

Workshop Manual Audi A3 2004 ➤

4-cylinder direct petrol injection engine (2.0 ltr. 4-valve), mechanics

Engine ID	AXW	BHD	BLX	BMB	BLY	BLR	BVY	BVZ	
-----------	-----	-----	-----	-----	-----	-----	-----	-----	--

Edition 02.2012



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

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
- 26 - Exhaust system



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

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 Technical data	1
1.1 Engine number	1
1.2 Engine data	1
2 Safety precautions	3
2.1 Working on the fuel system	3
2.2 Procedure before opening high-pressure section of injection system	3
2.3 Working on the cooling system	4
2.4 Using testers and measuring instruments during a road test	4
2.5 Working on the exhaust system	4
3 General repair instructions	5
3.1 Rules for cleanliness when working on fuel supply system and injection system	5
3.2 Routing and attachment of pipes, hoses and wiring	5
3.3 Checking for leaks in the fuel system	5
3.4 Foreign particles in engine	5
3.5 Checking cylinder bore	6
3.6 Contact corrosion!	6
3.7 Checking vacuum system	6
3.8 Installing radiators and condensers	7
10 - Removing and installing engine	8
1 Removing and installing engine, detaching from gearbox	8
1.1 Removing engine	8
1.2 Separating engine and gearbox	24
1.3 Securing engine to assembly stand	24
1.4 Installing engine	26
2 Assembly mountings	30
2.1 Assembly mountings - exploded view	30
2.2 Checking adjustment of assembly mountings (engine/gearbox mountings)	31
2.3 Adjusting assembly mountings	32
3 Overview of fitting locations	35
13 - Crankshaft group	40
1 Dismantling and assembling engine	40
1.1 Poly V-belt - exploded view	40
1.2 Removing and installing poly V-belt	41
1.3 Removing and installing crankshaft pulley	43
1.4 Removing and installing bracket for ancillaries	44
2 Sealing flanges and flywheel/drive plate - exploded view	49
2.1 Renewing crankshaft oil seal - pulley end	51
2.2 Removing and installing sealing flange (front), engine code AXW, BLX, BHD, BLY, BLR, BMB	53
2.3 Removing and installing sealing flange (front), engine code BVY, BVZ	56
2.4 Removing and installing flywheel/drive plate	59
2.5 Removing and installing crankshaft sealing flange (gearbox end), engine code AXW, BLX, BHD, BLY, BLR, BMB	62
2.6 Removing and installing crankshaft sealing flange (gearbox end), engine code BVY, BVZ	63
3 Crankshaft - exploded view	68
3.1 Identification of top crankshaft bearings	69
3.2 Crankshaft dimensions	69
3.3 Removing and installing chain sprocket	70



4	Pistons and conrods	72
4.1	Pistons and conrods - exploded view	72
4.2	Removing and installing pistons	73
4.3	Checking piston, piston rings and cylinder bore	74
4.4	Measuring axial clearance of conrods	76
4.5	Measuring radial clearance of conrods	77
15	Cylinder head, valve gear	78
1	Toothed belt drive	78
1.1	Toothed belt drive - exploded view, engine code AXW, BMB, BHD	78
1.2	Removing and installing toothed belt, engine code AXW, BMB, BHD	81
1.3	Toothed belt drive - exploded view, engine code BLX, BLY, BLR, BVY and BVZ	90
1.4	Removing and installing toothed belt, engine code BLX, BLY, BLR, BVY, BVZ	92
2	Removing and installing cylinder head	101
2.1	Cylinder head - exploded view	101
2.2	Removing and installing camshaft control valve 1 N205	103
2.3	Removing and installing cylinder head cover	105
2.4	Removing cylinder head	108
2.5	Checking compression	125
3	Servicing valve gear	129
3.1	Cylinder head, camshafts - exploded view	129
3.2	Removing and installing camshaft adjuster	131
3.3	Removing and installing camshafts	135
3.4	Renewing valve stem oil seals with cylinder head installed	142
3.5	Renewing valve stem oil seals with cylinder head removed	146
3.6	Checking valve guides	149
3.7	Renewing exhaust camshaft oil seal	149
17	Lubrication	157
1	Removing and installing parts of lubrication system	157
1.1	Part I: Sump, balance shaft assembly - exploded view	157
1.2	Balance shaft assembly with oil pump - exploded view	159
1.3	Removing and installing sump with balance shaft assembly and oil pump, engine code AXW, BLX, BHD, BLY, BLR, BMB	162
1.4	Removing and installing sump, engine code BVY, BVZ	166
1.5	Removing and installing oil pump with balance shaft assembly, engine code BVY, BVZ	170
1.6	Pre-tensioning chain tensioner	173
1.7	Oil filter bracket - exploded view	173
1.8	Draining oil filter housing	176
1.9	Checking oil pressure and oil pressure switch	176
1.10	Removing and installing oil cooler	178
1.11	Removing and installing oil filter bracket	181
19	Cooling	186
1	Removing and installing parts of cooling system	186
1.1	Connection diagram for coolant hoses without auxiliary heater, engine code AXW, BLX, BHD, BLY, BLR, BMB	186
1.2	Connection diagram for coolant hoses with auxiliary heater, engine code AXW, BLX, BHD, BLY, BLR, BMB	188
1.3	Connection diagram for coolant hoses, engine code BVY, BVZ	189
1.4	Draining and filling cooling system	190
1.5	Parts of cooling system (on engine) - exploded view, engine code AXW, BLX, BHD, BLY, BLR, BMB	194
1.6	Parts of cooling system (on engine) - exploded view, engine code BVY, BVZ	196
1.7	Coolant distributor housing with thermostat - exploded view, engine code AXW, BLX, BHD, BLY, BLR, BMB	197

1.8	Removing and installing map-controlled engine cooling thermostat F265 , engine code AXW, BLX, BHD, BLY, BLR, BMB	197
1.9	Checking map-controlled engine cooling thermostat F265 , engine code AXW, BLX, BHD, BLY, BLR, BMB	204
1.10	Removing and installing coolant distributor housing with thermostat, engine code BVY, BVZ	205
1.11	Removing and installing coolant pump	206
1.12	Removing and installing coolant pipe	210
1.13	Parts of cooling system (on body) - exploded view	213
1.14	Removing and installing radiator fan V7 and radiator fan 2 V177	215
1.15	Removing and installing radiator	216
1.16	Checking cooling system for leaks	219
26	- Exhaust system	221
1	Removing and installing parts of exhaust system	221
1.1	Exhaust manifold with catalytic converter - exploded view, engine code AXW, BLX, BHD, BLR, BMB	221
1.2	Exhaust manifold with catalytic converter - exploded view, engine code BVY	223
1.3	Exhaust manifold - exploded view, engine code BLY, BVZ	224
1.4	Removing and installing exhaust manifold	224
1.5	Exhaust system - exploded view, engine code AXW, BLX	229
1.6	Exhaust system - exploded view, engine code BLR, BVY	233
1.7	Exhaust system - exploded view, engine code BLY, BVZ, BMB, BHD	235
1.8	Removing and installing front exhaust pipe with catalytic converter	237
1.9	Separating centre and rear silencers	239
1.10	Stress-free alignment of exhaust system	240
1.11	Checking exhaust system for leaks	241
2	Exhaust gas recirculation system, engine code AXW, BLX, BLR, BVY	242
2.1	Exhaust gas recirculation system - exploded view	242
2.2	Exhaust gas recirculation valve N18 with exhaust gas recirculation potentiometer G212	243



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

00 – Technical data

1 Technical data

1.1 Engine number

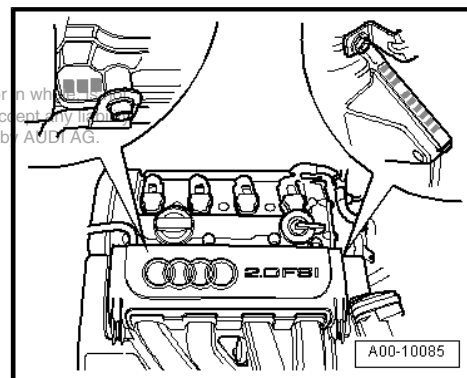
The engine number (including „Engine code“ and „Serial number“) can be found on the left of the joint between engine and gearbox.

The engine code is also stamped on the cylinder head.

The engine number consists of up to nine characters (alphanumeric). The first part (up to 3 code letters) represents the „engine code letters“, the second part (6 digits) the „serial number“. If more than 999 999 engines were produced with the same code letters, the first of the 6 digits is replaced by a letter.

Additionally there is a sticker on the toothed belt cover showing the „engine code“ and „serial number“.

The engine code is also to be found on the vehicle data sticker.



1.2 Engine data

Code letters	AXW	BLX	BLY	BMB	BHD	BLR	BVY	BVZ
Capacity	1.98 4	1.98 4	1.98 4	1.98 4	1.98 4	1.98 4	1.98 4	1.98 4
Power at output	110/ 6000	110/ 6000	110/ 6000	110/ 6000	110/ 6000	110/ 6000	110/ 6000	110/ 6000
Torque	200/ 3500	200/ 3500	200/ 3500	200/ 3500	200/ 3500	200/ 3500	200/ 3500	200/ 3500
Bore	82.5	82.5	82.5	82.5	82.5	82.5	82.5	82.5
Stroke	92.8	92.8	92.8	92.8	92.8	92.8	92.8	92.8
Compression ratio	11.5	11.5	10.5	10.5	10.5	11.5	11.5	11.5
RON	98 ¹⁾	98 ¹⁾	98 ¹⁾	98 ¹⁾	98 ¹⁾	98 ¹⁾	98 ¹⁾	98 ¹⁾
Injection/ignition system	FSI	FSI	FSI	FSI	FSI	FSI	FSI	FSI
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
Knock control	yes	yes	yes	yes	yes	yes	yes	yes
Turbocharging/supercharging	no	no	no	no	no	no	no	no



Code letters	AXW	BLX	BLY	BMB	BHD	BLR	BVY	BVZ
Exhaust gas re-circulation	yes	yes	no	no	no	yes	yes	yes
Intake manifold change-over	yes	yes	yes	yes	yes	yes	yes	yes
Variable valve timing	yes	yes	yes	yes	yes	yes	yes	yes
Secondary air system	no	no	no	no	no	no	no	no

1) Regular unleaded petrol (RON 95) can also be used, but will cause a slight loss of power.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

2 Safety precautions

2.1 Working on the fuel system

When working on the fuel system note the following warnings:



WARNING

The fuel system operates at extremely high pressure. This can cause injury.

- ◆ *The fuel pressure in the high-pressure section of the injection system must be reduced to a residual pressure prior to opening the system.*
- ◆ *Wrap a clean cloth around the connection and carefully loosen the connection to allow the residual pressure to dissipate.*

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Procedure before opening high-pressure section of injection system ⇒ Rep. gr. 24 .

Observe the following to prevent injuries to persons and damage to the injection and ignition system:

- ◆ Always switch off the ignition before connecting or disconnecting electrical wiring for the injection or ignition system or tester cables.
- ◆ Always switch off ignition before washing engine.
- ◆ Faults are stored in engine control units if electrical connectors were unplugged and engine was started: „Generate readiness code“ in „Guided Functions“ ⇒ Vehicle diagnostic tester .



Caution

To prevent irreparable damage to the electronic components when disconnecting the battery:

- ◆ *Observe notes on procedure for disconnecting the battery.*
- ◆ *Always switch off the ignition before disconnecting the battery.*

- Disconnect battery ⇒ Rep. gr. 27 .

2.2 Procedure before opening high-pressure section of injection system



WARNING

- ◆ *The injection system consists of a high-pressure section (maximum approx. 120 bar) and a low-pressure section (approx. 6 bar).*
- ◆ *The fuel pressure in the high-pressure section must be reduced to a residual pressure of approx. 6 bar prior to opening the system. Procedure ⇒ Rep. gr. 24 .*

2.3 Working on the cooling system

When working on the cooling system note the following warnings:



WARNING

Hot steam/hot coolant can escape - risk of scalding.

- ◆ *The cooling system is under pressure when the engine is hot.*
- ◆ *To allow pressure to dissipate, cover filler cap on coolant expansion tank with cloth and open carefully.*



Caution

Overheating can occur if the filler cap is not fitted properly.

- ◆ *The filler cap must engage positively and audibly when it is closed.*

2.4 Using testers and measuring instruments during a road test

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



WARNING

Accidents can be caused if the driver is distracted by test equipment while road-testing, or if test equipment is not properly secured.

Persons sitting in the front passenger's seat could be injured if the airbag is triggered in an accident.

- *The use of test equipment while driving causes distraction.*
- *There is an increased risk of injury if test equipment is not secured.*
- ◆ *Test equipment must always be secured on the rear seat with a strap and operated from the rear seat by a second person.*

2.5 Working on the exhaust system

When working on the exhaust system please note the following:



Caution

Avoid damage to flexible joint.

- ◆ *Do not bend flexible joint more than 10°.*
- ◆ *Install flexible joint so that it is not under tension.*
- ◆ *Take care not to damage wire mesh on flexible joint.*

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

3 General repair instructions

3.1 Rules for cleanliness when working on fuel supply system and injection system

Even small amounts of dirt can cause malfunctions. For this reason, when working on the fuel supply system, the injection system or the turbocharger, please observe the following basic rules carefully:

- ◆ Carefully clean connection points and the surrounding area with engine cleaner or brake cleaner and dry thoroughly before opening.
- ◆ Seal off open lines and connections immediately with suitable sealing caps.
- ◆ Place parts that have been removed on a clean surface and cover them over. Do not use fluffy cloths.
- ◆ Only install clean components; replacement parts should only be unpacked immediately prior to installation. Do not use parts that have been previously unpacked and stored away loose (e.g. in toolboxes, etc.).
- ◆ When the system is open: Do not work with compressed air. Do not move the vehicle unless absolutely necessary.
- ◆ Make sure that no fuel runs onto the fuel hoses. Should this occur, the fuel hoses must be cleaned again immediately.
- ◆ Protect unplugged electrical connectors against dirt and moisture and make sure connections are dry when attaching.

3.2 Routing and attachment of pipes, hoses and wiring

- ◆ Mark fuel lines, hydraulic lines, vacuum lines, lines for activated charcoal filter system and electrical wiring etc. before removal so they can be re-installed in the original positions and correctly connected. Make sketches or take photographs if necessary.
- ◆ To prevent damaging pipes, hoses and wiring, ensure sufficient clearance from all moving or hot components in engine compartment (little space in engine compartment).

3.3 Checking for leaks in the fuel system

- Allow engine to run for several minutes at moderate rpm.
- Switch off ignition.
- Check complete fuel system for leaks.
- If leaks are found although the connections have been tightened to the correct torque, renew the relevant component.
- Road-test vehicle and accelerate with full throttle at least once.
- Then inspect high-pressure section of fuel system again for leaks.

3.4 Foreign particles in engine

- ◆ When working on the engine, all open inlet and exhaust ports must be sealed with suitable plugs (e.g. from engine bung set -VAS 6122-) to prevent foreign particles from entering the engine.

3.5 Checking cylinder bore

Dark or shiny patches on the cylinder wall do not indicate damage to the cylinder bore so long as the cross-hatching is visible.

The cylinder bore should always be measured at three points in the transverse direction and in the longitudinal direction using cylinder gauge -VAS 6078- .

3.6 Contact corrosion!

Contact corrosion can occur if unsuitable fasteners are used (e.g. bolts, nuts, washers, etc.).

For this reason, only fasteners with a special surface coating are used.

Additionally, all rubber and plastic parts and all adhesives are made of non-conductive materials.

Always install new parts if you are not sure whether used parts can be re-fitted ⇒ Electronic parts catalogue .

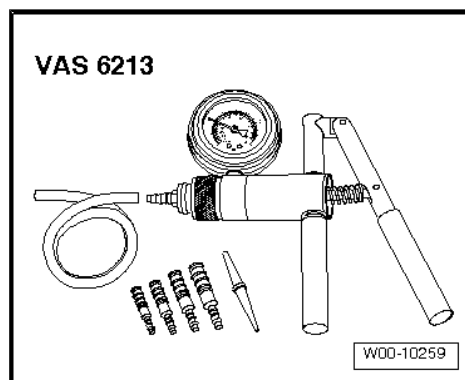
Note the following:

- ◆ We recommend using only genuine replacement parts; these have been tested and are compatible with aluminium.
- ◆ We recommend the use of Audi accessories.
- ◆ Damage caused by contact corrosion is not covered under warranty.

3.7 Checking vacuum system

Special tools and workshop equipment required

- ◆ Hand vacuum pump -VAS 6213-



Procedure

- Check all vacuum lines in the complete vacuum system for:
 - ◆ Cracks
 - ◆ Traces of animal bites
 - ◆ Kinked or crushed lines
 - ◆ Lines porous or leaking
- Check vacuum line to solenoid valve and from solenoid valve to corresponding component.
- If a fault is stored in the memory, check the vacuum lines leading to the corresponding component and also check the remaining vacuum lines in the system.
- If it is not possible to build up pressure with hand vacuum pump -VAS 6213- or if the pressure drops again immediately, check hand vacuum pump and connecting hoses for leaks.

3.8 Installing radiators and condensers

Even when the radiator and condenser are correctly installed, slight impressions may be visible on the fins of these components. This does not mean that the components are damaged. If the fins are only very slightly distorted, this does not justify renewal of the radiator or the condenser.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

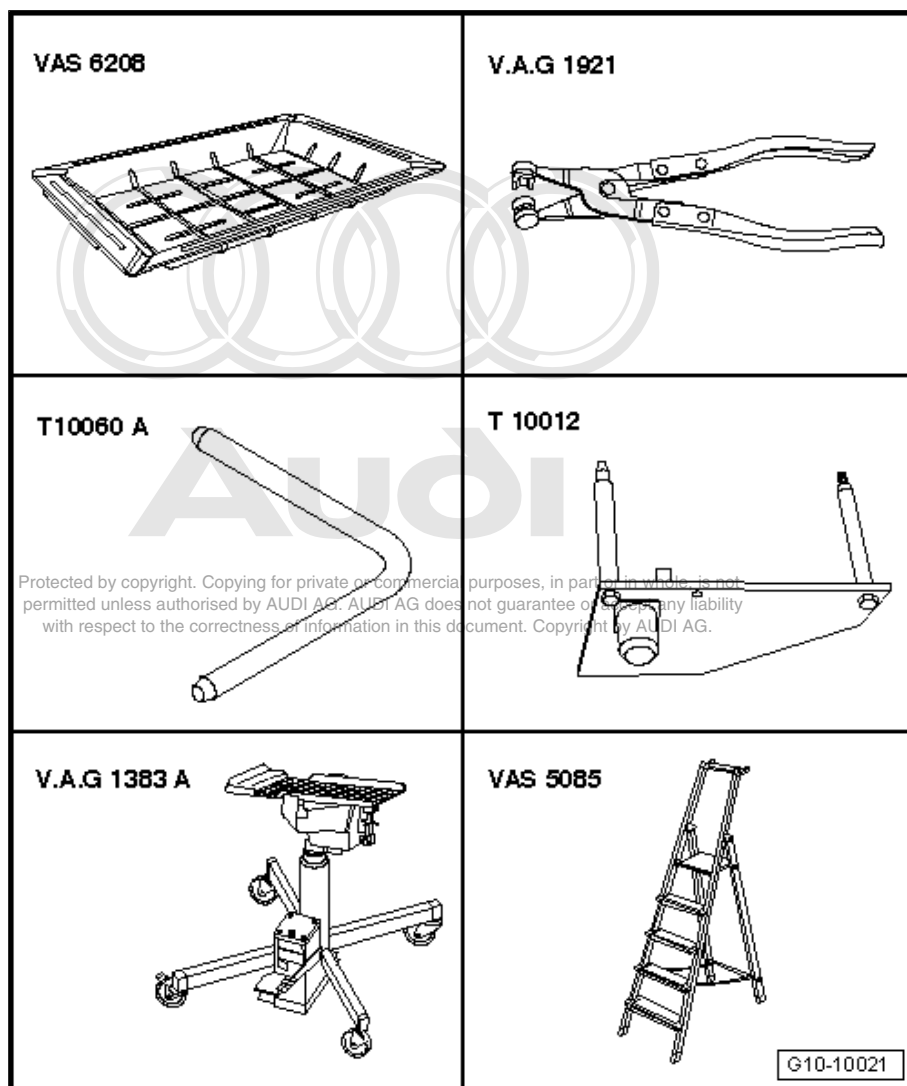
10 – Removing and installing engine

1 Removing and installing engine, detaching from gearbox

1.1 Removing engine

Special tools and workshop equipment required

- ◆ Drip tray for workshop hoist -VAS 6208-
- ◆ Hose clip pliers -V.A.G 1921-
- ◆ Locking pin -T10060 A-
- ◆ Engine bracket -T10012-
- ◆ Engine and gearbox jack - V.A.G 1383 A-
- ◆ Stepladder -VAS 5085-



Note

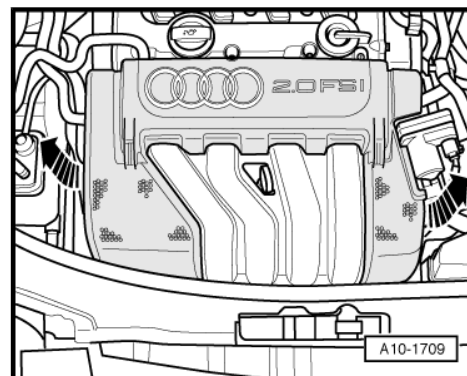
- ◆ The engine is removed from underneath together with the gearbox.
- ◆ Renew all cable ties which are released or cut open when removing the engine. Refit in the same position when installing the engine.
- ◆ Collect drained coolant in a clean container for re-use or disposal.

- Lift off engine cover panel -arrows-.

**WARNING**

Hot steam/hot coolant may escape when opening expansion tank. Cover cap with cloth and open carefully.

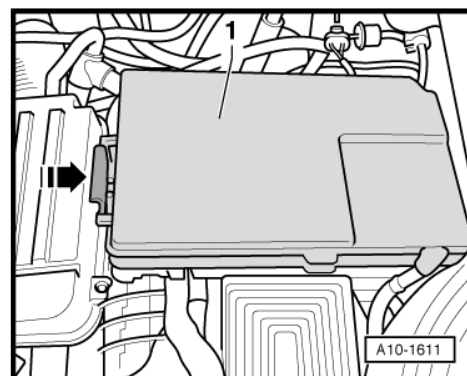
- Open filler cap on coolant expansion tank



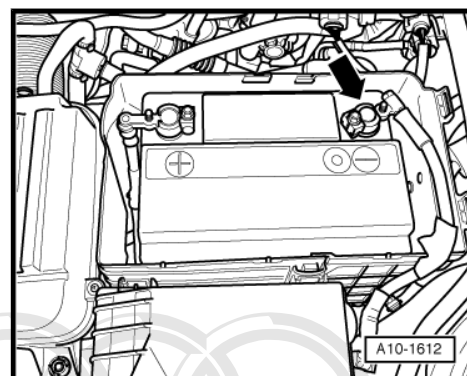
- Remove cover -1- over battery. To do so, press release tab -arrow-.

**WARNING**

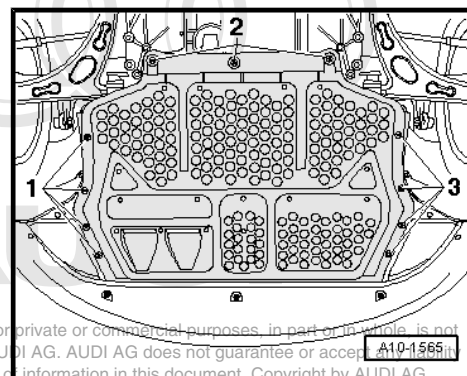
Observe notes on procedure for disconnecting the battery ⇒ Electrical system; Rep. gr. 27.



- With ignition switched off, disconnect battery earth cable -arrow-.
- Remove both front wheels.

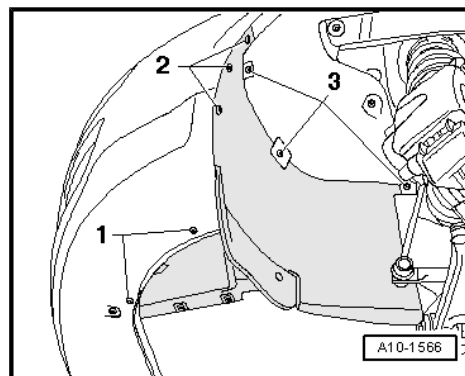


- Remove centre noise insulation - fasteners -1 ... 3-.

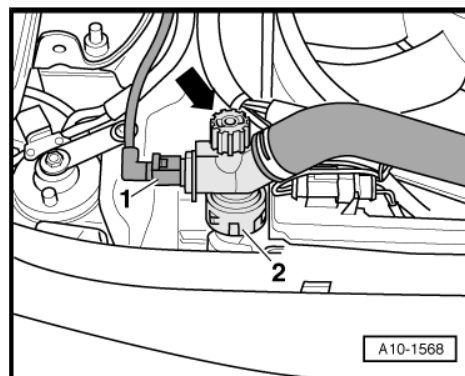


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept responsibility with respect to the correctness of information in this document. Copyright by AUDI AG.

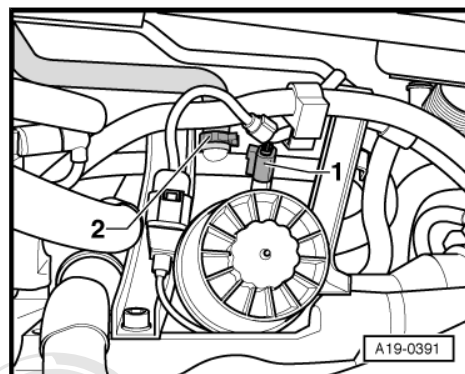
- Remove noise insulation (left and right) - fasteners -1 ... 3-.



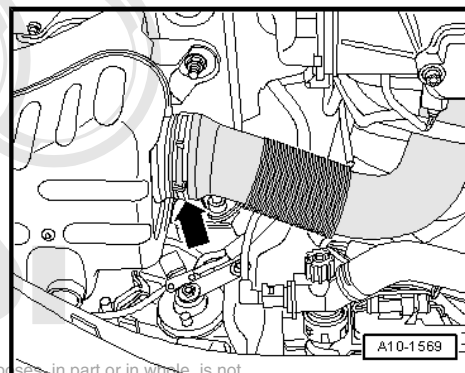
- Unplug electrical connector -1- from coolant temperature sender -G2- - radiator outlet.
- Place drip tray for workshop hoist -VAS 6208- beneath engine.
- Turn drain plug -arrow- on radiator anti-clockwise, if necessary fit drain hose to connection.
- Pull off retaining clip for bottom coolant hose and detach coolant hose -2- from radiator.



- Unplug electrical connector -1- from oil pressure sender.
- Also disconnect bottom coolant hose at coolant pipe -2-, and drain off remaining coolant.

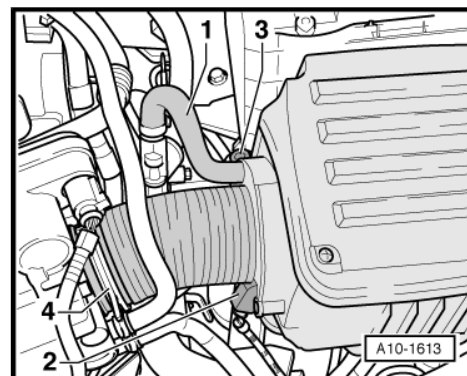


- Disconnect air intake hose -arrow- at bottom of resonator (loosen hose clip using hose clip pliers -V.A.G 1921-).

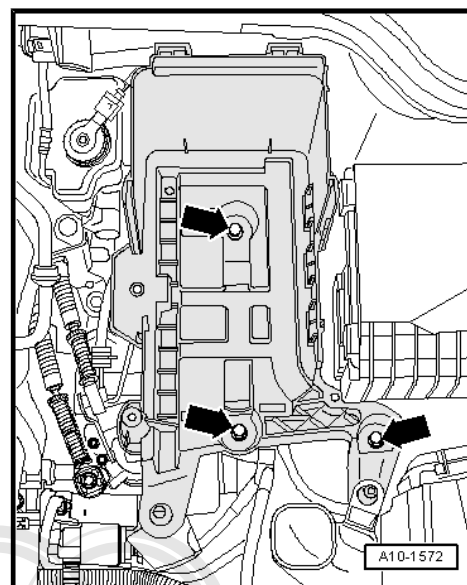


Protected by copyright. Copying for private or commercial purposes in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

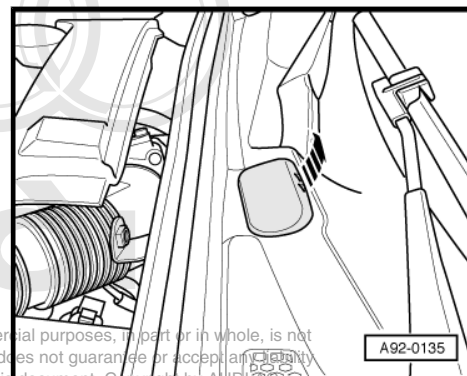
- Detach hose -1- from air cleaner housing.
- Unplug electrical connector -2- from air cleaner housing.
- Remove bolt -3-.
- Disconnect air intake hose -4- from throttle valve unit (loosen hose clip using hose clip pliers -V.A.G 1921-).
- Take out air cleaner housing.
- Disconnect air intake hose between resonator and lock carrier and take out.
- Remove battery ⇒ Electrical system; Rep. gr. 27 .



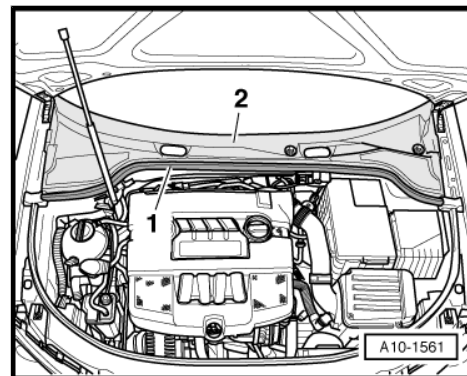
- Remove battery tray -arrows-.
- Detach battery tray from front of air duct.
- Use screwdriver to pry off cover caps on wiper arms and unscrew hexagon nuts.
- Pull wiper arms off wiper shafts and remove.



- Unclip washer jets -arrow-.
- Push washer jets through assembly opening back into plenum chamber, leaving hoses connected.

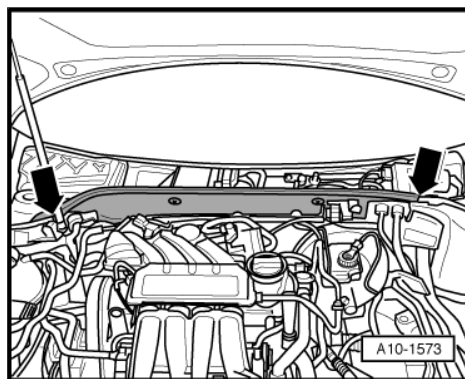


- Pull off rubber seal -1- on plenum chamber cover.
- Detach plenum chamber cover -2-.
- Detach engine wiring harness at rear plenum chamber panel.

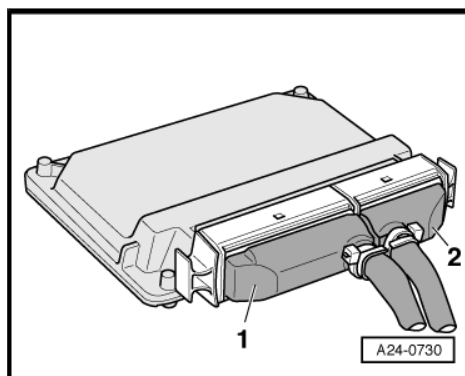


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by Audi AG.

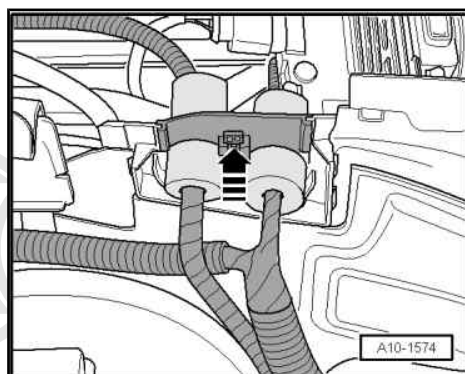
- Remove plenum chamber intermediate plate -arrows-.
- Remove engine control unit ⇒ Rep. gr. 24 .



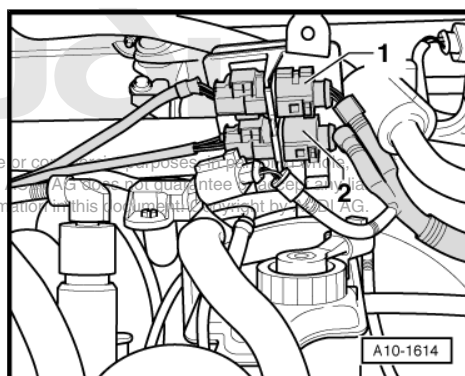
- Unplug engine wiring harness connector -1 and 2-.



- Release wiring protector for engine wiring harness -arrow- and lift off.

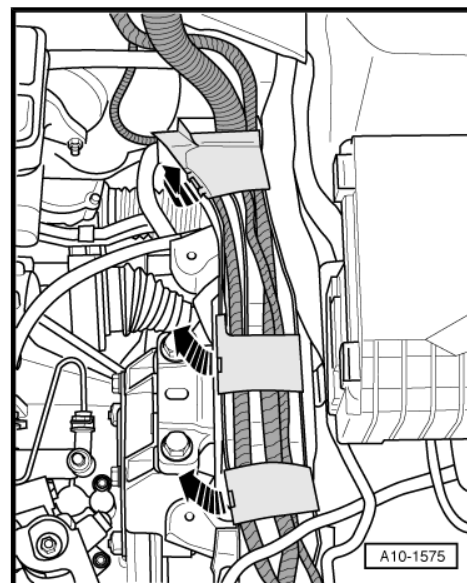


- Remove electrical connector -1- for Lambda probe 2 -G108- (before catalytic converter) from bracket and unplug.
- Remove electrical connector -2- for Lambda probe -G39- (before catalytic converter) from bracket and unplug.

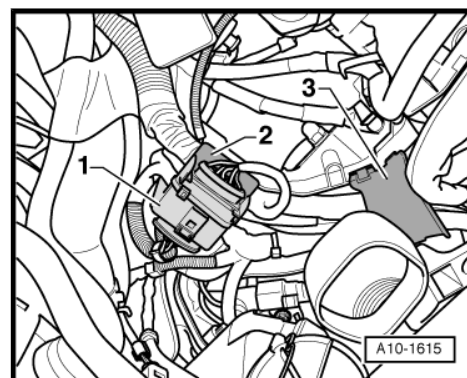


Protected by copyright. Copying for private or commercial purposes without permission is prohibited. Audi AG does not guarantee the accuracy of the information in this document with respect to the correctness of information.

- Open wiring duct brackets -arrows-.



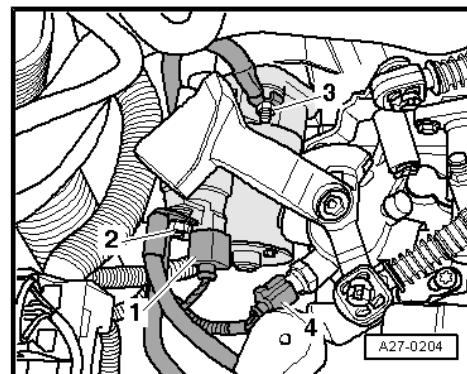
- Move electrical connector -1- clear and unplug connector.
- Open wiring duct bracket located below -2-.
- Open wiring duct bracket -3-.
- Remove engine control unit wiring harness from wiring duct.



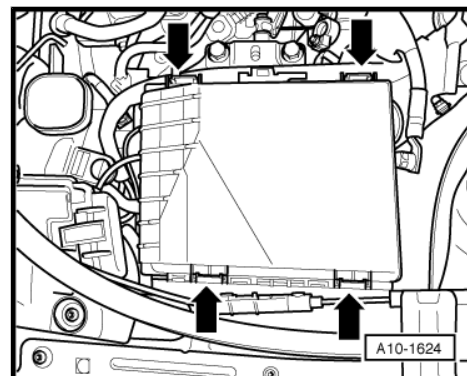
- Unplug electrical connector -4- for reversing light switch.
- Disconnect earth cable -3-.
- Detach wires -1 and 2- at starter.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted without the express written permission of AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

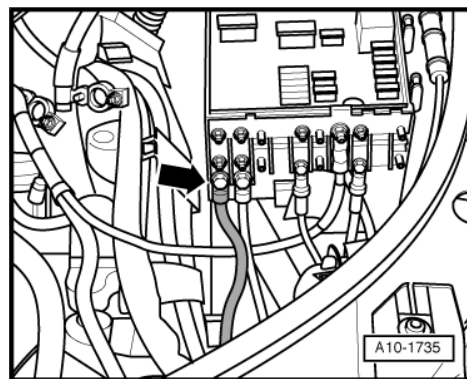
- Move wiring clear.



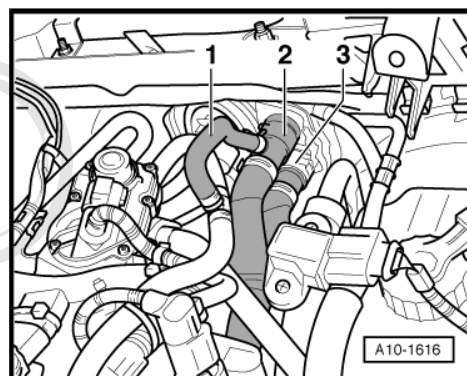
- Remove the cover above the fuse box (press release tabs -arrows-).



- Unscrew the electrical wire -arrow- and move clear up to alternator.



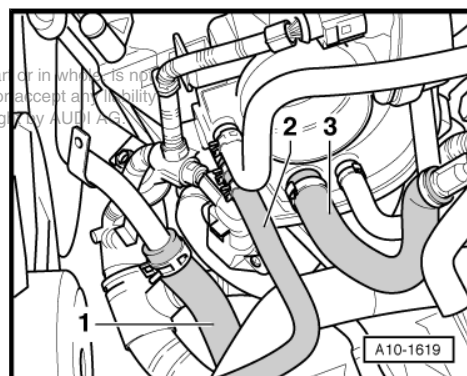
- Detach coolant hose -1-.
- Detach coolant hoses going to heat exchanger at bulkhead -2 and 3-.



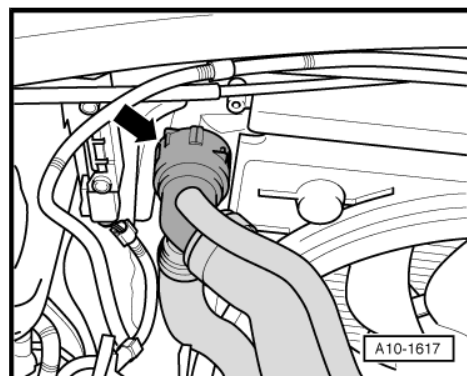
- Detach vacuum hose -3- going to brake servo at intake manifold.

- Disconnect coolant hose -1-.

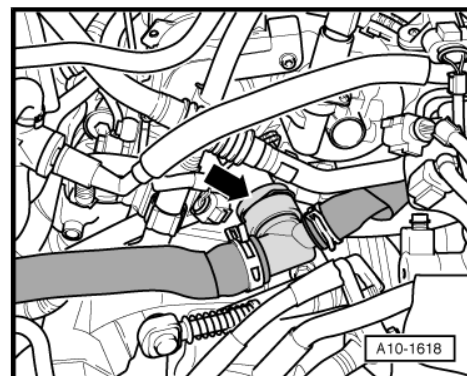
- Disconnect coolant hose -2- going to throttle valve unit.



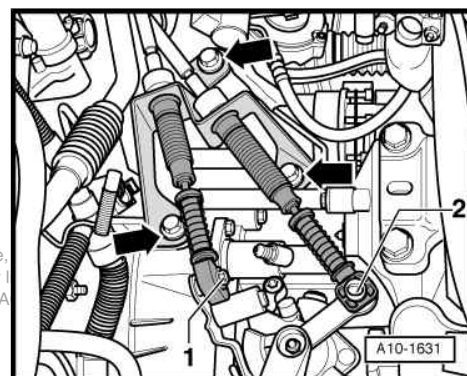
- Detach top coolant hose from radiator -arrow-.



- Disconnect coolant hose -arrow- and remove.



- Unclip securing clips -1- and -2- on both selector cables.
- Pull off selector cable end-pieces from gearbox selector lever and relay lever.
- Detach cable support bracket from gearbox -arrows- and place to one side.



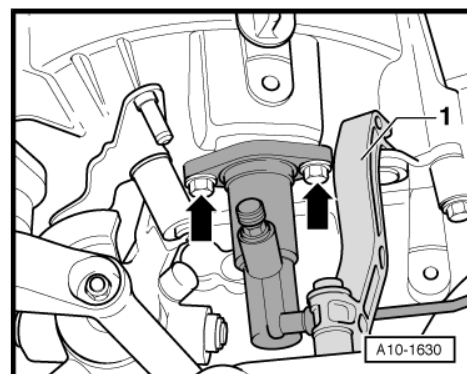
Protected by copyright. Copying for private or commercial purposes, in part or in whole, permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG

- Remove the support -1-.
- Detach slave cylinder -arrows- and place to one side. Do not open pipes.



WARNING

Do not press clutch pedal after removing slave cylinder.

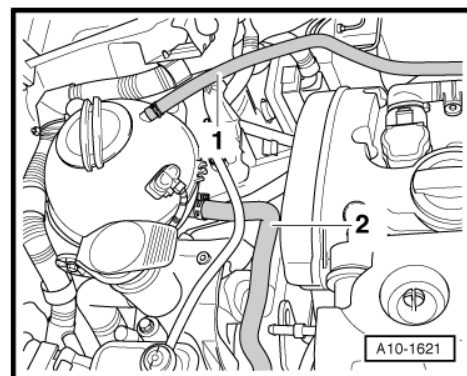


- Disconnect coolant hoses -1 and 2- at expansion tank.



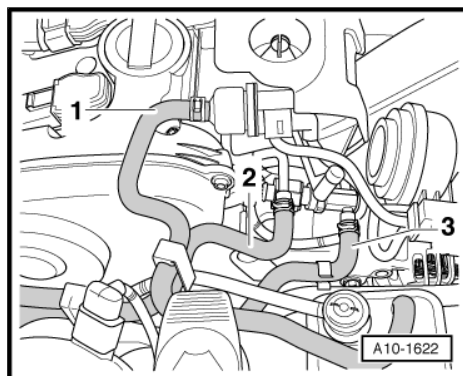
WARNING

The fuel system is pressurised. Wrap a cloth around the connection before opening the system. Then release pressure by carefully loosening the connection.

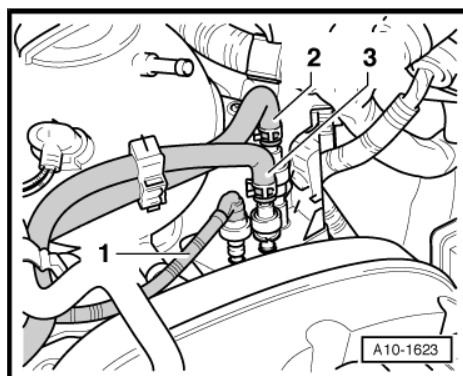


- Mark fuel supply and return lines.

- Detach hose going to activated charcoal filter -1-.
- Disconnect fuel supply line -2- by pulling release tab.
- Disconnect fuel return line -3- by pulling release tab.



- Disconnect vacuum line -1- going to activated charcoal filter by pressing release tab.
- Disconnect fuel supply line -2- by pulling release tab.
- Disconnect fuel return line -3- by pulling release tab.

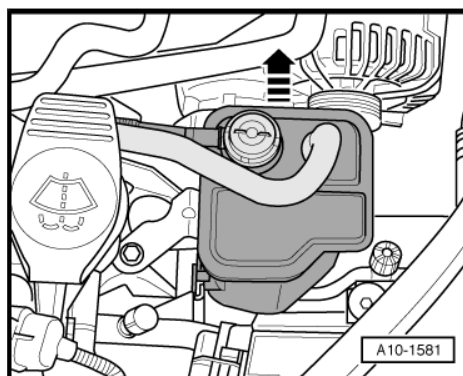


- Lift out activated charcoal filter from retainer with pipes connected -arrow-.

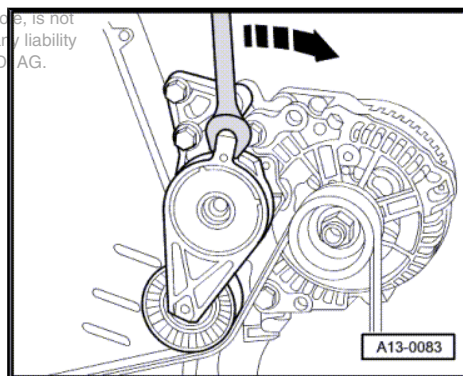


Note

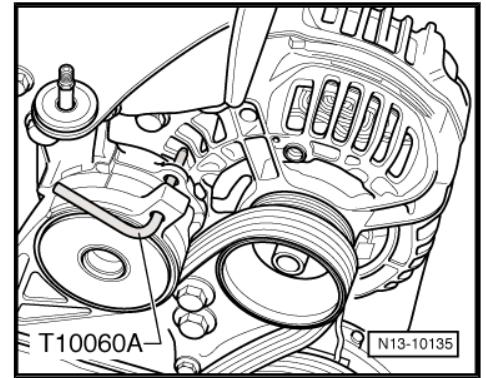
Before removing, mark direction of rotation of poly V-belt with chalk or felt-tip pen. If the belt runs in the opposite direction when it is refitted, this can cause breakage.



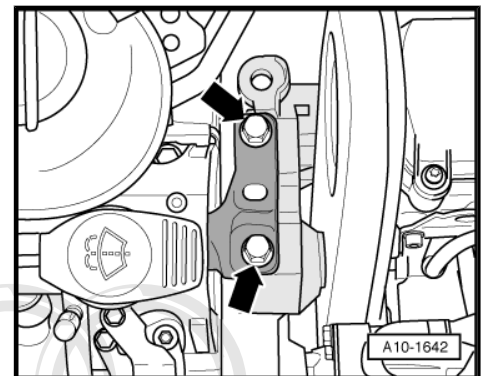
- To slacken poly V-belt, turn tensioner in direction of -arrow-.



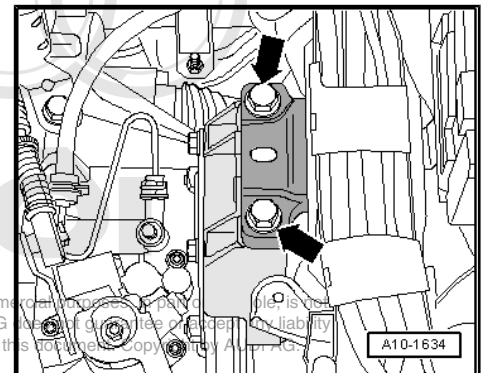
- Lock tensioner in position with locking pin -T10060A- .
- Take off poly V-belt.



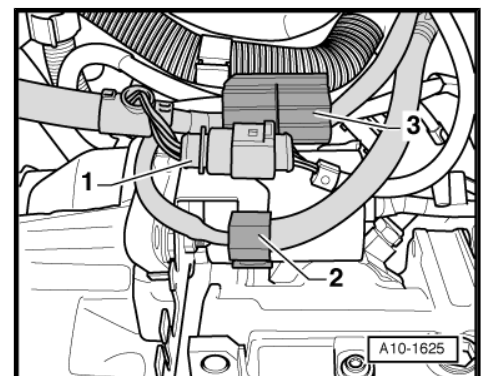
- Loosen bolts -arrows- of assembly mounting for engine approx. 2 turns.



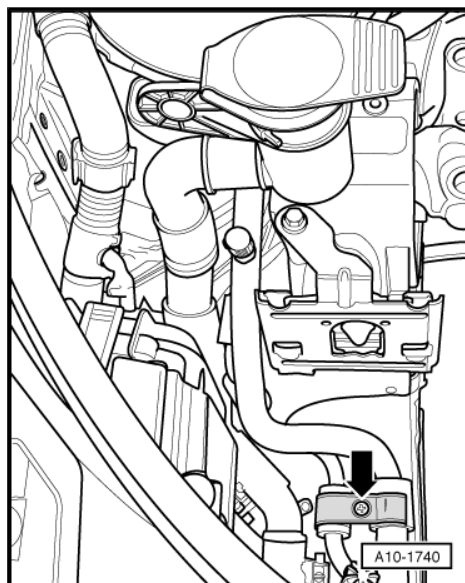
- Loosen bolts -arrows- of assembly mounting for gearbox approx. 2 turns.



- Unplug electrical connector -1-.
- Release cable retainers -2 and 3- and move electrical wiring clear.
- Remove bumper (front) ⇒ General body repairs, exterior; Rep. gr. 63; Front bumper .

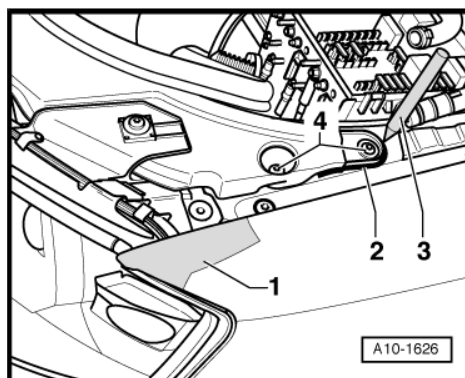


- Detach the refrigerant line bracket at the right longitudinal member -arrow-.

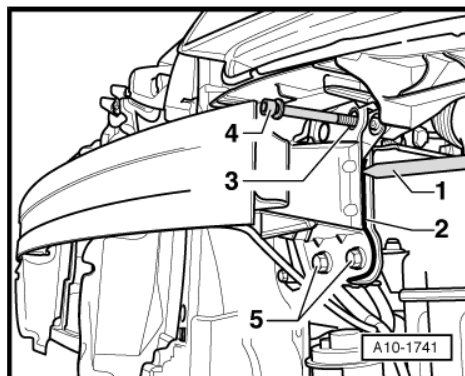


- Tape off the ends of the wing panels (left and right) using adhesive tape -1-.
- Mark the position of the front end on both wing flanges -2- e.g. using a felt-tip pen -3-.
- Remove bolts -4-.

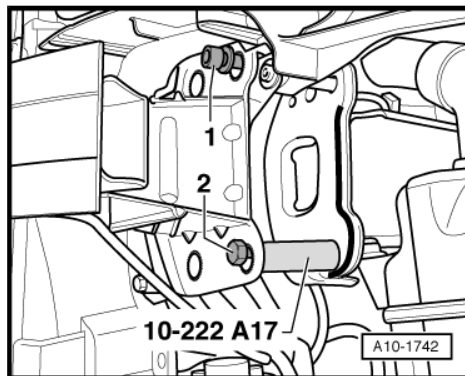
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- Mark the position of the front end -2- on the longitudinal members e.g. using a suitable pen -1-.
- Remove the upper securing bolts -3- of the front end on the left and right and insert long bolts -4- (e.g. M10×120).
- Remove the securing bolts -5- of the front end.



- Carefully pull the front end forward.
- Secure the front end on the left and right with a bolt -2- (e.g. M10×120) and bush 10-222 A17.



WARNING

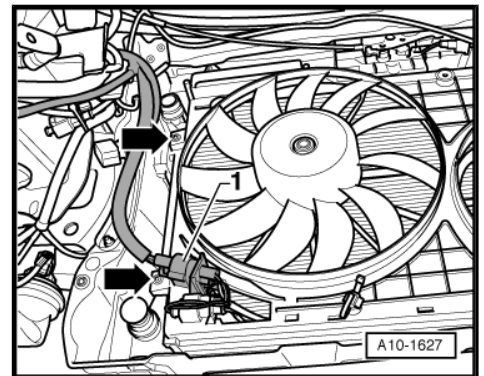
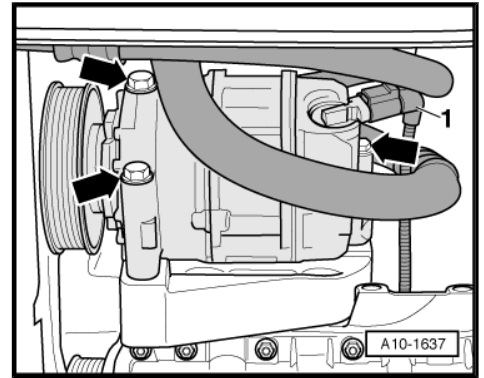
The air conditioner refrigerant circuit must not be opened.

- Unplug electrical connector -1- for magnetic clutch on air conditioner compressor.
- Remove bolts -arrows- for air conditioner compressor.

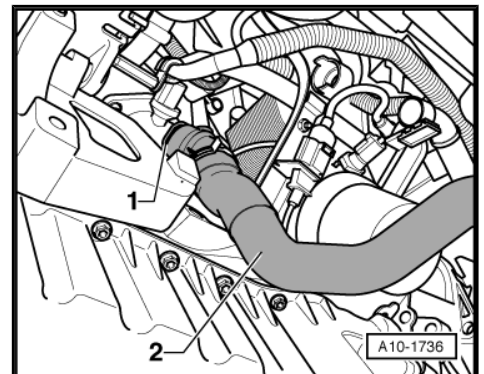
**Note**

To prevent damage to the air conditioner compressor and refrigerant pipes/hoses, ensure that the pipes and hoses are not stretched, kinked or bent.

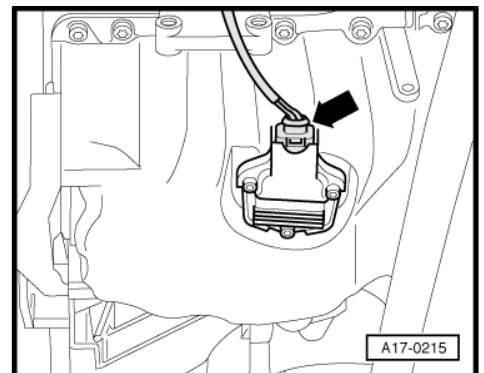
- Tie up air conditioner compressor together with the connected refrigerant hoses to longitudinal member.
- Unplug electrical connector -1-.
- Remove electric fan with radiator cowl (unscrew bolts on left and right -arrows-).



- Remove coolant hose -2- (pull out retaining clip -1-).



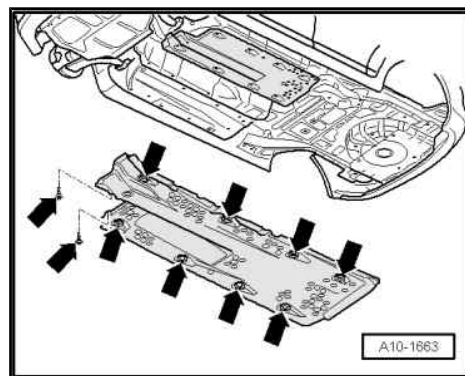
- Unplug electrical connector at oil level sender -arrow-.



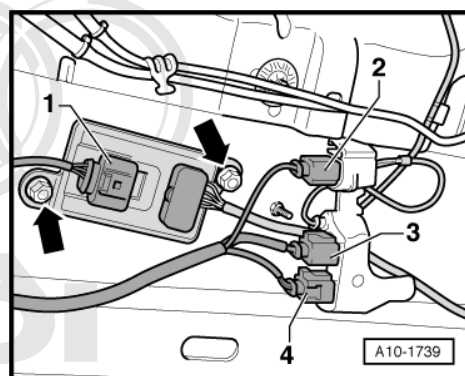
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Remove underbody cover (right-side) -arrows-.

Engine code AXW, BLX:



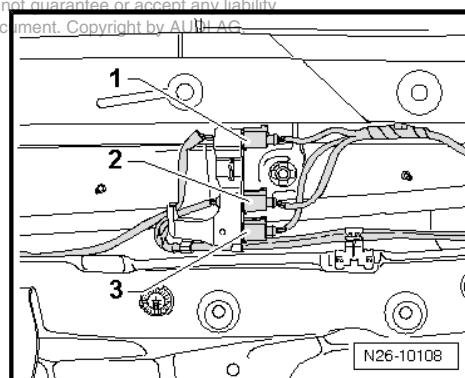
- Unplug electrical connector -1- from NOx sensor control unit -J583- .
- Detach NOx sensor control unit -J583- -arrows- and move wiring with control unit clear.
- Unplug electrical connector -2- for exhaust gas temperature sender 1 -G235- and move wiring clear.
- Unplug electrical connector (black) -3- for Lambda probe after catalytic converter -G130- and move wiring clear.
- Unplug electrical connector (brown) -4- for Lambda probe 2 after catalytic converter -G131- and move wiring clear.



Engine code BHD, BMB, BLR, BLY:

- Unplug electrical connectors for Lambda probes

All vehicles (continued):

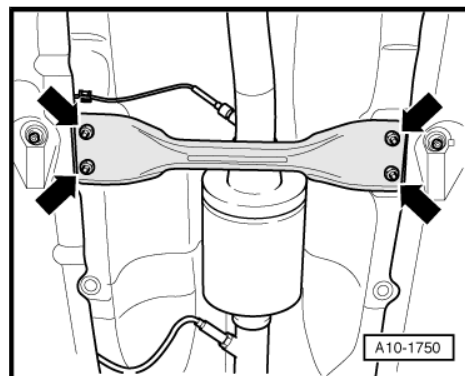


- Remove front cross-piece for underbody -arrows-.

