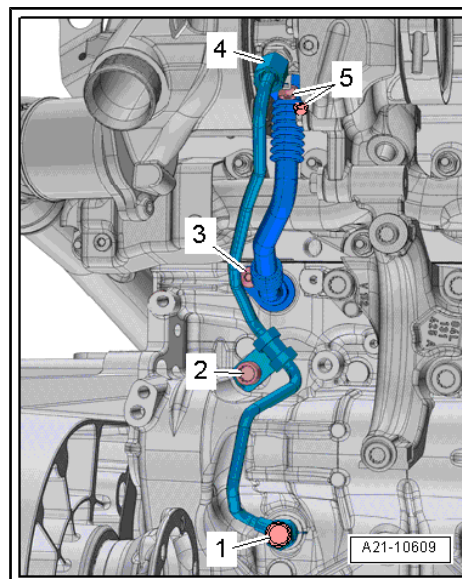
- Release screws -arrows- and remove pre-volume tank -1-.
- Disconnect the line from the exhaust temperature transmitter 1 - G235- .
- Remove catalytic converter
⇒ [“2.3 Removing and installing catalytic converter”, page 400](#) .
- Remove radiator for exhaust gas recirculation
⇒ [“4.5 Removing and installing radiator for exhaust gas recirculation”, page 415](#) .



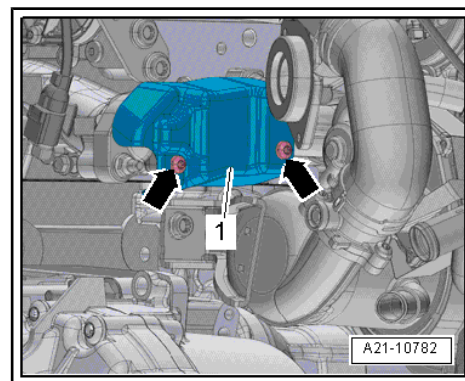
- Unscrew screws -1 ... 5 - and remove bracket for radiator for exhaust gas recirculation.



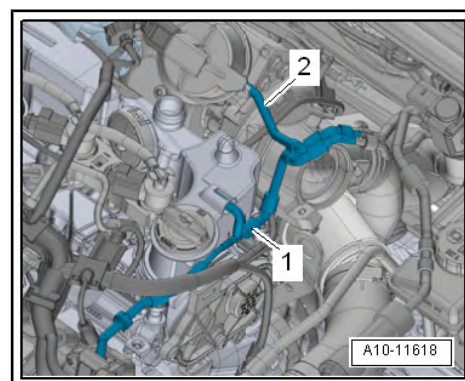
- Release nut -2- and remove union nut -4-.
- Unscrew screws -3-, -5-, remove oil return-flow line.



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



- Remove the vacuum hose -2- from the vacuum unit for charge pressure control.





- Unscrew nuts -arrows- and detach the exhaust gas turbocharger with exhaust manifold from the cylinder head, and remove from the top.

Install

Install in the reverse order of removal. When doing this, note the following:



Note

- ◆ *Replace gasket rings, gaskets, O-rings and the self-locking nuts after disassembly.*
- ◆ *Fill the exhaust turbocharger with engine oil at the connection fitting for the oil feed line.*
- ◆ *Hose connections and air guide pipes and hoses must be free of oil and grease before being installed.*
- ◆ *Secure all hose connection ends with spring-type clips that comply with the series design ➔ ETKA - Electronic Catalogue of Original Parts .*
- ◆ *To ensure the oil supply to the exhaust gas turbocharger, leave the engine running for about 1 minute after installing the exhaust gas turbocharger; do not rev up immediately.*
- Electrical connections and proper routing ➔ Electrical System; Rep. gr. 97 and ➔ Current flow diagrams, Electrical fault finding and Fitting locations.
- Install the rear coolant pipe
➔ [“3.7 Removing and installing the rear coolant pipe”, page 179](#) .
- Install mounting bracket for radiator for exhaust gas recirculation ➔ [page 412](#) .
- Install radiator for exhaust gas recirculation
➔ [“4.5 Removing and installing radiator for exhaust gas recirculation”, page 415](#) .
- Install high catalytic converter
➔ [“2.3 Removing and installing catalytic converter”, page 400](#) .
- Install pre-exhaust pipe
➔ [“1.2 Removing and installing exhaust pipe”, page 380](#) .
- Connect vacuum hose
➔ [“1.4 Connection diagram for vacuum hoses”, page 306](#) .

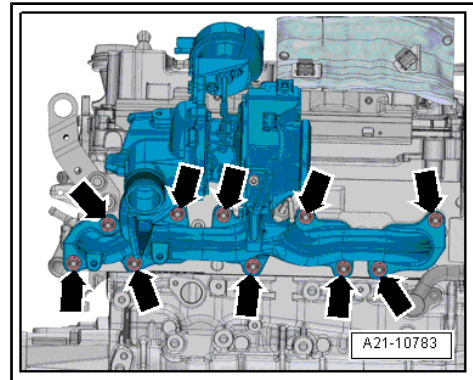
Tightening torques

- ◆ ➔ [“1.1 Exhaust gas turbocharger with component parts - Summary of components”, page 290](#)
- ◆ ➔ [“2.1 Summary of components - exhaust gas cleaning”, page 388](#)

1.3 Replace vacuum positioning element for charge pressure regulation with position sender for charge pressure regulator - G581-

Special tools and workshop equipment required

- ◆ Hand vacuum pump - VAS 6213-

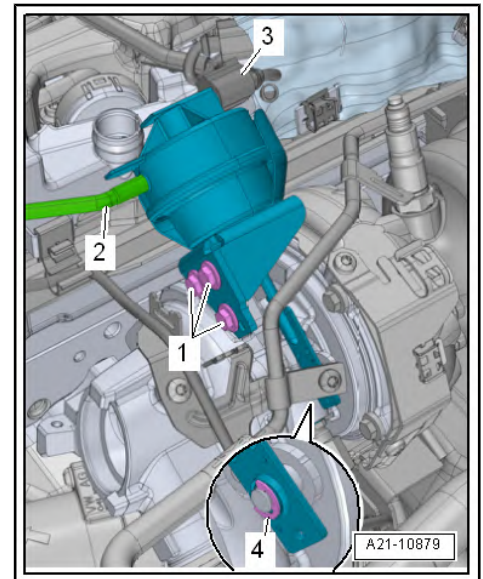


Removing

- Remove engine cover
⇒ "1.1 Removing and installing engine trim panel", page 10 .

Version 1

- Disconnect the electrical plug connection -3- from the position sender for charge pressure regulator - G581- .
- Remove the vacuum hose -2- from the vacuum unit for charge pressure control.
- Remove detention ring -4-.
- Release screws -1- from the pressure box.
- Unhook the control rod from the adjuster lever and remove the pressure box with position sender for charge pressure regulator - G581- .



Version 2

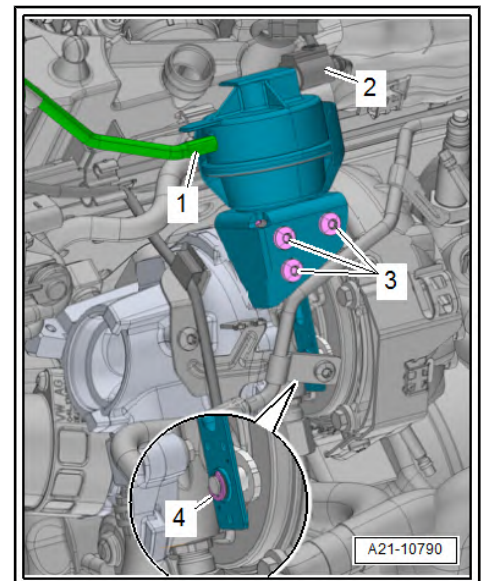
- Disconnect the electrical plug connection -2- from the position sender for charge pressure regulator - G581- .
- Remove the vacuum hose -1- from the vacuum unit for charge pressure control.
- Remove detention ring -4-.
- Unscrew screws -3- from the pressure box.
- Unhook the control rod from the adjuster lever and remove the pressure box with position sender for charge pressure regulator - G581- .

Install



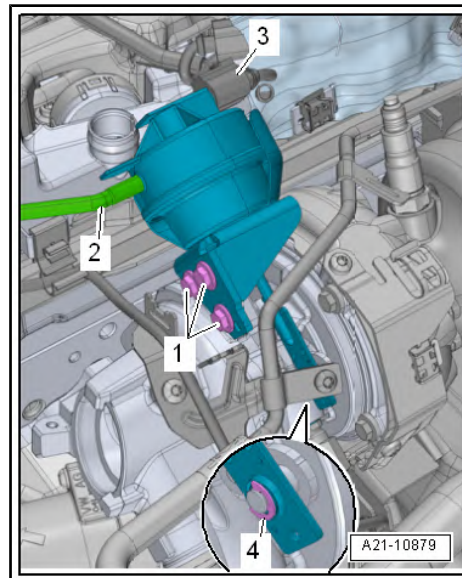
Note

Use new screws and a new circlip from the repair kit!



Version 1

- Hook in the control rod at the adjuster lever, attach the pressure box, and turn in the screws -1- as far as they can go by hand.
- Install the circlip -4-.
- Connect the electrical plug connection -3- to the position sender for charge pressure regulator - G581- .

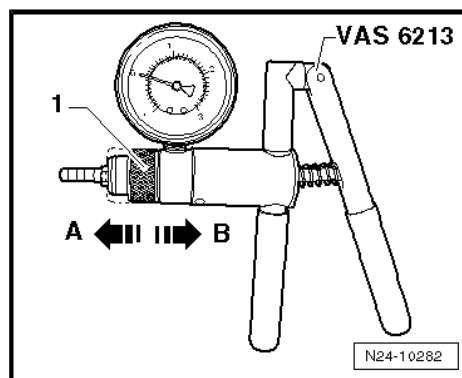
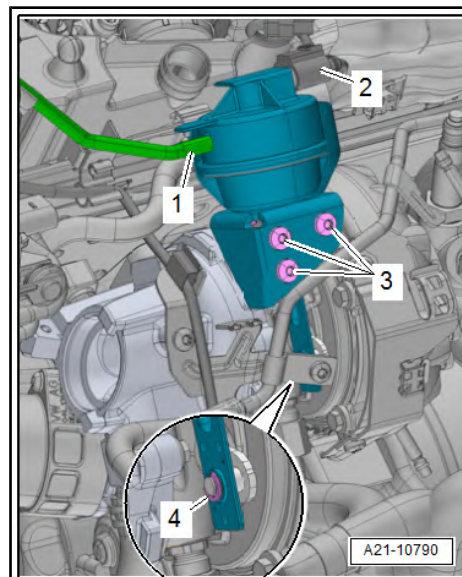


Version 2

- Hook in the control rod at the adjuster lever, attach the pressure box, and turn in the screws -3- as far as they can go by hand.
- Install the circlip -4-.
- Connect the electrical plug connection -2- to the position sender for charge pressure regulator - G581- .

Continued for all versions

- Adjust the control rod for the dashpot, measuring the initial tension as you do so.
- You must use ⇒ Vehicle diagnostic tester.
- Targeted functions
- 01 - read measured value block
- Put the sliding ring -1- of the hand vacuum pump - VAS 6213- in position-A- for "vacuum"



- Connect the hand vacuum pump - VAS 6213- to the pressure box -arrow-.



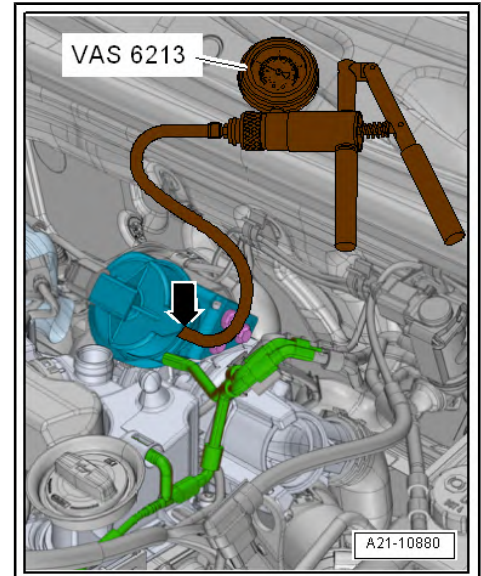
Caution

Risk of damage to the pressure box from excessive vacuum.

- ◆ *Under no circumstances, must a vacuum greater than -800 mbar be generated.*

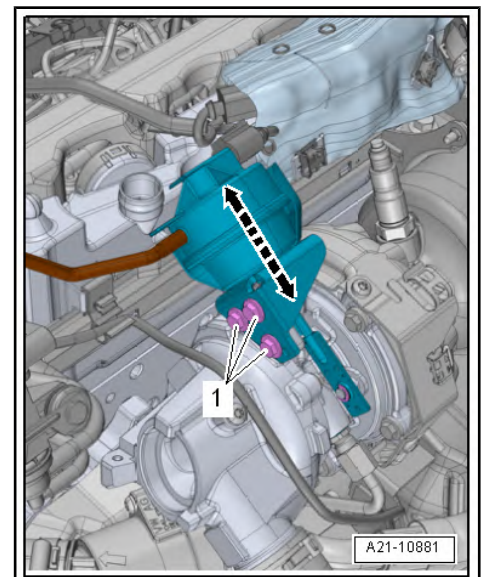
Adjust the voltage value

- Using the hand vacuum pump - VAS 6213- continue pumping until the pressure gauge indicates a vacuum between -650...-700 mbar.



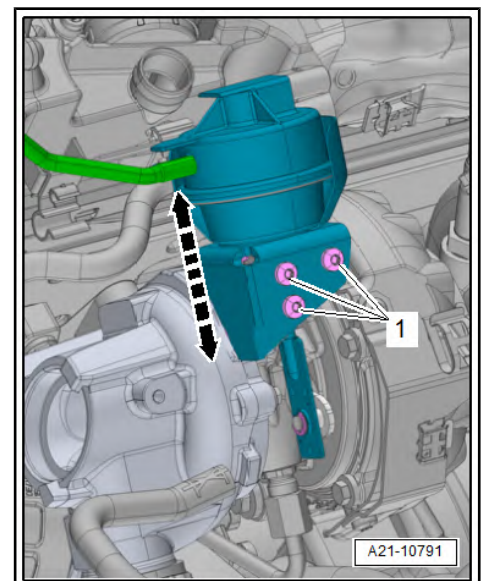
Version 1

- Slide the pressure box in the -direction of arrow- until a voltage of 0.75 ± 0.02 V appears on the ⇒ Vehicle diagnostic tester.
- Tighten screws -1- to 10 Nm.



Version 2

- Slide the pressure box in the -direction of arrow- until a voltage of 0.75 ± 0.02 V appears on the ⇒ Vehicle diagnostic tester.
- Tighten screws -1- to 10 Nm.

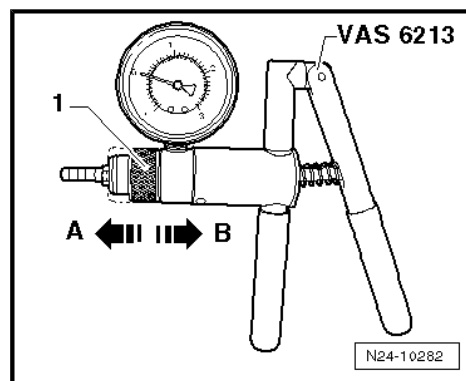




- Put the sliding ring -1- of the hand vacuum pump - VAS 6213- into position -B- to ensure the pressure box is vented until the pressure reaches the ambient pressure.

Check the voltage value

- Put the sliding ring -1- of the hand vacuum pump - VAS 6213- in position-A- for “vacuum”
- Using the hand vacuum pump - VAS 6213- continue pumping until the pressure gauge indicates a vacuum between -650...-700 mbar.
- The ⇒ Vehicle diagnostic tester should now indicate a voltage of 0.75 ± 0.02 V.



Voltage not OK.



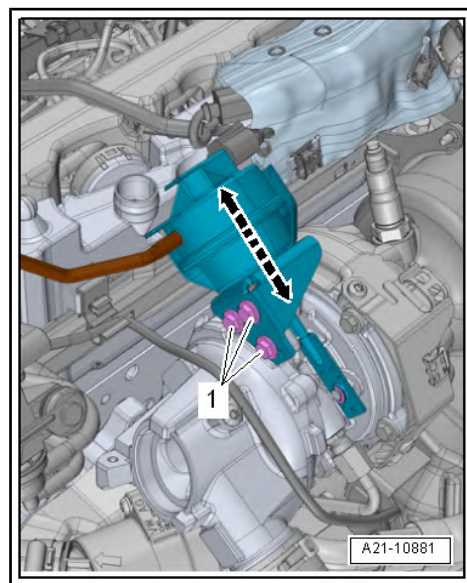
Note

Version 1 is shown as an example.

- Release screws -1-.
- Adjust the voltage value ⇒ [page 305](#) .

Voltage value o.k.

- Coat the screws with sealing varnish from the repair kit.
- Install the engine cover
⇒ [“1.1 Removing and installing engine trim panel”, page 10](#) .
- Start engine and erase fault memory ⇒ Vehicle diagnostic tester.



1.4 Connection diagram for vacuum hoses

1 - Vacuum line

2 - Non-return valve

- ☐ Check fitting position
- ☐ the positive side points to the cylinder head cover

3 - Cylinder head cover

- ☐ with vacuum unit

4 - Vacuum unit

- ☐ at exhaust gas turbo-charger
- ☐ with position sender for charge pressure regulator - G581-
- ☐ for charge pressure control

5 - Head tube for vacuum

- ☐ from charge pressure control solenoid valve - N75- for vacuum unit on the exhaust gas turbo-charger

6 - Solenoid valve for charge pressure control - N75-

7 - To the brake servo unit

8 - Non-return valve

- ☐ Check fitting position

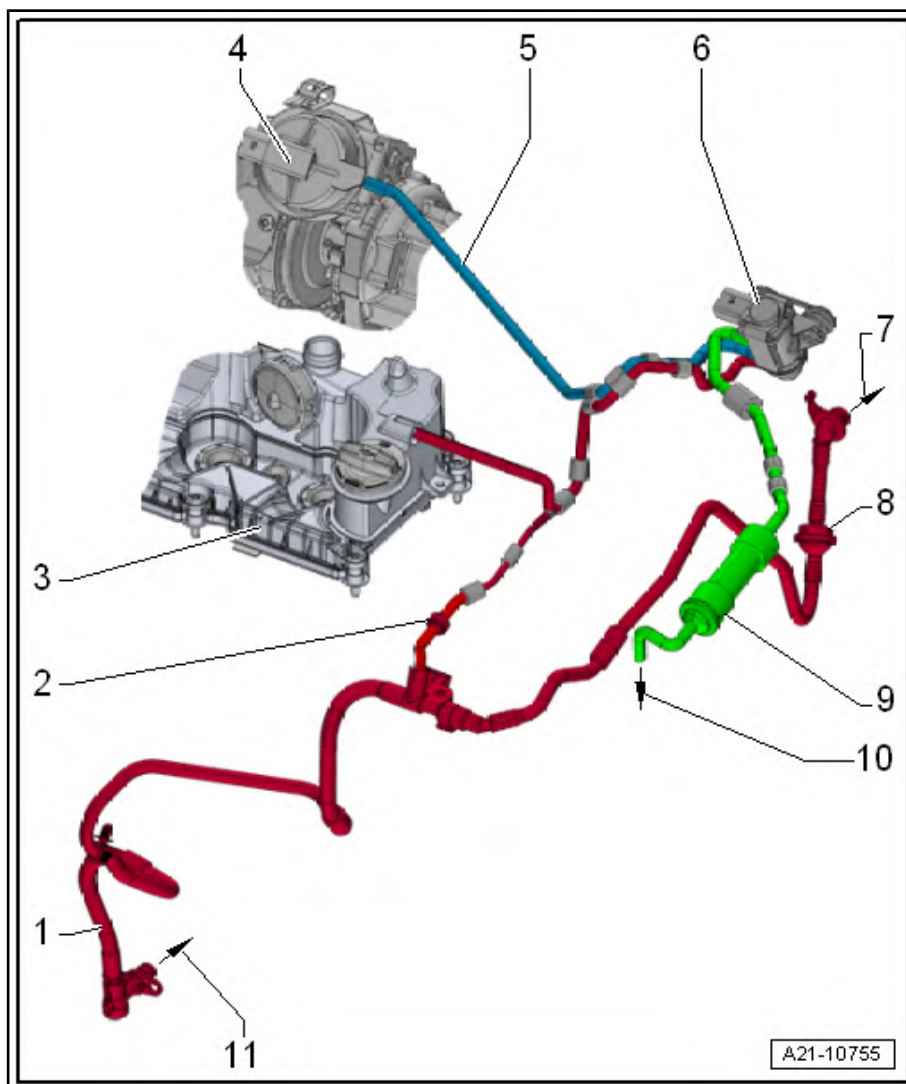
9 - Vent line

10 - To air filter housing

11 - To vacuum pump

- ☐ in the oil pump

⇒ ["1.1 Parts of the lubrication system - Summary of components", page 127](#)



1.5 Checking vacuum system

Special tools and workshop equipment required

- ◆ Hand vacuum pump , e.g. -VAS 6213-

Work procedure

- Check all the vacuum lines in the complete vacuum system for:
 - ◆ tears
 - ◆ Interruption (martin bites)
 - ◆ Crimping
 - ◆ porous points and other leaks
- Check vacuum line to the solenoid valve and check solenoid valve for the respective component.
- In the event of an event memory entry, check the vacuum lines to the mentioned component and also the remaining vacuum lines to the other components.



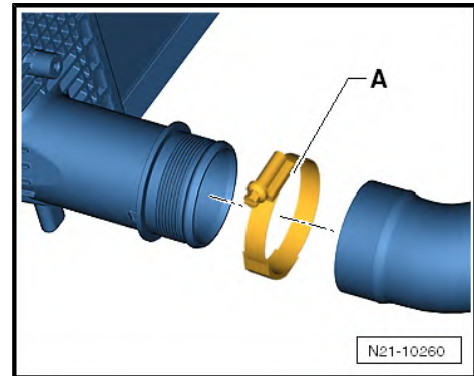
- If no vacuum can be created or the vacuum drops immediately with the hand vacuum pump - VAS 6213- , check hand vacuum pump and connecting hoses for leaks.

1.6 Hose connections with screw clamps



Note

- ◆ *Connections, charge air pipes and hoses of charge air system must be free of oil and grease before being installed.*
- ◆ *Only install approved screw clamps for securing the hose connections ⇒ ETKA - Electronic Catalogue of Original Parts .*
- ◆ *In order to secure the charge air hoses on their connection fittings, the threads must be treated with rust solvent if the screw clamps have been used beforehand.*
- ◆ *After a repair, check all the charge air pipes, charge air hoses and vacuum lines for tight connection and leaktightness.*



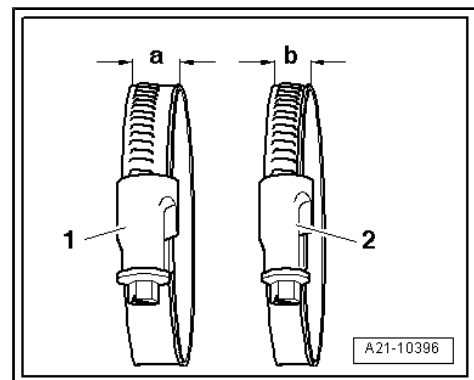
Caution

The screw clamps -A- on the charge air hoses must definitely be precisely tightened in accordance with the specifications ⇒ [page 308](#) .

- ◆ *A too low or on the contrary, a too high tightening torque of the screw clamps, may result in the charge air hose slipping off the fluted pipe or the charge air pipe while driving.*

Tightening torques of the screw clamps

- 1 - Hose clamp -a- = 12 mm wide: 5.5 Nm
- 2 - Screw clamp -b- = 9 mm wide: 3 Nm



2 Charge-air system - radiator, leak-tightness

⇒ ["2.1 Charge air cooling - Summary of components", page 309](#)

⇒ ["2.2 Removing and installing charge pressure sender G31 ", page 311](#)

⇒ ["2.3 Checking the charge-air system for leaktightness", page 311](#)

2.1 Charge air cooling - Summary of components

1 - Gasket ring

- ☐ replace after removal

2 - Fit pin

3 - Screw

- ☐ 8 Nm

4 - Gasket

- ☐ replace after removal

5 - Screw

- ☐ Tightening torque and tightening order
⇒ [page 357](#)

6 - Support

- ☐ for the intake manifold

7 - Screw

- ☐ Tightening torque and tightening order
⇒ [page 357](#)

8 - Screw

- ☐ replace after removal
- ☐ Tightening torque and tightening order
⇒ [page 357](#)

9 - Fit pin

10 - Screw

- ☐ 8 Nm

11 - Intake manifold with charge air cooler

- ☐ The intake manifold and charge air cooler form a single building unit

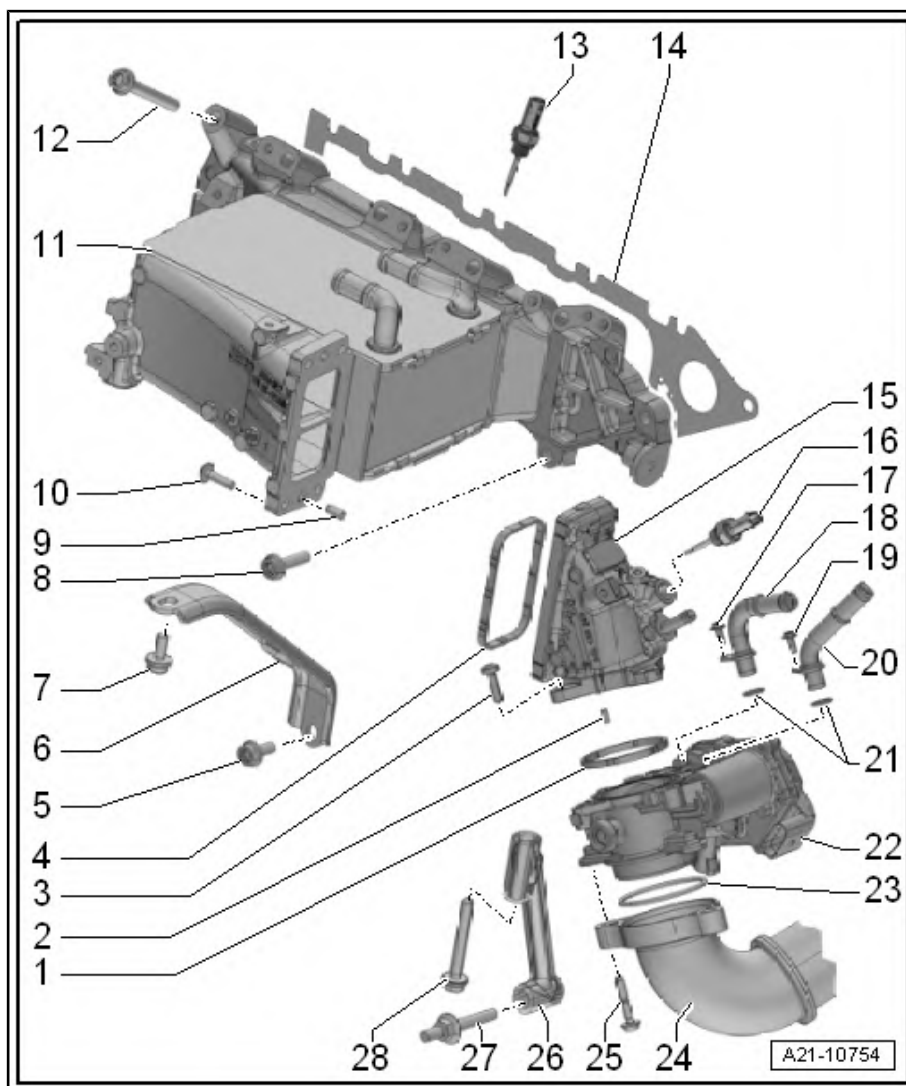
- ☐ removing and installing ⇒ ["6.3 Removing and installing intake manifold", page 359](#)

12 - Screw

- ☐ replace after removal
- ☐ Tightening torque and tightening order ⇒ [page 357](#)

13 - Charge air temperature transmitter after charge air cooler - G811-

- ☐ removing and installing
⇒ ["4.1 Removing and installing intake air temperature transmitter G42 / charge air temperature transmitter after charge air cooler G811 ", page 342](#)
- ☐ 22 Nm



14 - Seal

- ☐ replace after removal

15 - Supports

- ☐ for throttle valve control unit - J338-

16 - Intake air temperature transmitter - G42-

- ☐ removing and installing
 ⇒ ["4.1 Removing and installing intake air temperature transmitter G42 / charge air temperature transmitter after charge air cooler G811 ", page 342](#)
- ☐ 22 Nm

17 - Screw

- ☐ 10 Nm

18 - Coolant pipe

19 - Screw

- ☐ 10 Nm

20 - Coolant pipe

21 - O-rings

- ☐ replace after removal
- ☐ Moisten with coolant

22 - Throttle valve module - J338-

- ☐ With throttle valve potentiometer - G69-
- ☐ removing and installing ⇒ ["6.2 Removing and installing the throttle valve control unit J338 ", page 357](#)

23 - O-ring

- ☐ replace after removal

24 - Air guide pipe

25 - Screw

- ☐ 8 Nm

26 - Bracket

- ☐ for throttle valve control unit - J338-

27 - Screw

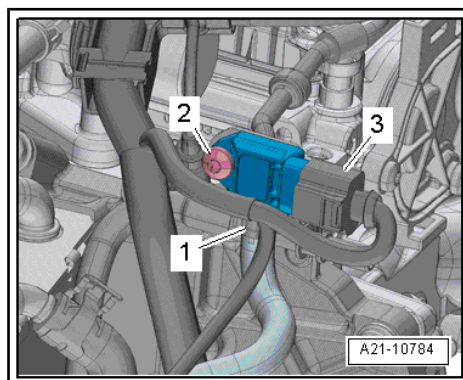
- ☐ Tightening torque and tightening order ⇒ [page 357](#)

28 - Screw

- ☐ Tightening torque and tightening order ⇒ [page 357](#)

Charge pressure sender - G31- - tightening torque

- Tighten -2- to 9 Nm.



2.2 Removing and installing charge pressure sender - G31-

Removing

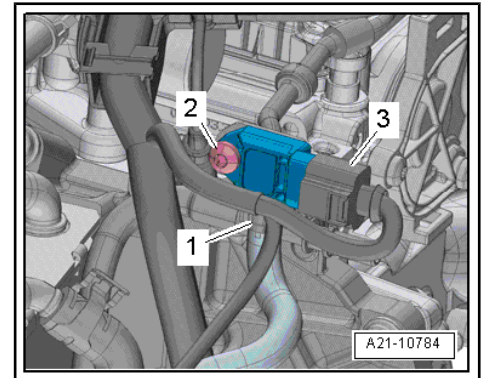
- Remove engine cover
⇒ [“1.1 Removing and installing engine trim panel”, page 10](#) .
- Separate electrical plug connection -3-.
- Spray hose with a solvent at charge pressure sender - G31- before removing it.



Caution

Risk of destruction of the charge pressure sender as a result of the connection fitting breaking.

- ◆ *Pull hose off carefully and straight from the connection fitting.*



- Release screws -2- and remove charge pressure sender - G31- .

Install

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

Tightening torques

- ◆ ⇒ [Fig. ““ Charge pressure sender -G31- - tightening torque””, page 310](#)

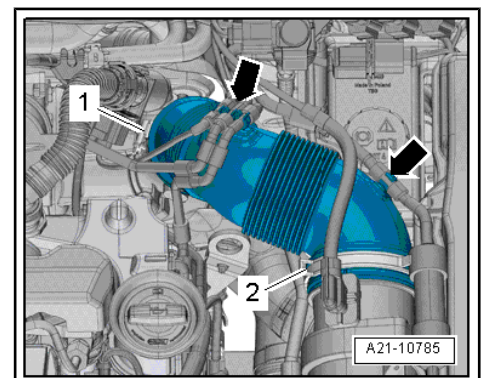
2.3 Checking the charge-air system for leaktightness

Special tools and workshop equipment required

- ◆ Charge-air system testing device , e. g. -V.A.G 1687-
- ◆ Adapter , e.g. -V.A.G 1687/11-
- ◆ Adapter , e.g. -V.A.G 1687/15-
- ◆ Hose binding claw

Test procedure

- Remove engine cover
⇒ [“1.1 Removing and installing engine trim panel”, page 10](#) .
- Disconnect vacuum hoses on the air guide pipe -arrows-.
- Loosen hose clamp -1-, -2-, remove air guide pipe.





- Connect adapter - V.A.G 1687/11- with -V.A.G 1687/15- to the exhaust gas turbocharger.
- Connect testing device for charge-air systems - V.A.G 1687- to adapter.

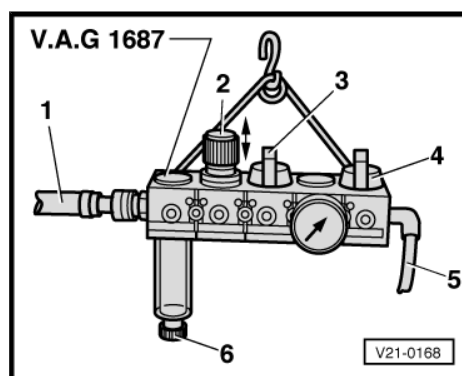
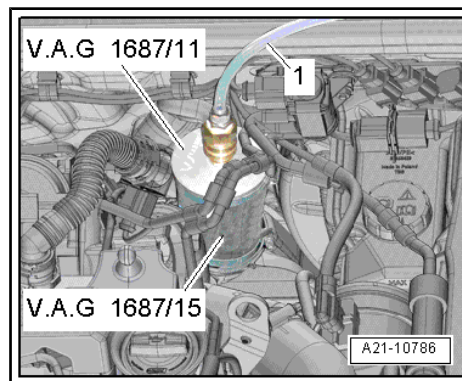
Prepare tester for charge air system - V.A.G 1687- as follows:

- Unscrew pressure control valve -2- fully and close the valves -3- and -4-.



Note

The rotary knob must be pulled to the top in order to rotate the pressure control valve -2-.



- Connect the pneumatic hose -1- (pneumatic support) to tester for charge air system.

i Note

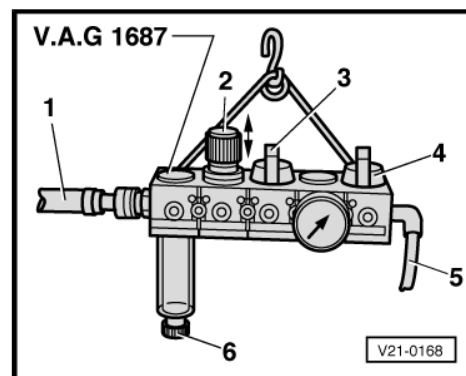
If there is water in the inspection glass, drain water via the drain plug -6-.

- Open valve -3-.



Caution

The pressure must not be greater than 0.05 MPa (0.5 bar)! A too high pressure can damage the engine.



- Set the pressure to 0.05 MPa (0.5 bar) with the pressure control valve -2-.
- Open valve -4- and wait until the test circuit is filled. If necessary regulate the pressure to 0.05 MPa (0.5 bar).
- Listen to, touch or use commercially available leak search spray or the ultrasonic measuring device e. g. -V.A.G 1842- to check the charge-air system with exhaust gas turbocharger for leak points.

i Note

- ◆ *Minor leaks are permissible on the suction side of the turbo-charger, because the intake hoses are not designed for over-pressure.*
- ◆ *A small amount of air escapes via the valves into the engine. For this reason no pressure test is possible.*
- ◆ *Use of ultrasonic measuring device - V.A.G 1842- ⇒ operating instructions .*
- ◆ *In case of a leak point, observe the instructions for charge air system ⇒ **"3 Repair instructions", page 6** during the installation.*
- ◆ *Before removing the adapter, depressurize the test circuit by detaching the hose coupling.*



23 – Mixture preparation - injection

1 Diesel direct injection system - fitting location, system overview

⇒ [“1.1 Installation location overview - fuel injection system”, page 314](#)

⇒ [“1.2 Schematic overview - fuel system”, page 320](#)

⇒ [“1.3 Filling/bleeding the fuel system”, page 321](#)

⇒ [“1.4 Check the fuel system for tightness”, page 322](#)

1.1 Installation location overview - fuel injection system

⇒ [“1.1.1 Installation location overview - engine compartment”, page 314](#)

⇒ [“1.1.2 Installation location overview - engine from left”, page 317](#)

⇒ [“1.1.3 Installation location overview - engine from right”, page 319](#)

1.1.1 Installation location overview - engine compartment

The control unit is equipped with a fault memory. Before repairs, setting operations and fault finding, interrogate the fault memory and execute a self-diagnosis → Vehicle diagnostic tester.



Note

- ◆ *Faults can be detected by the control unit as checking and adjustment work is being undertaken and then saved. It is therefore absolutely necessary to delete the fault memory after completing all checking and adjustment work → Vehicle diagnostic tester*
- ◆ *Observe the safety precautions when working on the diesel direct injection system ⇒ [“2 Safety instructions”, page 3](#).*

1 - Coolant valve for cylinder head - N489-

- ❑ Fitting location
⇒ [page 317](#)

2 - Injection units

- ◆ Injector, cylinder 1 - N30-
- ◆ Injector, cylinder 2 - N31-
- ◆ Injector, cylinder 3 - N32-
- ◆ Injector, cylinder 4 - N33-
- ❑ Summary of components
⇒ ["2.1 Summary of components - injection units \(injectors\)", page 323](#)

3 - Differential pressure transmitter - G505-

- ❑ Summary of components
⇒ ["3 Exhaust temperature regulation", page 402](#)

4 - Exhaust gas pressure sensor 1 - G450-

- ❑ only for vehicles with engine identification characters CRKB, CRMB, CUNA
- ❑ Summary of components
⇒ ["5.1 Lambda probe - Summary of components", page 351](#)

5 - Position sender for charge pressure regulator - G581-

6 - Engine noise speaker

- ❑ only for vehicles with engine identification characters CUPA
- ❑ removing and installing ⇒ ["8.1 Removing and installing engine noise speaker", page 369](#)

7 - Coolant temperature transmitter - G62-

- ❑ Summary of components ⇒ ["2.2 Summary of components - coolant temperature transmitter", page 161](#)

8 - Solenoid valve for charge pressure control - N75-

- ❑ Electrical plug connection for solenoid valve for charge pressure control - N75-
- ❑ Electrical plug connection for exhaust gas temperature transmitter 4 - G648-
- ❑ Electrical plug connection for exhaust gas temperature transmitter 3 - G495-
- ❑ Electrical plug connection for lambda probe - G39-
- ❑ Fitting location ⇒ [page 317](#)

9 - Air mass meter - G70-

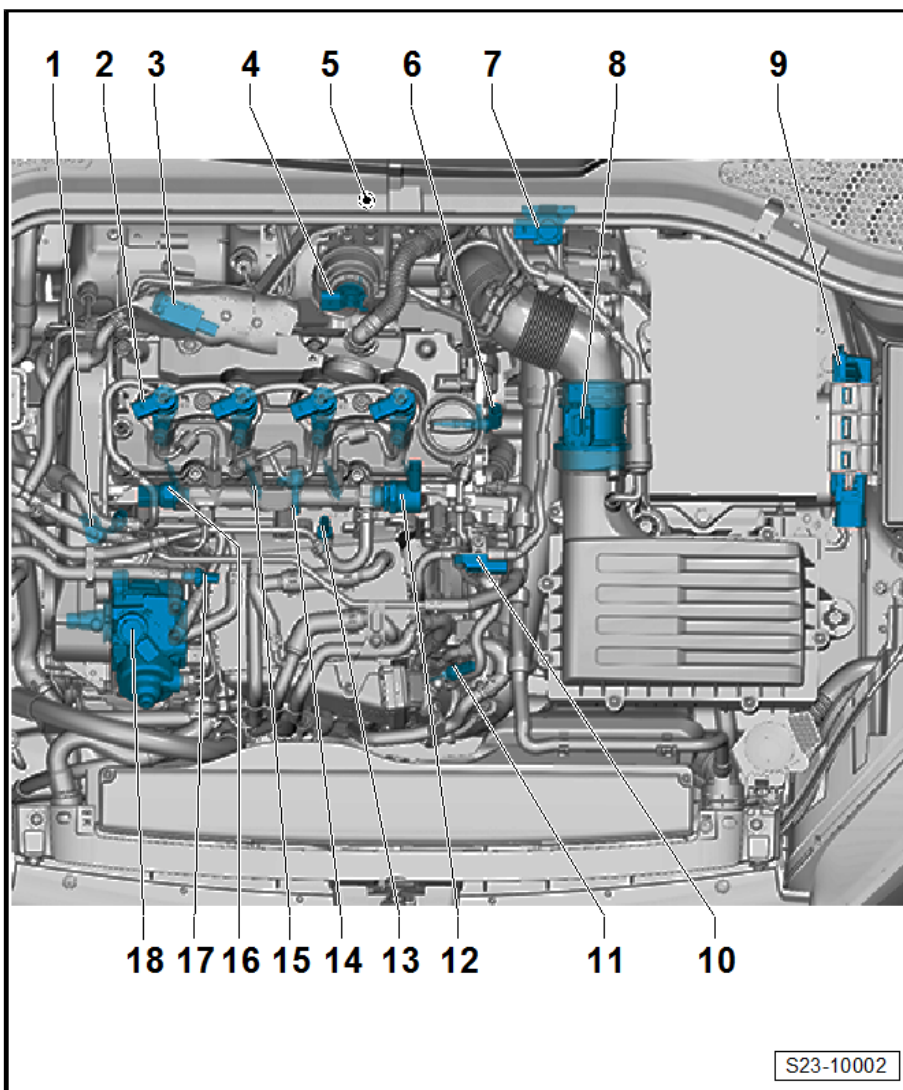
- ❑ Fitting location ⇒ [page 317](#)

10 - Engine control unit - J623-

- ❑ removing and installing ⇒ ["7 Engine control unit", page 366](#)

11 - Charge pressure sender - G31-

- ❑ Summary of components ⇒ ["2.1 Charge air cooling - Summary of components", page 309](#)



12 - Intake air temperature transmitter - G42-

- ❑ Summary of components ⇒ [“6.1 Assembly overview - intake manifold”, page 355](#)

13 - Control valve for fuel pressure - N276-

- ❑ Summary of components ⇒ [“2.2 Fuel distributor - summary of components”, page 325](#)

14 - Charge air temperature transmitter after charge air cooler - G811-

- ❑ Summary of components ⇒ [“6.1 Assembly overview - intake manifold”, page 355](#)

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

- ❑ Summary of components ⇒ [“1.1 Summary of components - preheating system”, page 420](#)

16 - Glow plugs

- ◆ Glow plug 1 - Q10-
- ◆ Glow plug 2 - Q11-
- ◆ Glow plug 3 - Q12- ; for engine identification characters CRKB, CRMB, CUNA with combustion chamber pressure sender for cylinder 3 - G679-
- ◆ Glow plug 4 - Q13-
- ❑ Summary of components ⇒ [“1.1 Summary of components - preheating system”, page 420](#)

17 - Fuel pressure sender - G247-

- ❑ Summary of components ⇒ [“2.2 Fuel distributor - summary of components”, page 325](#)

18 - Fuel temperature transmitter - G81-

- ❑ in the fuel feed line
- ❑ removing and installing ⇒ [“4.2 Removing and installing fuel temperature transmitter G81”, page 342](#)

19 - High pressure pump

- ❑ with fuel dosage valve - N290- (do not remove valve)
- ❑ Summary of components ⇒ [“3.1 Summary of components - high pressure pump”, page 338](#)

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

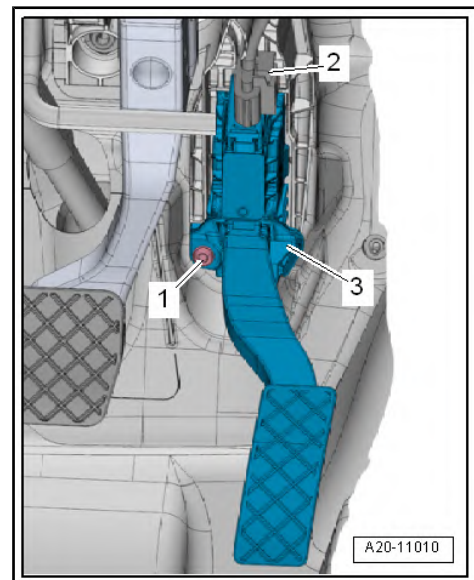
- ◆ In the accelerator pedal module.