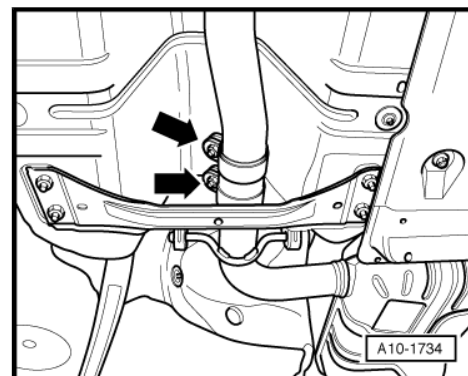


Note

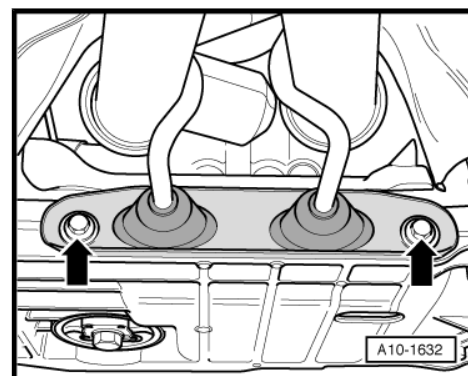
To avoid damage, the flexible joints in the front exhaust pipe must not be bent more than 10°.



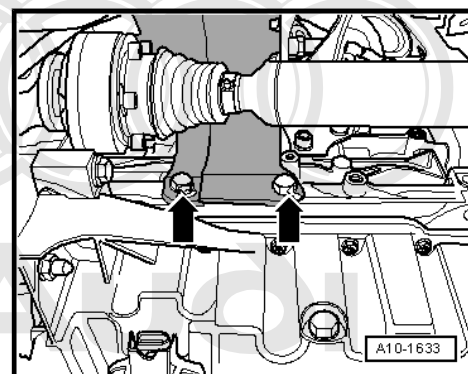
- Separate exhaust system at clamp -arrows-.



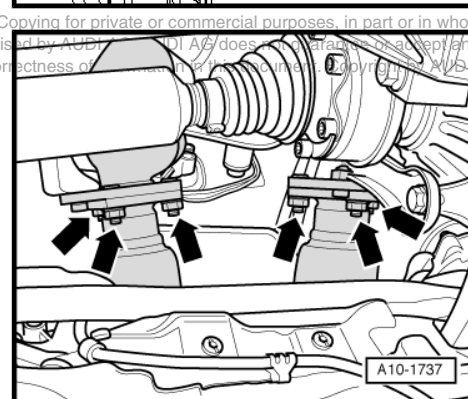
- Unbolt bracket for exhaust system -arrows-.



- Unbolt heat shield for drive shaft (right-side) -arrows-.



- Remove securing nuts -arrows- on front exhaust pipe/exhaust manifold.
- Remove front exhaust pipe.
- Unbolt drive shafts (left and right) from gearbox flanges.
- Tie up the left drive shaft.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted without the prior written authorisation of AUDI AG. AUDI AG does not accept any liability with respect to the correctness of the content of this document. Copyright © AUDI AG.

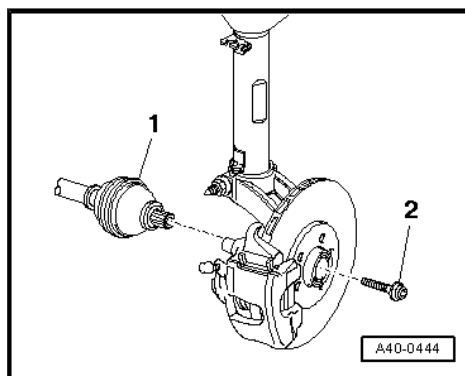
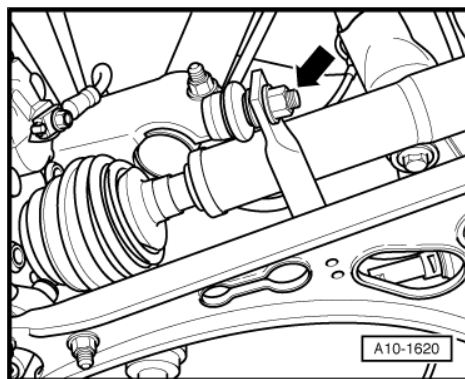
- Detach coupling rod from anti-roll bar -arrow-.



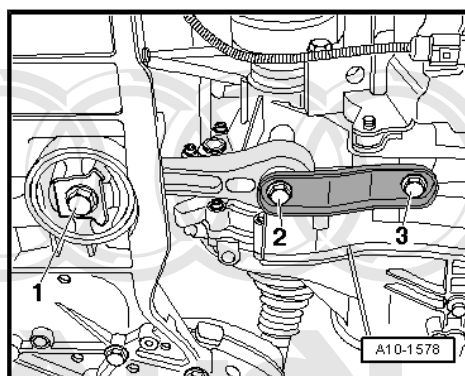
WARNING

The wheel bearing must not be under load when loosening the drive shaft flange bolt (vehicle must not be standing on its wheels).

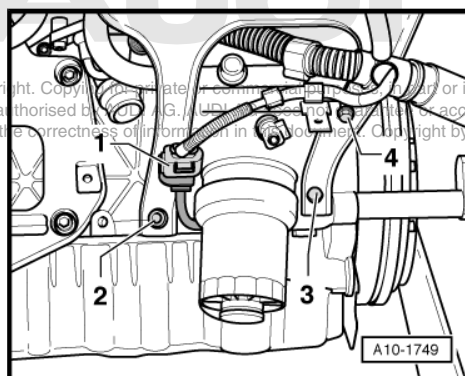
- Have a second mechanic press the brake pedal.
- Unscrew flange bolt -2- from drive shaft (right-side).
- Remove drive shaft (right-side).



- Unscrew bolts -1 and 3- and remove pendulum support.

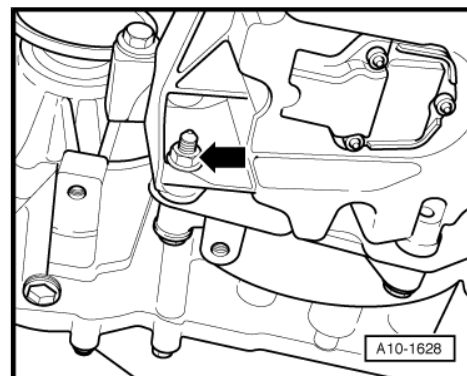


- Detach electrical connector -1- from bracket.
- Remove bolts -1 and 3-.



Protected by copyright. Copying, translating, communicating to the public or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

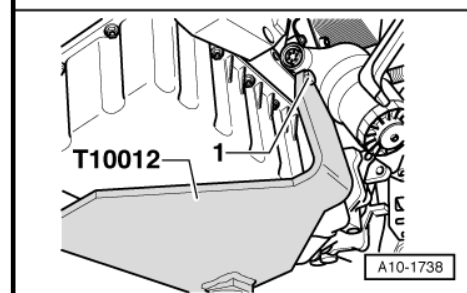
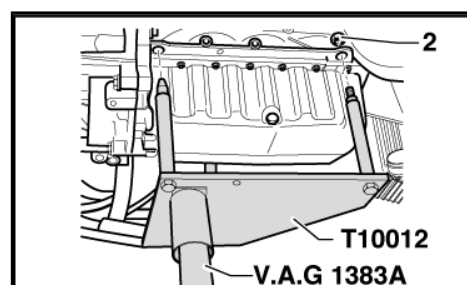
- Remove bolt -arrow-.



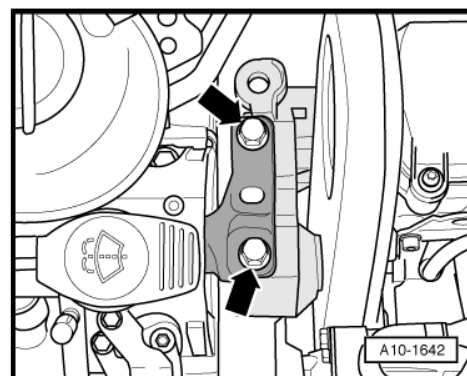
- Bolt engine bracket -T10012- with securing bolt -1- and nut -2- to cylinder block (tightening torque: approx. 20 Nm).
- Insert engine and gearbox jack -V.A.G 1383 A- in engine bracket -T10012- and raise engine slightly.

**Note**

To unscrew bolts for assembly mounting use stepladder -VAS 5085-.



- Remove bolts -arrows- of assembly mounting on engine.



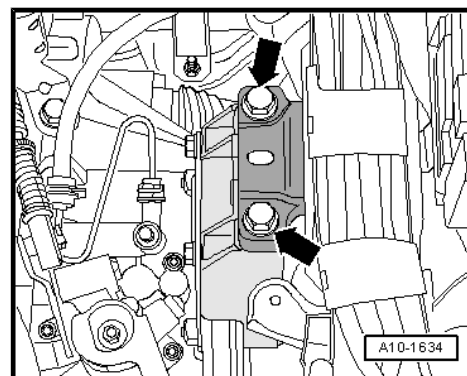
- Remove bolts -arrows- of assembly mounting for gearbox.

**Note**

Copying for private or commercial purposes, in part or in whole, is not permitted without the express written authorisation of AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- ◆ Check that all hoses, pipes and wiring connections between engine, gearbox and body have been detached.
- ◆ Carefully guide engine/gearbox assembly when lowering to avoid damage.

- Pull engine/gearbox assembly as far forward as possible, and lower gradually.



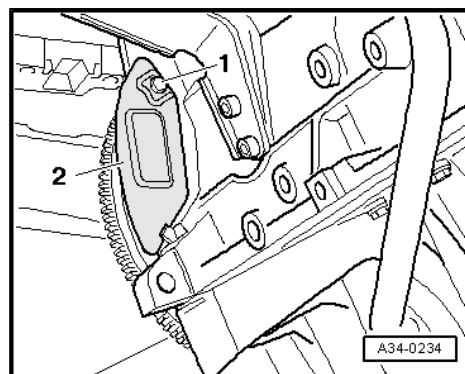
1.2 Separating engine and gearbox

- Engine/gearbox assembly removed and attached to engine bracket -T10012- .
- Unscrew bolt -1- with gearbox installed.
- Pull up cover plate -2- and remove.



Note

Shown in illustration with gearbox removed.



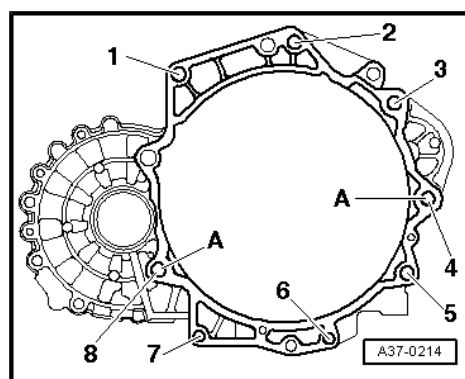
- Remove bolts -1 ... 8- on engine/gearbox flange.
- Detach starter.



Note

The manual gearbox can be detached from the engine without a workshop hoist, a 2nd mechanic is required for this purpose.

- Separate gearbox from engine.



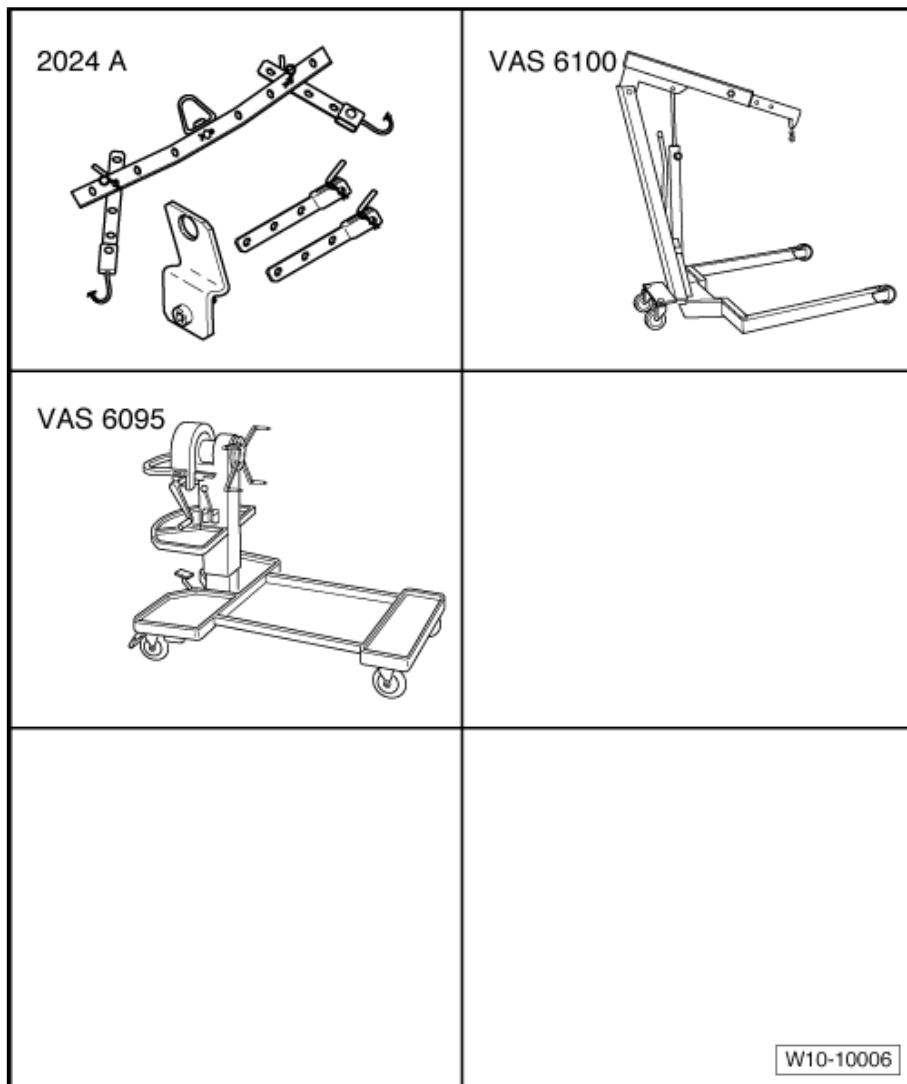
1.3 Securing engine to assembly stand



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Special tools and workshop equipment required

- ◆ Lifting tackle -2024 A-
- ◆ Workshop hoist -VAS 6100-
- ◆ Engine and gearbox support -VAS 6095-



- Gearbox detached from engine.
- Detach crankcase breather hose from oil filler neck.
- Engage lifting tackle -2024 A- on engine and workshop hoist -VAS 6100-.



Note

To adjust to the centre of gravity of the assembly, the perforated rails of the support hooks must be positioned as shown.

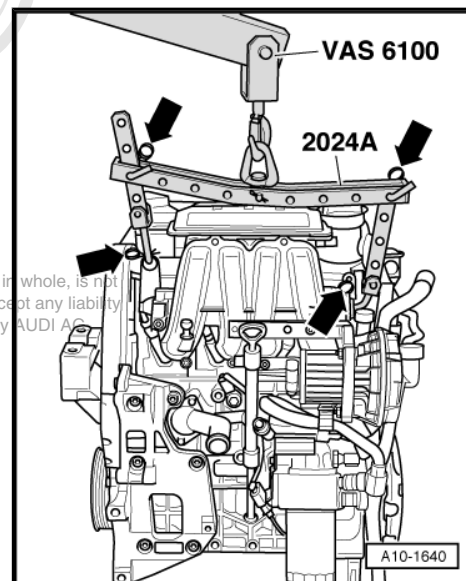


WARNING

The support hooks and locating pins on the lifting tackle must be secured with locking pins (arrows in illustration).

- Lift engine off engine bracket -VAS 6100- using workshop hoist -T10012-.

Secure engine to engine and gearbox support -VAS 6095- when dismantling/assembling engine.



1.4 Installing engine

- Engine attached to engine bracket -T10012-

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



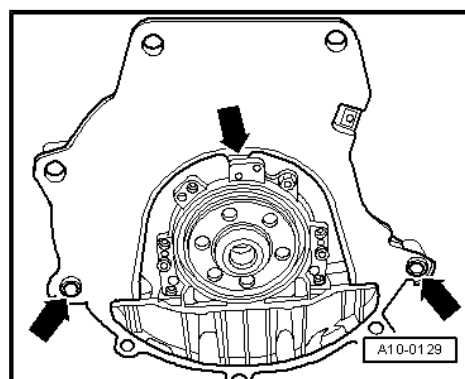
Note

- ◆ Reinstall all cable ties in the same locations when assembling.
 - ◆ Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ Parts catalogue .
 - ◆ Renew self-locking nuts and bolts when performing assembly work.
 - ◆ Renew bolts which are tightened to a specified angle as well as oil seals and gaskets.
 - ◆ Clean input shaft splines and (in the case of used clutch plates) the hub splines. Remove corrosion and apply only a very thin coating of grease G 000 100 to the splines. Then move clutch plate back and forth on input shaft until the hub moves smoothly on the shaft. Remove any excess grease.
- Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability for this document. Copyright by AUDI AG.
- Check that dowel sleeves for centralising engine/gearbox are fitted in cylinder block, and install if necessary.
 - Ensure that the intermediate plate is engaged on the sealing flange and pushed onto the dowel sleeves -arrows-.
 - Make sure that clutch plate is centred properly ⇒ 6-speed manual gearbox 02S; Rep. gr. 30 .
 - Check clutch release bearing for wear; renew if necessary.
 - Bolt gearbox to engine.



Note

- ◆ Tightening torques apply only to lightly greased, oiled, phosphated or black-finished nuts and bolts.
- ◆ Additional lubricant such as engine oil or gearbox oil may be used, but do not use lubricant containing graphite.
- ◆ Do not use degreased parts.
- ◆ Tolerance for tightening torques: 10%.

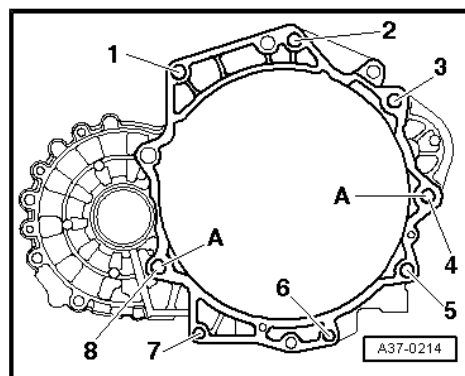


Securing engine to gearbox

Item	Bolt	Nm
1, 2	M12×65	80
3 ¹⁾ , 4 ¹⁾	M12×135	80
5 ... 7	M10×60	40
8	M12×90	65

- ¹⁾ Bolt with M8 threaded pin

A: Centring sleeves

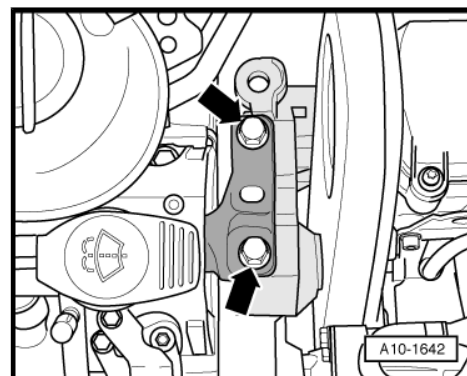
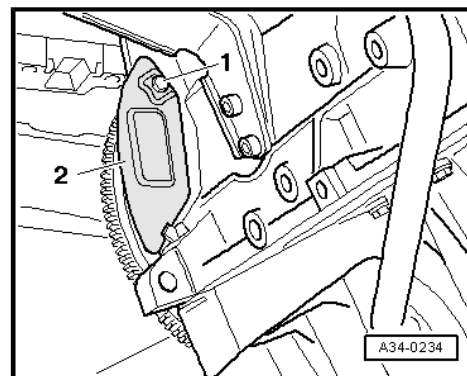


- Push in deflector plate -2- in such a way that the lower lug engages into the cylinder block and secure on top with bolt -1-.

**Note**

Shown in illustration with gearbox removed.

- Guide engine/gearbox assembly into the body.
- Tighten bolts -arrows- of assembly mounting for engine initially hand-tight.

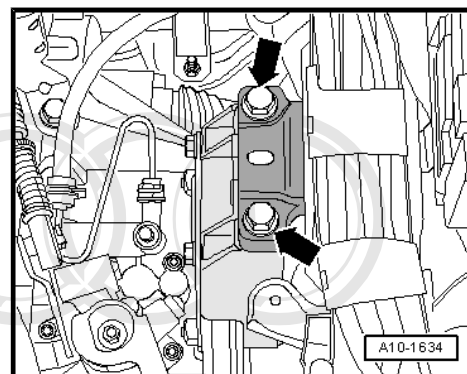


- Tighten bolts -arrows- of assembly mounting for gearbox initially finger-tight.
- Use new securing bolts.

**Note**

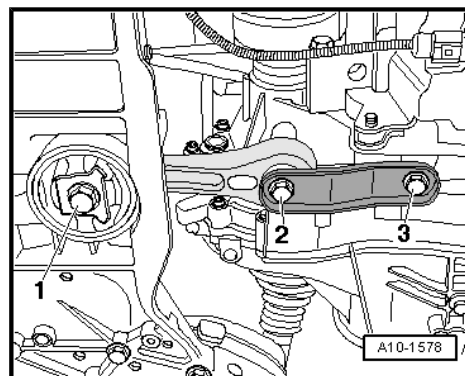
The bolts are tightened to final torque only after adjusting the engine mountings ⇒ [page 30](#).

- Remove engine bracket -T10012- from engine.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Secure pendulum support to gearbox and subframe -1...3-.
- Install drive shafts ⇒ Running gear, front-wheel drive and four-wheel drive; Rep. gr. 40 .
- Install exhaust system and align it free of stress
⇒ [page 240](#) .
- Install air conditioner compressor ⇒ Air conditioning; Rep. gr. 87 .
- Install hydraulic clutch slave cylinder ⇒ 6-speed manual gearbox 02S; Rep. gr. 30; Servicing clutch mechanism .
- Install selector mechanism on gearbox and adjust ⇒ 6-speed manual gearbox 02S; Rep. gr. 34; Servicing selector mechanism .
- To facilitate positioning of alternator, drive back bushes for securing bolts slightly.
- Install alternator ⇒ Electrical system; Repair group 27 .
- Install poly V-belt ⇒ [page 41](#) .
- Adjust engine mountings ⇒ [page 30](#) .
- Electrical connections and routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Install wiper arms ⇒ Electrical system; Rep. Gr. 92 .
- Install battery ⇒ Electrical system; Rep. gr. 27 .
- Bleed fuel system ⇒ Motronic direct injection and ignition system (4-cylinder); Rep. Gr. 24; Servicing fuel injection system .
- Check oil level.
- Fill up with coolant ⇒ [page 190](#) .



Note

- ◆ *Drained-off coolant may only be used again if the original cylinder head and cylinder block are re-installed.*
- ◆ *Contaminated or dirty coolant must not be used again.*



WARNING

Never use battery charging equipment for boost starting. There is danger of damaging the vehicle's control units.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Tightening torques

Component		Nm
Bolts/nuts	M6	10
	M8	20
	M10	45
	M12	65
Except for the following:		
Pendulum support to gearbox		40 + 90° 1) 2)
Pendulum support to subframe		100 + 90° 1) 2)
Air-conditioner compressor to bracket for ancillaries		25
Terminal B+ to starter		16
Earth wire to gearbox		23

- 1) 90° = a quarter of a turn
- 2) Renew nuts/bolts



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

2 Assembly mountings

2.1 Assembly mountings - exploded view

1 - Gearbox support

- ☐ Illustration shows version for dual clutch gearbox

2 - Bolt

- ☐ Gearbox support to gearbox
- ☐ Tightening torque ⇒ Rep. gr. 34

3 - Bolt

- ☐ Gearbox support to gearbox
- ☐ Tightening torque ⇒ Rep. gr. 34

4 - Engine mounting

5 - Bolt

- ☐ Engine mounting to body
- ☐ Renew
- ☐ 40 Nm + turn 90° further

6 - Bracket for activated charcoal filter

7 - Bolt

- ☐ 9 Nm

8 - Nut

- ☐ 9 Nm

9 - Bolt

- ☐ Connecting bracket to body
- ☐ Renew
- ☐ 20 Nm + turn 90° further

10 - Bolt

- ☐ Connecting bracket to engine mounting
- ☐ Renew
- ☐ 20 Nm + turn 90° further

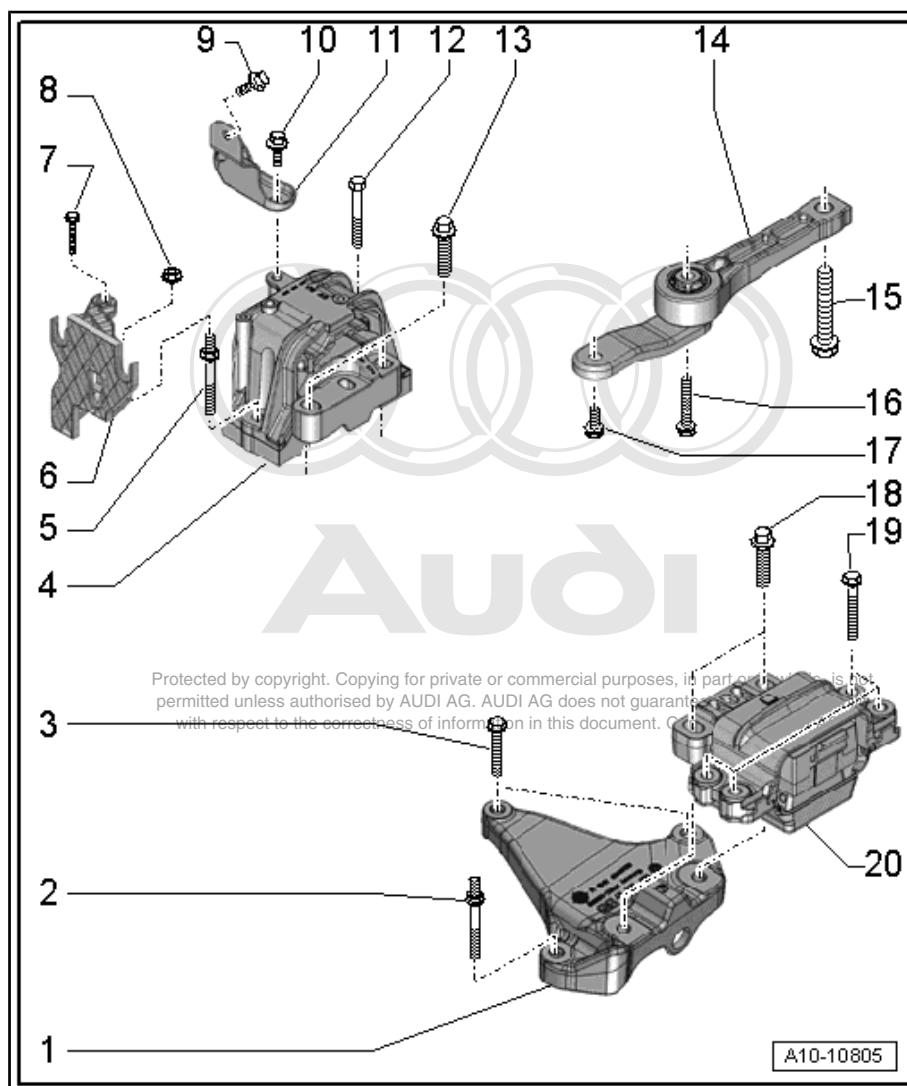
11 - Connecting bracket

12 - Bolt

- ☐ Engine mounting to body
- ☐ Renew
- ☐ 40 Nm + turn 90° further

13 - Bolt

- ☐ Engine mounting to timing chain cover
- ☐ Renew
- ☐ 60 Nm + turn 90° further



14 - Pendulum support**15 - Bolt**

- ☐ Pendulum support to subframe
- ☐ Renew
- ☐ 100 Nm + turn 90° further

16 - Bolt

- ☐ Pendulum support to gearbox
- ☐ Renew
- ☐ 40 Nm + turn 90° further

17 - Bolt

- ☐ Pendulum support to gearbox
- ☐ Renew
- ☐ 40 Nm + turn 90° further

18 - Bolt

- ☐ Gearbox mounting to gearbox support
- ☐ Tightening torque ⇒ Rep. gr. 34

19 - Bolt

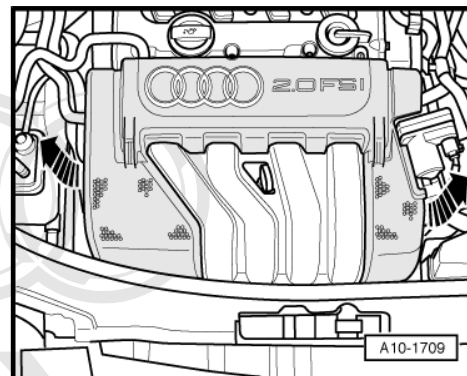
- ☐ Gearbox mounting to body
- ☐ Tightening torque ⇒ Rep. gr. 34

20 - Gearbox mounting

- ☐ Illustration shows version for dual clutch gearbox

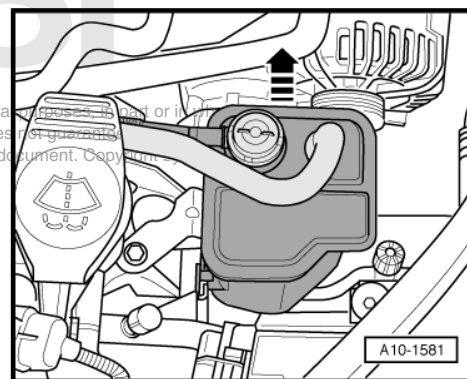
2.2 Checking adjustment of assembly mountings (engine/gearbox mountings)

- Remove engine cover panel -arrows-.



- Lift out activated charcoal filter from retainer -in direction of arrow- with pipes connected and lay aside.

The following specifications must be obtained:



Protected by copyright. Copying for private or commercial purposes without or if not permitted unless authorised by AUDI AG. AUDI AG does not guarantee the correctness of information in this document. Copyright

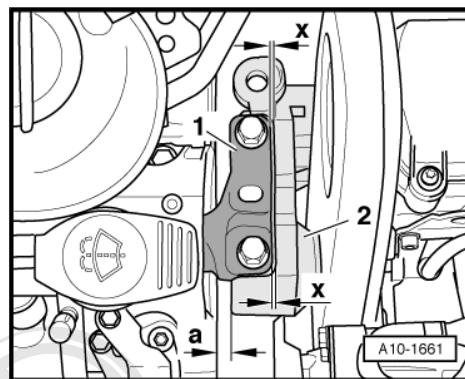
- ◆ There must be a distance of $-a-$ = 16 mm between engine support -1- and longitudinal member (right-side).
- ◆ The side of the engine support casting -2- must be located parallel to the support arm -1- (dimension x = dimension x).



Note

Distance a = 16 mm can also be checked with e.g. a suitable cylindrical bar.

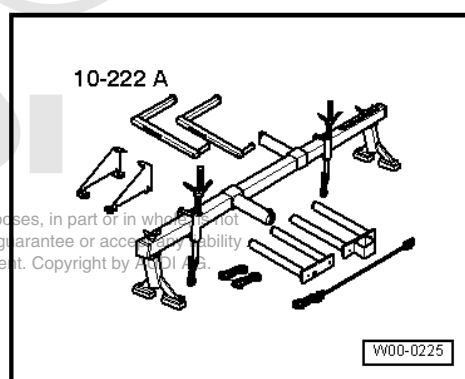
If the distance measured is too large or small, the assembly mountings must be adjusted ⇒ [page 32](#) .



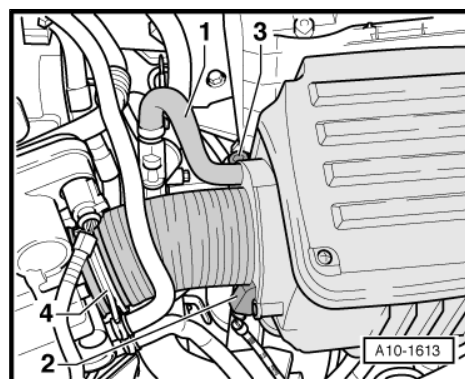
2.3 Adjusting assembly mountings

Special tools and workshop equipment required

- ◆ Support bracket -10 - 222 A-



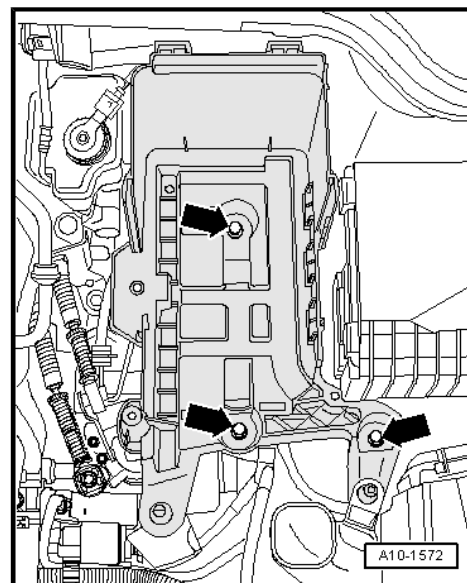
- Detach hose -1- from air cleaner housing.
- Unplug electrical connector -2- from air cleaner housing.
- Remove bolt -3-.
- Disconnect air intake hose -4- from throttle valve unit (loosen hose clip using hose clip pliers -V.A.G 1921-).
- Take out air cleaner housing.
- Remove battery ⇒ Electrical system; Rep. gr. 27 .



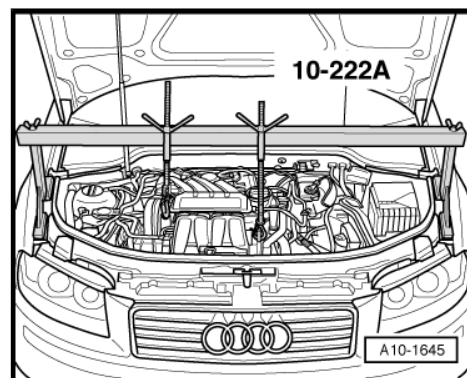
- Remove battery tray -arrows-.
- Detach battery tray from front of air duct.

Audi

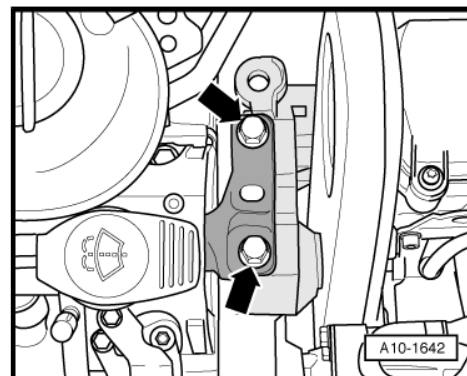
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



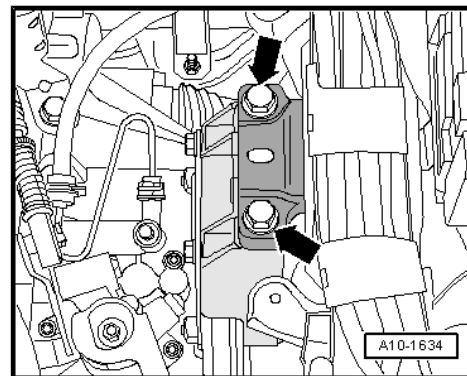
- Position support bracket -10 - 222 A- on bolted flanges of wing panels. The spindles face forwards.
- Detach crankcase breather hose from oil filler neck.
- Attach hooks of spindles with shackles -10 - 222 A /12- to the lifting eyes.
- Take up weight of engine evenly with both spindles (but do not raise engine).



- Unscrew and renew all bolts -arrows- on engine assembly mounting one at a time (if not already renewed when engine was installed) and screw bolts in loosely.



- Unscrew and renew all bolts -arrows- on gearbox assembly mounting one at a time (if not already renewed when engine was installed) and screw bolts in loosely.



- Using a tyre iron, adjust engine between support arm -1- and engine support -2- until the specifications listed below are obtained:
- ◆ There must be a distance of -a- = 16 mm between engine support -2- and longitudinal member (right-side).
- ◆ The side surface of the engine support casting -2- must be aligned parallel to the support arm -1- (dimension x = dimension x).



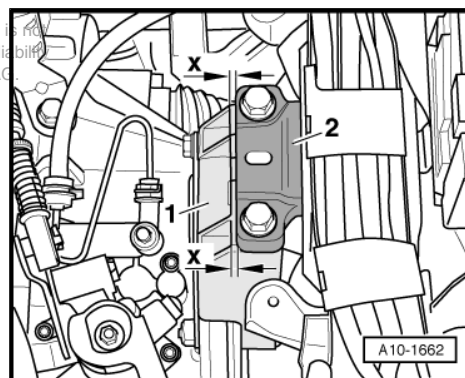
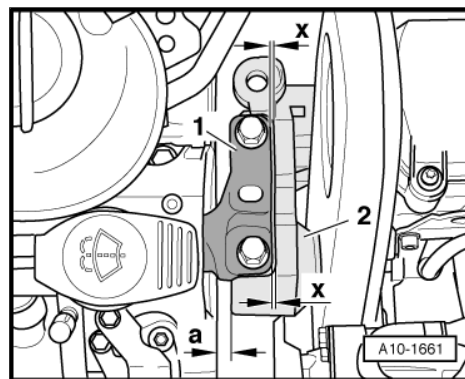
Note

Distance a = 16 mm can also be checked with e.g. a suitable cylindrical bar.

- Tighten bolts for assembly mounting (engine side) to 60 Nm + 90°.
- Ensure that the edges of the support arm (on the gearbox assembly mounting) -2- and gearbox support -1- are parallel.
- Tighten bolts for assembly mounting (gearbox side) to 60 Nm + 90°.

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

- Install battery ⇒ Electrical system; Rep. gr. 27 .



3 Overview of fitting locations

1 - Activated charcoal filter solenoid valve 1 -N80-

2 - Motronic control unit -J220-

3 - Exhaust gas recirculation valve -N18- with exhaust gas recirculation potentiometer - G212-

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright © AUDI AG

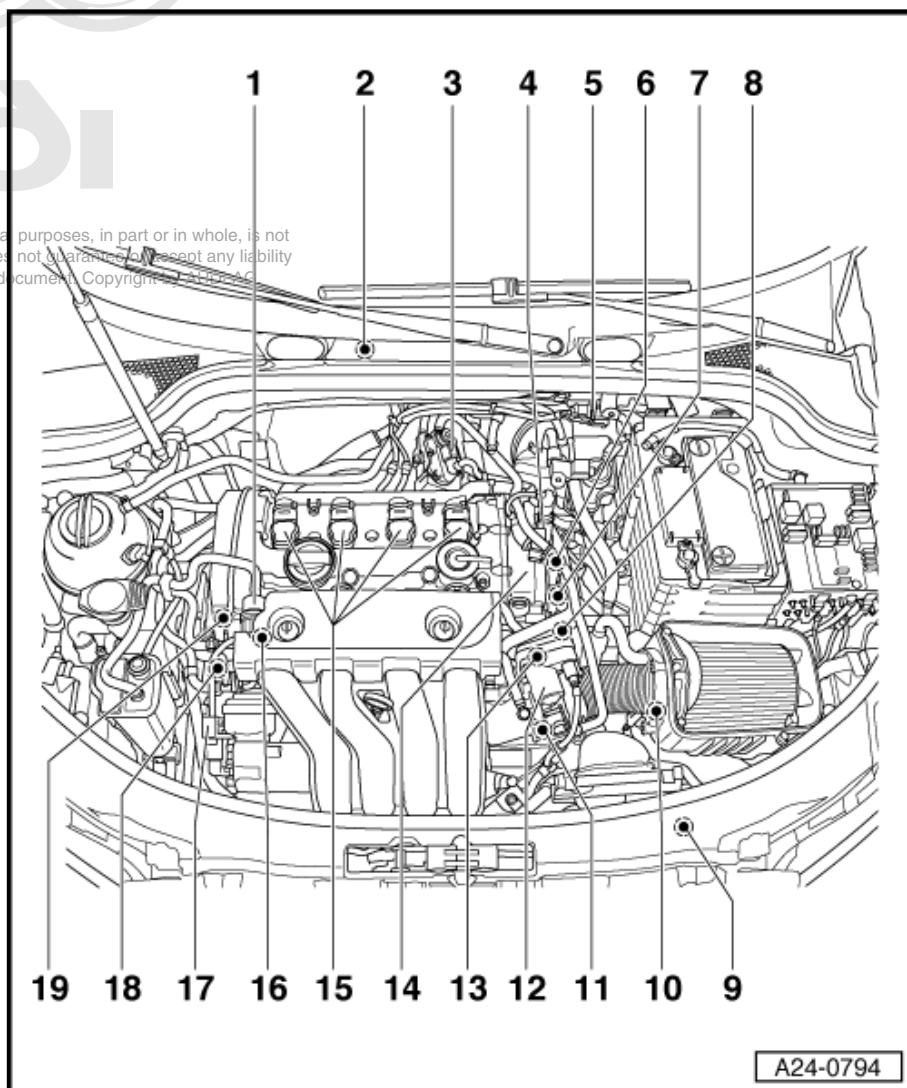
4 - Camshaft control valve 1 - N205-

☐ → [page 37](#)

5 - 6-pin connector

☐ For Lambda probe - G39- before catalytic converter and Lambda probe heater -Z19- (black)

☐ For Lambda probe II - G108- before catalytic converter and Lambda probe heater 2 -Z28-



(brown)

- ☐ ⇒ [page 37](#)

6 - Coolant temperature sender -G62- (4-pin)

- ☐ ⇒ [page 37](#)

7 - Fuel pressure regulating valve -N276-

- ☐ ⇒ [page 37](#)

8 - Single-plunger high-pressure pump

9 - Coolant temperature sender - radiator outlet -G83-

- ☐ ⇒ [page 38](#)

10 - Intake air temperature sender II -G299-

- ☐ ⇒ [page 37](#)

11 - Intake manifold pressure sender -G71- with intake air temperature sender -G42-

- ☐ ⇒ [page 38](#)

12 - Throttle valve module -J338-

- ☐ With throttle valve drive (electric power control) -G186- and angle sender 2 for throttle valve drive -G188-

13 - 8-pin connector for fuel injectors

14 - Vacuum pump

15 - Ignition coils with output stages

- ☐ Ignition coil 1 with output stage -N70-
- ☐ Ignition coil 2 with output stage -N127-
- ☐ Ignition coil 3 with output stage -N291-
- ☐ Ignition coil 4 with output stage -N292-

16 - Fuel pressure sender -G247

- ☐ ⇒ [page 38](#)

17 - Variable intake manifold change-over valve -N156-

- ☐ ⇒ [page 37](#)

18 - Right-side of engine (in direction of travel)

- ☐ ⇒ [page 38](#)
- ☐ Fuel pressure sender, low pressure -G410-
- ☐ Activated charcoal filter system solenoid valve -N80-
- ☐ Variable intake manifold change-over valve -N156-
- ☐ 3-pin connector for engine speed sender -G28-
- ☐ Map-controlled engine cooling system thermostat -F265-
- ☐ 3-pin connector for knock sensor 1 -G61-
- ☐ Hall sender -G40- (camshaft position sensor)

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

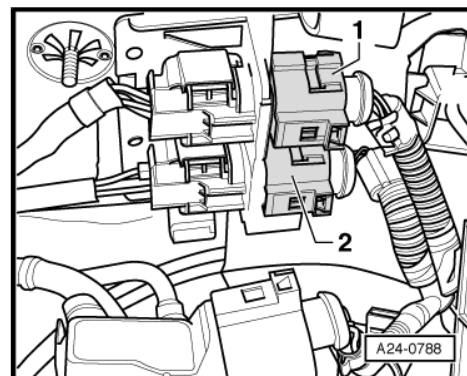
- ☐ ⇒ [page 38](#)

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

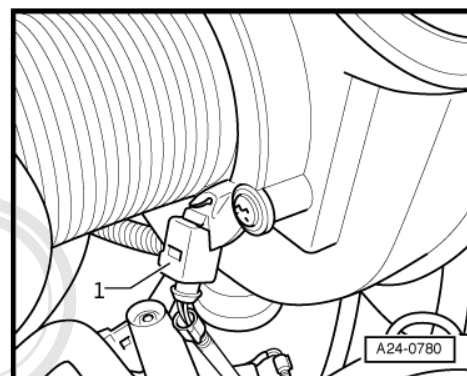
Connectors for Lambda probes before catalytic converter

1 - Connector for Lambda probe II -G108- before catalytic converter (for cylinders 2 and 3)

2 - Connector for Lambda probe -G39- before catalytic converter (for cylinders 1 and 4)



Intake air temperature sender -G299-



Left side of engine (in direction of travel)

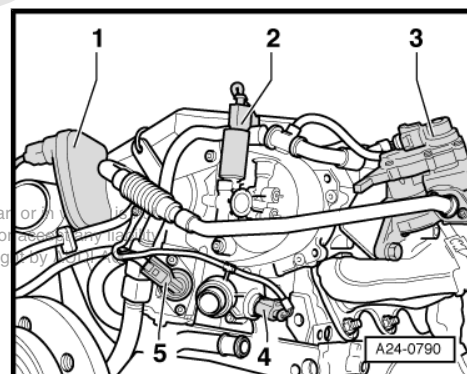
1 - Throttle valve module -J338- with throttle valve drive -G186- , angle sender for throttle valve drive -G187- and angle sender 2 for throttle valve drive -G188-

2 - Camshaft control valve 1 -N205-

3 - Exhaust gas recirculation valve -N18- with exhaust gas recirculation potentiometer -G212-

4 - Coolant temperature sender -G62-

5 - Fuel pressure regulating valve -N276-

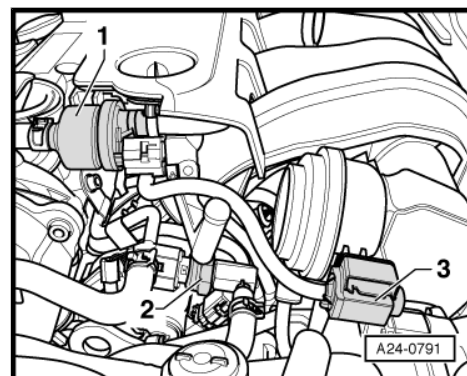


Right side of engine (in direction of travel)

1 - Activated charcoal filter system solenoid valve -N80-

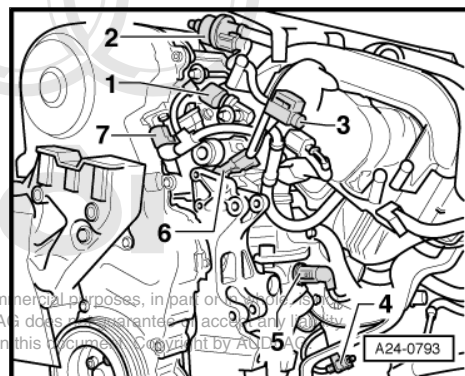
2 - Fuel pressure sender, low pressure -G410-

3 - Intake manifold change-over valve -N156



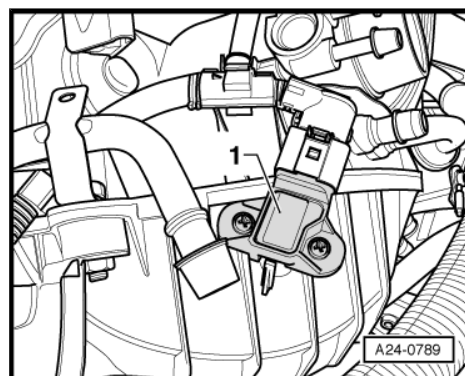
Right side of engine (in direction of travel)

- 1 - Fuel pressure sender, low pressure -G410-
- 2 - Activated charcoal filter system solenoid valve -N80-
- 3 - Variable intake manifold change-over valve -N156-
- 4 - 3-pin connector for engine speed sender -G28-
- 5 - Map-controlled engine cooling system thermostat -F265-
- 6 - 3-pin connector for knock sensor 1 -G61-
- 7 - Hall sender -G40- (camshaft position sensor)



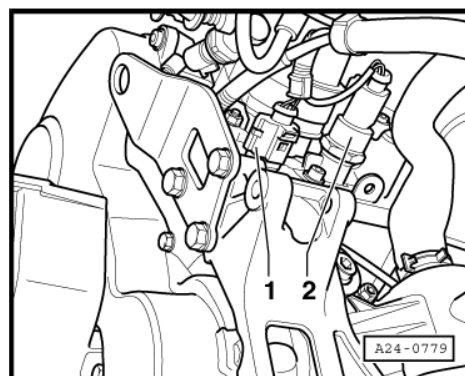
Intake manifold pressure sender -G71- and intake air temperature sender -G42-

- 1 - Intake manifold pressure sender -G71- and intake air temperature sender -G42-



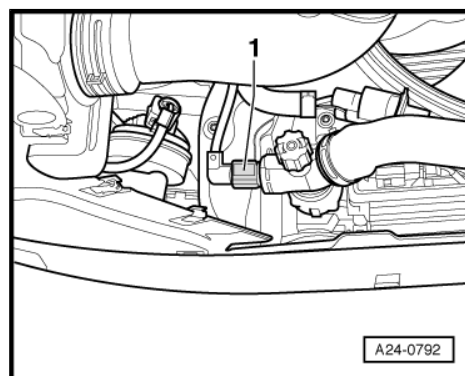
Knock sensor I -G61- and fuel pressure sender -G247-

- 1 - 3-pin connector for knock sensor 1 -G61-
- 2 - Fuel pressure sender -G247-



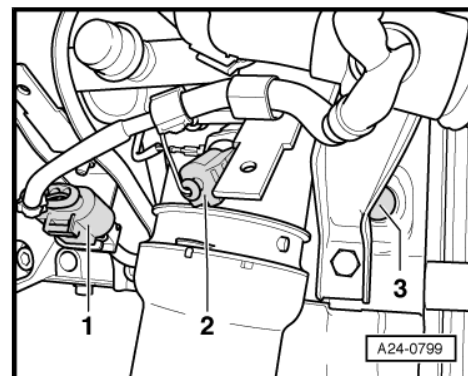
Coolant temperature sender - radiator outlet -G83-

- 1 - Coolant temperature sender - radiator outlet -G83-



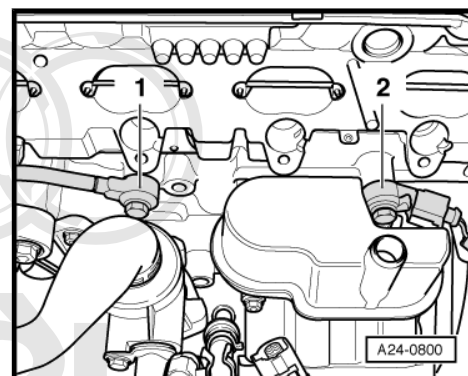
Fitting locations

- 1 - 3-pin connector for knock sensor 2 -G66-
- 2 - Oil pressure switch
- 3 - Engine speed sender -G28-



Knock sensors (beneath fuel rail)

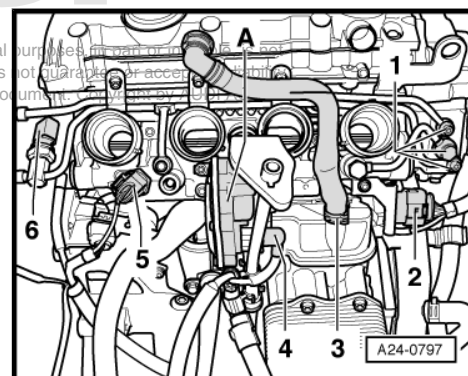
- 1 - Knock sensor 1 -G61-
- 2 - Knock sensor 2 -G66-



Intake manifold flap for air distribution

- 4 - Connector for intake manifold flap motor -V157-

A - Intake manifold flap motor -V157- with intake manifold flap potentiometer -G336-



13 – Crankshaft group

1 Dismantling and assembling engine

1.1 Poly V-belt - exploded view



Note

Before removing, mark direction of rotation of poly V-belt with chalk or felt-tip pen. If the belt runs in the opposite direction when it is refitted, this can cause breakage. Ensure that the belt is properly seated in the pulleys when installing.

1 - Pulley

- ☐ For poly V-belt
- ☐ Removing and installing
⇒ [page 43](#)

2 - Bolt (special type) ⇒ Parts catalogue

- ☐ Renew
- ☐ 10 Nm + 90°

3 - 23 Nm

4 - Engine lifting eye

5 - Tensioner for poly V-belt

- ☐ Pivot with open-end spanner to slacken poly V-belt
- ☐ Secure tensioner in position using locking pin - T10060 A-

6 - Bracket for ancillaries

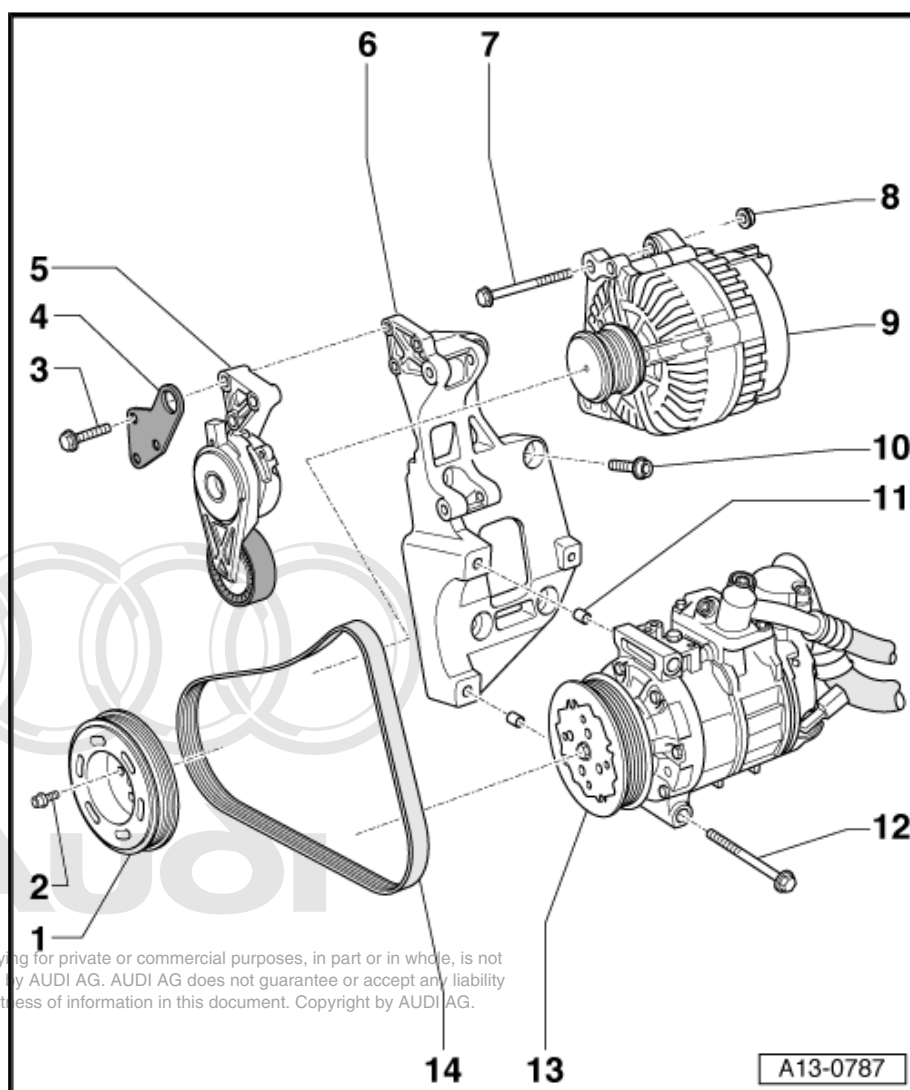
- ☐ Removing and installing
⇒ [page 44](#)

7 - 23 Nm

8 - 23 Nm

9 - Alternator

- ☐ Removing and installing: ⇒ Electrical system; Repair group 27
- ☐ To facilitate attachment of alternator, knock back threaded bushes for alternator securing



bolts slightly

10 - Bolt

- ☐ Apply locking fluid when fitting
- ☐ Locking fluid ⇒ Parts catalogue
- ☐ Tightening sequence ⇒ [page 41](#)

11 - Bush

- ☐ 2x

12 - 25 Nm

13 - Air conditioner compressor

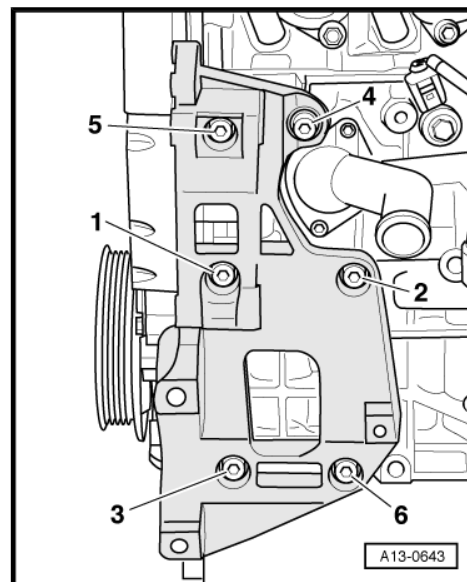
- ☐ Removing and installing: ⇒ Air conditioning; Repair group 87

14 - Poly V-belt

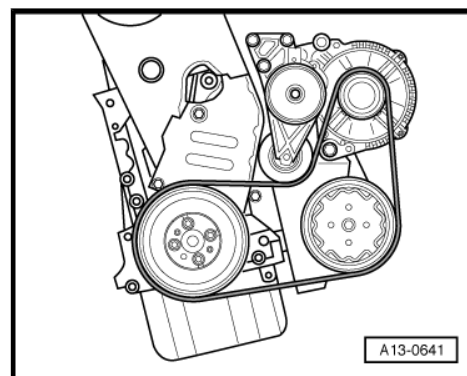
- ☐ Routing of poly V-belt ⇒ [page 41](#)
- ☐ Check for wear
- ☐ Do not kink
- ☐ Removing and installing ⇒ [page 41](#)

Bracket for ancillaries - tightening torque and tightening sequence

- Install bolts using locking fluid; for locking fluid refer to ⇒ Parts catalogue .
- Tighten bolts to 45 Nm in the sequence -1 ... 6-.



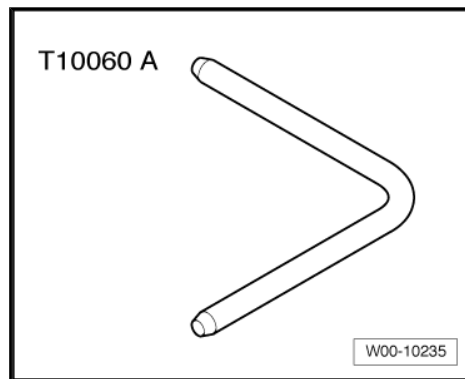
Routing of poly V-belt



1.2 Removing and installing poly V-belt

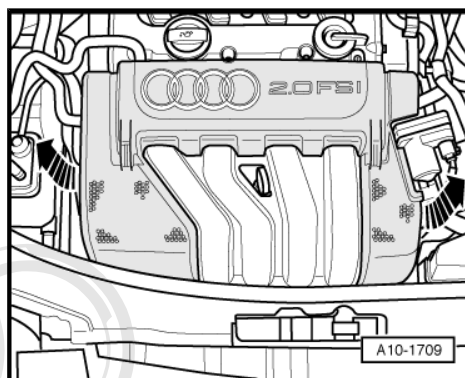
Special tools and workshop equipment required

- ◆ Locking pin -T10060A-



Removing

- Remove engine cover panel -arrows-.



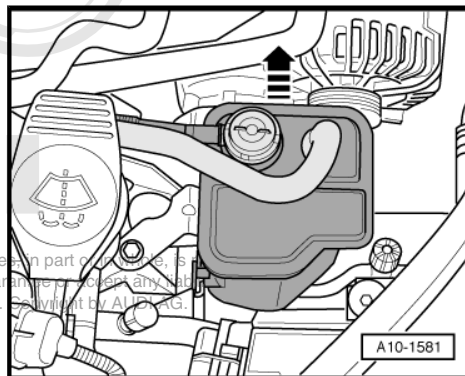
- Lift out activated charcoal filter from retainer with pipes connected -arrow- and lay aside.



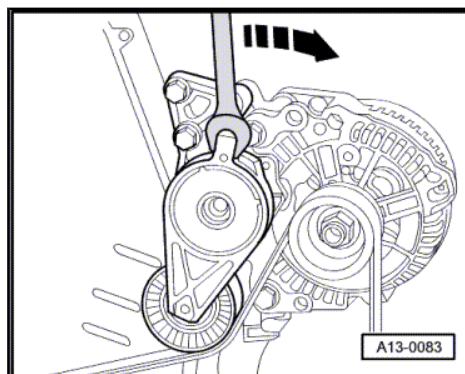
Note

Before removing, mark direction of rotation of poly V-belt with chalk or felt-tip pen. If the belt runs in the opposite direction when it is refitted, this can cause breakage.

Protected by copyright. Copying for private or commercial purposes in part or in whole, is permitted unless authorised by AUDI AG. AUDI AG does not guarantee the accuracy of any information with respect to the correctness of information in this document. Copyright by AUDI AG.



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



- Lock tensioner in position with locking pin -T10060A- .
- Take off poly V-belt.

Installing

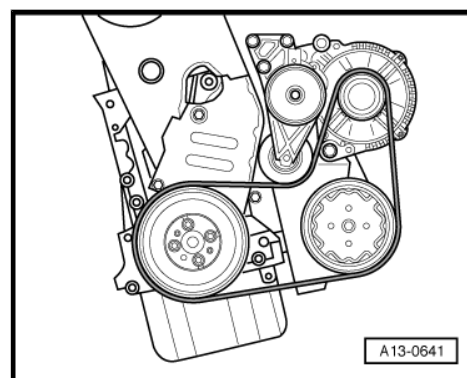
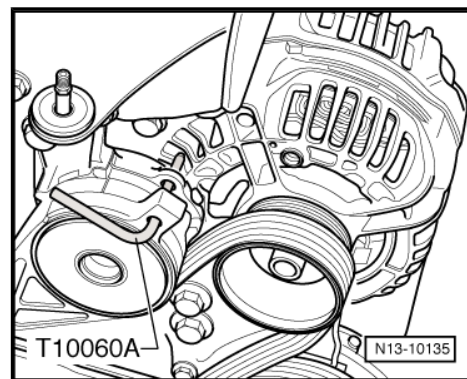
Installation is carried out in the reverse order; note the following:



Note

Before fitting poly V-belt, make sure all ancillary units (alternator and air-conditioner compressor) are firmly secured.

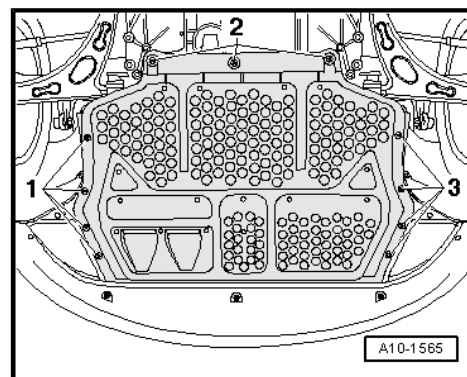
- Fit the poly V-belt onto the crankshaft and air conditioner compressor pulleys.
- Then position poly V-belt on alternator pulley and release tensioner.
- Check that poly V-belt is properly seated.
- Start engine and check that belt runs properly.



1.3 Removing and installing crankshaft pulley

Removing

- Poly V-belt must be removed ⇒ [page 41](#) .
- Remove centre noise insulation -1 ... 3-.



- Unbolt crankshaft pulley.



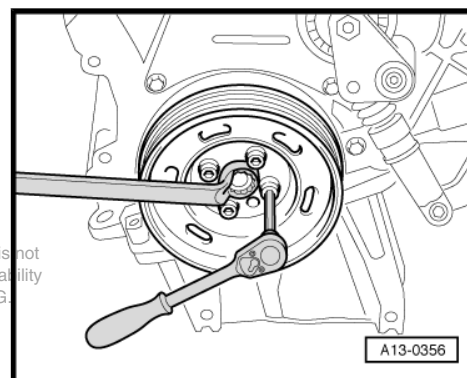
Note

To loosen and tighten the crankshaft pulley, counterhold central bolt with a ring spanner.

Installing

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

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

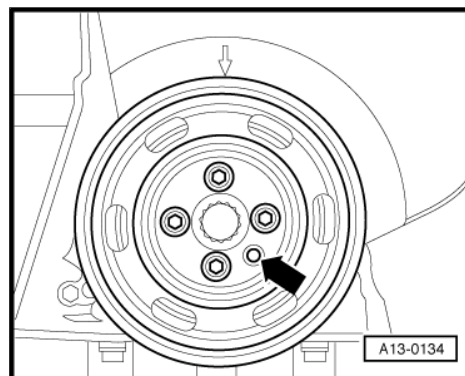


- Install the crankshaft pulley with genuine bolts only: ⇒ Parts catalogue .
- ◆ Can only be installed in one position: The hole -arrow- in the crankshaft pulley must fit over the projection on the toothed belt sprocket.

Tightening torque

Component	Nm
Pulley to crankshaft	10 + 90° 1) 2)

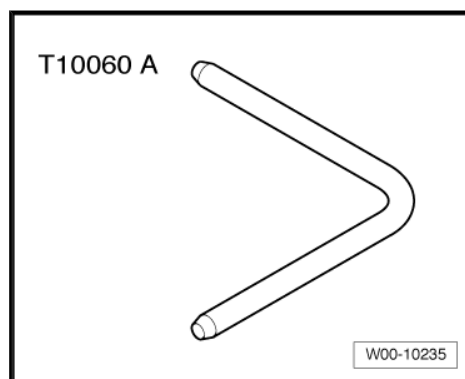
- 1) 90° = a quarter of a turn
- 2) Renew nuts/bolts



1.4 Removing and installing bracket for ancillaries

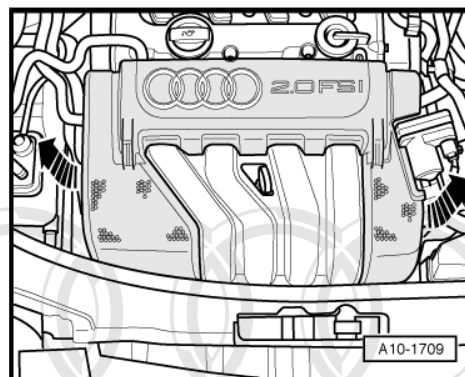
Special tools and workshop equipment required

- ◆ Locking pin -T10060A-



Removing

- Lift off engine cover panel -arrows-.

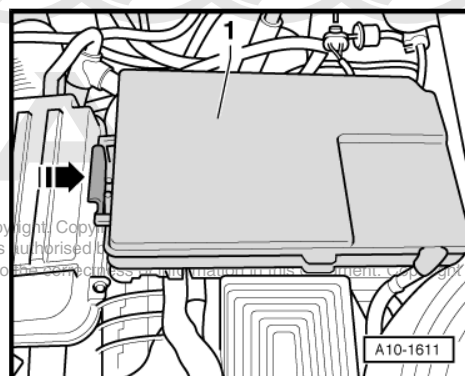


- Remove cover -1- over battery. To do so, press release tab -arrow-.



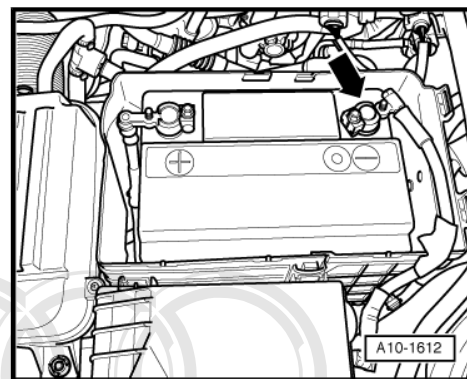
WARNING

Observe notes on procedure for disconnecting battery ⇒ Electrical system; Repair group 27 .



Protected by copyright. Copying, reproduction, distribution, or any other use in whole, is not permitted unless authorised by Audi AG. Audi AG is not liable for any damage or liability with respect to the content of this document. Copyright © 2012 Audi AG.

- With ignition switched off, disconnect battery earth cable -arrow-.



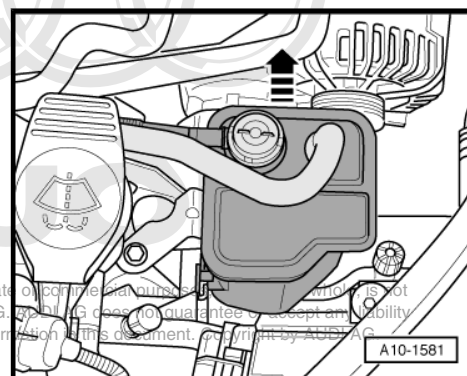
- Lift out activated charcoal filter from retainer with pipes connected -arrow- and lay aside.



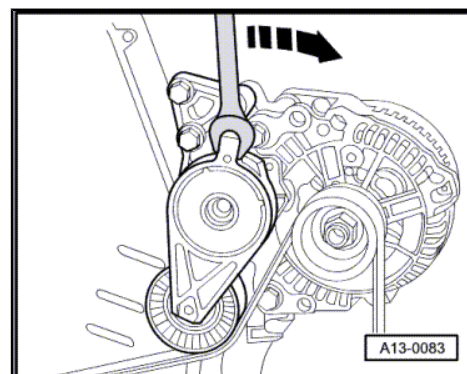
Note

Before removing, mark direction of rotation of poly V-belt with chalk or felt-tip pen. If the belt runs in the opposite direction when it is refitted, this can cause breakage.

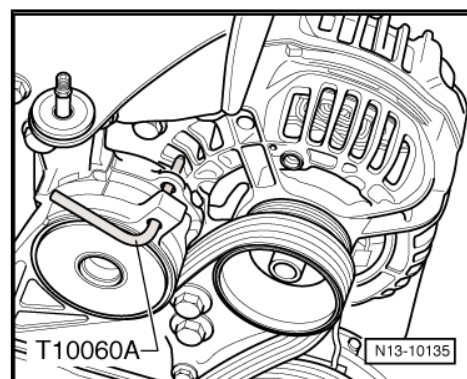
Protected by copyright. Copying for private or commercial purposes without the express written permission of Audi AG is prohibited. Audi AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by Audi AG.



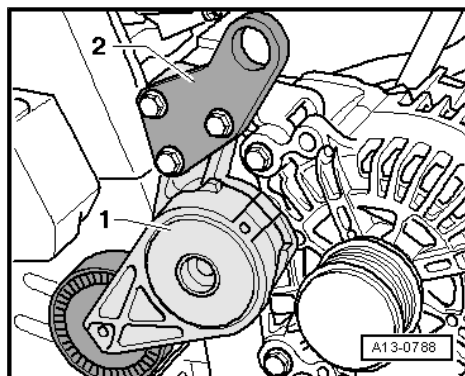
- To slacken poly V-belt, turn tensioner in -direction of arrow-.



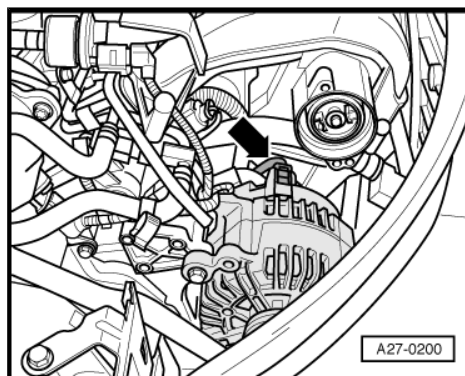
- Lock tensioner in position with locking pin -T10060A-.
- Take off poly V-belt.



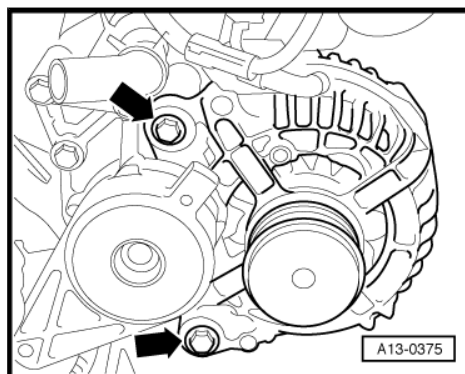
- Remove tensioner -1- for poly V-belt and engine lifting eye -2-.



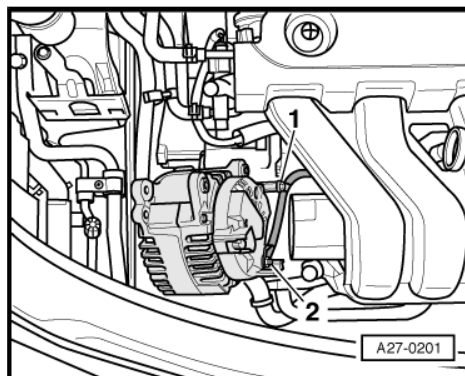
- Unplug electrical connector -arrow-.



- Unscrew the bolts -arrows- and remove alternator from bracket for ancillaries.
- Swivel alternator towards right side of vehicle with wiring connected.

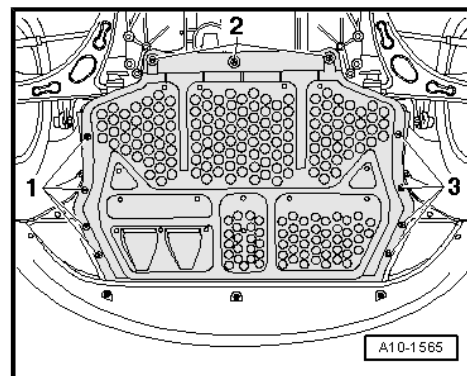


- Unscrew wire -2- at alternator.
- Unscrew wire clamp -1- at alternator.

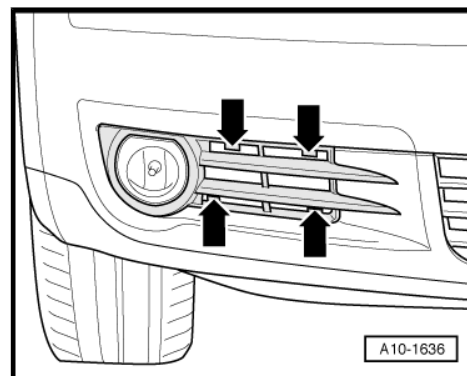


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Remove centre noise insulation -1 ... 3-.



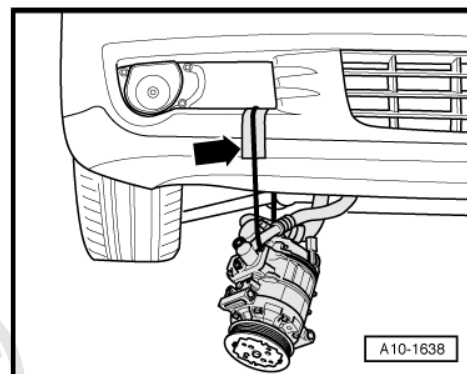
- Press the release tabs -arrows- and detach air intake grille.



- Protect bumper from scratches using adhesive tape -arrow-.

**WARNING**

The air conditioner refrigerant circuit must not be opened.

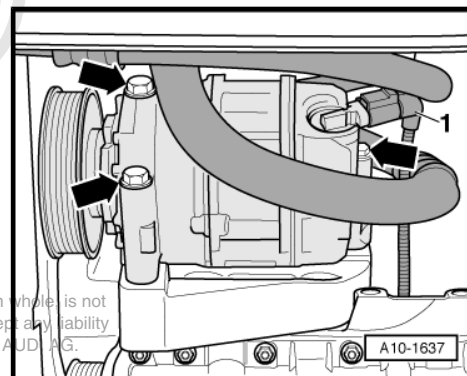


- Unplug electrical connector -1- for magnetic clutch on air conditioner compressor.
- Remove bolts -arrows- for air conditioner compressor.

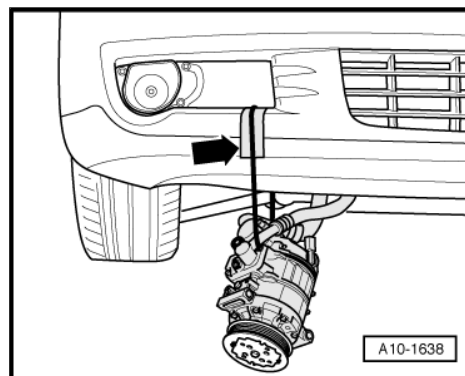
**Note**

To prevent damage to the air conditioner compressor and refrigerant pipes/hoses, ensure that the pipes and hoses are not stretched, kinked or bent.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- Tie up air conditioner compressor together with the connected refrigerant hoses to bumper.

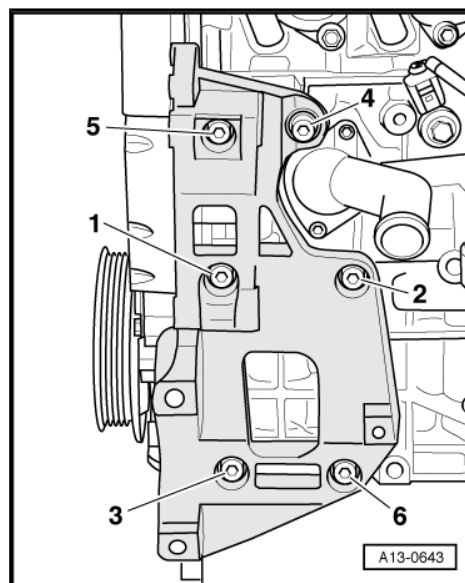


- Detach bracket for ancillaries: bolts -1 ... 6-.

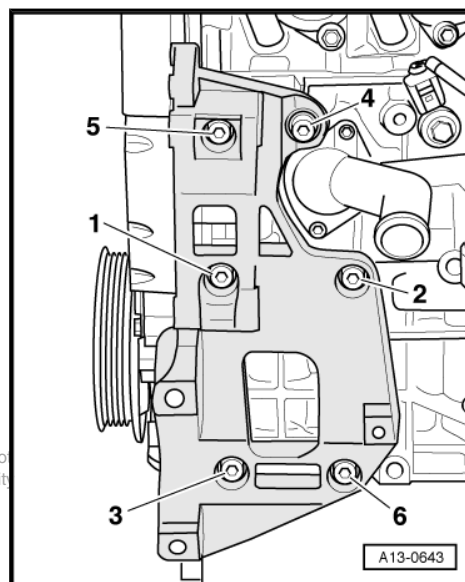
Installing

- Tightening torques ⇒ [page 40](#)

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



- Tighten bolts in the sequence -1 ... 6-. Tightening torque ⇒ [page 41](#)
- Install alternator ⇒ Electrical system; Repair group 27 .
- Install air conditioner compressor ⇒ Air conditioning; Rep. gr. 87 .
- Install poly V-belt ⇒ [page 41](#) .
- Connect battery. Procedures required ⇒ Electrical system; Repair group 27 .



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

2 Sealing flanges and flywheel/drive plate - exploded view



Note

Servicing clutch ⇒ Rep. gr. 30

1 - Central bolt

- ☐ Renew
- ☐ 90 Nm + turn 90° further
- ☐ Do not lubricate with oil

2 - Toothed belt sprocket

3 - Bolt

- ☐ 15 Nm

4 - Oil seal

- ☐ Renewing ⇒ [page 51](#)
- ☐ Do not lubricate with oil

5 - Sealing flange (front)

- ☐ Must be positioned on dowel sleeves
- ☐ Removing and installing, engine code AXW, BLX, BHD, BLY, BLR, BMB ⇒ [page 53](#)
- ☐ Removing and installing, engine code BVY, BVZ ⇒ [page 56](#)
- ☐ The sump must be removed when removing and installing on engine codes AXW, BLX, BHD, BLY, BLR, BMB ⇒ [page 162](#)

6 - Cylinder block

- ☐ Removing and installing crankshaft ⇒ [page 68](#)
- ☐ Dismantling and assembling pistons and con-rods ⇒ [page 72](#)

7 - Bolt

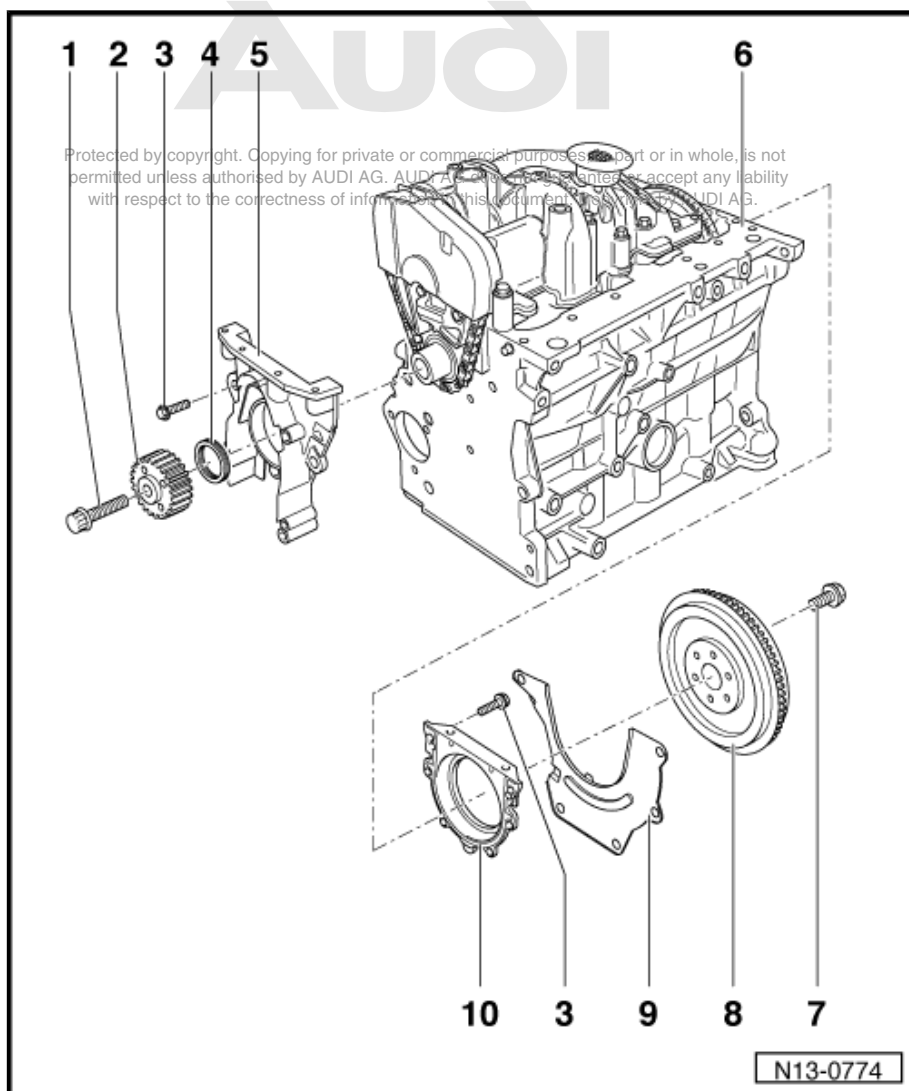
- ☐ Renew
- ☐ 60 Nm + turn 90° further

8 - Dual-mass flywheel/drive plate

- ☐ Removing and installing dual-mass flywheel ⇒ [page 59](#)
- ☐ Removing and installing drive plate ⇒ [page 59](#)
- ☐ Can only be installed in one position. Holes are off-set

9 - Intermediate plate

- ☐ Must be positioned on dowel sleeves
- ☐ Do not damage/bend when assembling
- ☐ Is fitted onto sealing flange ⇒ [page 50](#)

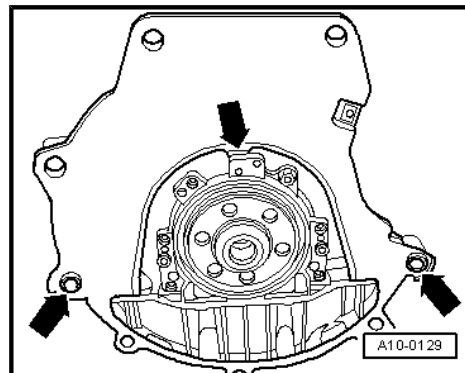


10 - Sealing flange with oil seal (gearbox end)

- ☐ Renew only as complete unit
- ☐ Do not lubricate/grease sealing lip of oil seal
- ☐ Removing and installing, engine code AXW, BLX, BHD, BLY, BLR, BMB ⇒ [page 62](#)
- ☐ Removing and installing, engine code BVY, BVZ ⇒ [page 63](#)
- ☐ The sump must be removed when removing and installing on engine codes AXW, BLX, BHD, BLY, BLR, BMB ⇒ [page 162](#)
- ☐ Before installing, remove oil residue from crankshaft journal with a clean cloth.

Installing intermediate plate

- Fit intermediate plate on sealing flange and push onto dowel sleeves -arrows-.

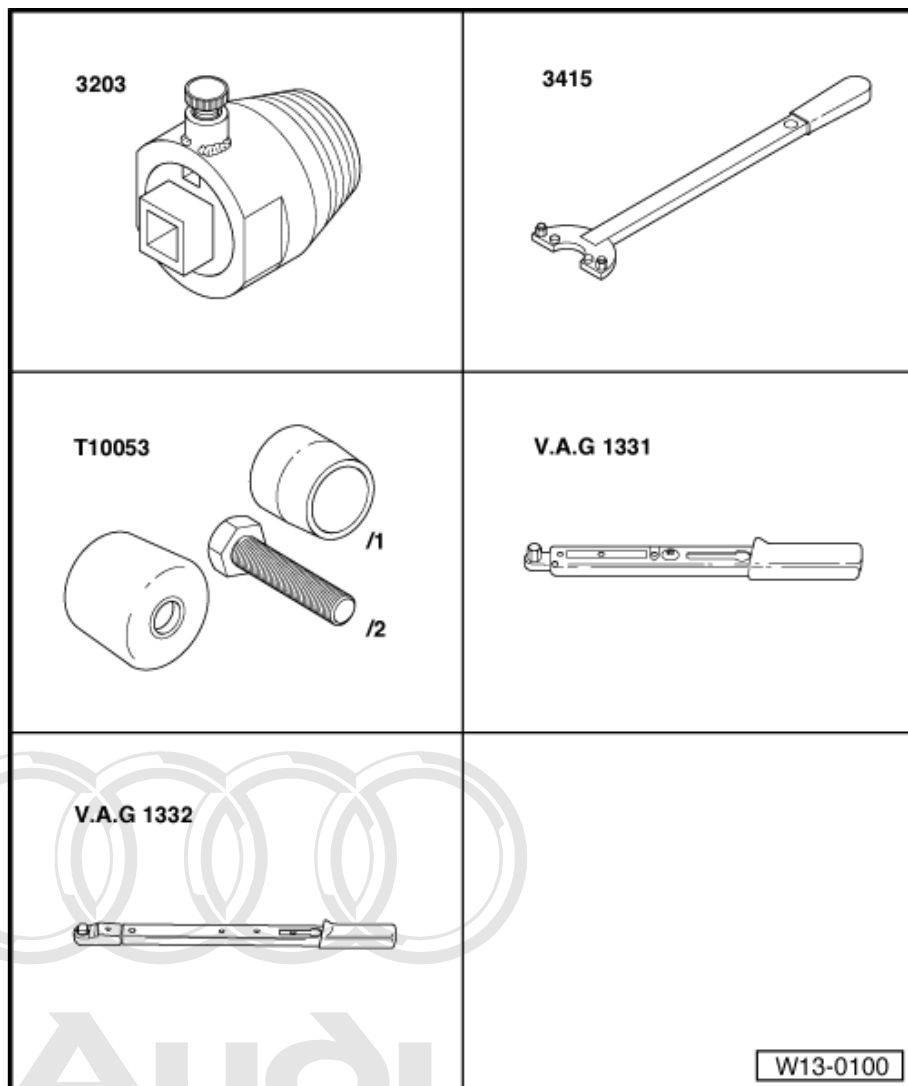


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

2.1 Renewing crankshaft oil seal - pulley end

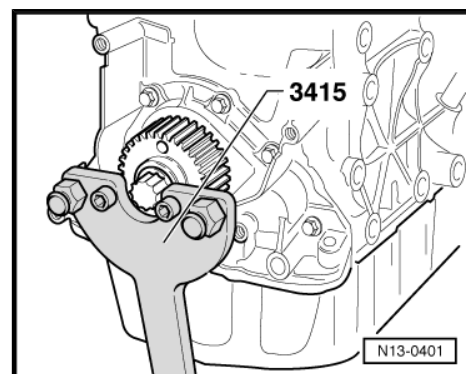
Special tools and workshop equipment required

- ◆ Oil seal extractor -3203-
- ◆ Counterhold tool -3415-
- ◆ Assembly tool -T10053-
- ◆ Torque wrench -V.A.G 1331-
- ◆ Torque wrench -V.A.G 1332-

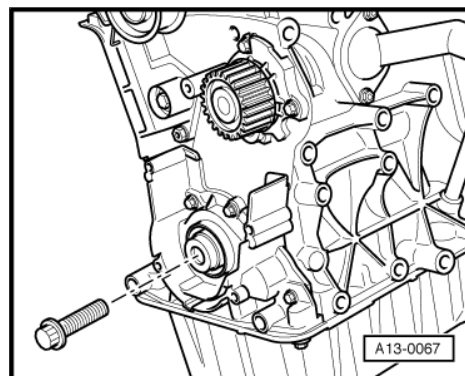


Removing

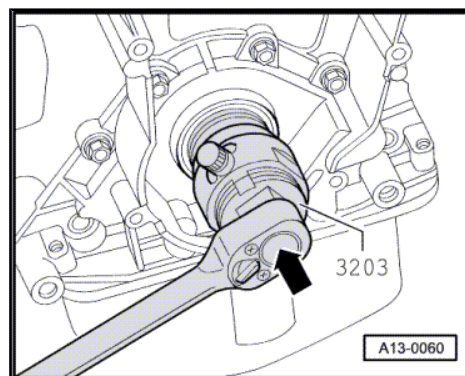
- Remove poly V-belt with respect to the correctness of information in this document. Copyright by AUDI AG.
⇒ „1.2 Removing and installing poly V-belt“, page 41 .
- Remove toothed belt: engine codes AXW, BMB, BHD
⇒ „1.2 Removing and installing toothed belt, engine code AXW, BMB, BHD“, page 81 , engine codes BLX, BLY, BLR, BVY, BVZ ⇒ page 92 .
- Remove crankshaft sprocket. To do this, counter-hold sprocket with special tool -3415- .



- To guide oil seal extractor, screw central bolt into crankshaft onto stop by hand.
- Unscrew inner part of oil seal extractor -3203- 9 turns (approx. 20 mm) from the outer part and lock in position with the knurled screw.

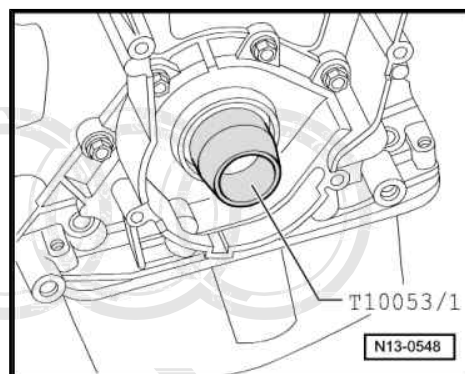


- Lubricate threaded head of oil seal extractor -3203- , place it in position and, exerting firm pressure, screw it into oil seal as far as possible.
- Loosen knurled screw and turn inner part against crankshaft until the oil seal is pulled out.
- Clamp flats of oil seal extractor in vice. Remove oil seal with pliers.
- Clean contact surface and sealing surface.

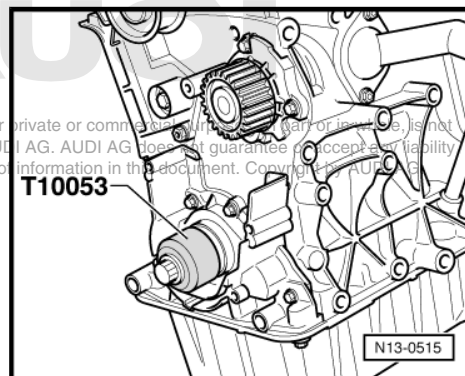


Installing

- Remove oil residue from crankshaft journal with a clean cloth.
- Position guide sleeve T10053/1 from assembly tool -T10053- on crankshaft journal.
- Push oil seal over guide sleeve onto crankshaft journal.



- Press in oil seal with central bolt of toothed belt sprocket and thrust sleeve of assembly tool -T10053- until flush.
- Renew central bolt for toothed belt sprocket.

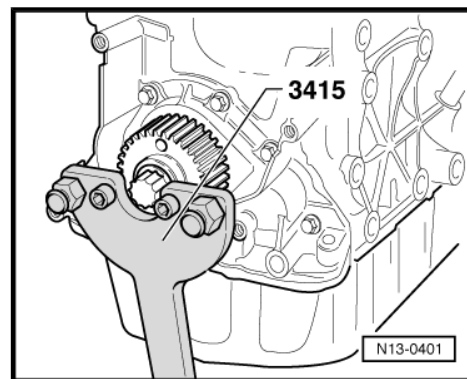


Protected by copyright. Copying for private or commercial use, in whole or in part, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee the correctness of information in this document. Copyright © AUDI AG

- Install crankshaft sprocket and lock in position with counter-hold tool -3415- .

**Note**

- ◆ *Contact surface between toothed belt sprocket and crankshaft must be free of oil.*
- ◆ *Do not lubricate bolt for crankshaft sprocket.*
- Install toothed belt: engine codes AXW, BMB, BHD
⇒ [page 81](#) , engine codes BLX, BLY, BLR, BVY, BVZ
⇒ [page 92](#) .
- Install poly V-belt ⇒ [page 41](#) .

**Tightening torque**

Component	Nm
Toothed belt sprocket to crankshaft	90 + 90° ¹⁾ 2)

- ¹⁾ 90° = a quarter of a turn
- ²⁾ Renew nuts/bolts

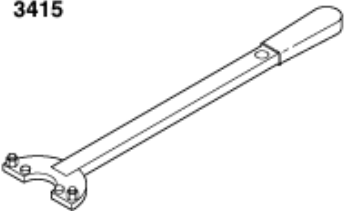
2.2 Removing and installing sealing flange (front), engine code AXW, BLX, BHD, BLY, BLR, BMB



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Special tools and workshop equipment required

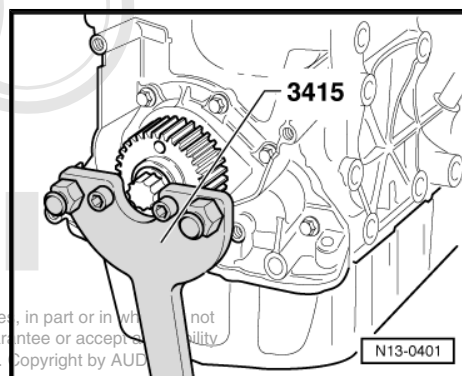
- ◆ Counterhold tool -3415-
- ◆ Assembly tool -T10053-
- ◆ Torque wrench -V.A.G 1331-
- ◆ Torque wrench -V.A.G 1332-

3415 	T10053 
V.A.G 1331 	V.A.G 1332 
	W13-0101

Removing

- Remove poly V-belt ⇒ [page 41](#) .
- Remove toothed belt: engine codes AXW, BMB, BHD ⇒ [page 81](#) , engine codes BLX, BLY, BLR, BVY, BVZ ⇒ [page 92](#) .
- Remove crankshaft sprocket. To do this, counter-hold sprocket with special tool -3415- .
- Drain off engine oil.

The sump must be removed on vehicles with codes AXW, BLX, BHD, BLY, BLR, BMB ⇒ [page 162](#) .



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Unscrew bolts -1 ... 6-.
- Lever off sealing flange: release by tapping lightly with a rubber hammer if necessary.
- Carefully remove any remaining sealant from cylinder block.

**WARNING**

Wear safety goggles.

- Use rotating plastic brush to remove sealant residue on sealing flange.
- Clean the sealing surfaces. The sealing surfaces must be free of oil and grease.

Installing**Note**

The sealing flange must be installed within 5 minutes after applying the silicone sealant.

- Cut off tube nozzle at front marking (diameter of nozzle approx. 3 mm).
- Apply silicone sealant onto clean sealing surface of sump as illustrated.
- ♦ Silicone sealant ⇒ Parts catalogue
- ♦ Width of sealant bead -arrows-: 2 ... 3 mm.

**Note**

The sealant bead must not be thicker, as otherwise excess sealant will enter the sump and obstruct the strainer in the oil pump.

- Fit sealing flange immediately and tighten all bolts -1 ... 6- slightly.

**Note**

Use guide sleeve T10053/1 from assembly tool -T10053- when fitting sealing flange with oil seal in position.

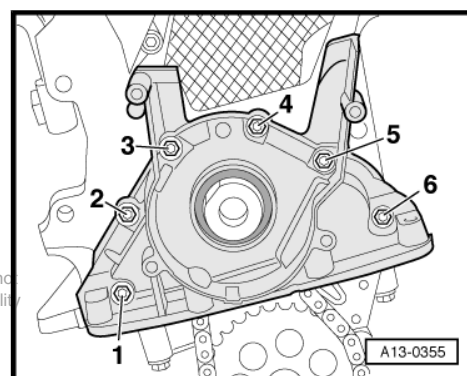
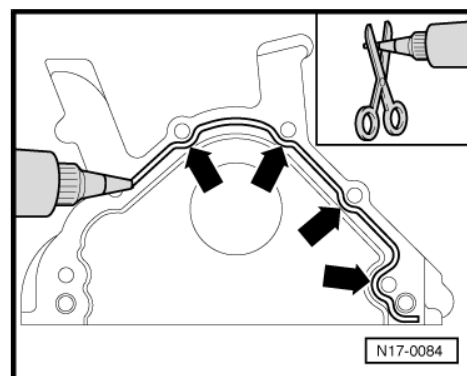
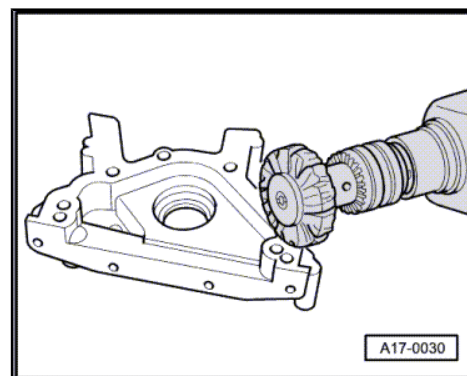
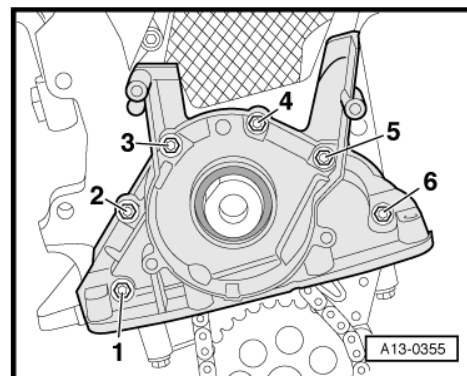
- Tighten securing bolts of sealing flange in diagonal sequence.

Install sump: engine codes AXW, BLX, BHD, BLY, BLR, BMB
⇒ [page 162](#).

**Note**

After installing, allow sealant to dry for approx. 30 minutes Then (and only then) fill the engine with engine oil.

- Remove oil residue from crankshaft journal with a clean cloth.



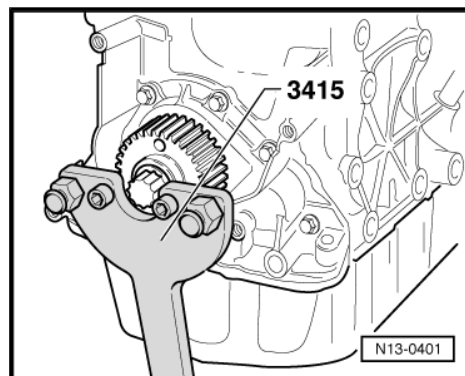
- Install crankshaft sprocket and lock in position with counterhold tool -3415- .



Note

Thread and shoulder must be free of oil and grease.

- Install toothed belt: engine codes AXW, BMB, BHD
⇒ [page 81](#) , engine codes BLX, BLY, BLR, BVY, BVZ
⇒ [page 92](#) .
- Install poly V-belt ⇒ [page 41](#) .



Tightening torque

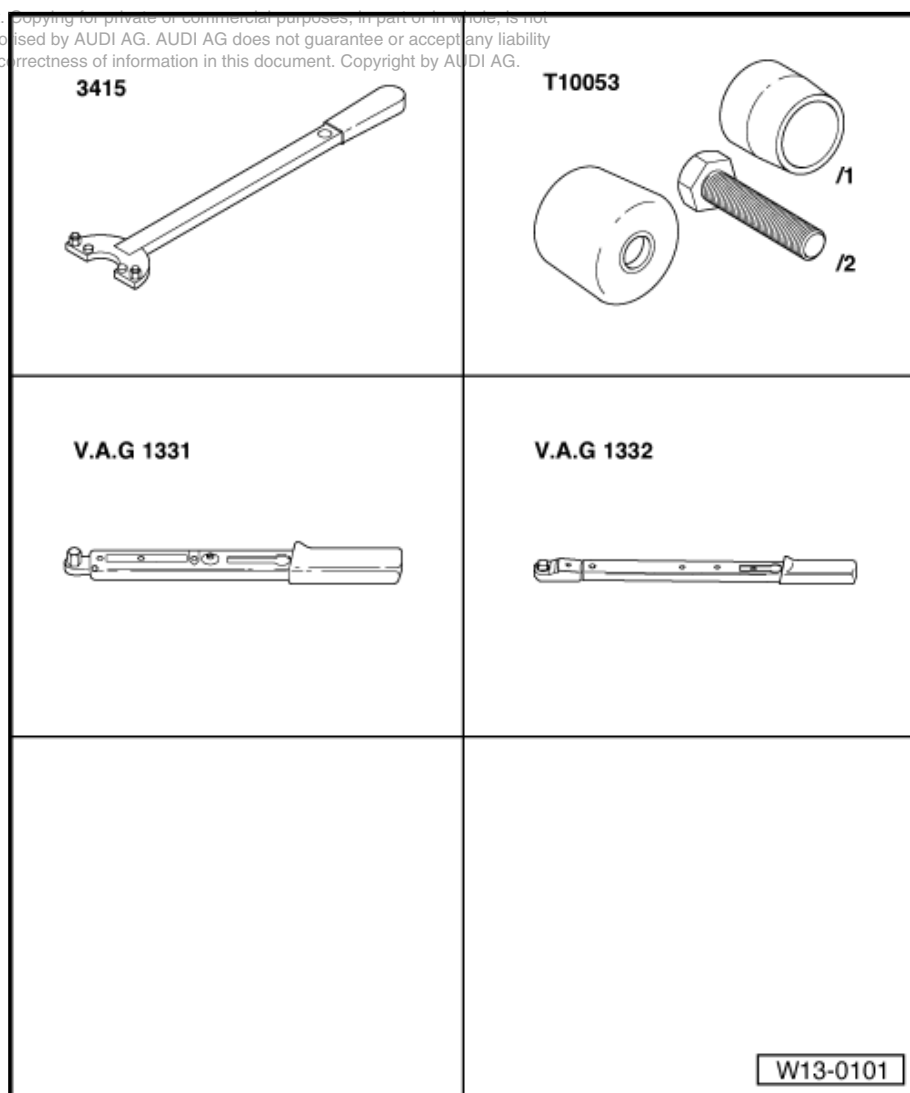
Component	Nm
Sealing flange to cylinder block	15
Toothed belt sprocket to crankshaft	90 + 90° 1) 2)

- 1) 90° = a quarter of a turn
- 2) Renew nuts/bolts

2.3 Removing and installing sealing flange (front), engine code BVY, BVZ

Special tools and workshop equipment required

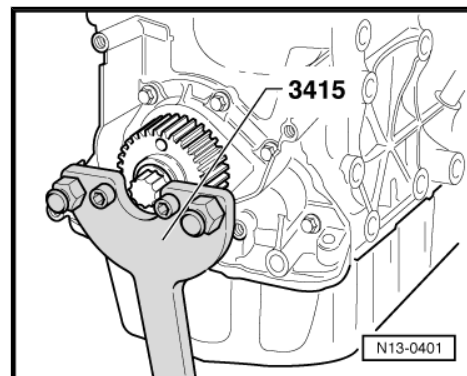
- ◆ Counterhold tool -3415-
- ◆ Assembly tool -T10053-
- ◆ Torque wrench -V.A.G 1331-
- ◆ Torque wrench -V.A.G 1332-
- ◆ Electric drill with plastic brush attachment
- ◆ Safety goggles



◆ Sealant ⇒ Parts catalogue

Removing

- Remove poly V-belt ⇒ [page 41](#) .
- Remove toothed belt: engine codes AXW, BMB, BHD
⇒ [page 81](#) , engine codes BLX, BLY, BLR, BVY, BVZ
⇒ [page 92](#) .
- Remove crankshaft sprocket. To do this, counter-hold sprocket with special tool -3415- .



- Remove bolts -1 ... 10-.
- Lever off front sealing flange and remove.
- Drive out oil seal with flange removed.

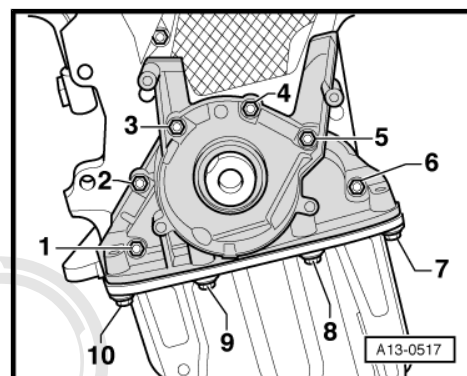
Installing



Note

Place a cloth over the exposed section of the sump.

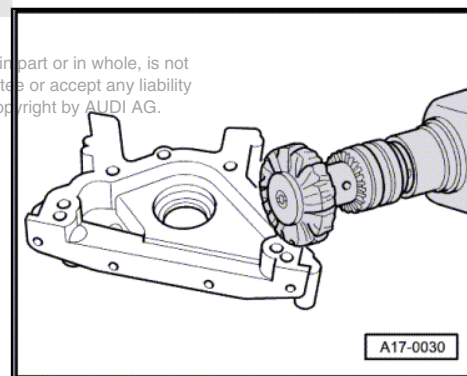
- Carefully remove any sealant residue on the cylinder block and sump.



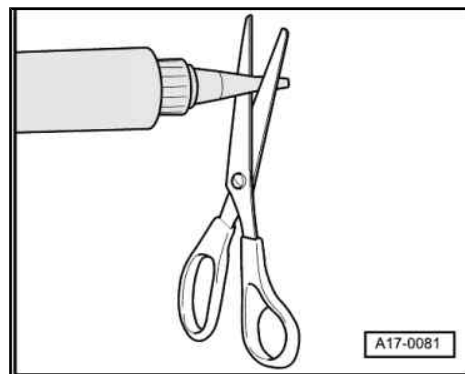
WARNING

Wear safety goggles.

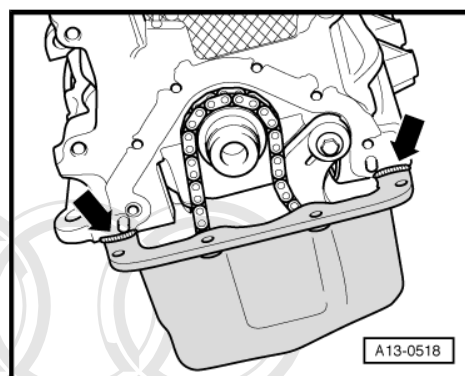
- Remove sealant residue from sealing flange with rotating plastic brush or similar.
- Clean sealing surfaces; they must be free of oil and grease.



- Cut off tube nozzle at front marking (diameter of nozzle approx. 2 mm).



- Apply a thin bead of sealant at the edge of the joint between the cylinder block and the sump -arrows-.



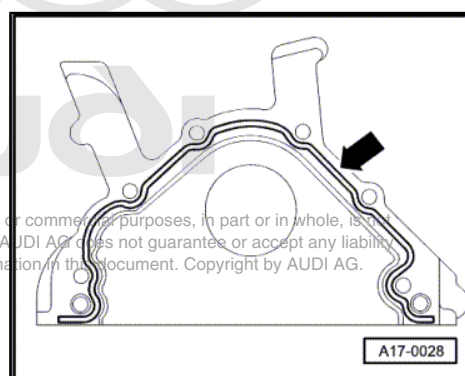
- Apply the bead of sealant onto the clean sealing surface of the sealing flange as illustrated -arrow-.
- Thickness of sealant bead: 2 ... 3 mm



Note

Sealant bead must not be wider than 3 mm, otherwise excess sealant could ingress into sump and clog strainer in oil intake pipe.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted without the express written consent of AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



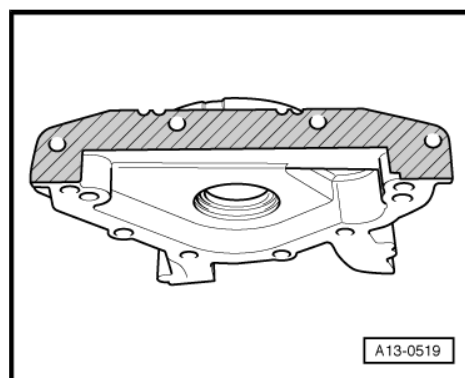
- Coat the lower sealing surface on the sealing flange lightly with sealant -hatched area-.



Note

The sealing flange must be installed within 5 minutes after applying sealant.

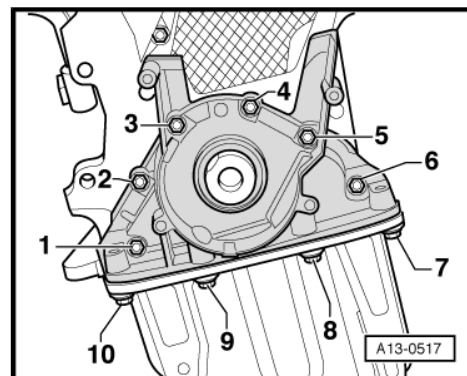
- Push the sealing flange carefully onto the dowel pins on the cylinder block.



Note

Use guide sleeve -T10053/1- to attach sealing flange with oil seal fitted.

- Tighten bolts in the specified sequence:
- Tighten bolts -1 ... 6-.
- Tighten bolts -7 ... 10-.
- Install crankshaft oil seal (pulley end) ⇒ [page 51](#) .
- Remove oil residue from crankshaft journal with a clean cloth.



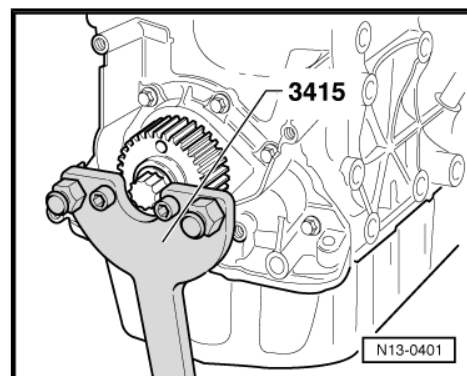
- Install crankshaft sprocket and lock in position with counterhold tool -3415- .

**Note**

Thread and shoulder must be free of oil and grease.

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

- Install toothed belt: engine codes AXW, BMB, BHD
⇒ [page 81](#) , engine codes BLX, BLY, BLR, BVY, BVZ
⇒ [page 92](#) .
- Install crankshaft pulley ⇒ [page 43](#) .
- Install poly V-belt ⇒ [page 41](#) .

**Tightening torque**

Component	Nm
Sealing flange to cylinder block	15
Toothed belt sprocket to crankshaft	90 + 90° 1)2)
• 1) Renew bolt • 2) 90° = one quarter turn.	

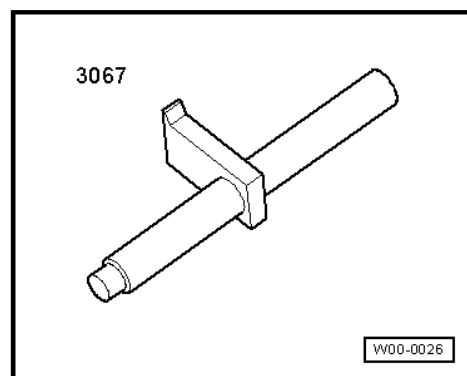
2.4 Removing and installing flywheel/drive plate

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

2.4.1 Removing and installing flywheel

Special tools and workshop equipment required

- ◆ Counterhold 3067



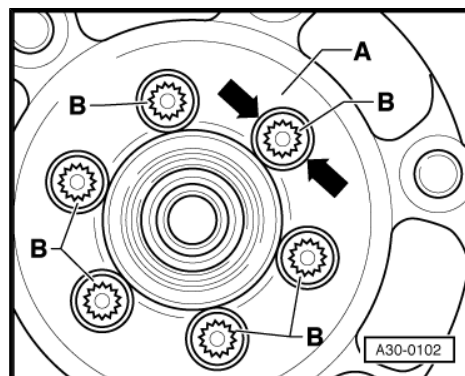
Removing



Note

To avoid damaging the dual-mass flywheel during removal, the bolts -B- must not be removed using a pneumatic or impact driver. The bolts -B- must be unscrewed by hand without power tools.

- Rotate the dual-mass flywheel -A- so that the bolts -B- align centrally with the holes -arrows-.
- When unscrewing bolts -B-, ensure that none of the bolt heads come into contact with the flywheel -arrows-. The flywheel will otherwise be damaged as the bolts are screwed out further.



- Insert counterhold -3067- in hole on cylinder block.
- Mark position of flywheel in relation to engine.
- Unbolt flywheel.

Installing

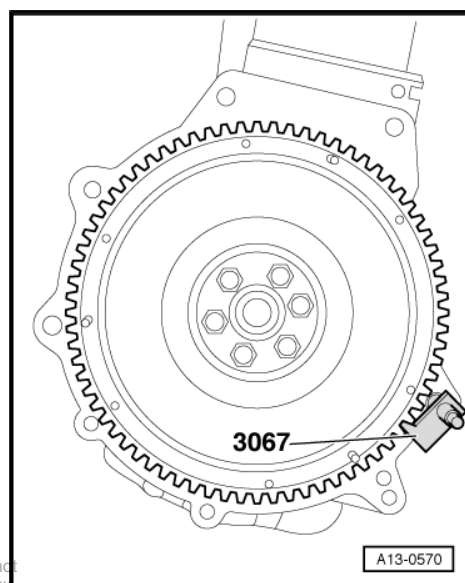
Installation is carried out in the reverse order; note the following:

- Renew bolts.