2 - Electrical plug connections for accelerator pedal module



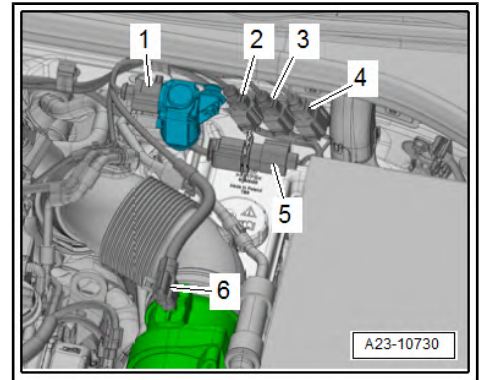
Note

Accelerator pedal position sender - G79- and accelerator pedal position sender 2 - G185- are integrated in the gas pedal module and cannot be replaced separately.



Electrical plug connections

- 1 - Solenoid valve for charge pressure control - N75-
- 2 - Exhaust gas temperature transmitter 4 - G648-
- 3 - Exhaust gas temperature transmitter 3 - G495-
- 4 - Exhaust gas temperature transmitter 2 - G448- for vehicles with engine identification characters CRKB, CRMB, CUNA
- 5 - Lambda probe - G39-
- 6 - Air mass meter - G70-

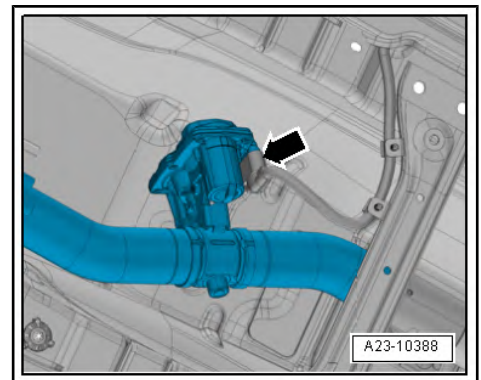


Installation location of exhaust flap control unit - J883-

- in the pre-exhaust pipe

Removing and installing

⇒ [“1.1 Summary of components - front, middle and rear silencer”, page 370](#) .

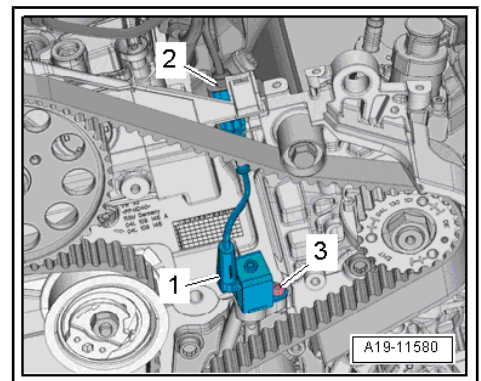


Installation location of coolant valve for cylinder head - N489-

- Pos. -1- top on coolant pump.

Removing and installing

⇒ [“2.6 Removing and installing coolant valve for cylinder head N489”, page 165](#) .



1.1.2 Installation location overview - engine from left



1 - Charge air cooler pump - V188-

- ❑ Summary of components
⇒ [“2.3 Summary of components - electric coolant pump”, page 162](#)

2 - Oil pressure control valve - N428-

- ❑ Summary of components
⇒ [“1.1 Parts of the lubrication system - Summary of components”, page 127](#)
- ❑ removing and installing
⇒ [“1.9 Removing and installing valve for oil pressure control N428”, page 141](#)

3 - Control motor for exhaust gas recirculation - V338- with exhaust gas recirculation potentiometer - G212-

- ❑ only for vehicles with engine identification characters CRKB, CRVC, CRMB, CUNA
- ❑ Summary of components
⇒ [“4.2 Control motor for exhaust gas recirculation V338 - Summary of components”, page 412](#)

4 - Inlet camshaft control valve 1 - N205-

- ❑ only for vehicles with engine identification characters CRKB, CRMB, CUNA
- ❑ Summary of components ⇒ [“2.1 Assembly overview - valve gear”, page 104](#)

5 - Throttle valve module - J338-

- ❑ With throttle valve potentiometer - G69-
- ❑ Summary of components ⇒ [“6.1 Assembly overview - intake manifold”, page 355](#)

6 - Oil pressure switch for reduced oil pressure - F378-

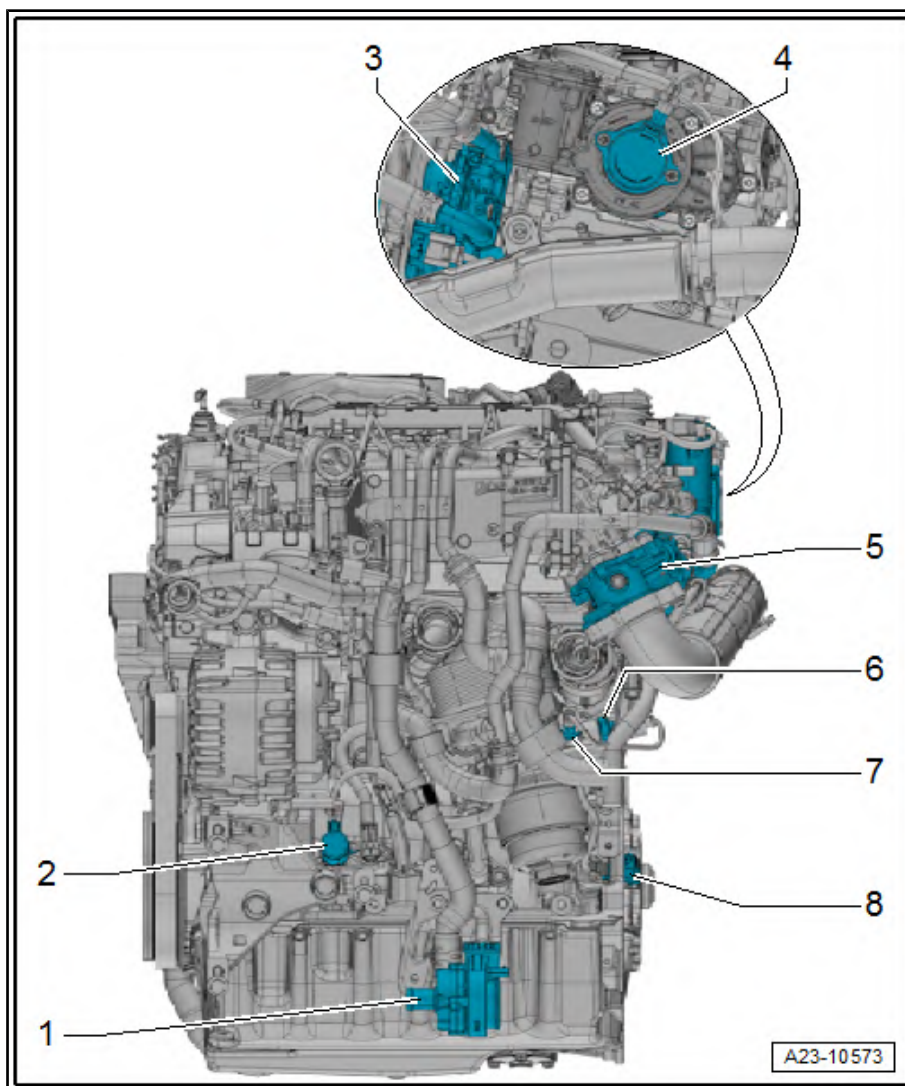
- ❑ Summary of components ⇒ [“1.3 Summary of components - oil filter holder”, page 130](#)

7 - Oil pressure switch - F1-

- ❑ Summary of components ⇒ [“1.3 Summary of components - oil filter holder”, page 130](#)

8 - Engine speed transmitter - G28-

- ❑ Summary of components ⇒ [“1.1 Summary of components - preheating system”, page 420](#)



1.1.3 Installation location overview - engine from right



Note

The Summary of components only concerns vehicles with engine identification characters CLHA, CLHB, CRKB, CKFB, CKFC, CUPA, CRMB, CUNA.

1 - Oil level and oil temperature transmitter - G266-

- ☐ Summary of components
⇒ ["1.1 Parts of the lubrication system - Summary of components", page 127](#)

2 - Control motor 2 for exhaust gas recirculation - V339-

- ☐ Summary of components
⇒ ["4.1 Exhaust gas recirculation with radiator for exhaust gas recirculation - Summary of components", page 408](#)

3 - Exhaust gas temperature transmitter 1 - G235-

- ☐ Summary of components
⇒ ["3 Exhaust temperature regulation", page 402](#)

4 - Exhaust gas temperature transmitter 2 - G448-

- ☐ only for vehicles with engine identification characters CRKB, CRMB, CUNA
- ☐ Summary of components
⇒ ["3.1 Summary of components - exhaust temperature regulation", page 402](#)

- ☐ Electrical plug connection for exhaust gas temperature transmitter 2 - G448- ⇒ [page 317](#)

5 - lambda probe - G39- with heating for lambda probe - Z19-

- ☐ Summary of components ⇒ ["3 Exhaust temperature regulation", page 402](#)
- ☐ electrical plug connection for Lambda probe - G39- ⇒ [page 317](#)

6 - Exhaust gas temperature transmitter 3 - G495-

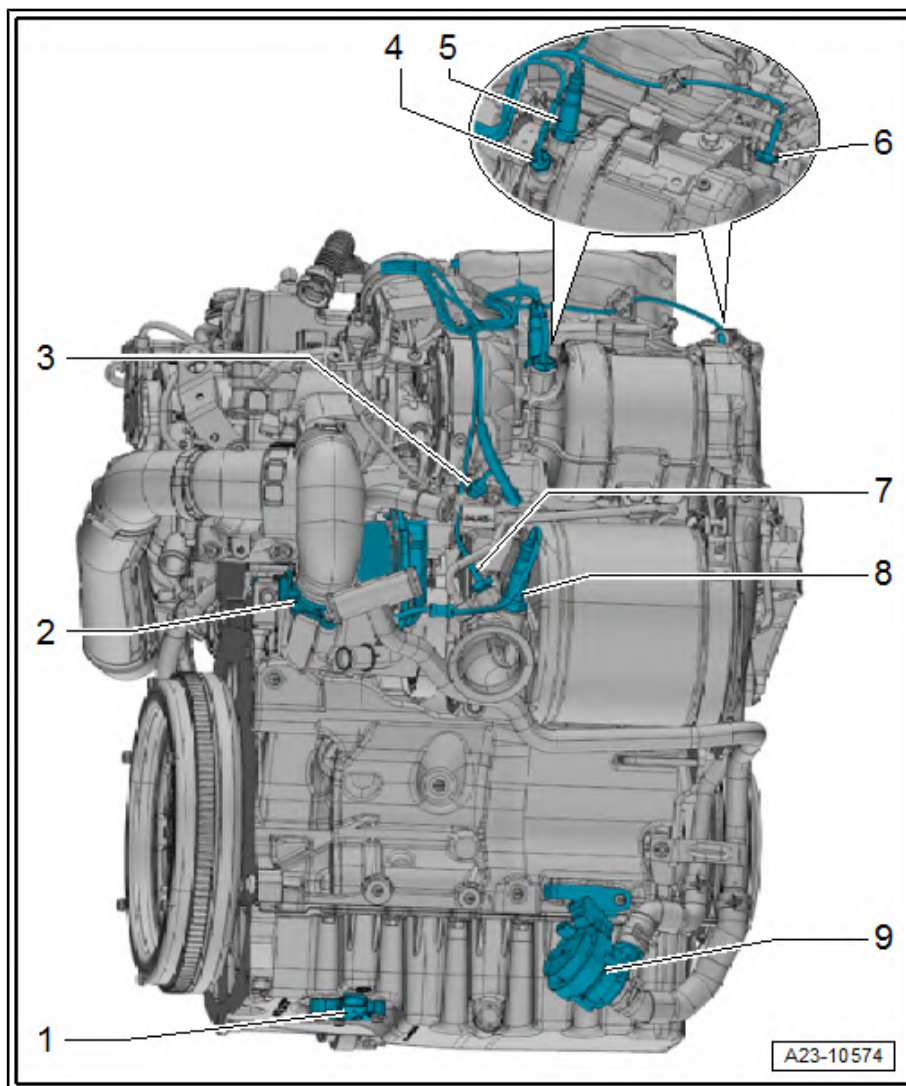
- ☐ Summary of components ⇒ ["3 Exhaust temperature regulation", page 402](#)
- ☐ Electrical plug connection for exhaust gas temperature transmitter 3 - G495- ⇒ [page 317](#)

7 - Exhaust gas temperature transmitter 4 - G648-

- ☐ Summary of components ⇒ ["3 Exhaust temperature regulation", page 402](#)
- ☐ Electrical plug connection for exhaust gas temperature transmitter 4 - G648- ⇒ [page 317](#)

8 - Lambda probe downstream of catalytic converter - G130- with heating for lambda probe - Z29-

- ☐ only for vehicles with engine identification characters CRKB, CRMB, CUNA





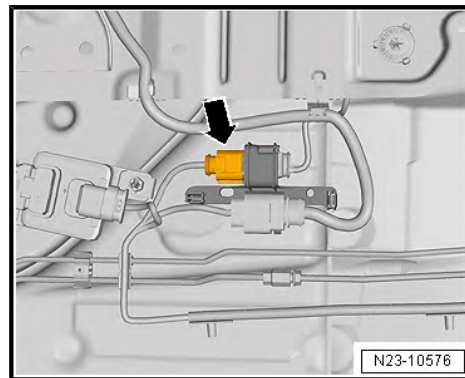
- ❑ Summary of components
⇒ [“3.1 Summary of components - exhaust temperature regulation”, page 402](#)
- ❑ electrical plug connection for lambda probe downstream of catalytic converter - G130- ⇒ [page 320](#)

9 - Heating backup pump - V488-

- ❑ Summary of components ⇒ [“2.3 Summary of components - electric coolant pump”, page 162](#)

Fitting location of electrical plug connection for Lambda probe after catalytic converter - G130- (only for vehicles with engine identification characters CRKB, CRMB, CUNA)

- Below the left centre console -arrow-.



1.2 Schematic overview - fuel system



Note

- ◆ Red = fuel feed line
- ◆ Blue = fuel return-flow line
- ◆ The arrows point in the fuel flow direction.

1 - Fuel filter

- Summary of components
⇒ [“2.3 Fuel filter - Summary of components”, page 217](#)

2 - High pressure pump

- Summary of components
⇒ [“3.1 Summary of components - high pressure pump”, page 338](#)

3 - Fuel dosage valve - N290-

4 - Fuel temperature transmitter - G81-

5 - Fuel pressure sender - G247-

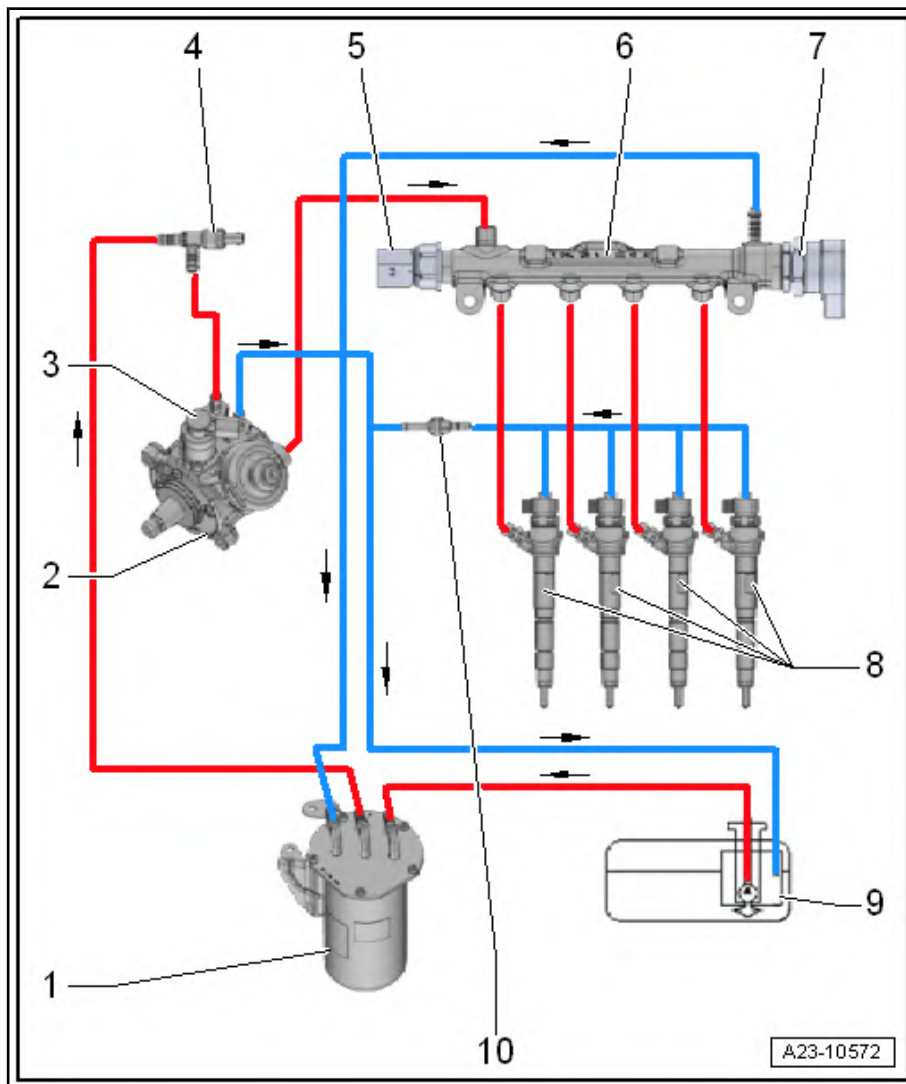
- Summary of components
⇒ [“2.2 Fuel distributor - summary of components”, page 325](#)

6 - Fuel distributor

- Summary of components
⇒ [“2.2 Fuel distributor - summary of components”, page 325](#)

7 - Control valve for fuel pressure - N276-

- Summary of components
⇒ [“2.2 Fuel distributor - summary of components”, page 325](#)



8 - Injection units

- Summary of components ⇒ [“2.1 Summary of components - injection units \(injectors\)”, page 323](#)
- Observe part number ⇒ ETKA - Electronic Catalogue of Original Parts

9 - Fuel tank

- with fuel pump for predelivery - G6-
- Summary of components ⇒ [“2.1 Fuel tank with component parts - Summary of components”, page 204](#)

10 - Choke

1.3 Filling/bleeding the fuel system



Caution

In order to prevent the high pressure pump from running dry (very narrow tolerances) and to achieve a quick engine start after parts are replaced, the following must be observed:

- ◆ *If fuel system between tank and pump parts/components have been removed or replaced the fuel system must be filled/bled before the engine is started up for the first time.*



In order to fill up the high pressure pump with fuel, proceed as follows:

- Vehicle must be refuelled.
- Connect vehicle diagnosis tester and switch on ignition system.
- Perform Targeted Function Activate fuel delivery unit, bleed fuel system.
- The fuel pump activates.
- The fuel pump must run for approximately 3 minutes to ensure that the pump is sufficiently filled with fuel.
- After filling the fuel system, start the engine.
- Run the engine at medium speed for several minutes, then turn it off again.
- Test fuel system for tightness
⇒ ["1.4 Check the fuel system for tightness", page 322](#) .
- Delete event memory entry with Vehicle diagnosis tester .
- Then conduct test drive with at least one full load acceleration.
- Then check high-pressure area again for tightness.



Note

If there is still air in the fuel system the engine may enter dry-running operation during the test drive. Switch off engine and delete the event memory. Then continue the test drive.

- Delete event memory entry with Vehicle diagnosis tester .

1.4 Check the fuel system for tightness

- Let the engine run at idling speed for a few minutes.
- Carry out a visual inspection of the complete fuel system for leaks after switching off the engine.

If there is leakage despite the correct tightening torque:

- Replace the affected component part and repeat the test sequence.

If no leaks are found:

- Carry out a test drive with minimum one full load acceleration up to max. speed.
- Then once again carry out a visual inspection of the complete fuel system for leaks.

2 Injection units/fuel distributor

⇒ [“2.1 Summary of components - injection units \(injectors\)”, page 323](#)

⇒ [“2.2 Fuel distributor - summary of components”, page 325](#)

⇒ [“2.3 Check injection units”, page 326](#)

⇒ [“2.4 Adjust the correction values for injection units”, page 326](#)

⇒ [“2.5 Check injection unit return quantity with engine running”, page 326](#)

⇒ [“2.6 Check injection unit return flow quantity at starter speed”, page 329](#)

⇒ [“2.7 Carry out the vacuum test of the injection units”, page 330](#)

⇒ [“2.8 Removing and installing the injection units”, page 331](#)

⇒ [“2.9 Removing and installing high pressure lines”, page 334](#)

⇒ [“2.10 Removing and installing the fuel distributor”, page 336](#)

2.1 Summary of components - injection units (injectors)

1 - Gasket ring

- ☐ in the cylinder head cover
- ☐ replace after removal
⇒ [“1.1 Assembly overview - cylinder head cover”, page 85](#)

2 - Copper disc

- ☐ replace after removal

3 - O-ring

- ☐ replace after removal

4 - Injection unit

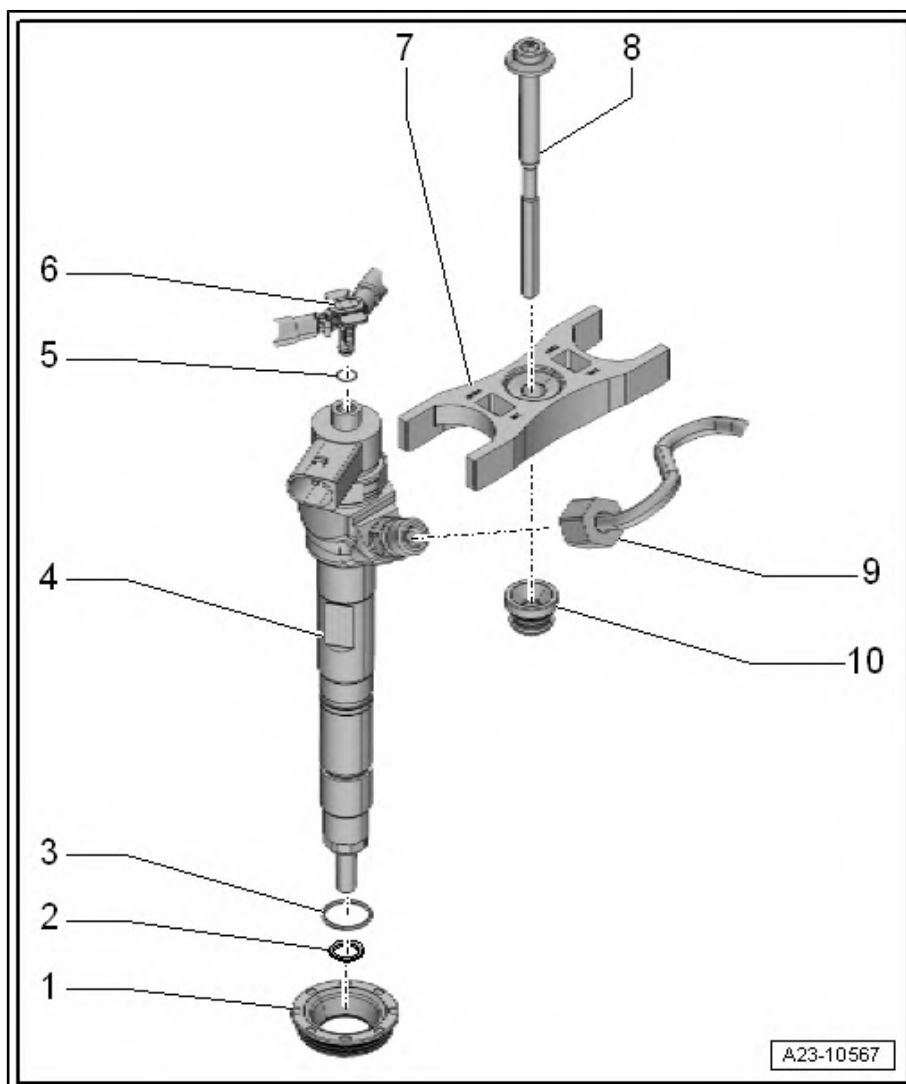
- ☐ removed injection units, high pressure lines and clamping claws to be re-installed must only be mounted again at the same cylinder.
- ☐ removing and installing
⇒ [“2.8 Removing and installing the injection units”, page 331](#)
- ☐ Observe part number ⇒ ETKA - Electronic Catalogue of Original Parts

5 - O-ring

- ☐ replace after removal

6 - Fuel return-flow line

- ☐ to fuel tank
- ☐ must not be kinked, damaged or blocked
- ☐ do not disassemble





- ☐ fill/bleed fuel system after exchange ⇒ ["1.3 Filling/bleeding the fuel system", page 321](#) .

7 - Clamping claw

Caution

Risk of engine damage!
When installing a new stripped engine and after fitting the high pressure lines, it is absolutely necessary to tighten the clamping claws of the injection units to the specified tightening torque
Pos. -8-
⇒ Item 8 (page 324) . In order to align the injection units when fitting the high pressure lines, the clamping claws are only tightened in series »by hand«.

- ☐ removed injection units and clamping claws to be re-installed must only be mounted again at the same cylinder.
- ☐ Fitting position ⇒ [page 324](#)

8 - Screw

- ☐ replace after removal
- ☐ 9 Nm + torque a further 180° (1/2 turn)

9 - High pressure line

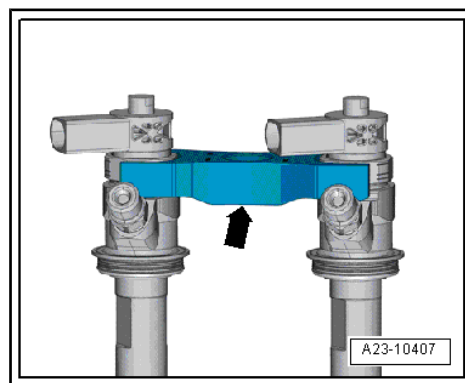
- ☐ between fuel distributor and injection units
- ☐ follow all instructions for installation of high pressure lines
 ⇒ ["2.9.2 Installing high pressure line", page 335](#)
- ☐ install free of stress
- ☐ 28 Nm

10 - Grommet

- ☐ in the cylinder head cover
- ☐ replace if damaged.

Fitting position of the clamping claw

- One clamping claw has 2 injection units.
- The clamping claw gasket -arrow- points downwards.



2.2 Fuel distributor - summary of components

1 - Fuel pressure sender - G247-

- ☐ removing and installing
⇒ [“4.6 Removing and installing fuel pressure sender G247”](#), page 347
- ☐ Reuse possible
⇒ [“4.6 Removing and installing fuel pressure sender G247”](#), page 347
- ☐ 100 Nm

2 - High pressure line

- ☐ between fuel distributor and injection units
- ☐ follow all instructions for installation of high pressure lines
⇒ [“2.9.2 Installing high pressure line”](#), page 335
- ☐ 28 Nm

3 - Fuel distributor

- ☐ removing and installing
⇒ [“2.10 Removing and installing the fuel distributor”](#), page 336

4 - Screw

- ☐ 20 Nm

5 - O-ring

- ☐ replace after removal

6 - Control valve for fuel pressure - N276-

- ☐ Renew. ⇒ [“4.5 Replace fuel pressure regulating valve N276”](#), page 346 .
- ☐ replace after each removal
- ☐ Re-adjust after replacing the learning values in “Targeted Functions” ⇒ Vehicle diagnostic tester
- ☐ 80 Nm

7 - Fuel return-flow hose

8 - Fuel return-flow line

9 - Screw

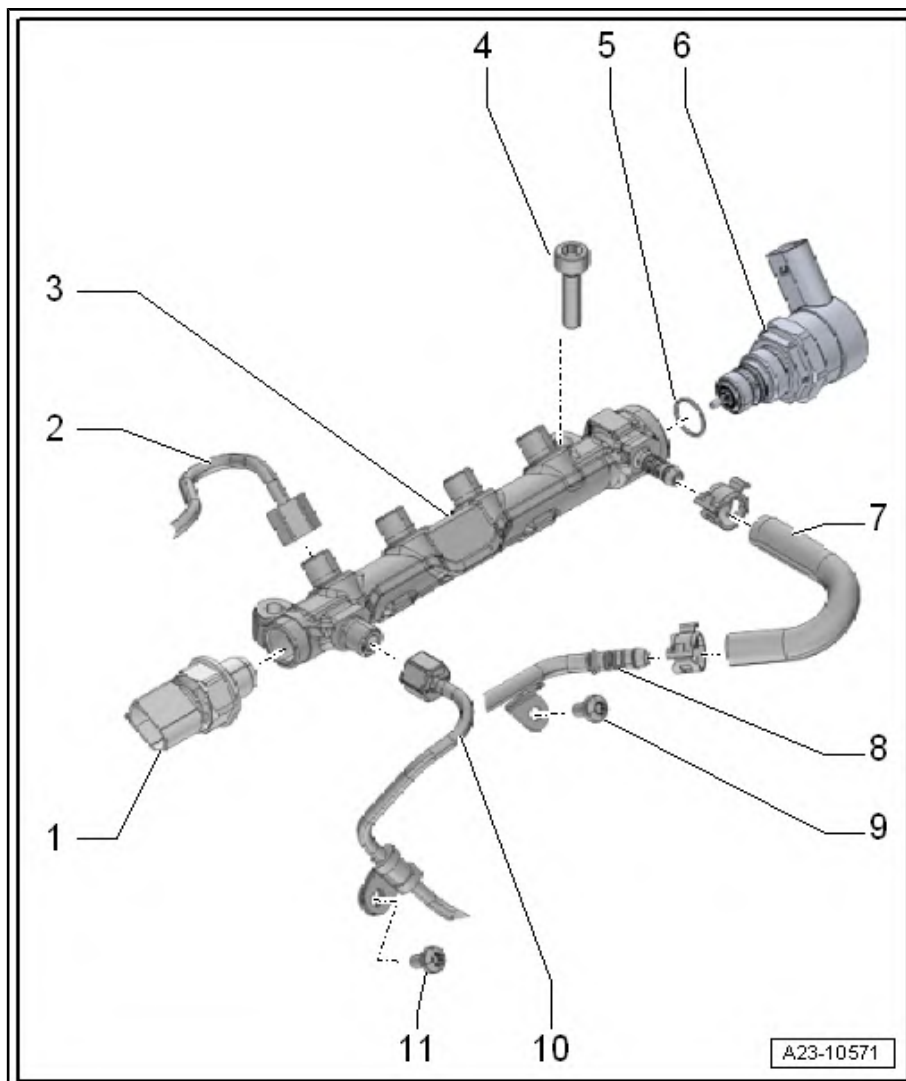
- ☐ 8 Nm

10 - High pressure line

- ☐ between the high pressure pump and the fuel distributor
- ☐ follow all instructions for installation of high pressure lines
⇒ [“2.9.2 Installing high pressure line”](#), page 335
- ☐ 28 Nm

11 - Screw

- ☐ 8 Nm





2.3 Check injection units

There are 3 ways to check the injection units.

- ◆ ⇒ [“2.4 Adjust the correction values for injection units”, page 326](#)
- ◆ ⇒ [“2.5 Check injection unit return quantity with engine running”, page 326](#)
- ◆ ⇒ [“2.6 Check injection unit return flow quantity at starter speed”, page 329](#)

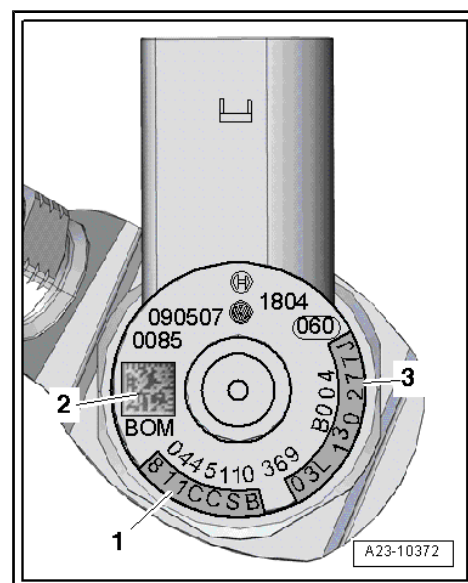
2.4 Adjust the correction values for injection units

- ◆ The “injector quantity adjustment (IQA)” functionality has the task of correcting the injection quantity individually for each cylinder of a common rail system in the entire map range.
- ◆ The 7-digit adjustment values are printed on each injection unit. The printed values may be letters and/or digits.



View from the top of the injection unit

- 1 - Adjustment value (checksum; information in the image is only an example)
 - 2 - Data Matrix Code
 - 3 - Part number
- ◆ After replacement of an injection unit the adjustment value must be written to the engine control unit.
 - ◆ After replacement of the engine control unit the “injection unit adjustment values” must be transferred to the new engine control unit.
 - ◆ In addition, check all other “injector quantity adjustment (IQA)” injection units to ensure that all values have been entered correctly. If the correct values are stored in the engine control unit, these values must never be entered again.
 - ◆ The work procedure for the adaptation is described in the “Targeted fault finding”. (The work sequence is also described in “Targeted Functions”.) ⇒ Vehicle diagnostic tester.



2.5 Check injection unit return quantity with engine running

A - Check return quantity of all injection units

Special tools and workshop equipment required

- ◆ Measuring vessel, fuel test

Work procedure



Note

- ◆ *Safety precautions when working on the fuel supply system*
⇒ *"2 Safety instructions", page 3*.
- ◆ *Observe rules for cleanliness*
⇒ *"3.1 Rules of cleanliness", page 6*.
- Remove engine cover
⇒ *"1.1 Removing and installing engine trim panel", page 10*.
- Disconnect hose connection -2- at the fuel return-flow line.
- Close the return-flow line connection with a blind plug -1-.
- Keep fuel return-flow hose -2- (extend if necessary) in a measuring vessel to measure the overall return flow quantity.
- Start engine and run in idle for 2 minutes.
- Specified value in 2 minutes: 0 ml to 50 ml
- If the specified value is reached, increase engine rpm to 2000 to 2500 rpm for 2 minutes, then check the return flow quantity.
- Specified value in 2 minutes: less than 250 ml

If the specified value is exceeded, this indicates that there is one (or more) defective fuel injection unit(s). Check the return flow quantity of each individual injection unit

B - Check return quantity of the individual injection units

Special tools and workshop equipment required

- ◆ Hose clamps up to Ø 25 mm - MP7-602 (3094)-
- ◆ Return flow quantity measuring device - VAS 6684-

Work procedure



Note

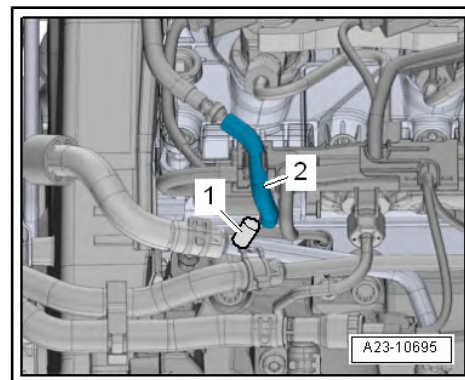
- ◆ *Safety precautions when working on the fuel supply system*
⇒ *"2 Safety instructions", page 3*.
- ◆ *Observe rules for cleanliness*
⇒ *"3.1 Rules of cleanliness", page 6*.



Note

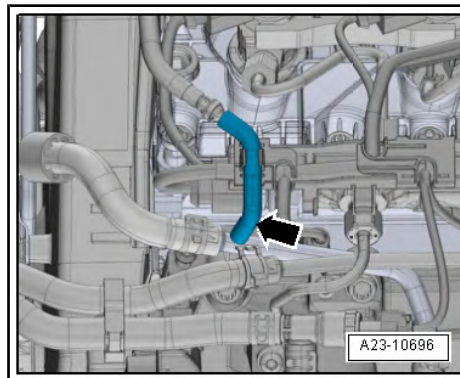
Each injection unit has a small fuel return-flow quantity. If this return flow quantity is relatively great (in relation to the return flow quantity of the other injection units), this injection unit is probably defective.

- Before removing, clean all return flow connections (for example with a commercially available cold cleaner).
- Dry all cleaned parts.





- Pinch of coolant hose -arrow- using a hose clamp of up to 25 mm - MP7-602 (3094)- .
- Remove noise insulation.

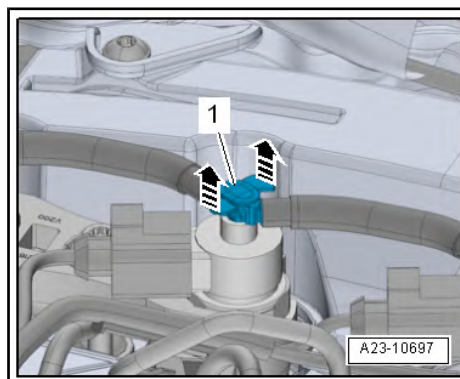


- Pull off return-flow line connections on injection unit by pulling release buttons upwards -arrows-.

**Note**

Pay attention to cleanliness; no dirt must get into the removed return lines and the connections of the injection units.

- Firmly fit adapter C6 to the return-flow line connections of all 4 injection units.
- Connect hose lines of the return flow quantity measuring device - VAS 6684- to the adapter.
- Start engine and run in idle for a few minutes.

**Caution**

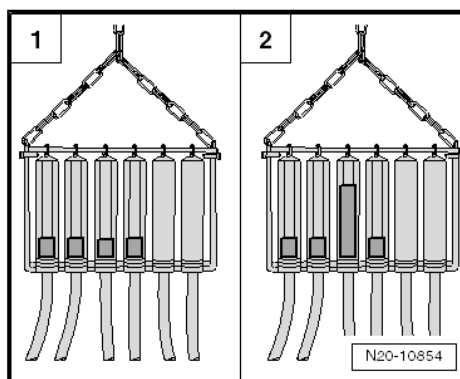
Risk of damage to injection units when return-flow lines are removed.

- ◆ ***No acceleration must occur during testing - the engine must run in idle.***

- When the engine is at operating temperature while the engine is idling there must be only minimal difference in the return flow quantity of all 4 return-flow lines (example -1-).
- If one injection unit has a significantly higher return flow quantity (example -2-), this injection unit must be replaced
⇒ ["2.8 Removing and installing the injection units", page 331](#) .

Assembly of fuel return-flow lines

- Carefully press the connections of the return-flow lines onto the injection units. The cap must click audibly into place, afterwards carefully press the unlocking bolt downwards.
- Check fuel system for tightness
⇒ ["1.4 Check the fuel system for tightness", page 322](#) .



2.6 Check injection unit return flow quantity at starter speed

Note

If the engine will not start the return flow quantity of the injection units can also be tested at starter speed.

Special tools and workshop equipment required

- ◆ Return flow quantity measuring device - VAS 6684-

Work procedure

Note

- ◆ *Safety precautions when working on the fuel supply system*
⇒ *"2 Safety instructions", page 3*.
- ◆ *Observe rules for cleanliness*
⇒ *"3.1 Rules of cleanliness", page 6*.

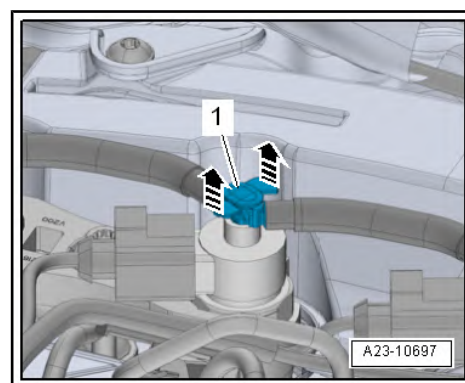
Note

Each injection unit has a small fuel return-flow quantity. If this return flow quantity is relatively great (in relation to the return flow quantity of the other injection units), this injection unit is probably defective.

- Remove engine cover
⇒ *"1.1 Removing and installing engine trim panel", page 10*.
- Before removing, clean all return flow connections (for example with a commercially available cold cleaner).
- Dry all cleaned parts.
- Remove noise insulation.
- Pull return-flow line connections of the injection units - to do so, pull the bracket upwards -arrows-.

Note

Pay attention to cleanliness; no dirt must get into the removed return lines and the connections of the injection units.



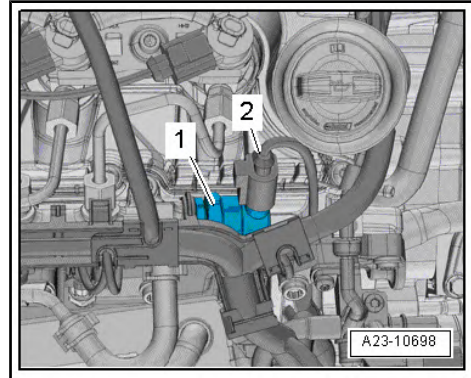


- Disconnect electrical plug connection -2- at the fuel pressure control valve - N276- Pos. -1-.

**Note**

This prevents fuel from being injected during the start attempt.

- Firmly fit adapter C6 to the return-flow line connections of all 4 injection units.
- Connect hose lines of the return flow quantity measuring device - VAS 6684- to the adapter.
- Actuate the starter 3 times (leave a pause of 20 seconds between each start attempt - starter overheating protection).
- Specified value of the return flow quantity: 0 ml
- If fuel is leaking from one fuel injection unit, that injection unit must be replaced.
- Put the electrical plug connection from the fuel pressure control valve - N276- back in place.

**Assembly of fuel return-flow lines**

- Press connections of return-flow lines onto the injection units until they audibly locks into place.
- Then press the brackets down on both sides.
- Check fuel system for tightness
⇒ [“1.4 Check the fuel system for tightness”, page 322](#) .
- Interrogating and erasing fault memory of engine control unit
⇒ Vehicle diagnostic tester.