Tightening torque

Component	Nm
Dual-mass flywheel to crankshaft	60 + 90° 1) 2)

- 1) 90° = a quarter of a turn
- 2) Renew nuts/bolts

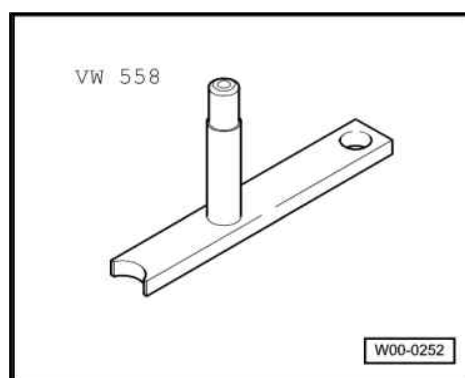


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

2.4.2 Removing and installing drive plate

Special tools and workshop equipment required

- ◆ Clutch counterhold tool -VW 558-



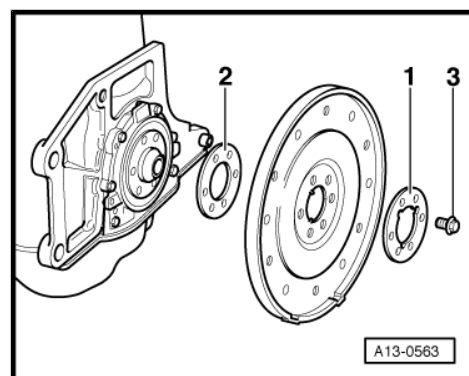
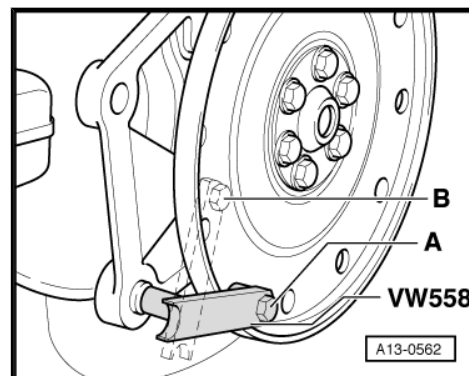
- ◆ M8×45 hexagon bolt and two M10 hexagon nuts
- ◆ Depth gauge

Removing

- Secure clutch counterhold tool -VW 558- to the drive plate using a M8x45 hexagon bolt. Fit two M10 hexagon nuts between counterhold tool and drive plate. Position of counterhold tool: -A- when loosening; -B- when tightening

Installing

- Fit drive plate using washer with notches -1-.
- Fit new bolts -3- and tighten to 30 Nm.



- Measure distance -a- at three points and calculate average value.

◆ Specification: 19.5...21.1 mm

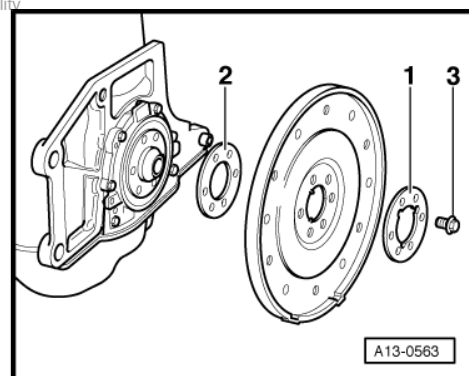
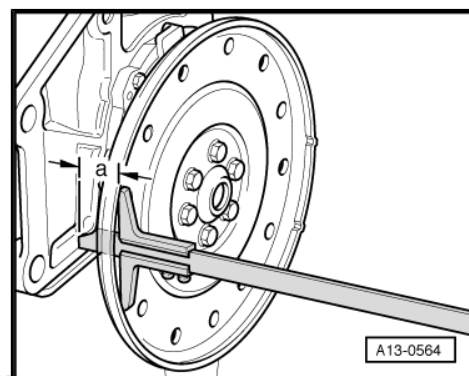


Note

Measurement is taken through the hole in the drive plate to the machined surface of the cylinder block.

If the value is below specification:

- Remove drive plate again and fit shim -2-. Re-tighten bolts -3- to 30 Nm.



Tightening torque

Component	Nm
Drive plate to crankshaft	60 + 90° ¹⁾ 2)

- ¹⁾ 90° = a quarter of a turn
- ²⁾ Renew nuts/bolts

2.5 Removing and installing crankshaft sealing flange (gearbox end), engine code AXW, BLX, BHD, BLY, BLR, BMB

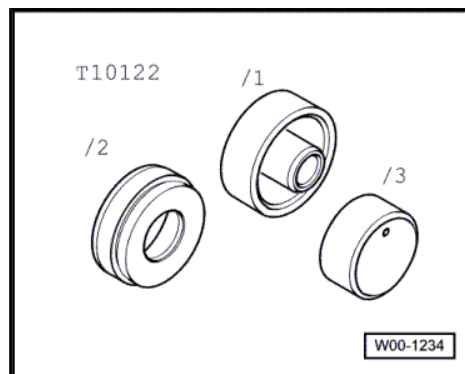


Note

The fitting tool -T10122- is only required for sealing flanges without support sleeve

Special tools and workshop equipment required

- ♦ Fitting tool -T10122-



Removing sealing flange

- Remove gearbox ⇒ Rep. gr. 30 .
- Remove flywheel ⇒ [page 59](#) or drive plate ⇒ [page 60](#) .
- Remove sump
⇒ „1.3 Removing and installing sump with balance shaft assembly and oil pump, engine code AXW, BLX, BHD, BLY, BLR, BMB“, [page 162](#) .
- Unbolt sealing flange -arrows-.

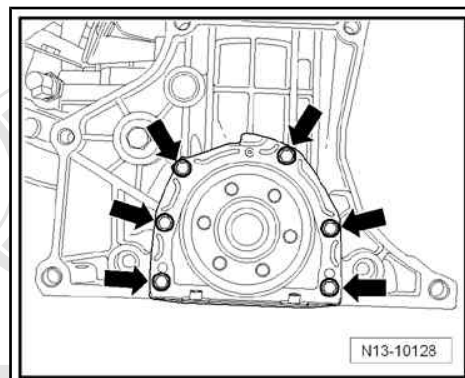
Installing sealing flange



Note

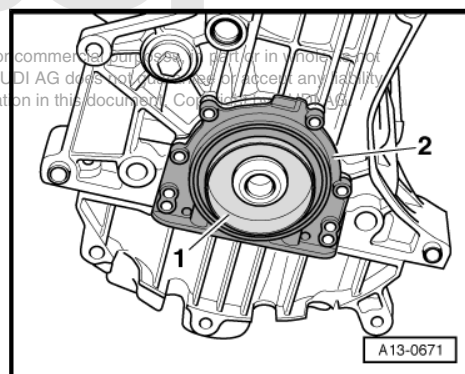
Do not additionally oil or grease sealing lip of oil seal.

- Clean the sealing surfaces. The sealing surfaces must be free of oil and grease.
- Remove oil residue from crankshaft journal with a clean cloth.



Sealing flange with support sleeve:

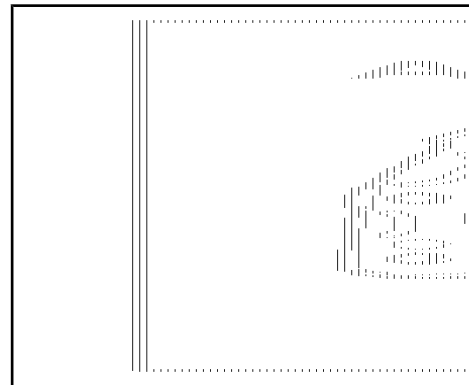
- Carefully push sealing flange -2- together with support sleeve -1- (fitted on replacement part) onto crankshaft when installing.
- Push the sealing flange carefully onto the dowel sleeves on the cylinder block.



Sealing flange without support sleeve:

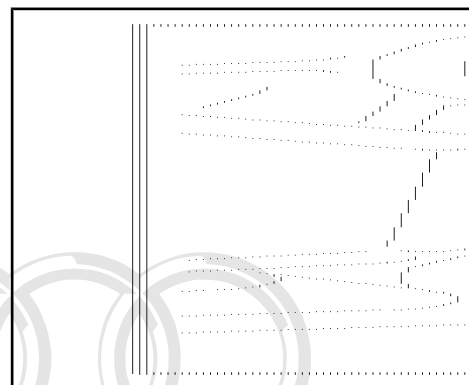
- Fit assembly sleeves -T10122/1- and -T10122/2- together.

- Push outer side of sealing flange -A- onto assembly sleeves.
- Separate assembly sleeves.



- Fit sealing flange -A- onto crankshaft with assembly sleeve - T10122/2- and push sealing flange over crankshaft journal.

All vehicles (continued):



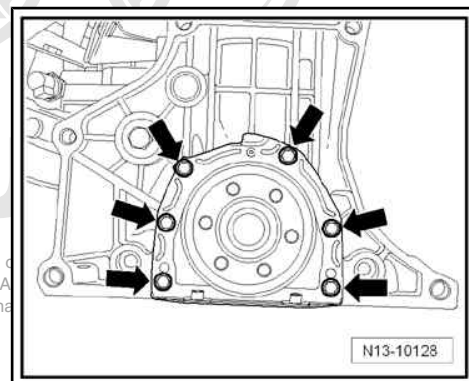
- Tighten bolts -arrows-.
- Install sump
⇒ „1.3 Removing and installing sump with balance shaft assembly and oil pump, engine code AXW, BLX, BHD, BLY, BLR, BMB“, page 162 .
- Remove gearbox ⇒ Rep. gr. 30 .

Further assembly is basically carried out in reverse order of dismantling.

Protected by copyright. Copying for private use is permitted unless authorised by AUDI AG. All rights reserved with respect to the correctness of information.

Tightening torque

Component	Nm
Sealing flange to cylinder block	15



2.6 Removing and installing crankshaft sealing flange (gearbox end), engine code BVY, BVZ

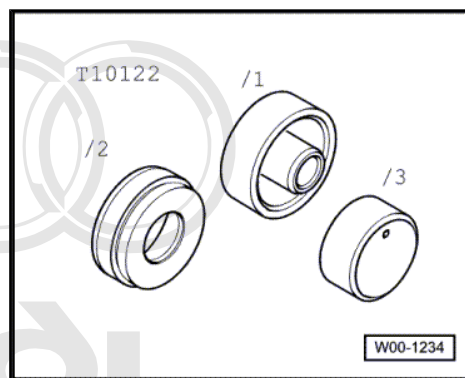


Note

The fitting tool -T10122- is only required for sealing flanges without support sleeve

Special tools and workshop equipment required

◆ Fitting tool -T10122-



◆ Electric drill with plastic brush attachment

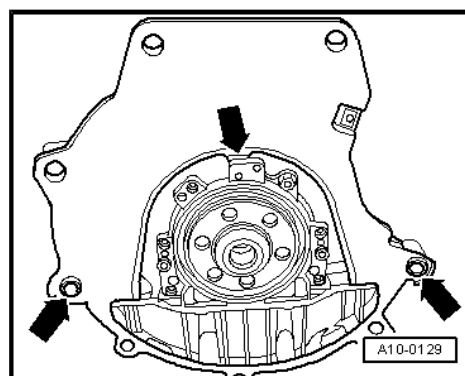
◆ Safety goggles

◆ Sealant ⇒ Parts catalogue

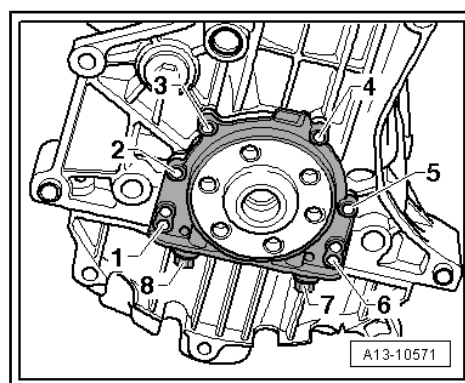
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Removing sealing flange

- Remove gearbox ⇒ Rep. gr. 30 .
- Remove flywheel ⇒ [page 59](#) or drive plate ⇒ [page 60](#) .
- Detach intermediate plate at sealing flange and dowel sleeves -arrows-.



- Remove bolts -1 ... 8-.
- Detach sealing flange.



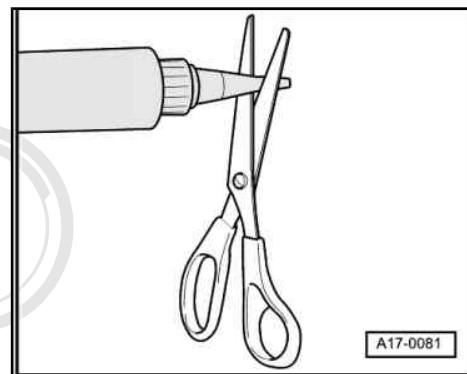
Installing sealing flange:



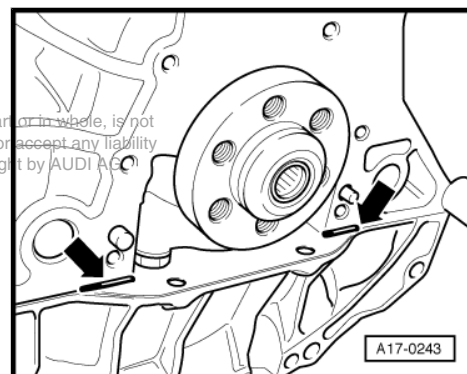
Note

Place a cloth over the exposed section of the sump.

- Carefully remove any sealant residue on the cylinder block and sump.
- Clean sealing surfaces; they must be free of oil and grease.
- Cut off tube nozzle at front marking (diameter of nozzle approx. 2 mm).
- Apply a thin bead of sealant at the edge of the joint between the cylinder block and the sump -arrows-.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

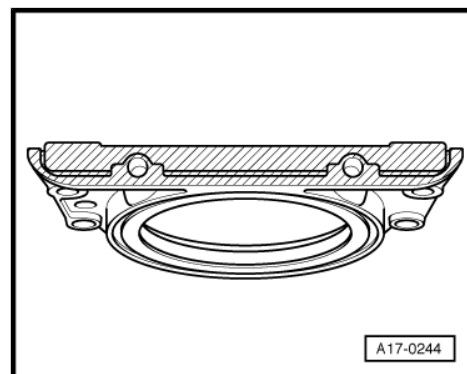


- Coat the lower sealing surface on the sealing flange lightly with sealant -hatched area-.



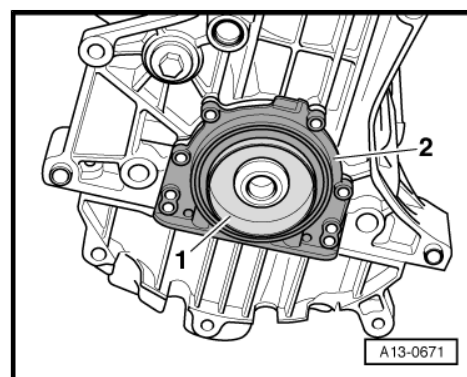
Note

- ◆ *The sealing flange must be installed within 5 minutes after applying sealant.*
- ◆ *Do not additionally oil or grease sealing lip of oil seal.*



Sealing flange with support sleeve:

- Carefully push sealing flange -2- together with support sleeve -1- (fitted on replacement part) onto crankshaft when installing.
- Push the sealing flange carefully onto the dowel sleeves on the cylinder block.

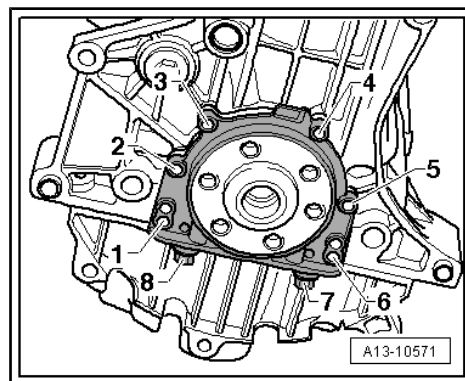


– Tighten bolts in the specified sequence:

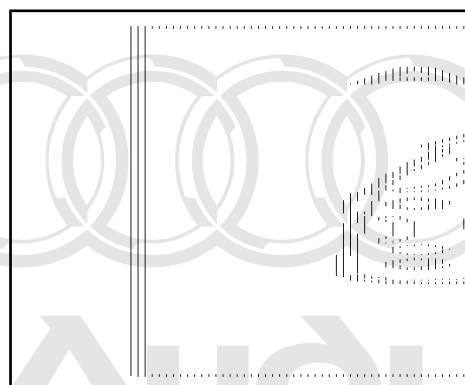
1. Tighten bolts -1 ... 6-.
2. Tighten bolts -7- and -8-.

Sealing flange without support sleeve:

– Fit assembly sleeves -T10122/1- and -T10122/2- together.



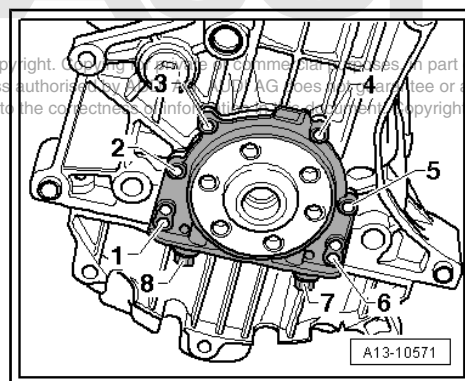
- Push outer side of sealing flange -A- onto assembly sleeves.
- Separate assembly sleeves.
- Fit sealing flange -A- onto crankshaft with assembly sleeve -T10122/2- and push sealing flange over crankshaft journal.



– Tighten bolts in the specified sequence:

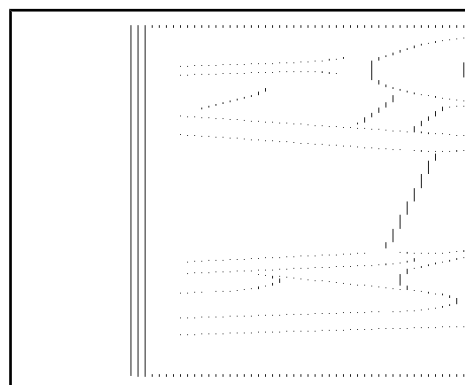
1. Tighten bolts -1 ... 6-.

Protected by copyright. Copying or using in commercial purposes, in part or in whole, is not permitted unless authorized by Audi AG. Audi AG does not warrant or accept any liability with respect to the correctness of information. Copyright by AUDI AG.



1. Tighten bolts -7- and -8-.

All vehicles (continued):

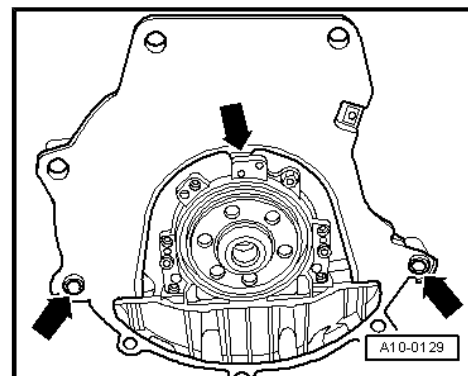


Remaining installation steps are carried out in reverse sequence; note the following:

- Fit intermediate plate on sealing flange and push onto dowel sleeves -arrows-.
- Install dual-mass flywheel ⇒ [page 59](#) .
- Remove gearbox ⇒ Rep. gr. 30 .

Tightening torque

Component	Nm
Sealing flange to cylinder block	15
Sump to sealing flange	15



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

3 Crankshaft - exploded view

1 - 65 Nm + 90° (1/4 turn) further

- ☐ Renew
- ☐ Threaded along complete length
- ☐ When measuring crankshaft radial clearance, tighten to 65 Nm only. Do not turn further.

2 - Bearing cap

- ☐ Bearing cap 1: Pulley end
- ☐ Bearing shell retaining lugs (cylinder block/bearing cap) must be on the same side

3 - 10 Nm + 1/4 turn (90°) further

- ☐ Renew

4 - Sender wheel

- ☐ For engine speed sender -G28-
- ☐ Sender wheel must be renewed if bolts are loosened
- ☐ Can only be installed in one position. Holes are off-set
- ☐ Removing and installing ⇒ [page 69](#)

5 - Crankshaft

- ☐ Axial clearance when new: 0.07...0.23 mm; wear limit: 0.30 mm
- ☐ Check radial clearance with Plastigage: New: 0.017...0.037 mm; wear limit: 0.07 mm
- ☐ Do not rotate the crankshaft when checking the radial clearance
- ☐ Crankshaft dimensions ⇒ [page 69](#)

6 - Thrust washers

- ☐ For bearing No. 3

7 - Bearing shell for cylinder block

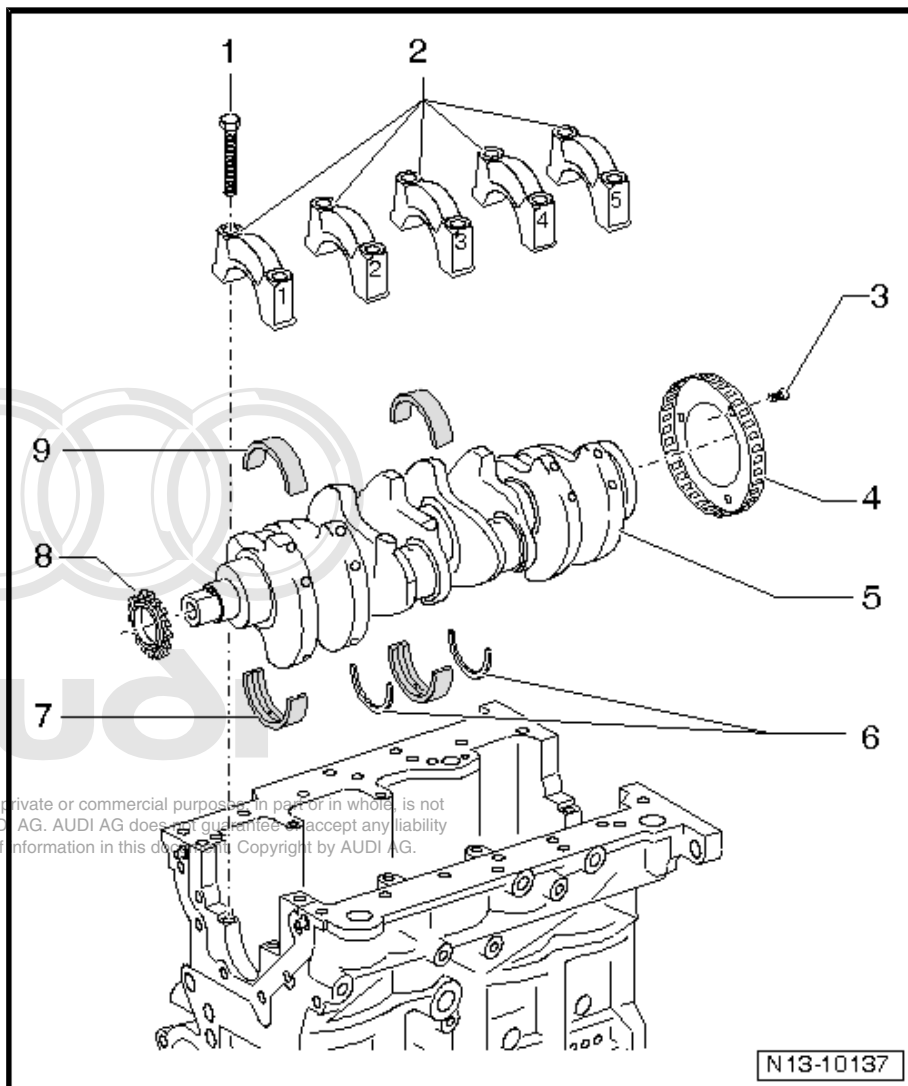
- ☐ With oil groove
- ☐ Classification for replacement parts ⇒ [page 69](#)
- ☐ Do not interchange used bearing shells (mark positions)

8 - Chain sprocket

- ☐ For oil pump drive

9 - Bearing shell for bearing cap

- ☐ Without oil groove
- ☐ Do not interchange used bearing shells (mark positions)



Note

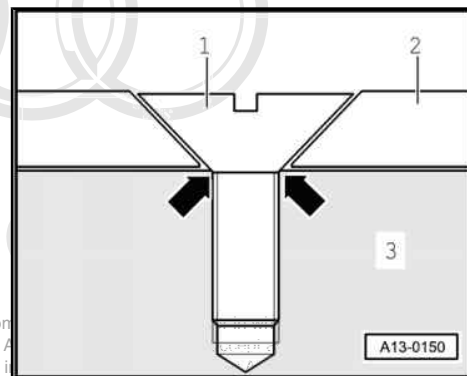
Secure engine to repair stand using engine and gearbox support -VW 540- when dismantling/assembling engine ⇒ [page 24](#).

Removing and installing sender wheel

- Sender wheel -2- must always be renewed after slackening off bolts -1-.

Note

Protected by copyright. Copying for private or commercial use is not permitted unless authorised by AUDI AG. AUDI AG is not responsible with respect to the correctness of information.



- ◆ After fastening for a second time, attachment point of countersunk-head bolts in sender wheel is deformed to such an extent that bolt heads make contact with crankshaft -3- -arrows- and sender wheel beneath bolts is loose.
- ◆ Sender wheel can only be fitted in one position because holes are offset.

Tightening torque

Component	Nm
Sender wheel to crankshaft	10 + 90° 1) 2)

- 1) 90° = a quarter of a turn
- 2) Renew nuts/bolts

3.1 Identification of top crankshaft bearings

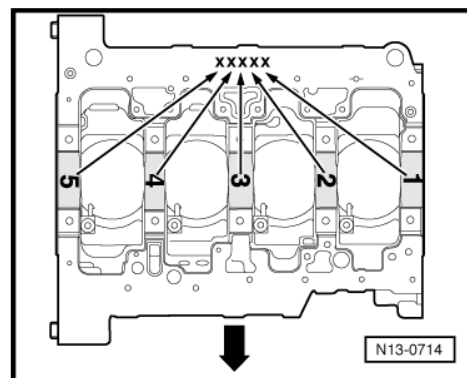
Top bearing shells of the correct thickness are allocated to the cylinder block at the factory. Coloured dots are used to identify the thickness of the bearing shells.

Letter codes on the lower sealing surface of the cylinder block indicate the thickness of the bearing shell to be fitted at each location.

G	=	Yellow
B	=	Blue
W	=	White

Note

- ◆ Arrow points in direction of travel.
- ◆ Use blue bearing shells if the identification is no longer visible.
- ◆ The bottom crankshaft bearing shells are only supplied as replacement parts with „yellow“ marking.



3.2 Crankshaft dimensions

(in mm)

Honing dimension	Crankshaft main bearing journal Ø	Conrod bearing journal Ø
Basic dimension	-0.017	-0.022
	54.00	47.80
	-0.037	-0.042

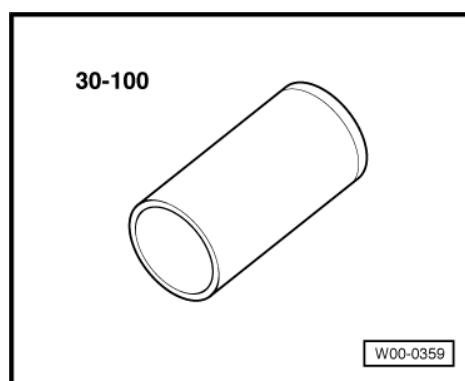
Honing dimension	Crankshaft main bearing journal Ø	Conrod bearing journal Ø
1st undersize	-0.017	-0.022
	53.75	47.55
2nd undersize	-0.037	-0.042
	53.50	47.30
3rd undersize	-0.017	-0.022
	53.25	47.05
	-0.037	-0.042

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

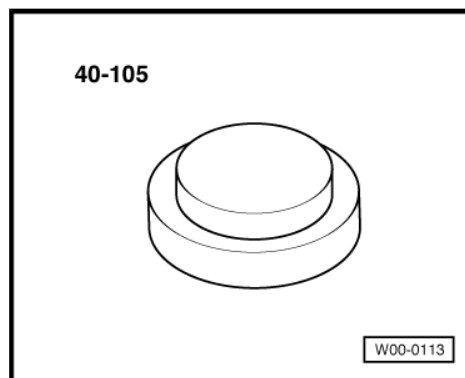
3.3 Removing and installing chain sprocket

Special tools and workshop equipment required

- ◆ Drift sleeve -30 - 100-



- ◆ Thrust plate -40 - 105-



- ◆ Two-arm puller, commercially available
- ◆ Protective gloves

Removing

- Remove front sealing flange: engine codes AXW, BLX, BHD, BLY, BLR, BMB ⇒ [page 53](#) ; engine codes BVY, BVZ ⇒ [page 56](#) .

- Pull chain sprocket off crankshaft with puller -2- (Kukko 44-1 or similar). Use thrust plate -40 - 105- to protect end of crankshaft.

Installing

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



WARNING

Wear protective gloves.

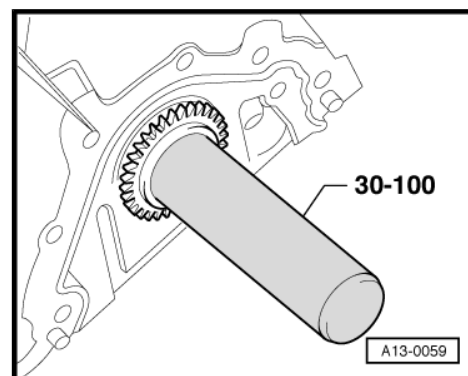
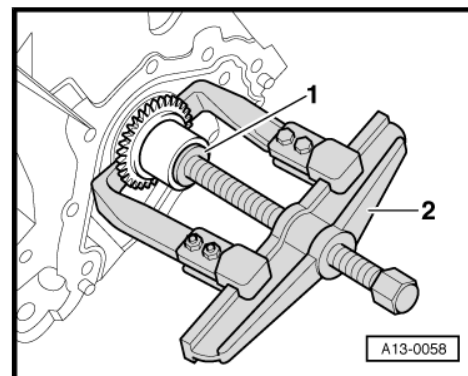
- Heat chain sprocket in oven for approx. 15 minutes to 220°C.



Note

Installation position: wide collar on sprocket facing towards engine,

- Fit chain sprocket on end of crankshaft using pliers, and press onto crankshaft as far as the stop using drift sleeve -30 - 100- .
- Install front sealing flange: engine codes AXW, BLX, BHD, BLY, BLR, BMB ⇒ [page 53](#) ; engine codes BVY, BVZ ⇒ [page 56](#) .



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

4 Pistons and conrods



Note

All bearing and running surfaces must be oiled before assembling.

4.1 Pistons and conrods - exploded view

1 - Conrod bolt, 30 Nm + 1/4 turn (90°) further

- ☐ Renew
- ☐ Lubricate threads and contact surface
- ☐ To measure radial clearance, tighten to 30 Nm but do not turn further

2 - Pressure relief valve, 27 Nm

- ☐ Opening pressure: 1.6...1.9 bar

3 - Oil spray jet

- ☐ For piston cooling

4 - Conrod bearing cap

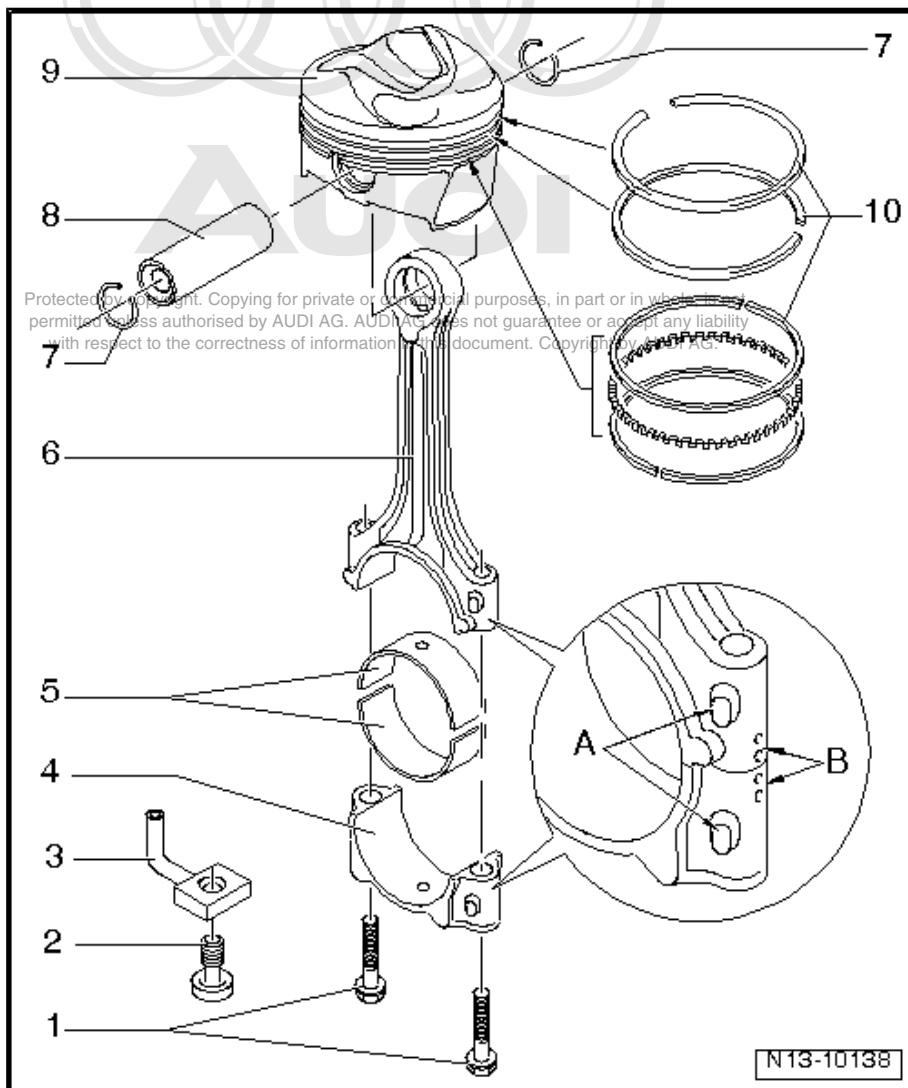
- ☐ Note installation position
- ☐ Due to the cracking method used to separate the bearing cap from the conrod in manufacture, the caps only fit in one position and only on the appropriate conrod.
- ☐ Mark cylinder number -B-
- ☐ Installation position: Markings -A- face towards pulley end

5 - Bearing shell

- ☐ Note installation position ⇒ [page 73](#)
- ☐ Do not interchange used bearing shells
- ☐ Measuring axial clearance ⇒ [page 76](#)
- ☐ Measuring radial clearance ⇒ [page 77](#)

6 - Conrod

- ☐ With industrially cracked conrod bearing cap
- ☐ Only renew as a complete set
- ☐ Mark cylinder number -B-
- ☐ Installation position: Markings -A- face towards pulley end



7 - Circlip**8 - Piston pin**

- ☐ If difficult to move, heat piston to 60 °C
- ☐ Remove and install using drift -VW 222 A-

9 - Piston

- ☐ Checking ⇒ [page 75](#)
- ☐ Mark installation position and cylinder number
- ☐ Arrow on piston crown points to pulley end
- ☐ Install using piston ring clamp
- ☐ Checking cylinder bore ⇒ [page 76](#)

10 - Piston rings

- ☐ Offset gaps by 120°
- ☐ Use piston ring pliers to remove and install
- ☐ Marking faces to piston crown
- ☐ Checking ring gap ⇒ [page 74](#)
- ☐ Checking ring-to-groove clearance ⇒ [page 75](#)

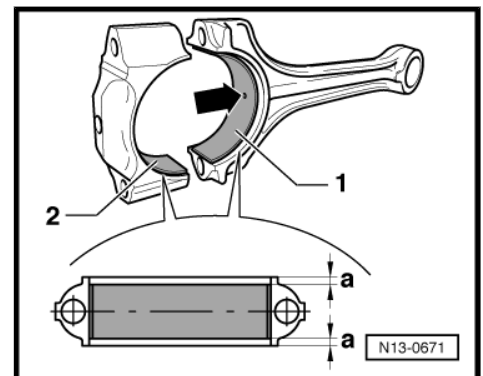
Bearing shells - installation position

Bearing shell -1- with oil drilling -arrow- for conrod.

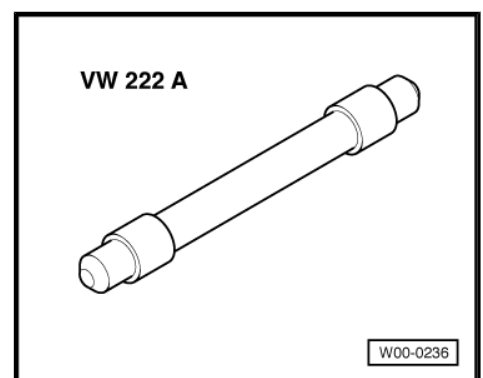
Bearing shell -2- without oil drilling for conrod bearing cap.

- Position bearing shells in centre of conrod and conrod bearing cap when fitting.

Dimension -a- must be identical on both sides.

**4.2 Removing and installing pistons****Special tools and workshop equipment required**

- ◆ Drift -VW 222 A-



- ◆ Piston ring clamp, commercially available

Removing

- Remove cylinder head ⇒ [page 105](#) .
- Engine codes AXW, BLX, BHD, BLY, BLR, BMB: Remove sump with balance shaft assembly and oil pump ⇒ [page 162](#) .

- Engine codes BVY, BVZ: Remove oil pump with balance shaft assembly ⇒ [page 170](#) .
- Mark installation position and cylinder number of piston.
- Mark installation position and cylinder number of conrod ⇒ [Item 6 \(page 72\)](#) .
- Remove conrod bearing cap and pull out piston and conrod upwards.

**Note**

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

- Take circlip out of piston pin boss.
- Use drift -VW 222 A- to drive out piston pin.

Installing

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

- Tightening torque ⇒ „4 Pistons and conrods“, [page 72](#)

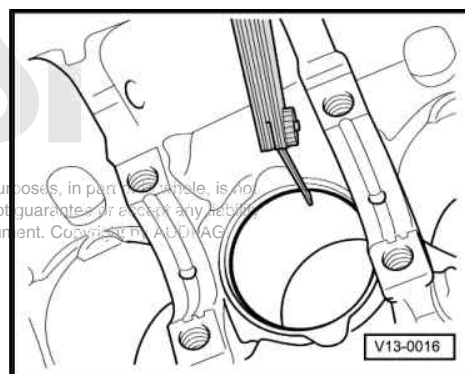
**Note**

- ◆ *Renew the bolts tightened with specified tightening angle.*
- ◆ *Arrow on piston crown points to pulley end.*
- ◆ *Piston ring gaps should be spaced at 120°.*
- Oil running surfaces of bearing shells.
- Install piston using commercially available piston ring clamp; note installation position ⇒ [Item 9 \(page 73\)](#) .
- Install conrod bearing cap; note installation position ⇒ [Item 4 \(page 72\)](#) .
- Install cylinder head ⇒ [page 105](#) .
- Engine codes AXW, BLX, BHD, BLY, BLR, BMB: Install sump with balance shaft assembly and oil pump ⇒ [page 162](#) .
- Engine codes BVY, BVZ: Install oil pump with balance shaft assembly ⇒ [page 170](#) .

4.3 Checking piston, piston rings and cylinder bore

Checking piston ring gap

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any responsibility with respect to the correctness of information in this document. Copyright © AUDI AG

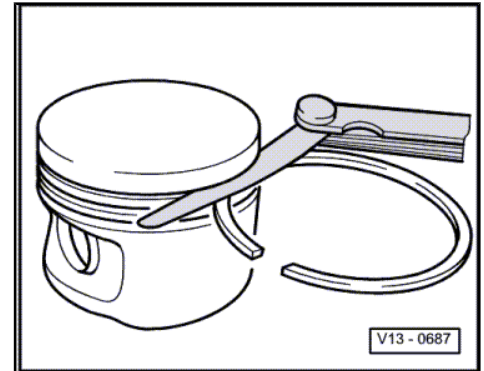


Special tools and workshop equipment required

- ◆ Feeler gauge
- Push ring squarely from above down to approx. 15 mm from bottom end of cylinder.

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

Checking ring-to-groove clearance



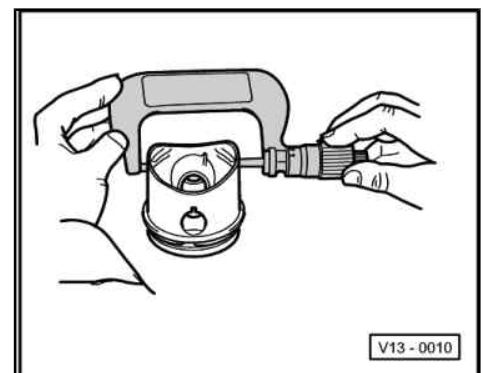
Special tools and workshop equipment required

- ◆ Feeler gauge

- Clean groove in piston before checking clearance

Piston ring		Ring-to-groove clearance	
		New	Wear limit
Compression rings	mm	0.06...0.09	0.20
Oil scraper ring	mm	0.03...0.06	0.15

Checking piston



Special tools and workshop equipment required

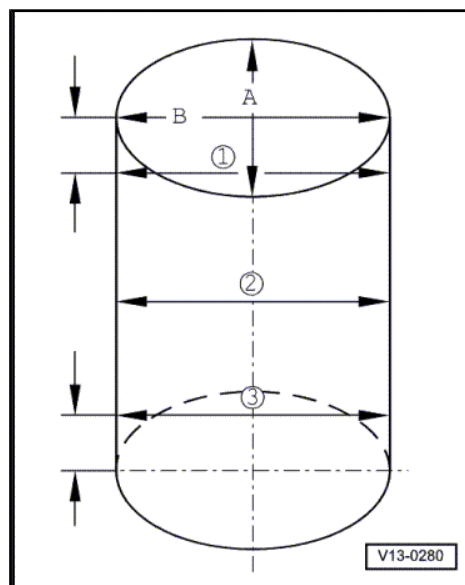
- ◆ Micrometer 75...100 mm

- Measure pistons approx 10 mm from the lower edge of skirt, at 90 ° to the piston pin axis.

Difference between actual and nominal diameter: not more than 0.04 mm.

		Piston Ø
Basic dimension	mm	82.465 ¹⁾
• ¹⁾Dimensions not including graphite coating (thickness 0.02 mm). The graphite coating will wear down in service.		

Checking cylinder bore



Special tools and workshop equipment required

- ◆ Cylinder gauge -VAS 6078-



Note

- ◆ *Dark or shiny patches on the cylinder wall do not indicate damage to the cylinder bore so long as the cross-hatching is visible.*
- ◆ *The cylinder bore should always be measured at three points in the transverse direction and in the longitudinal direction using cylinder gauge -VAS 6078-.*
- Use a cylinder gauge -VAS 6078- to take measurements at 3 points in transverse direction -A- and in longitudinal direction -B-.

Difference between actual and nominal diameter: **not more than 0.08 mm.**

Copyright by Audi AG. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



Note

Measuring the cylinder bores must not be done when the cylinder block is mounted on a repair stand with engine and gearbox support -VW 540-, as incorrect measurements may result.

		Cylinder bore Ø
Basic dimension	mm	82.51

4.4 Measuring axial clearance of conrods

Special tools and workshop equipment required

- ◆ Feeler gauge

Procedure

- Check gap using feeler gauge.

Axial clearance:

- New: 0.10 ... 0.30 mm.
- Wear limit: 0.40 mm.

4.5 Measuring radial clearance of conrods

Special tools and workshop equipment required

- ◆ Plastigage

Procedure

- Remove conrod bearing cap.
- Clean bearing cap and bearing journal.
- Place a length of Plastigage corresponding to the width of the bearing on the bearing journal or in the bearing shell.
- Fit conrod bearing caps and tighten to 30 Nm without turning bolts further; do not rotate crankshaft.
- Remove conrod bearing cap again.
- Compare width of Plastigage with measurement scale.

Radial clearance:

- New: 0.01 ... 0.052 mm.
- Wear limit: 0.09 mm.
- Renew conrod bolts.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

15 – Cylinder head, valve gear

1 Toothed belt drive

1.1 Toothed belt drive - exploded view, engine code AXW, BMB, BHD



Note

Mark the rotation direction of the toothed belt with chalk or felt-tip pen before removing. If the belt runs in the opposite direction when it is refitted, this can cause breakage.

1 - Toothed belt cover (bottom)

- ☐ Unbolt crankshaft pulley to remove

2 - 10 Nm

- ☐ Apply locking fluid when fitting
- ☐ Locking fluid ⇒ Parts catalogue

3 - Toothed belt cover (centre)

4 - Engine support

- ☐ Removing ⇒ Removing and installing toothed belt ⇒ [page 81](#)

5 - 45 Nm

- ☐ Observe correct tightening sequence ⇒ [page 81](#)

6 - Toothed belt cover (top)

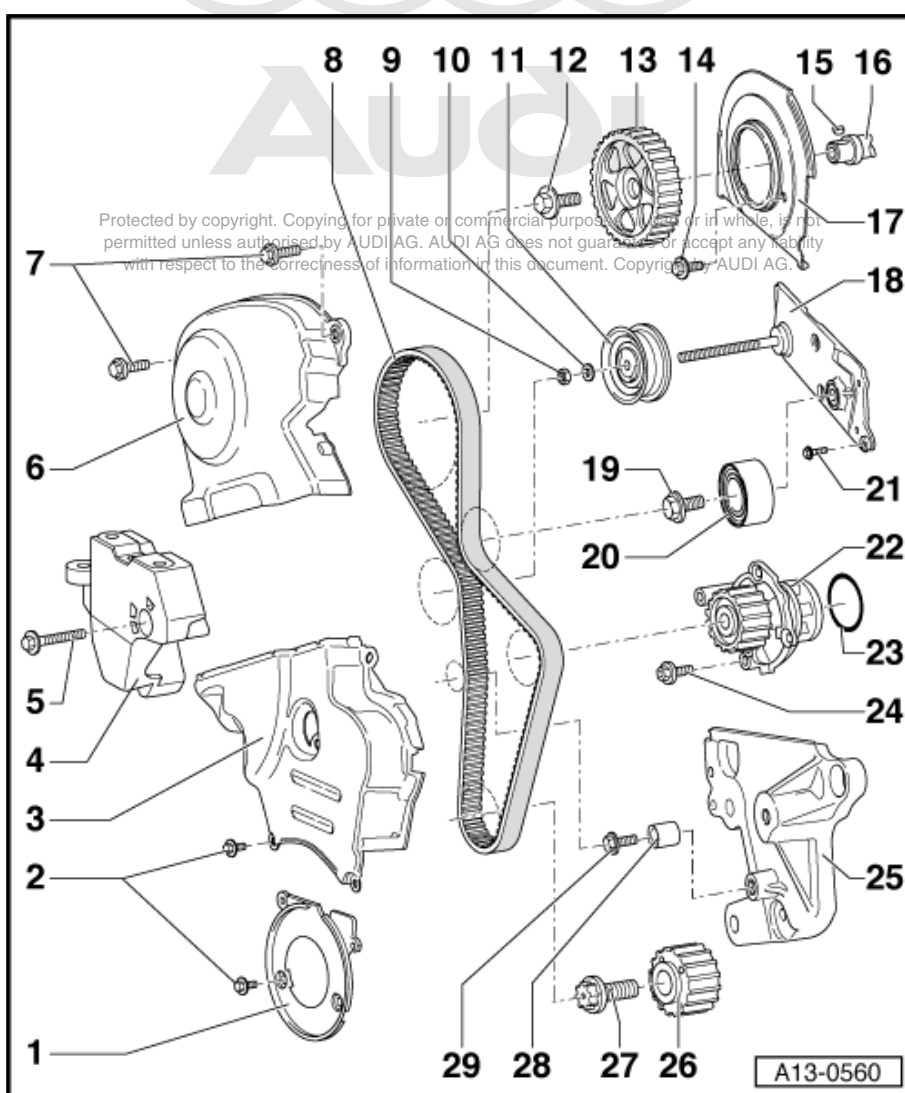
- ☐ Removing and installing ⇒ [page 80](#)

7 - 10 Nm

- ☐ Apply locking fluid when fitting
- ☐ Locking fluid ⇒ Parts catalogue

8 - Toothed belt

- ☐ Before removing, mark direction of rotation with



chalk or felt-tip pen

- ☐ Check for wear
- ☐ Removing ⇒ [page 81](#)
- ☐ Installing (adjusting valve timing) ⇒ [page 81](#)

9 - 25 Nm

10 - Washer

11 - Tensioning roller

- ☐ Installation position ⇒ [page 80](#)

12 - 50 Nm + turn 180° further

- ☐ Renew
- ☐ Use counterhold 3036 when loosening and tightening ⇒ [page 80](#)

13 - Camshaft sprocket

- ☐ Remove toothed belt prior to removing and installing ⇒ [page 81](#)
- ☐ Installation position fixed by Woodruff key ⇒ [Item 15 \(page 79\)](#)
- ☐ Detaching camshaft sprocket ⇒ [page 80](#)

14 - 23 Nm

- ☐ Apply locking fluid when fitting
- ☐ Locking fluid ⇒ Parts catalogue

15 - Woodruff key

- ☐ Check for firm attachment

16 - Camshaft

17 - Toothed belt cover (rear)

18 - Retaining plate for tensioning roller

- ☐ Observe correct tightening sequence ⇒ [page 81](#)

19 - 40 Nm

20 - Idler roller

21 - 9 Nm

22 - Coolant pump

- ☐ Removing and installing ⇒ [page 206](#)

23 - O-ring

- ☐ Renew

24 - 15 Nm

25 - Retaining plate

- ☐ Tightening sequence ⇒ [page 81](#)

26 - Crankshaft sprocket

- ☐ Contact surface between sprocket and crankshaft must be free of oil
- ☐ Can only be installed in one position

27 - 90 Nm + 90° (1/4 turn) further

- ☐ Renew
- ☐ Do not lubricate with oil
- ☐ Use counterhold 3415 when slackening off and tightening
- ☐ Attaching counterhold tool 3415 ⇒ [page 81](#)

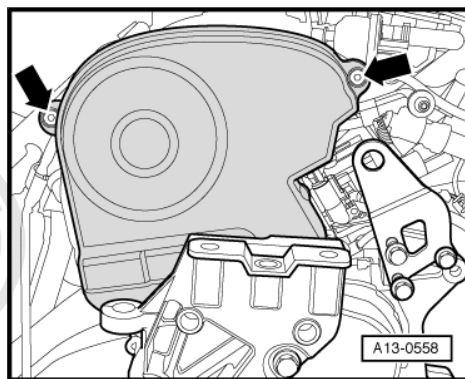
28 - Damper wheel

29 - 25 Nm

This document is a technical specification for repair and maintenance purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability respect to the correctness of information in this document. Copyright by AUDI AG.

Removing and installing toothed belt cover (top)

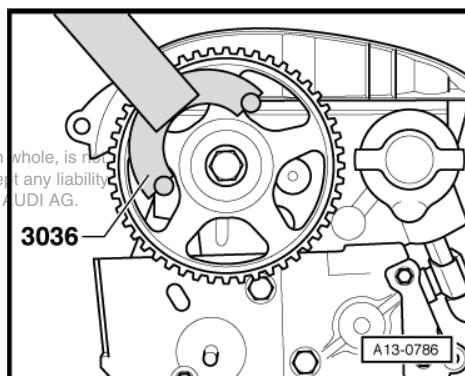
- Remove the bolts -arrows- and lift off toothed belt cover.
- Engage carefully in toothed belt cover (centre) when installing.



Loosening camshaft sprocket

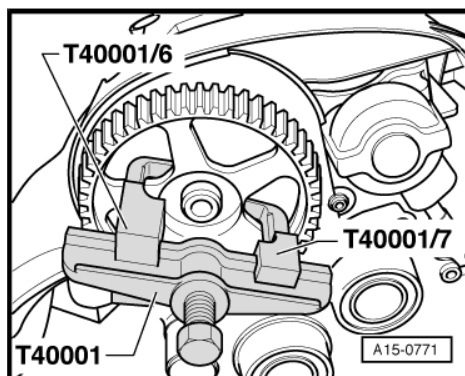
- Use counterhold 3036 to loosen and tighten the central bolt.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



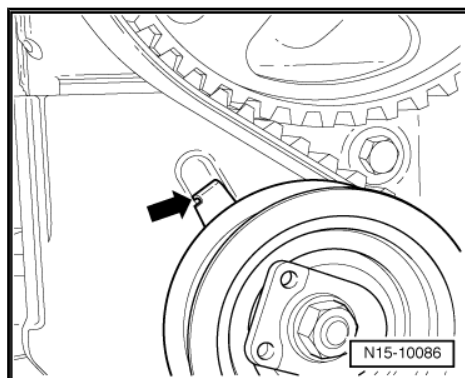
Detaching camshaft sprocket

- Use two-arm puller -T40001- with claws T400001/6 and T400001/7 to detach camshaft sprocket.



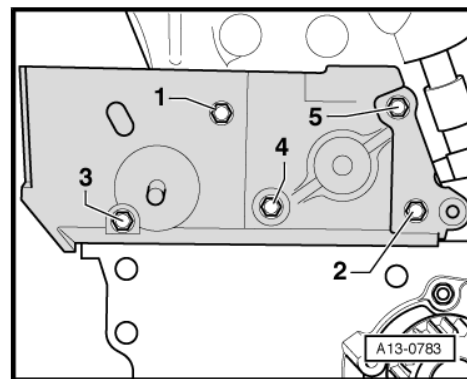
Installation position of toothed belt tensioning roller

Retaining lug -arrow- must engage in slot on cylinder head.

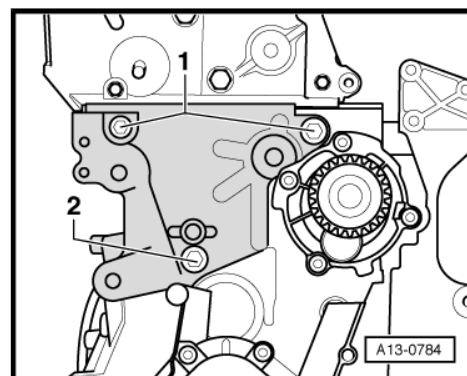


Tightening sequence for retaining plate

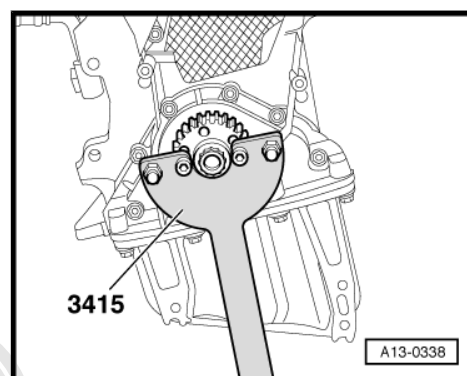
- Tighten retaining plate bolts to 9 Nm in the sequence -1 ... 5-.

**Tightening sequence for retaining plate**

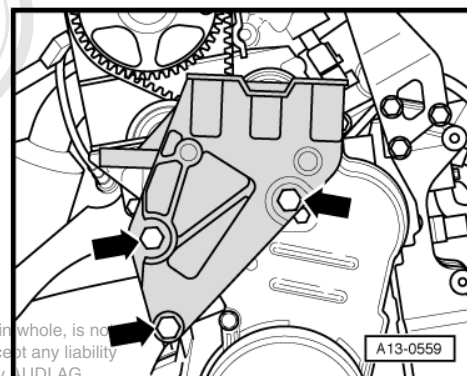
- First tighten bolts -1- to 40 Nm.
- Then tighten bolt -2- to 15 Nm.

**Removing and installing crankshaft sprocket**

- Use counterhold 3415 to loosen and tighten the central bolt.

**Installing engine support**

- Initially screw bolts -arrows- in hand-tight.
- Then tighten bolts -arrows- to 45 Nm.



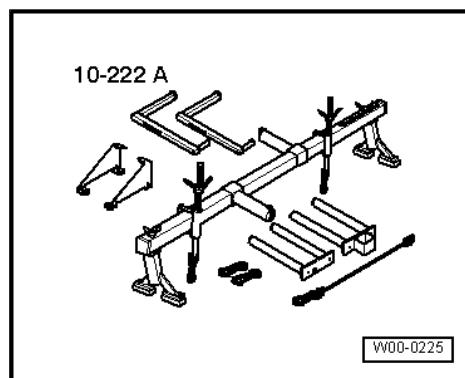
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG

1.2 Removing and installing toothed belt, engine code AXW, BMB, BHD

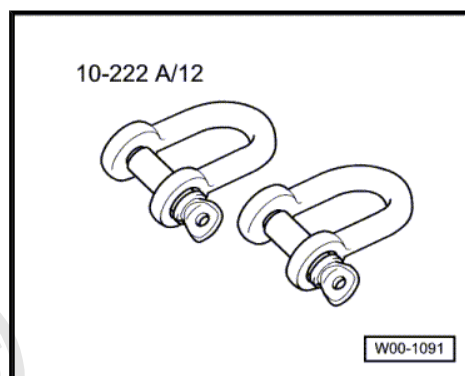
Special tools and workshop equipment required



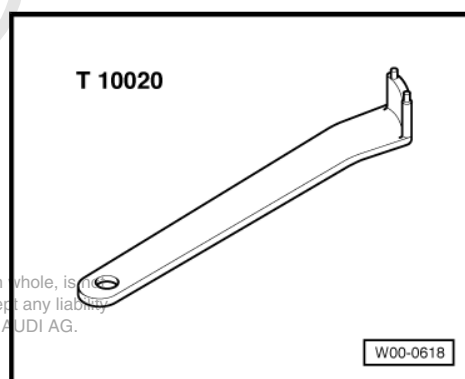
◆ Support bracket -10 - 222 A-



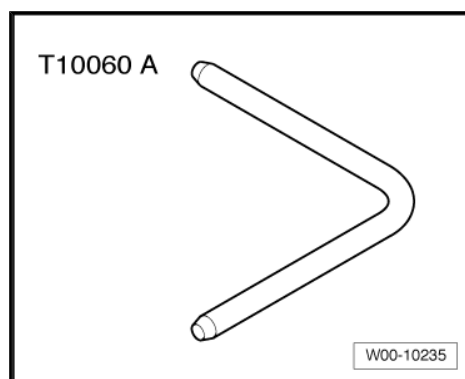
◆ Shackle -10 - 222 A /12-



◆ Pin wrench -T10020-



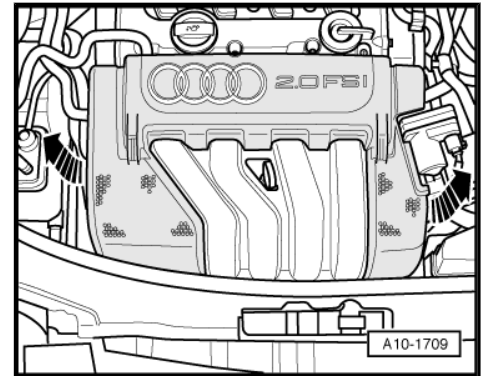
◆ Locking pin -T10060A-



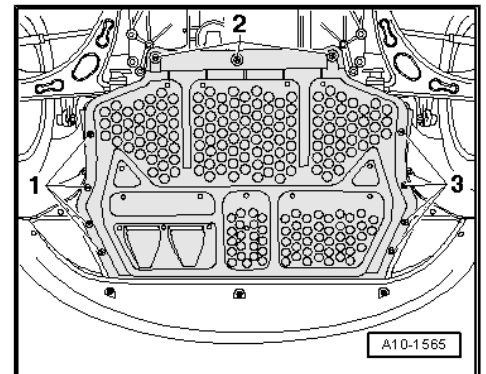
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Removing

- Lift off engine cover panel -arrows-.