2.7 Carry out the vacuum test of the injection units

Special tools and workshop equipment required

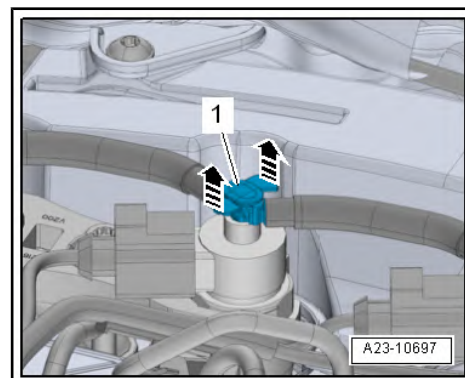
- ◆ Hand vacuum pump , e.g. -VAS 6213-
- ◆ Adapter C6 from return quantity measuring device - VAS 6684-

Work procedure**Note**

- ◆ *Safety precautions when working on the fuel supply system*
⇒ [“2 Safety instructions”, page 3](#) .
- ◆ *Observe rules for cleanliness*
⇒ [“3.1 Rules of cleanliness”, page 6](#) .
- Delete event memory entry with vehicle diagnosis tester ⇒ Vehicle diagnostic tester.
- Remove engine cover
⇒ [“1.1 Removing and installing engine trim panel”, page 10](#) .
- Before removing, clean all connections (for example with a commercially available cold cleaner).

i Note

- ◆ *Pay attention to cleanliness, no dirt must get into the fuel system.*
 - ◆ *Check cylinders one after another.*
 - Dry all cleaned parts.
- Start with cylinder 1.
- Remove noise insulation.
 - Pull off return-flow line connections on injection unit by pulling release buttons upwards -arrows-.



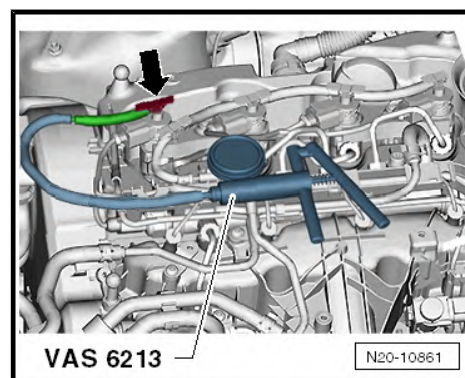
- Connect the clean, blown through adapter on the injection unit to be tested.
- A vacuum of -500 mbar is built up using the hand vacuum pump - VAS 6213- .

If the injection units are O.K, the vacuum remains constant for more than 30 s.

If the injection units are defective, the vacuum drops within 2 ... 3 s to 0 bar.

If necessary repeat the test, pay attention to the vacuum loss on the hand vacuum pump - VAS 6213- .

- Replace injection units
⇒ ["2.8 Removing and installing the injection units", page 331](#) .



2.8 Removing and installing the injection units

Special tools and workshop equipment required

- ◆ Extractor - T10055-
- ◆ Assembly sleeve - T10377-
- ◆ Extractor - T10415-

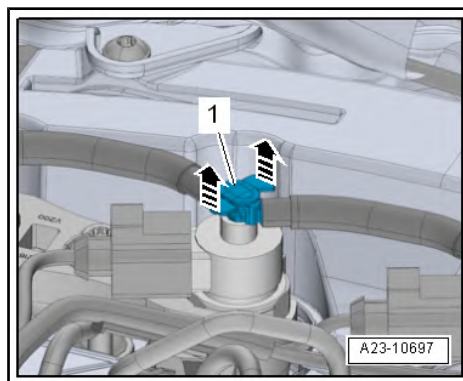
Removing

i Note

- ◆ *Safety precautions when working on the fuel supply system*
⇒ ["2 Safety instructions", page 3](#) .
- ◆ *Observe rules for cleanliness*
⇒ ["3.1 Rules of cleanliness", page 6](#) .



- Remove engine cover
⇒ [“1.1 Removing and installing engine trim panel”, page 10](#) .
- Remove noise insulation.
- Pull off return-flow line connections on injection unit by pulling release buttons upwards -arrows-.

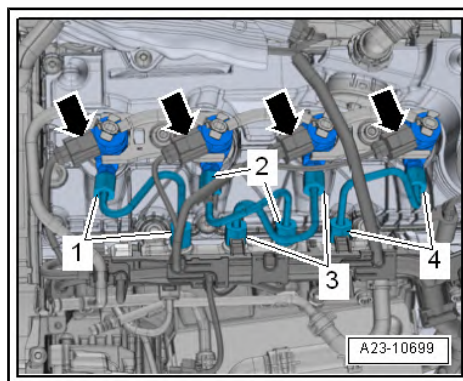


- Disconnect electrical plug connections -arrows- at the glow plugs.

**Note**

Each clamping claw secures 2 injection valves and can only be removed when both injection units are »removed«.

- Unscrew union nuts of the respective high pressure lines -1...4- and pull off the corresponding high pressure lines.
- Close open lines and connections with blind plugs.

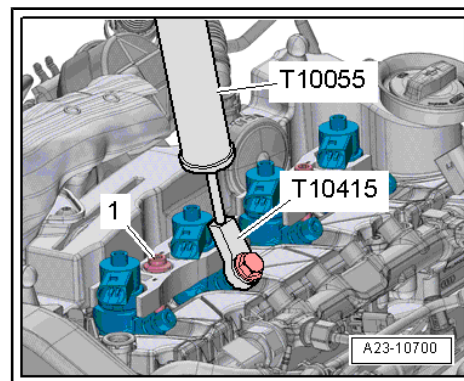


- Unscrew screw -1- and remove clamping claws.
- Order for injection unit expansion: First remove injection unit on cylinder “2” and then on cylinder “1”, on cylinder “4” and then on cylinder “3” respectively.
- Position extractor - T10055- with the extractor - T10415- as shown in the illustration and pull out upwards.
- Remove the clamping screw before removing the injection unit.



Note

To avoid damaging the sealing lip, use rotary motion to pull off injection units.



- Place the removed injection units on a clean cloth.

Install



Caution

Risk of damage to injection unit sealing surfaces.

- ◆ ***To remove the soot particles on the sealing surface of the injection unit, clean the injection unit shaft in the cylinder head with cleaning set - VAS 6811- or with a cloth soaked in engine oil.***

Installing new injection units

When installing a new injection unit the following must be replaced:

- ◆ Copper gasket ring
- ◆ O-ring for the injection unit shaft
- ◆ O-ring for fuel return-flow line connection
- Follow all instructions for installation of high pressure lines
⇒ [“2.9.2 Installing high pressure line”, page 335](#) .

Installing used injection units

When reinstalling a used injection unit the following must be replaced:

- ◆ Copper gasket ring
- ◆ O-ring for the injection unit shaft
- ◆ O-ring for fuel return-flow line connection
- Spray the tip of the injection unit with a rust solvent spray. Remove soot particles or oil particles with a cloth after approximately 5 minutes.
- For disassembling the old copper gasket ring from the injection unit, carefully tighten the gasket ring in a vice until the copper gasket ring is prevented from spinning between the chuck jaws. Pull the injection unit out of the copper gasket ring with slight turning and pulling movements of the hand.
- Clean the deposit below the copper sealing ring.



- Replace the gasket ring for the injection channel, for this step use the assembly sleeve - T10377- .

Continuation for used and new injection units:

- Coat all O-rings with assembly oil, engine oil or diesel fuel before installation.
- Install the injection units.
- First tighten the union nuts of the high pressure lines hand-tight. Check that seating is free of tension.
- After replacement of one or more injection units the correction values for the new injection units must be written to the engine control unit
⇒ [“2.4 Adjust the correction values for injection units”, page 326](#) .
- Filling and bleeding the fuel system
⇒ [“1.3 Filling/bleeding the fuel system”, page 321](#) .

Tightening torque

- ♦ Summary of components - injection units (injectors)
⇒ [“2.1 Summary of components - injection units \(injectors\)”, page 323](#) .

2.9 Removing and installing high pressure lines

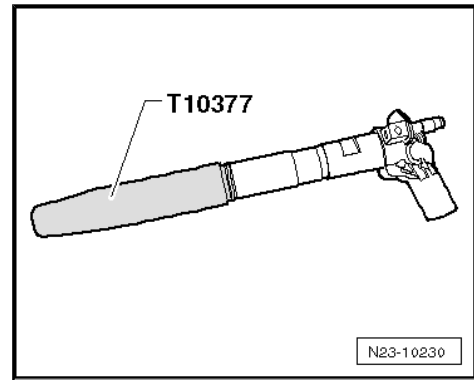
2.9.1 Remove high pressure line between fuel distributor and the high pressure pump.

Removing

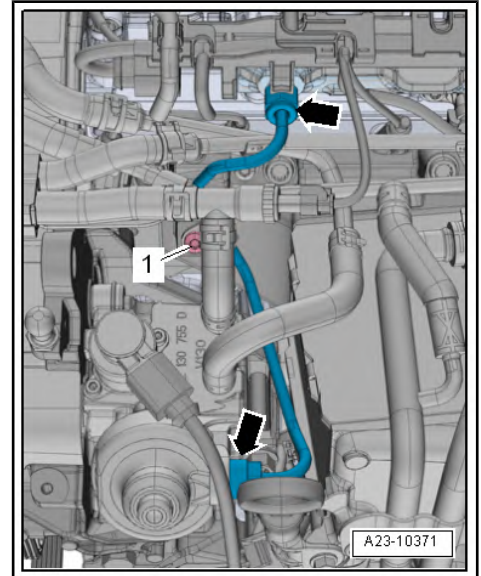


Note

- ♦ *Safety precautions when working on the fuel supply system*
⇒ [“2 Safety instructions”, page 3](#) .
- ♦ *Observe rules for cleanliness*
⇒ [“3.1 Rules of cleanliness”, page 6](#) .
- Remove engine cover
⇒ [“1.1 Removing and installing engine trim panel”, page 10](#) .
- Clean fuel line and line end with cold cleaner and blow dry with compressed air.



- Release screw -1-.
- Unscrew union nuts -arrows- and remove high pressure line.



2.9.2 Installing high pressure line

Special tools and workshop equipment required

- ◆ Tool insert SW 17
- ◆ Socket wrench insert - T40055-



Note

- ◆ *Safety precautions when working on the fuel supply system*
⇒ [“2 Safety instructions”, page 3](#).
- ◆ *Observe rules for cleanliness*
⇒ [“3.1 Rules of cleanliness”, page 6](#).

Work procedure



Note

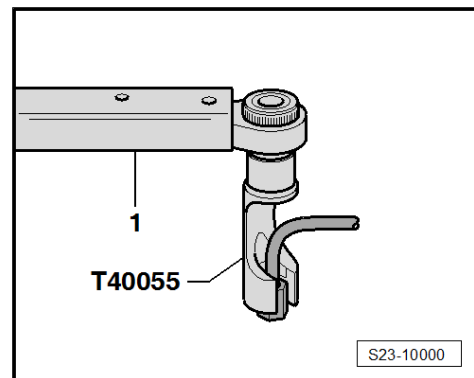
- ◆ *Clean fuel line and line end with cold cleaner before removal, and blow dry with compressed air.*
- ◆ *Pay attention to the cylinder specific marking when re-using the high pressure lines.*
- ◆ *The high pressure lines can be re-used after the following tests:*
- ◆ *Check the sealing cone of the respective high pressure line for deformations and cracks.*
- ◆ *The line borings must not be deformed, constricted or damaged.*
- ◆ *Corroded lines must no longer be used.*

**Caution**

Risk of line break because of high pressure line being under tension.

- ◆ ***Loosen fuel distributor and clamps for improved, tension-free positioning of injection lines. If necessary, move the fuel distributor slightly and turn the corresponding injection unit slightly. The lines must be never bent or twisted.***

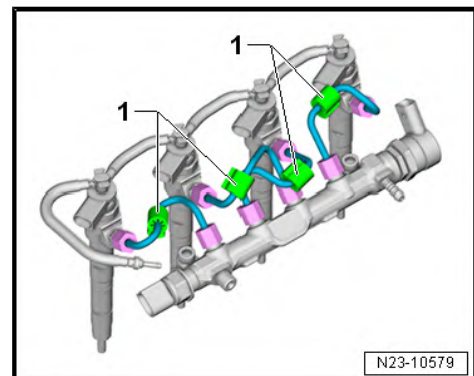
- Suction off dirt from the sealing cone at the fuel distributor.
- Moisten thread of the nut with clean engine oil.
- Hand-tighten union nuts, ensure that the fit is tension-free.
- To tighten the high pressure lines on the fuel distributor and injection units, use torque wrench -1- with tool insert SW 17 or socket wrench insert - T40055- .



- Set balancing weight -1- on the high-pressure lines as shown in the diagram.
- Check fuel system for tightness
⇒ [“1.4 Check the fuel system for tightness”, page 322](#) .

Tightening torques

- ◆ ⇒ [“2.1 Summary of components - injection units \(injectors\)”, page 323](#)
- ◆ ⇒ [“2.2 Fuel distributor - summary of components”, page 325](#)

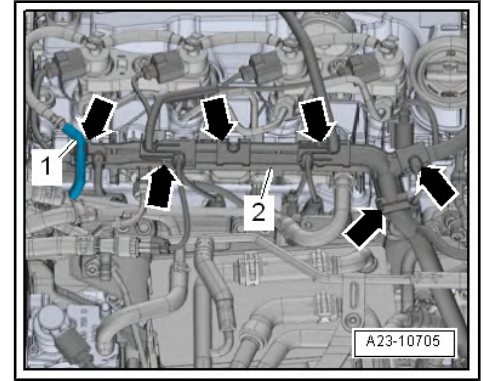


2.10 Removing and installing the fuel distributor

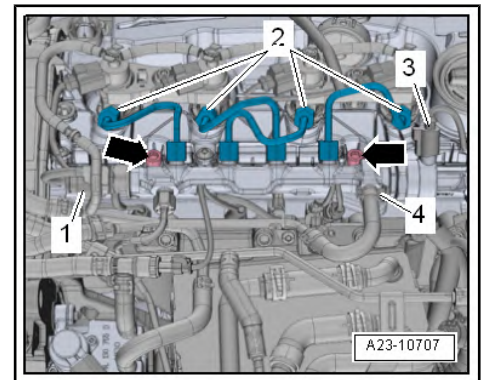
Removing**Note**

- ◆ ***Safety precautions when working on the fuel supply system***
⇒ [“2 Safety instructions”, page 3](#) .
- ◆ ***Observe rules for cleanliness***
⇒ [“3.1 Rules of cleanliness”, page 6](#) .
- Remove high pressure line between fuel distributor and the high pressure pump
⇒ [“2.9.1 Remove high pressure line between fuel distributor and the high pressure pump.”, page 334](#) .

- Expose fuel return-flow hose -1-.
- Open holding clamps -arrows-, unclip and remove cable duct -2-.



- Disconnect electrical plug connections:
1 - for fuel pressure sender - G247-
3 - for fuel pressure regulating valve - N276-
- Loosen hose clamp -4-, pull off fuel return-flow hose.
- Unscrew high pressure line union nuts -2-.
- Remove high pressure line and place it on a clean cloth.
- Screw out screws -arrows- and remove fuel distributor.



Install

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

- Follow all instructions for installation of high pressure lines
⇒ [“2.9.2 Installing high pressure line”, page 335](#) .

Tightening torques

- ◆ ⇒ [“2.1 Summary of components - injection units \(injectors\)”, page 323](#)
- ◆ ⇒ [“2.2 Fuel distributor - summary of components”, page 325](#)



3 High pressure pump

⇒ [“3.1 Summary of components - high pressure pump”, page 338](#)

⇒ [“3.2 Removing and installing the high pressure pump”, page 339](#)

3.1 Summary of components - high pressure pump

1 - Bracket for auxiliary units

- ❑ removing and installing
⇒ [“1.5 Removing and installing bracket for auxiliary units”, page 41](#)

2 - Bolt

- ❑ Qty. 3
- ❑ different lengths
- ❑ replace after removal
- ❑ Specified torque:
- ◆ short screw, 20 Nm + torque a further 45° (1/8 turn)
- ◆ long screw, 20 Nm + torque a further 180° (1/2 turn)

3 - Toothed belt gear on the high pressure pump

4 - Nut

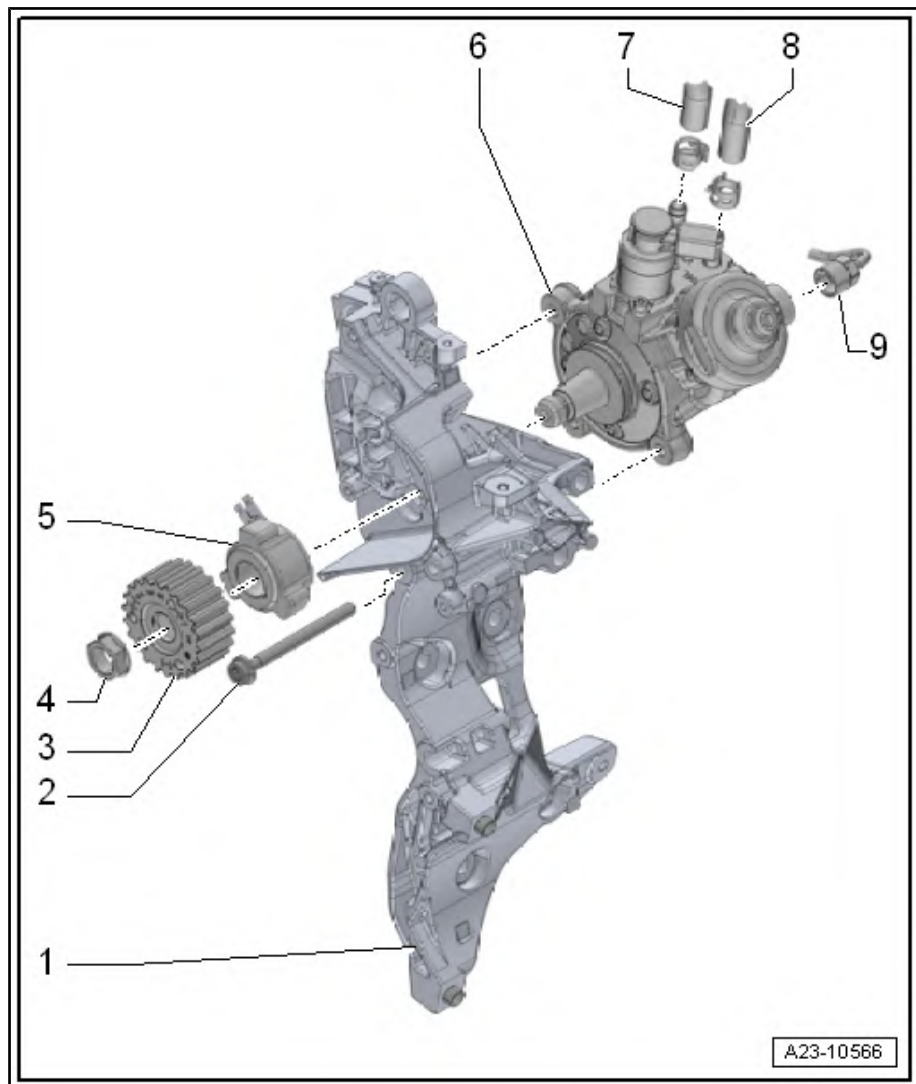
- ❑ to release and tighten use counterholder - T10051-
- ❑ 95 Nm

5 - Hub

- ❑ to remove, use extractor -T10489-

6 - High pressure pump

- ❑ with fuel dosage valve - N290- (do not remove valve)
- ❑ removing and installing
⇒ [“3.2 Removing and installing the high pressure pump”, page 339](#)



Caution

Risk of damage to the high pressure pump through running dry.
When the high pressure pump is removed or replaced, the fuel system must be filled/bled before the engine is started for the first time
 ⇒ [“1.3 Filling/bleeding the fuel system”, page 321](#).

- ☐ Re-adjust after replacing the learning values in "Targeted Functions" ⇒ Vehicle diagnostic tester

7 - Fuel intake hose

8 - Fuel return-flow hose

9 - High pressure line

- ☐ between fuel distributor and high pressure pump
- ☐ removing
⇒ ["2.9.1 Remove high pressure line between fuel distributor and the high pressure pump.", page 334](#)
- ☐ follow all instructions for installation of high pressure lines
⇒ ["2.9.2 Installing high pressure line", page 335](#)

3.2 Removing and installing the high pressure pump

Special tools and workshop equipment required

- ◆ Counterholder - T10051-
- ◆ Extractor -T10489-
- ◆ Locking pin -T10492-

Removing



Note

- ◆ *Safety precautions when working on the fuel supply system*
⇒ ["2 Safety instructions", page 3](#) .
- ◆ *Observe rules for cleanliness*
⇒ ["3.1 Rules of cleanliness", page 6](#) .



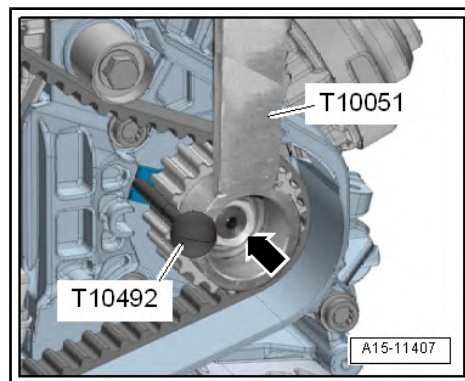
Caution

Risk of damage to the high pressure pump through running dry.

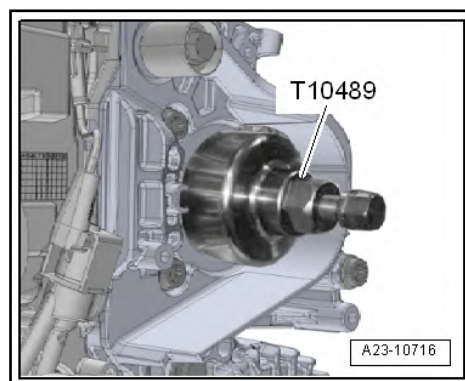
- ◆ ***If the high pressure pump is removed or replaced, the fuel system must be filled/bled before the engine is started for the first time***
⇒ ["1.3 Filling/bleeding the fuel system", page 321](#) .

- Remove the toothed belt from the camshaft
⇒ ["1.10 Remove the toothed belt from the camshaft", page 49](#) .
- Remove high pressure line between fuel distributor and the high pressure pump
⇒ ["2.9.1 Remove high pressure line between fuel distributor and the high pressure pump.", page 334](#) .

- Place counterholder - T10051- at the high pressure pump toothed belt pulley.
- Tighten nuts -arrow- hand tight.
- Pull off rig pin -T10492- , carefully turn high pressure pump shaft in stress-free position.
- Unscrew nuts -arrow-, remove counterholder - T10051- .
- Remove the high pressure pump toothed belt pulley.



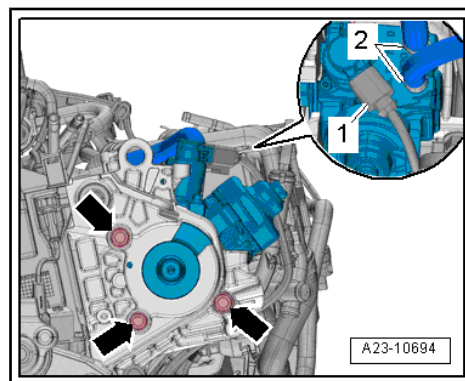
- Suspend extractor -T10489- at the hub by turning to the right.
- Remove the hub of the high pressure pump.



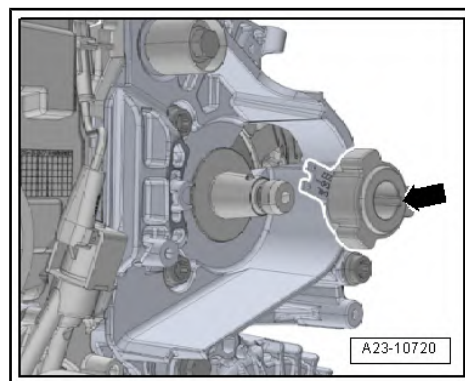
- Remove fuel return-flow hoses -2-.
- Separate electrical plug connection -1-.
- Unscrew screws -arrows-.
- Carefully remove the high pressure pump.

Install

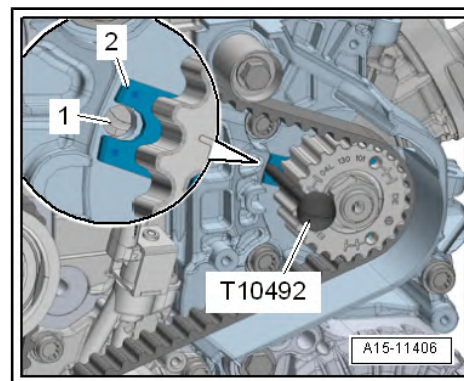
Installation is performed in the reverse order, pay attention to the following points:



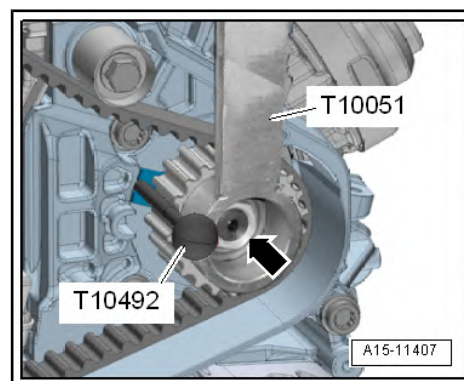
- Place hub -arrow- on the high pressure pump shaft.
- The key on the high pressure pump shaft must engage into the slot in the hub.



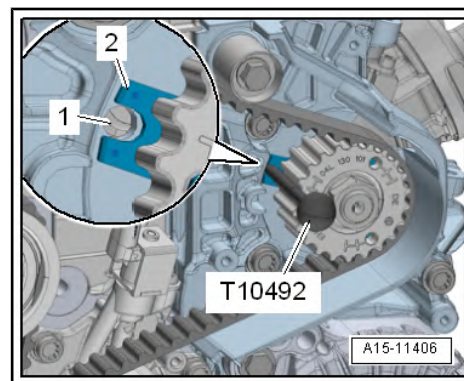
- Mount the toothed belt pulley onto the hub.
- There must not be any oil present between the counterholder and the toothed belt pulley



- Turn nuts -arrow- to the thread of the high pressure pump shaft.
- Place counterholder on toothed belt pulley and tighten nuts hand-tight -arrow-.
- Turn high pressure pump toothed belt pulley using the counterholder - T10051- until it can be locked with the rig pin - T10492- .



- To do so, insert the rig pin -T10492- into fork -2- of the hub and into the bore behind it -1- in the auxiliary units bracket.
- Loosen nuts -arrow- again.
- It must still be possible to just turn the high pressure pump toothed belt pulley, however it must not hang loose.
- Installing the timing belt
⇒ [“1.11 Removing and installing toothed belt”, page 52](#) .
- Installing high pressure line
⇒ [“2.9.2 Installing high pressure line”, page 335](#) .



Caution

Risk of damage to the high pressure pump through running dry.

- ◆ ***If the high pressure pump is removed or replaced, the fuel system must be filled/bled before the engine is started for the first time***
⇒ [“1.3 Filling/bleeding the fuel system”, page 321](#) .

- After replacing the high pressure pump, re-adjust the learning values in “Targeted Functions” ⇒ Vehicle diagnostic tester.

Tightening torques

- ◆ ⇒ [“3.1 Summary of components - high pressure pump”, page 338](#)

4 Senders and sensors

⇒ ["4.1 Removing and installing intake air temperature transmitter G42 / charge air temperature transmitter after charge air cooler G811", page 342](#)

⇒ ["4.2 Removing and installing fuel temperature transmitter G81", page 342](#)

⇒ ["4.3 Removing and installing air flow mass meter G70", page 343](#)

⇒ ["4.4 Check fuel pressure regulating valve N276", page 344](#)

⇒ ["4.5 Replace fuel pressure regulating valve N276", page 346](#)

⇒ ["4.6 Removing and installing fuel pressure sender G247", page 347](#)

⇒ ["4.7 Removing and installing differential pressure transmitter G505", page 348](#)

⇒ ["4.8 Removing and installing pressure sensor for exhaust gas 1 G450", page 349](#)

4.1 Removing and installing intake air temperature transmitter - G42- / charge air temperature transmitter after charge air cooler - G811-

Removing

– Remove engine cover
⇒ ["1.1 Removing and installing engine trim panel", page 10](#) .

– Disconnect the electrical plug connection -1- or -2-.

1 - Charge air temperature transmitter after charge air cooler - G811-

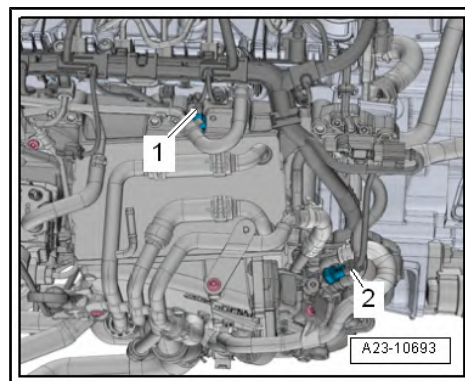
2 - Intake air temperature transmitter - G42-

– Unscrew the corresponding charge air temperature transmitter.

Install

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

• Tightening torque
⇒ ["6.1 Assembly overview - intake manifold", page 355](#) .



4.2 Removing and installing fuel temperature transmitter - G81-

Removing

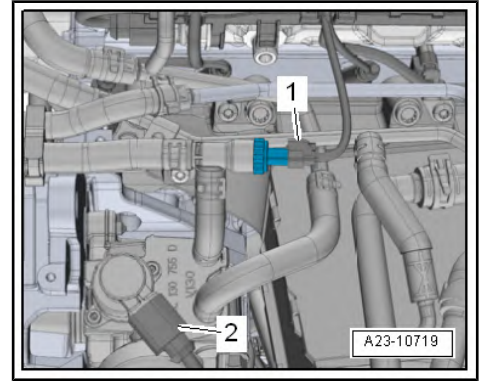
– Remove engine cover
⇒ ["1.1 Removing and installing engine trim panel", page 10](#) .

- Separate electrical plug connection -1-.
- Unscrew fuel temperature transmitter - G81- -arrow-.

Install

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

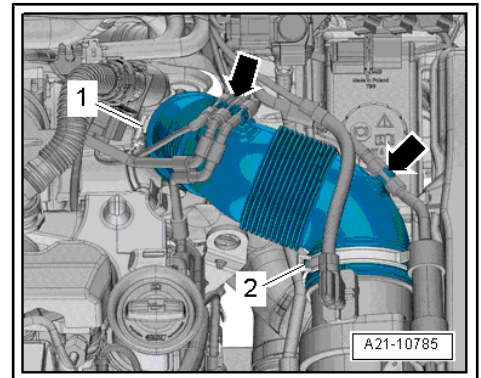
- Check fuel system for tightness
⇒ ["1.4 Check the fuel system for tightness", page 322](#) .



4.3 Removing and installing air flow mass meter - G70-

Special tools and workshop equipment required

- ◆ Hose clip pliers - VAS 6362-
- Remove engine cover
⇒ ["1.1 Removing and installing engine trim panel", page 10](#) .
- Disconnect vacuum hoses on the air guide pipe -arrows-.
- Loosen hose clamps -1-, -2-, remove intake hose.





- Release screw -1-.
- Turn the air mass meter - G70- Pos. -2- in direction of arrow -B- and remove.

Install

It is essential that the following work instructions be performed to ensure perfect functioning of the air mass meter - G70- .

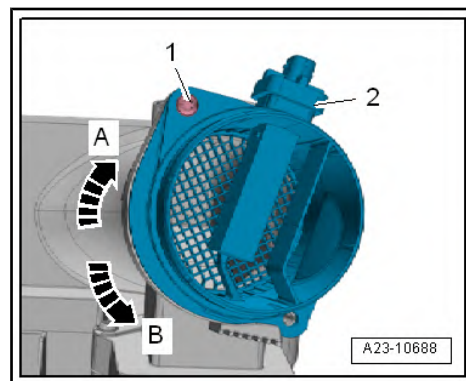
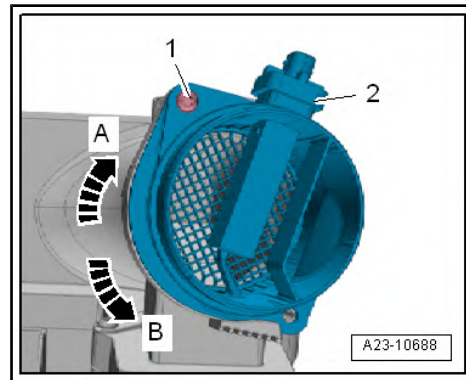


Note

- ◆ *If the air filter is heavily soiled or soaked, dirt particles or moisture can enter the air mass meter and distort the measured air flow values. This results in a reduction of output, because a lower injection quantity is calculated.*
- ◆ *Always use an original air filter element.*
- ◆ *Always replace any damaged gasket rings (unmetered air).*
- ◆ *Use a silicone-free lubricant for installing the air guide hose and gasket ring.*
- ◆ *The hose- and pipe supports and the air guide hoses must be de-oiled and degreased before installing.*
- ◆ *Secure all hose connections with spring-type clips that comply with the series design ⇒ ETKA - Electronic Catalogue of Original Parts .*
- Check air mass meter as well as air guide hose (on the side of the fresh air) for salt residues, dirt and leaves.
- Check suction channel up to air filter insert for dirt. if you find it is dirty, remove salt residues, dirt and leaves from the air filter housing (top and bottom section) (clean by washing or using a vacuum as required).
- To install, position the air mass meter - G70- Pos. -2- and turn in the direction of arrow -A-.

Tightening torques

- ◆ ⇒ ["6.4 Summary of components - air filter", page 362](#)



4.4 Check fuel pressure regulating valve - N276-

Special tools and workshop equipment required

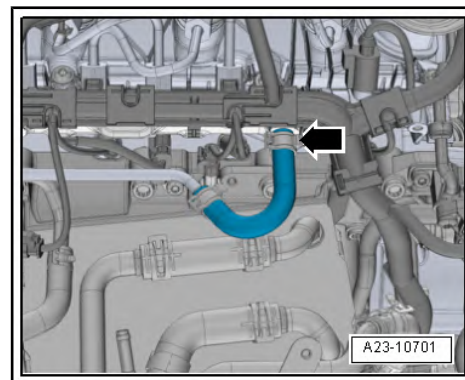
- ◆ Suitable auxiliary hose for connection to the fuel return-flow line
- ◆ Fuel tank, approx. 200 ml

Work procedure



Note

- ◆ *Safety precautions when working on the fuel supply system*
⇒ *"2 Safety instructions", page 3*.
- ◆ *Observe rules for cleanliness*
⇒ *"3.1 Rules of cleanliness", page 6*.
- Remove engine cover
⇒ *"1.1 Removing and installing engine trim panel", page 10*.
- Loosen hose clamp -arrow-, remove fuel return-flow hose from the fuel distributor.
- Close the return-flow line connection with a blind plug.



- Connect an auxiliary hose -3- to the fuel distributor return hose -2-.
- Hold this hose line -3- in a suitable vessel in order to measure the return flow quantity.

1) Test with engine running

- Start engine and run at idling speed.
- Specified value: greater than 75 ml in 30 seconds

If the specified value is not reached, the fuel pressure regulating valve - N276- is defective.

2) Test with engine running

If the condition under point 1) is fulfilled, increase the engine speed to ≥ 2000 rpm.

- Return flow quantity specified value: 0 ml
- A drop-leakage is permissible

If the specified value is not reached, the fuel pressure regulating valve - N276- is defective.

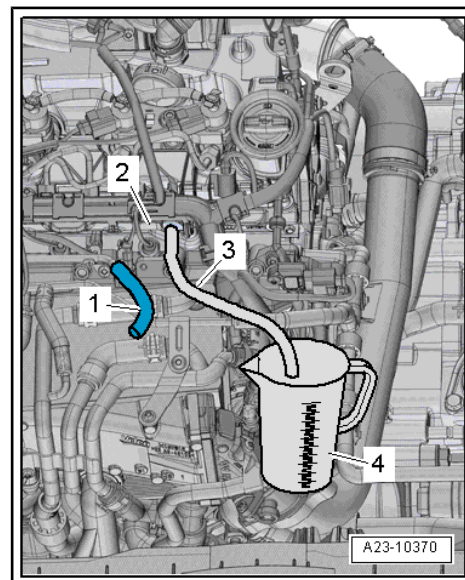
3) The engine will no longer start

Perform test at starter speed.

- Return flow quantity specified value: 0 ml
- A drop-leakage is permissible

If the specified value is not reached, the fuel pressure regulating valve - N276- is defective.

- Replace fuel pressure regulating valve - N276-
⇒ *"4.5 Replace fuel pressure regulating valve N276", page 346*.





4.5 Replace fuel pressure regulating valve - N276-

The fuel pressure regulating valve - N276- is located on the fuel distributor and provides a constant pressure in the fuel distributor and in the injection lines (fuel high pressure circuit).

The regulating valve opens if there is too high a pressure in the fuel high pressure circuit so that one part of the fuel from the fuel distributor returns to the fuel tank via a return-flow line.

The pressure control valve closes if there is too low a pressure in the high-pressure fuel circuit and thus seals the high-pressure side from the low-pressure side.



Note

The fuel pressure regulating valve - N276- is not reusable.

Special tools and workshop equipment required

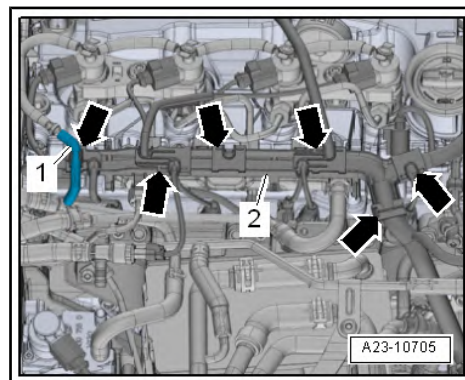
- ◆ Cleaning and degreasing agent , e.g. -D 009 401 04-
- ◆ Protective goggles and gloves
- ◆ Open-end wrench SW 30

Removing



Note

- ◆ *Safety precautions when working on the fuel supply system*
⇒ *"2 Safety instructions", page 3 .*
- ◆ *Observe rules for cleanliness*
⇒ *"3.1 Rules of cleanliness", page 6 .*
- Remove engine cover
⇒ *"1.1 Removing and installing engine trim panel", page 10 .*
- Expose fuel return-flow hose -1-.
- Open holding clamps -arrows-, unclip and remove cable duct -2-.
- Before removing, clean the threaded area of the fuel pressure regulating valve - N276- .
- No dirt must get into the hole of the fuel distributor.
- No cleaning agent must get into the plug connection, clean carefully.
- Dry fuel pressure regulating valve - N276-



- Separate electrical plug connection -2-.
- Loosen union nuts -1- - to do so, hold on hexagon against the fuel distributor. Afterwards release by hand.
- Suction the dirt out of the fuel distributor hole (thread and contact surface). To do so do not use any mechanical tools.
- Close the open port on the fuel rail with a clean plugs.

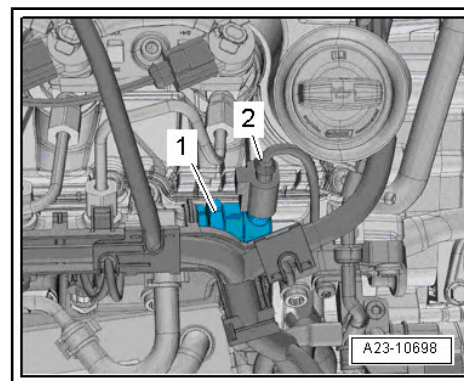
Install

- Tightening torque
⇒ [“2.2 Fuel distributor - summary of components”, page 325](#)



Note

- ◆ *Replace the fuel pressure regulating valve - N276- each time it is removed.*
- ◆ *Moisten the threaded insert and the biting edge of the fuel pressure regulating valve - N276- with diesel fuel.*
- Tighten the union nut by hand.
- Align the new control valve so that the connecting cable is re-installed free of tension after the plug has been repositioned.
- Counterhold housing hexagon of the regulating valve in this position using a wrench or pliers (such as water pump pliers).
- To tighten the union nuts use a suitable torque wrench with an open-end wrench (size 30).
- Filling and bleeding the fuel system
⇒ [“1.3 Filling/bleeding the fuel system”, page 321](#) .



4.6 Removing and installing fuel pressure sender - G247-

Special tools and workshop equipment required

- ◆ Socket insert size 27 - T40218-
- ◆ Cleaning and degreasing agent , e.g. -D 009 401 04-
- ◆ Protective goggles and gloves

Removing



Note

- ◆ *Safety precautions when working on the fuel supply system*
⇒ [“2 Safety instructions”, page 3](#) .
- ◆ *Observe rules for cleanliness*
⇒ [“3.1 Rules of cleanliness”, page 6](#) .
- Remove engine cover
⇒ [“1.1 Removing and installing engine trim panel”, page 10](#) .



WARNING

Wear protective gloves and protective goggles when working with grease remover!



- Before removing, clean the thread area around the fuel pressure sender - G247- with a grease remover (no dirt must get into the hole of the fuel distributor).

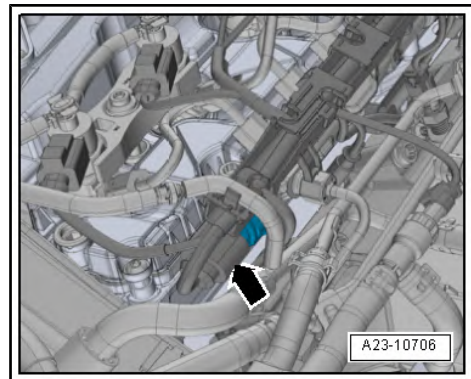
**Note**

No grease remover must get into the plug connection, carefully clean.

- Dry the fuel pressure sender - G247- .
- Separate electrical plug connection -2-.
- Unscrew the fuel pressure sender - G247- with the socket insert size 27 - T40218- .
- Suction the dirt out of the fuel distributor hole (thread and contact surface). To do so do not use any mechanical tools.

**Note**

Close the fuel distributor hole immediately with a suitable screw plug in order to prevent dirt from penetrating.

**Install****Note**

- ♦ *Pay attention to damage of the sealing surfaces (biting edge seal) and the thread of the new fuel pressure sender - G247- . It is possible to use the fuel pressure sender - G247- again.*
- ♦ *Also check the sealing surface in the hole of the fuel distributor.*
- ♦ *Coat the threaded insert and biting edge of the fuel pressure sender - G247- with Diesel fuel.*
- Tighten the fuel pressure sender - G247- by hand.
- Tighten the sender:
 - ♦ Specified torque:
 - ⇒ [“2.2 Fuel distributor - summary of components”, page 325](#) .
- Filling and bleeding the fuel system
 - ⇒ [“1.3 Filling/bleeding the fuel system”, page 321](#) .
- Tightening torque
 - ⇒ [“2.2 Fuel distributor - summary of components”, page 325](#)

4.7 Removing and installing differential pressure transmitter - G505-

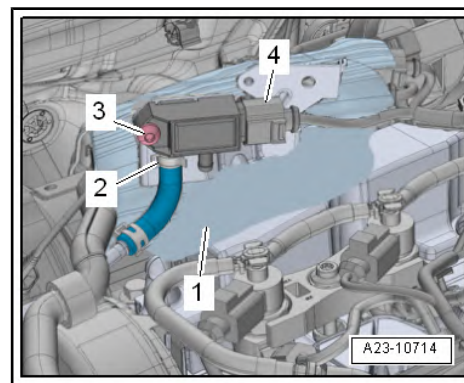
**Note**

The differential pressure transmitter - G505- determines the load- ing status of the particle filter.

Removing

- Remove engine cover
 - ⇒ [“1.1 Removing and installing engine trim panel”, page 10](#) .

- Open heat protection sleeve -1-.
- Separate electrical plug connection -4-.
- Unscrew screw -3-, remove differential pressure transmitter - G505- from the holder.
- Spray hose with a solvent at charge pressure sender - G505- before removing it.
- Loosen hose clamp -2-.
- Disconnect hose carefully and straight from the connection fittings (the connection fittings move slightly out of the differential pressure transmitter - G505-).