- Remove noise insulation (centre) - fasteners -1 ... 3-.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

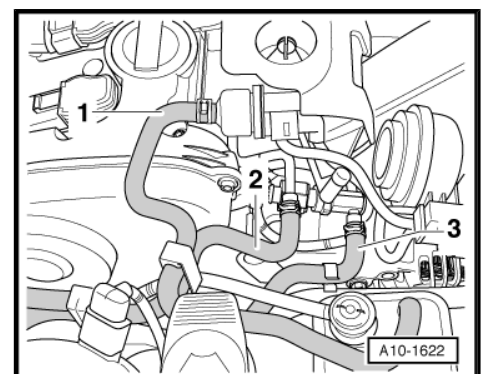
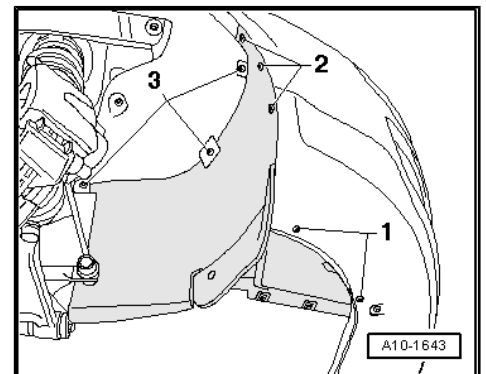
- Remove noise insulation (right-side) - fasteners -1 ... 3-.



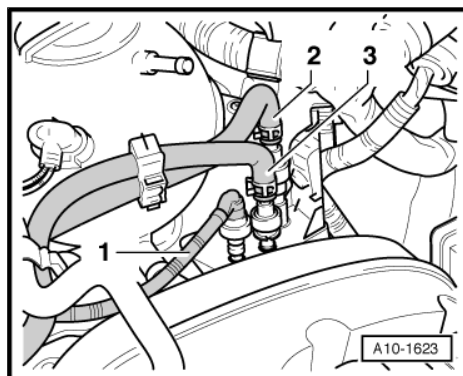
WARNING

The fuel system is pressurised. Wrap a cloth around the connection before opening the system. Then release pressure by carefully loosening the connection.

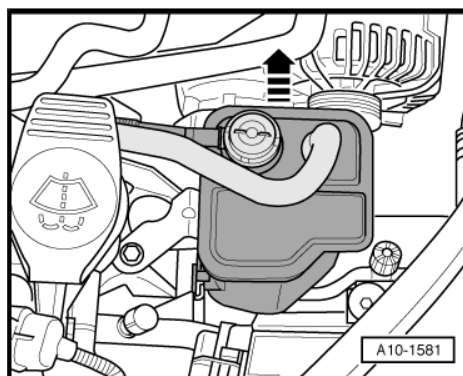
- Mark fuel supply and return lines.
- Detach hose going to activated charcoal filter -1-.
- Disconnect fuel supply line -2- by pulling release tab.
- Disconnect fuel return line -3- by pulling release tab.



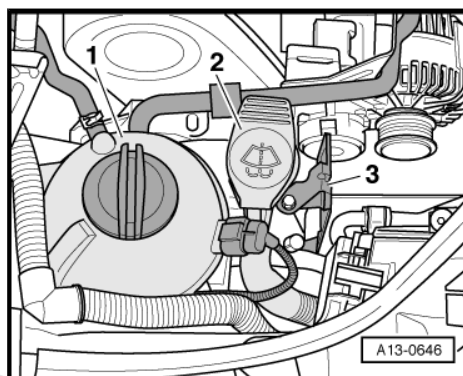
- Disconnect vacuum line -1- going to activated charcoal filter by pressing release tab.
- Disconnect fuel supply line -2- by pulling release tab.
- Disconnect fuel return line -3- by pulling release tab.



- Lift out activated charcoal filter from retainer with pipes connected -arrow-.



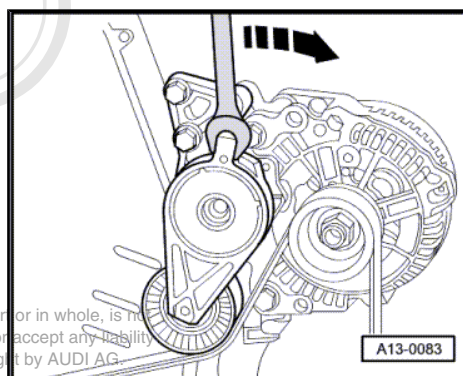
- Unbolt bracket -3- for ACF.
- Unfasten bolt at filler neck of washer fluid reservoir -2-.
- Disconnect electrical wire for coolant shortage indicator switch at expansion tank -1-.
- Unbolt coolant expansion tank and lay it aside with pipes connected.



Note

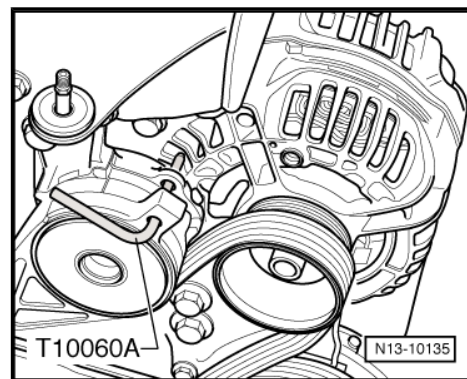
Before removing, mark direction of rotation of poly V-belt with chalk or felt-tip pen. If the belt runs in the opposite direction when it is refitted, this can cause breakage.

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



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Lock tensioner in position with locking pin -T10060A- .
- Take off poly V-belt.
- Remove locking pin -T10060A- from tensioner for poly V-belt.



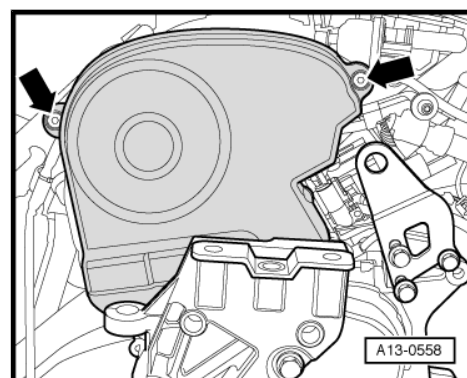
- Remove the bolts -arrows- and lift off toothed belt cover.

**Note**

Engage carefully in toothed belt cover (centre) when installing.

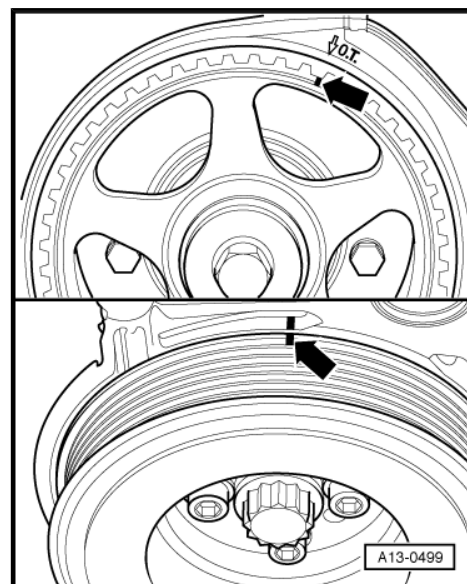
**WARNING**

The engine must only be turned at the crankshaft, in the direction of normal engine rotation (clockwise).

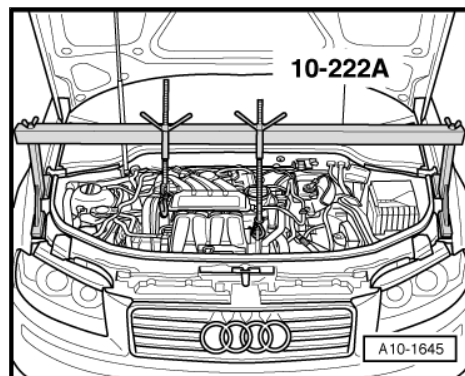
**Note**

Turn over the engine at the central bolt on the crankshaft.

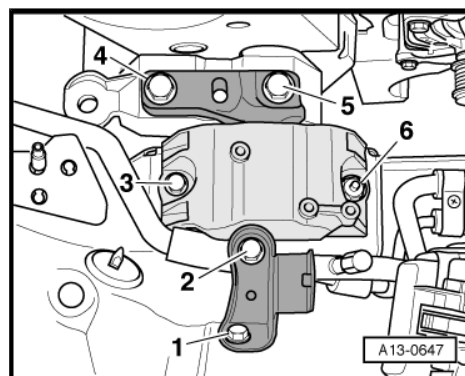
- Rotate engine to TDC of No. 1 cylinder by turning central bolt of crankshaft sprocket in normal direction of rotation. Marking on camshaft sprocket and marking on crankshaft must be aligned to TDC of cylinder No. 1 -arrows-.



- Position support bracket 10-222 A on wing mounting flange. The spindles face forwards.
- Detach crankcase breather hose from oil filler neck.
- Attach hooks of spindles with shackles -10 - 222 A /12- to the lifting eyes.
- Take up weight of engine evenly with both spindles (but do not raise engine).



- Remove bolts -1- and -2- and detach connecting bracket.
- Unscrew bolts -3 ... 6- and detach engine mounting.

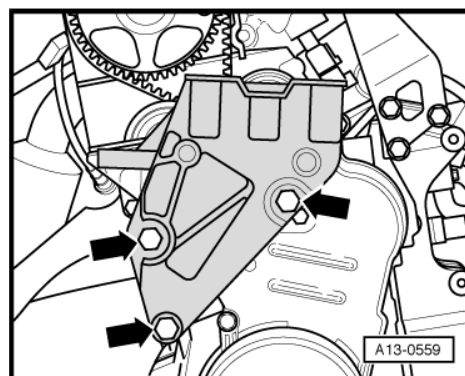


- Remove bolts -arrows- and take off engine support



Note

To slacken the bolts for the engine support, raise or lower the engine slightly as necessary via the spindles on engine support bracket -10 - 222 A- .

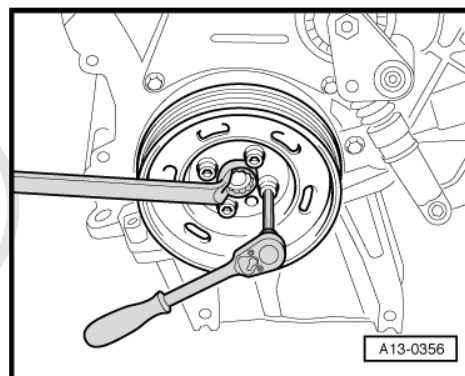


- Unbolt crankshaft pulley.

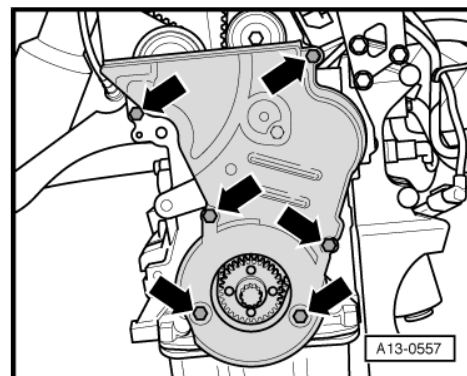


Note

To loosen and tighten the crankshaft pulley, counterhold central bolt with a ring spanner.



- Unbolt toothed belt covers (bottom and centre) -arrows-.
- Mark rotation direction of toothed belt with chalk or felt-tip pen.



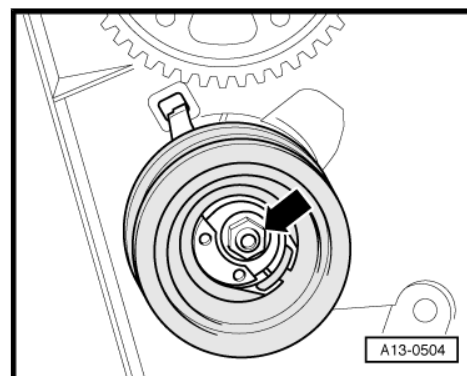
- Loosen nut on tensioning roller -arrow- several turns.
- Remove toothed belt.

Installing (adjusting valve timing)

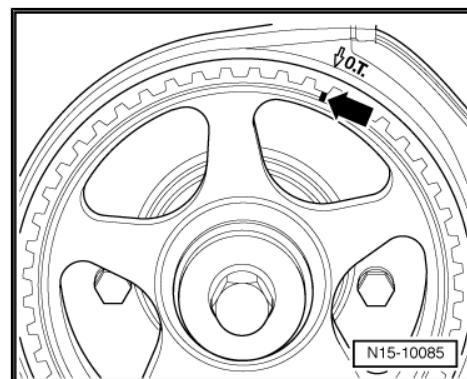


Note

- ◆ *When turning the camshaft, the crankshaft must not be at TDC. Otherwise, there is a risk of damage to valves and piston crowns.*
- ◆ *The engine must be no more than warm to touch.*



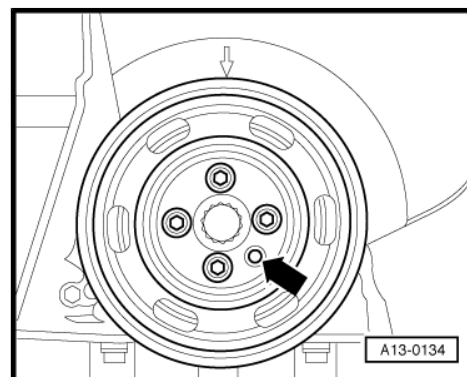
- Bring mark on camshaft sprocket in line with mark on toothed belt cover.
- Fit toothed belt on crankshaft sprocket (note rotation direction).
- Secure toothed belt cover (bottom section) with the two bolts at the bottom.



Note

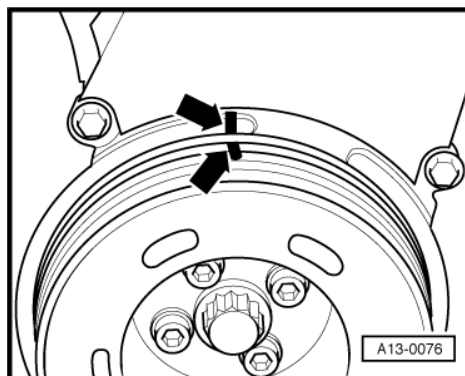
The vibration damper/pulley can only be installed in one position: The hole -arrow- in the vibration damper must fit over the projection on the toothed belt sprocket on the crankshaft.

- Install vibration damper / pulley with new bolts. Note positive location -arrow-; tightening torque: 10 Nm + 90° further.

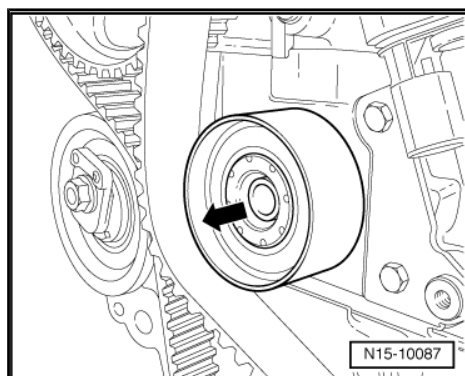


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Turn crankshaft at vibration damper to TDC No. 1 cylinder -arrows-.

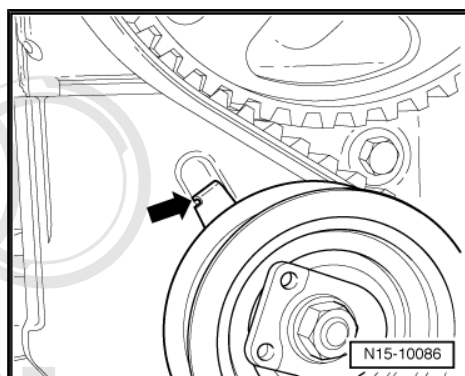


- Fit toothed belt in the sequence: tensioning roller, camshaft sprocket, coolant pump and last onto idler roller -arrow-.

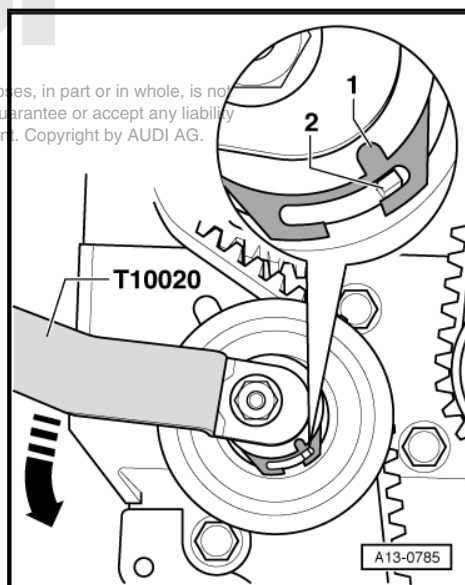


Note

Check tensioning roller is seated correctly in cylinder head.



- Tension toothed belt. To do so, turn pin wrench -T10020- at the eccentric adjuster anti-clockwise (direction of arrow) until the notch -1- is above the indicator -2- (toothed belt over-tensioned).
- Then release tension on toothed belt until the notch -1- and the indicator -2- are aligned.
- Tighten securing nut
- Turn crankshaft two turns in direction of engine rotation and set again to TDC. Make sure that the engine is rotated without stopping during the final 45° (1/8 turn).
- Check tension of toothed belt again. Specification: indicator and notch must align.



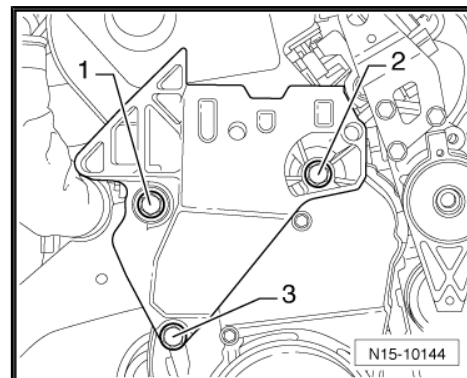
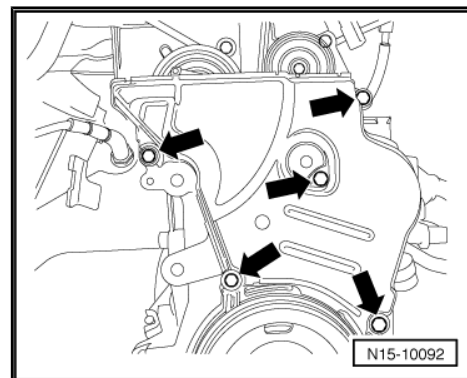
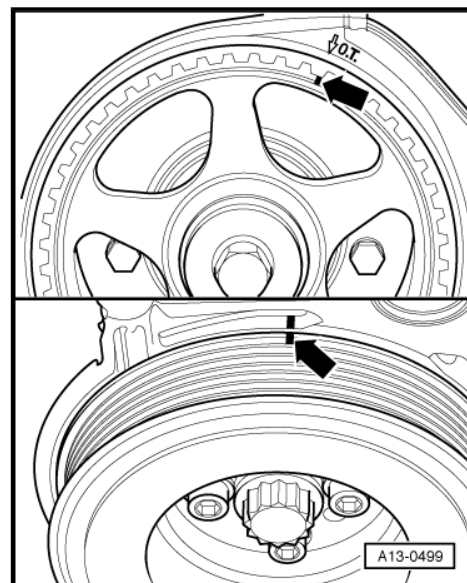
- Check valve timing again.

If the markings do not align:

- Repeat adjustment of valve timing.

If the markings align:

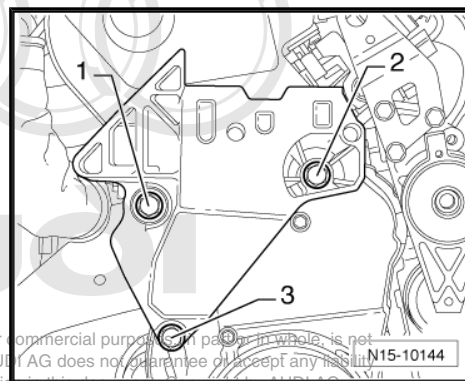
- Install toothed belt cover (centre) -arrows-.
- Install toothed belt cover (top section).
- Insert bottom securing bolt in engine support. Attach engine support to cylinder block from below and tighten bolt finger-tight.



Note

Note different bolt lengths. Bolt -2- is approx. 15 mm shorter than bolts -1 and 3-.

- Fit bolts -1 and 2- and tighten all bolts.
- Lower the engine down to installation position.
- Install complete assembly mounting for engine.
- Remove support bracket -10-222A- .
- Place toothed belt on crankshaft sprocket (observe direction of rotation).
- Adjust engine mountings ⇒ [page 32](#) .
- Install poly V-belt ⇒ [page 41](#) .
- Bleed fuel system ⇒ Motronic direct injection and ignition system (4-cylinder); Rep. Gr. 24; Servicing fuel injection system .



Tightening torques

Component	Nm
Toothed belt tensioning roller to cylinder head	23
Toothed belt cover (bottom) to cylinder block	10 ³⁾
Toothed belt cover (centre) to cylinder block	10 ³⁾
Engine support to cylinder block	45
Engine mounting to body	40 + 90° ^{1) 2)}
Connecting bracket to body/engine mounting	20 + 90° ^{1) 2)}

- ¹⁾ 90° = a quarter of a turn
- ²⁾ Renew nuts/bolts
- ³⁾ Install using locking fluid; for locking fluid refer to ⇒ Parts catalogue .

1.3 Toothed belt drive - exploded view, engine code BLX, BLY, BLR, BVY and BVZ

1 - 10 Nm

2 - Toothed belt cover (top)

3 - 50 Nm + turn 180° further

- ☐ Renew
- ☐ Use counterhold tool -3036- to loosen and tighten

4 - Camshaft sprocket

- ☐ Installation position fixed by Woodruff key

5 - 10 Nm

- ☐ Apply locking fluid when fitting

6 - Toothed belt cover (rear)

7 - Woodruff key

- ☐ Check for firm attachment

8 - 25 Nm

9 - Semi-automatic tensioning roller

10 - Coolant pump

- ☐ Removing and installing
⇒ [page 206](#)

11 - O-ring

- ☐ Renew

12 - 25 Nm

13 - Damper wheel

14 - 15 Nm

15 - 35 Nm

16 - Damper wheel

17 - Sealing flange

18 - Crankshaft sprocket

- ☐ Contact surface between sprocket and crankshaft must be free of oil
- ☐ Can only be installed in one position

19 - 90 Nm + 90° (1/4 turn) further

- ☐ Renew
- ☐ Do not lubricate with oil
- ☐ Use counterhold tool -3415- to loosen and tighten

20 - Toothed belt

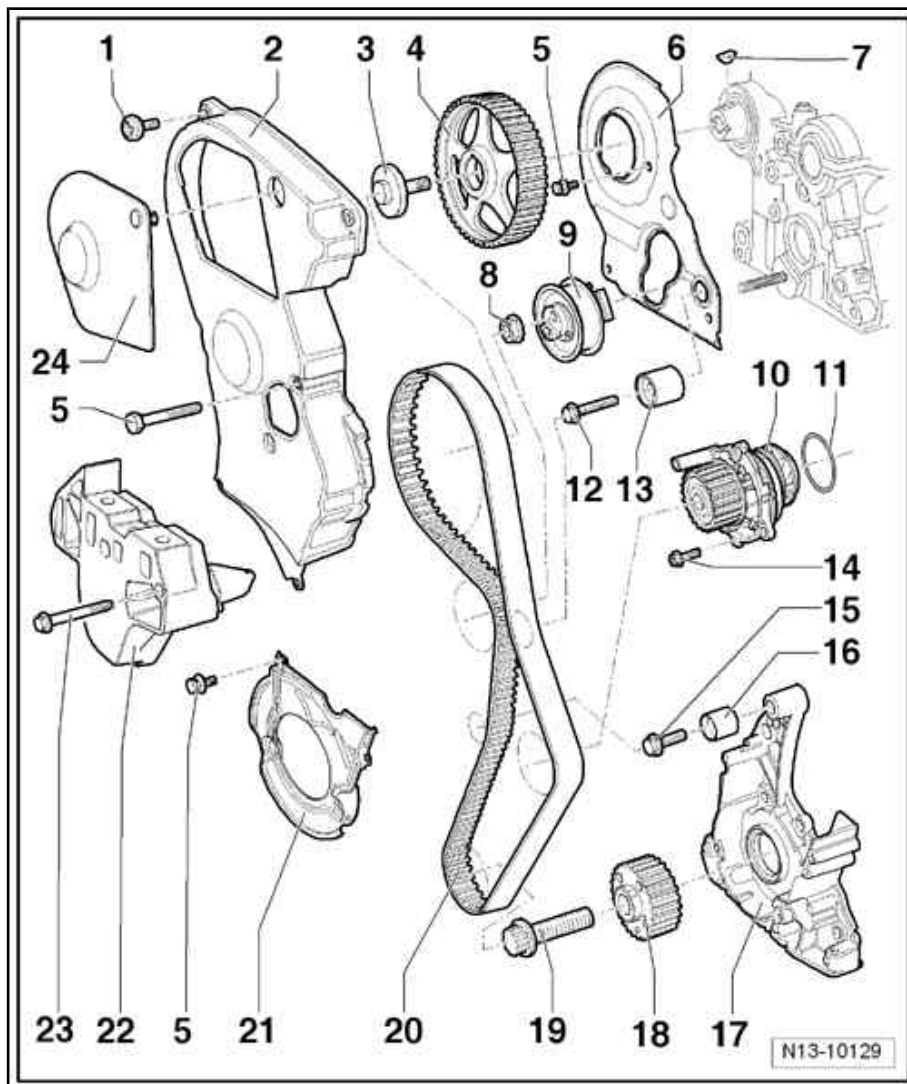
- ☐ Before removing, mark direction of rotation with chalk or felt-tip pen
- ☐ Check for wear
- ☐ Removing and installing ⇒ [page 92](#)

21 - Toothed belt cover (bottom)

22 - Engine support

23 - 45 Nm

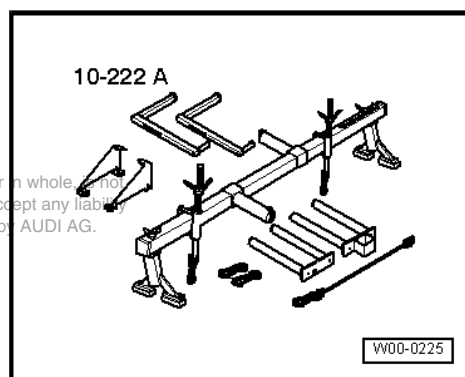
24 - Cap for toothed belt cover



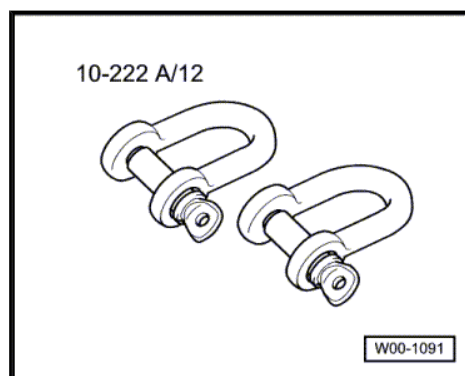
1.4 Removing and installing toothed belt, engine code BLX, BLY, BLR, BVY, BVZ

Special tools and workshop equipment required

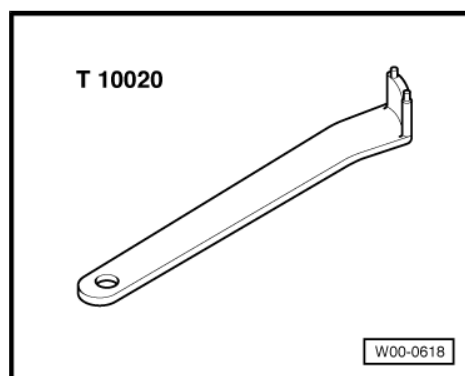
- ◆ Support bracket -10 - 222 A-



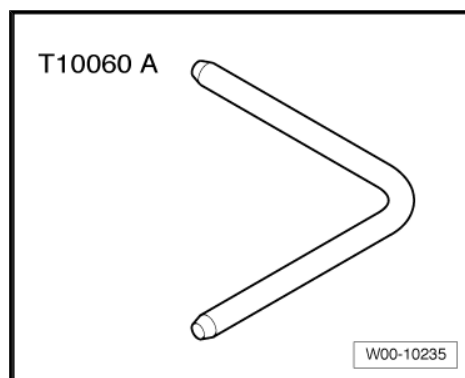
- ◆ Shackle -10 - 222 A /12-



- ◆ Pin wrench -T10020-



- ◆ Locking pin -T10060A-

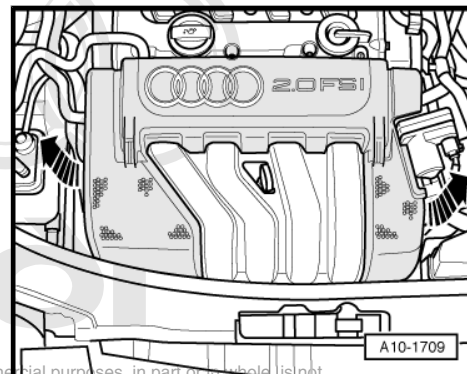


**Note**

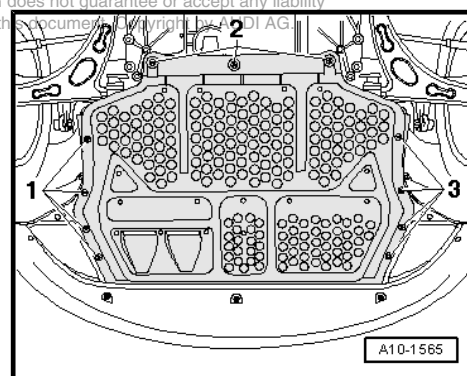
In order to remove the engine support, the engine must be raised as far as possible with support bracket -10-222A-. Detach drive shafts from gearbox to prevent damage to the drive shafts (otherwise the permissible bending angle is exceeded).

Removing

- Lift off engine cover panel -arrows-.



- Remove noise insulation (centre) with fasteners -1...3-.

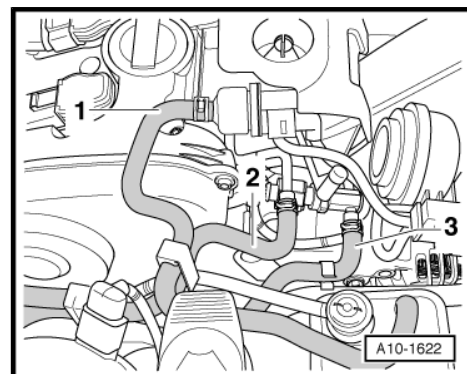
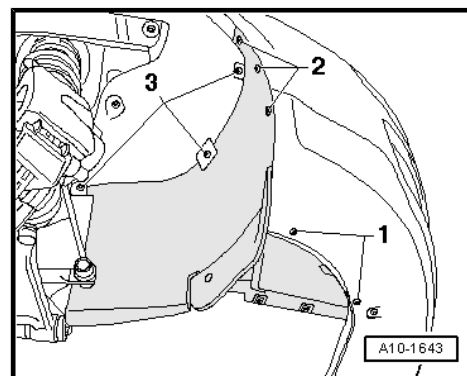


- Remove noise insulation (right-side) - fasteners -1 ... 3-.

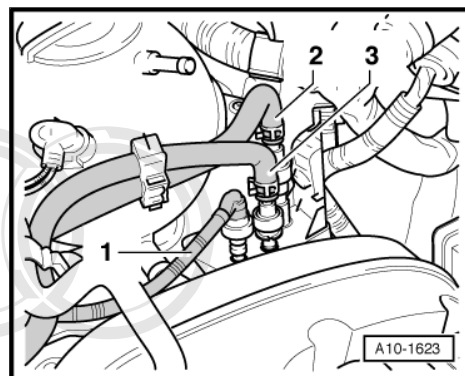
**WARNING**

Fuel supply line is pressurised. Wear safety goggles and protective clothing to avoid possible injury and skin contact. Before removing from hose connection wrap a cloth around the connection. Then release pressure by carefully pulling hose off connection.

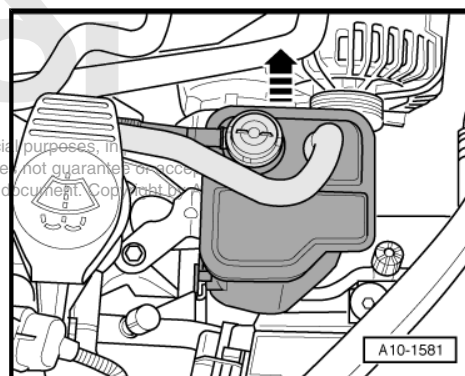
- Mark fuel supply and return lines.
- Detach hose going to activated charcoal filter -1-.
- Disconnect fuel supply line -2- by pulling release tab.
- Disconnect fuel return line -3- by pulling release tab.



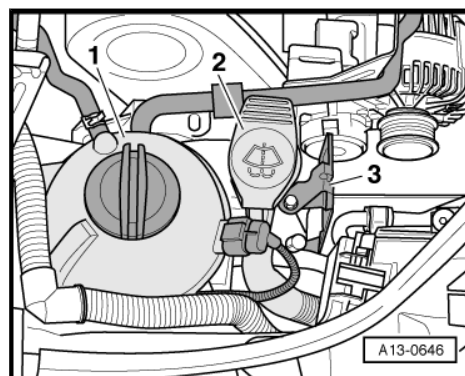
- Disconnect vacuum line -1- going to activated charcoal filter by pressing release tab.
- Disconnect fuel supply line -2- by pulling release tab.
- Disconnect fuel return line -3- by pulling release tab.



- Lift out activated charcoal filter from retainer with pipes connected -arrow-.



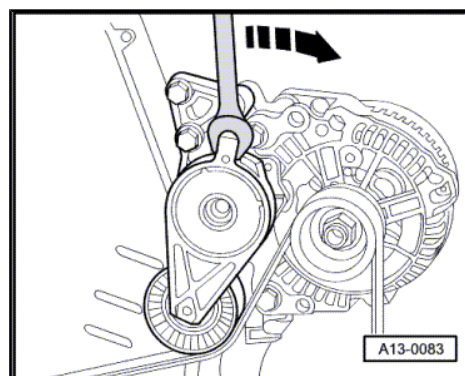
- Unbolt bracket -3- for ACF.
- Unfasten bolt at filler neck of washer fluid reservoir -2-.
- Disconnect electrical wire for coolant shortage indicator switch at expansion tank -1-.
- Unbolt coolant expansion tank and lay it aside with pipes connected.



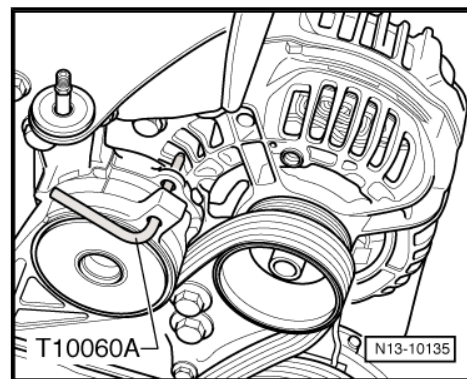
Note

Before removing, mark direction of rotation of poly V-belt with chalk or felt-tip pen. If the belt runs in the opposite direction when it is refitted, this can cause breakage.

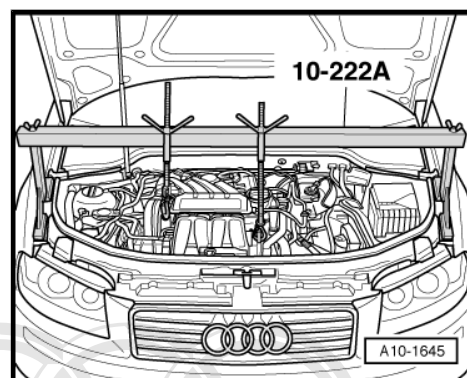
- To slacken poly V-belt, turn tensioner in -direction of arrow-.



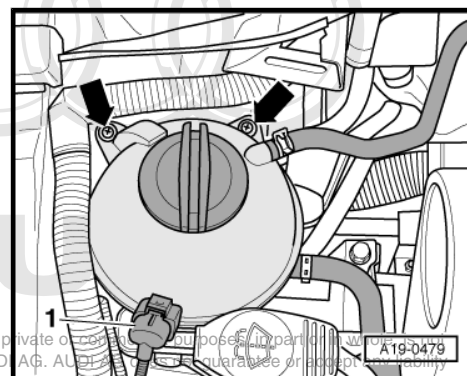
- Lock tensioner in position with locking pin -T10060A- .
- Take off poly V-belt.
- Remove locking pin -T10060A- from tensioner for poly V-belt.



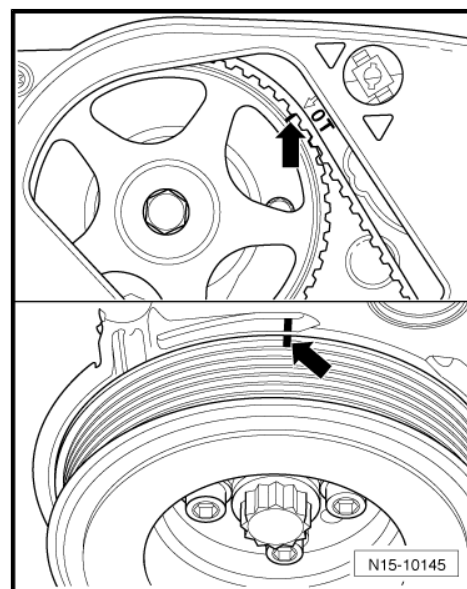
- Position support bracket -10 - 222 A- on bolted flanges of wing panels. The spindles face forwards.
- Detach crankcase breather hose from oil filler neck.
- Attach hooks of spindles with shackles -10 - 222 A /12- to the lifting eyes.
- Take up weight of engine evenly with both spindles (but do not raise engine).



- Unplug electrical connector -1-. Detach coolant expansion tank and move clear to one side.

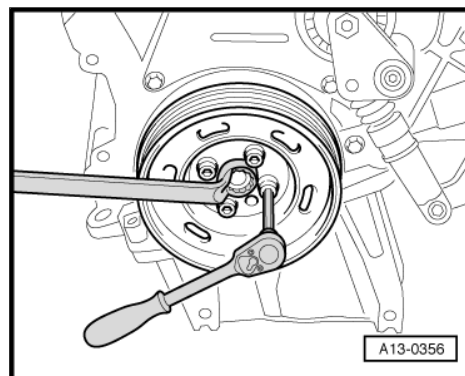


- Set camshaft sprocket to TDC marking by turning crankshaft. Marking on camshaft sprocket must align with arrow on toothed belt cover.

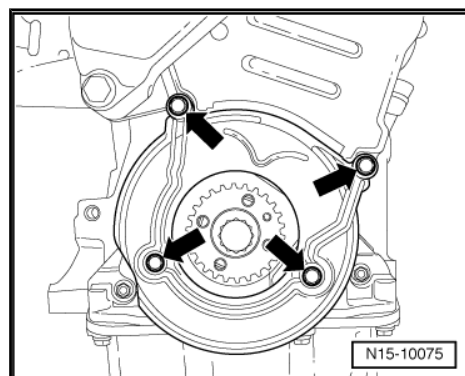


Protected by copyright. Copying for private or commercial purposes in part or in full is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept responsibility with respect to the correctness of information in this document. Copyright by AUDI AG.

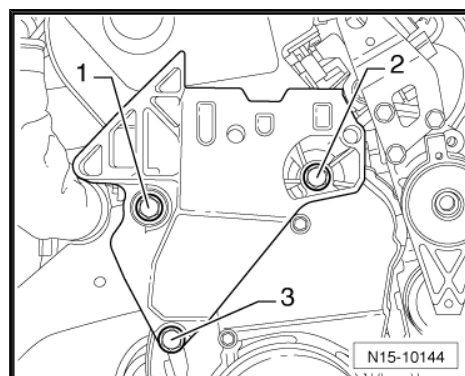
- Remove vibration damper / pulley.



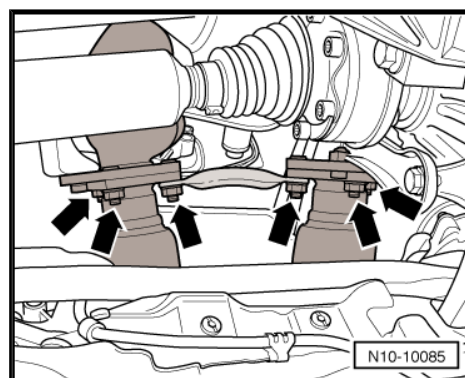
- Unscrew bolts from toothed belt cover (bottom) -arrows-.



- Remove bolt at bottom -3-.

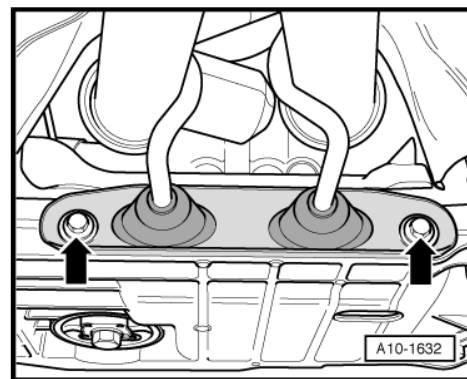


- Remove securing nuts -arrows- on front exhaust pipe/exhaust manifold.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Unbolt bracket for exhaust system -arrows-.



- Unscrew bolts -2- and -3- at pendulum support.
- Detach drive shafts from gearbox ⇒ Rep. gr. 40 .

Vehicles with air conditioning:

- Detach air conditioning system pipes from body.



Note

Do not open air conditioning system!

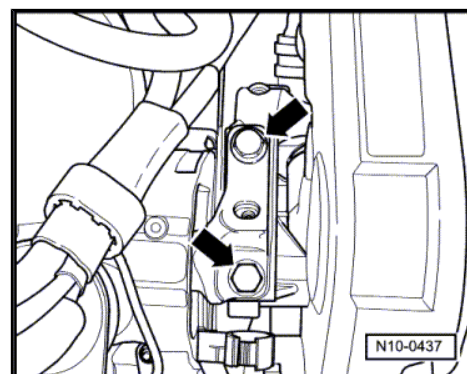
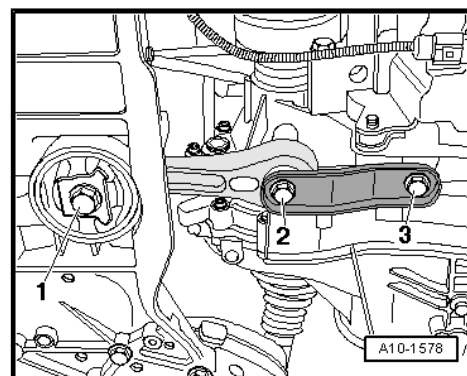
All vehicles (continued):

- Remove securing bolts from assembly mounting/engine support -arrows- and remove complete assembly mounting.

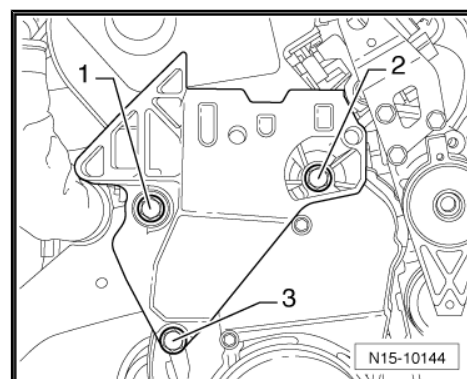


Caution

When raising engine with support bracket -10-222A- , ensure that components/hoses are not damaged, stretched or torn off.



- Raise engine with support bracket -10-222A- until it is possible to loosen and remove the two top bolts -1 and 2- securing the engine support.
- Raise engine further until the engine support can be removed from above.



- Unscrew remaining toothed belt cover bolts -arrows- and remove toothed belt cover from engine.
- Mark direction of rotation of toothed belt.
- Loosen tensioning roller and remove toothed belt.
- Turn crankshaft back slightly.

Installing (adjusting valve timing)



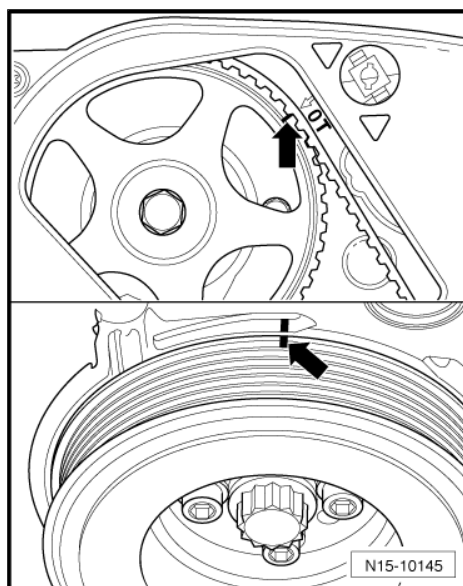
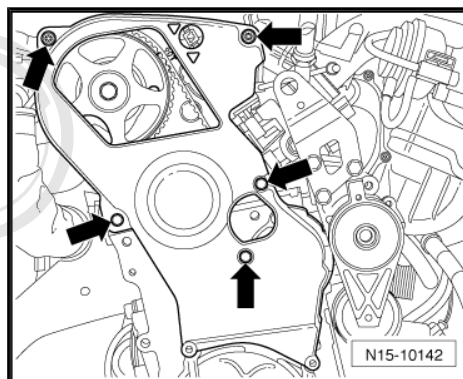
Note

- ◆ *When turning the camshaft, the crankshaft must not be at TDC. Otherwise, there is a risk of damage to valves and piston crowns.*

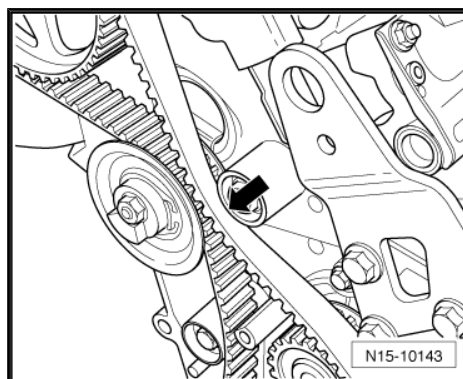
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted without the express written consent of AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- ◆ *The engine must be no more than warm to touch.*

- Fit toothed belt on crankshaft sprocket (note rotation direction).
- Secure toothed belt cover (bottom section) with the two bolts at the bottom.
- Install vibration damper / pulley with new bolts. Tightening torque: 10 Nm + turn 90° further.
- Turn crankshaft and camshaft to TDC No. 1 cylinder -arrows-.



- Fit toothed belt in the sequence: tensioning roller, camshaft sprocket, coolant pump and last onto idler roller -arrow-.



**Note**

Check tensioning roller is seated correctly in cylinder head.

- Tension toothed belt. To do so, turn hexagon key at the eccentric adjuster clockwise (direction of arrow) until the notch is above the indicator (toothed belt over-tensioned).
- Then release tension on toothed belt.
- Now tension toothed belt until the notch and the indicator are aligned.
- Tighten securing nut
- Turn crankshaft two turns in direction of engine rotation and set again to TDC. Make sure that the engine is rotated without stopping during the final 45° (1/8 turn).
- Check tension of toothed belt again. Specification: indicator and notch must align.

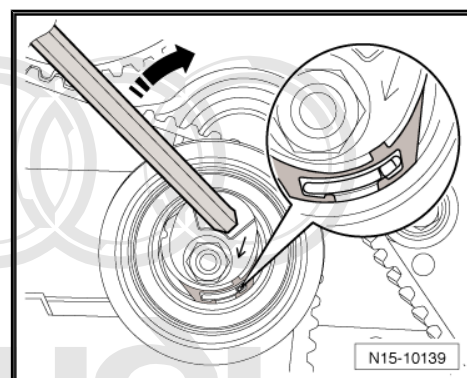
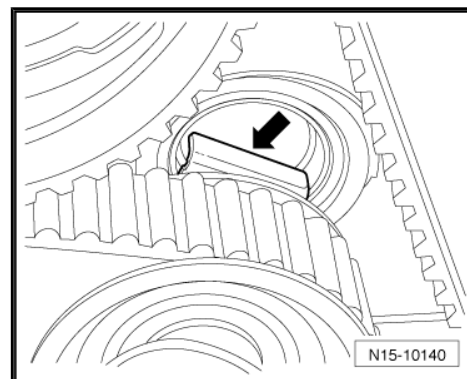
- Check valve timing again.

If the markings do not align:

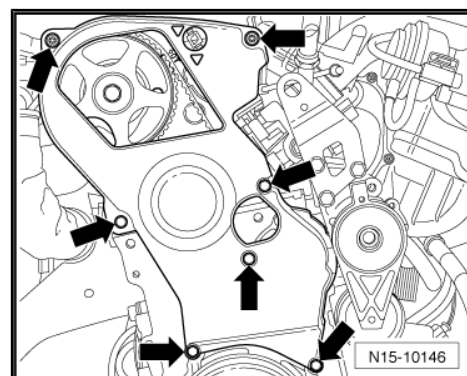
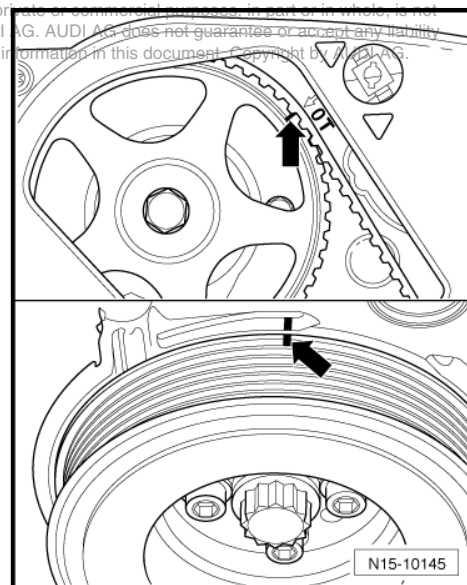
- Repeat adjustment of valve timing.

If the markings align:

- Install toothed belt cover -arrows-.
- Install engine support on cylinder block from above and tighten bolts finger-tight.



Protected by copyright. Copying for private or commercial use without permission is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

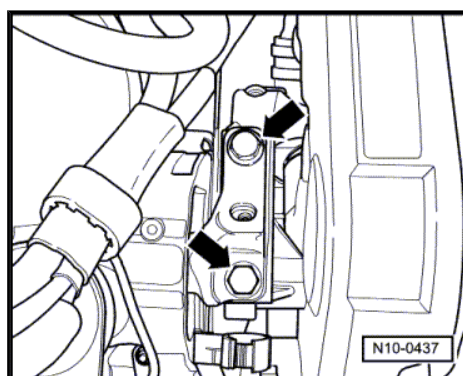
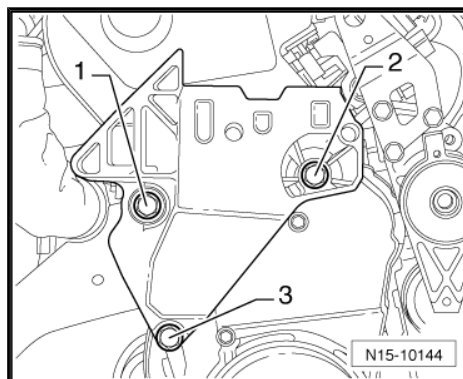




Note

Note different bolt lengths. Bolt -3- is approx. 25 mm shorter than bolts -1 and 2-.

- Lower engine with support bracket -10-222A- until it is possible to tighten the bolt at the bottom -3-.
- Tighten all bolts.
- Lower the engine down to installation position.
- Install complete assembly mounting for engine. Tightening torques ⇒ [page 30](#) .
- Secure assembly mounting for engine to engine support -arrows-; to do so, bring surfaces into contact using support bracket -10-222A- . Tightening torque: 60 Nm + 90° (1/4 turn) further.
- Remove support bracket -10-222A- .
- Install poly V-belt ⇒ [page 41](#) .
- Attach fuel hoses onto connections. Make sure plug-in connectors are properly secured.
- Install coolant expansion tank.
- Install noise insulation tray ⇒ General body repairs, exterior; Rep. gr. 50 ; Body - front; Exploded view - noise insulation .
- Fit engine cover panel.



Tightening torques

Component	Nm
Toothed belt tensioning roller to cylinder head	25
Toothed belt cover (bottom) to cylinder block	10 ³⁾
Toothed belt cover (centre) to cylinder block	10 ³⁾
Engine support to cylinder block	45
Engine mounting to body	40 + 90° ¹⁾ 2)
Connecting bracket to body/engine mounting	20 + 90° ¹⁾ 2)

- ¹⁾ 90° = a quarter of a turn
- ²⁾ Renew nuts/bolts
- ³⁾ Install using locking fluid; for locking fluid refer to ⇒ Parts catalogue .

2 Removing and installing cylinder head

2.1 Cylinder head - exploded view

1 - Cylinder head bolt

- ☐ Renew
- ☐ Note correct sequence when loosening
⇒ [page 102](#)
- ☐ Note correct sequence when tightening
⇒ [page 102](#)

2 - Bolt

- ☐ Note sequence for loosening and tightening
⇒ [page 102](#)

3 - Cylinder head cover

4 - Seal

- ☐ Renew if damaged or leaking

5 - Gasket for cylinder head cover

- ☐ Renew if damaged or leaking

6 - Bracket

7 - 10 Nm

8 - Oil filler cap

9 - 4 Nm

10 - Camshaft control valve 1 - N205-

- ☐ Removing and installing
⇒ [page 103](#)

11 - Seal

- ☐ Renew

12 - Cable retainer

13 - 10 Nm

14 - 10 Nm

15 - Housing

16 - Gasket

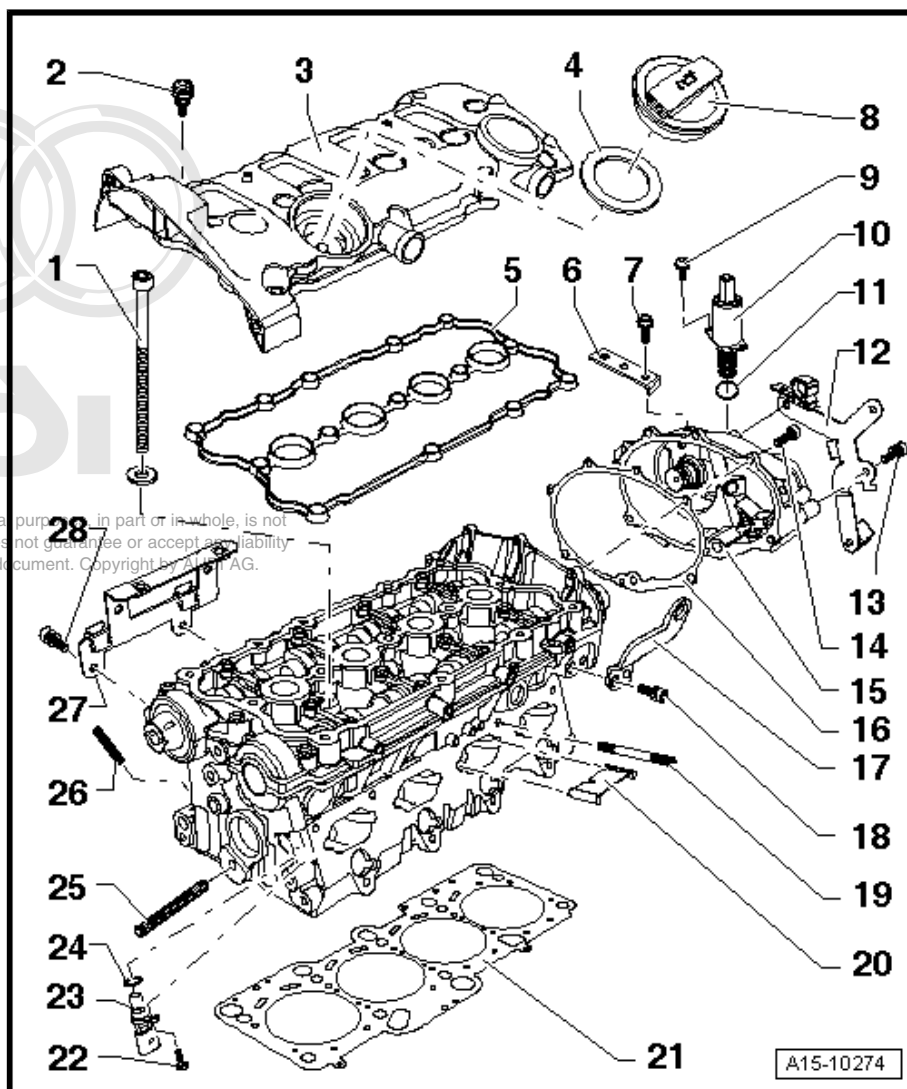
- ☐ Renew

17 - Transport plate

18 - 25 Nm

19 - 10 Nm

- ☐ Stud for intake manifold



20 - Separating plate

21 - Cylinder head gasket

- ☐ Renew
- ☐ Check installation position: Part No. towards cylinder head

22 - 10 Nm

23 - Hall sender -G40-

24 - Seal

25 - 10 Nm

- ☐ Stud for tensioning roller

26 - 20 Nm

- ☐ Stud for exhaust manifold

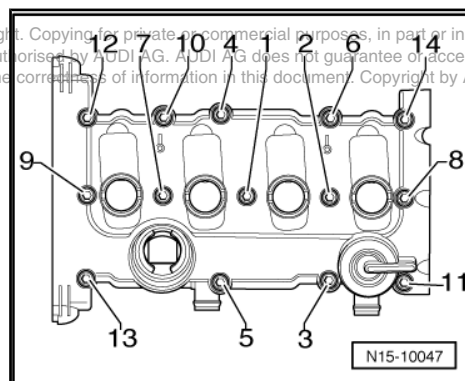
27 - Bracket

28 - 10 Nm

Tightening sequence for cylinder head cover

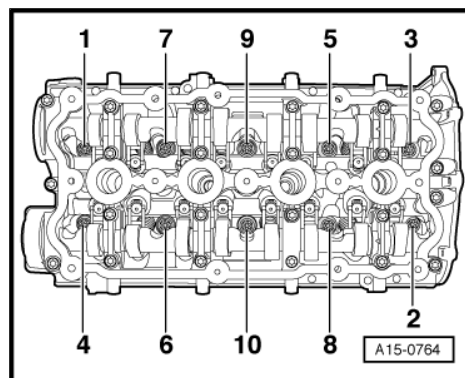
- Tightening torque 10 Nm

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



Slackening cylinder head bolts

- Slacken cylinder head bolts in the sequence -1 ... 10-.



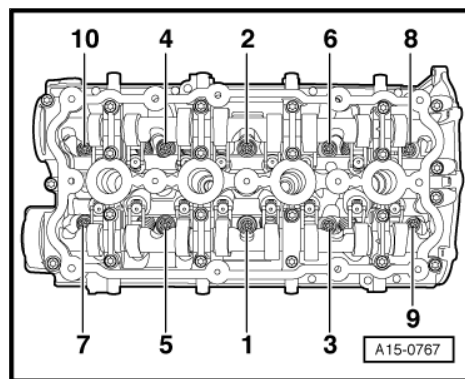
Tightening sequence for cylinder head

- Tighten cylinder head bolts in the sequence -1 ... 10- as follows:
1. Tighten with torque wrench initially to 40 Nm.
 2. Use rigid wrench to turn 90° further.
 3. Use rigid wrench to turn 90° further.



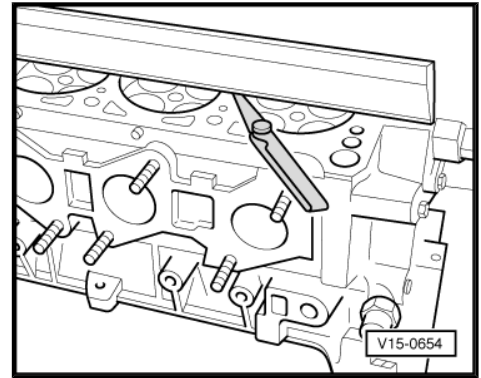
Note

Cylinder head bolts do not have to be torqued down again later after repair work.

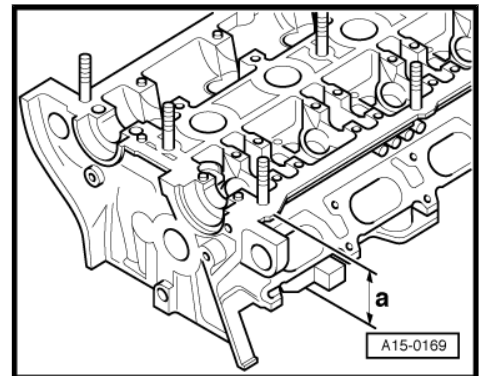


Checking cylinder head for distortion

- Use straight edge and feeler gauge to measure for distortion at several points.
- ◆ Max. permissible distortion: 0.1 mm

**Cylinder head machining limit**

- Machining of the cylinder head (surface grinding) is only permissible down to the minimum dimension -a-.
- ◆ Minimum dimension -a- = 139.20 mm

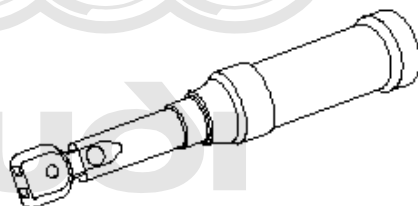
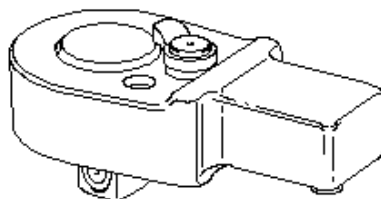
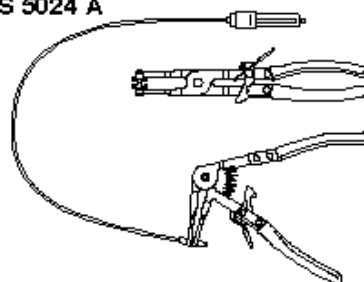
**2.2 Removing and installing camshaft control valve 1 -N205-**

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

**Special tools and workshop equipment required**

- ◆ Torque wrench -V.A.G 1783-
- ◆ Torx bit set -V.A.G 1766-
- ◆ Ratchet insert 1/4" -VAS 6234-
- ◆ Spring type clip pliers - VAS 5024 A-

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

V.A.G 1783**V.A.G 1766****VAS 6234****VAS 5024 A**

G15-10015

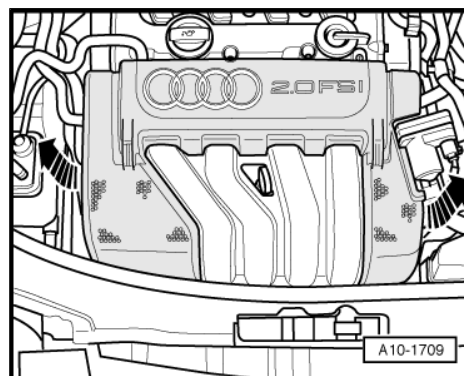
Removing**Note**

Always renew seals and gaskets.

- Lift off engine cover -arrows-.

**Note**

Do not pull on electrical connector when removing camshaft control valve 1 -N205- .



A10-1709

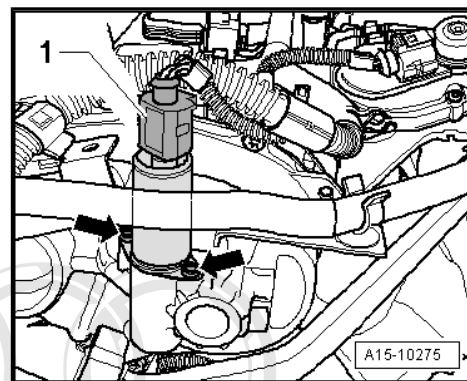
- Unplug electrical connector -1- from camshaft control valve 1 -N205- .
- Remove bolts -arrows- and take camshaft control valve 1 -N205- out of housing.

Installing



Note

- ◆ *Make sure the camshaft control valve 1 -N205- and the housing are free from any kind of dirt.*
- ◆ *Do not remove camshaft control valve 1 -N205- from packaging until you are ready to install it.*



Caution

- ◆ *Do not expose the camshaft control valve 1 -N205- to shock impacts.*

- Lubricate the seal with engine oil.
- Carefully fit camshaft control valve 1 -N205- into housing and press in by hand as far as the stop (exert pressure in line with axis of valve).
- Screw in bolts and tighten to 4 Nm using torque wrench -V.A.G 1783- , ratchet insert 1/4" -VAS 6234- , Torx bit T20 and bit holder from Torx bit set -V.A.G 1766- .

Further assembly is basically carried out in reverse order of dismantling.

Tightening torque

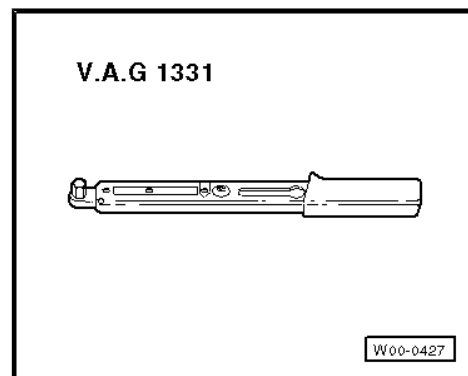
Component	Nm
Camshaft control valve 1 -N205-	4

2.3 Removing and installing cylinder head cover

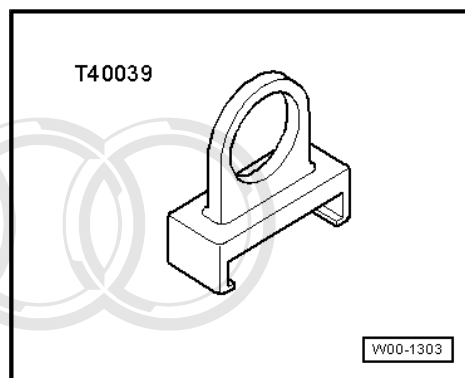
Removing

Special tools and workshop equipment required

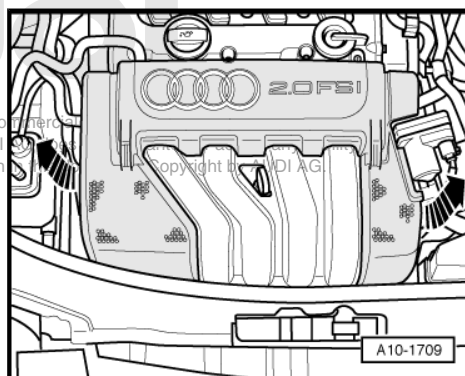
- ◆ Torque wrench -V.A.G 1331-



◆ Puller -T40039-



- Lift off engine cover -arrows-.

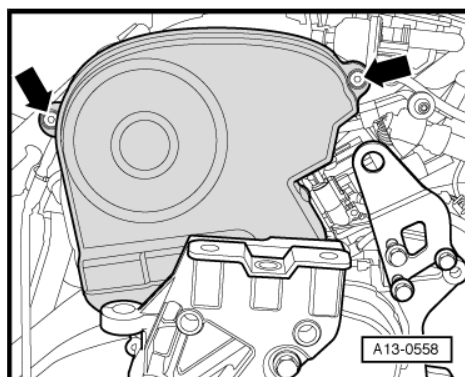


- Remove the bolts -arrows- and lift off toothed belt cover.

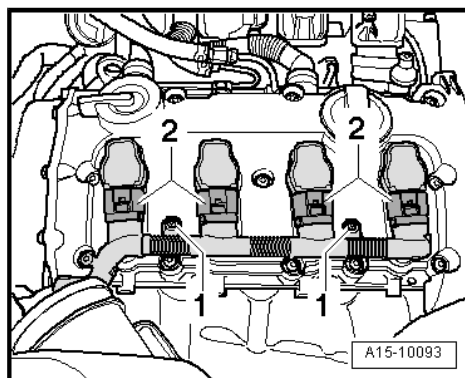


Note

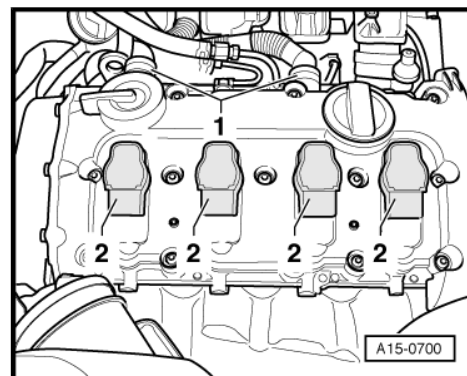
Engage carefully in toothed belt cover (centre) when installing.



- Remove bolts -1-.
- Unplug electrical connectors -2- from ignition coils and move wiring clear.



- Disconnect crankcase breather hoses -1- from cylinder head cover.
- Remove ignition coils with output stages -2- using puller - T40039- .



- Remove bolts -arrows-.
- Loosen cylinder head cover working from outside to inside.
- Remove cylinder head cover.

Installing

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



Note

Renew cylinder head cover gaskets if damaged.

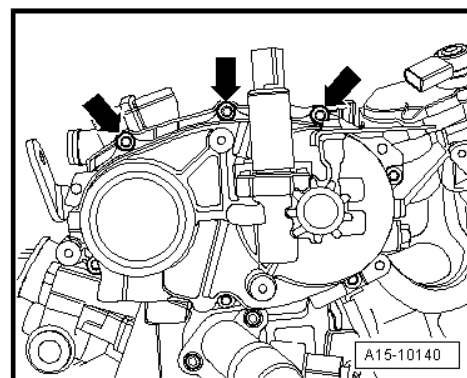
- Tighten bolts for cylinder head cover ⇒ [page 102](#) .
- Make sure toothed belt cover (top) is correctly fitted.

Tightening torques

Component	Nm
Cylinder head cover to cylinder head	10
Toothed belt cover to cylinder block	10 1)

Protected by copyright. Copying for private or limited purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- 1) Install using locking fluid; for locking fluid refer to ⇒ Parts catalogue .



2.4 Removing cylinder head



Note

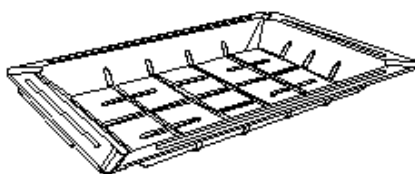
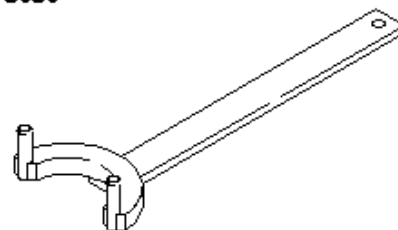
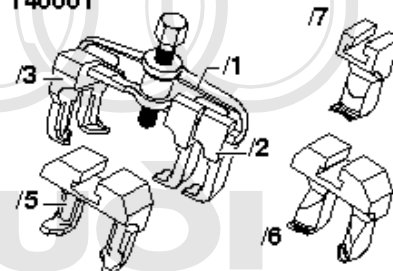
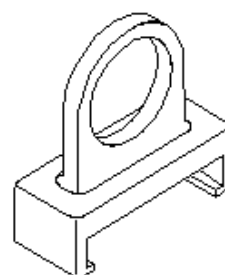
- ◆ *Renew the cylinder head bolts.*
- ◆ *On assembly, renew oil seals and gaskets as well as self-locking nuts and bolts that are tightened by turning through to a specified angle.*
- ◆ *When installing an exchange cylinder head with the camshafts fitted, the contact surfaces between bucket tappet and cam running surface must be oiled after installation of the cylinder head.*
- ◆ *The plastic protectors fitted to protect the open valves must only be removed immediately before fitting the cylinder head.*
- ◆ *When fitting a new cylinder head or cylinder head gasket, drain off all the old coolant and re-fill with fresh coolant.*
- ◆ *Cylinder heads which have cracks between the valve seats or between a valve seat insert and the spark plug thread can be re-installed without reducing service life, provided the cracks are only slight and do not exceed a maximum of 0.3 mm in width, and no more than the first 4 turns of the spark plug threads are cracked.*



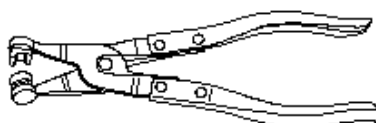
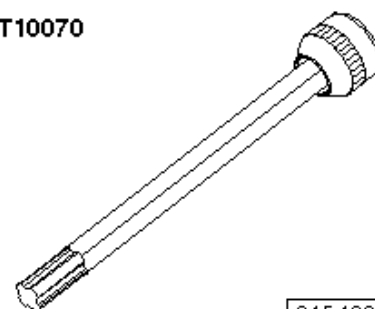
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Special tools and workshop equipment required

- ◆ Drip tray for workshop hoist -VAS 6208-
- ◆ Counterhold tool -3036-
- ◆ Two-arm puller -T40001-
- ◆ Puller -T40039-
- ◆ Hose clip pliers -V.A.G 1921-
- ◆ Special wrench (Polydrive) -T10070-

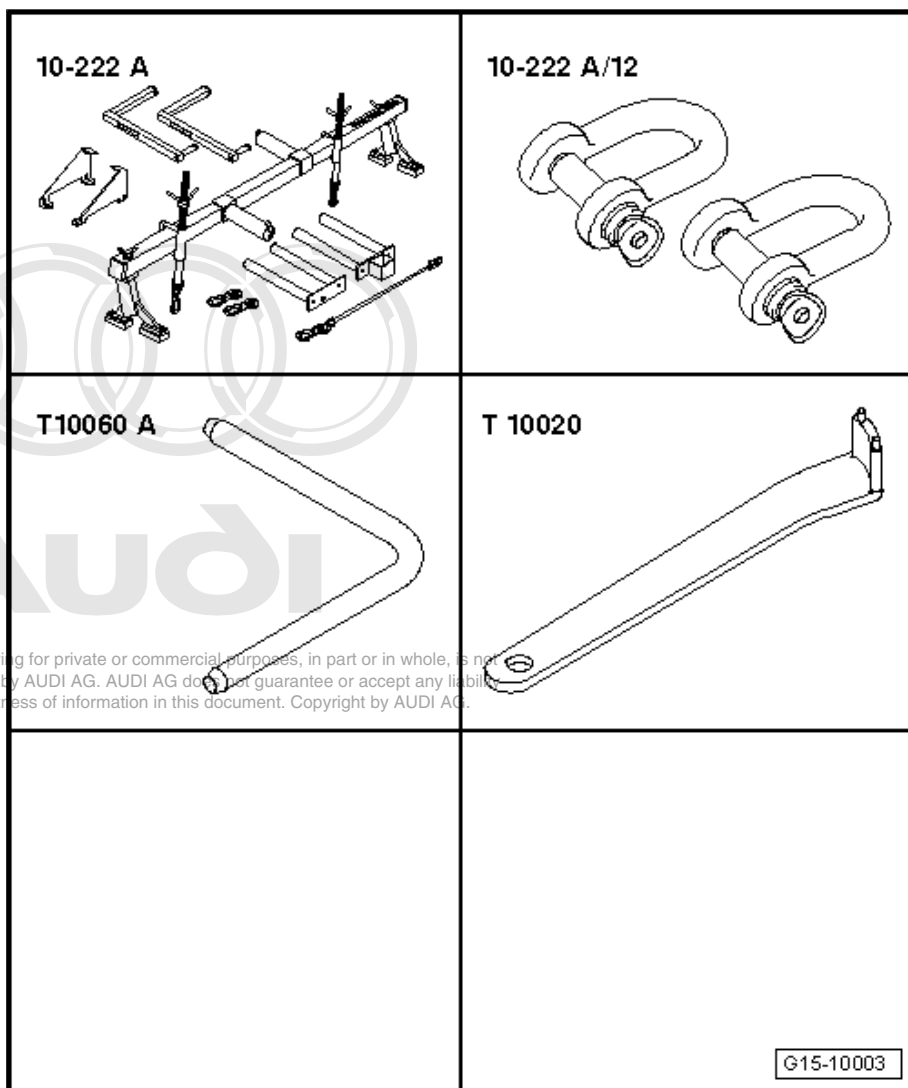
VAS 6208**3036****T40001****T40039**

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of any technical information in this document. Copyright by AUDI AG.

V.A.G 1921**T10070**

G15-10032

- ◆ Support bracket -10 - 222 A-
- ◆ Shackle -10 - 222 A /12-
- ◆ Locking pin -T10060A-
- ◆ Pin wrench -T10020-



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Removing

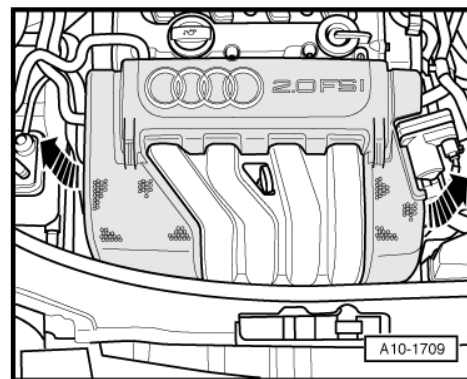
- Engine in vehicle.



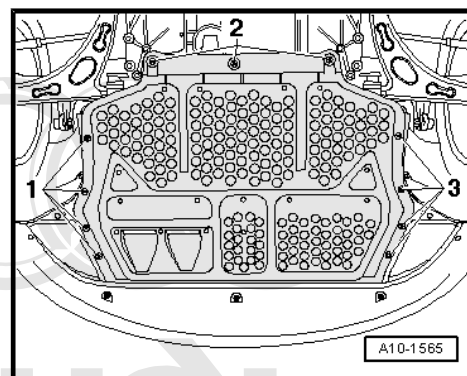
Note

- ◆ *All cable ties which are released or cut open when removing must be refitted in the same position when installing.*
 - ◆ *If engine oil is contaminated, change the oil ⇒ Maintenance ; Booklet 808 .*
 - ◆ *Before applying sealant, check information: ⇒ Parts catalogue .*
- Obtain code on vehicles with coded radio / radio and navigation system (RNS).

- Lift off engine cover panel -arrows-.



- Remove noise insulation (centre) - fasteners -1 ... 3-.



- Remove noise insulation (right-side) - fasteners -1 ... 3-.

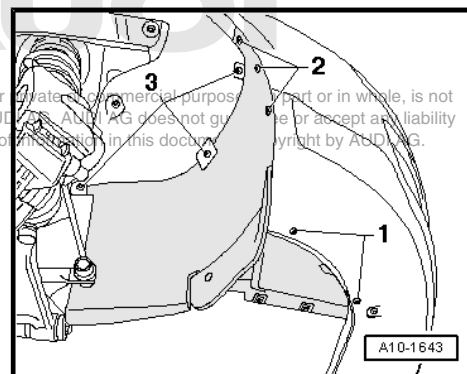


WARNING

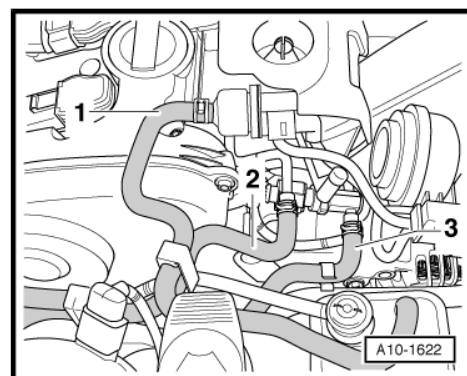
The fuel system is pressurised. Wrap a cloth around the connection before opening the system. Then release pressure by carefully loosening the connection.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of instructions in this document. Copyright by AUDI AG.

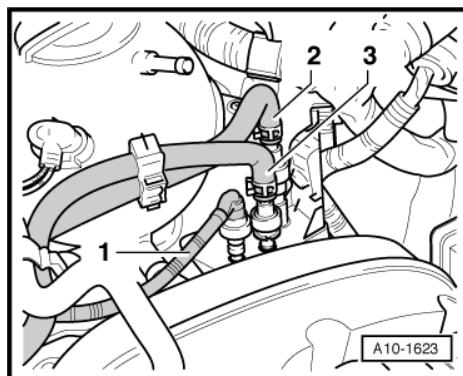
- Mark fuel supply and return lines.



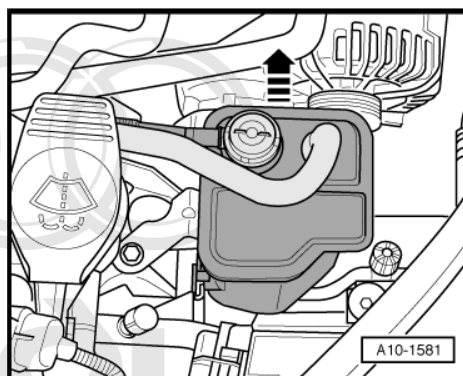
- Detach hose going to activated charcoal filter -1-.
- Disconnect fuel supply line -2- by pulling release tab.
- Disconnect fuel return line -3- by pulling release tab.



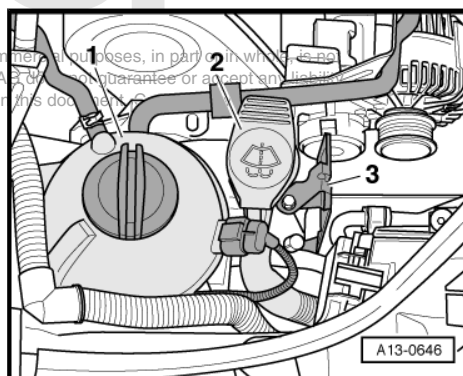
- Disconnect vacuum line -1- going to activated charcoal filter by pressing release tab.
- Disconnect fuel supply line -2- by pulling release tab.
- Disconnect fuel return line -3- by pulling release tab.



- Lift out activated charcoal filter from retainer with pipes connected -arrow-.



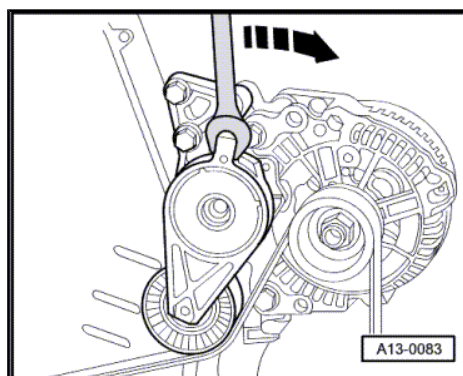
- Unbolt bracket -3- for ACF.
- Unfasten bolt at filler neck of washer fluid reservoir -2-.
- Disconnect electrical wire for coolant shortage indicator switch at expansion tank -1-.
- Unbolt coolant expansion tank and lay it aside with pipes connected.



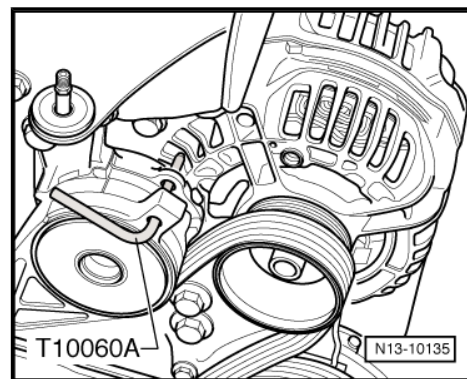
Note

Before removing, mark direction of rotation of poly V-belt with chalk or felt-tip pen. If the belt runs in the opposite direction when it is refitted, this can cause breakage.

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



- Lock tensioner in position with locking pin -T10060A- .
- Take off poly V-belt.
- Remove locking pin -T10060A- from tensioner for poly V-belt.



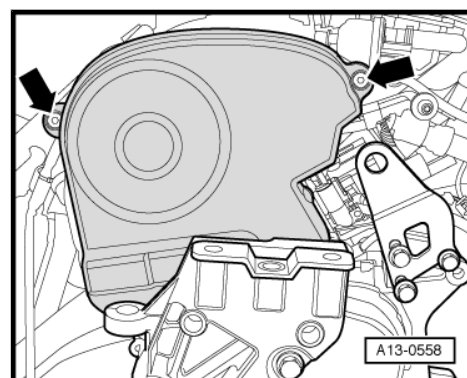
- Remove the bolts -arrows- and lift off toothed belt cover.

**Note**

Engage carefully in toothed belt cover (centre) when installing.

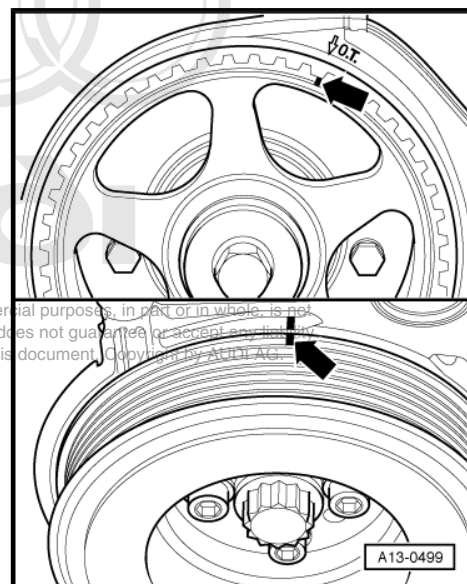
**WARNING**

The engine must only be turned at the crankshaft, in the direction of normal engine rotation (clockwise).

**Note**

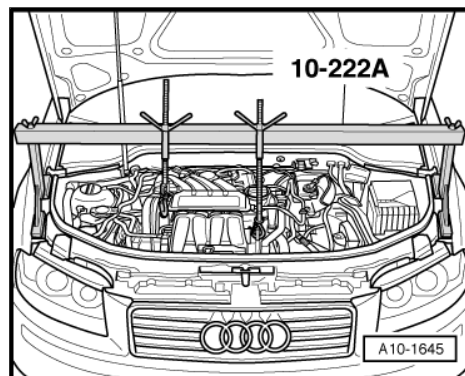
Turn over the engine at the central bolt on the crankshaft.

- Rotate engine to TDC of No. 1 cylinder by turning central bolt of crankshaft sprocket in normal direction of rotation. Marking on camshaft sprocket and marking on crankshaft must be aligned to TDC of cylinder No. 1 -arrows-.

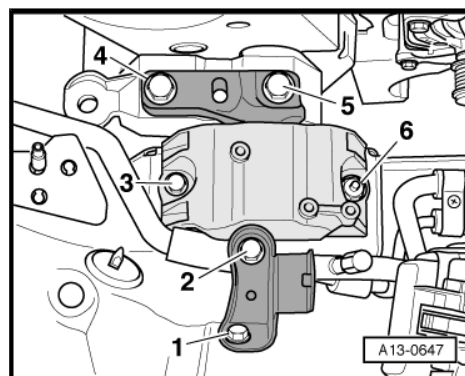


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Position support bracket -10 - 222 A- on bolted flanges of wing panels. The spindles face forwards.
- Detach crankcase breather hose from oil filler neck.
- Attach hooks of spindles with shackles -10 - 222 A /12- to the lifting eyes.
- Take up weight of engine evenly with both spindles (but do not raise engine).



- Remove bolts -1- and -2- and detach connecting bracket.
- Unscrew bolts -3 ... 6- and detach engine mounting.

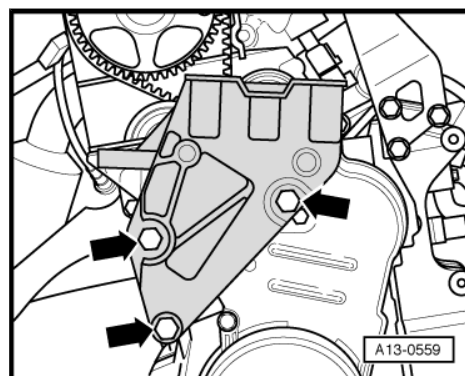


- Unscrew bolts -arrows- and remove engine support.



Note

To slacken the bolts for the engine support, raise or lower the engine slightly as necessary via the spindles on engine support bracket -10 - 222 A- .

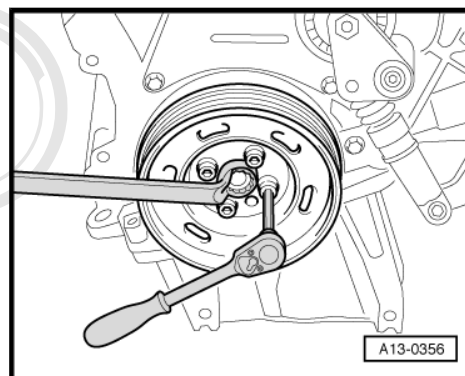


- Unbolt crankshaft pulley.



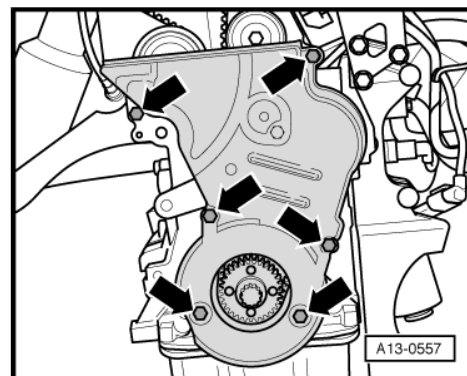
Note

To loosen and tighten the crankshaft pulley, counterhold central bolt with a ring spanner.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Unbolt toothed belt covers (bottom and centre) -arrows-.
- Mark rotation direction of toothed belt with chalk or felt-tip pen.

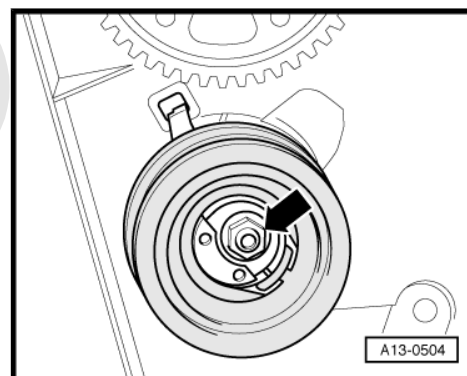


- Loosen nut on tensioning roller -arrow- several turns.
- Remove toothed belt.


WARNING

Hot steam/hot coolant may escape when opening expansion tank. Cover cap with cloth and open carefully.

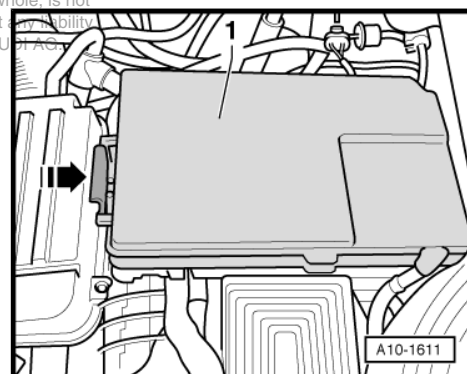
- Open filler cap on coolant expansion tank



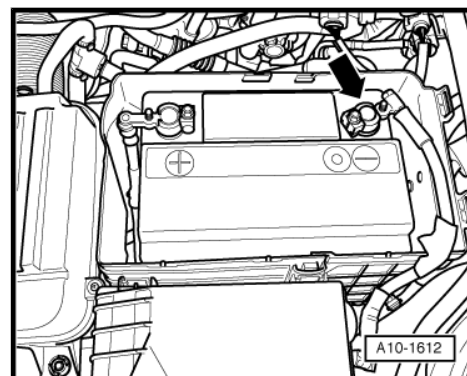
- Remove cover 1 over battery. To do so, press release tab -arrow-.


WARNING

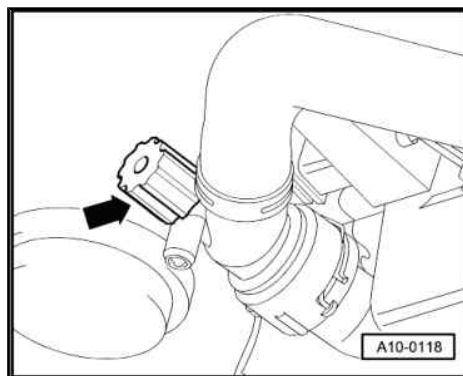
Observe notes on procedure for disconnecting battery → Electrical system; Repair group 27.



- With ignition switched off, disconnect battery earth cable -arrow-.
- Place drip tray for workshop hoist -VAS 6208- beneath engine.



- Turn drain plug -arrow- on radiator anti-clockwise, if necessary fit drain hose to connection.

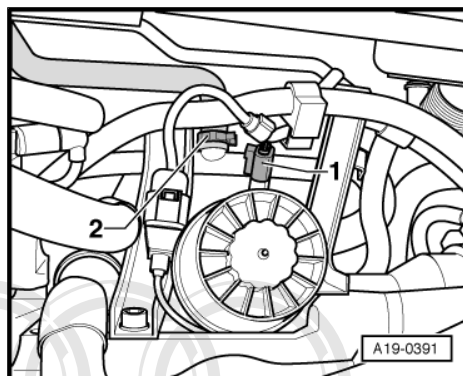


- Unplug electrical connector -1- from oil pressure sender.
- Also disconnect bottom coolant hose at coolant pipe -2-, and drain off remaining coolant.

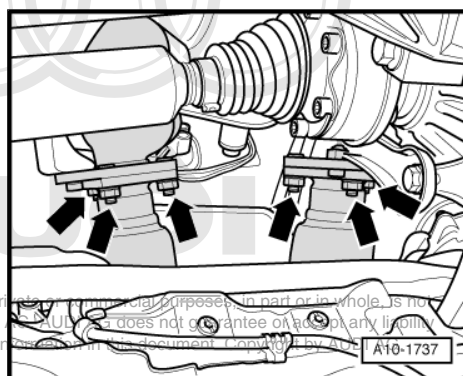


Note

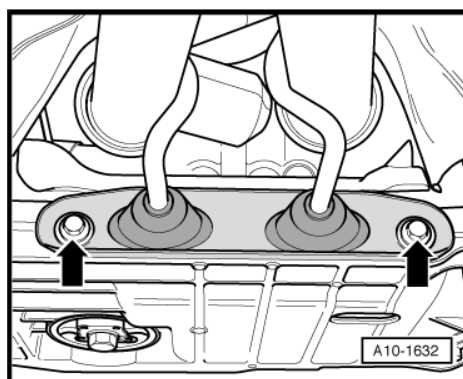
To avoid damage, the flexible joints in the front exhaust pipe must not be bent more than 10°.



- Remove securing nuts -arrows- on front exhaust pipe/exhaust manifold.

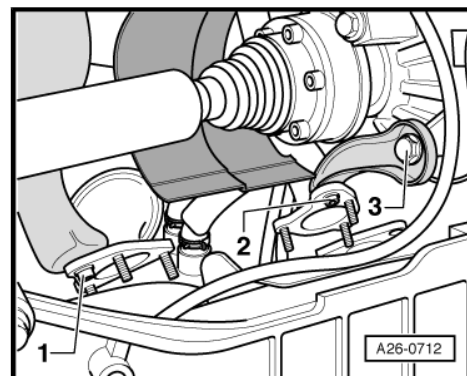


- Unbolt bracket for exhaust system -arrows-.

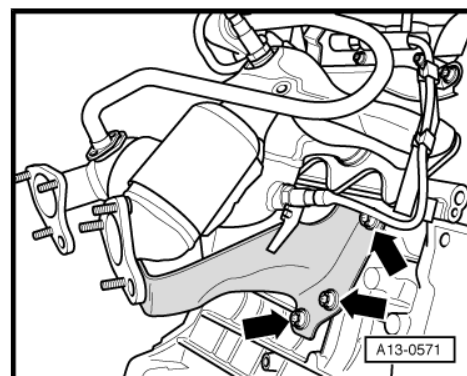


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

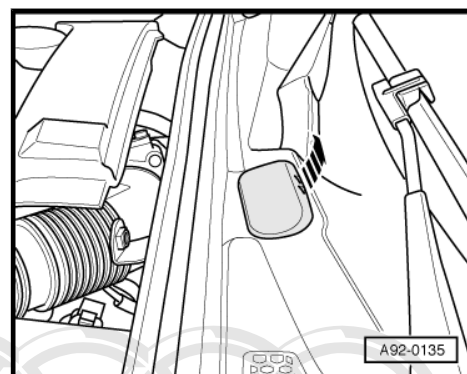
- Loosen bolt -3-.
- Unscrew bolts -1- and -2- securing exhaust manifold support (left and right).



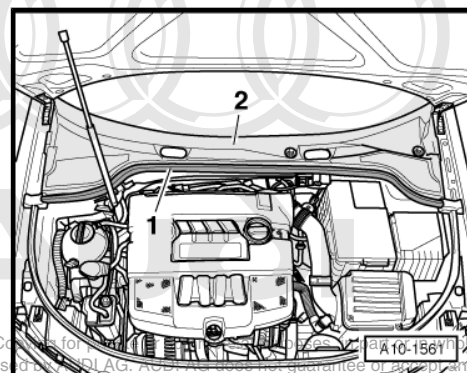
- Remove exhaust manifold support -arrows-.
- Use screwdriver to pry off cover caps on wiper arms and unscrew hexagon nuts.
- Pull wiper arms off wiper shafts and remove.



- Unclip washer jets -arrow-.
- Push washer jets through assembly opening back into plenum chamber, leaving hoses connected.

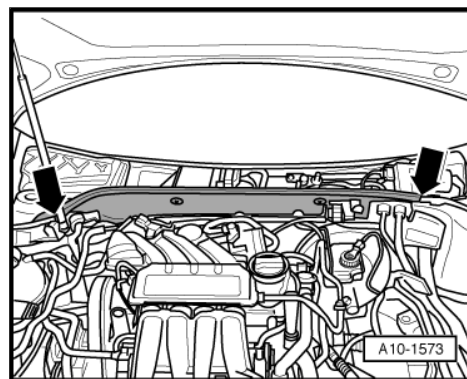


- Pull off rubber seal -1- on plenum chamber cover.
- Detach plenum chamber cover -2-.
- Detach engine wiring harness at rear plenum chamber panel.

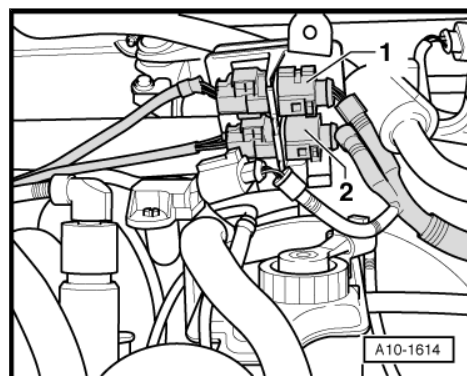


Protected by copyright. Copying for private use is permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept liability with respect to the correctness of information in this document. Copyright by AUDI AG.

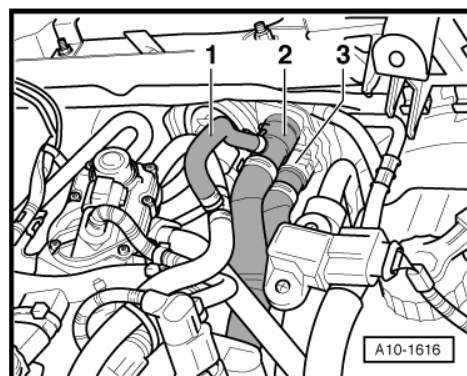
- Remove plenum chamber intermediate plate -arrows-.



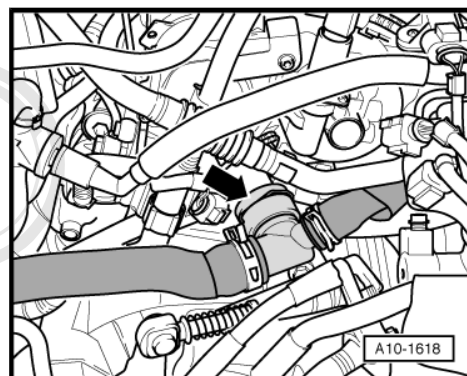
- Remove electrical connector -1- for Lambda probe (before catalytic converter) from bracket and unplug.
- Remove electrical connector -2- for Lambda probe (before catalytic converter) from bracket and unplug.



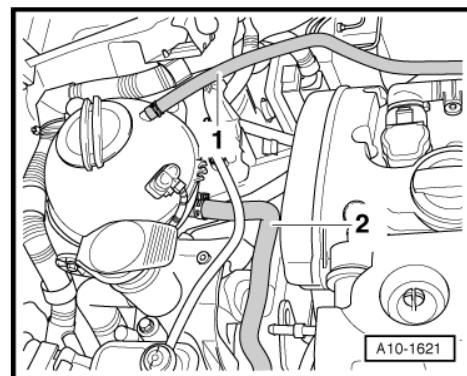
- Detach coolant hose -1-.



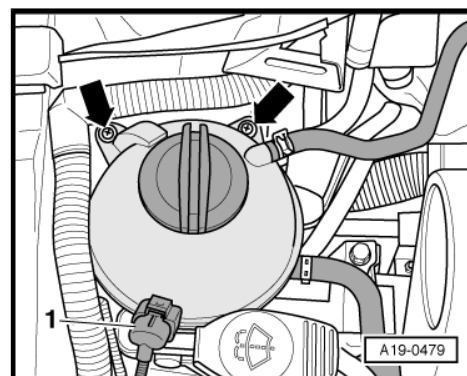
- Disconnect coolant hose -arrow-.



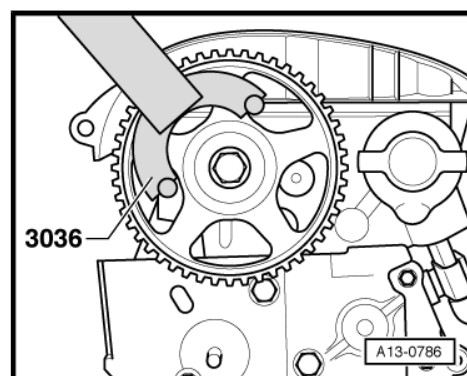
- Disconnect coolant hoses -1- and -2- at expansion tank.



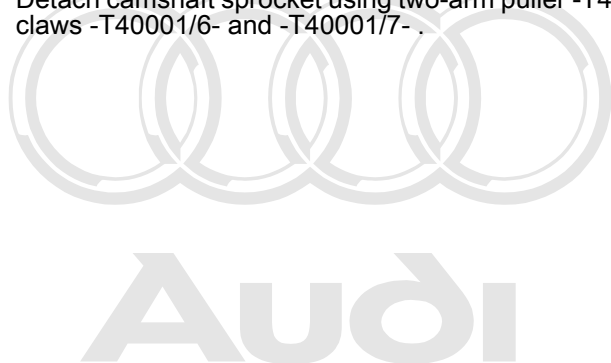
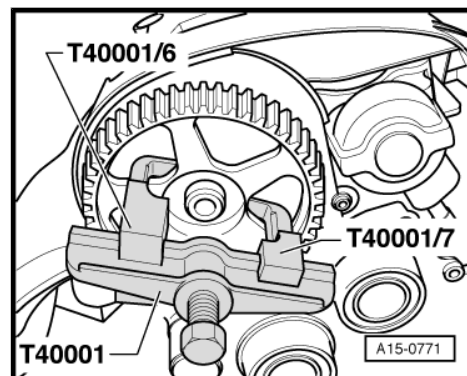
- Unplug electrical connector -1- for coolant shortage indicator switch at expansion tank.
- Unscrew coolant expansion tank -arrows- and lay it aside.



- Loosen camshaft sprocket bolt using counterhold -3036- .

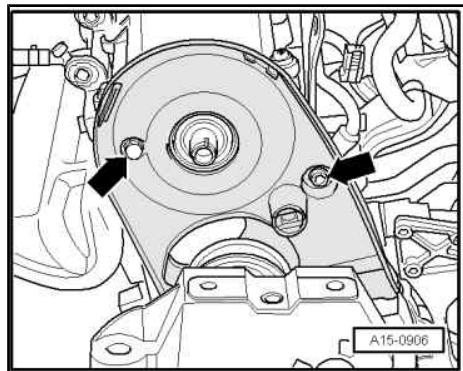


- Detach camshaft sprocket using two-arm puller -T40001- with claws -T40001/6- and -T40001/7- .

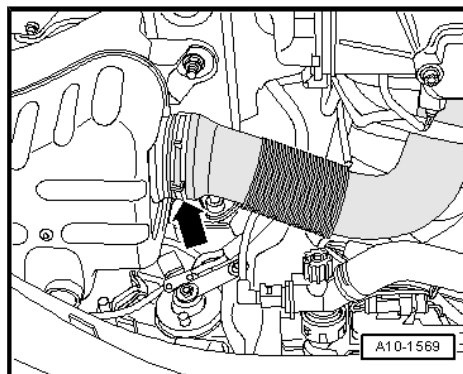


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

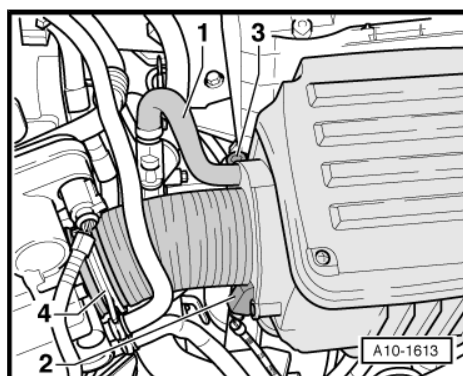
- Unbolt toothed belt cover (rear) from cylinder head -arrows-.



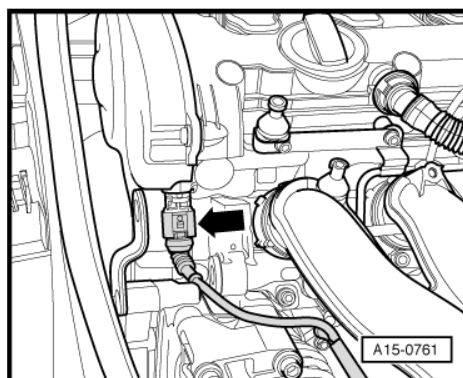
- Disconnect air intake hose -arrow- at bottom of resonator (loosen hose clip using hose clip pliers -V.A.G 1921-).



- Detach hose -1- from air cleaner housing.
- Unplug electrical connector -2- from air cleaner housing.
- Remove bolt -3-.
- Disconnect air intake hose -4- from throttle valve unit (loosen hose clip using hose clip pliers -V.A.G 1921-).
- Take out air cleaner housing.

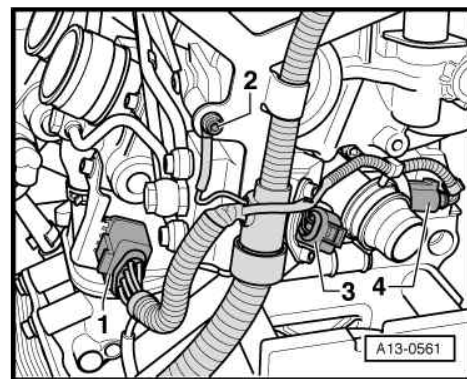


- Unplug electrical connector arrow from sender wheel on camshaft.

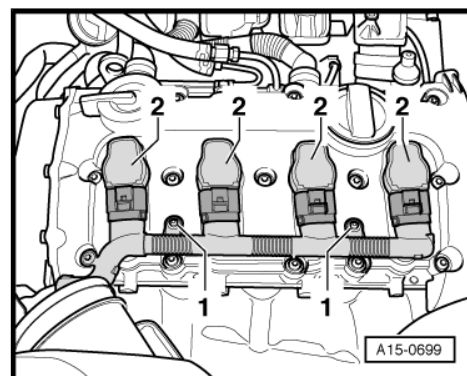


- Remove intake manifold ⇒ Rep. gr. 24 .

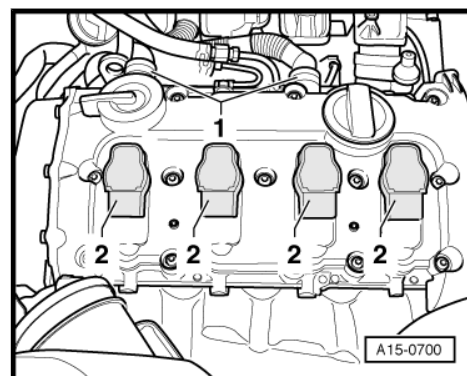
- Disconnect earth cable -2-.
- Unplug electrical connector -3-.
- Unplug electrical connector -4-.
- Remove bolts -1-.



- Unplug electrical connectors -2- from ignition coils and move wiring clear.



- Remove ignition coils with output stages -2- using puller - T40039- .
- Loosen cylinder head cover working from outside to inside.
- Remove cylinder head cover.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Slacken cylinder head bolts using special wrench (Polydrive) -T10070- , keeping to sequence shown.



Note

Check that all hoses, pipes and wiring connections between engine, gearbox and body have been detached.

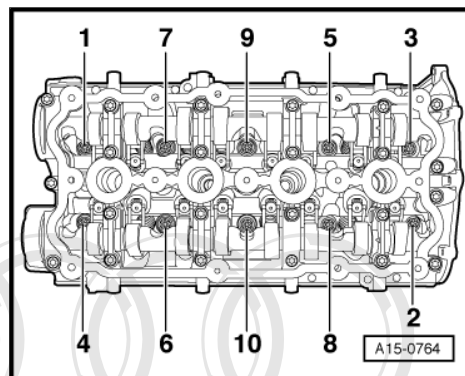
- Remove cylinder head.

Installing cylinder head



Note

- ◆ Renew the cylinder head bolts.
- ◆ On assembly, renew oil seals and gaskets as well as self-locking nuts and bolts that are tightened by turning through to a specified angle.
- ◆ Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ *Parts catalogue*.
- ◆ If repairing, carefully remove any remaining gasket material from the cylinder head and cylinder block. Ensure that no long scores or scratches are made on the surfaces.
- ◆ Carefully remove any remaining emery and abrasive material.
- ◆ Do not remove new cylinder head gasket from packaging until it is ready to be fitted.
- ◆ Handle gasket very carefully. Damage to the silicone coating or the indented area will lead to leaks.
- ◆ No oil or coolant must be allowed to remain in the blind holes for the cylinder head bolts in the cylinder block.
- ◆ For high-temperature paste refer to ⇒ *Parts catalogue*.



WARNING

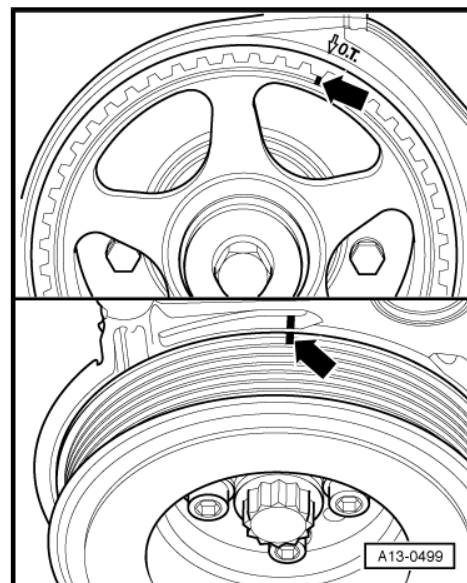
The engine must only be turned at the crankshaft, in the direction of normal engine rotation (clockwise).



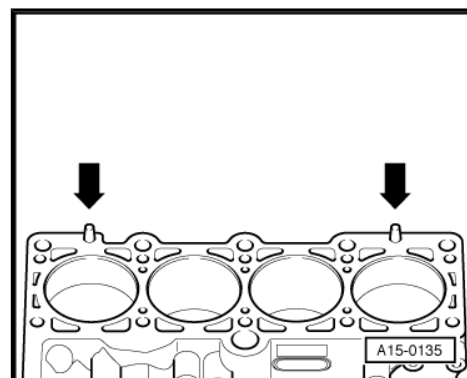
Note

Turn over the engine at the central bolt on the crankshaft.

- Set camshaft to TDC for No. 1 cylinder before fitting cylinder head -arrow-.
- Check whether crankshaft is at TDC of No. 1 cylinder -bottom arrow-.



- Place cylinder head gasket in position.
- ◆ Note position of centring pins in cylinder block -arrows-.
- ◆ Note installation position of cylinder head gasket. Part No. should be legible from inlet side.
- Fit cylinder head.
- Insert and hand-tighten cylinder head bolts.



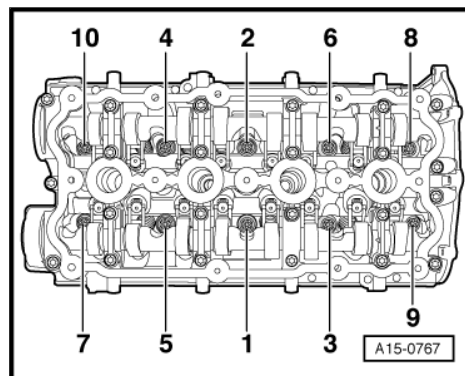
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Tighten cylinder head bolts in two stages in sequence shown as follows:
- Tighten using torque wrench:
 - ◆ 1st stage: 40 Nm
- Tighten using rigid spanner:
 - ◆ 2nd stage: turn 180° (1/2 turn) further (alternatively 2 x 90° is possible)



Note

Cylinder head bolts do not have to be torqued down again later after repair work.



- Install cylinder head cover ⇒ [page 108](#) .
- Install wiper arms ⇒ Electrical system; Rep. Gr. 92 .
- Install toothed belt: engine codes AXW, BMB, BHD
⇒ [page 81](#) , engine codes BLX, BLY, BLR, BVY, BVZ
⇒ [page 92](#) .
- Install poly V-belt ⇒ [page 41](#) .
- Electrical connections and routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Install intake manifold ⇒ Motronic direct injection and ignition system (4-cylinder); Rep. Gr. 24; Servicing injection system .
- Connect battery ⇒ Electrical system; Rep. Gr. 27 .
- Bleed fuel system ⇒ Motronic direct injection and ignition system (4-cylinder); Rep. Gr. 24; Servicing fuel injection system .
- Check oil level.
- Fill up with coolant ⇒ [page 190](#) .



Note

- ◆ *Drained-off coolant may only be used again if the original cylinder head and cylinder block are re-installed.*
- ◆ *Contaminated or dirty coolant must not be used again.*



WARNING

Never use battery charging equipment for boost starting. There is danger of damaging the vehicle's control units.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Tightening torques

Component		Nm
Bolts/nuts	M6	10
	M8	20
Except for the following:		
Front exhaust pipe to exhaust manifold		25 ¹⁾ ²⁾
Cylinder head cover to cylinder head		10
Toothed belt cover to cylinder block		10 ³⁾
Battery cable clamp to battery terminal		6

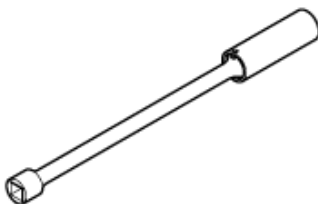
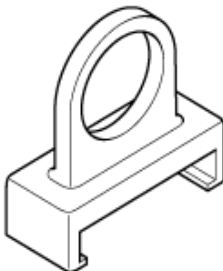
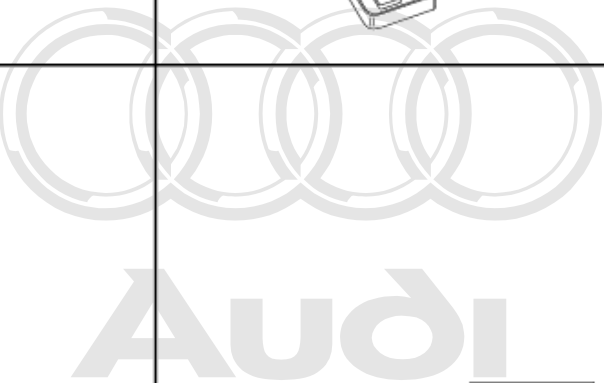
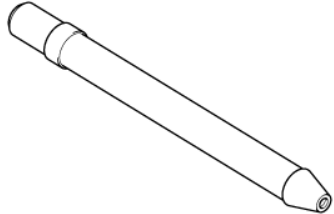
- ¹ Coat exhaust manifold studs and Lambda probe threads with high-temperature paste; for high-temperature paste refer to ⇒ Parts catalogue .
- ²⁾ Renew nuts/bolts.
- ³⁾ Install using locking fluid; for locking fluid refer to ⇒ Parts catalogue .