Install

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



Note

- ◆ *Blow out control lines of the differential pressure transmitter - G505- to the particle filter with compressed air before installation in particle filter direction (it may be blocked or iced up by condensation water).*
- ◆ *Pay attention to the tight connection and leaktightness of the hose.*
- ◆ *Only install approved spring strap clips for securing the hose connections ⇒ ETKA - Electronic Catalogue of Original Parts .*
- After replacing the differential pressure transmitter - G505- , an adaption must be performed in the function "Targeted functions" ⇒ Vehicle diagnostic tester.

Tightening torques

- ◆ ⇒ ["3.1 Summary of components - exhaust temperature regulation", page 402](#)
- ◆ ⇒ ["2.1 Summary of components - exhaust gas cleaning", page 388](#)

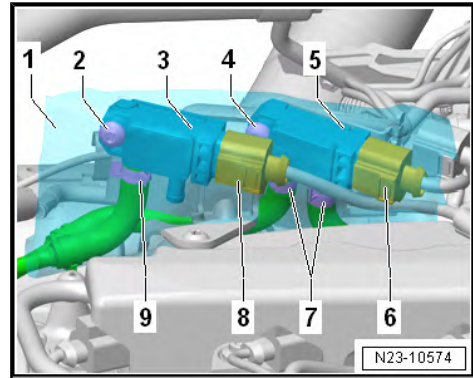
4.8 Removing and installing pressure sensor for exhaust gas 1 - G450-

Removing

- Remove engine cover
⇒ ["1.1 Removing and installing engine trim panel", page 10](#) .



- Open heat protection sleeve -1-.
- Separate electrical plug connection -8-.
- Unscrew screw -2-, lightly press the differential pressure transmitter - G505- -3- to one side.
- Separate electrical plug connection -6-.
- Release screw -4-.
- Spray hoses on the pressure sensor 1 for exhaust gas - G450- -5- with a solvent before removal.
- Loosen hose clamps -7-.

**Caution**

Risk of destruction of the pressure sensor as a result of the connection fitting breaking.

- ◆ ***Pull hoses off carefully and straight from the connection fitting.***

Install

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

**Note**

- ◆ *Blow out control lines of the exhaust gas pressure sender 1 - G450- to the particle filter with compressed air before installation in particle filter direction (it may be blocked or iced up by condensation water).*
- ◆ *Pay attention to the tight connection and leaktightness of the hose.*
- ◆ *Only install approved spring strap clips for securing the hose connections ⇒ ETKA - Electronic Catalogue of Original Parts .*
- After replacing the pressure sensor 1 for exhaust gas - G450- the adapted values must be set in the function "Targeted functions" ⇒ Vehicle diagnostic tester.

Tightening torques

- ◆ ⇒ ["3.1 Summary of components - exhaust temperature regulation", page 402](#)

5 Lambda probe

⇒ [“5.1 Lambda probe - Summary of components”, page 351](#)

⇒ [“5.2 Removing and installing Lambda probe G39”, page 352](#)

⇒ [“5.3 Removing and installing Lambda probe after catalytic converter G130”, page 353](#)

5.1 Lambda probe - Summary of components

1 - Lambda probe downstream of catalytic converter - G130- with heating for lambda probe - Z29-

- ☐ only for vehicles with engine identification characters CRKB, CRMB, CUNA
- ☐ removing and installing
⇒ [“5.3 Removing and installing Lambda probe after catalytic converter G130”, page 353](#)
- ☐ Observe mounting instructions ⇒ [page 354](#)
- ☐ 52 Nm

2 - Exhaust gas temperature transmitter 4 - G648-

- ☐ removing and installing
⇒ [“3.2 Removing and installing exhaust gas temperature transmitter”, page 403](#)
- ☐ the thread of the exhaust gas temperature transmitter is coated and must not be coated additionally with hot bolt paste

3 - Exhaust gas temperature transmitter 1 - G235-

- ☐ removing and installing
⇒ [“3.2 Removing and installing exhaust gas temperature transmitter”, page 403](#)
- ☐ Coat threads with hot bolt paste; hot bolt paste ⇒ ETKA - Electronic Catalogue of Original Parts

4 - Exhaust gas temperature transmitter 2 - G448-

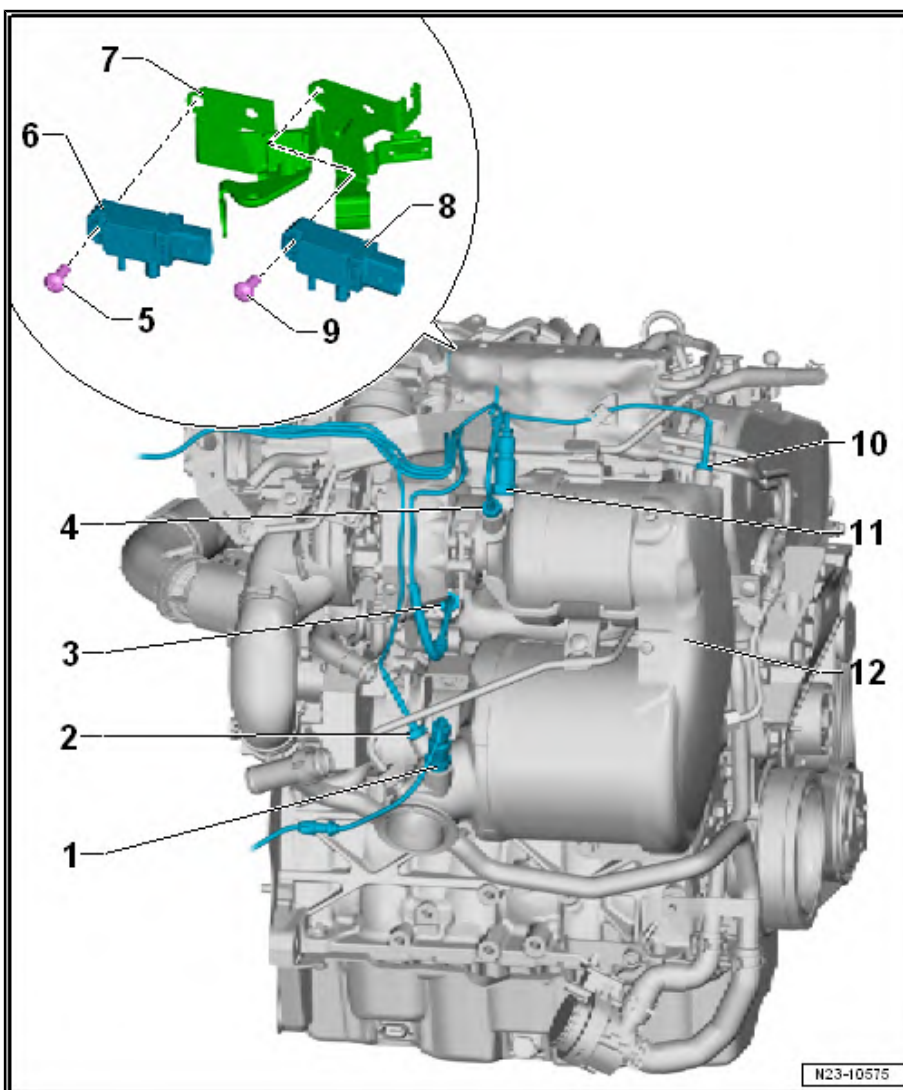
- ☐ only for vehicles with engine identification characters CRKB, CRMB, CUNA
- ☐ removing and installing
⇒ [“3.2 Removing and installing exhaust gas temperature transmitter”, page 403](#)

5 - Screw

- ☐ 8 Nm

6 - Differential pressure transmitter - G505-

- ☐ removing and installing
⇒ [“4.7 Removing and installing differential pressure transmitter G505”, page 348](#)



**7 - Support****8 - Exhaust gas pressure sensor 1 - G450-**

- ☐ only for vehicles with engine identification characters CRKB, CRMB, CUNA
- ☐ removing and installing
⇒ [“4.8 Removing and installing pressure sensor for exhaust gas 1 G450”, page 349](#)

9 - Screw

- ☐ 8 Nm

10 - Exhaust gas temperature transmitter 3 - G495-

- ☐ removing and installing
⇒ [“3.2 Removing and installing exhaust gas temperature transmitter”, page 403](#)
- ☐ the thread of the exhaust gas temperature transmitter is coated and must not be coated additionally with hot bolt paste

11 - lambda probe - G39- with heating for lambda probe - Z19-

- ☐ removing and installing ⇒ [“5.2 Removing and installing Lambda probe G39”, page 352](#)
- ☐ 55 Nm

12 - Exhaust gas cleaner

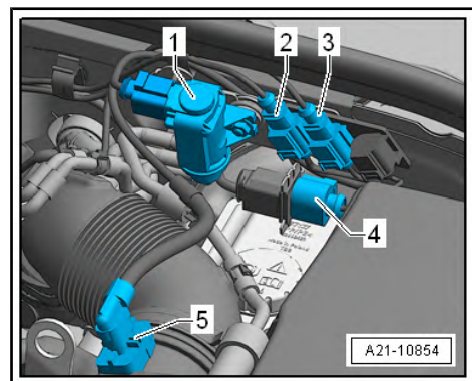
5.2 Removing and installing Lambda probe - G39-

Special tools and workshop equipment required

- ◆ Extension piece (No. 22) - T10491-

Removing

- Remove engine cover
⇒ [“1.1 Removing and installing engine trim panel”, page 10](#) .
- Take the electrical plug connection -4- for Lambda probe - G39- out of its holder and disconnect, expose the electric cable.



- Unscrew lambda probe - G39- -arrow- with extension (No. 22)
- T10491- .

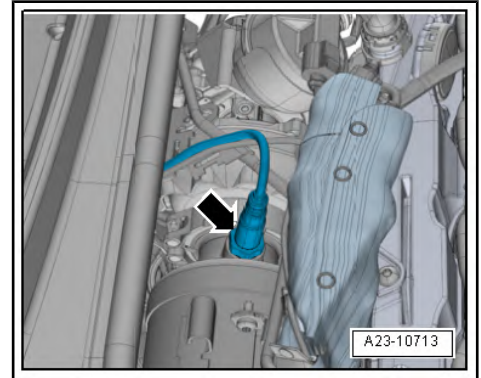
Install

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



Note

- ◆ *New lambda probes are coated with an assembly paste; the paste is not allowed to reach to slots on the body of the probe.*
- ◆ *For a re-used lambda probe, only coat the thread with hot bolt paste . This paste must not come into contact with the slots of the lambda probe body.*
- ◆ *The electrical wiring of the lambda probe must be attached to the same position when installing. This prevents the lambda probe cable from coming into contact with the exhaust pipe.*



Tightening torques

- ◆ ⇒ [“5.1 Lambda probe - Summary of components”, page 351](#) .

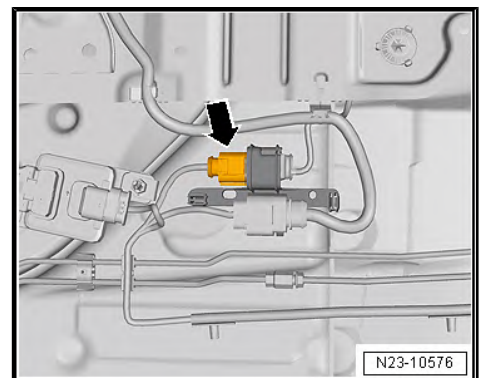
5.3 Removing and installing Lambda probe after catalytic converter - G130-

Special tools and workshop equipment required

- ◆ Socket insert for Lambda probe - 3337-

Removing

- Remove the sound dampening systems and tunnel cover ⇒ Body Work; Rep. gr. 50 .
- Remove the right underfloor trim panel ⇒ Body Work; Rep. gr. 50 .
- Take the electrical plug connection -arrow- for Lambda probe after catalytic converter - G130- out of its holder and disconnect, expose the electric cable.





- Unscrew the lambda probe after catalytic converter - G130-
-arrow- with a socket wrench from the socket insert for lambda
probe - 3337- .

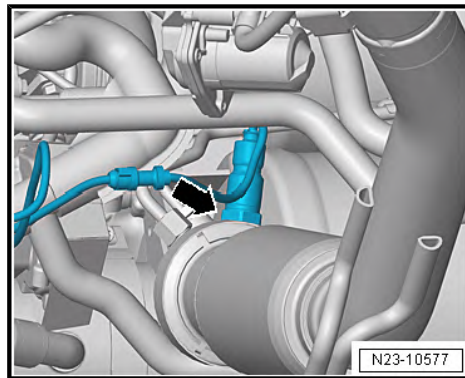
Install

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



Note

- ◆ *New lambda probes are coated with an assembly paste; the paste is not allowed to reach to slots on the body of the probe.*
- ◆ *For a re-used lambda probe, only coat the thread with hot bolt paste . This paste must not come into contact with the slots of the lambda probe body.*
- ◆ *The electrical wiring of the lambda probe must be attached to the same position when installing. This prevents the lambda probe cable from coming into contact with the exhaust pipe.*



Tightening torques

- ◆ ⇒ [“5.1 Lambda probe - Summary of components”, page 351](#) .
- ◆ Sound dampening system - Summary of components ⇒ Body Work; Rep. gr. 50 .
- ◆ Underfloor trim panel - Summary of components ⇒ Body Work; Rep. gr. 50 .

6 Intake manifold, air filter

⇒ [“6.1 Assembly overview - intake manifold”, page 355](#)

⇒ [“6.2 Removing and installing the throttle valve control unit J338”, page 357](#)

⇒ [“6.3 Removing and installing intake manifold”, page 359](#)

⇒ [“6.4 Summary of components - air filter”, page 362](#)

⇒ [“6.5 Removing and installing air filter”, page 364](#)

6.1 Assembly overview - intake manifold

1 - Gasket ring

- ☐ replace after removal

2 - Fit pin

3 - Screw

- ☐ 8 Nm

4 - Gasket

- ☐ replace after removal

5 - Screw

- ☐ Tightening torque and tightening order
⇒ [page 357](#)

6 - Support

- ☐ for the intake manifold
- ☐ Tightening torque and tightening order
⇒ [page 357](#)

7 - Screw

- ☐ Tightening torque and tightening order
⇒ [page 357](#)

8 - Screw

- ☐ replace after removal
- ☐ Tightening torque and tightening order
⇒ [page 357](#)

9 - Fit pin

10 - Screw

- ☐ 8 Nm

11 - Intake manifold with charge air cooler

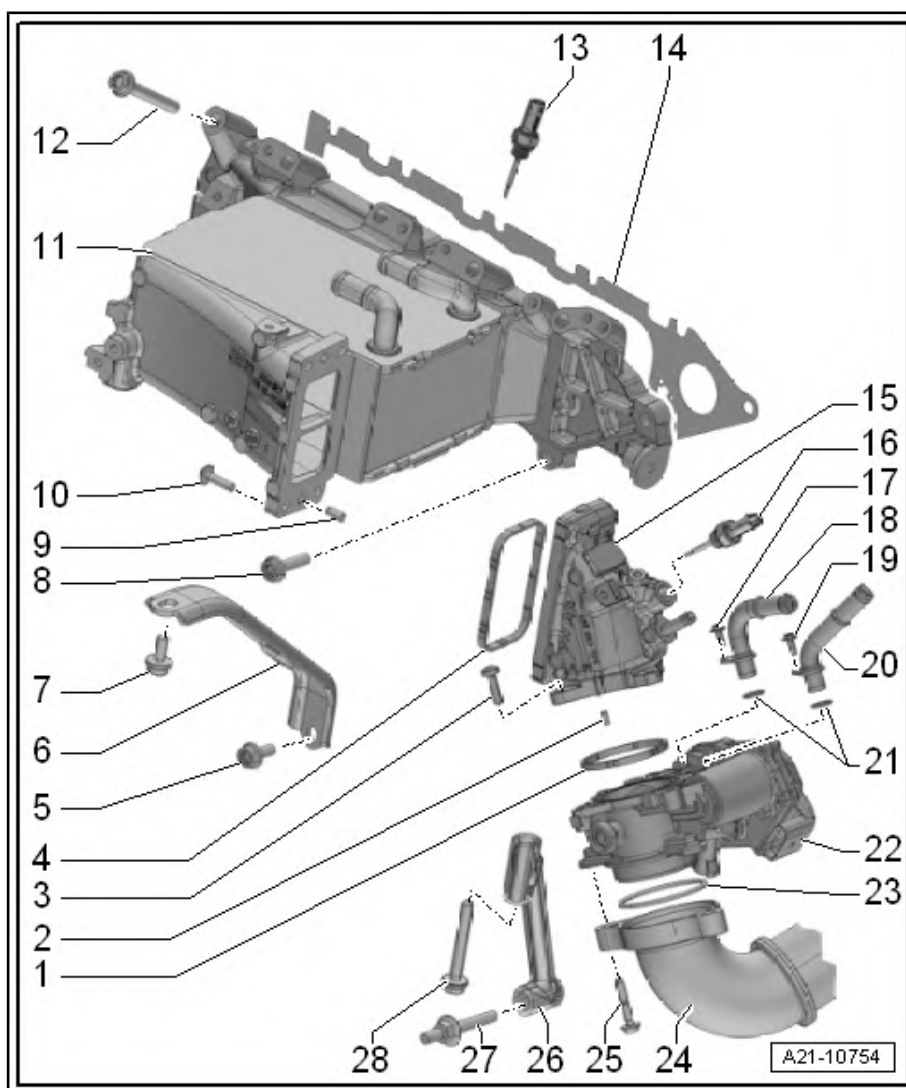
- ☐ The intake manifold and charge air cooler form a single building unit
- ☐ removing and installing ⇒ [“6.3 Removing and installing intake manifold”, page 359](#)

12 - Screw

- ☐ replace after removal
- ☐ Tightening torque and tightening order ⇒ [page 357](#)

13 - Charge air temperature transmitter after charge air cooler - G811-

- ☐ removing and installing
⇒ [“4.1 Removing and installing intake air temperature transmitter G42 / charge air temperature transmitter after charge air cooler G811”, page 342](#)





- ☐ 22 Nm

14 - Gasket

- ☐ replace after removal

15 - Inlet connections

- ☐ for throttle valve control unit - J338-

16 - Intake air temperature transmitter - G42-

- ☐ removing and installing
⇒ [“4.1 Removing and installing intake air temperature transmitter G42 / charge air temperature transmitter after charge air cooler G811 ”, page 342](#)
- ☐ 22 Nm

17 - Screw

- ☐ 10 Nm

18 - Coolant pipe

19 - Screw

- ☐ 10 Nm

20 - Coolant pipe

21 - O-rings

- ☐ replace after removal

22 - Throttle valve module - J338-

- ☐ With throttle valve potentiometer - G69-
- ☐ removing and installing ⇒ [“6.2 Removing and installing the throttle valve control unit J338 ”, page 357](#)

23 - O-ring

- ☐ replace after removal

24 - Air guide pipe

25 - Bolt

- ☐ Tightening torque ⇒ [“2.1 Charge air cooling - Summary of components”, page 309](#)

26 - Bracket

- ☐ for throttle valve control unit - J338-
- ☐ Tightening torque and tightening order ⇒ [page 357](#)

27 - Screw

- ☐ Tightening torque and tightening order ⇒ [page 357](#)

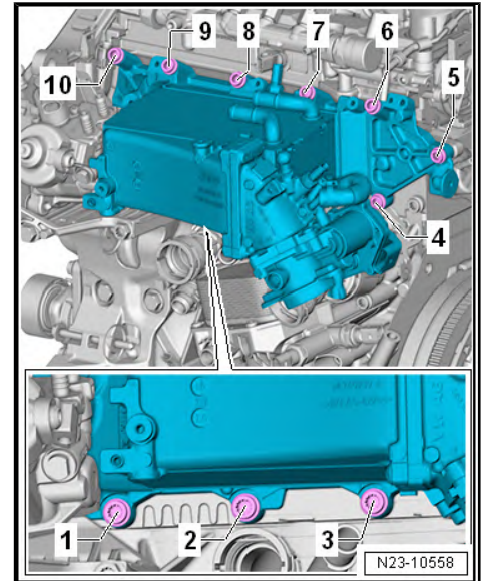
28 - Screw

- ☐ Tightening torque and tightening order ⇒ [page 357](#)

Intake manifold with charge air cooler - tightening torque and tightening order

- Tighten screws in steps:

Stage	Screws	Tightening torque
1.	-1 ... 10-	by hand as far as the stop
2.	-1 ... 10-	tighten to 20 Nm
	-1 ... 10-	turn 90° further



Mounting bracket for intake manifold and mounting bracket for throttle flap control unit - tightening torque and -sequence

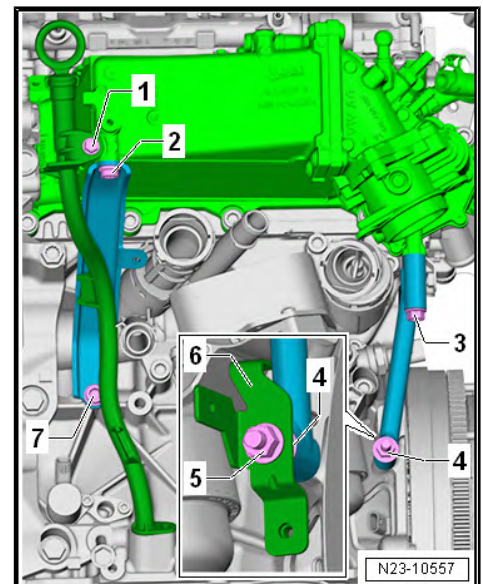
- Tighten screws in steps:



Caution

When installing the mounting bracket for the intake manifold and, where necessary, the throttle flap control unit, ensure that the appropriate bracket is not screwed into place under tension or at an angle- crucial.

Stage	Nuts and bolts	Tightening torque
1.	-2-, -3-, -4-, -7-	firmly by hand as far as the stop
2.	-2-, -3-, -4-, -7-	tighten to 20 Nm
3.	-5-	tighten to 10 Nm
4.	-1-	tighten to 10 Nm



6.2 Removing and installing the throttle valve control unit - J338-

Special tools and workshop equipment required

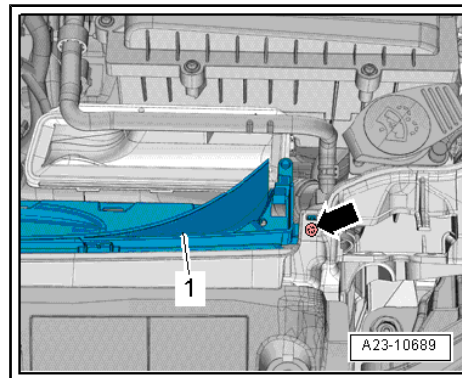
- ◆ Hose clamps up to Ø 25 mm - MP7-602 (3094)-
- ◆ Hose clip pliers - VAS 6362-

Removing

- Remove engine cover
⇒ [“1.1 Removing and installing engine trim panel”, page 10](#) .
- Remove air filter housing
⇒ [“6.5 Removing and installing air filter”, page 364](#) .

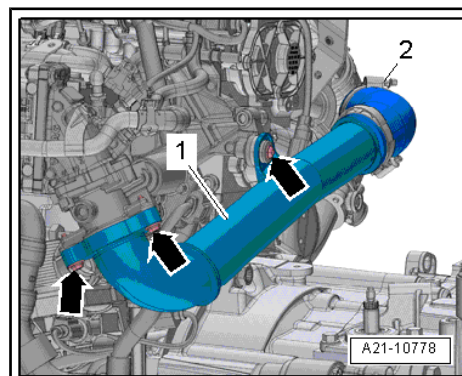


- Release screw left and right -arrow-.
- Unclip and remove bottom part -1- of air guide.



- Unscrew screws -arrows-.
- Loosen hose clamp -2-, remove air guide pipe -1-.

For vehicles with engine identification characters CLHA, CLHB, CKFB, CKFC, CUPA, CRVC



- Unscrew screws -arrows-.
- Unclamp coolant hose -1- and -4- with hose clamps to 25 mm - MP7-602 (3094)- .

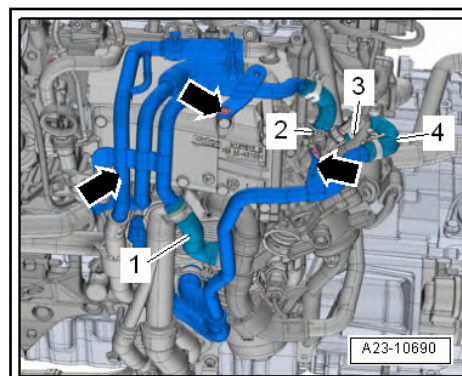


Note

Place a cloth below to absorb leaking coolant.

- Loosen hose clamps -2-, -3-, remove coolant hoses.

For vehicles with engine identification characters CRKB, CRMB, CUNA



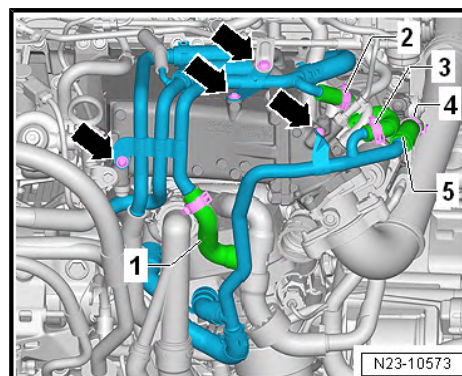
- Release screws -arrows-.
- Unclamp coolant hose -1- and -5- with hose clamps to 25 mm - MP7-602 (3094)- .



Note

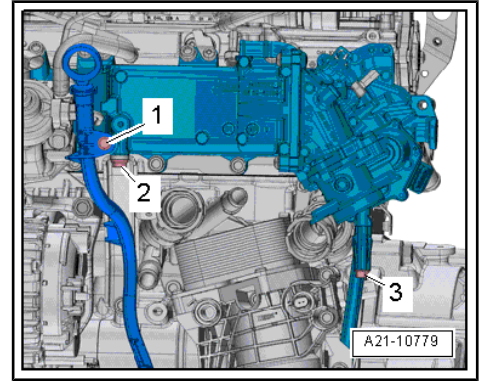
Place a cloth below to absorb leaking coolant.

- Loosen hose clamps -2-, -3-, -4-, remove coolant hoses.



- Release screw -3-.

Continued for all vehicles

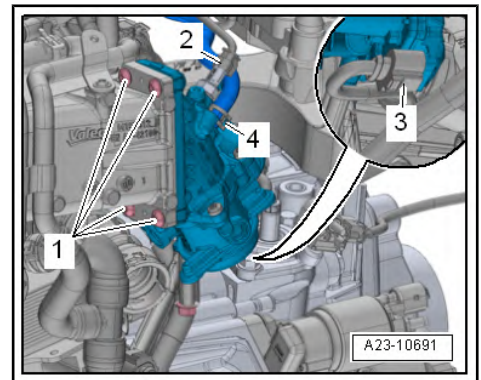


- Disconnect electrical plug connections:
 - 2 - for Intake air temperature transmitter - G42-
 - 3 - for throttle valve control unit - J338-
- Loosen hose clamp -4-, remove air guide hose.
- Unscrew screws -1-, remove connection fittings with throttle valve control unit - J338- .

Install

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

- Tightening torque
⇒ ["6.1 Assembly overview - intake manifold", page 355](#) .



Note

Replace gasket and O-ring.

- When attaching the inlet connection to the throttle valve control unit - J338- , pay attention to the fit pins.
- Install the front top coolant pipe
⇒ ["3.2 Removing and installing the front top coolant pipes", page 172](#) .
- Install air filter
⇒ ["6.5 Removing and installing air filter", page 364](#) .

6.3 Removing and installing intake manifold



Note

The intake manifold and charge air cooler form a single building unit.

Special tools and workshop equipment required

- ◆ Hose clip pliers - VAS 6362-
- ◆ Socket insert XZN 10 - T10501-

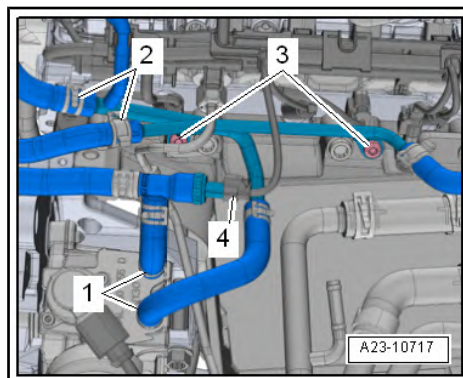
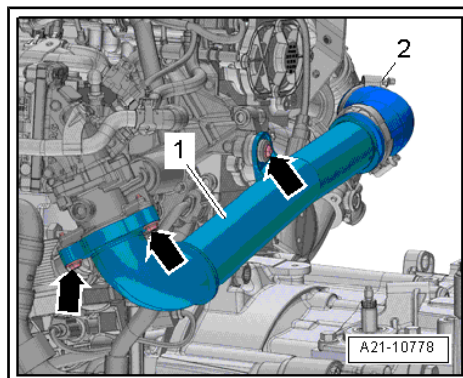
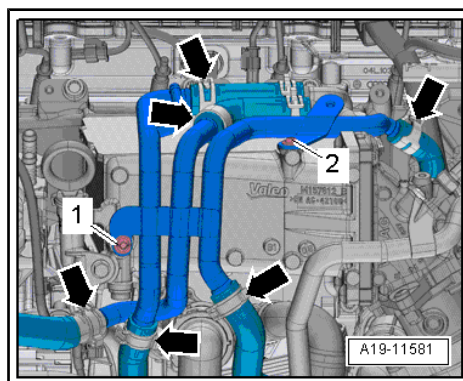


Removing



Note

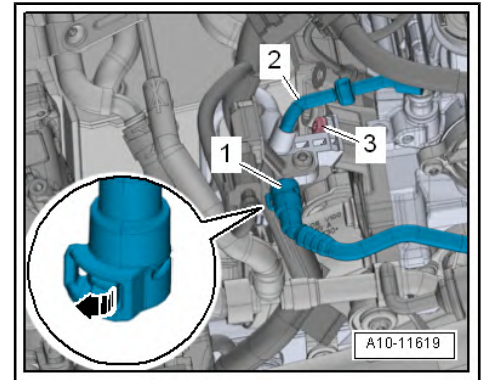
- ♦ *Safety precautions when working on the fuel supply system*
⇒ *"2 Safety instructions", page 3*.
- ♦ *Observe rules for cleanliness*
⇒ *"3.1 Rules of cleanliness", page 6*.
- Remove front top coolant pipe
⇒ *"3.2 Removing and installing the front top coolant pipes", page 172*.
- Remove high pressure line
⇒ *"2.9 Removing and installing high pressure lines", page 334*.
- Remove air filter
⇒ *"6.5 Removing and installing air filter", page 364*.
- Unscrew screws -arrows-.
- Loosen hose clamp -2-, remove air guide pipe -1-.
- Separate electrical plug connection -4-.
- Loosen hose clamps -1-, -2-, remove fuel hoses.
- Unscrew screws -3-, lay fuel lines towards the rear.



- Unlock catch -arrow-, remove vacuum hose -1-.
- Unscrew screw -3-, remove vacuum hose -2-.

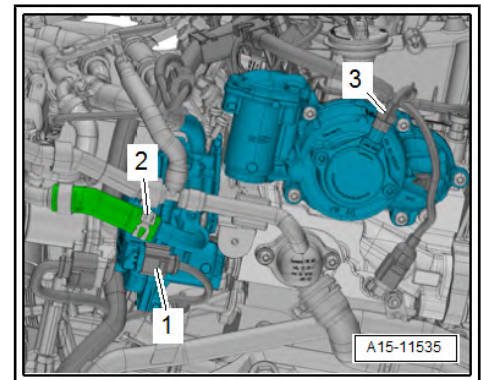
For vehicles with engine identification characters CRKB, CRMB, CUNA

- Removing the cover for the radiator fan
⇒ ["4.5 Removing and installing fan shroud", page 195](#) .

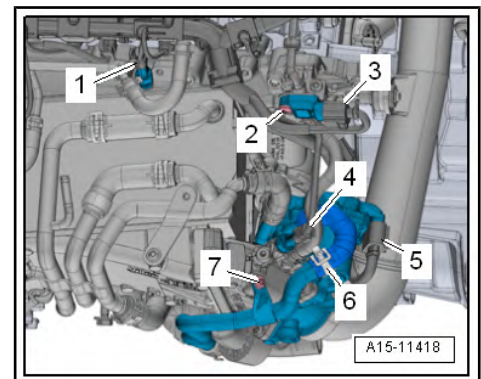


- Separate electrical plug connection -1-.
- Loosen hose clamp -2-.

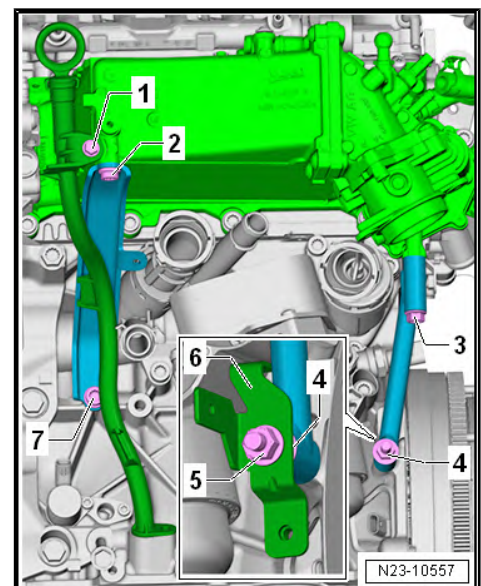
Continued for all vehicles



- Disconnect and expose electrical plug connections:
1 - for charge air temperature transmitter after charge air cooler - G811-
3 - for charge pressure sender - G31-
4 - for intake air temperature transmitter - G42-
5 - for throttle valve control unit - J338-
- Unscrew hose clamps -2-, -7-, remove coolant hose -6-.



- Release screw -1- for guide pipe for oil dipstick.
- Unscrew nuts -5- and remove the mounting bracket -6- from the double screw -4-.
- Release screws -4-, -7-.
- Unscrew screws -2-, -3- for intake manifold holder.





- Unscrew screws -10...1- with the Polydrive socket XZN 10 - T10501- , remove the intake manifold with charge air cooler.

Install

- Place the new cylinder head gasket onto the fitted pins.



Caution

Do not damage the sealing surface of the intake manifold when placing it onto the fitted pins.

- Tighten screws -1...10- as per the tightening torques and - sequence
⇒ [Fig. "Intake manifold with charge air cooler - tightening torque and tightening order"](#) , page 357 .

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



Note

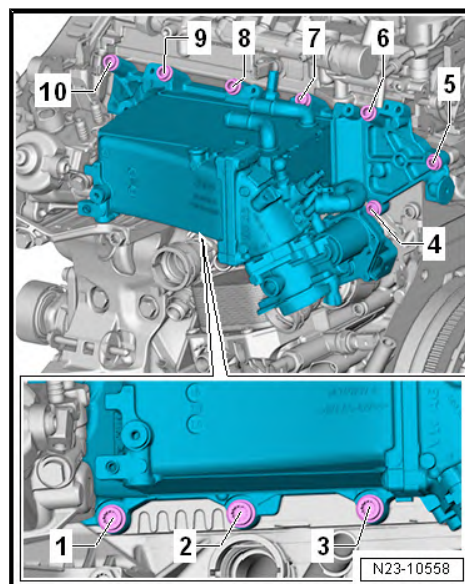
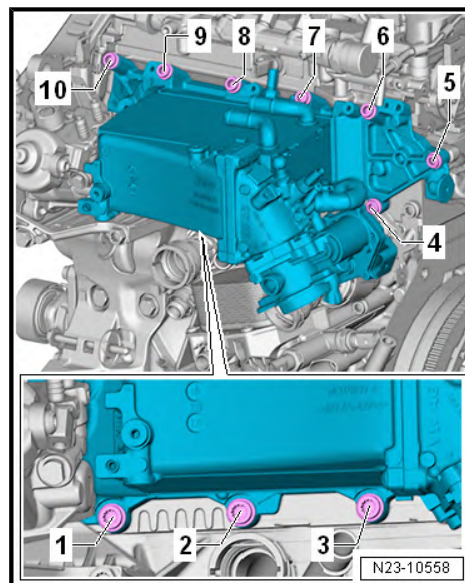
Replace gasket.

- Install air filter
⇒ ["6.5 Removing and installing air filter"](#) , page 364 .
- Installing high pressure line
⇒ ["2.9.2 Installing high pressure line"](#) , page 335 .
- Install the front top coolant pipe
⇒ ["3.2 Removing and installing the front top coolant pipes"](#) , page 172 .

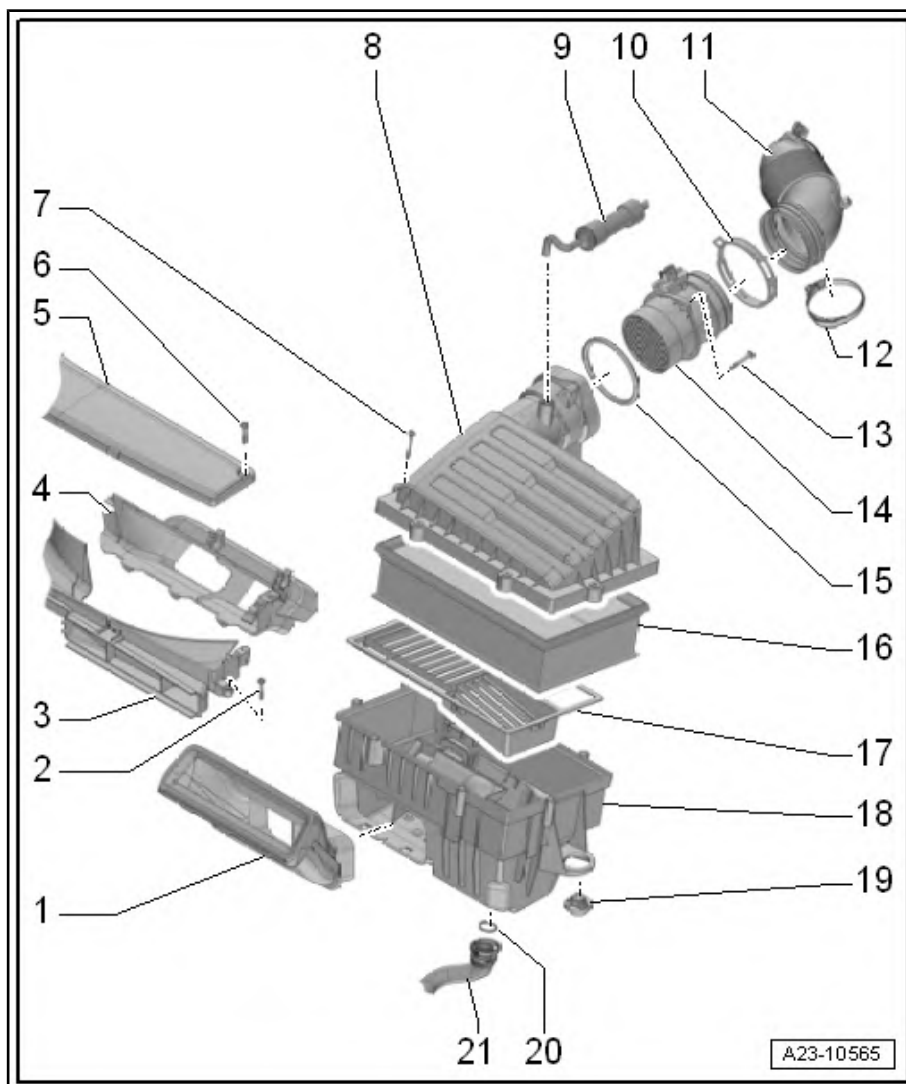
Tightening torques

- ♦ ⇒ ["1.6 Hose connections with screw clamps"](#) , page 308
- ♦ ⇒ ["6.1 Assembly overview - intake manifold"](#) , page 355
- ♦ ⇒ ["1.1 Parts of the lubrication system - Summary of components"](#) , page 127

6.4 Summary of components - air filter



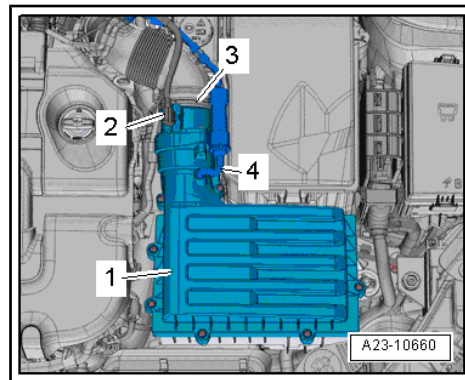
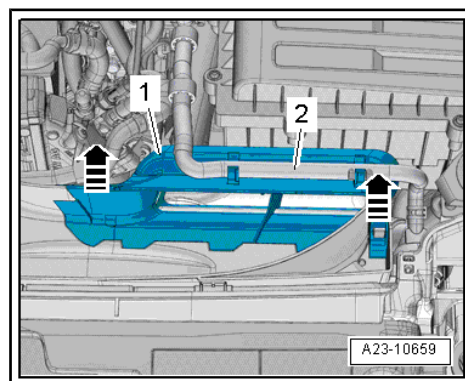
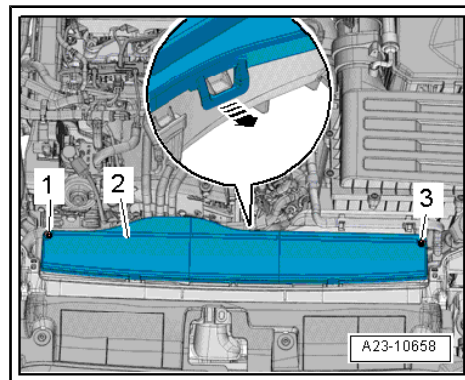
- 1 - Air deflector**
 - ☐ on the air filter lower part
- 2 - Screw**
 - ☐ 2 Nm
- 3 - Air guide lower part**
 - ☐ on the lock support
- 4 - air guide pipe top**
 - ☐ on the lock support
- 5 - Cover**
 - ☐ for air guide
- 6 - Screw**
 - ☐ 2 Nm
- 7 - Screw**
 - ☐ 1.5 Nm
- 8 - Air filter upper part**
 - ☐ remove mechanical contaminations
- 9 - Breather hose**
 - ☐ from charge pressure control solenoid valve - N75-
- 10 - Spring strap clamp**
- 11 - Intake hose**
- 12 - Screw clamp**
 - ☐ installing
⇒ ["1.6 Hose connections with screw clamps", page 308](#)
- 13 - Screw**
 - ☐ 1.5 Nm
- 14 - Air mass meter - G70-**
removing and installing ⇒ ["4.3 Removing and installing air flow mass meter G70 ", page 343](#)
- 15 - O-ring**
 - ☐ replace if damaged.
- 16 - Air filter element**
 - ☐ pay attention to change intervals ⇒ Maintenance ; Booklet Octavia III
- 17 - Insert**
 - ☐ for air filter lower part
- 18 - Air filter lower part**
 - ☐ remove mechanical contaminations
- 19 - Rubber buffer**
- 20 - O-ring**
 - ☐ replace if damaged.
- 21 - Water drain hose**
 - ☐ with valve
 - ☐ clean



6.5 Removing and installing air filter

Removing

- Unscrew screws -1-, -3-.
- Unlock catch -arrows-, remove cover-2-.
- Expose coolant hose -2-.
- Unlock catches -arrows-, remove air guide pipe upper part -1-.
- Disconnect the plug connection -2- at the air mass meter -G70- .
- Disconnect vacuum hose -4-.
- Loosen hose clamp -3-, remove extraction hose.
- Remove air filter -1-.