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

2.5 Checking compression

Special tools and workshop equipment required

- ◆ Spark plug socket and extension -3122 B-
- ◆ Puller -T40039-
- ◆ Torque wrench -V.A.G 1331-
- ◆ Compression tester -V.A.G 1763-
- ◆ Adapter -V.A.G 1381/5A-

3122 B 	T40039 
V.A.G 1331 	V.A.G 1763 
	
V.A.G 1381/5A 	

W15-10006

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

W00-10160

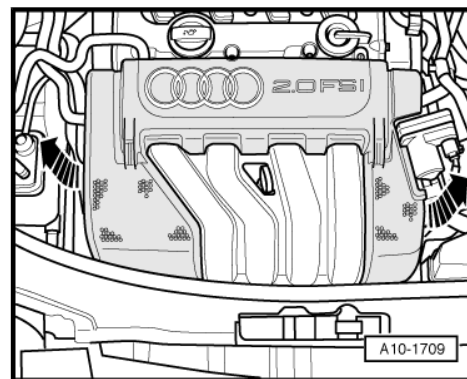
Test sequence



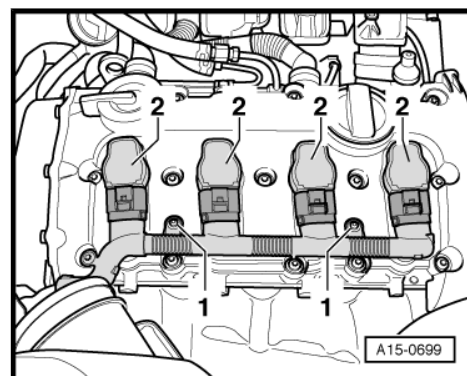
Note

- ◆ Engine oil temperature at least 30 °C
- ◆ Battery voltage at least 12.7 V

- Lift off engine cover -arrows-.



- Remove bolts -1-.
- Unplug electrical connectors -2- from ignition coils and move wiring clear.



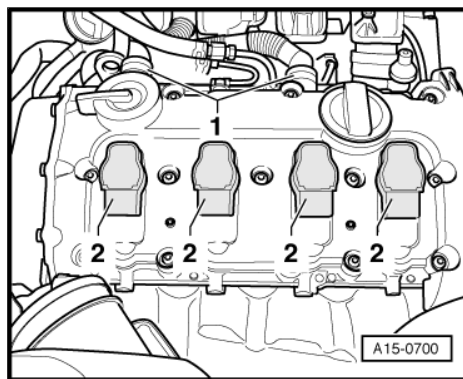
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Remove ignition coils with output stages -2- using puller - T40039- .
- Remove spark plugs with spark plug socket -3122 B- .
- Unplug 8-pin connector for injectors ⇒ [Item 13 \(page 36\)](#) .
- Check compression pressure with compression tester -V.A.G 1763- and adapter -V.A.G 1381/5A- .



Note

Using the compression tester ⇒ *Operating instructions* .



- Operate starter until pressure reading on tester no longer rises.

Compression pressure:

Engine code letters	New pressure in bar	Wear limit bar	Permissible difference between cylinders bar
AXW, BLX, BLR, BVY	11.5	8.0	3.0 (maximum)
BHD, BMB, BLY, BVZ	10.5	7.0	3.0 (maximum)

- Install spark plugs and ignition coils.
- Read out fault memory of engine control unit ⇒ Guided Fault Finding function of vehicle diagnostic, testing and information system VAS 5051 .



Note

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Faults will have been stored in the memory because connectors have been unplugged. Interrogate and, if necessary, erase fault memory after completing the check.

Tightening torques

Component	Nm
Spark plugs in cylinder head	30

3 Servicing valve gear



Note

- ◆ *Cylinder heads which have cracks between the valve seats or between a valve seat insert and the spark plug thread can be re-installed without reducing service life, provided the cracks are only slight and do not exceed a maximum of 0.3 mm in width, and no more than the first 4 turns of the spark plug threads are cracked.*
- ◆ *After installing camshafts, wait for approx. 30 minutes before starting engine. Hydraulic valve compensation elements have to settle (otherwise valves will strike pistons).*
- ◆ *After working on the valve gear, turn the engine carefully at least 2 rotations to ensure that none of the valves make contact when the starter is operated.*
- ◆ *Always fit new seals and gaskets.*

3.1 Cylinder head, camshafts - exploded view

1 - 50 Nm + turn 180° further

☐ Renew

2 - Camshaft sprocket

3 - Oil seal

☐ Renewing ⇒ [page 149](#)

4 - Cylinder head

5 - Valve guide

☐ Checking ⇒ [page 149](#)

6 - Valve stem oil seal

7 - Valve spring

8 - Upper valve spring plate

9 - Cotters

10 - Hydraulic valve clearance compensation element

☐ Do not interchange

☐ Lubricate contact surface

11 - Parallel key

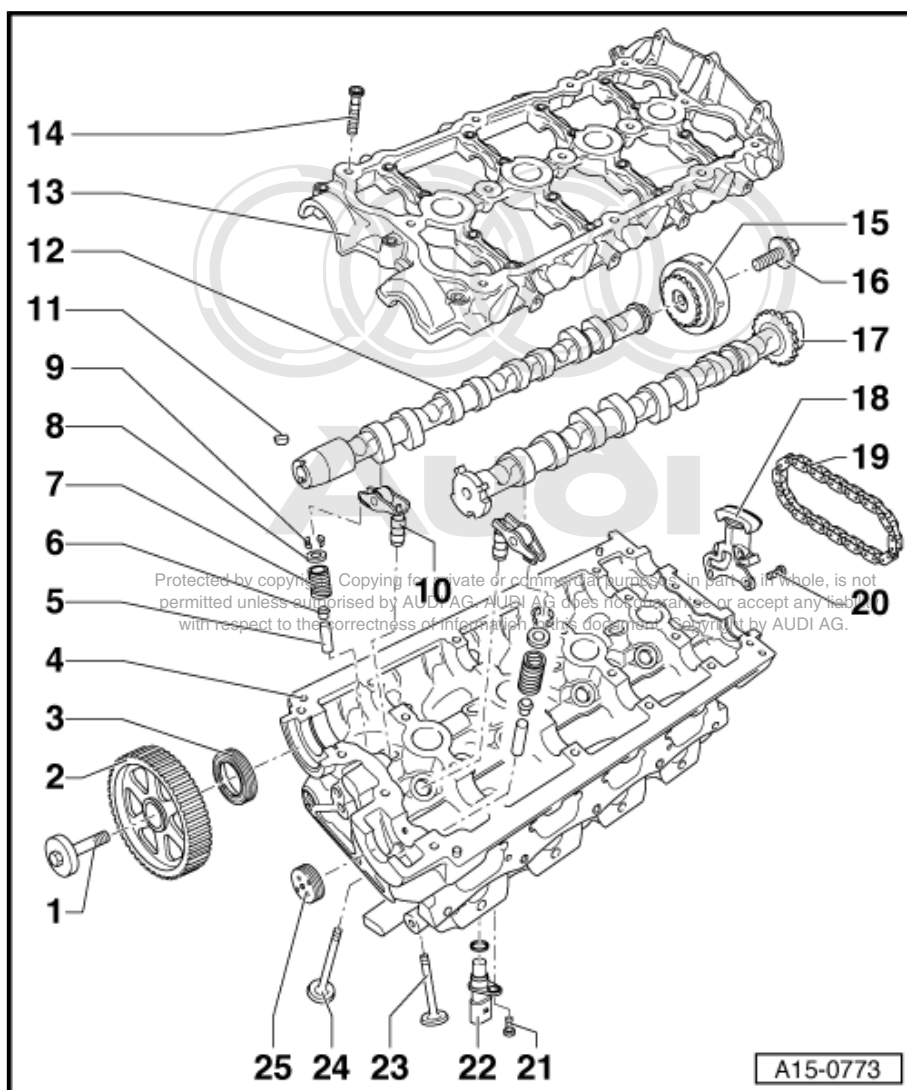
☐ Check for firm attachment

12 - Exhaust camshaft

☐ Check radial clearance with Plastigage (roller rocker fingers removed)

☐ Radial clearance when bearing Ø is 24 mm: 0.024 ... 0.066 mm

☐ Radial clearance when bearing Ø is 32 mm:





0.030 ... 0.051 mm

- ☐ Runout: max. 0.04 mm

13 - Retaining frame

- ☐ With integrated camshaft bearings
- ☐ Clean sealing surface; machining not permitted
- ☐ Remove old sealant residues

14 - 8 Nm + turn 90° further

- ☐ Renew

15 - Camshaft adjuster**16 - 20 Nm + turn 45° further**

- ☐ Renew

17 - Inlet camshaft

- ☐ Check radial clearance with Plastigage (roller rocker fingers removed)
- ☐ Radial clearance when bearing $\varnothing$ is 24 mm: 0.024 ... 0.066 mm
- ☐ Runout: max. 0.04 mm

18 - Chain tensioner**19 - Drive chain****20 - 10 Nm****21 - 10 Nm****22 - Phase sensor****23 - Exhaust valve**

- ☐ Do not machine, only grinding-in is permitted
- ☐ Valve dimensions [⇒ page 130](#) ,
- ☐ Checking valve guides [⇒ page 149](#)

24 - Inlet valve

- ☐ Do not machine, only grinding-in is permitted
- ☐ Valve dimensions [⇒ page 130](#) ,
- ☐ Checking valve guides [⇒ page 149](#)

25 - Sealing cap

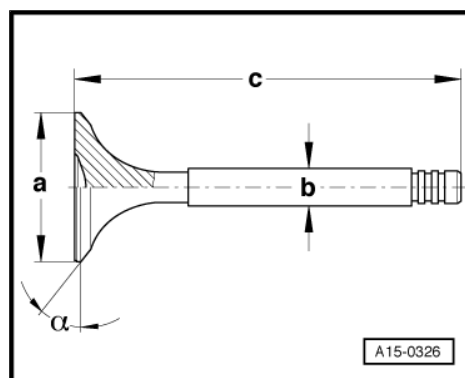
- ☐ Renew
- ☐ Removing sealing cap with retaining frame installed: pierce on one side with an awl and pry out
- ☐ Installing: press in 1 ... 2 mm deep without sealant using thrust piece -3334-

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Valve dimensions**Note**

Inlet and exhaust valves must not be machined. Only grinding-in is permitted.

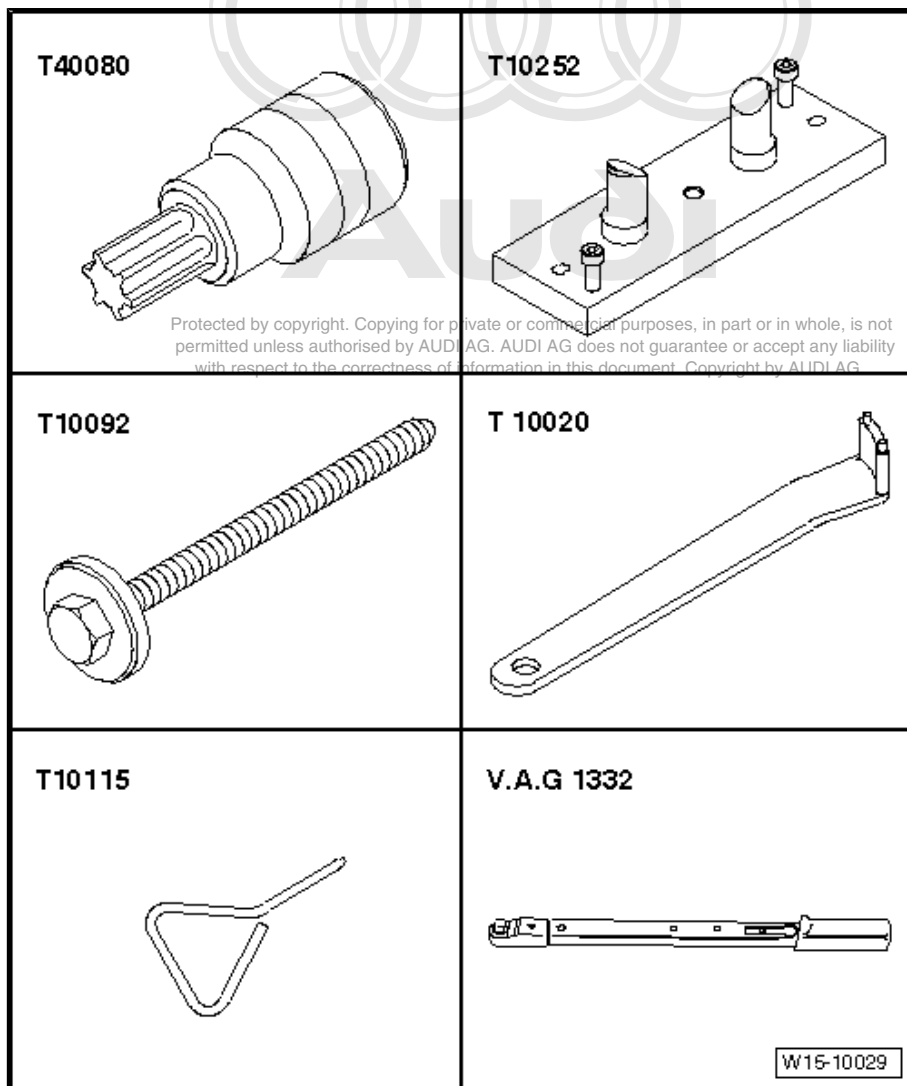
Dimension		Inlet valve	Exhaust valve
$\varnothing$ a	mm	33.85 ± 0.10	28.0 ± 0.1
$\varnothing$ b	mm	5.98 ± 0.01	5.96 ± 0.01
c	mm	104.0 ± 0.2	101.9 ± 0.2
α	°	45	45



3.2 Removing and installing camshaft adjuster

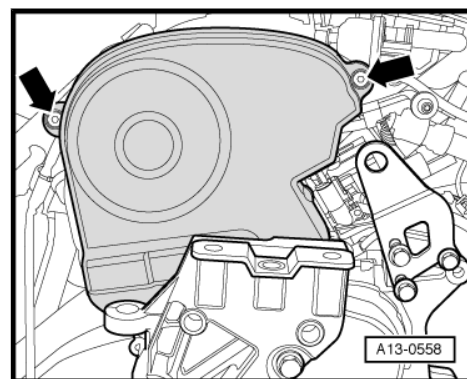
Special tools and workshop equipment required

- ◆ Special wrench, long reach -T40080-
- ◆ Camshaft clamp -T10252-
- ◆ Tensioning bolt -T10092-
- ◆ Pin wrench -T10020-
- ◆ Locking pin -T10115-
- ◆ Torque wrench -V.A.G 1332-
- ◆ Torque wrench -V.A.G 1332-

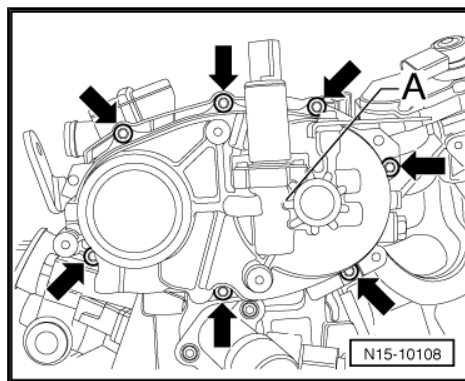


Removing

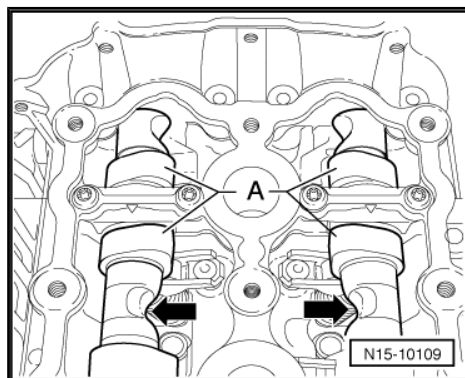
- Remove intake manifold ⇒ Rep. gr. 24 .
- Remove high-pressure pump ⇒ Rep. gr. 24 .
- Remove bolts -arrows-.
- Remove ignition coils with output stages ⇒ Rep. gr. 24 .
- Loosen cylinder head cover bolts, working from outside inwards, and remove cylinder head cover.



- Remove camshaft adjuster cover -arrows-.



- Align mark on camshaft sprocket with mark on toothed belt cover. The indentations -arrows- face each other.

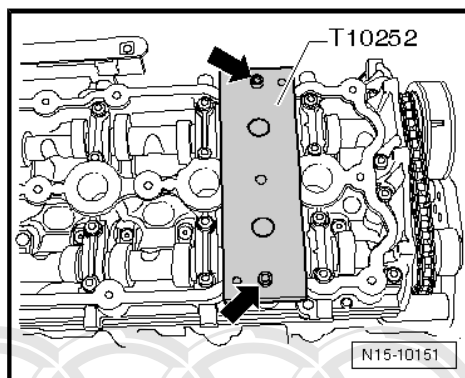


- Fit camshaft clamp -T10252- as shown and secure -arrows-.
- Loosen securing bolt from camshaft adjuster using special wrench -T40080- .



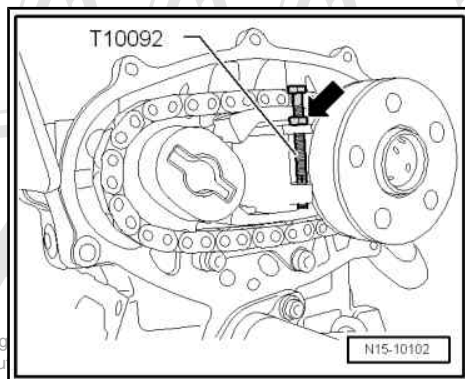
Note

Two different types of chain tensioner were employed, depending on production date. For version A use tensioning bolt -T10092- . For version B use locking pin -T10115- .



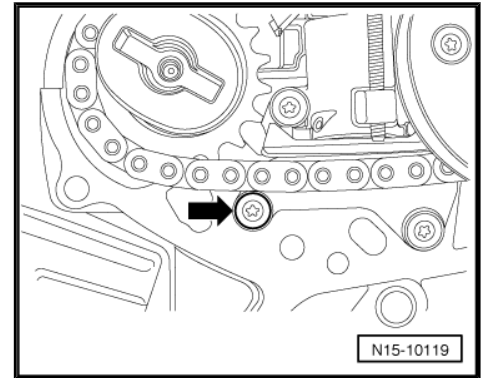
Version A

- Compress chain tensioner and lock with tensioning bolt -T10092- and M5 nut -arrow-.



Protected by copyright. Reproduction, distribution, or any other use without the written permission of Audi AG is prohibited. Audi AG is not liable for any damage or liability arising from the use of this document. Copyright by AUDI AG.

- Remove centre securing bolt of chain tensioner -arrow-.



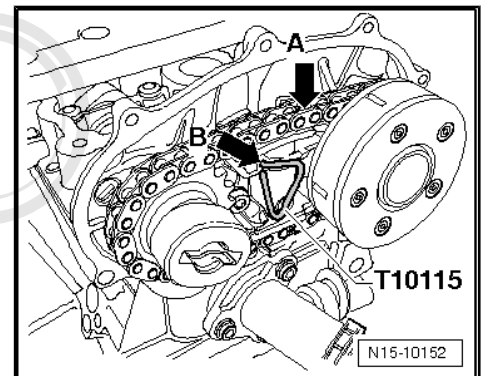
Version B

- Compress chain tensioner -arrow A- and lock with locking pin -T10115- -arrow B-.

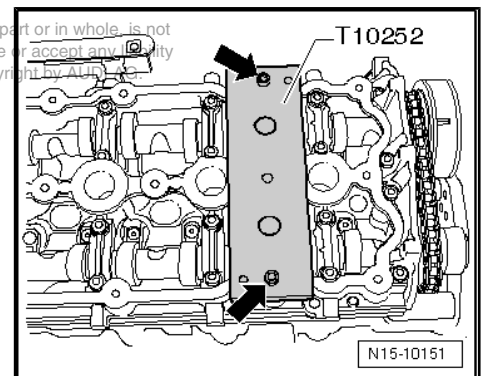
All vehicles (continued):

- Remove securing bolt from camshaft adjuster and remove camshaft adjuster together with chain.

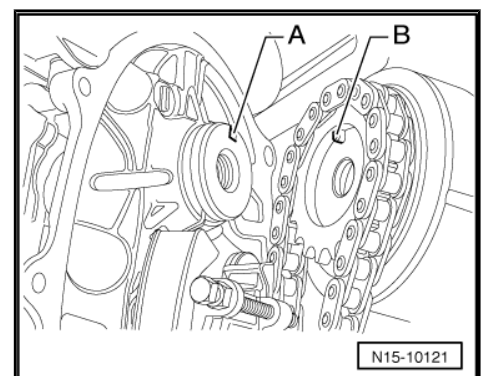
Installing



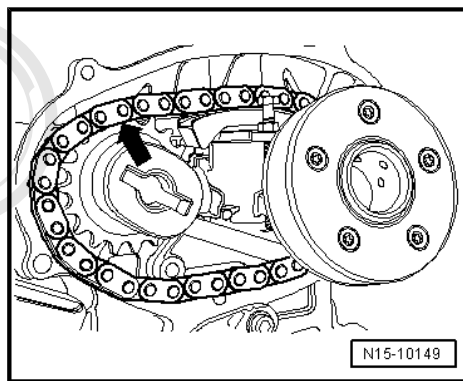
- Tightening torques → [page 129](#) → [page 101](#)
- The camshafts are located with the camshaft clamp -T10252-
- Fit chain onto camshaft adjuster.



- Hold camshaft adjuster in front of exhaust camshaft so that notch -A- is aligned with pin -B-.



- Lay chain over inlet camshaft sprocket starting at top -arrow- without changing its position.



- Turn inlet camshaft slowly in direction of arrow -A- using pin wrench -T10020- until camshaft adjuster fits onto camshaft.

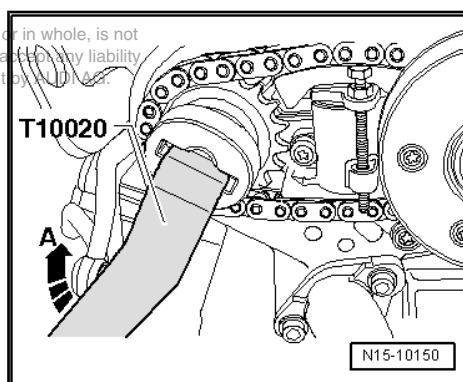
This document is not a technical specification. It is for information only and does not constitute a guarantee or acceptance of liability with respect to the correctness of information in this document. Copyright by VAG AG.



Note

If it is not possible to fit the pin into the notch: remove chain and fit chain again.

- Tighten new securing bolt for camshaft adjuster. Use special wrench -T40080- for this purpose.

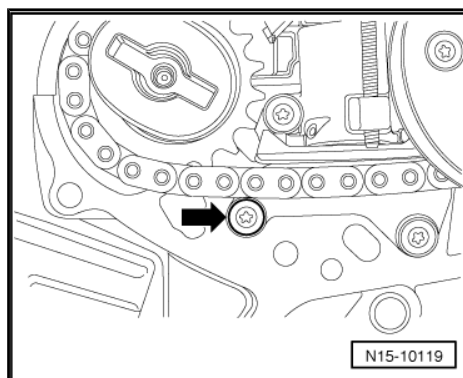


Note

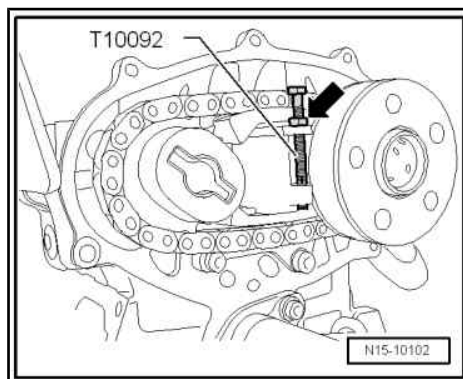
Two different types of chain tensioner were employed, depending on production date. For version A use tensioning bolt -T10092-. For version B use locking pin -T10115-.

Version A

- Tighten centre securing bolt of chain tensioner -arrow-.



- Remove tensioning bolt -T10092- -arrow-.



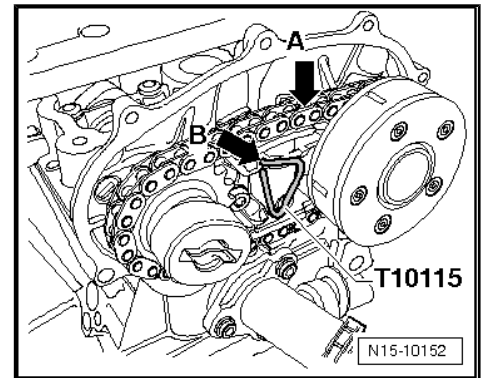
Version B

- Remove locking pin -T10115- -arrow B-.

All vehicles (continued):

Further assembly is basically carried out in reverse order of dismantling.

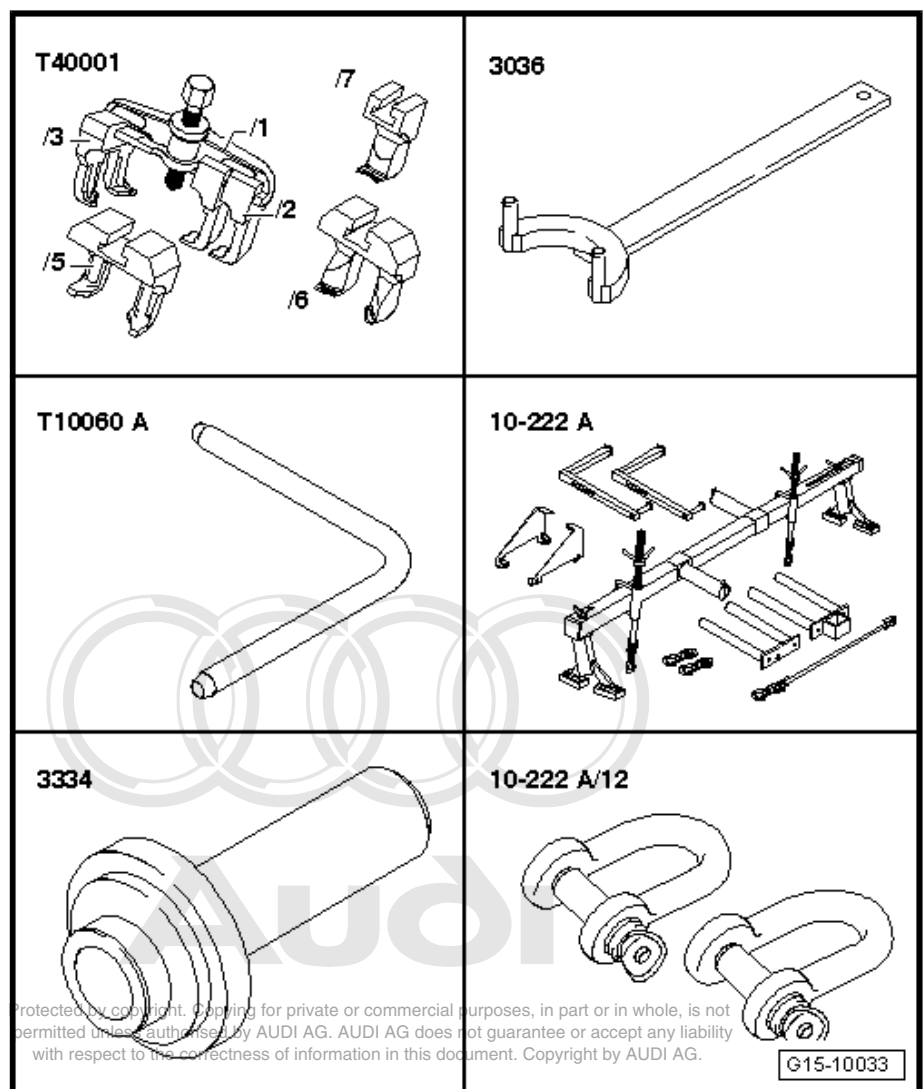
- Installing high-pressure pump ⇒ Rep. gr. 24



3.3 Removing and installing camshafts

Special tools and workshop equipment required

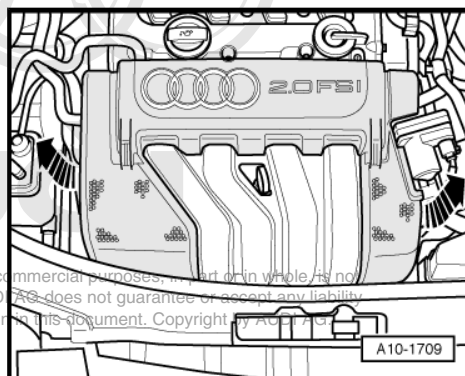
- ◆ Two-arm puller -T40001-
- ◆ Counterhold tool -3036-
- ◆ Locking pin -T10060 A-
- ◆ Support bracket -10 - 222 A-
- ◆ Thrust piece -3334-
- ◆ Shackle -10 - 222 A /12-

**Removing****Engine code BLX, BLY, BLR, BVY, BVZ**

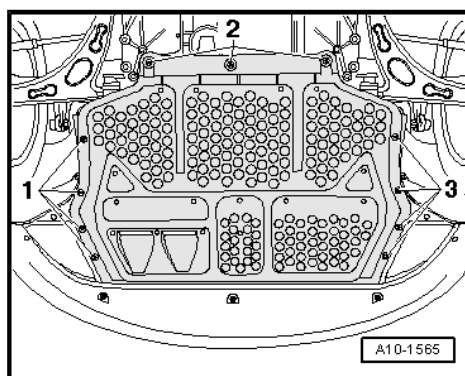
- Remove toothed belt ⇒ [page 92](#) .

Engine code AXW, BMB, BHD

- Lift off engine cover panel -arrows-.



- Remove noise insulation (centre) - fasteners -1 ... 3-.



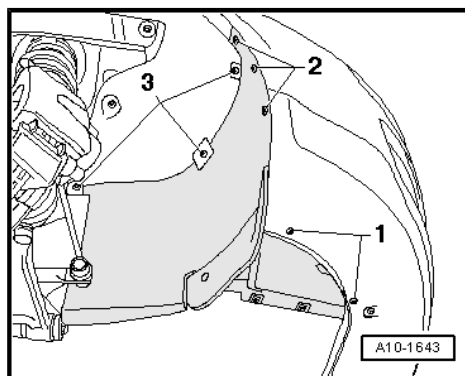
- Remove noise insulation (right-side) - fasteners -1 ... 3-.



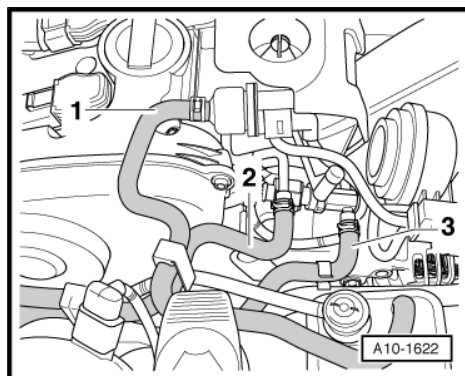
WARNING

The fuel system is pressurised. Wrap a cloth around the connection before opening the system. Then release pressure by carefully loosening the connection.

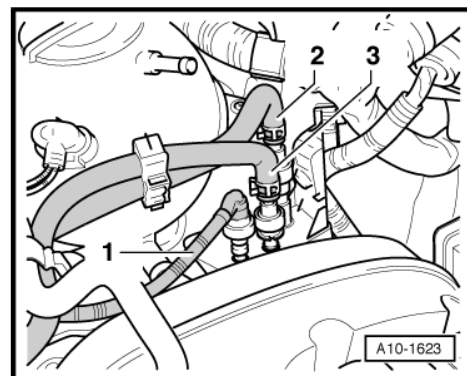
- Mark fuel supply and return lines.



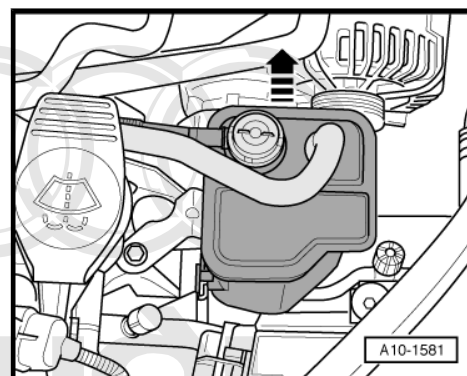
- Detach hose going to activated charcoal filter -1-.
- Disconnect fuel supply line -2- by pulling release tab.
- Disconnect fuel return line -3- by pulling release tab.



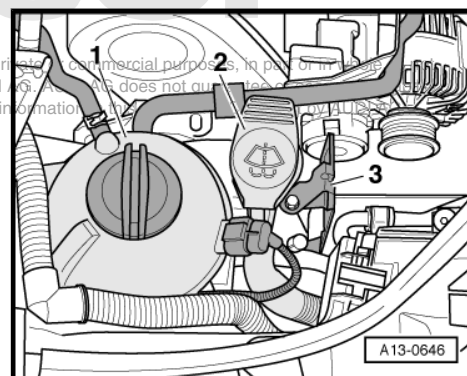
- Disconnect vacuum line -1- going to activated charcoal filter by pressing release tab.
- Disconnect fuel supply line -2- by pulling release tab.
- Disconnect fuel return line -3- by pulling release tab.



- Lift out activated charcoal filter from retainer with pipes connected -arrow-.



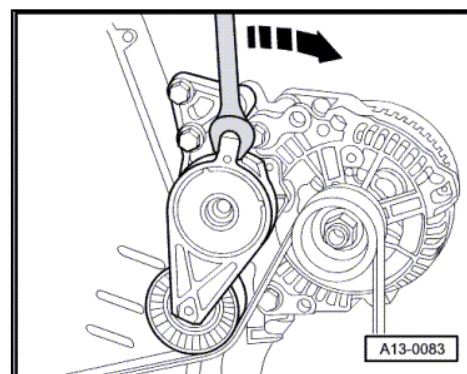
- Unbolt bracket -3- for ACF.
- Unfasten bolt at filler neck of washer fluid reservoir -2-.
- Disconnect electrical wire for coolant shortage indicator switch at expansion tank -1-.
- Unbolt coolant expansion tank and lay it aside with pipes connected.



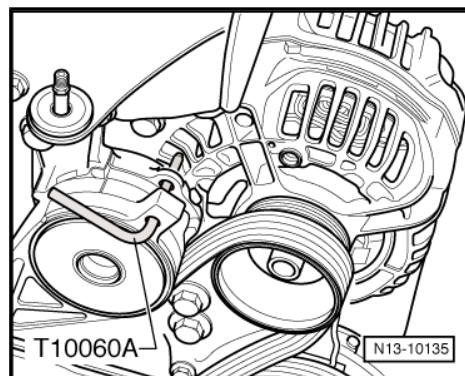
Note

Before removing, mark direction of rotation of poly V-belt with chalk or felt-tip pen. If the belt runs in the opposite direction when it is refitted, this can cause breakage.

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



- Lock tensioner in position with locking pin -T10060A- .
- Take off poly V-belt.
- Remove locking pin -T10060A- from tensioner for poly V-belt.



- Remove the bolts -arrows- and lift off toothed belt cover.



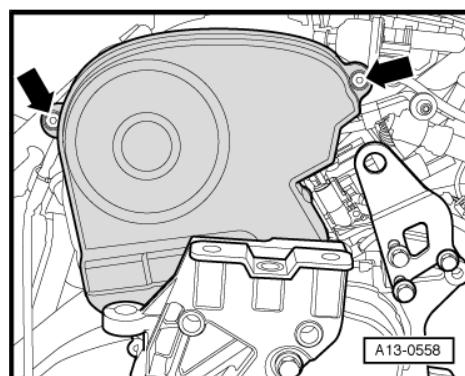
Note

Engage carefully in toothed belt cover (centre) when installing.



WARNING

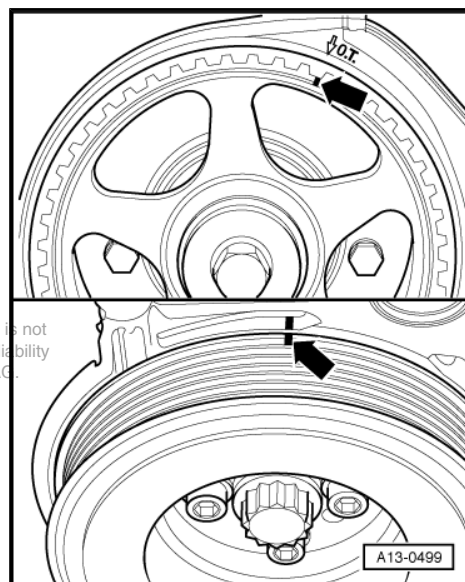
The engine must only be turned at the crankshaft, in the direction of normal engine rotation (clockwise).



Note

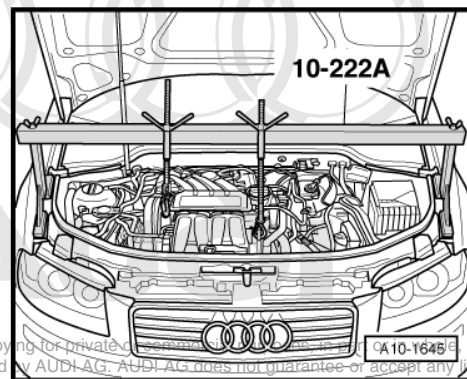
Turn over the engine at the central bolt on the crankshaft.

- Rotate engine to TDC of No. 1 cylinder by turning central bolt of crankshaft sprocket in normal direction of rotation. Marking on camshaft sprocket and marking on crankshaft must be aligned to TDC of cylinder No. 1 -arrows-.



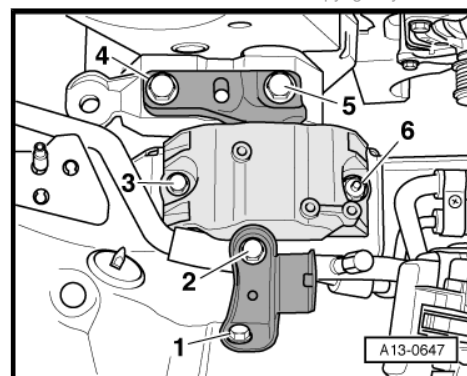
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Position support bracket -10 - 222 A- on bolted flanges of wing panels. The spindles face forwards.
- Detach crankcase breather hose from oil filler neck.
- Attach hooks of spindles with shackles -10 - 222 A /12- to the lifting eyes.
- Take up weight of engine evenly with both spindles (but do not raise engine).



Protected by copyright. Copying for private use is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Remove bolts -1- and -2- and detach connecting bracket.
- Remove bolts -3 ... 6- and detach engine mounting.

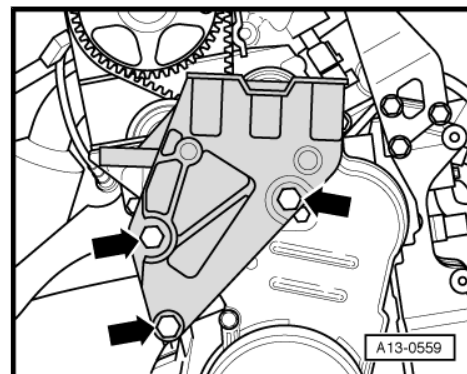


- Remove bolts -arrows- and take off engine support

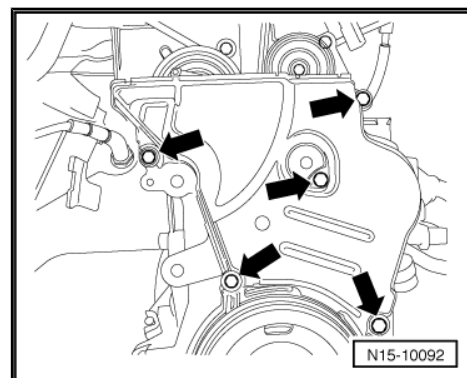


Note

To slacken the bolts for the engine support, raise or lower the engine slightly as necessary via the spindles on engine support bracket -10 - 222 A- .

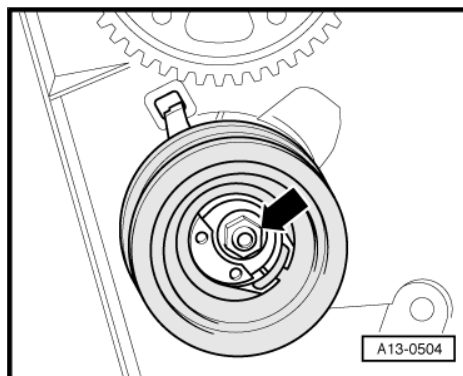


- Unscrew bolts for toothed belt cover (centre) -arrows- and remove toothed belt cover from engine.

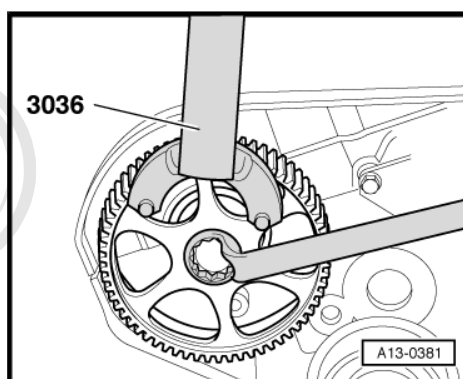


- Loosen nut on tensioning roller -arrow- several turns.
- Remove toothed belt.

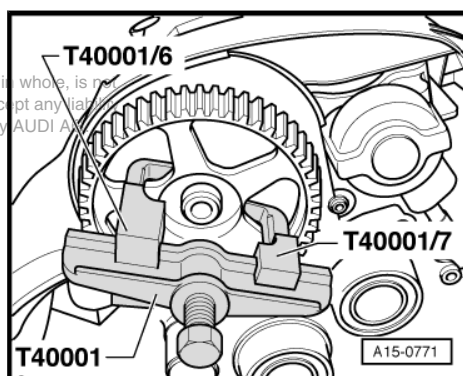
All vehicles (continued):



- Loosen camshaft sprocket using counterhold -3036- .



- Use puller -T40001- , claw -T40001/6- and claw -T40001/7- to pull off camshaft sprocket.
- Detach toothed belt cover (rear) from cylinder head.
- Remove camshaft adjuster ⇒ [page 131](#) .
- Loosen retaining frame bolts evenly working from outside inwards and remove retaining frame.
- Carefully lift out the camshafts and place them down on a clean surface.



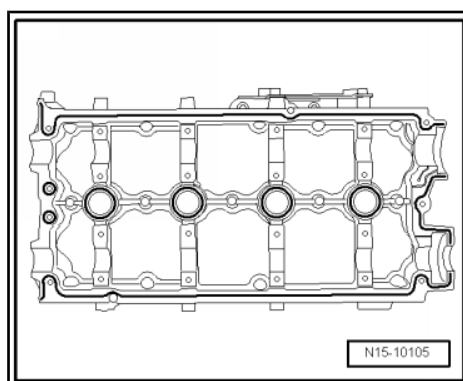
- Remove old sealant from groove in retaining frame and from sealing surfaces.
- Make sure dirt and remnants of sealant do not drop into cylinder head.

Installing

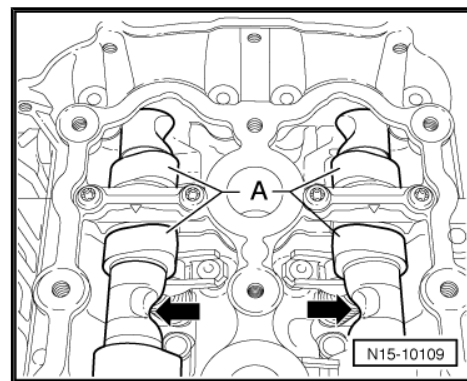


Note

- ◆ The sealing surfaces must be free of oil and grease.
- ◆ Pistons must not be at TDC.
- ◆ Ensure that all roller rocker fingers contact the valve ends correctly.
- Lubricate running surfaces of the camshafts with oil.



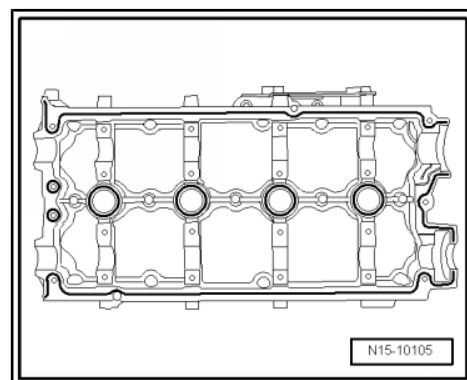
- Insert camshafts carefully in the camshaft bearings of cylinder head. Cams -A- of cylinder 4 must face each other.



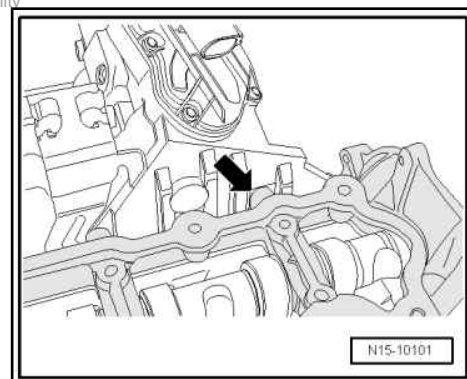
- Apply an even, slightly projecting sealant bead into the clean groove of the retaining frame.

**Note**

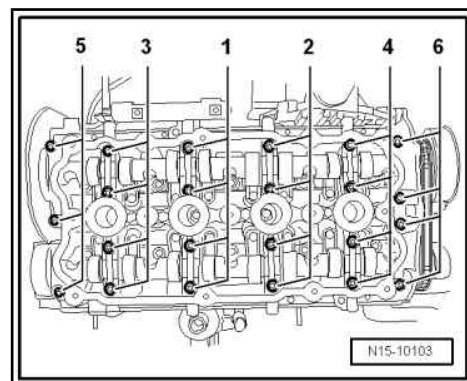
- ◆ Do not apply the sealant thicker than prescribed. If necessary remove excess sealant with a lint-free cloth.
- ◆ No time should be allowed to elapse when fitting and securing retaining frame, as sealant starts to harden as soon as sealing surfaces make contact.
- ◆ Note the use-by date of the sealant.



- Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability for errors or omissions.
- Fit retaining frame so that it goes past the exhaust gas recirculation valve -N18- -arrow-.
 - Tighten bolts lightly in several stages, working from inside outwards.



- Then tighten bolts in the sequence indicated to 8 Nm.
- Drive in cap ⇒ [Item 25 \(page 130\)](#) approx. 1...2 mm deep using thrust piece -3334- .
- Install camshaft oil seal ⇒ [page 149](#) .
- Install toothed belt cover (rear).
- Insert parallel key into camshaft.



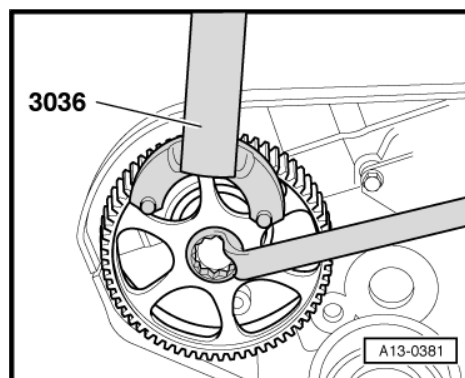
- Install camshaft sprocket. To tighten bolt, hold camshaft sprocket in position using counterhold tool -3036- .



Note

- ◆ *When turning the camshaft, the pistons must not be at TDC. This could otherwise result in damage to valves and pistons.*
- ◆ *Make sure parallel key is correctly seated.*

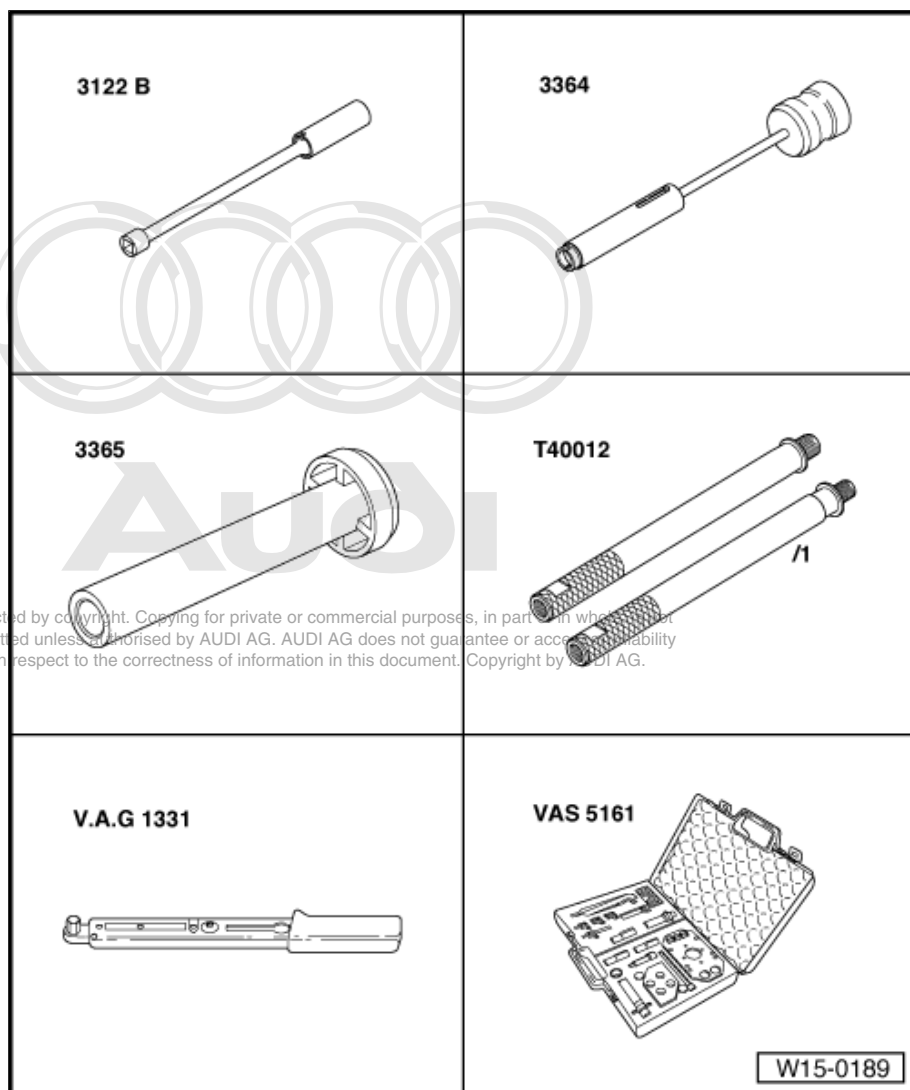
- Install camshaft adjuster ⇒ [page 131](#) .
- Install toothed belt: engine codes AXW, BMB, BHD ⇒ [page 81](#) , engine codes BLX, BLY, BLR, BVY, BVZ ⇒ [page 92](#) .
- Install cylinder head cover ⇒ [page 105](#) .



3.4 Renewing valve stem oil seals with cylinder head installed

Special tools and workshop equipment required

- ◆ Spark plug socket and extension -3122 B-
- ◆ Valve stem seal puller -3364-
- ◆ Valve stem seal fitting tool -3365-
- ◆ Adapter -T40012-
- ◆ Torque wrench -V.A.G 1331-
- ◆ Removal and installation device for valve cotters -VAS 5161-
- ◆ Guide plate for 2.0 ltr. and 3.0 ltr. FSI engine -VAS 5161/19B-

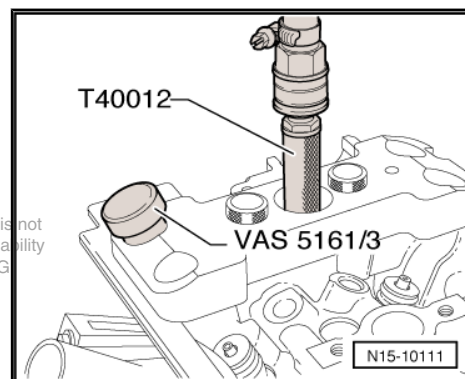
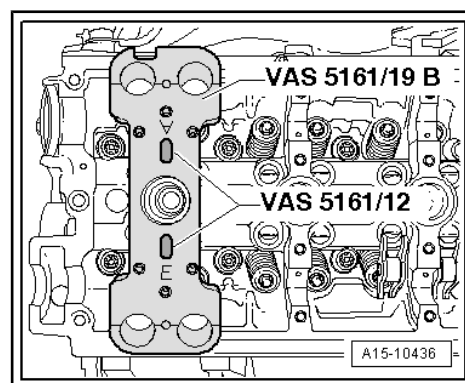


Removing valve stem oil seals

- Remove camshafts ⇒ [page 135](#) .

**Note**

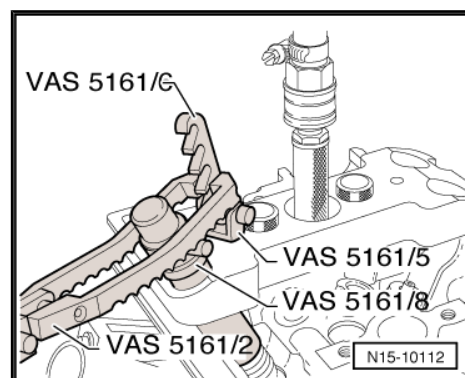
- ◆ *In order to renew the valve stem oil seals of exhaust valves of cylinder 3 and cylinder 4, the exhaust gas recirculation valve -N18- must also be removed.*
- ◆ *On some cylinder heads sleeves are fitted below the valve stem oil seals on the inlet side. These sleeves must not be removed.*
- Remove roller rocker fingers and place onto a clean surface. When doing so, make sure that roller rocker fingers are not interchanged.
- Remove spark plugs with spark plug socket -3122 B- .
- Secure guide plate for 2.0 ltr. and 3.0 ltr. FSI engine -VAS 5161/19B- to cylinder head with knurled screws -VAS 5161/12- as shown.
- Set piston of the respective cylinder to „bottom dead centre“.
- Screw adapter -T40012- into spark plug hole and connect to compressed air supply of at least 6 bar.
- Knock loose sticking valve cotters using punch -VAS 5161/3- and a plastic-headed hammer.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG

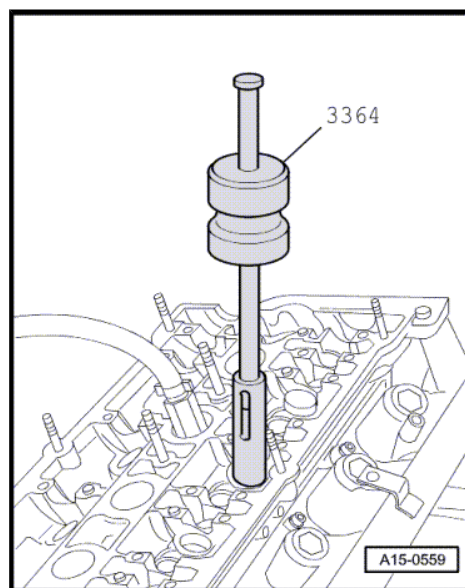
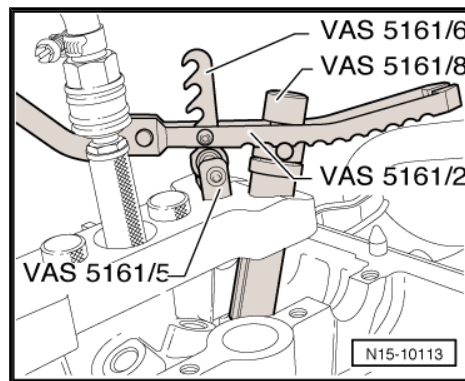
For inlet side

- Screw snap-in device -VAS 5161/6- with engaging fork -VAS 5161/5- into centre thread on guide plate for 2.0 ltr. and 3.0 ltr. FSI engine -VAS 5161/19B- .
- Insert assembly cartridge -VAS 5161/8- into guide plate for 2.0 ltr. and 3.0 ltr. FSI engine -VAS 5161/19B- .
- Engage pressure fork -VAS 5161/2- on snap-in device -VAS 5161/6- .

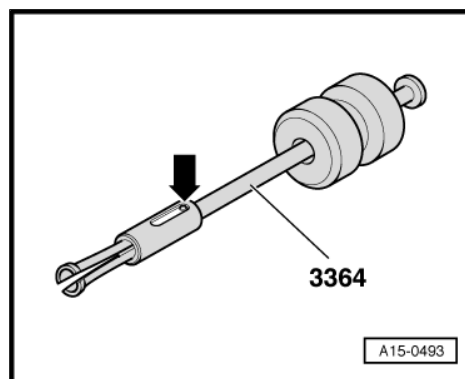


For exhaust side

- Screw snap-in device -VAS 5161/6- with engaging fork -VAS 5161/5- into outer thread on guide plate for 2.0 ltr. and 3.0 ltr. FSI engine -VAS 5161/19B- .
- Press down assembly cartridge -VAS 5161/8- and at the same time, turn knurled screw of assembly cartridge -VAS 5161/8- clockwise until tips engage in valve cotters.
- Move knurled screw back and forth slightly; the valve cotters are thus forced apart and taken up by the assembly cartridge.
- Release pressure fork -VAS 5161/2- .
- Take out assembly cartridge -VAS 5161/8- .
- Pull off valve stem oil seal with valve stem seal puller -3364- .