Install

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

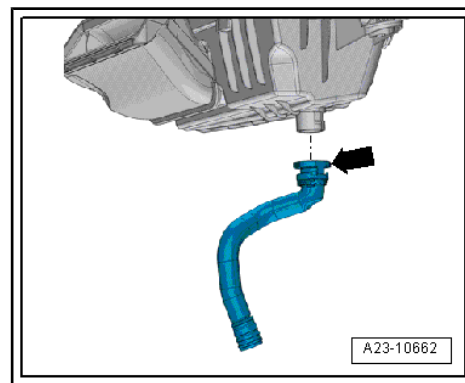
- ◆ Tightening torque
⇒ ["6.4 Summary of components - air filter", page 362](#)



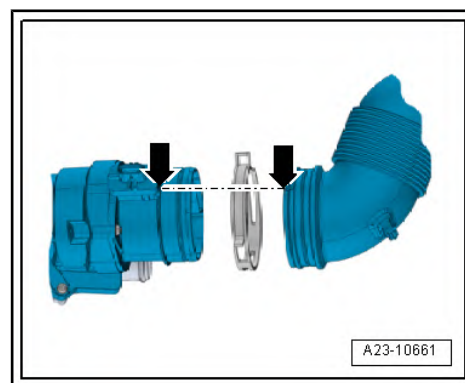
Note

- ◆ *Connections, charge air pipes and hoses of charge air system must be free of oil and grease before being installed.*
- ◆ *Use a silicone lubricant to assemble the suction hose.*
- ◆ *Only install approved spring strap clips for securing the hose connections ⇒ ETKA - Electronic Catalogue of Original Parts .*

- Disconnect water drainage hose -arrow-.
- Clean connection and air filter lower part and hose to remove dirt and leaves.



- When attaching the suction nozzle to the air filter housing, pay attention to the installation markings -arrows-.
- Put air filter onto the battery tray and push in until there is an audible click.
- Press air filter down again and check by pulling that the air filter is fully engaged.





7 Engine control unit

⇒ ["7.1 Removing and installing engine control unit J623", page 366](#)

7.1 Removing and installing engine control unit - J623-

⇒ ["7.1.1 Removing and installing engine control unit J623", page 366](#)

⇒ ["7.1.2 Removing and installing engine control unit J623, engine control unit with protective housing", page 366](#)

7.1.1 Removing and installing engine control unit - J623-

Removing



Note

- ◆ If the engine control unit is replaced, the must be ⇒ Vehicle diagnostic tester connected and the function "replace engine control unit" must be carried out.
- ◆ If the adjustment values of the injection units can no longer be read from the old (defective) engine control unit, these adjustment values must be manually entered into the new engine control unit and adapted to it.



Caution

If the engine control unit touches the plus pole of the battery, this will destroy the engine control unit.

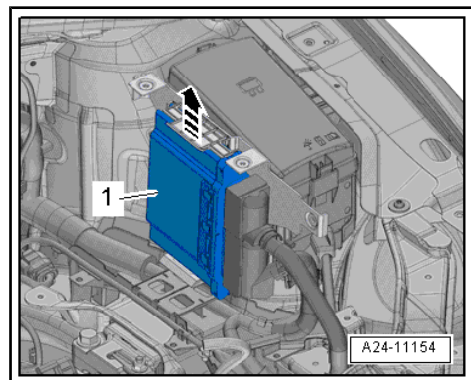
- Unlock catch in -direction of the arrow- and remove the engine control unit -1-.
- Unlock plug connections for engine control unit - J623- and pull off.

Install

Installation is carried out in the reverse order.

After installing a new engine control unit, the following work step must be performed

- Activate engine control unit ⇒ Vehicle diagnostic tester.



7.1.2 Removing and installing engine control unit - J623- , engine control unit with protective housing

Removing

Special tools and workshop equipment required

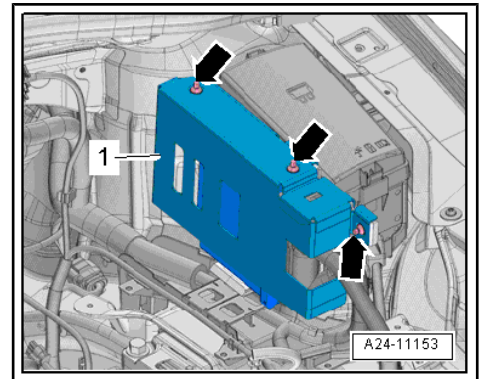
- ◆ commercially available miniature grinder
- ◆ Hot air blower , e.g. -VAS 1978/14A- with push-on nozzle from wiring harness repair set , e.g. -VAS 1978 B-



Note

- ◆ If the engine control unit is replaced, the must be ⇒ Vehicle diagnostic tester connected and the function "replace engine control unit" must be carried out.
- ◆ If the adjustment values of the injection units can no longer be read from the old (defective) engine control unit, these adjustment values must be manually entered into the new engine control unit and adapted to it.

Unscrew shear bolts -arrows- to remove the protective housing
-1- as follows:

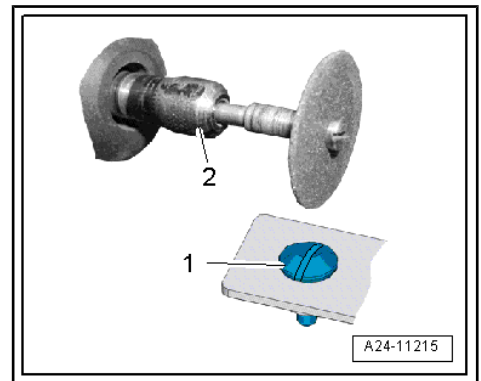


- In the shear bolt head -1-, using a miniature grinder -2-, make a slot for a screwdriver.



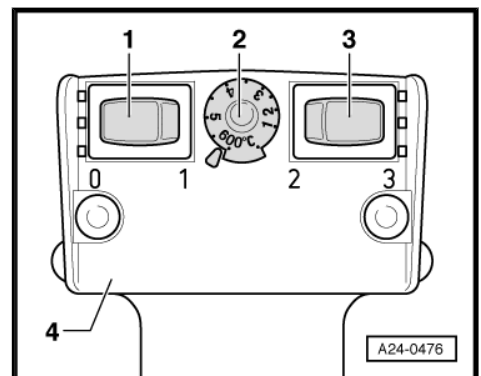
Note

- ◆ The threads of the pull-off screws are equipped with safety agent. Warming the pull-off screw when grinding a slot for a screwdriver makes it easier to undo the screw afterwards.
- ◆ If the pull-off screws still cannot be undone, warm the, up with a hot air blower.



Undoing pull-off screws with a hot air blower

- Set the temperature adjustment potentiometer -2- to maximum heating performance and set the air flow two stage switch -3- to position 3.



WARNING

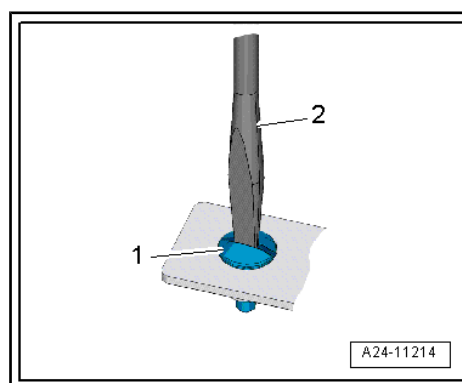
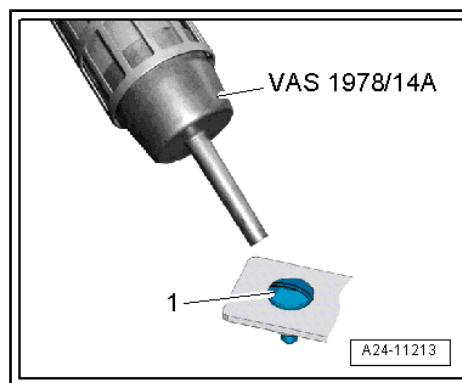
Risk of burns from hot air blower.

- ◆ Only warm up the pull-off screws with a hot air blower.
- ◆ By warming the pull-off screws, the cover plate and parts in its vicinity are heated up strongly too. Where necessary, protect these parts by a piece of sheet covering.

- Heat the shear bolt head -1- for approximately 20 to 30 seconds.

Continued for slackened screws

- Release shear bolt -1- using the screwdriver -2-.

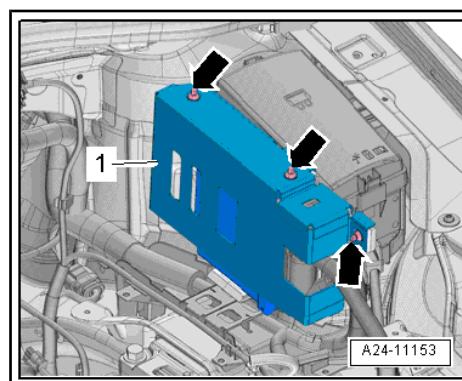


- Remove protective housing -1-.



Caution

If the engine control unit touches the plus pole of the battery, this will destroy the engine control unit.



- Unlock catch in -direction of the arrow- and remove the engine control unit -1-.
- Unlock plug connections for engine control unit - J623- and pull off.

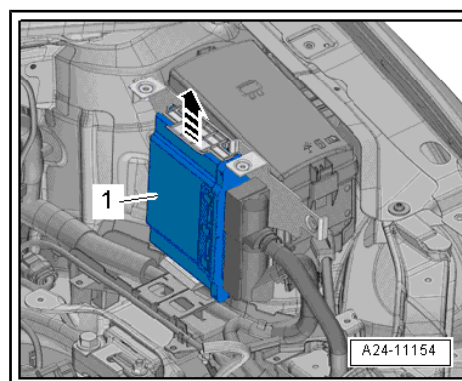
Install

Install in the reverse order of removal. When doing this, note the following:

- It is imperative for the protective housing to be put back in place on the engine control unit - J623- .
- Clean the threaded holes for the shear bolts to remove safety agent residues. Cleaning can be done using a tapper.
- Secure the protective housing with new shear bolts.

After installing a new engine control unit, the following work step must be performed

- Activate engine control unit ⇒ Vehicle diagnostic tester.



8 Engine noise speaker

⇒ **"8.1 Removing and installing engine noise speaker",
page 369**

8.1 Removing and installing engine noise speaker

Removing

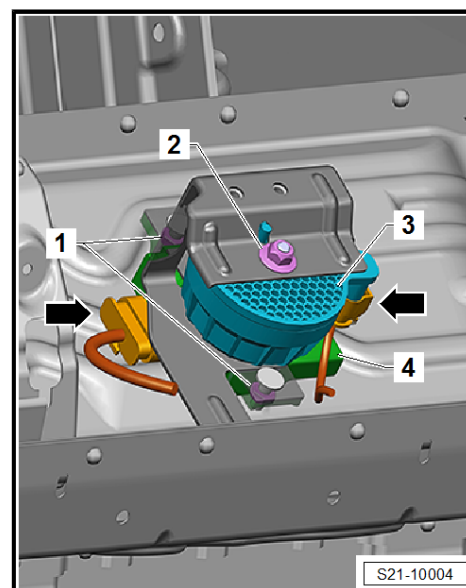
- Removing plenum chamber cover and then bulkhead plenum chamber ⇒ Body Work; Rep. gr. 50 .
- Disconnect the plug connections -arrows-.
- Unscrew nut -2- and the control element of the engine noise speaker -3-.
- Unscrew nuts -1- and the control element of the engine noise speaker -4-.

Install

Installation is carried out in the reverse order.

Tightening torques

Nut	Tightening torque
Nuts -1-	3 Nm
Nuts -2-	7 Nm



S21-10004



26 – Exhaust system

1 Removing and installing exhaust pipes/silencers

⇒ ["1.1 Summary of components - front, middle and rear silencer", page 370](#)

⇒ ["1.2 Removing and installing exhaust pipe", page 380](#)

⇒ ["1.3 Removing and installing the exhaust flap control unit J883", page 381](#)

⇒ ["1.4 Removing and installing rear silencer", page 381](#)

⇒ ["1.5 Replacing middle or rear silencer", page 385](#)

⇒ ["1.6 Aligning exhaust system free of stress", page 386](#)

⇒ ["1.7 Align exhaust tailpipes", page 387](#)

⇒ ["1.8 Inspecting the exhaust system for leaktightness", page 387](#)

1.1 Summary of components - front, middle and rear silencer

⇒ ["1.1.1 Summary of components - front, middle and rear silencer, vehicles with front-wheel drive \(engine identification characters CLHA, CLHB, CRKB\)", page 370](#)

⇒ ["1.1.2 Summary of components - front, middle and rear silencer, vehicles with front-wheel drive \(engine identification characters CKFB, CKFC, CRMB\)", page 373](#)

⇒ ["1.1.3 Summary of components - front, middle and rear silencer, vehicles with front-wheel drive \(engine identification characters CUPA, CUNA\)", page 375](#)

⇒ ["1.1.4 Front, middle and rear silencer, vehicles with EU4 emission level \(engine identification characters CRVC\)", page 377](#)

⇒ ["1.1.5 Summary of components - front, middle and rear silencer, vehicles with four-wheel drive \(engine identification characters CLHA, CKFC, CRMB, CUNA\)", page 379](#)

1.1.1 Summary of components - front, middle and rear silencer, vehicles with front-wheel drive (engine identification characters CLHA, CLHB, CRKB)

1 - Gasket

- ☐ replace after removal
- ☐ Check fitting position
⇒ [page 372](#)

2 - Clamping sleeve

- ☐ replace
- ☐ Fitting position
⇒ [page 372](#)
- ☐ 7 Nm

3 - Pre-exhaust pipe

- ☐ removing and installing
⇒ ["1.2 Removing and installing exhaust pipe", page 380](#)
- ☐ ustawienie układu wydechowego bez naprężeń
⇒ ["1.6 Aligning exhaust system free of stress", page 386](#)
- ☐ Observe part number ⇒ ETKA - Electronic Catalogue of Original Parts

4 - Support

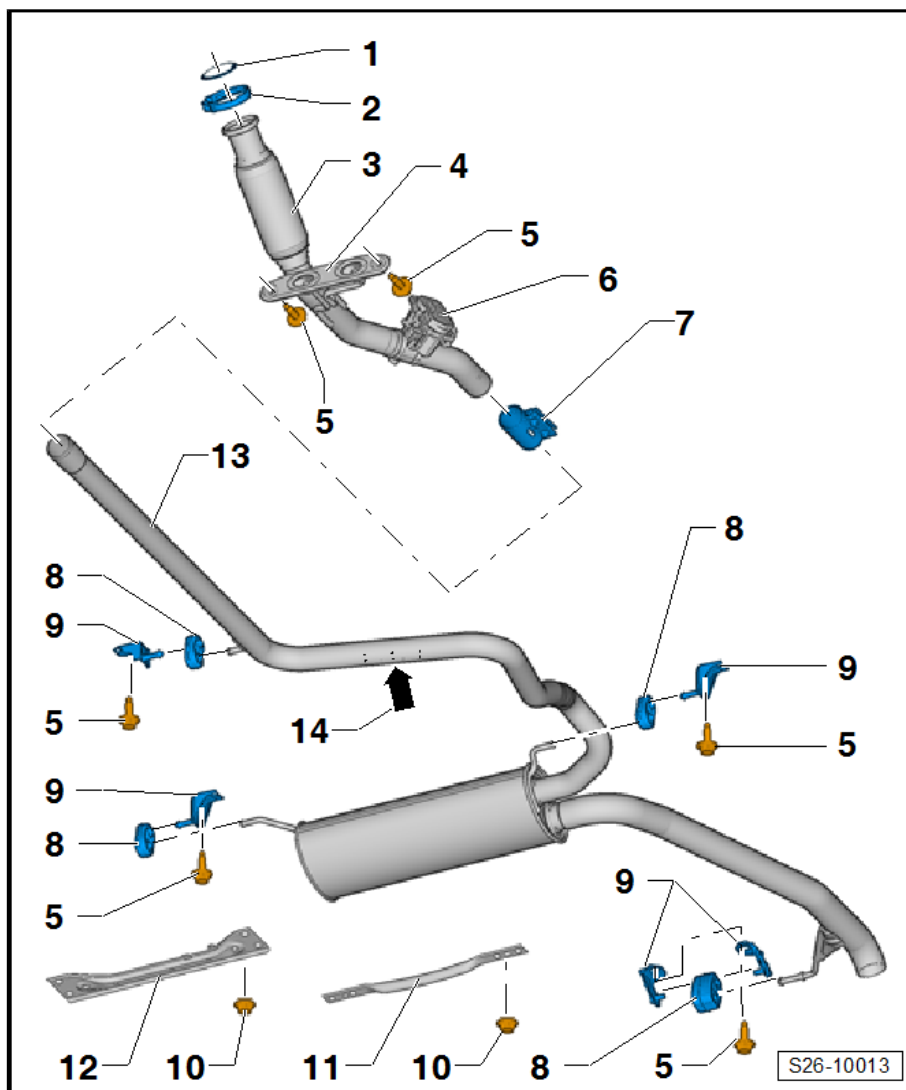
- ☐ replace if damaged

5 - Screw

- ☐ 23 Nm

6 - Exhaust flap control unit - J883-

- ☐ removing and installing
⇒ ["1.3 Removing and installing the exhaust flap control unit J883", page 381](#)



7 - Front clamping sleeve

- ☐ before tightening, align exhaust system free of stress
⇒ ["1.6 Aligning exhaust system free of stress", page 386](#)
- ☐ Fitting position ⇒ [page 372](#)
- ☐ Tighten bolted connections evenly
- ☐ 30 Nm

8 - Retaining strap

- ☐ replace if damaged

9 - Hanger

- ☐ replace if damaged

10 - Nut

- ☐ 20 Nm

11 - Rear tunnel bridge

12 - Front tunnel bridge

13 - Middle and rear silencer

- ☐ for first equipment a building unit, replace individually when carrying out repairs
⇒ ["1.5 Replacing middle or rear silencer", page 385](#)
- ☐ ustawienie układu wydechowego bez naprężeń
⇒ ["1.6 Aligning exhaust system free of stress", page 386](#)



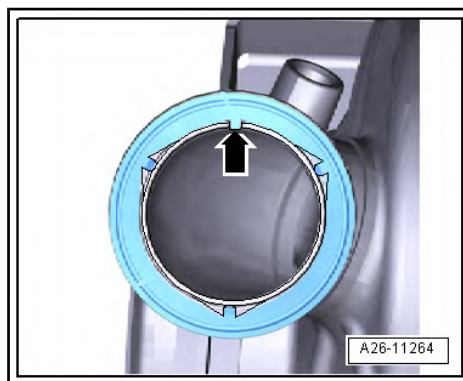
- ❑ removing and installing ⇒ [“1.4 Removing and installing rear silencer”, page 381](#)

14 - Separation point

- ❑ for repairs
- ❑ marked with recesses around the circumference
- ❑ Separation point ⇒ [“1.5 Replacing middle or rear silencer”, page 385](#)

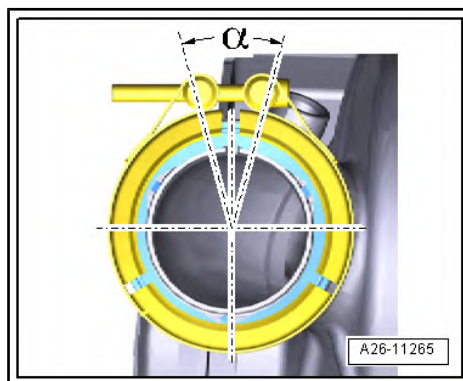
Installation position of gasket between exhaust gas cleaning module and pre-exhaust pipe

- The square catch of the gasket -arrow- must be in the groove of the exhaust gas cleaning module.



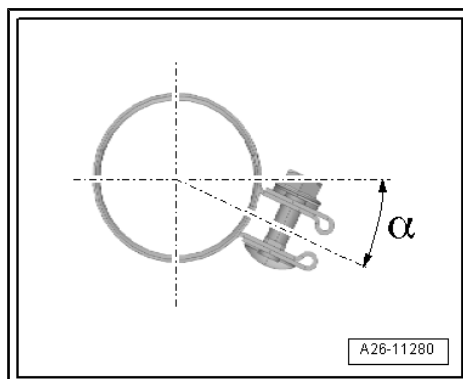
Installation position of clamping sleeve for pre-exhaust pipe

- Angle $-\alpha-$ = $0 \pm 30^\circ$.



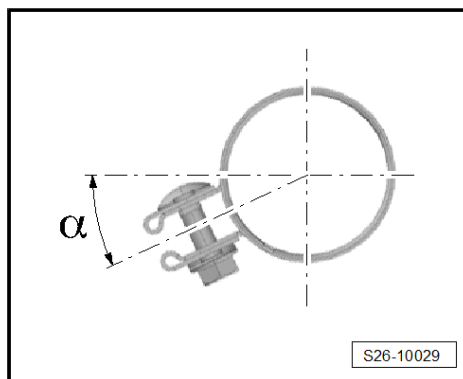
Installation position of front clamp

- Install clamping sleeve in the angle position shown.
- Angle $-\alpha-$ = approximately 20° .
- Bolted connection to the right.
- Nuts upwards.



Installation position of rear clamp

- Install clamping sleeve in the angle position shown.
- Angle $-\alpha-$ = approximately 30° .
- Bolted connection to the left.
- Nut downwards



1.1.2 Summary of components - front, middle and rear silencer, vehicles with front-wheel drive (engine identification characters CKFB, CKFC, CRMB)

1 - Gasket

- ☐ replace after removal
- ☐ Check fitting position
⇒ [page 374](#)

2 - Clamping sleeve

- ☐ replace
- ☐ Fitting position
⇒ [page 374](#)
- ☐ 7 Nm

3 - Pre-exhaust pipe

- ☐ removing and installing
⇒ ["1.2 Removing and installing exhaust pipe", page 380](#)
- ☐ ustawienie układu wydechowego bez naprężeń
⇒ ["1.6 Aligning exhaust system free of stress", page 386](#)

4 - Support

- ☐ replace if damaged

5 - Screw

- ☐ 23 Nm

6 - Exhaust flap control unit - J883-

- ☐ removing and installing
⇒ ["1.3 Removing and installing the exhaust flap control unit J883", page 381](#)

7 - Front clamping sleeve

- ☐ before tightening, align exhaust system free of stress ⇒ ["1.6 Aligning exhaust system free of stress", page 386](#)
- ☐ Fitting position ⇒ [page 374](#)
- ☐ Tighten bolted connections evenly
- ☐ 30 Nm

8 - Retaining strap

- ☐ replace if damaged

9 - Hanger

- ☐ replace if damaged

10 - Nut

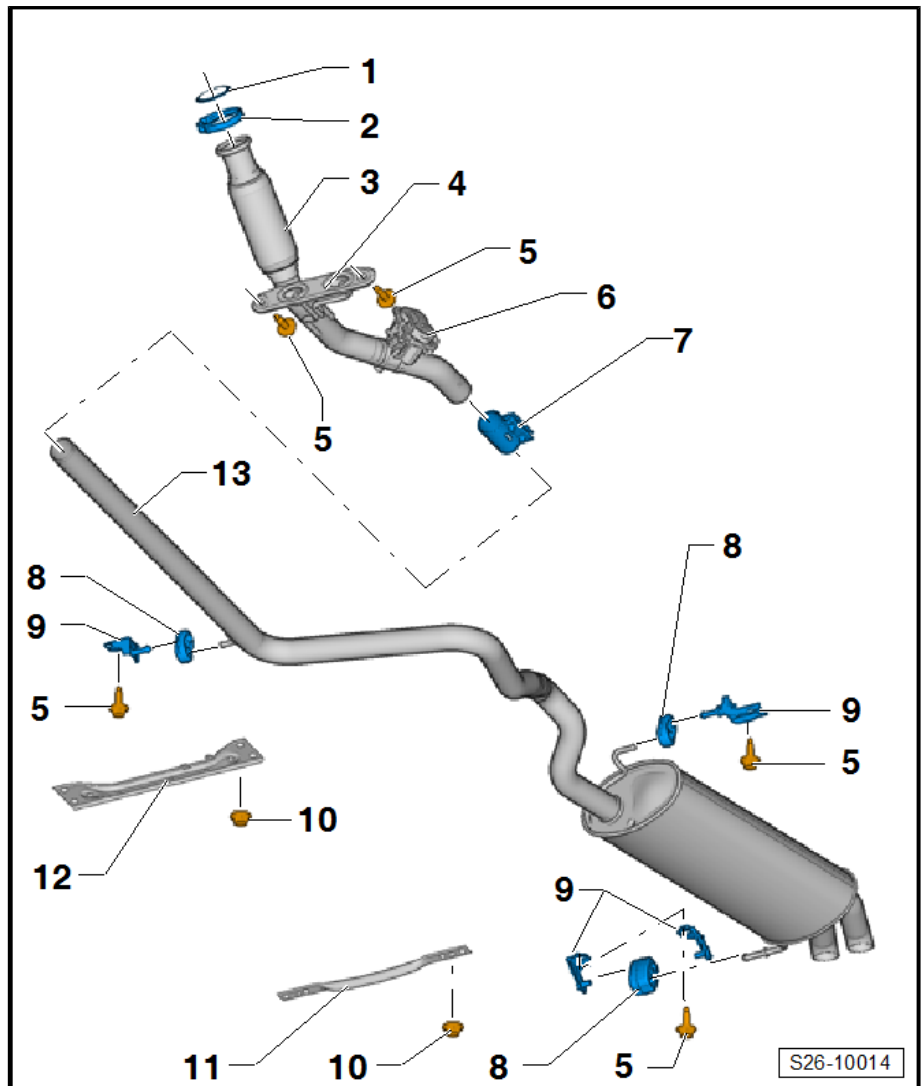
- ☐ 20 Nm

11 - Rear tunnel bridge

12 - Front tunnel bridge

13 - Middle and rear silencer

- ☐ for first equipment a building unit, replace individually when carrying out repairs
⇒ ["1.5 Replacing middle or rear silencer", page 385](#)





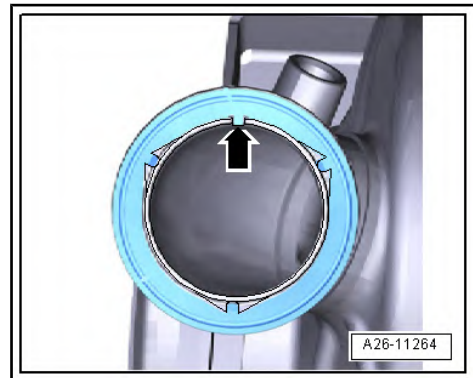
- ❑ ustawienie układu wydechowego bez naprężeń
⇒ [“1.6 Aligning exhaust system free of stress”, page 386](#)
- ❑ removing and installing ⇒ [“1.4 Removing and installing rear silencer”, page 381](#)

14 - Separation point

- ❑ for repairs
- ❑ marked with recesses around the circumference
- ❑ Separation point ⇒ [“1.5 Replacing middle or rear silencer”, page 385](#)

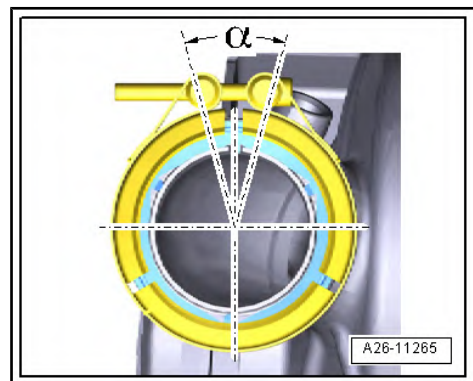
Installation position of gasket between exhaust gas cleaning module and pre-exhaust pipe

- The square catch of the gasket -arrow- must be in the groove of the exhaust gas cleaning module.



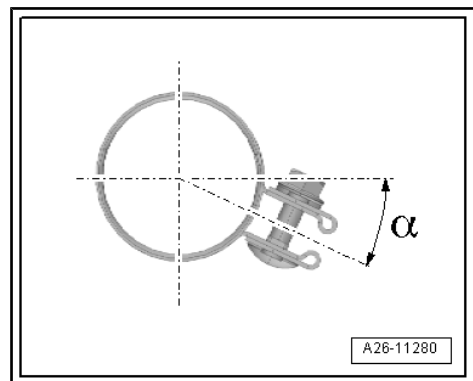
Installation position of clamping sleeve for pre-exhaust pipe

- Angle $-\alpha-$ = $0 \pm 30^\circ$.



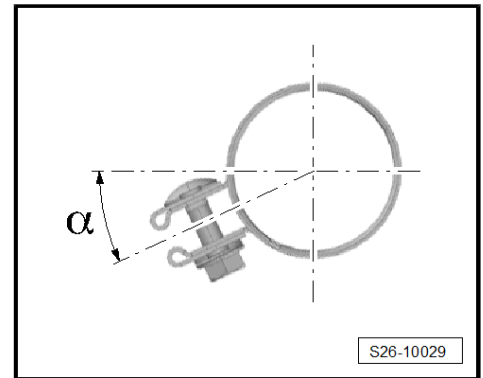
Installation position of front clamp

- Install clamping sleeve in the angle position shown.
- Angle $-\alpha-$ = approximately 20° .
- Bolted connection to the right.
- Nuts upwards.



Installation position of rear clamp

- Install clamping sleeve in the angle position shown.
- Angle α = approximately 30°.
- Bolted connection to the left.
- Nut downwards



1.1.3 Summary of components - front, middle and rear silencer, vehicles with front-wheel drive (engine identification characters CUPA, CUNA)

1 - Gasket

- ☐ replace after removal
- ☐ Check fitting position
⇒ [page 376](#)

2 - Clamping sleeve

- ☐ replace
- ☐ Fitting position
⇒ [page 376](#)
- ☐ 7 Nm

3 - Support

- ☐ replace if damaged

4 - Screw

- ☐ 23 Nm

5 - Exhaust flap control unit - J883-

- ☐ removing and installing
⇒ ["1.3 Removing and installing the exhaust flap control unit J883", page 381](#)

6 - Pre-exhaust pipe

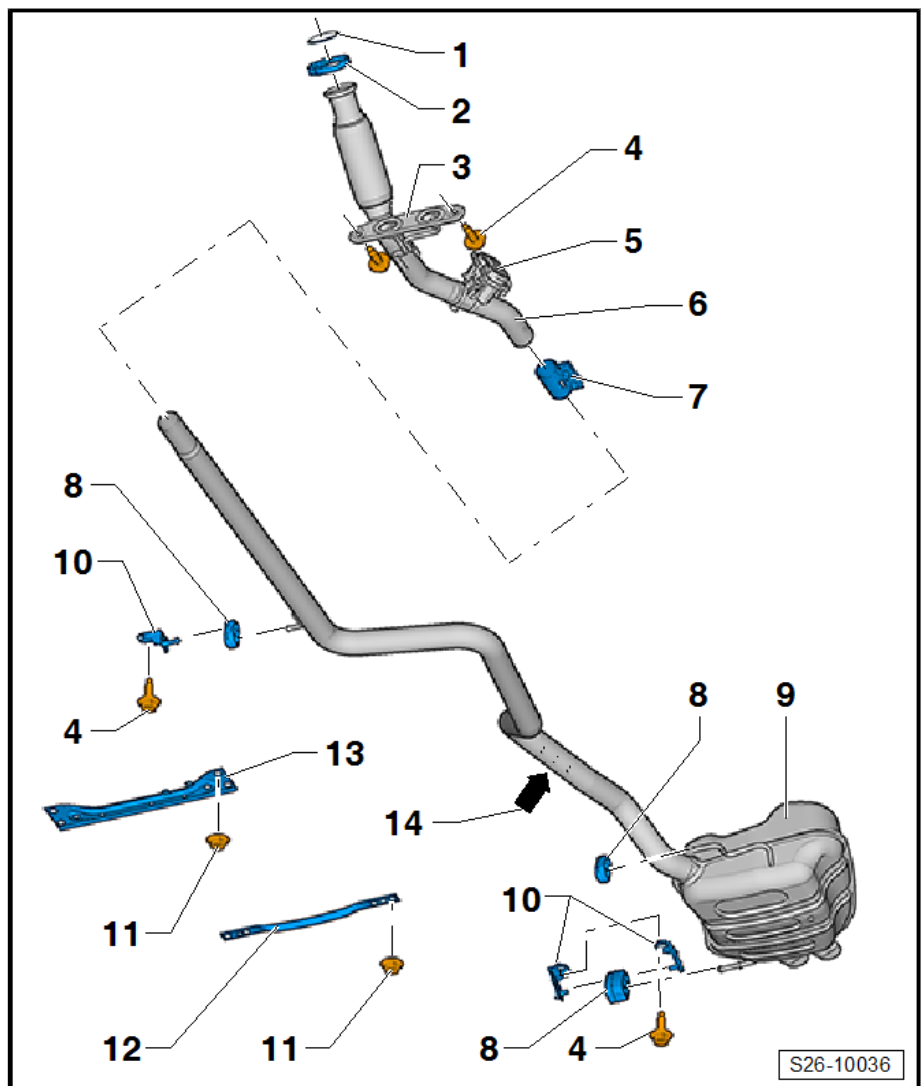
- ☐ removing and installing
⇒ ["1.2 Removing and installing exhaust pipe", page 380](#)
- ☐ ustawienie układu wydechowego bez naprężeń
⇒ ["1.6 Aligning exhaust system free of stress", page 386](#)

7 - Front clamping sleeve

- ☐ before tightening, align exhaust system free of stress ⇒ ["1.6 Aligning exhaust system free of stress", page 386](#)
- ☐ Fitting position ⇒ [page 376](#)
- ☐ Tighten bolted connections evenly
- ☐ 30 Nm

8 - Retaining strap

- ☐ replace if damaged



9 - Middle and rear silencer

- ☐ for first equipment a building unit, replace individually when carrying out repairs
⇒ ["1.5 Replacing middle or rear silencer", page 385](#)
- ☐ ustawienie układu wydechowego bez naprężeń
⇒ ["1.6 Aligning exhaust system free of stress", page 386](#)
- ☐ removing and installing ⇒ ["1.4 Removing and installing rear silencer", page 381](#)

10 - Hanger

- ☐ replace if damaged

11 - Nut

- ☐ 20 Nm

12 - Rear tunnel bridge

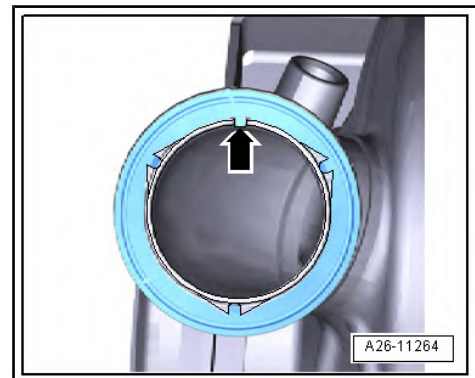
13 - Front tunnel bridge

14 - Separation point

- ☐ for repairs
- ☐ marked with recesses around the circumference
- ☐ Separation point ⇒ ["1.5 Replacing middle or rear silencer", page 385](#)

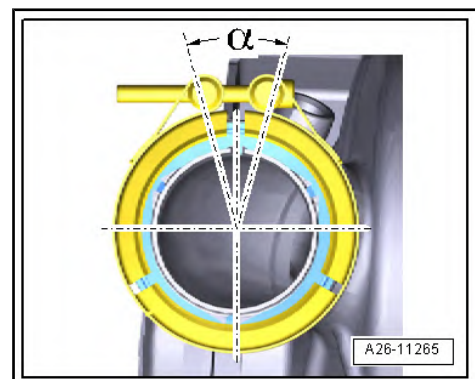
Installation position of gasket between exhaust gas cleaning module and pre-exhaust pipe

- The square catch of the gasket -arrow- must be in the groove of the exhaust gas cleaning module.



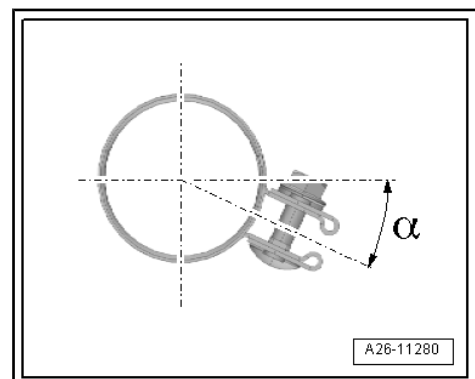
Installation position of clamping sleeve for pre-exhaust pipe

- Angle $-\alpha-$ = $0 \pm 30^\circ$.



Installation position of front clamp

- Install clamping sleeve in the angle position shown.
- Angle $-\alpha-$ = approximately 20° .
- Bolted connection to the right.
- Nuts upwards.



1.1.4 Front, middle and rear silencer, vehicles with EU4 emission level (engine identification characters CRVC)

1 - Gasket

- ☐ replace after removal
- ☐ Check fitting position
⇒ [page 378](#)

2 - Clamping sleeve

- ☐ replace
- ☐ Fitting position
⇒ [page 378](#)
- ☐ 7 Nm

3 - Pre-exhaust pipe

- ☐ removing and installing
⇒ ["1.2 Removing and installing exhaust pipe", page 380](#)
- ☐ ustawienie układu wydechowego bez naprężeń
⇒ ["1.6 Aligning exhaust system free of stress", page 386](#)

4 - Screw

- ☐ 23 Nm

5 - Support

- ☐ replace if damaged

6 - Front clamping sleeve

- ☐ before tightening, align exhaust system free of stress
⇒ ["1.6 Aligning exhaust system free of stress", page 386](#)
- ☐ Fitting position
⇒ [page 378](#)
- ☐ Tighten bolted connections evenly
- ☐ 30 Nm

7 - Front tunnel bridge

8 - Nut

- ☐ 20 Nm

9 - Retaining strap

- ☐ replace if damaged

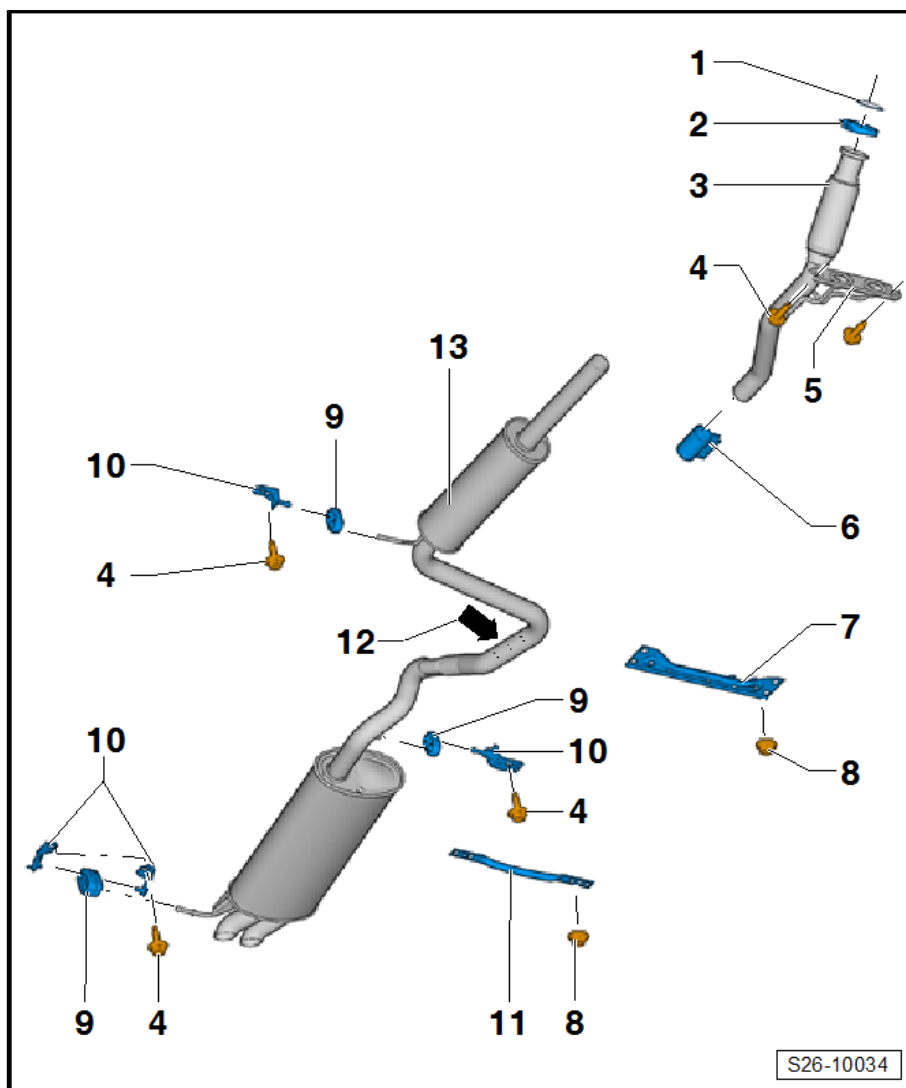
10 - Hanger

- ☐ replace if damaged

11 - Rear tunnel bridge

12 - Separation point

- ☐ for repairs
- ☐ marked with recesses around the circumference
- ☐ Separation point ⇒ ["1.5 Replacing middle or rear silencer", page 385](#)

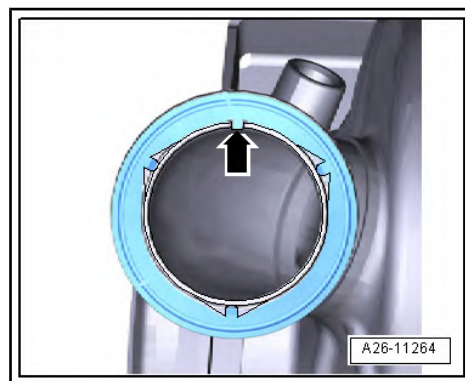


13 - Middle and rear silencer

- ❑ for first equipment a building unit, replace individually when carrying out repairs
⇒ ["1.5 Replacing middle or rear silencer", page 385](#)
- ❑ ustawienie układu wydechowego bez naprężeń
⇒ ["1.6 Aligning exhaust system free of stress", page 386](#)
- ❑ removing and installing ⇒ ["1.4 Removing and installing rear silencer", page 381](#)

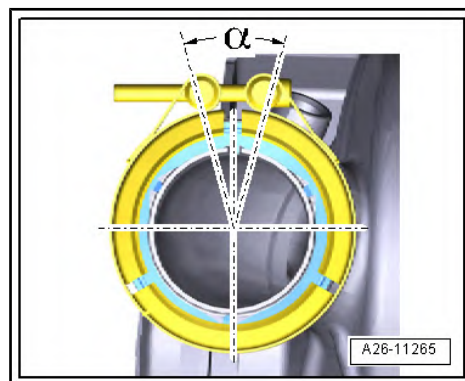
Installation position of gasket between exhaust gas cleaning module and pre-exhaust pipe

- The square catch of the gasket -arrow- must be in the groove of the exhaust gas cleaning module.



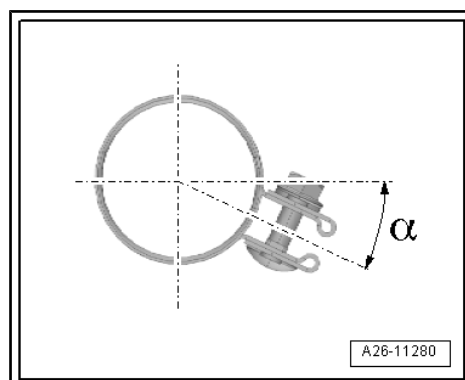
Installation position of clamping sleeve for pre-exhaust pipe

- Angle $-\alpha-$ = $0 \pm 30^\circ$.



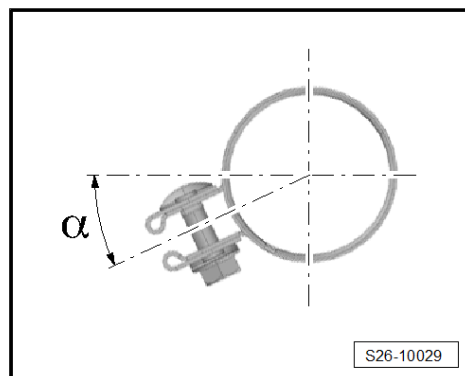
Installation position of front clamp

- Install clamping sleeve in the angle position shown.
- Angle $-\alpha-$ = approximately 20° .
- Bolted connection to the right.
- Nuts upwards.



Installation position of rear clamp

- Install clamping sleeve in the angle position shown.
- Angle $-\alpha-$ = approximately 30° .
- Bolted connection to the left.
- Nut downwards



1.1.5 Summary of components - front, middle and rear silencer, vehicles with four-wheel drive (engine identification characters CLHA, CKFC, CRMB, CUNA)

1 - Gasket

- ☐ replace after removal
- ☐ Check fitting position
⇒ [page 380](#)

2 - Clamping sleeve

- ☐ replace
- ☐ Fitting position
⇒ [page 380](#)
- ☐ 7 Nm

3 - Support

- ☐ replace if damaged

4 - Exhaust flap control unit - J883-

- ☐ removing and installing
⇒ ["1.3 Removing and installing the exhaust flap control unit J883", page 381](#)

5 - Screw

- ☐ 23 Nm

6 - Pre-exhaust pipe

- ☐ removing and installing
⇒ ["1.2 Removing and installing exhaust pipe", page 380](#)
- ☐ ustawienie układu wydechowego bez naprężeń
⇒ ["1.6 Aligning exhaust system free of stress", page 386](#)

7 - Front clamping sleeve

- ☐ before tightening, align exhaust system free of stress ⇒ ["1.6 Aligning exhaust system free of stress", page 386](#)
- ☐ Fitting position ⇒ [page 380](#)
- ☐ Tighten bolted connections evenly
- ☐ 30 Nm

8 - Middle and rear silencer

- ☐ ustawienie układu wydechowego bez naprężeń
⇒ ["1.6 Aligning exhaust system free of stress", page 386](#)
- ☐ removing and installing ⇒ ["1.4 Removing and installing rear silencer", page 381](#)

9 - Retaining strap

- ☐ replace if damaged

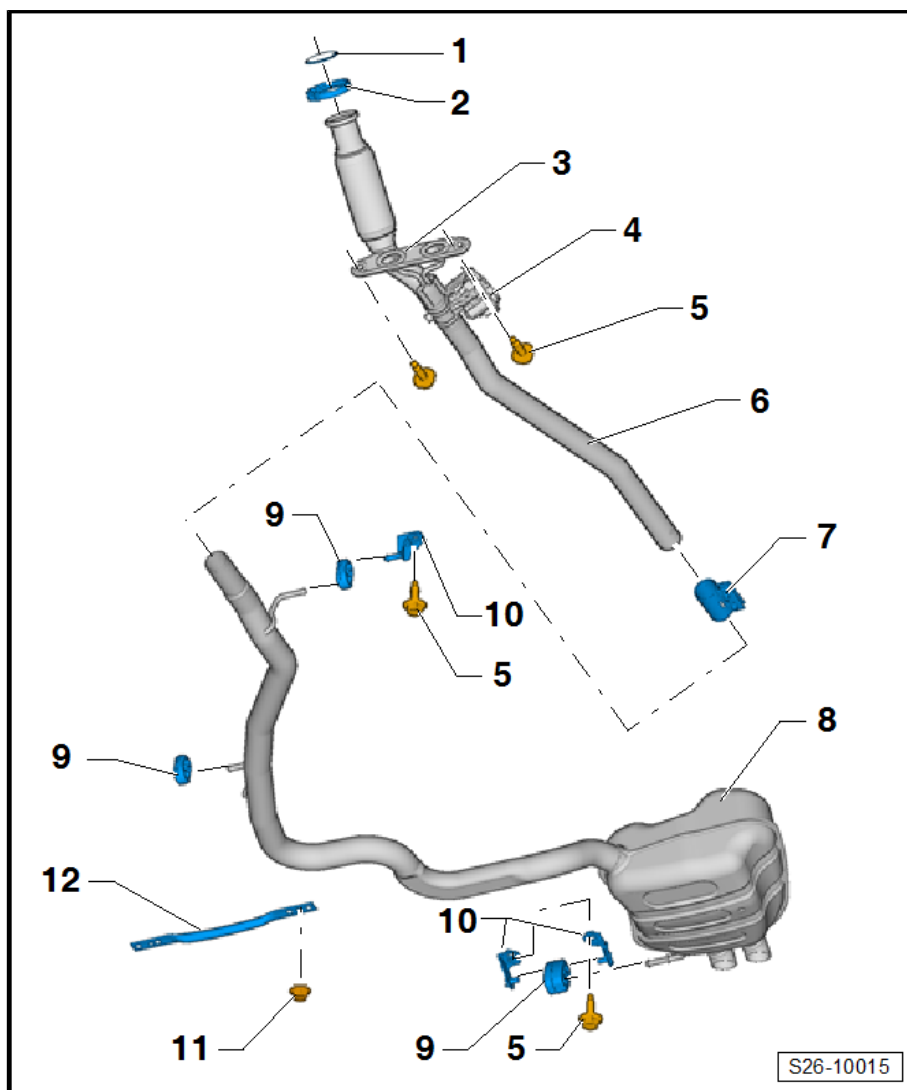
10 - Hanger

- ☐ replace if damaged

11 - Nut

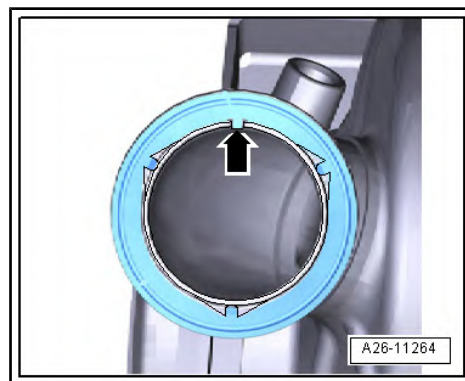
- ☐ 20 Nm

12 - Rear tunnel bridge



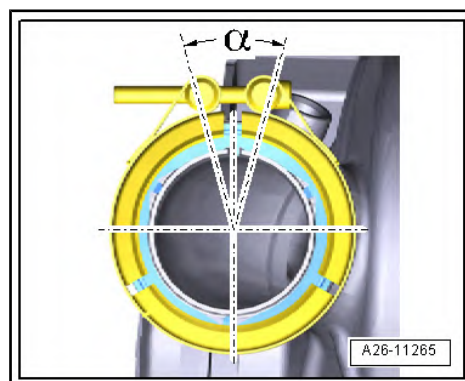
Installation position of gasket between exhaust gas cleaning module and pre-exhaust pipe

- The square catch of the gasket -arrow- must be in the groove of the exhaust gas cleaning module.



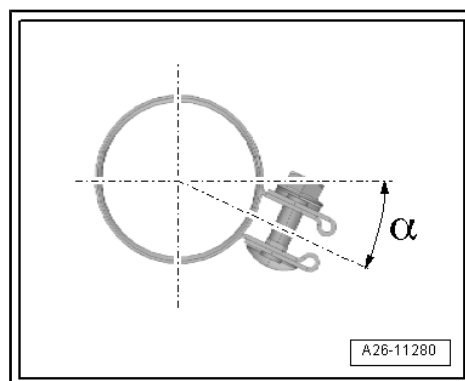
Installation position of clamping sleeve for pre-exhaust pipe

- Angle $-\alpha-$ = $0 \pm 30^\circ$.



Installation position of front clamp

- Install clamping sleeve in the angle position shown.
- Angle $-\alpha-$ = approximately 50° .
- Bolted connection to the right.
- Nuts upwards.



1.2 Removing and installing exhaust pipe

Removing

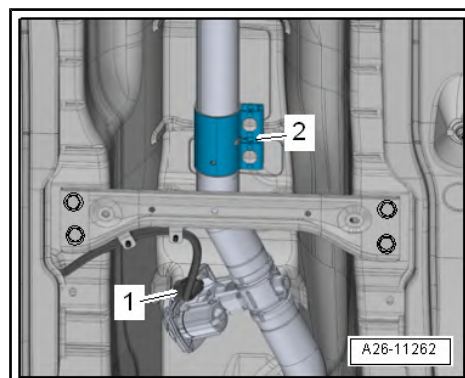
- Remove tunnel cover at bottom \Rightarrow Body Work; Rep. gr. 50 .

For vehicles with engine identification characters CLHA, CLHB, CRKB, CKFB, CKFC, CUPA, CRMB, CUNA

- Separate electrical plug connection -1-.

Continued for all vehicles

- Slacken the clamping sleeve -2- and slide it backwards.



- Release screws -1-.
- Slacken screw -2- and remove air filter housing.
- Remove pre-exhaust pipe.

Install

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



Note

Replace gasket.

- Observe installation position of clamping sleeve between exhaust gas cleaning module and pre-exhaust pipe
⇒ [“1.1 Summary of components - front, middle and rear silencer”, page 370](#) .
- Align exhaust system free of stress
⇒ [“1.6 Aligning exhaust system free of stress”, page 386](#) .

Tightening torques

- ◆ ⇒ [“1.1 Summary of components - front, middle and rear silencer”, page 370](#)

1.3 Removing and installing the exhaust flap control unit - J883-

For vehicles with engine identification characters CLHA, CLHB, CRKB, CKFB, CKFC, CUPA, CRMB, CUNA

Removing

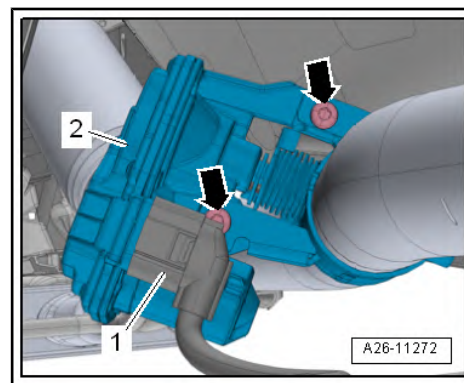
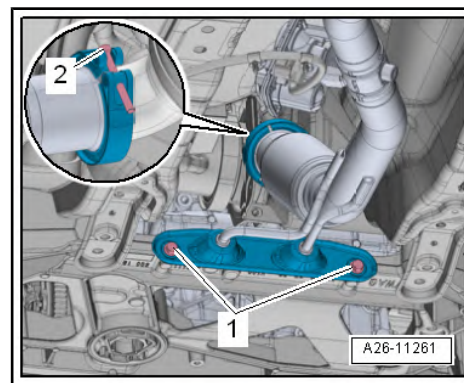
- Remove tunnel cover at bottom ⇒ Body Work; Rep. gr. 50 .
- Separate electrical plug connection -1-.
- Release screws -arrows-, remove exhaust flap control unit - J883- .

Install

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

Tightening torques

Screws	Tightening torque
-Arrows-	9 Nm



1.4 Removing and installing rear silencer

⇒ [“1.4.1 Removing and installing rear silencer, vehicles with front-wheel drive \(engine identification characters CLHA, CLHB, CRKB, CKFB, CKFC, CRVC, CRMB\)”, page 381](#)

⇒ [“1.4.2 Removing and installing rear silencer, vehicles with front-wheel drive \(engine identification characters CUPA, CUNA\)”, page 383](#)

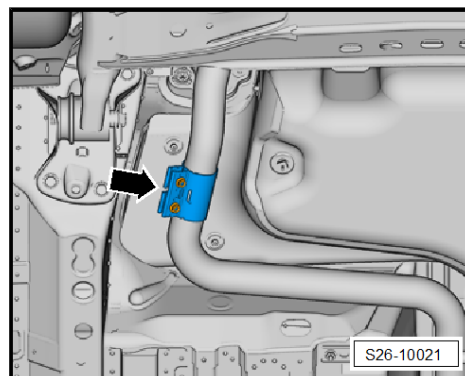
⇒ [“1.4.3 Removing and installing rear silencer, vehicles with four-wheel drive \(engine identification characters CLHA, CKFC, CRMB, CUNA\)”, page 385](#)

1.4.1 Removing and installing rear silencer, vehicles with front-wheel drive (engine

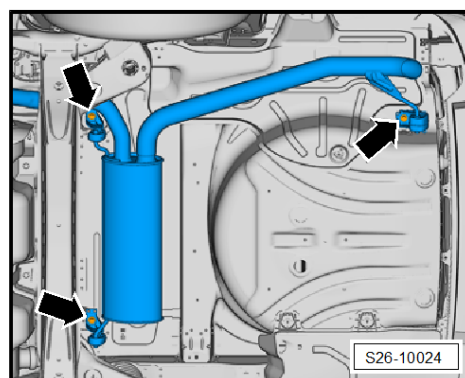
identification characters CLHA, CLHB, CRKB, CKFB, CKFC, CRVC, CRMB)

Removing

- Vehicles without separation point Replace middle or rear silencer ⇒ [“1.5 Replacing middle or rear silencer”, page 385](#) .
- Vehicles with separation point: Loosen clamping sleeve -arrow- and press forwards.
- Release screws -arrows-, remove rear silencer.



Vehicles with 1.6l engine

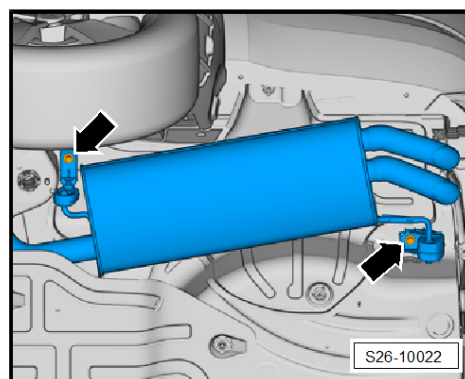


Vehicles with 2.0l engine

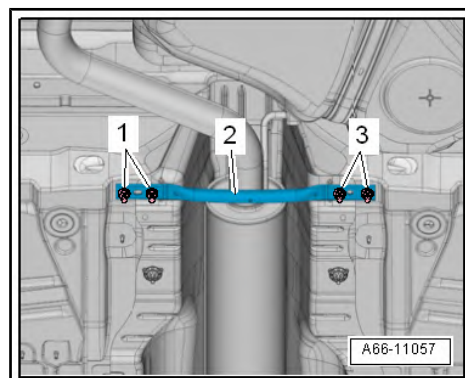
Continued for all vehicles

If the exhaust pipe must be removed:

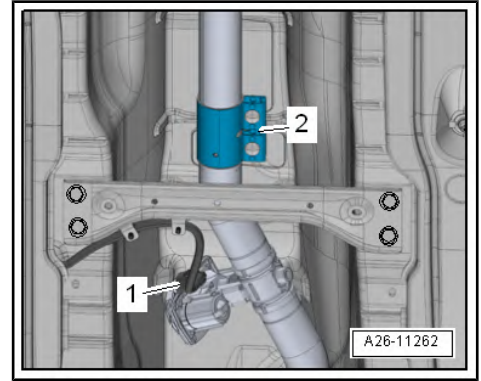
- Remove the rear left underfloor trim panel ⇒ Body Work; Rep. gr. 50 .



- Remove rear tunnel bridge -2-
⇒ [“1 Removing and installing exhaust pipes/silencers”, page 370](#) .



- Loosen the clamping sleeve -2- and slide it forwards.



- Unscrew screws -arrows-, remove middle silencer.

Install

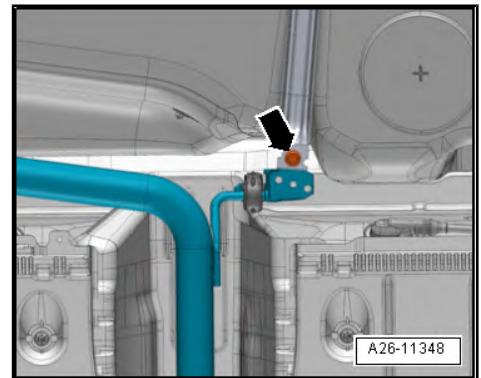
Installation is performed in the reverse order, pay attention to the following points:



Note

Replace gasket.

- Observe the rear and front installation position of clamping plate
⇒ [“1.1 Summary of components - front, middle and rear silencer”, page 370](#)
- Align exhaust system free of stress
⇒ [“1.6 Aligning exhaust system free of stress”, page 386](#) .



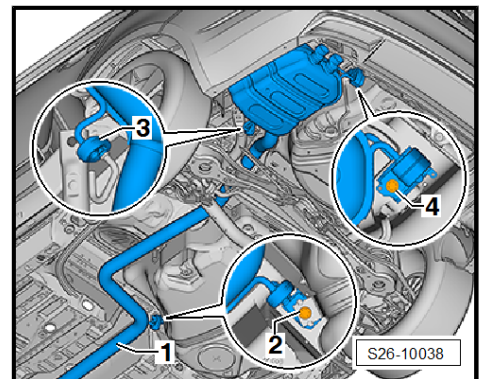
Tightening torques

- ◆ ⇒ [“1.1 Summary of components - front, middle and rear silencer”, page 370](#)

1.4.2 Removing and installing rear silencer, vehicles with front-wheel drive (engine identification characters CUPA, CUNA)

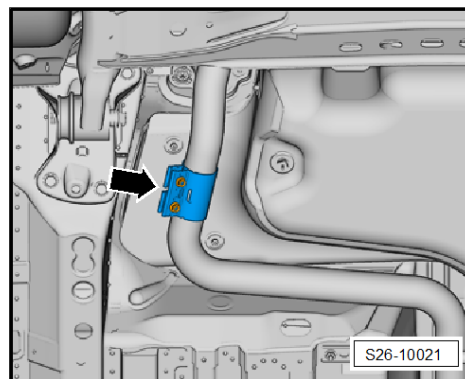
Removing

- Vehicles without separation point Replace middle or rear silencer ⇒ [“1.5 Replacing middle or rear silencer”, page 385](#) .
- Vehicles with separation point: Unhook suspension -3- from the rear silencer.





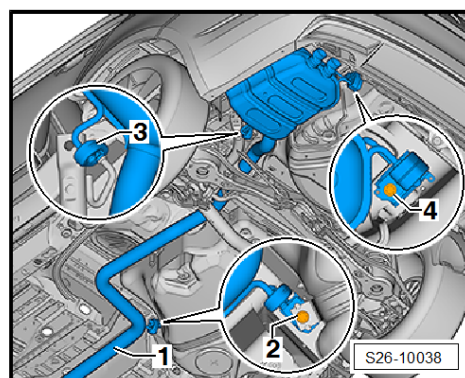
- Loosen clamping sleeve -arrow- and press forwards.



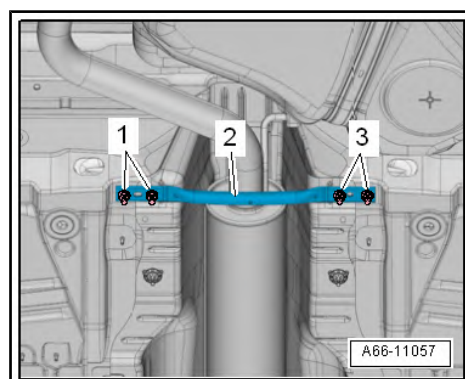
- Screw out screw -4- and remove rear silencer.

If the exhaust pipe must be removed:

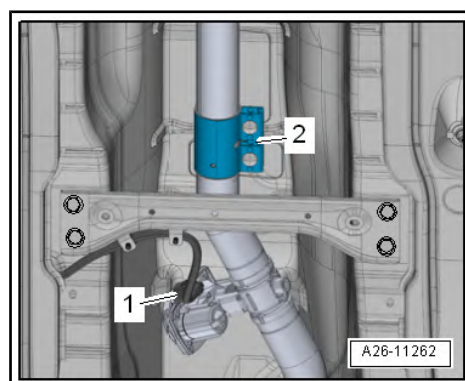
- Remove the rear left underfloor trim panel ⇒ Body Work; Rep. gr. 50 .



- Remove rear tunnel bridge -2-
⇒ [“1.1 Summary of components - front, middle and rear silencer”, page 370](#) .



- Loosen the clamping sleeve -2- and slide it forwards.



- Unscrew screw -2-, remove middle silencer -1-.

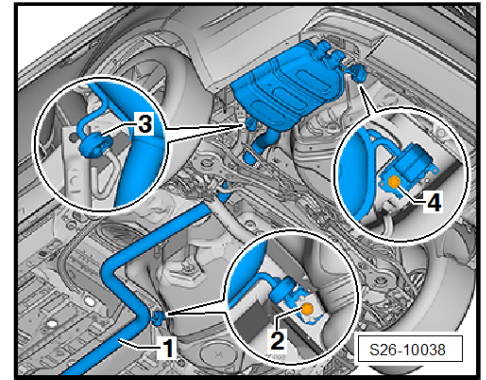
Install

Install in the reverse order of removal. When doing this, note the following:

- Align exhaust system free of stress
⇒ [“1.6 Aligning exhaust system free of stress”, page 386](#) .

Tightening torques

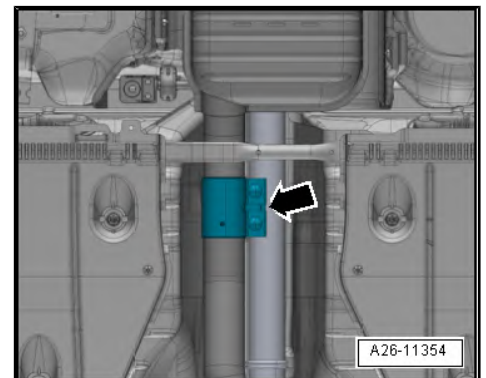
- ◆ ⇒ [“1.1 Summary of components - front, middle and rear silencer”, page 370](#)



1.4.3 Removing and installing rear silencer, vehicles with four-wheel drive (engine identification characters CLHA, CKFC, CRMB, CUNA)

Removing

- Loosen clamping sleeve -arrow- and press forwards.



- Unhook suspension -3- from the rear silencer.
- Remove screws -2- and -4-, remove rear silencer -1-.

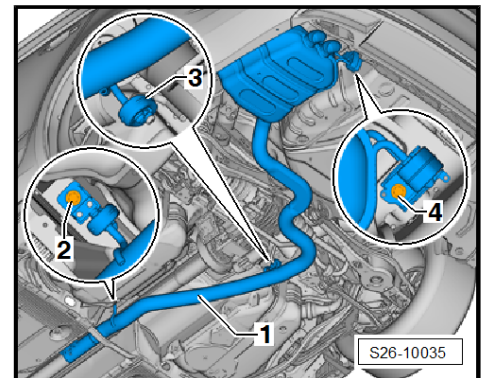
Install

Install in the reverse order of removal. When doing this, note the following:

- Align exhaust system free of stress
⇒ [“1.6 Aligning exhaust system free of stress”, page 386](#) .

Tightening torques

- ◆ ⇒ [“1.1 Summary of components - front, middle and rear silencer”, page 370](#)



1.5 Replacing middle or rear silencer

Special tools and workshop equipment required

- ◆ Body saw e.g. -V.A.G 1523 A-
- ◆ Protective goggles

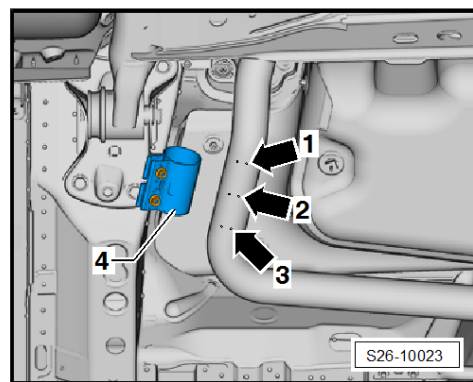
**Note**

- ◆ For vehicles with torsion beam rear axle, a disconnection is provided in the exhaust pipe to facilitate removal of the exhaust system.
- ◆ The separation point is marked by indentation on the circumference of the exhaust pipe.

Work procedure**WARNING**

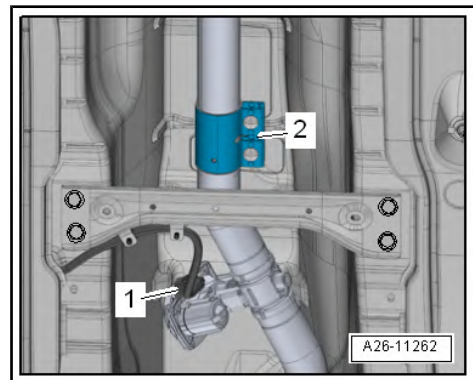
To avoid injury from metal shavings, wear eye protection and protective clothing.

- Separate exhaust pipe at right angles at the separation point -arrow 2-.
- When installing, position clamping sleeve -4- at the side markings arrow -1- and arrow -3-.
- Note installation position of clamping sleeve
⇒ ["1.1 Summary of components - front, middle and rear silencer", page 370](#) .
- Align exhaust system free of stress
⇒ ["1.6 Aligning exhaust system free of stress", page 386](#) .
- Tighten bolted connections of warm-type clamp evenly to 30 Nm.
- The bolted connection points to the left.

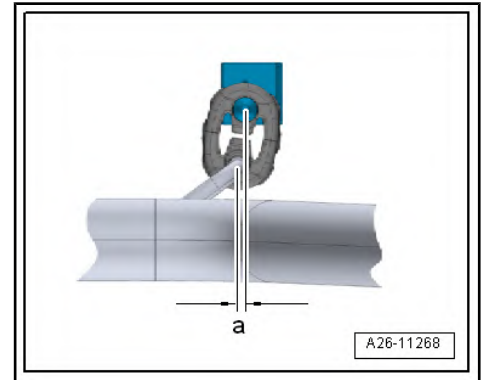


1.6 Aligning exhaust system free of stress

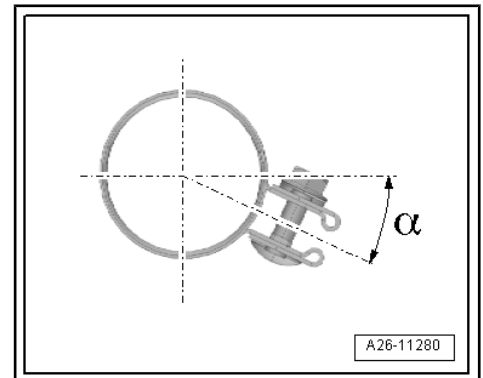
- The exhaust system is aligned when cold.
- Slacken bolted connections of clamping sleeve -2-.



- Push the rear silencer so far forward until the pre-tensioning on the retaining strap on the exhaust pipe is $-a = 5 \text{ mm}$.

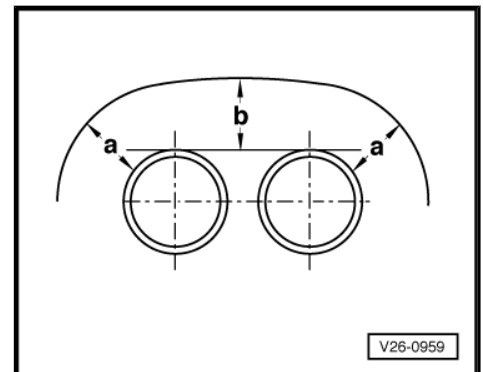


- Install clamping sleeve in the angle position shown.
- Vehicles with front-wheel-drive: Angle $-\alpha =$ approximately 20° .
- Vehicles with four-wheel drive: Angle $-\alpha =$ approximately 50° .
- Bolted connection to the right.
- Nuts upwards.
- Tighten bolted connections of clamping sleeve evenly to 30 Nm.



1.7 Align exhaust tailpipes

- Align rear silencer in such a way that there is an equal distance $-a-$ and $-b-$ between bumper opening and exhaust tailpipes.
- For centering the exhaust tailpipes, if necessary loosen the suspension of the rear silencer.



1.8 Inspecting the exhaust system for leak-tightness

- Start engine and run at idling speed.
- Close off exhaust tailpipes for the duration of the leak test, for example using cloths or plugs.
- Check connection points for leaktightness by listening: exhaust manifold at cylinder head, exhaust gas turbocharger at pre-exhaust pipe, etc.
- Eliminate any leak found.

2 Cleansing exhaust emissions

⇒ ["2.1 Summary of components - exhaust gas cleaning", page 388](#)

⇒ ["2.2 Removing and installing exhaust gas cleaning module", page 392](#)

⇒ ["2.3 Removing and installing catalytic converter", page 400](#)

2.1 Summary of components - exhaust gas cleaning

⇒ ["2.1.1 Summary of components - exhaust gas cleaning \(engine identification characters CLHA, CLHB, CRKB, CKFB, CKFC, CUPA, CRMB, CUNA\)", page 388](#)

⇒ ["2.1.2 Summary of components exhaust gas cleaning \(engine identification characters CRVC\)", page 391](#)

2.1.1 Summary of components - exhaust gas cleaning (engine identification characters CLHA, CLHB, CRKB, CKFB, CKFC, CUPA, CRMB, CUNA)

1 - Pre-exhaust pipe

- ☐ removing and installing
⇒ ["1.2 Removing and installing exhaust pipe", page 380](#)
- ☐ ustawienie układu wydechowego bez naprężeń
⇒ ["1.6 Aligning exhaust system free of stress", page 386](#)

2 - Clamping sleeve

- ☐ replace after removal
- ☐ Fitting position
⇒ ["1.1 Summary of components - front, middle and rear silencer", page 370](#)
- ☐ Tightening torque
⇒ ["1.1 Summary of components - front, middle and rear silencer", page 370](#)

3 - Gasket

- ☐ Check fitting position
⇒ ["1.1 Summary of components - front, middle and rear silencer", page 370](#)

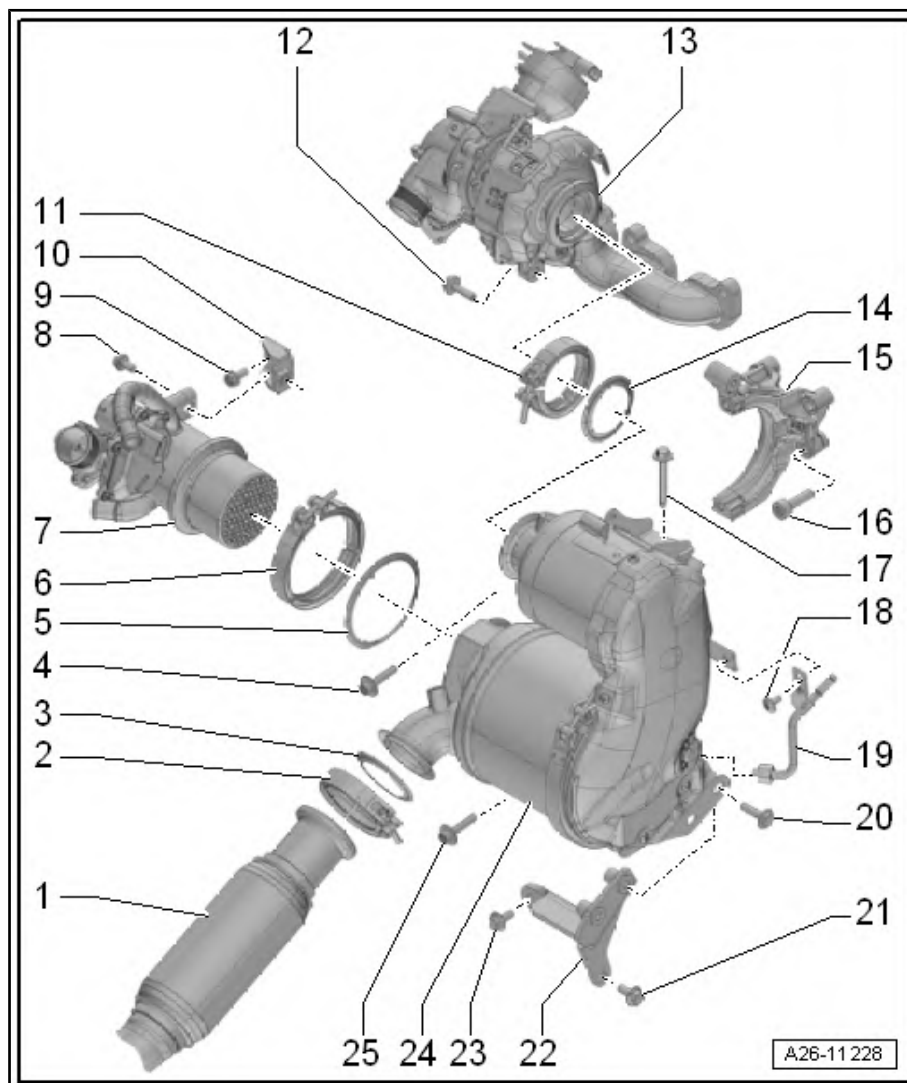
4 - Screw

- ☐ Tightening torque and tightening order
⇒ [page 398](#)

5 - Gasket

6 - Clamping sleeve

- ☐ Fitting position ⇒ [page 410](#)
- ☐ Tightening torque and tightening order ⇒ [page 410](#)



7 - Radiator for exhaust gas recirculation

- ☐ removing and installing
⇒ ["4.5 Removing and installing radiator for exhaust gas recirculation", page 415](#)

8 - Screw

- ☐ Tightening torque and tightening order
⇒ ["4.1 Exhaust gas recirculation with radiator for exhaust gas recirculation - Summary of components", page 408](#)

9 - Screw

- ☐ Tightening torque and tightening order
⇒ ["4.1 Exhaust gas recirculation with radiator for exhaust gas recirculation - Summary of components", page 408](#)

10 - Support

- ☐ for radiator for exhaust gas recirculation

11 - Clamping sleeve

- ☐ Fitting position ⇒ [page 390](#)

12 - Screw

- ☐ Tightening torque and tightening order
⇒ ["1.1 Exhaust gas turbocharger with component parts - Summary of components", page 290](#)

13 - Exhaust gas turbocharger

- ☐ removing and installing ⇒ ["1.2 Removing and installing exhaust gas turbocharger", page 292](#)

14 - Seal

- ☐ put it onto the catalyst

15 - Bracket

- ☐ for exhaust gas cleaning module
- ☐ with balancing element
- ☐ Prepare balancing element for installation ⇒ [page 397](#)

16 - Bolt

Tightening torque and tightening order
⇒ ["1.1 Exhaust gas turbocharger with component parts - Summary of components", page 290](#)

17 - Screw

- ☐ Tightening torque and tightening order ⇒ [page 398](#)

18 - Screw

- ☐ 9 Nm

19 - Measurement pipe

- ☐ to differential pressure transmitter - G505-
- ☐ Union nut tightening torque 45 Nm

20 - Bolt

- ☐ Tightening torque and tightening order ⇒ [page 398](#)

21 - Screw

- ☐ Tightening torque and tightening order ⇒ [page 390](#)

22 - Bracket

- ☐ for exhaust gas cleaning module
- ☐ with balancing elements
- ☐ Prepare balancing elements for installation ⇒ [page 397](#)

23 - Screw

- ☐ Tightening torque and tightening order ⇒ [page 390](#)

24 - Exhaust gas cleaning module

- ☐ Particle filter with catalyser



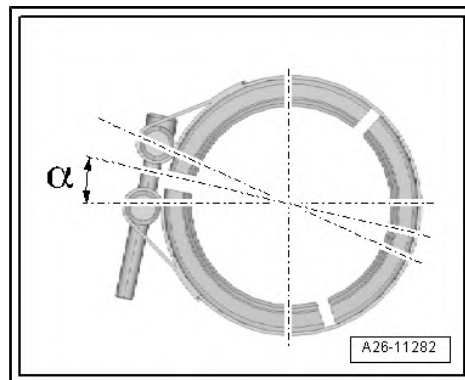
- ❑ removing and installing ➔ [“2.2 Removing and installing exhaust gas cleaning module”, page 392](#)

25 - Screw

- ❑ Tightening torque and tightening order ➔ [page 398](#)

Installation position of gripper clamp for exhaust gas cleaning module

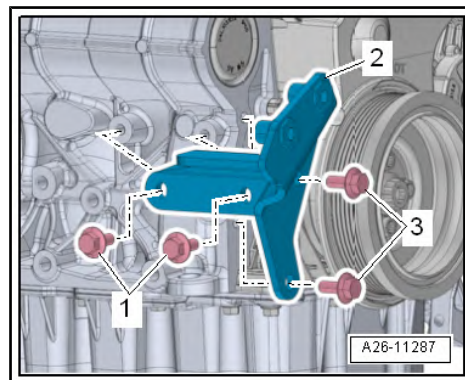
- Angle α = 30°.



Bracket -2- for exhaust gas cleaning module - tightening torques and tightening order

- Tighten screws in steps in the specified sequence:

Stage	Screws	Tightening torque
1.	-3-	by hand as far as the stop
2.	-1-	20 Nm
3.	-3-	20 Nm



2.1.2 Summary of components exhaust gas cleaning (engine identification characters CRVC)

1 - Screw

- ☐ Tightening torque and tightening order
⇒ [page 401](#)

2 - Support

- ☐ must not be fitted
- ☐ screwed onto the cylinder head
- ☐ Tightening torque and tightening order
⇒ [page 401](#)

3 - Catalytic converter/diesel particulate filter

- ☐ Country-specific components
- ☐ removing and installing
⇒ ["2.3 Removing and installing catalytic converter", page 400](#)

4 - Screw

- ☐ Tightening torque and tightening order
⇒ [page 401](#)

5 - Gasket

- ☐ replace after removal

6 - Clamping sleeve

- ☐ Tightening torque and tightening order
⇒ [page 401](#)

7 - Gasket

- ☐ replace after removal

8 - Clamping sleeve

- ☐ 7 Nm

9 - Pre-exhaust pipe

- ☐ removing and installing ⇒ ["1.2 Removing and installing exhaust pipe", page 380](#)
- ☐ ustawienie układu wydechowego bez naprężeń
⇒ ["1.6 Aligning exhaust system free of stress", page 386](#)

10 - Screw

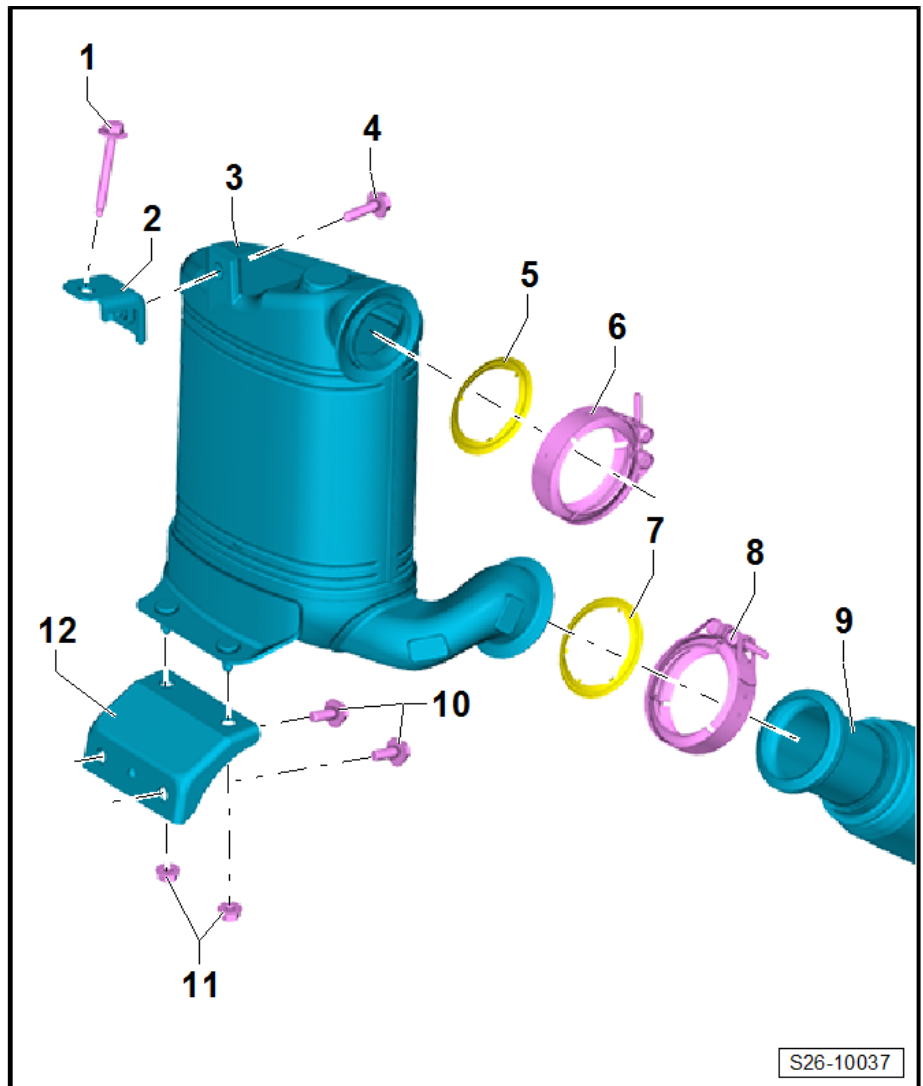
- ☐ Tightening torque and tightening order ⇒ [page 401](#)

11 - Nuts

- ☐ Tightening torque and tightening order ⇒ [page 401](#)

12 - Support

- ☐ screwed onto the crankcase
- ☐ Tightening torque and tightening order ⇒ [page 401](#)





2.2 Removing and installing exhaust gas cleaning module

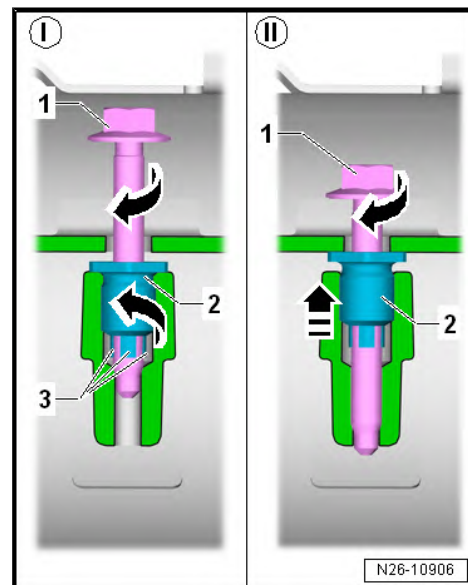
For vehicles with engine identification characters CLHA, CLHB, CRKB, CKFB, CKFC, CUPA, CRMB, CUNA



Note

The exhaust gas cleaning module is attached to the engine with 4 balancing elements among other items. These balancing elements have a left-hand thread on the outside. When being screwed on, the screw -1- initially moves the balancing element -2- as a result of the friction on the pegs -3-. The balancing element moves across the screw head against the left-hand thread, despite the fact that the screw is rotating in the anticlockwise direction, thus compensating for the clearance between the components. The balancing element must be freely rotatable via its left-hand thread, otherwise the pegs do not create friction on the screw that is needed to move the balancing element. In order not to minimise the friction, no lubricant should get onto the peg.

Function of the balancing element



Special tools and workshop equipment required

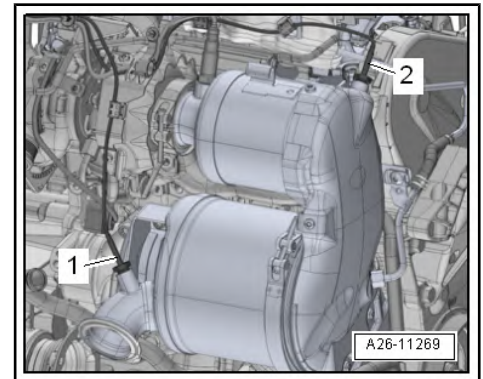
- ◆ Socket insert SW 8 - 3247-
- ◆ Assembly aid - T10511-
- ◆ Calibration tool - T10512-

Removing

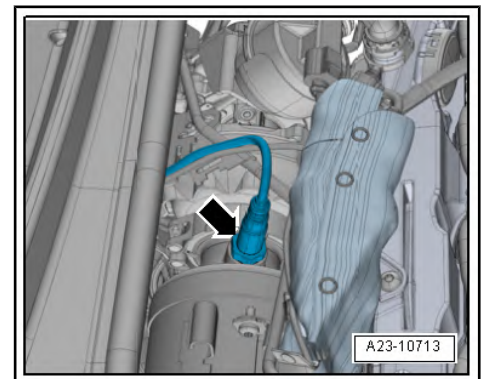
- Remove assembly carrier with steering gear ⇒ Chassis; Rep. gr. 40 .
- Remove the front silencer
⇒ ["1.2 Removing and installing exhaust pipe", page 380](#) .
- Drain coolant ⇒ ["1.2 Draining and filling coolant", page 151](#) .
- Remove rear coolant pipe
⇒ ["3.7 Removing and installing the rear coolant pipe", page 179](#) .
- Remove radiator for exhaust gas recirculation
⇒ ["4.5 Removing and installing radiator for exhaust gas recirculation", page 415](#) .

For engines with identification characters CLHA, CLHB, CKFB, CKFC, CUPA

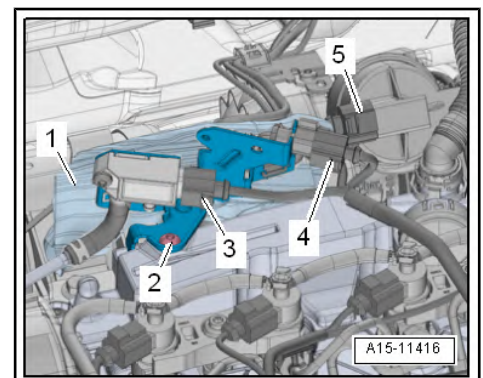
- Remove exhaust temperature transmitter -1- and -2-
⇒ [“3.2 Removing and installing exhaust gas temperature transmitter”, page 403](#) .



- Remove lambda probe - G39-
⇒ [“3.1 Summary of components - exhaust temperature regulation”, page 402](#) .

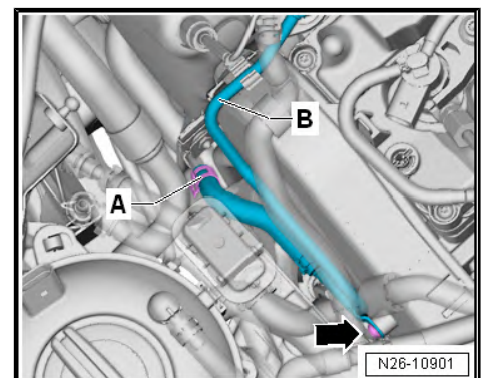


- Open heat protection sleeve -1-.
- Take electrical plug connection-4 - out of the holder, disconnect and expose electric cable.
- Disconnect electrical plug connections -3-, -5-, expose electric wiring loom.
- Unscrew screw -2-, lay bracket with differential pressure transmitter - G505- to the rear.



- Release screw -arrow-.
- Open clamp -A-, pull out hose, unclip pipeline -B- and remove with the differential pressure transmitter - G505- .

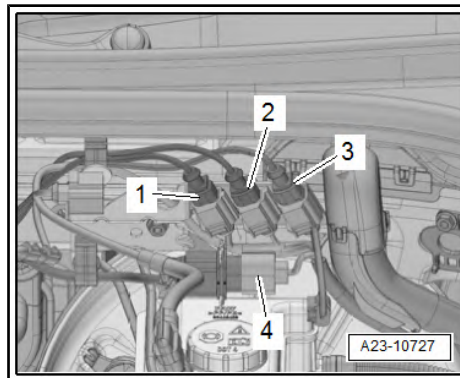
For engines with identification characters CRKB, CRMB, CUNA



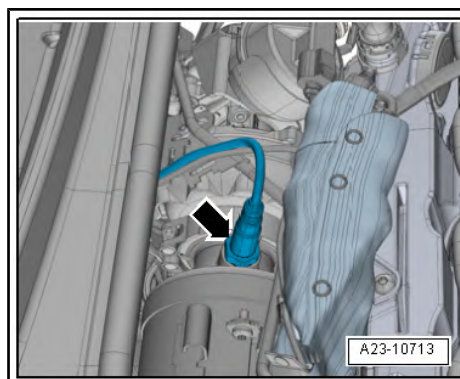
- Disconnect electrical plug connections and lay the electric cables to one side:

- 1 - for exhaust gas temperature transmitter 4 - G648-
- 2 - for exhaust gas temperature transmitter 3 - G495-
- 3 - for exhaust gas temperature transmitter 2 - G448-

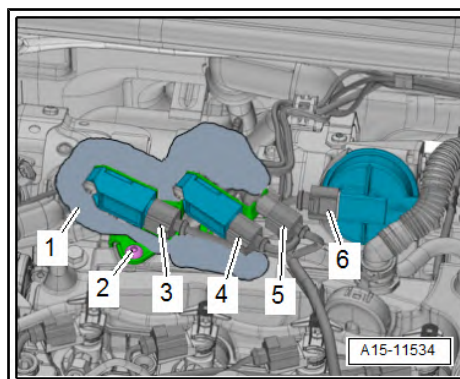
- Remove exhaust temperature transmitter - G648- and -G495-
-G448- ⇒ ["3 Exhaust temperature regulation", page 402](#) .



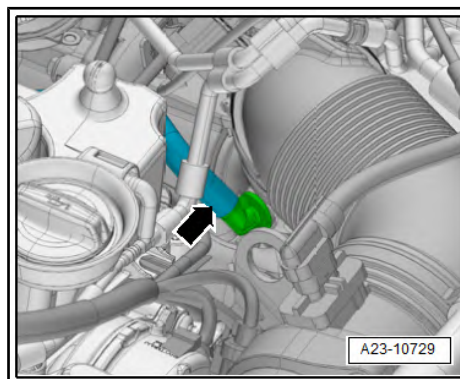
- Remove lambda probe - G39-
⇒ ["3.1 Summary of components - exhaust temperature regulation", page 402](#) .
- Remove lambda probe - G130-
⇒ ["5.3 Removing and installing Lambda probe after catalytic converter G130", page 353](#) .



- Open heat protection sleeve -1-.
- Take electrical plug connection-5 - out of the holder, disconnect and expose electric cable.
- Disconnect electrical plug connections -3- and -4- and expose electric wiring loom.
- Release screw -2-.

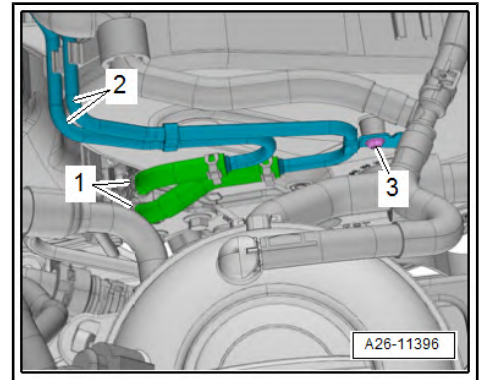


- Detach vacuum hose -arrow- and put to one side.



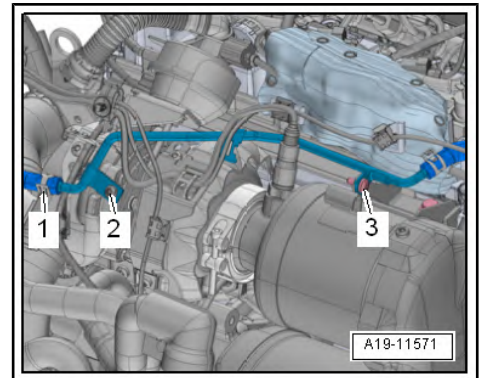
- Release screw -3-.
- Loosen hose clamps -1-, remove hoses.
- Press out pipeline -2- and remove the differential pressure transmitter.

Continued for all vehicles



- Open hose clamp -1-, remove coolant hose.
- Unscrew screws -2- and -3- and swivel coolant line to the side.

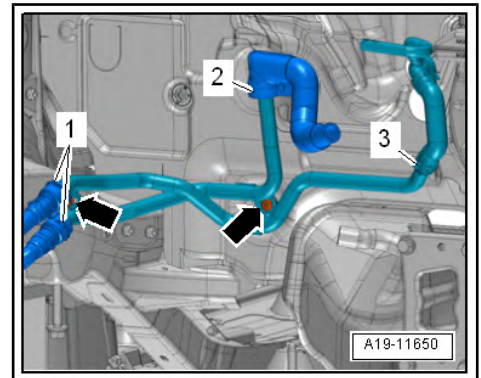
Vehicles fitted with auxiliary heating



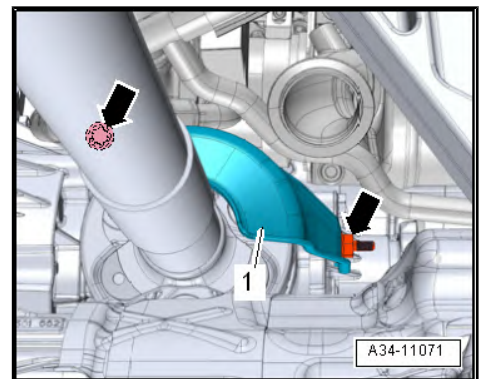
- Raise holding clamps -1- and undo hose clamp -3-, remove coolant hoses.
- Release nuts -arrows-, remove coolant pipe.

Vehicles with four-wheel drive

- Unscrew the right driveshaft from the angle gearbox ⇒ Suspension; Rep. gr. 40 and tie up towards the rear.



- Release screws -arrows- and remove heat shield -1-.
- To reinstall, mark the position of the flexible disk and the angle gearbox flange to each other.
- Unscrew the propshaft from the angle gearbox -arrows-, while counterholding with a lever on the triangular flange.



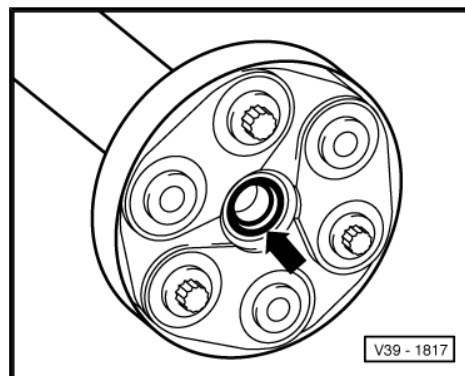


- Push engine/gearbox assembly slightly forward (towards the front of the body) and then pull off the propshaft from the angle gearbox.

**Caution**

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

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

**Note**

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

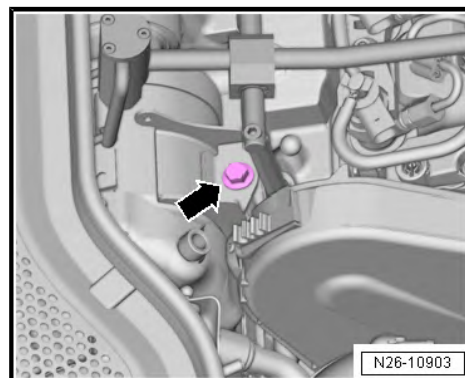
- Tie up propshaft towards the left vehicle side.

Continued for all vehicles

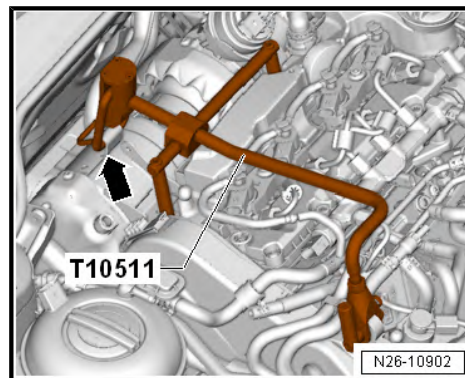
- Release screw -arrow-.

**Note**

The feet of the assembly aid - T10511- are supported on the screw heads of the cylinder head cover.



- Place assembly aid - T10511- as shown, suspend retaining bracket -arrow- in the suspension catch of the exhaust gas cleaning module.



- Open clamp -1- and position it on the flared opening of the exhaust gas cleaning module.
- Unscrew the remaining screws in the order -4 ... 2-.

Right-hand drive

- Push engine forwards with the assistance of a second mechanic.

Continued for all vehicles

- Swivel the exhaust gas cleaning module downwards away from the engine and push it upwards.
- Pull retaining bracket out of the suspension catch of the exhaust gas cleaning module and remove the exhaust gas cleaning module downwards.

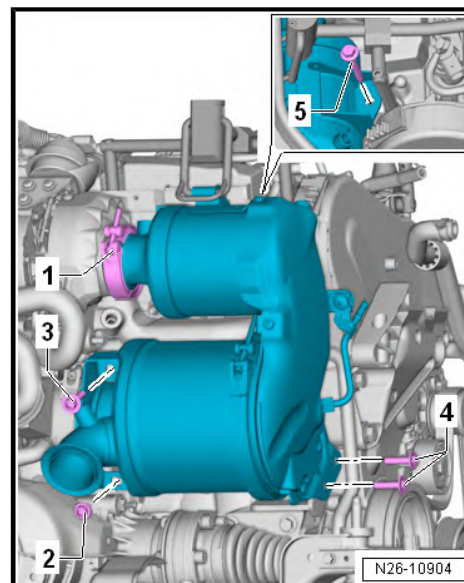
Install

- Assembly aid - T10511- positioned on engine



Note

- ◆ *Ensure that the retaining bracket of the assembly aid - T10511- pivoted in the front wall direction is - »open«-.*
- ◆ *Replace seals, self-locking nuts and gripper clamp for exhaust gas cleaning module.*
- ◆ *Fit all cable straps back at the same points when re-installing.*



Caution

Risk of stress fractures and engine damage caused by the built-in exhaust gas cleaning module being under tension.

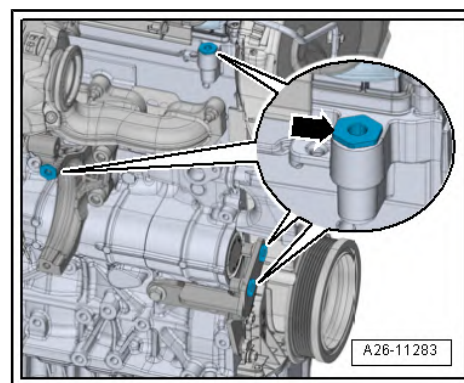
- ◆ *Before installation, ensure that these balancing elements are not stiff or tight.*
- ◆ *The balancing element must turn freely in the thread.*
- ◆ *Lubricant must only be applied to the thread, the retaining lugs must remain »clean«.*
- ◆ *The screw retaining lugs must be bent far enough for the balancing element to be moved when the screw is screwed in.*

- Check for and ensure ease of movement of the balancing elements -arrow-.
- Fully unscrew balancing elements in the clockwise direction (left-hand thread).
- Clean stiff threads and moisten them with lubricant if necessary.

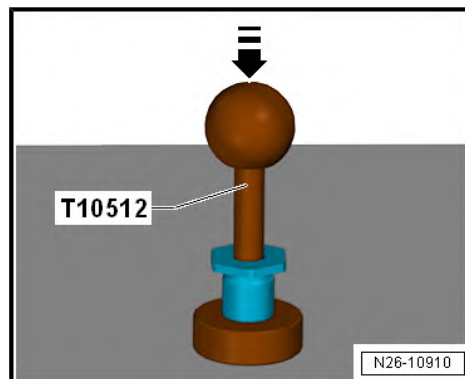


Caution

Retaining lugs of the balancing elements must not be moistened with lubricants of any kind. Reducing the friction would impair the function of the balancing element.



- Bring retaining lugs to the functional dimension using the calibration tool - T10512- .
- Slide the balancing element onto the firing pin, insert into the centring sleeve and turn the retaining lugs back by striking the ball stud lightly using the palm of your hand.
- Screw balancing elements in fully by hand and unscrew again by 45°.



- Disconnect the gasket -1- at the exhaust gas cleaning module.
- Unhook clamp screw and lay clamp -2- entirely on the flared opening of the exhaust gas cleaning module. Do not bend clamp

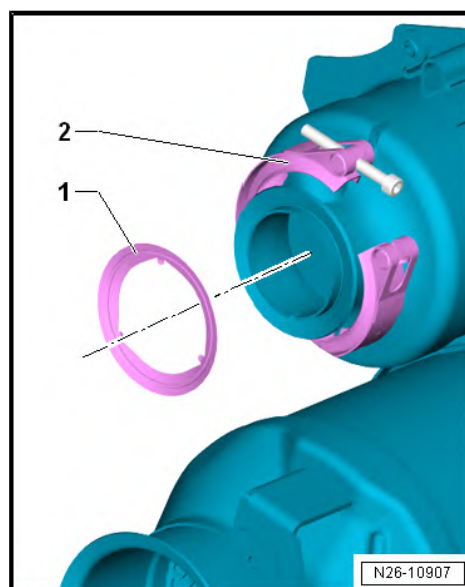
Right-hand drive

- Push engine forwards with the assistance of a second mechanic.

Continued for all vehicles

- Guide exhaust cleaning module to the installation position from below, push it up and hook the bracket in the suspension catch of the exhaust gas cleaning module.

The exhaust gas cleaning module is now suspended in weight-neutral manner in the approximate installation position.

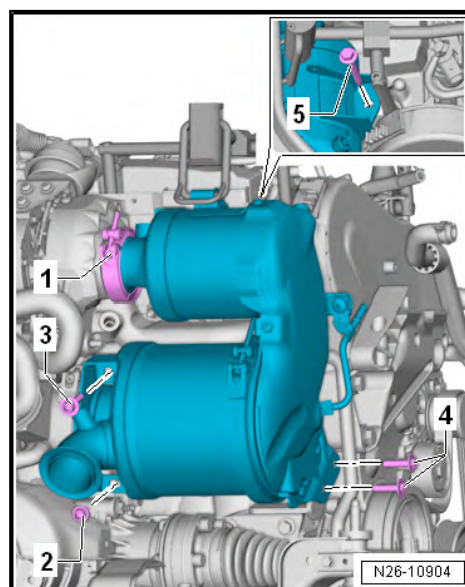


Note

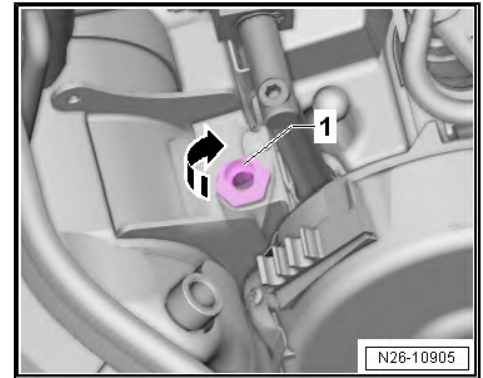
Replace all fixing screws of the exhaust gas cleaning module.

Tightening order for exhaust gas cleaning module

Stage	Bolt	Measure
1.	Warm-type clamp -1-	Position using the sealing flange and tighten to 3 Nm
2.	Screw -2-	Tighten until hand-tight and immediately loosen by a torquing angle of 90°
3.	Warm-type clamp -1-	tighten to 8 Nm
4.	Screw -2-	tighten to 20 Nm
5.	Screw -3-	insert and lock by pressing. Do not tighten or turn screw
6.	Screws -4-	insert and lock by pressing. Tighten screws to 20 Nm
7.	Screw -3-	tighten to 20 Nm



- Unscrew balancing element (left-hand thread) -1- on the cylinder head using socket insert SW 8 - 3247- in -arrow direction- as far as the stop, then rotate a further 90°.



Continued tightening order

Stage	Bolt	Measure
8.	Screw -5-	insert and lock by pressing
9.	Screw -5-	tighten to 20 Nm
10.	Screw -5-	Turn 90° further
11.	Screw -5-	turn 45° further

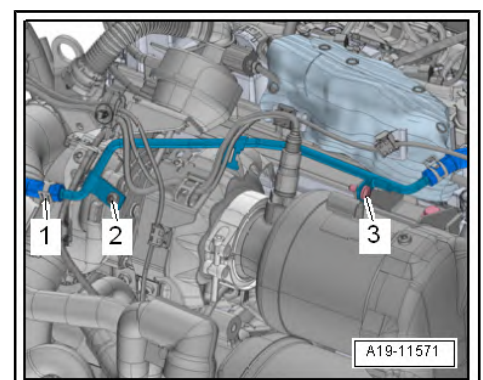
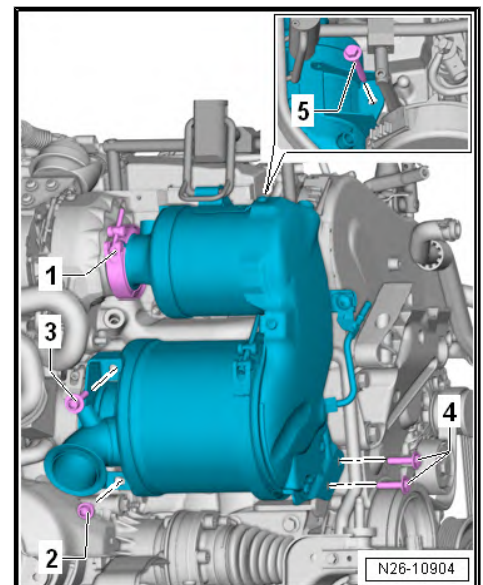
Assembling is performed continuing in the reverse order, while paying attention to the following:

Vehicles with four-wheel drive

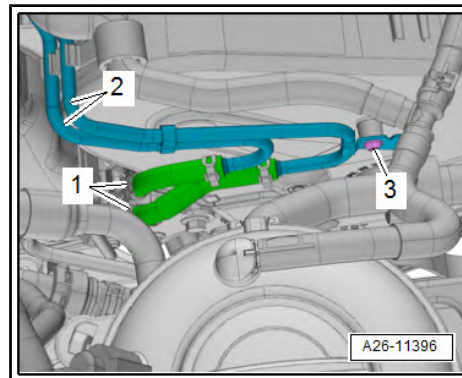
- Unscrew propshaft from angle gearbox ⇒ Gearbox; Rep. gr. 39 .
- Screw on the right driveshaft to the angle gearbox ⇒ Suspension; Rep. gr. 40 .

Continued for all vehicles

- Install radiator for exhaust gas recirculation
⇒ [“4.5 Removing and installing radiator for exhaust gas recirculation”, page 415](#) .
- Electrical connections and proper routing ⇒ Electrical System; Rep. gr. 97 and ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Install the left coolant pipe
⇒ [“3.6 Remove and install the left coolant pipes”, page 178](#) .
- Install the rear coolant pipe
⇒ [“3.7 Removing and installing the rear coolant pipe”, page 179](#) .
- Install front silencer
⇒ [“1.2 Removing and installing exhaust pipe”, page 380](#) .
- Connect coolant hose, fit hose clamp -1-.
- Screw in screws -2- and -3- and tighten to 10 Nm.



- Connect hoses, fit hose clamps -1-.
- Tighten screw -3-, Pos. -4-
⇒ ["1.6 Summary of components - toothed belt guard", page 42](#) .
- Screw on holder for differential pressure transmitter to cylinder head cover, Pos. -5-
⇒ ["1.1 Assembly overview - cylinder head cover", page 85](#) .
- Install the assembly carrier ⇒ Chassis; Rep. gr. 40 .
- After replacing the exhaust gas cleaning module, reset the learning values⇒ Vehicle diagnostic tester, Targeted Functions, Resetting learning values.

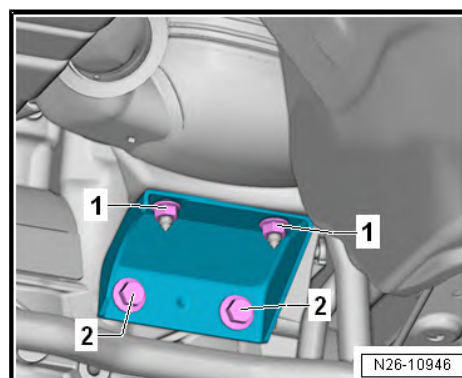
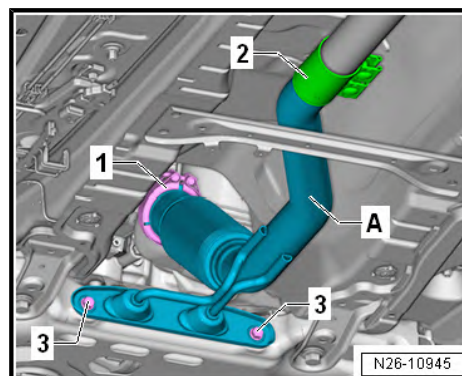


2.3 Removing and installing catalytic converter

For vehicles with engine identification characters CRVC

Removing

- Remove the sound dampening systems and tunnel cover ⇒ Body Work; Rep. gr. 50 .
- Undo the screws of the clamping sleeve -2-, leave the clamping sleeve in the fitting position.
- Open clamp -1- and remove.
- Unscrew the screws -3-, slide the clamping sleeve -2- to the rear and remove the pre-exhaust pipe -A-.
- Unscrew the fixing nuts -1-, undo the screws -2- by a quarter turn.
- Remove engine cover
⇒ ["1.1 Removing and installing engine trim panel", page 10](#) .



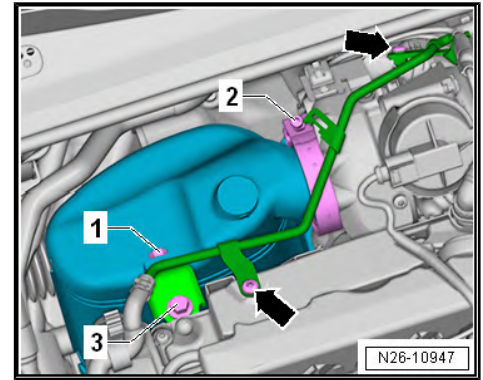
- Unscrew the screws -arrows- of the coolant line , pull the coolant line slightly to the front.
- Unscrew screws -1- and -3-, open and remove the clamp -2-.
- Carefully remove the catalytic converter upwards.

Install



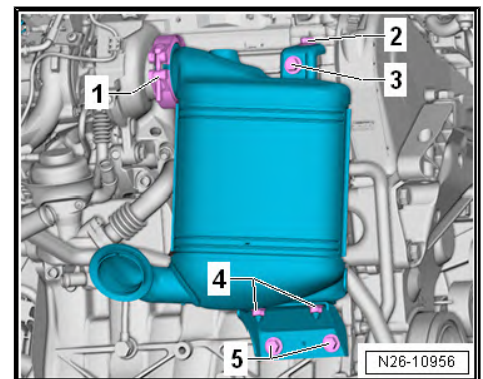
Note

- ◆ Replace self-locking nuts and screws as well as gasket rings, gaskets and O-rings after disassembly.
- ◆ Secure all hose connection ends with spring-type clips that comply with the series design ➔ ETKA - Electronic Catalogue of Original Parts .
- ◆ Fit all cable straps on again in the same place when installing.
- Position the new seal onto the centering studs of the flared opening onto the catalytic converter, slide the new clamp over the flared opening.
- Place the catalytic converter into position from the top and, using the pin bolts, insert into the bottom mounting bracket.
- For further tightening sequence, see the following table
➔ [page 401](#)



Tightening torques and tightening sequence, catalytic converter

Stage	Component	Measure
I	Warm-type clamp -1-	Position via the sealing flange, secure screw
II	Screws -2- and -3-	Tighten until hand-tight and immediately loosen by a torquing angle of 90°
III	Warm-type clamp -1-	tighten to 8 Nm
IV	Nuts -4-	tighten to 20 Nm
V	Screws -5-	tighten to 20 Nm
VI	Screw -2-	tighten to 20 Nm, turn a further 90°, then turn another 45°
VII	Screw -3-	tighten to 20 Nm



Further installation occurs in reverse order.



3 Exhaust temperature regulation

⇒ [“3.1 Summary of components - exhaust temperature regulation”, page 402](#)

⇒ [“3.2 Removing and installing exhaust gas temperature transmitter”, page 403](#)

3.1 Summary of components - exhaust temperature regulation



Caution

Malfunction caused by loose exhaust gas temperature transmitter

- ◆ *The threads of the exhaust gas temperature transmitter - G495- and -G648- are coated. They must NOT be coated additionally with hot bolt paste and must be tightened to the specified tightening torque.*

1 - Lambda probe downstream of catalytic converter - G130- with heating for lambda probe - Z29-

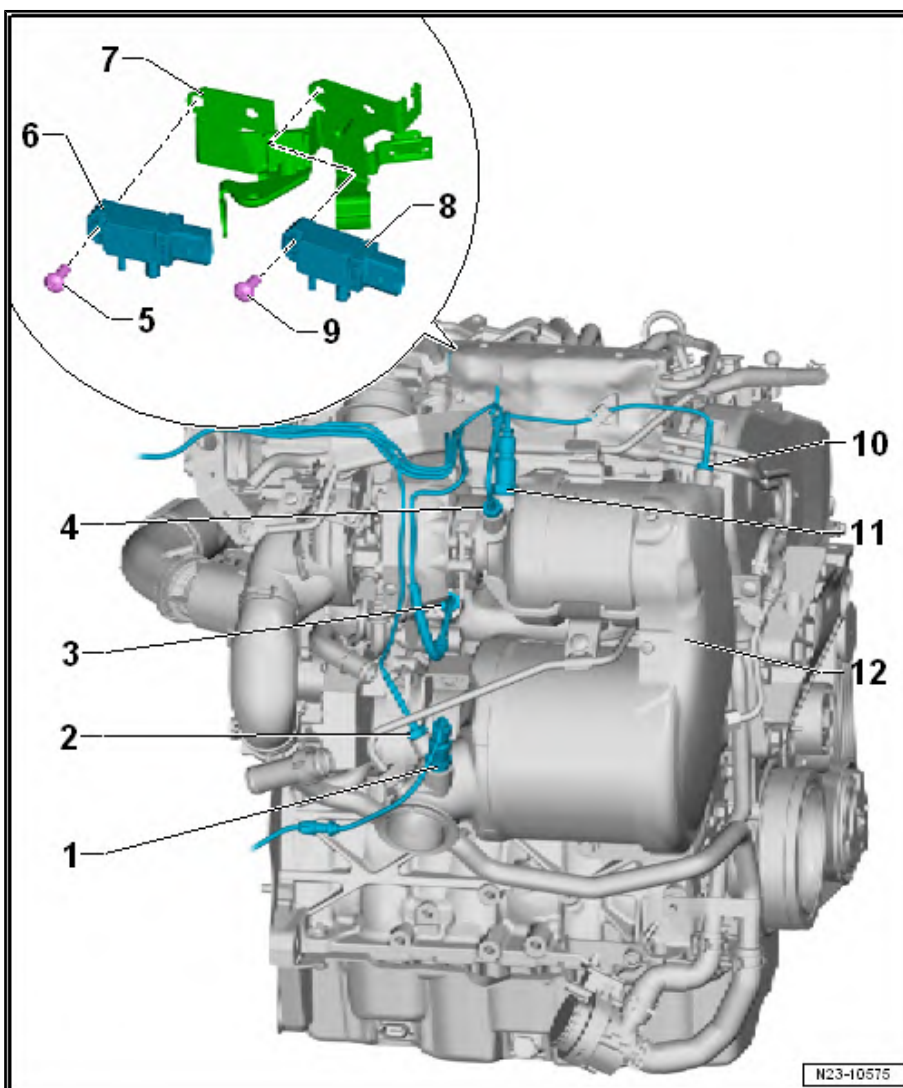
- ☐ only for vehicles with engine identification characters CRKB, CRMB, CUNA
- ☐ removing and installing
⇒ [“5.3 Removing and installing Lambda probe after catalytic converter G130”, page 353](#)

2 - Exhaust gas temperature transmitter 4 - G648-

- ☐ removing and installing
⇒ [“3.2 Removing and installing exhaust gas temperature transmitter”, page 403](#)
- ☐ the thread of the exhaust gas temperature transmitter is coated and must not be coated additionally with hot bolt paste
- ☐ 2.0l engines: 60 Nm
- ☐ 1.6l engines: 45 Nm

3 - Exhaust gas temperature transmitter 1 - G235-

- ☐ removing and installing
⇒ [“3.2 Removing and installing exhaust gas temperature transmitter”, page 403](#)
- ☐ Coat threads with hot bolt paste; hot bolt paste
⇒ ETKA - Electronic Catalogue of Original Parts
- ☐ 45 Nm





4 - Exhaust gas temperature transmitter 2 - G448-

- ☐ only for vehicles with engine identification characters CRKB, CRMB, CUNA
- ☐ the thread of the exhaust gas temperature transmitter is coated and must not be coated additionally with hot bolt paste
- ☐ removing and installing
⇒ ["3.2 Removing and installing exhaust gas temperature transmitter", page 403](#)
- ☐ 60 Nm

5 - Screw

- ☐ Tightening torque ⇒ [page 351](#)

6 - Differential pressure transmitter - G505-

- ☐ removing and installing
⇒ ["4.7 Removing and installing differential pressure transmitter G505", page 348](#)

7 - Support

8 - Exhaust gas pressure sensor 1 - G450-

- ☐ only for vehicles with engine identification characters CRKB, CRMB, CUNA
- ☐ removing and installing
⇒ ["4.8 Removing and installing pressure sensor for exhaust gas 1 G450", page 349](#)

9 - Screw

- ☐ Tightening torque ⇒ [page 351](#)

10 - Exhaust gas temperature transmitter 3 - G495-

- ☐ removing and installing
⇒ ["3.2 Removing and installing exhaust gas temperature transmitter", page 403](#)
- ☐ the thread of the exhaust gas temperature transmitter is coated and must not be coated additionally with hot bolt paste
- ☐ 2.0l engines: 60 Nm
- ☐ 1.6l engines: 45 Nm

11 - lambda probe - G39- with heating for lambda probe - Z19-

- ☐ removing and installing ⇒ ["5.2 Removing and installing Lambda probe G39", page 352](#)

12 - Exhaust gas cleaner

3.2 Removing and installing exhaust gas temperature transmitter

⇒ ["3.2.1 Removing and installing the exhaust gas temperature transmitter 1 G235", page 403](#)

⇒ ["3.2.2 Remove and install exhaust gas temperature transmitter 3 G495 / exhaust gas temperature transmitter 4 G648", page 404](#)

⇒ ["3.2.3 Removing and installing exhaust gas temperature transmitter 2 G448 \(engine identification characters CRKB, CRMB, CUNA\)", page 406](#)

3.2.1 Removing and installing the exhaust gas temperature transmitter 1 - G235-

Special tools and workshop equipment required

- ◆ Extension SW 17 , e.g. -V.A.G 1331/10-



Removing



Note

- ◆ *Fit all cable straps on again in the same place when installing.*
- ◆ *When removing, the electric cable must be not cut off, since doing so would mean that fault diagnosis would no longer be possible.*
- Remove engine cover
⇒ [“1.1 Removing and installing engine trim panel”, page 10](#) .
- Open heat protection sleeve.
- Take electrical plug connection-1 - out of the holder, disconnect and expose electric wiring loom.
- Unscrew exhaust gas temperature transmitter 1 - G235- Position -2- using extension SW 17 - V.A.G 1331/10- .

Install

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



Note

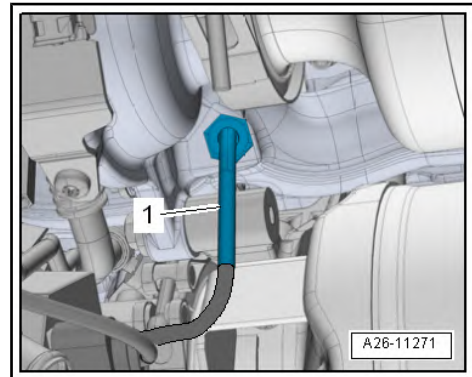
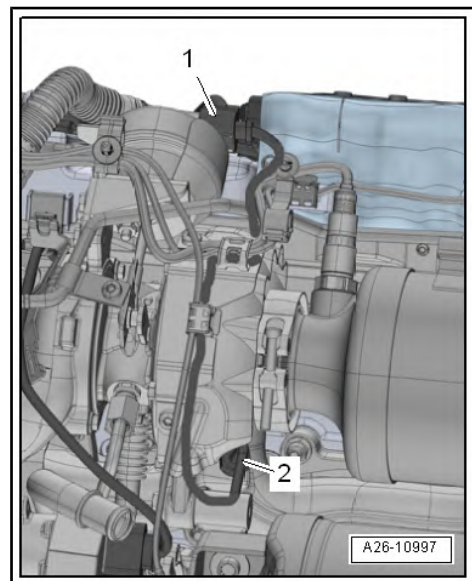
- ◆ *Protect exhaust gas temperature transmitter from impacts and shocks: Do not use any exhaust gas temperature transmitter that has been dropped.*
- ◆ *Coat threads with hot bolt paste; hot bolt paste ⇒ ETKA - Electronic Catalogue of Original Parts .*

Fitting position of the exhaust gas temperature transmitter - G235- :

- Angled shank -1- downwards horizontally.
- Electrical connections and proper routing ⇒ Electrical System; Rep. gr. 97 and ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

Tightening torques

- ◆ ⇒ [“3.1 Summary of components - exhaust temperature regulation”, page 402](#)



3.2.2 Remove and install exhaust gas temperature transmitter 3 - G495- / exhaust gas temperature transmitter 4 - G648-

Special tools and workshop equipment required

- ◆ Set of tools - T10395-

Removing



Note

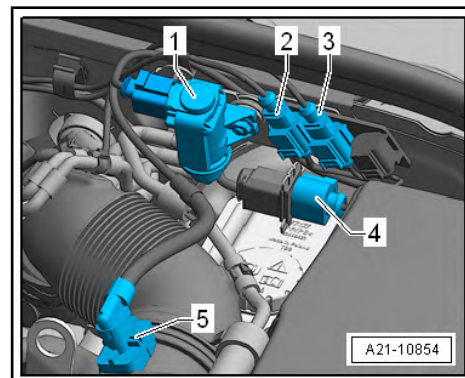
- ◆ *Fit all cable straps on again in the same place when installing.*
- ◆ *When removing, the electric cable must be not cut off, since doing so would mean that fault diagnosis would no longer be possible.*

- Remove engine cover
⇒ [“1.1 Removing and installing engine trim panel”, page 10](#) .

- Expose the following plug connections and electric cables:

2 - for exhaust gas temperature transmitter 4 - G648-

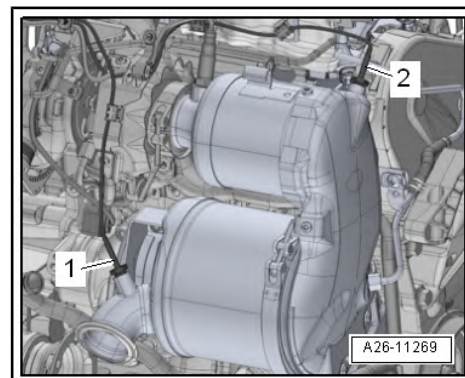
3 - for exhaust gas temperature transmitter 3 - G495-



- Screw exhaust gas temperature transmitter concerned out using a tool from the tool kit - T10395- and a suitable insertion tool.

1 - for exhaust gas temperature transmitter 4 - G648-

2 - for exhaust gas temperature transmitter 3 - G495-



Install

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



Caution

Malfunction caused by loose exhaust gas temperature transmitter

- ◆ *The threads of the exhaust gas temperature transmitter - G495- and -G648- are coated. They must NOT be coated additionally with hot bolt paste and must be tightened to the specified tightening torque.*



Note

Protect exhaust gas temperature transmitter from impacts and shocks: Do not use any exhaust gas temperature transmitter that has been dropped.

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

Tightening torques

- ◆ ⇒ [“3.1 Summary of components - exhaust temperature regulation”, page 402](#)



3.2.3 Removing and installing exhaust gas temperature transmitter 2 - G448- (engine identification characters CRKB, CRMB, CUNA)

Special tools and workshop equipment required

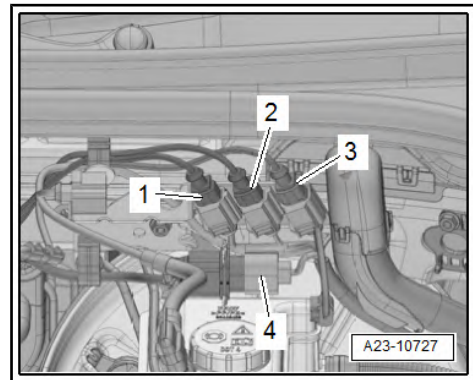
- ◆ Set of tools - T10395 A-

Removing



Note

- ◆ *Fit all cable straps on again in the same place when installing.*
- ◆ *When removing, the electric cable must be not cut off, since doing so would mean that fault diagnosis would no longer be possible.*
- Remove engine cover
⇒ [“1.1 Removing and installing engine trim panel”, page 10](#) .
- Disconnect plug connection -3- and lay the electric cable to one side.



- Unscrew exhaust temperature transmitter 2 - G448- -arrow-.

Install

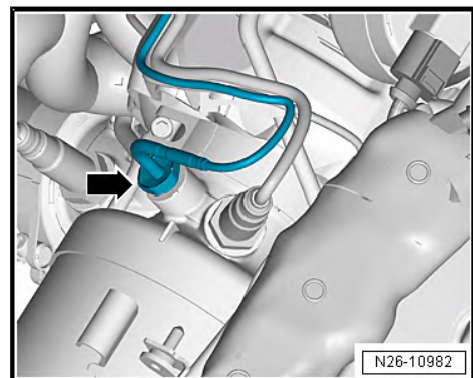
Installation is performed in a similar way in the reverse order. Pay attention to the following points:



Caution

Malfunction caused by a loose exhaust gas temperature transmitter.

- ◆ *the thread of the temperature transmitter 2 - G448- is coated. It must NOT be coated additionally with hot bolt paste and must be tightened to the specified tightening torque.*



Note

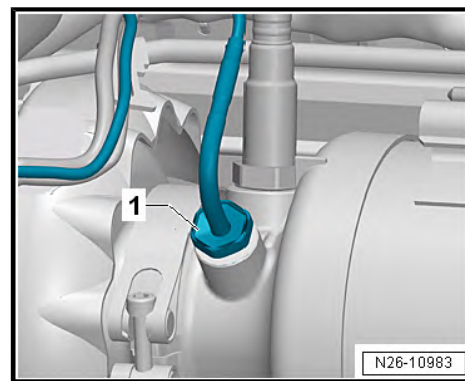
Protect exhaust gas temperature transmitter from impacts and shocks: Do not use any exhaust gas temperature transmitter that has been dropped.

Fitting position of the exhaust gas temperature transmitter 2 - G448- :

- The angled shaft -1- must point vertically upwards.
- Electrical connections and proper routing ⇒ Electrical System; Rep. gr. 97 and ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

Tightening torques

- ◆ ⇒ [“3.1 Summary of components - exhaust temperature regulation”, page 402](#)





4 Exhaust gas recirculation system

⇒ "4.1 Exhaust gas recirculation with radiator for exhaust gas recirculation - Summary of components", page 408

⇒ "4.2 Control motor for exhaust gas recirculation V338 - Summary of components", page 412

⇒ "4.3 Removing and installing control motor for exhaust gas recirculation V338", page 413

⇒ "4.4 Removing and installing control motor 2 for exhaust gas recirculation V339", page 413

⇒ "4.5 Removing and installing radiator for exhaust gas recirculation", page 415

4.1 Exhaust gas recirculation with radiator for exhaust gas recirculation - Summary of components

⇒ "4.1.1 Exhaust gas recirculation with radiator for exhaust gas recirculation - Summary of components (engine identification characters CLHA, CLHB, CRKB, CKFB, CKFC, CUPA, CRMB, CUNA)", page 408

⇒ "4.1.2 Exhaust gas recirculation with radiator for exhaust gas recirculation - Summary of components (engine identification characters CRVC)", page 410

4.1.1 Exhaust gas recirculation with radiator for exhaust gas recirculation - Summary of components (engine identification characters CLHA, CLHB, CRKB, CKFB, CKFC, CUPA, CRMB, CUNA)

1 - Radiator for exhaust gas recirculation

- ❑ removing and installing
⇒ [“4.5 Removing and installing radiator for exhaust gas recirculation”, page 415](#)

2 - Screw

- ❑ Tightening torque and tightening order
⇒ [page 410](#) , if only the radiator for exhaust gas recirculation has been removed

3 - Support

- ❑ for radiator for exhaust gas recirculation

4 - Screw

- ❑ Tightening torque and tightening order
⇒ [page 410](#) , if only the radiator for exhaust gas recirculation has been removed

5 - Clamping sleeve

- ❑ replace after removal
- ❑ Fitting position
⇒ [page 410](#)
- ❑ Tightening torque and tightening order
⇒ [page 410](#)

6 - Seal

- ❑ replace after removal

7 - Exhaust gas cleaning module

- ❑ removing and installing ⇒ [“2.2 Removing and installing exhaust gas cleaning module”, page 392](#)

8 - Control motor 2 for exhaust gas recirculation - V339-

- ❑ removing and installing
⇒ [“4.4 Removing and installing control motor 2 for exhaust gas recirculation V339”, page 413](#)



Note

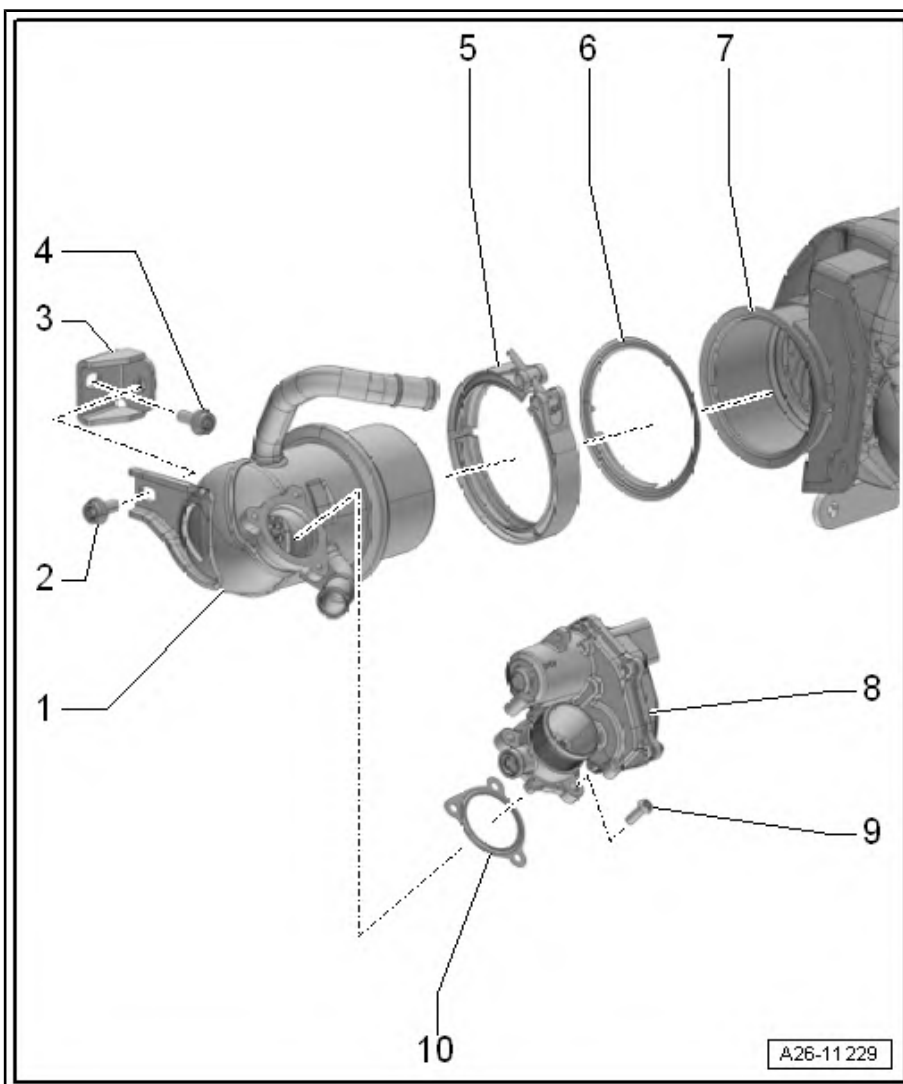
Control motor for exhaust gas recirculation is protected against damage using heat from a heat-protection matting. If this heat-protection matting gets damaged it will need to be replaced and the control motor checked by heat damage (it may also need to be replaced).

9 - Screw

- ❑ 9 Nm

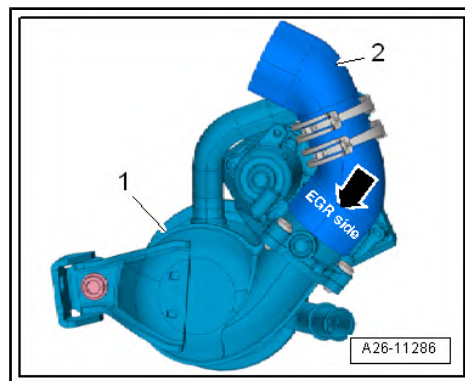
10 - Seal

- ❑ replace after removal



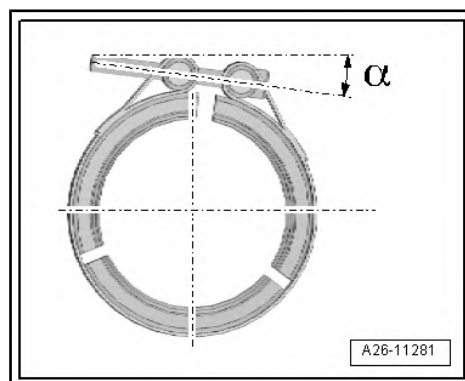


Installation position of air guide hose at radiator for exhaust gas recirculation



Installation position for radiator for exhaust gas recirculation

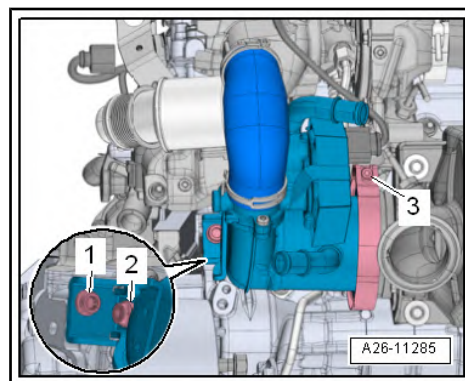
- Angle α = 10 ... 15°.



Radiator for exhaust gas recirculation - tightening torques and tightening order

- Tighten screws in steps in the given sequence:

Stage	Screws	Tightening torque
1.	Warm-type clamp -3-	7 Nm
2.	-1-, -2-	by hand as far as the stop
3.	-1-, -2-	20 Nm

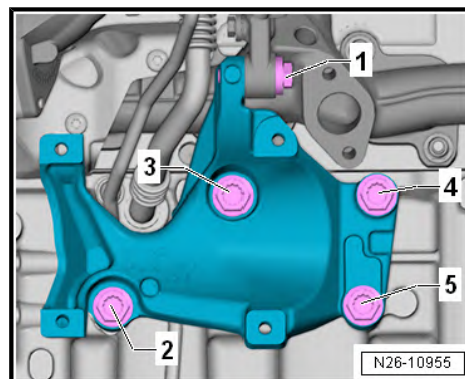


4.1.2 Exhaust gas recirculation with radiator for exhaust gas recirculation - Summary of components (engine identification characters CRVC)



Tightening torques and -sequence holder for radiator for exhaust gas recirculation

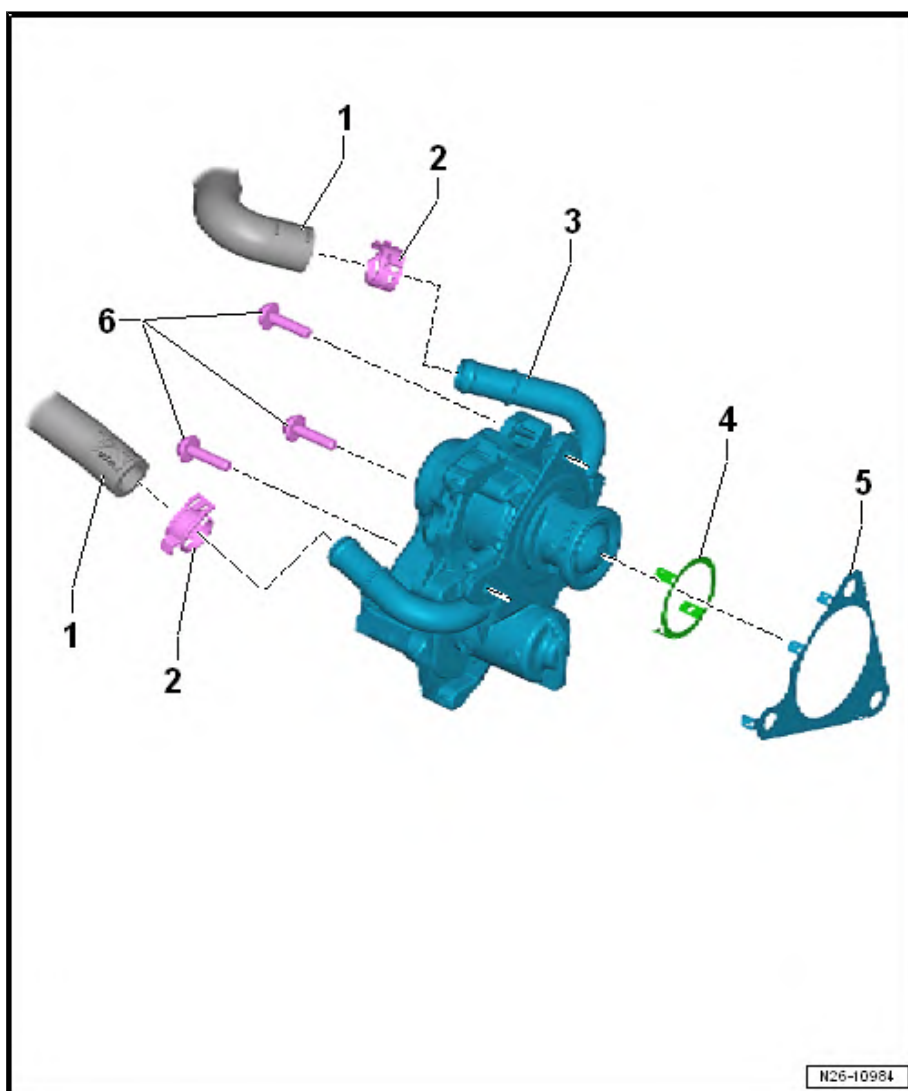
Stage	Screws	Tightening torque
1.	-2 ... 5-	by hand as far as the stop
2.	-1-	tighten to 20 Nm
3.	-2 ... 5-	tighten to 55 Nm



4.2 Control motor for exhaust gas recirculation - V338- - Summary of components

For vehicles with engine identification characters CRKB, CRVC, CRMB, CUNA

- 1 - Coolant hose
- 2 - Spring strap clamp
- 3 - EGR control motor - V338-
 - ☐ with EGR potentiometer - G212-
 - ☐ removing and installing
⇒ ["4.3 Removing and installing control motor for exhaust gas recirculation V338", page 413](#)
- 4 - Gasket
 - ☐ replace after removal
- 5 - Gasket
 - ☐ replace after removal
- 6 - Screw
 - ☐ 9 Nm



4.3 Removing and installing control motor for exhaust gas recirculation - V338-

For vehicles with engine identification characters CRVC, CRKB, CRMB, CUNA

Special tools and workshop equipment required

- ◆ Hose clamps up to Ø 25 mm - MP7-602 (3094)-

Removing



Note

Observe rules for cleanliness.

- Remove throttle valve module - J338-
⇒ ["6.2 Removing and installing the throttle valve control unit J338", page 357](#) .
- Separate electrical plug connection -3-.
- Disconnect the coolant hose with the hose clamp -MP7-602 (3094)- .
- Loosen hose clamp -2-, remove coolant hose.
- Unscrew screws -arrows-, remove control motor for exhaust gas recirculation - V338- .

Install

Install in the reverse order of removal. When doing this, note the following:



Note

- ◆ *Replace gasket.*
- ◆ *Secure all hose connection ends with spring-type clips that comply with the series design ⇒ ETKA - Electronic Catalogue of Original Parts .*

Tightening torques

- ◆ ⇒ ["4.2 Control motor for exhaust gas recirculation V338 - Summary of components", page 412](#)
- ◆ ⇒ ["6.1 Assembly overview - intake manifold", page 355](#)

4.4 Removing and installing control motor 2 for exhaust gas recirculation - V339-

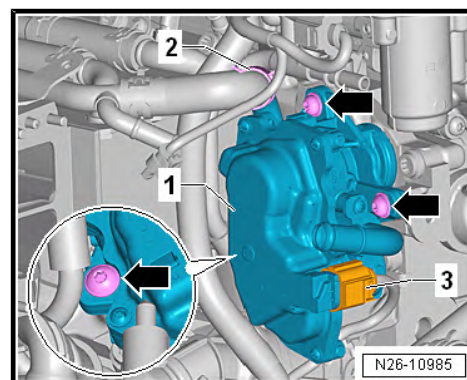
For vehicles with engine identification characters CLHA, CLHB, CRKB, CKFB, CKFC, CUPA, CRMB, CUNA

Special tools and workshop equipment required

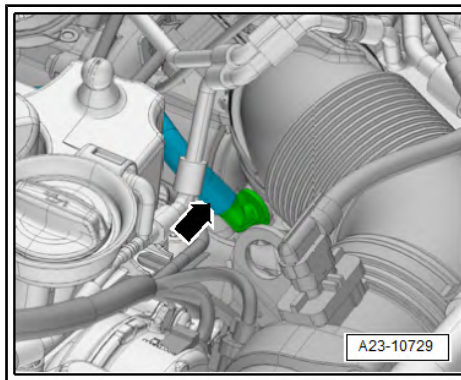
- ◆ Hose clip pliers - VAS 6362-

Removing

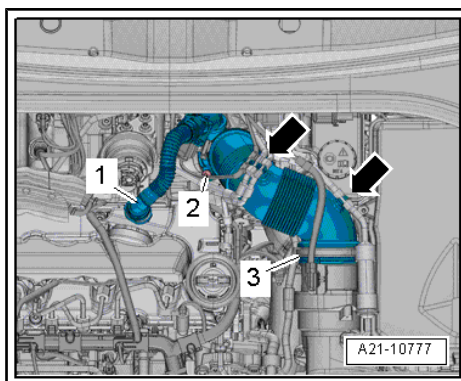
- Remove engine cover
⇒ ["1.1 Removing and installing engine trim panel", page 10](#) .



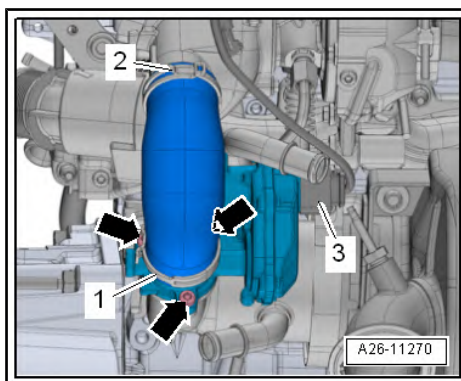
- if a vacuum hose is present: Remove it -arrow- and lay to the side.



- Press release buttons on the hose -1- for crankcase ventilation, remove hose from cylinder head cover.
- Disconnect vacuum hoses on the air guide pipe -arrows-.
- Loosen spring strap clip -3-, remove air guide pipe from air mass meter - G70- .
- Release screw -2-, swivel air guide pipe with inlet connection towards the rear and detach from exhaust gas turbocharger.



- Loosen spring strap clips -1-, -2-, remove exhaust gas recirculation hose.
- Press heat protection sleeve to the side, disconnect electrical plug connection -3-.
- Unscrew screws -arrows-, remove control motor 2 for exhaust gas recirculation - V339- .



Install

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



Note

- ◆ *Replace gasket and O-ring after disassembly.*
- ◆ *Secure all hose connections with spring-type clips that comply with the series design ⇒ ETKA - Electronic Catalogue of Original Parts .*

Tightening torques

- ◆ ⇒ [“4.1 Exhaust gas recirculation with radiator for exhaust gas recirculation - Summary of components”, page 408](#)
- ◆ ⇒ [“1.1 Exhaust gas turbocharger with component parts - Summary of components”, page 290](#)

4.5 Removing and installing radiator for exhaust gas recirculation

⇒ ["4.5.1 Removing and installing radiator for exhaust gas recirculation \(engine identification characters CLHA, CLHB, CRKB, CKFB, CKFC, CUPA, CRMB, CUNA\)", page 415](#)

⇒ ["4.5.2 Removing and installing radiator for exhaust gas recirculation \(engine identification characters CRVC\)", page 417](#)

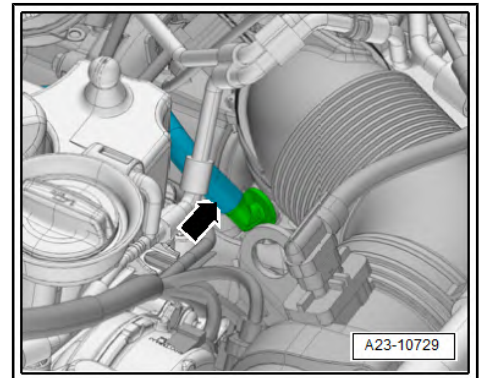
4.5.1 Removing and installing radiator for exhaust gas recirculation (engine identification characters CLHA, CLHB, CRKB, CKFB, CKFC, CUPA, CRMB, CUNA)

Special tools and workshop equipment required

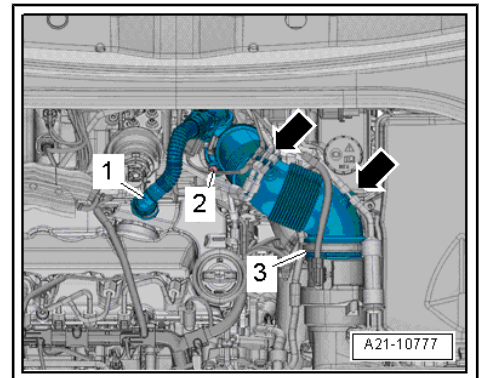
- ◆ Hose clip pliers - VAS 6340-

Removing

- Remove battery tray ⇒ Electrical System; Rep. gr. 27 .
- Remove left coolant pipe
⇒ ["3.6 Remove and install the left coolant pipes", page 178](#) .
- if a vacuum hose is present: Remove it -arrow- and lay to the side.



- Press release buttons on the hose -1- for crankcase ventilation, remove hose from cylinder head cover.
- Disconnect vacuum hoses on the air guide pipe -arrows-.
- Release screw -2-, swivel air guide pipe with inlet connection towards the rear and detach from exhaust gas turbocharger.





- Unscrew screws -arrows-, remove pulsation dampener -1-.

Vehicles fitted with a manual gearbox

- Remove switching and selector linkage from gearbox, unscrew linkage support and lay aside with the linkages ⇒ Gearbox; Rep. gr. 34 .

Vehicles with dual clutch gearbox 0CW

- Remove selector lever linkage from gearbox, unscrew linkage support and strap up with linkages ⇒ Gearbox; Rep. gr. 34 .

Vehicles with dual clutch gearbox 0D9

- Remove selector lever linkage from gearbox and pull it out of the linkage support ⇒ Gearbox; Rep. gr. 34 .

Vehicles with four-wheel drive

- Remove pre-exhaust pipe
⇒ [“1.2 Removing and installing exhaust pipe”, page 380](#) .

Continued for all vehicles

- Press heat protection sleeve to the side, disconnect electrical plug connection -5-.
- Loosen hose clamp -3-, remove air guide hose.
- Loosen hose clamp -4-, remove coolant hose.
- Loosen screw -6-, remove particle filter clamp.
- Unscrew screw -1-, loosen screw -2-.
- Remove radiator for exhaust gas recirculation.

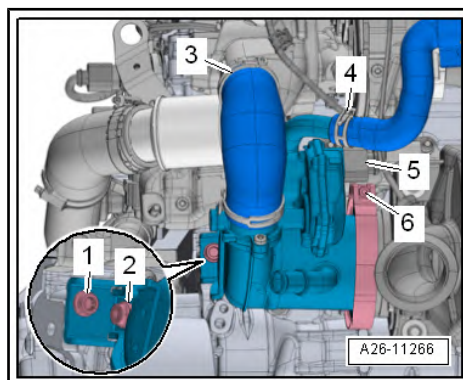
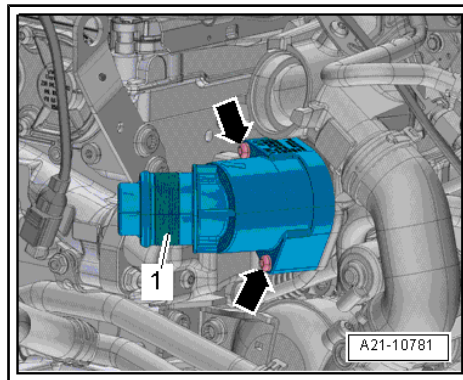
Install

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

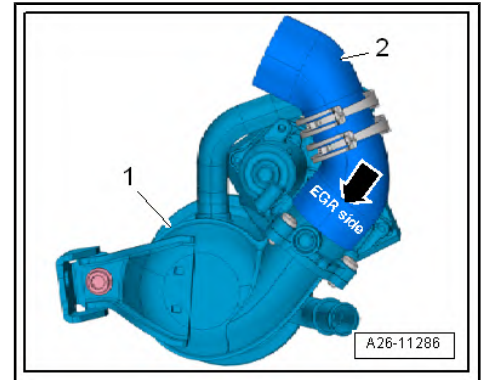


Note

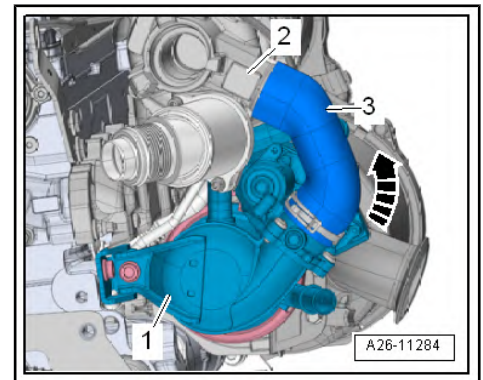
- ◆ Check heat-protection matting for damage, replace if necessary.
- ◆ If heat protection seal is defective, check control motor 2 for exhaust gas recirculation - V339- for heat damage, replace if necessary.
- ◆ Replace gaskets, clamp and spring strap clips after disassembly.
- ◆ Secure all hose connections with spring-type clips that comply with the series design ⇒ ETKA - Electronic Catalogue of Original Parts .



- Mount hose -2- on radiator -1- for exhaust gas recirculation.
- Fitting position: Marking “EGR side” -arrow- points to the exhaust gas recirculation radiator.
- Ensure that the air guide hose fitting is free of tension.



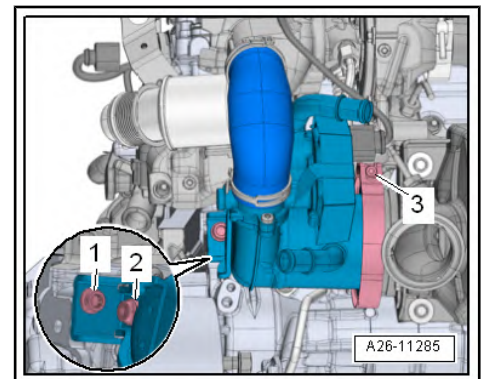
- Position radiator -1- for exhaust gas recirculation on the exhaust gas cleaning module with gasket and gripper clamp.
- Turn radiator for exhaust gas recirculation in anticlockwise direction -arrow- and simultaneously put hose -3- onto the exhaust gas turbocharger-2-.



- Bring gripper clamp -3- to installation position ⇒ [page 410](#) .
- Tighten screw connections ⇒ [page 410](#) .
- Install the left coolant pipe
⇒ [“3.6 Remove and install the left coolant pipes”, page 178](#) .

Tightening torques

- ◆ ⇒ [Fig. ““Radiator for exhaust gas recirculation - tightening torques and tightening order””, page 410](#)
- ◆ ⇒ [“1.1 Summary of components - front, middle and rear silencer”, page 370](#)



4.5.2 Removing and installing radiator for exhaust gas recirculation (engine identification characters CRVC)

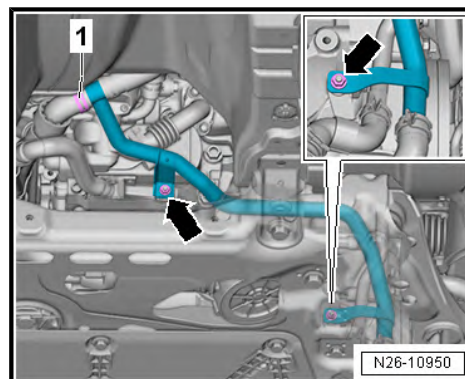
Special tools and workshop equipment required

- ◆ Socket insert - T10347-
- ◆ Socket insert XZN 10 - T10501-
- ◆ Set of tools - T10395 A-

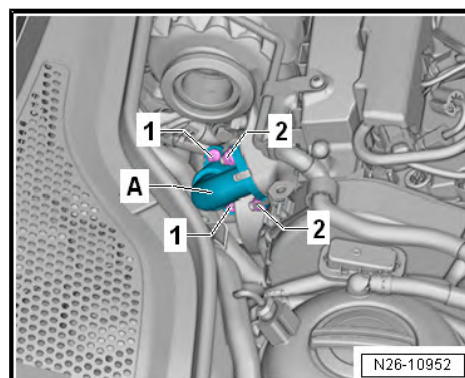
Removing

- Remove catalytic converter
⇒ [“2.3 Removing and installing catalytic converter”, page 400](#) .
- Drain coolant ⇒ [“1.2 Draining and filling coolant”, page 151](#) .

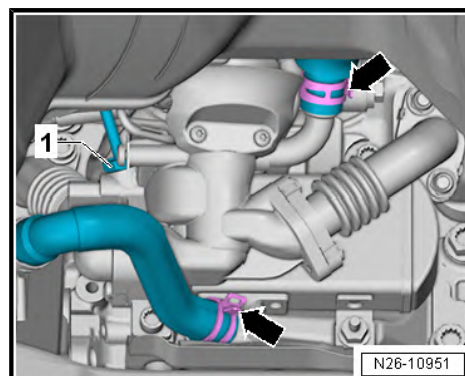
- Loosen hose clamp -1- and disconnect hose. Unscrew the nuts -arrows-.
- For example, tie use coolant pipe with cable straps.



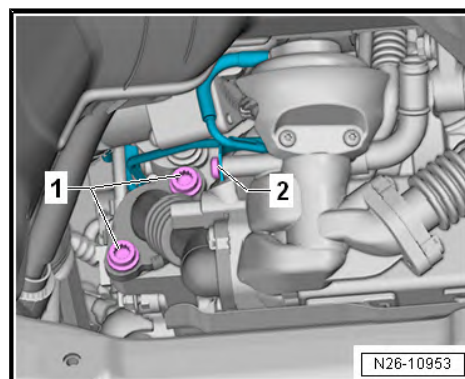
- Unscrew screws -1- with the Polydrive socket - T10347- , unscrew nuts -2-.
- Remove connection pipe -A-.



- Open the clamps -arrows-, remove the coolant hoses, unscrew the temperature transmitter for exhaust gas recirculation - G98- -1- using a suitable socket from the tool set - T10395 A- .



- Unscrew the screws -1- with the Polydrive socket XZN 10 - T10501- , unscrew mounting bracket for vacuum line -2-.
- Detach vacuum line from radiator for exhaust gas recirculation.



- Unscrew screws -arrows- and carefully remove the radiator for exhaust gas recirculation -A- through the vehicle tunnel.

Install

Install in the reverse order of removal. When doing this, note the following:

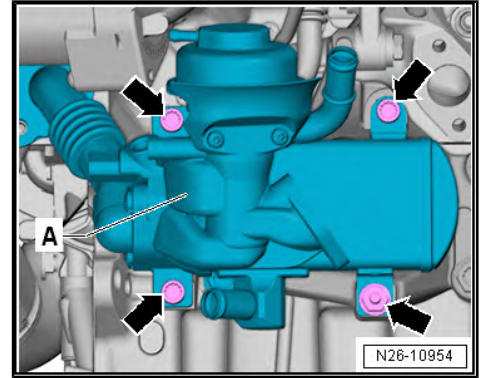


Note

- ◆ *Replace self-locking nuts and screws as well as gasket rings, gaskets and O-rings after disassembly.*
- ◆ *Secure all hose connection ends with spring-type clips that comply with the series design ⇒ ETKA - Electronic Catalogue of Original Parts .*
- ◆ *Fit all cable straps on again in the same place when installing.*
- Install high catalytic converter
⇒ [“2.3 Removing and installing catalytic converter”](#),
[page 400](#) .
- Top up coolant ⇒ [page 153](#) .

Tightening torques

- ◆ ⇒ [“4.1 Exhaust gas recirculation with radiator for exhaust gas recirculation - Summary of components”](#), [page 408](#)





28 – Glow plug system

1 Glow Plug System

⇒ [“1.1 Summary of components - preheating system”, page 420](#)

⇒ [“1.2 Removing and installing glow plugs”, page 421](#)

⇒ [“1.3 Removing and installing automatic glow period control unit J179”, page 423](#)

⇒ [“1.4 Removing and installing Hall sender G40”, page 423](#)

⇒ [“1.5 Removing and installing engine speed transmitter G28”, page 424](#)

1.1 Summary of components - preheating system

1 - Hall sender - G40-

- ❑ removing and installing
⇒ [“1.4 Removing and installing Hall sender G40”, page 423](#)

2 - Screw

- ❑ 9 Nm

3 - O-ring

- ❑ no spare parts, in case of damage replace together with Hall sender - G40-

4 - Glow plug

◆ Glow plug 1 - Q10-

◆ Glow plug 2 - Q11-

◆ Glow plug 3 - Q12-

◆ Glow plug 4 - Q13-

- ❑ the combustion chamber pressure sender for cylinder 3 - G679- is only integrated for cylinder 3 in the glow plug for engine identification characters CRKB, CRMB, CUNA

❑ Glow plug variants

⇒ [page 421](#)

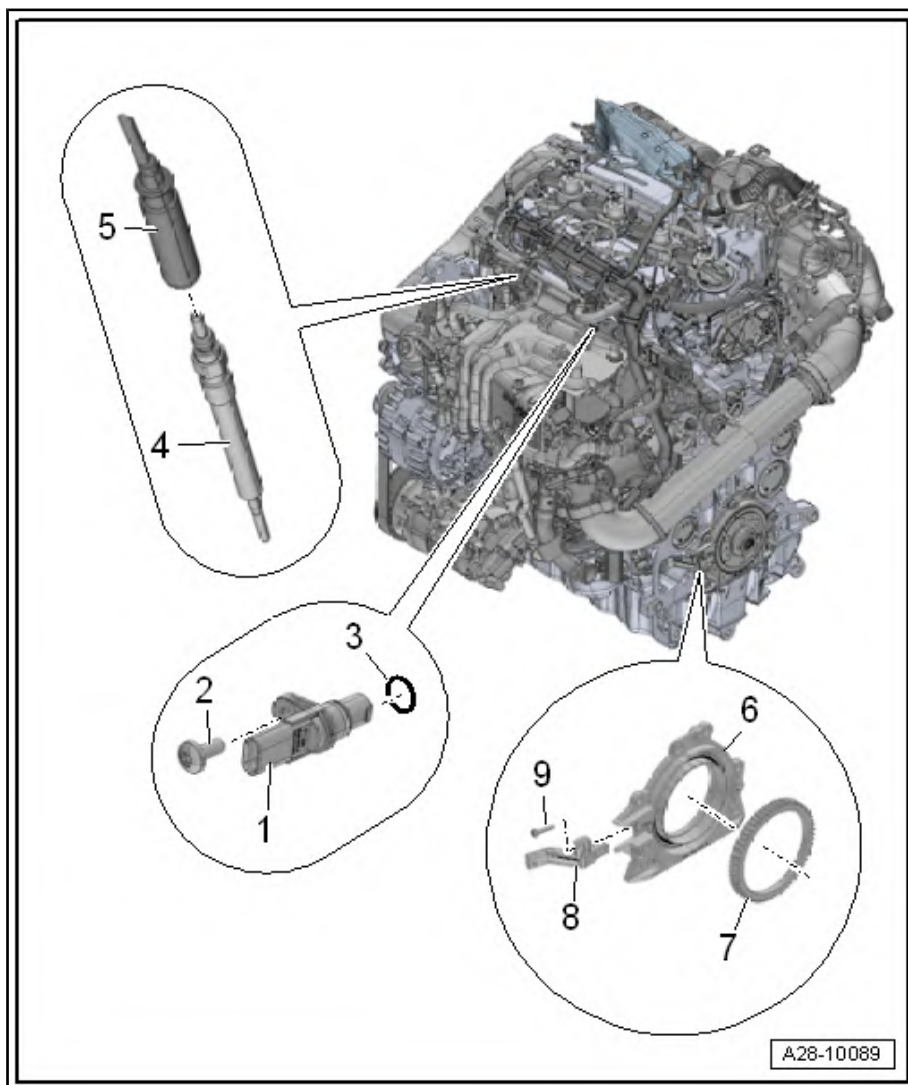
- ❑ removing and installing
⇒ [“1.2 Removing and installing glow plugs”, page 421](#)

❑ Glow plugs without combustion chamber pressure sender 17 Nm

❑ Glow plugs with combustion chamber pressure sender 12 Nm

5 - Electrical plug connection

- ❑ for glow plugs



6 - Sealing flange on the gearbox side

- ❑ removing and installing ⇒ [“2.4 Removing and installing sealing flange on gearbox side”, page 66](#)

7 - Rotor

- ❑ for engine speed transmitter - G28-
- ❑ removing and installing ⇒ [“2.4 Removing and installing sealing flange on gearbox side”, page 66](#)

8 - Engine speed transmitter - G28-

- ❑ removing and installing ⇒ [“1.5 Removing and installing engine speed transmitter G28”, page 424](#)

9 - Screw

- ❑ 4.5 Nm

1.2 Removing and installing glow plugs



Note

Metal glow plugs are installed in this engine.

Special tools and workshop equipment required

- ◆ Flexible-head wrench SW 10 -3220-
- ◆ Pliers - 3314-
- ◆ Cleaning and degreasing agent , e.g. -D 009 401 04-
- ◆ Protective goggles and gloves
- ◆ Socket insert 12 mm - VAS 6454- , only for engine identification characters CRKB, CRMB, CUNA

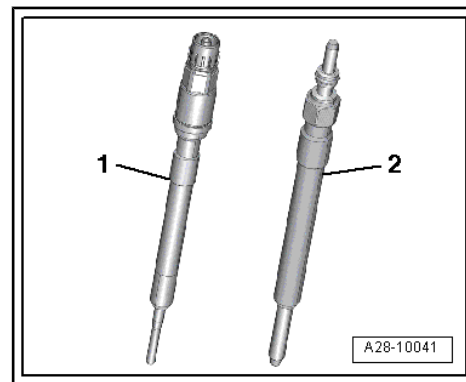
Removing

Glow plug variants

- 1 - Glow plugs with combustion chamber pressure sender - only for cylinder 3 with engine identification characters CRKB, CRMB, CUNA
- 2 - Glow plugs without combustion chamber pressure sender

Observe all safety measures and notes for assembly work on the fuel system and on the injection system as well as the rules for cleanliness ⇒ [“3 Repair instructions”, page 6](#) .

- Switch off ignition and pull out ignition key.
- Remove engine cover
⇒ [“1.1 Removing and installing engine trim panel”, page 10](#) .



Caution

Risk of damaging support sleeves.

- ◆ ***Only press pliers - 3314- for disconnecting glow plug connectors so far together that they grip the support sleeve collar securely without damaging it.***

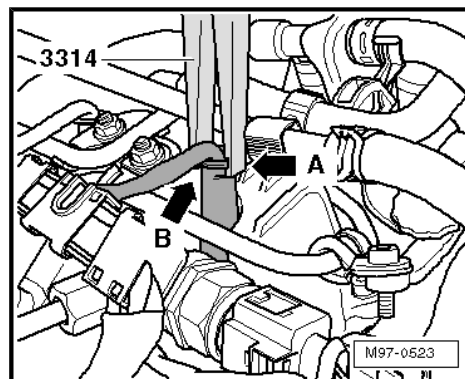
- Open holding clamps of the electrical wiring loom and disconnect the electrical plug connections from the glow plugs as follows.



- Position pliers - 3314- using the sliding groove arrow -A- at the support sleeve collar arrow -B-, as shown in the illustration.

**Caution**

- ♦ *Carefully remove the glow plug connectors from the glow plugs.*
- ♦ *If the plug is damaged when disconnecting it, the complete wiring loom including the plugs must be replaced (plugs cannot be replaced separately).*



- Carefully disconnect the plug from the glow plugs.
- Clean glow plugs in the cylinder head (no dirt must fall into the cylinder).

When cleaning, for example:

**WARNING**

Wear protective gloves and protective goggles when working with grease remover!

1. Suction off heavy dirt using a vacuum cleaner.
 2. Spray the pencil type glow plug channel using a brake cleaner or a suitable cleaner, let it take effect for a short period of time and blow out with compressed air.
 3. Then clean the pencil type glow plug channel with a cloth which is wetted with oil.
- To release the glow plugs, use socket wrench SW 10 - 3220- .

**Note**

With engine identification characters CRKB, CRMB, CUNA, use socket insert 12 mm - VAS 6454- to remove the glow plug in cylinder 3.

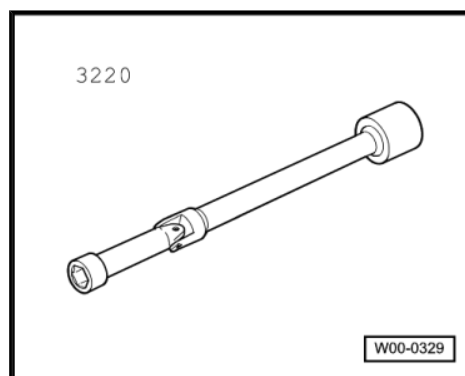
Install

Installation is carried out in the reverse order.

- To tighten the glow plugs, use socket wrench SW 10 - 3220- .

**Note**

With engine identification characters CRKB, CRMB, CUNA, use socket insert 12 mm - VAS 6454- to tighten the glow plug in cylinder 3.



- Place the glow plug connectors -1- back onto the glow plugs -arrows-.

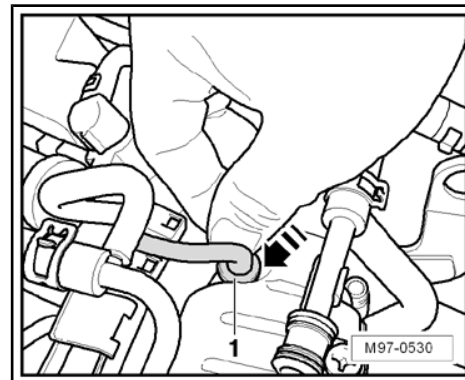


Note

Make sure the glow plug connectors fit tightly.

Tightening torques

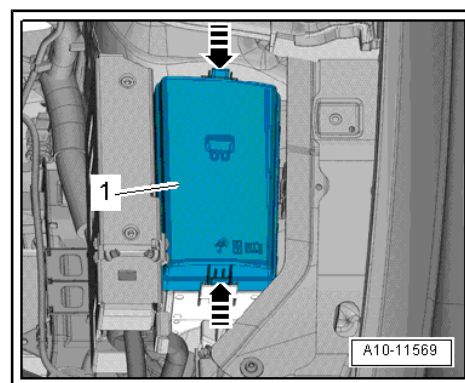
- ◆ ⇒ [“1.1 Summary of components - preheating system”, page 420](#)



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

Removing

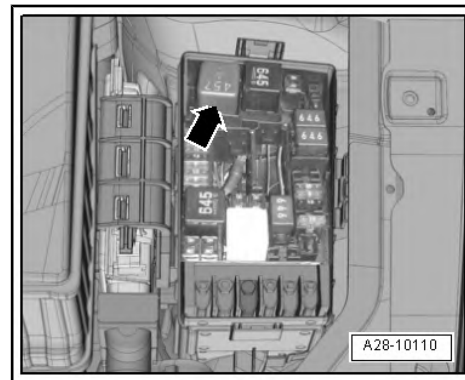
- Unlock catches -arrows-, remove cover.



- Remove automatic glow period control unit - J179- -arrow- from the socket in the e-box engine compartment.

Install

Installation is carried out in the reverse order.



1.4 Removing and installing Hall sender - G40-

Removing

- Remove engine cover
⇒ [“1.1 Removing and installing engine trim panel”, page 10](#) .

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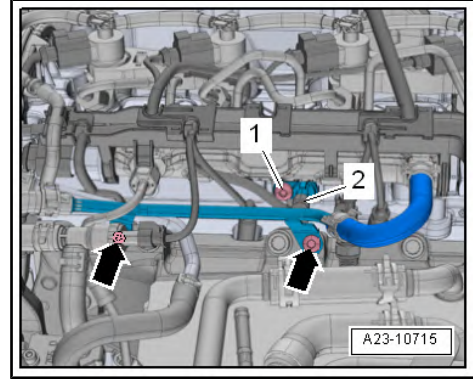


- Release screws -arrows-, push the right charge air pipe slightly to the side.
- Separate electrical plug connection -2-.
- Unscrew screw -1-, pull off Hall sender - G40- .

Install

Installation is carried out in the reverse order.

- ◆ Tightening torque
⇒ ["1.1 Summary of components - preheating system", page 420](#)



1.5 Removing and installing engine speed transmitter - G28-

Special tools and workshop equipment required

- ◆ Assembly tool - T10118-
- ◆ Socket insert size 4 - T10370-

Removing

- Remove the sound dampening system ⇒ Body Work; Rep. gr. 50 .
- Disconnect electrical plug connection -1- using the assembly tool - T10118- .



Note

To unlock the electrical plug connection without the assembly tool - T10118- , use a screwdriver to press plug on the engine speed transmitter and simultaneously raise release button with a thin wire hooklet.

- Unscrew screw -2-, remove engine speed transmitter - G28- .

Install

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

Tightening torque

- ◆ Summary of components - preheating system
⇒ ["1.1 Summary of components - preheating system", page 420](#)