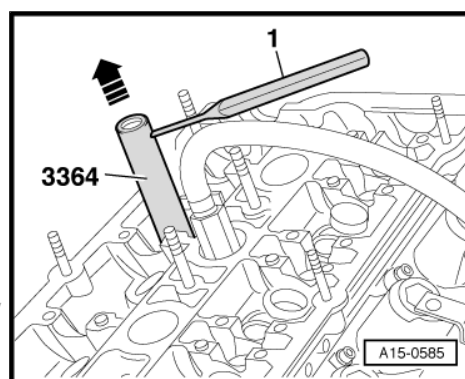
- If valve stem seal puller -3364- cannot be used on account of restricted space, knock out pin -arrow- with a punch and remove the impact extractor attachment.



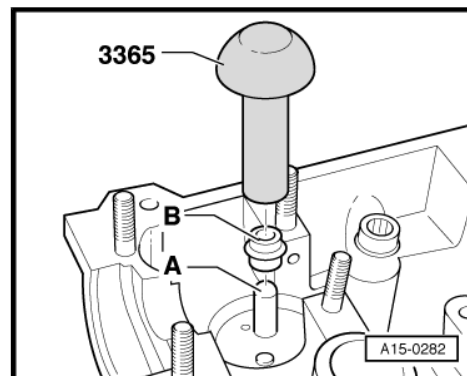
- Position lower part of valve stem seal puller -3364- on valve stem oil seal.
- Insert a punch -1- through hole in lower section of puller.
- Apply assembly lever to puller and pull out valve stem oil seal -arrow-.

Installing valve stem oil seals

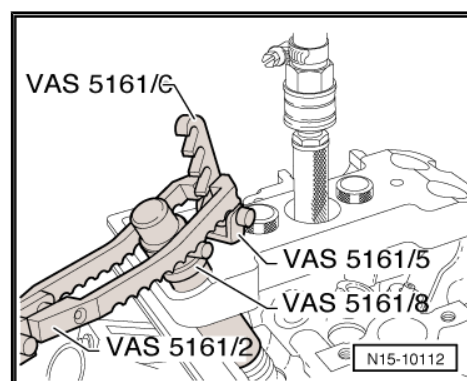
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



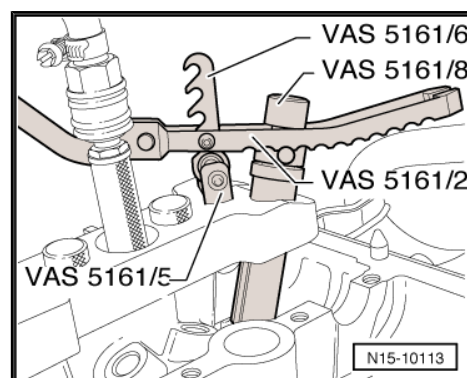
- To prevent damage to the new valve stem seals -B-, attach plastic sleeve -A- to valve stem.
- Lubricate sealing lip of valve stem oil seal -B-, place it in the valve stem seal fitting tool -3365- and push carefully onto valve guide.
- Remove plastic sleeve -A-.
- Insert valve spring and valve spring plate.
- Set up removal and installation device -VAS 5161- as shown.



Inlet side



Exhaust side

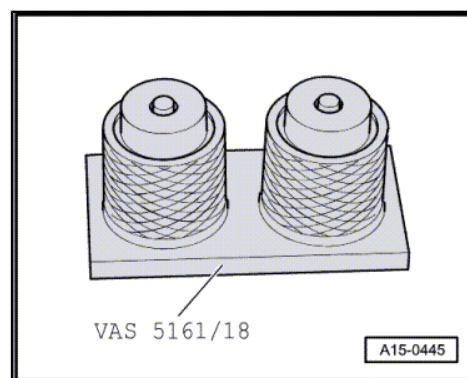


Note

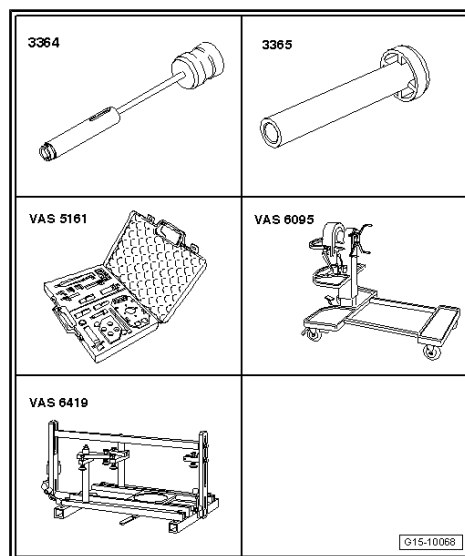
- ◆ *If valve cotters have been removed from assembly cartridge, they need to be put into insertion device -VAS 5161/18- first.*
- ◆ *Press assembly cartridge -VAS 5161/8- onto insertion device from above and pick up valve cotters.*
- Press down assembly cartridge -VAS 5161/8- with pressure fork -VAS 5161/2- and pull knurled screw of assembly cartridge up, at the same time turning it in both directions.
- Release the pressure fork -VAS 5161/2- with knurled screw still in pulled-out position.
- Take off removal and installation device -VAS 5161- .

Further assembly is basically carried out in reverse order of dismantling.

- Install camshafts ➔ [page 135](#) .



3.5 Renewing valve stem oil seals with cylinder head removed



Special tools and workshop equipment required

- ◆ Valve stem seal puller -3364-
- ◆ Valve stem seal fitting tool -3365-
- ◆ Removal and installation device for valve cotters -VAS 5161-
- ◆ Guide plate for 2.0 ltr. and 3.0 ltr. FSI engine -VAS 5161/19B-
- ◆ Engine and gearbox support -VAS 6095-
- ◆ Cylinder head tensioning device -VAS 6419-

Procedure

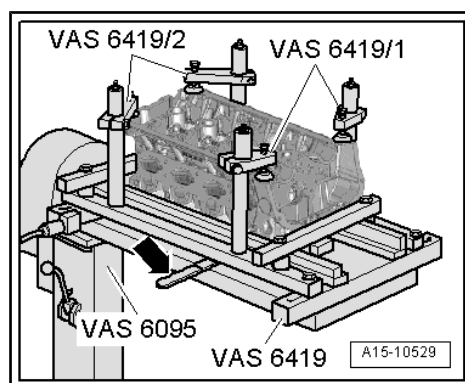
- Remove camshafts ⇒ [page 135](#) .



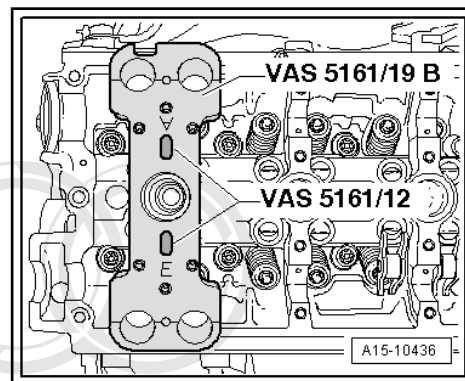
Note

On some cylinder heads sleeves are fitted below the valve stem oil seals on the inlet side. These sleeves must not be removed.

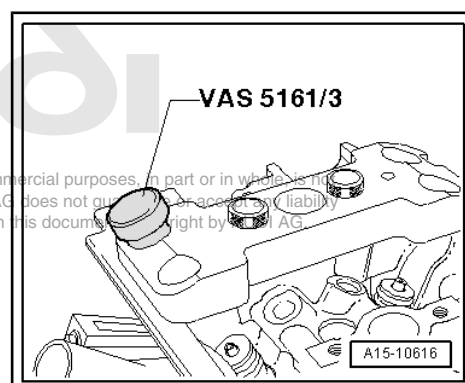
- Mark original positions of roller rocker fingers and hydraulic compensation elements for reinstallation.
- Remove roller rocker fingers together with hydraulic compensation elements and put down on a clean surface.
- Insert cylinder head tensioning device -VAS 6419- into engine and gearbox support -VAS 6095- .
- Secure cylinder head in cylinder head tensioning device -VAS 6419- , as illustrated.
- Connect cylinder head tensioning device -VAS 6419- to compressed air.
- Using lever -arrow-, slide air pad under combustion chamber where valve stem oil seals are to be removed.
- Apply just enough compressed air to bring air pad into contact with valve heads.



- Fit guide plate -VAS 5161/19B- from removal and installation device for valve cotters -VAS 5161- on cylinder head.
- Secure guide plate with knurled screws -VAS 5161/12- .



- Apply drift -VAS 5161/3- to guide plate and use plastic-headed hammer to release sticking valve cotters.

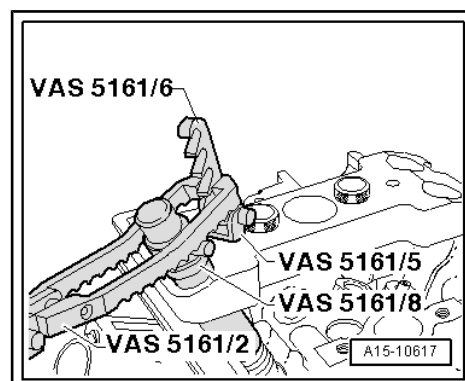


Protected by copyright. Copying for private or commercial purposes, in part or in whole is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee the accuracy or liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Screw snap-in device -VAS 5161/6- with engaging fork -VAS 5161/5- into guide plate.
- Insert assembly cartridge -VAS 5161/8- in guide plate.

Inlet side:

- Engage pressure fork -VAS 5161/2- at snap-in device, as shown in illustration.

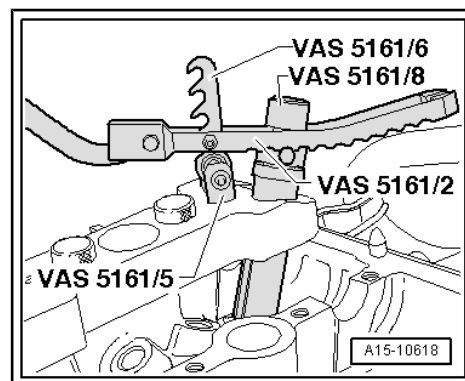


Exhaust side:

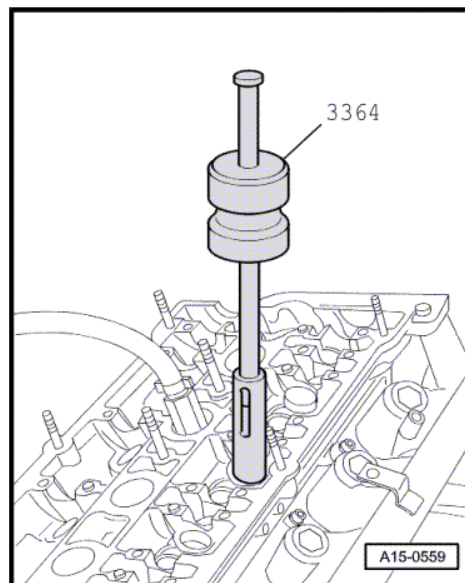
- Engage pressure fork -VAS 5161/2- at snap-in device, as shown in illustration.

Continuation for both sides:

- Press down with pressure fork for assembly cartridge.
- At the same time, turn knurled screw of assembly cartridge clockwise until tips engage in valve cotters.
- Turn knurled screw in both directions.
- The valve cotters are forced apart and are taken up by the cartridge.
- Release pressure fork.
- Take out assembly cartridge.
- Detach guide plate and turn to one side.
- Detach valve spring with valve spring plate.



- Pull off valve stem oil seal with valve stem seal puller -3364- .

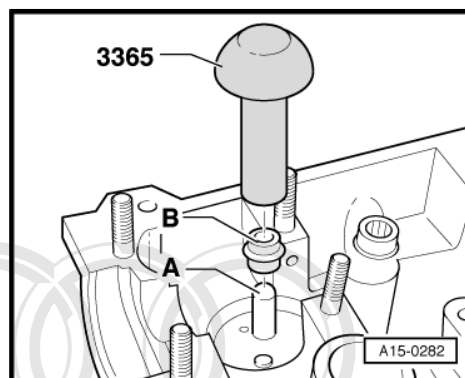


Caution

Make sure valve stem oil seals are not damaged when installing.

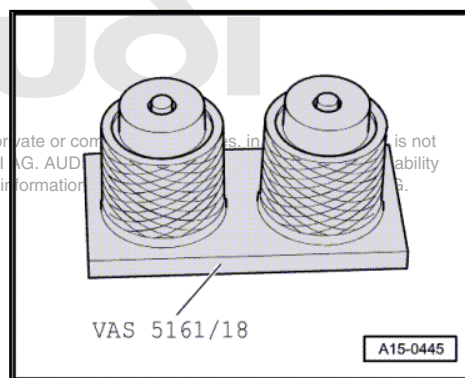
- ◆ **New valve stem oil seals -B- are supplied with plastic sleeve; fit plastic sleeve -A- onto valve stem.**

- Lightly oil sealing lip of valve stem oil seal.
- Slide valve stem oil seal onto plastic sleeve.
- Carefully press valve stem oil seal onto valve guide using valve stem seal fitting tool -3365- .
- Remove plastic sleeve.



If valve cotters have been removed from assembly cartridge, they must first be inserted in insertion device -VAS 5161/18- .

- Larger diameter of valve cotters faces upwards.
- Press assembly cartridge onto insertion device from above and take up valve cotters.
- Insert valve spring and valve spring plate.
- Secure guide plate back onto cylinder head.
- Insert assembly cartridge with knurled spacer ring in guide plate.
- Press down pressure fork and pull knurled screw upwards while turning screw in both directions.
- This will insert the valve cotters.
- Release the pressure fork with knurled screw still in pulled position.
- Repeat procedure for each valve.



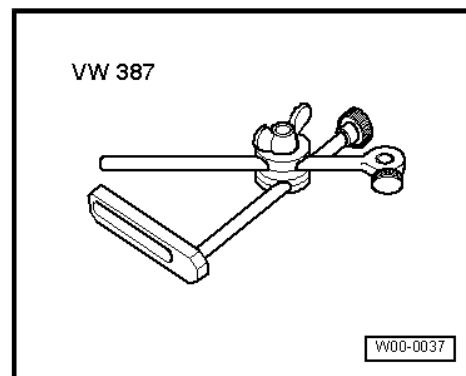
Installation is carried out in the reverse order; note the following:

- Install camshafts ➔ [page 135](#) .

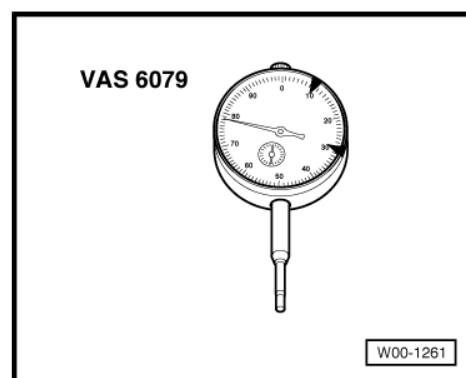
3.6 Checking valve guides

Special tools and workshop equipment required

- ◆ Universal dial gauge bracket -VW 387-



- ◆ Dial gauge -VAS 6079-



Test sequence

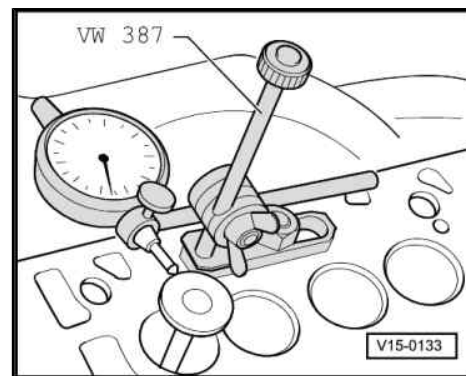
- Insert valve into valve guide. Only insert inlet valve into inlet guide and exhaust valve into exhaust guide, as the stem diameters are different.
- End of valve stem must be flush with valve guide.
- Determine amount of sideways play.
- Wear limit (sideways play): 0.8 mm.

If wear limit is exceeded:

- If the wear limit is exceeded, repeat the measurement with new valves.

If wear limit is exceeded:

- Renew the cylinder head.



Note

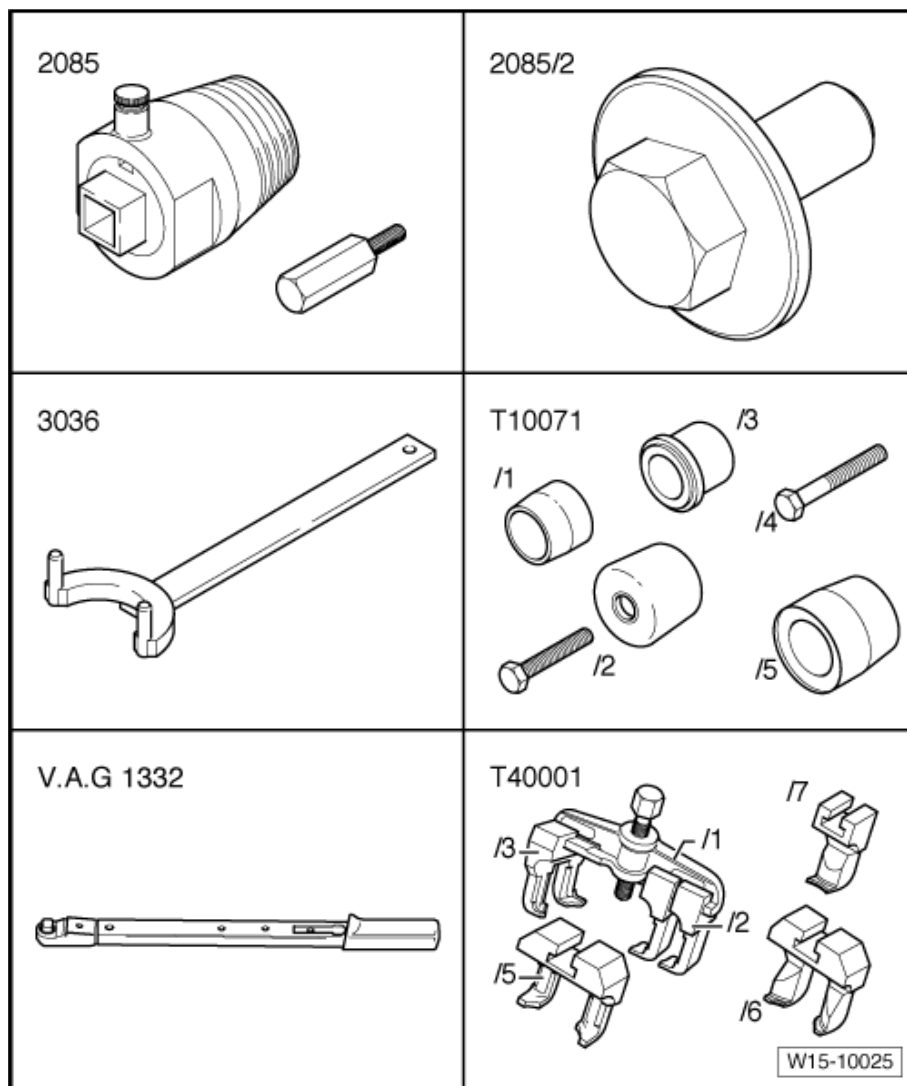
If the valve has to be renewed as part of a repair, use a new valve for the measurement.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

3.7 Renewing exhaust camshaft oil seal

Special tools and workshop equipment required

- ◆ Oil seal extractor -2085-
- ◆ Adapter -2085/2-
- ◆ Counterhold tool -3036-
- ◆ Assembly tool -T10071-
- ◆ Two-arm puller -T40001- with claw -T40001/6- and claw -T40001/7-
- ◆ Torque wrench -V.A.G 1332-



Removing

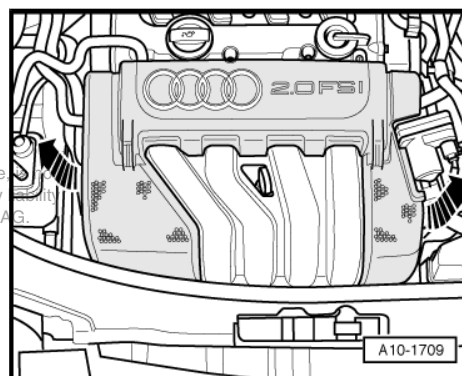
Cylinder head installed

Engine code BLX, BLY, BLR, BVY, BVZ

- Remove toothed belt ⇒ [page 92](#) .

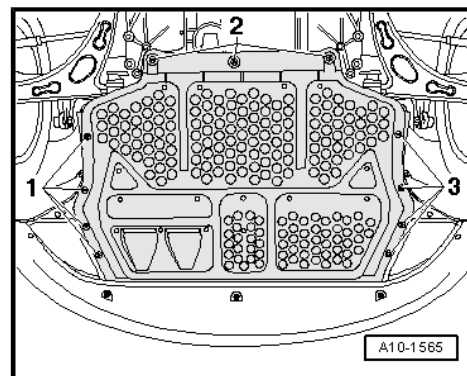
Engine code AXW, BMB, BHD

- Lift off engine cover panel -arrows-.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

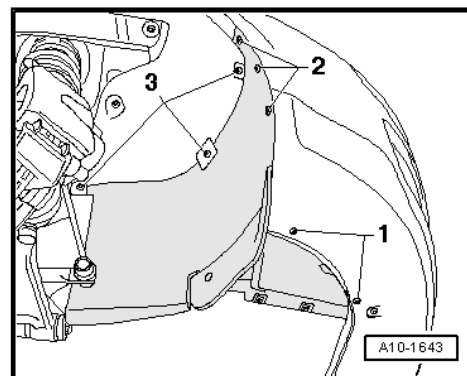
- Remove noise insulation (centre) - fasteners -1 ... 3-.



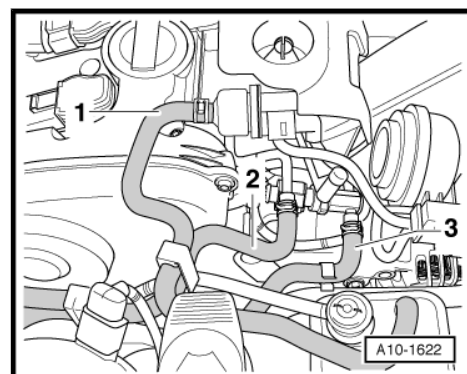
- Remove noise insulation (right-side) - fasteners -1 ... 3-

**WARNING**

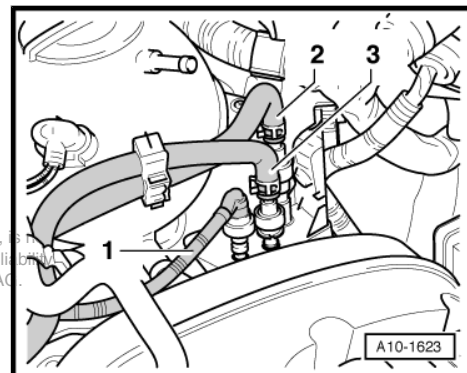
The fuel system is pressurised. Wrap a cloth around the connection before opening the system. Then release pressure by carefully loosening the connection.



- Mark fuel supply and return lines.
- Detach hose going to activated charcoal filter -1-.
- Disconnect fuel supply line -2- by pulling release tab.
- Disconnect fuel return line -3- by pulling release tab.

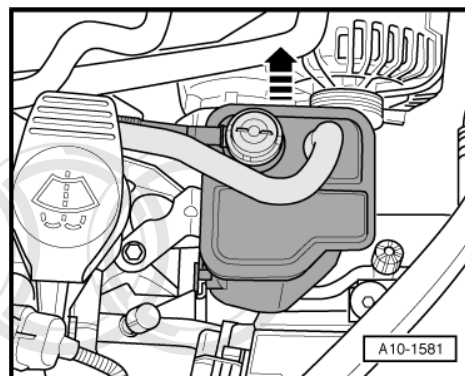


- Disconnect vacuum line -1- going to activated charcoal filter by pressing release tab.
- Disconnect fuel supply line -2- by pulling release tab.
- Disconnect fuel return line -3- by pulling release tab.

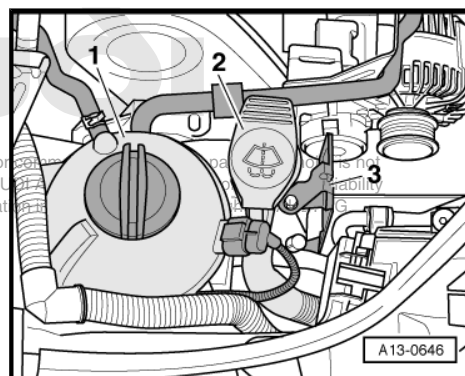


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Lift out activated charcoal filter from retainer with pipes connected -arrow-.



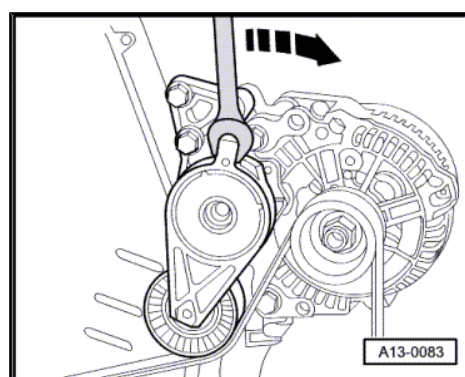
- Unbolt bracket -3- for ACF.
- Unfasten bolt at filler neck of washer fluid reservoir -2-.
- Disconnect electrical wire for coolant shortage indicator switch at expansion tank -1-.
- Unbolt coolant expansion tank and lay it aside with pipes connected.



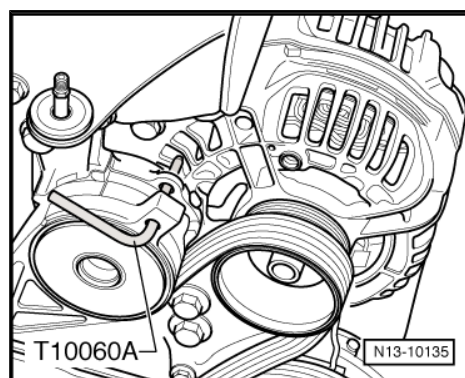
Note

Before removing, mark direction of rotation of poly V-belt with chalk or felt-tip pen. If the belt runs in the opposite direction when it is refitted, this can cause breakage.

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



- Lock tensioner in position with locking pin -T10060A-.
- Take off poly V-belt.
- Remove locking pin -T10060A- from tensioner for poly V-belt.



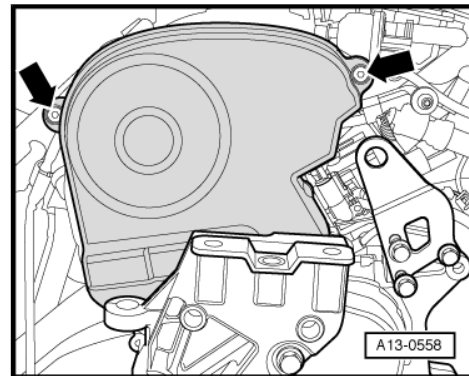
- Remove the bolts -arrows- and lift off toothed belt cover.

**Note**

Engage carefully in toothed belt cover (centre) when installing.

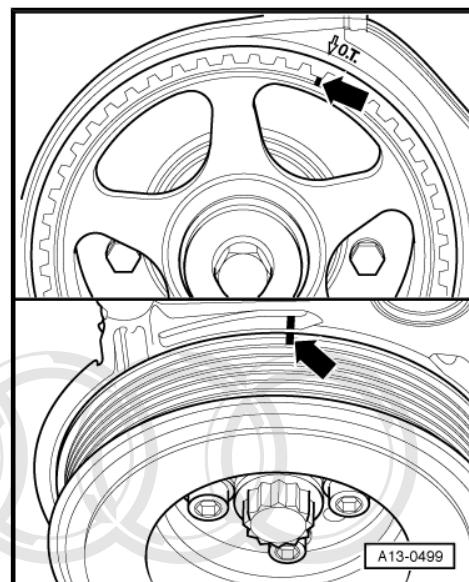
**WARNING**

The engine must only be turned at the crankshaft, in the direction of normal engine rotation (clockwise).

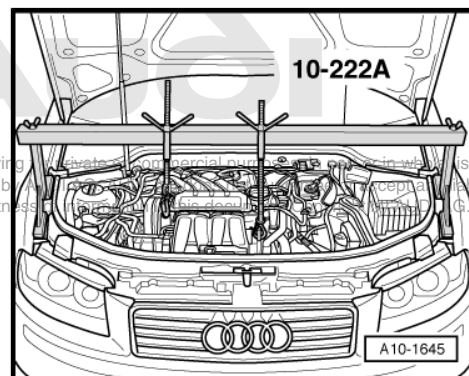
**Note**

Turn over the engine at the central bolt on the crankshaft.

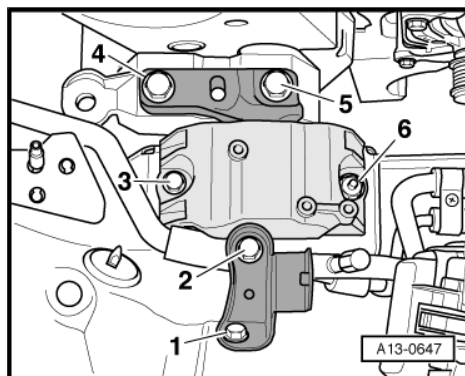
- Rotate engine to TDC of No. 1 cylinder by turning central bolt of crankshaft sprocket in normal direction of rotation. Marking on camshaft sprocket and marking on crankshaft must be aligned to TDC of cylinder No. 1 -arrows-.



- Position support bracket -10 - 222 A- on bolted flanges of wing panels. The spindles face forwards.
- Detach crankcase breather hose from oil filler neck.
- Attach hooks of spindles with shackles -10 - 222 A /12- to the lifting eyes.
- Take up weight of engine evenly with both spindles (but do not raise engine).



- Remove bolts -1- and -2- and detach connecting bracket.
- Remove bolts -3 ... 6- and detach engine mounting.

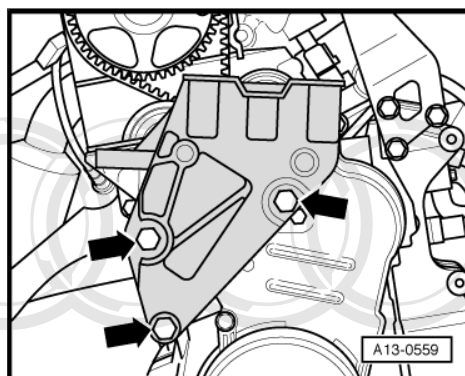


- Remove bolts -arrows- and take off engine support



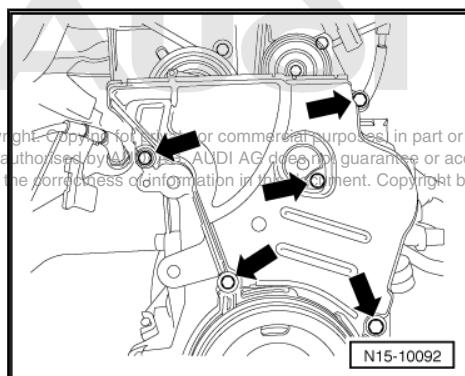
Note

To slacken the bolts for the engine support, raise or lower the engine slightly as necessary via the spindles on engine support bracket -10 - 222 A- .



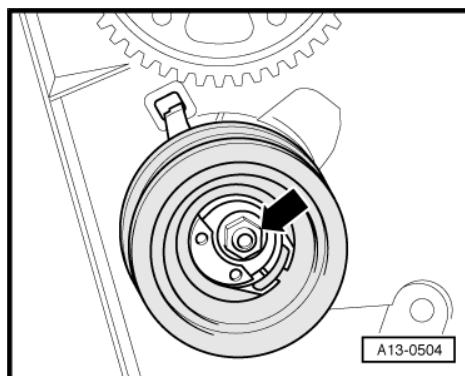
- Unscrew bolts for toothed belt cover (centre) -arrows- and remove toothed belt cover from engine.

Protected by copyright. Copying for private or commercial purposes in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

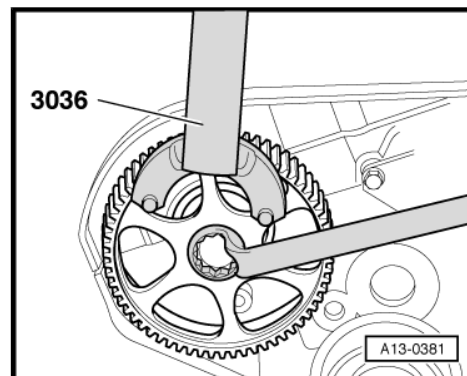


- Loosen nut on tensioning roller -arrow- several turns.
- Remove toothed belt.

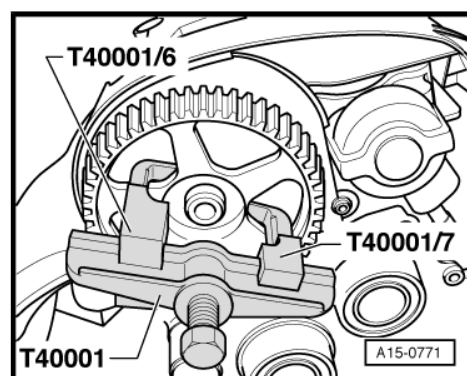
All vehicles (continued):



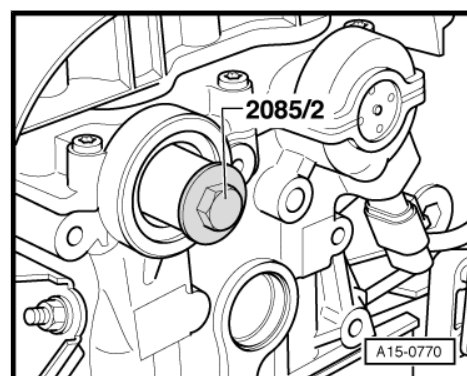
- Loosen camshaft sprocket (apply counterhold tool -3036-).



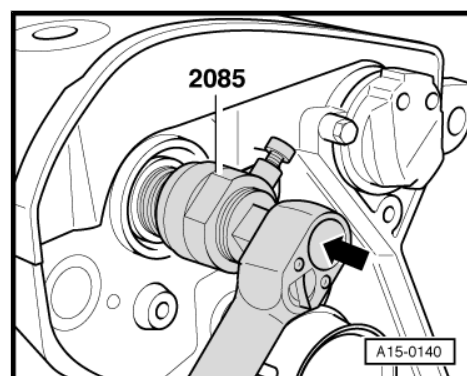
- Detach the camshaft sprocket using puller -T40001- and claws T40001/6 and T40001/7.



- To guide oil seal extractor, screw special tool 2085/2 from oil seal extractor -2085- by hand into camshaft as far as it will go.
- Unscrew inner part of oil seal extractor -2085- two turns (approx. 3 mm) out of the outer part and lock with knurled screw.



- Lubricate threaded head of oil seal extractor -2085- , place it in position and screw it into oil seal as far as possible (apply firm pressure).
- Loosen knurled screw and turn inner section against camshaft until oil seal is pulled out.
- Clamp flats of oil seal extractor in vice. Remove oil seal with pliers.

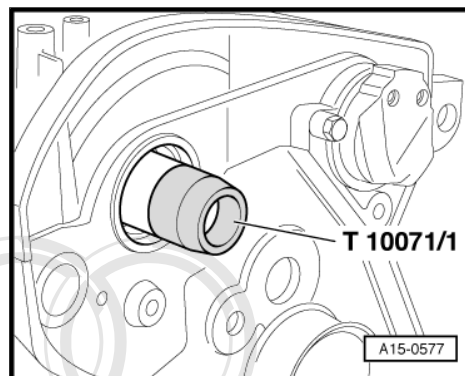


Installing

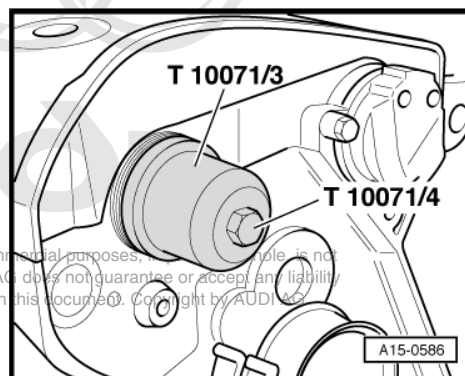
Tightening torques ⇒ [page 129](#)

- Do not lubricate sealing lip of oil seal.

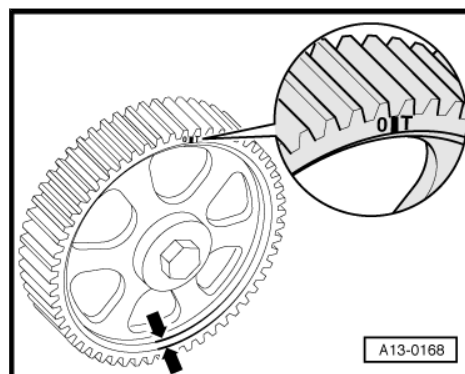
- Fit guide sleeve -T10071/1- from assembly tool -T10071- onto end of camshaft.
- Push oil seal over guide sleeve onto shaft.
- Detach guide sleeve.



- Press oil seal in onto stop using press sleeve -T10071/3- and bolt -T10071/4- from assembly tool -T10071- .



- Install camshaft sprocket.
- ◆ Check installation position: The thinner web of the camshaft sprocket faces outwards -arrows- and the marking for No. 1 cylinder TDC is visible.



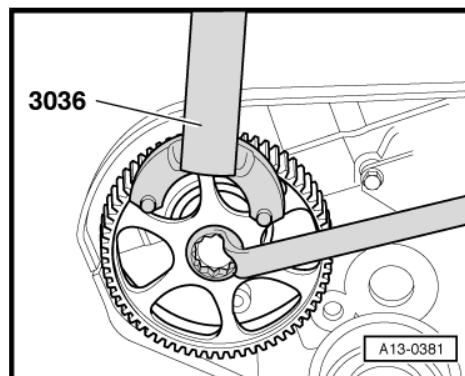
- Fit securing bolt of camshaft sprocket (use counterhold -3036-).



Note

If a piston is at TDC the valves could strike the piston when turning the camshaft. Pistons must therefore not be at TDC. This could otherwise result in damage to valves and pistons.

- Install toothed belt: engine codes AXW, BMB, BHD
⇒ [page 81](#) , engine codes BLX, BLY, BLR, BVY, BVZ
⇒ [page 92](#) .



17 – Lubrication

1 Removing and installing parts of lubrication system



Note

If large quantities of metal shavings or other particles are found in the engine oil when repairing the engine (possibly caused by partial seizure of crankshaft and conrod bearings), clean the oil passages thoroughly and renew the oil cooler to prevent further damage occurring later.

Protected by copyright. Audi AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Checking oil pressure ⇒ [page 176](#)

Viscosity grades and oil specifications: ⇒ Maintenance ; Booklet 808

For oil capacities refer to ⇒ Maintenance tables .

1.1 Part I: Sump, balance shaft assembly - exploded view

Balance shaft assembly with oil pump - exploded view
⇒ [page 159](#)

Oil filter bracket - exploded view ⇒ [page 173](#)

1 - 15 Nm

2 - Oil dipstick

- ☐ The oil level must not be above max. mark.

3 - Guide

4 - Guide tube

5 - Intermediate plate

- ☐ Removing and installing ⇒ [page 170](#)
- ☐ Renew on vehicles with engine codes AXW, BLX, BHD, BLY, BLR, BMB

6 - Oil pump with balance shaft assembly

- ☐ With pressure relief valve (12 bar)
- ☐ Removing and installing, engine code BVY, BVZ ⇒ [page 170](#)
- ☐ Removing and installing, engine code AXW, BLX, BHD, BLY, BLR, BMB ⇒ [page 162](#)
- ☐ The intermediate plate must always be renewed on vehicles with engine codes AXW, BLX, BHD, BLY, BLR, BMB if the oil pump with balance shaft assembly has been removed.

7 - 15 Nm + 1/4 turn (90°) further

- ☐ Renew
- ☐ Note different bolt lengths ⇒ [page 161](#)

8 - 15 Nm

9 - Sump

- ☐ Clean sealing surface before installing
- ☐ Removing and installing, engine code BVY, BVZ ⇒ [page 166](#)
- ☐ Removing and installing, engine code AXW, BLX, BHD, BLY, BLR, BMB ⇒ [page 162](#)
- ☐ The intermediate plate must always be renewed on vehicles with engine codes AXW, BLX, BHD, BLY, BLR, BMB if the sump is removed.

10 - 15 Nm

11 - Seal

- ☐ Rolled onto ⇒ [Item 12 \(page 158\)](#)

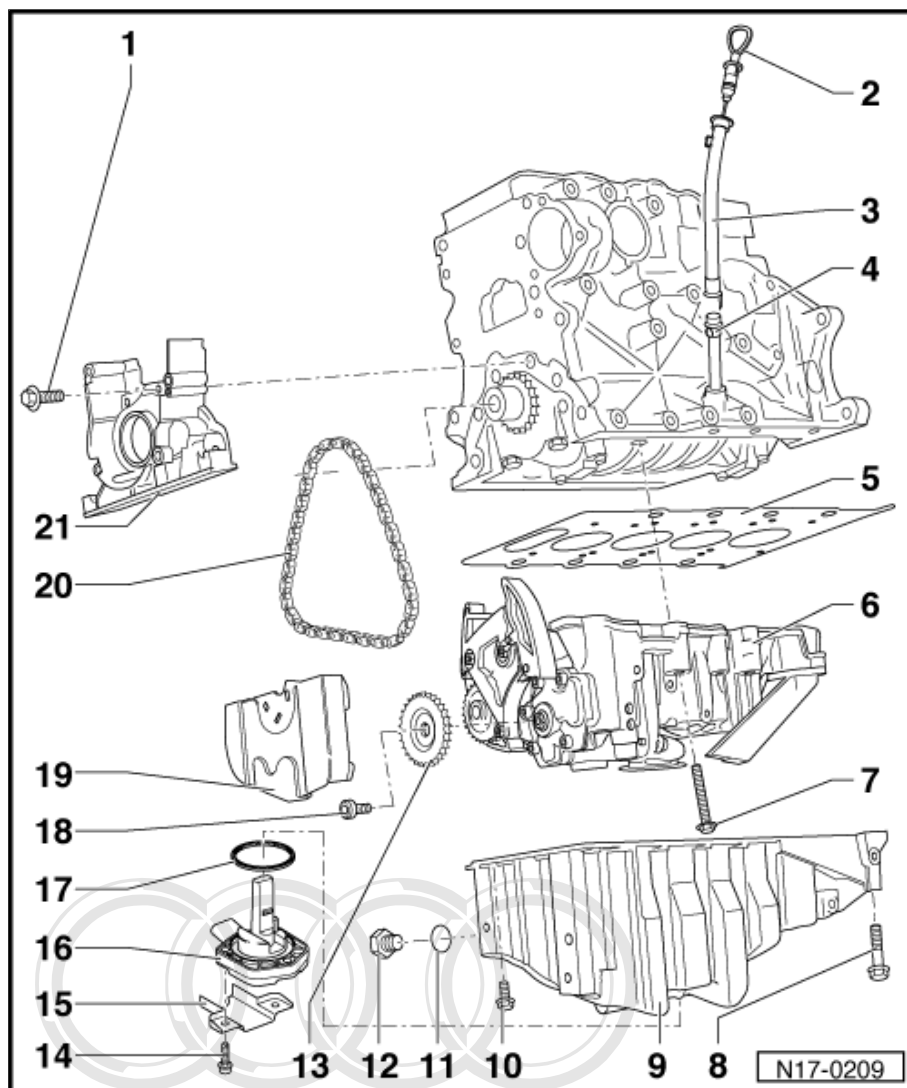
12 - Oil drain plug, 30 Nm

- ☐ With captive seal
- ☐ Renew

13 - Chain sprocket

14 - 10 Nm

- ☐ Not fitted on engine code BLY, BVZ



15 - Protective cap

- ☐ Not fitted on engine code BLY, BVZ

16 - Oil level and oil temperature sender -G266-

- ☐ Not fitted on engine code BLY, BVZ

17 - Seal

- ☐ Renew
- ☐ Lubricate before installing
- ☐ Not fitted on engine code BLY, BVZ

18 - 20 Nm + 90° (1/4 turn) further

- ☐ Renew

19 - Chain guard**20 - Chain****21 - Sealing flange**

- ☐ Must be positioned on dowel sleeves
- ☐ Removing and installing, engine code AXW, BLX, BHD, BLY, BLR, BMB ⇒ [page 49](#)
- ☐ Removing and installing, engine code BVY, BVZ ⇒ [page 49](#)
- ☐ The sump must be removed when removing and installing on engine codes AXW, BLX, BHD, BLY, BLR, BMB ⇒ [page 162](#)
- ☐ The intermediate plate must always be renewed on engine codes AXW, BLX, BHD, BLY, BLR, BMB if the sump is removed.
- ☐ Renewing crankshaft oil seal on pulley end ⇒ [page 51](#)

1.2 Balance shaft assembly with oil pump - exploded view

Sump with balance shaft housing - exploded view ⇒ [page 157](#)

Oil filter bracket - exploded view ⇒ [page 173](#)

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

1 - Chain guard

2 - Chain

- ☐ Before removing, mark running direction (fitting position) with paint

3 - Dowel sleeves

4 - Oil pump with balance shaft assembly

- ☐ Before installing, check that the two dowel sleeves for centralising are fitted.
- ☐ With pressure relief valve (12 bar)
- ☐ Removing and installing, engine code BVY, BVZ ⇒ [page 170](#)
- ☐ Removing and installing, engine code AXW, BLX, BHD, BLY, BLR, BMB ⇒ [page 162](#)
- ☐ The intermediate plate must always be renewed on engine codes AXW, BLX, BHD, BLY, BLR, BMB if the oil pump with balance shaft assembly is removed.

5 - 3 Nm

- ☐ Apply locking fluid when fitting

6 - Cover

- ☐ Prevents foam build-up in engine oil

7 - Oil return connection

- ☐ With seal

8 - 9 Nm

9 - Oil intake pipe

- ☐ Clean strainer if dirty

10 - 8 Nm

11 - O-ring

- ☐ Renew

12 - 15 Nm + 1/4 turn (90°) further

- ☐ Renew
- ☐ Note different bolt lengths ⇒ [page 161](#)

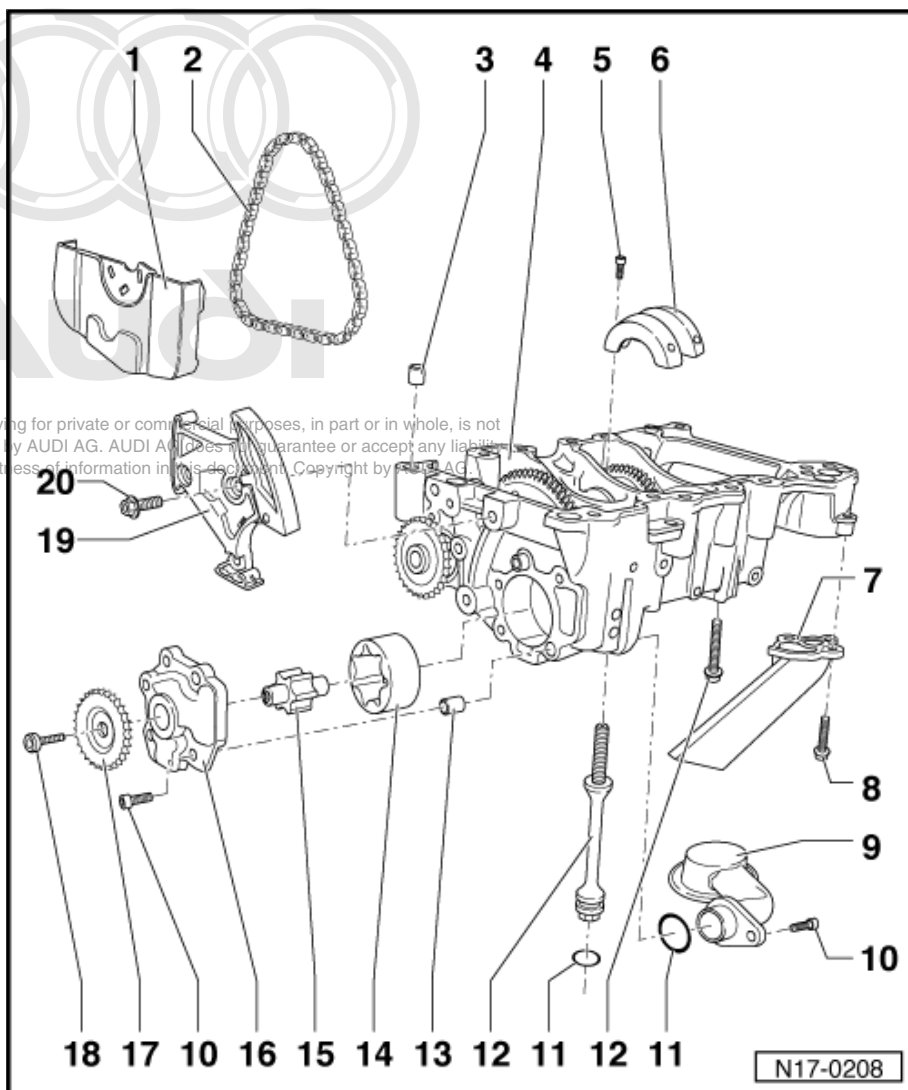
13 - Dowel sleeves

14 - Outer rotor

- ☐ Check contact surfaces for scores
- ☐ Marking must be visible

15 - Inner rotor

- ☐ Check contact surfaces for scores



16 - Oil pump cover

17 - Chain sprocket

18 - 20 Nm + 90° (1/4 turn) further

☐ Renew

19 - Chain tensioner with tensioning rail

☐ Pre-tensioning before installing ⇒ [page 173](#)

20 - 15 Nm

Positions of bolts for balance shaft assembly

A - Hexagon collared bolt M7x40

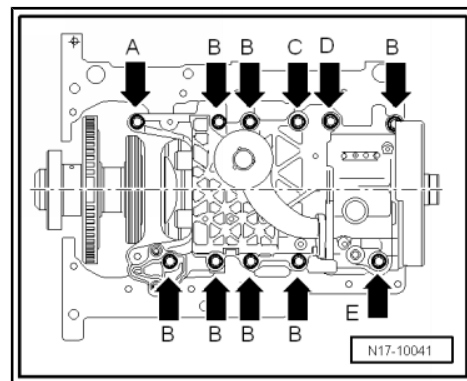
B - Hexagon collared bolt M7x55

C - Hexagon collared bolt M7x90

D - Hexagon collared bolt M7x115

E - Screw plug with O-ring

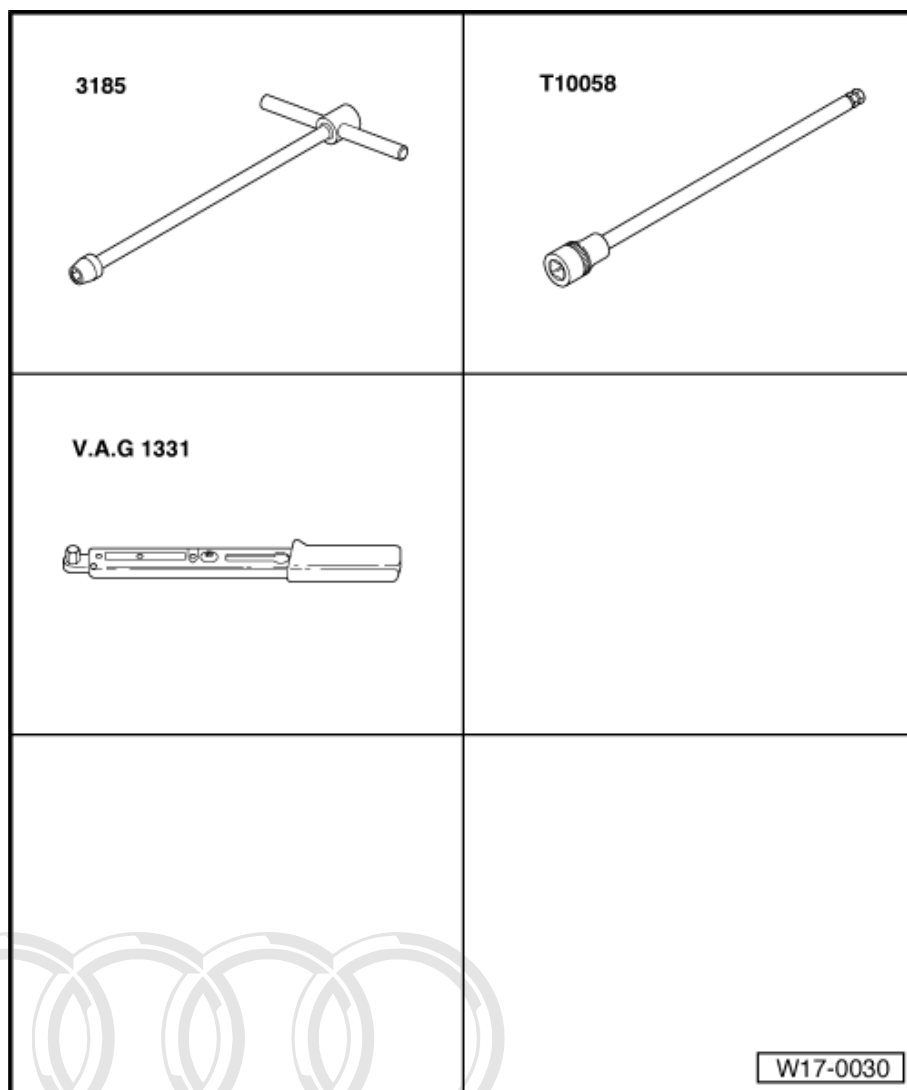
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



1.3 Removing and installing sump with balance shaft assembly and oil pump, engine code AXW, BLX, BHD, BLY, BLR, BMB

Special tools and workshop equipment required

- ◆ T-bar and socket, 10 mm -3185-
- ◆ Allen key, long reach - T10058-
- ◆ Torque wrench -V.A.G 1331-
- ◆ Flat scraper



Removing sump

- Remove noise insulation tray ⇒ General body repairs, exterior; Rep. gr. 50 ; Noise insulation .
- Drain off engine oil.



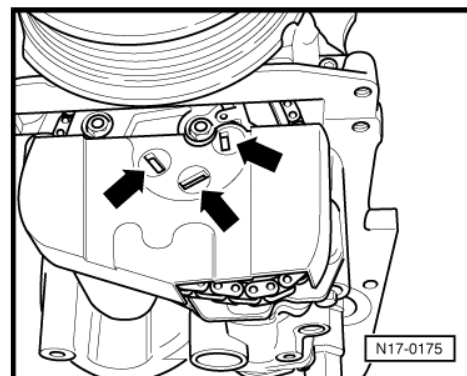
Note

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

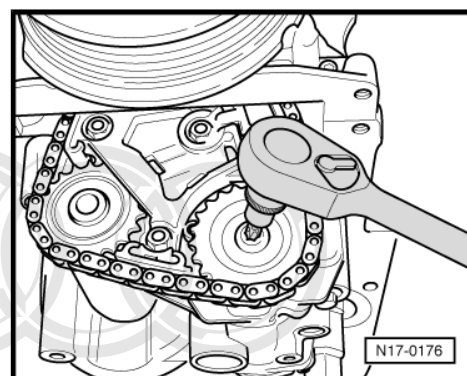
Please observe requirements for disposal.

- Remove bolts securing sump to gearbox.
- Unplug 3-pin connector from oil level and oil temperature sender -G266- .
- Slacken sump bolts at flywheel end using T-bar and socket, 10 mm -3185- and remove bolts using Allen key, long reach - T10058- .

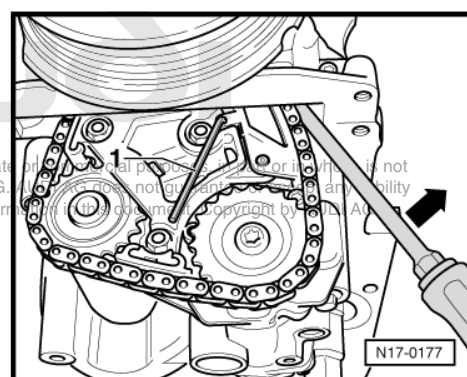
- Remove remaining bolts and take off sump. If necessary, loosen sump by striking lightly with a rubber hammer.
- Pull off chain guard. Retaining tabs can be released with a small screwdriver (insert in openings -arrows-).



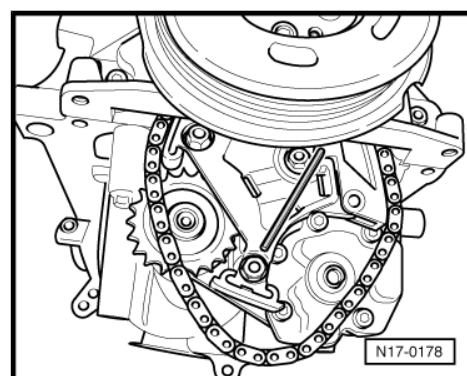
- Loosen bolt on oil pump chain sprocket. Counterhold on central bolt of vibration damper.



- Use screwdriver to slacken chain rail -arrow- and lock it in position using a 3 mm Allen key -1-.



- Detach oil pump chain sprocket and disengage chain at balance shaft drive.



Protected by copyright. Copying for private or internal purposes without permission is not permitted unless authorised by AUDI AG. All rights reserved. No part of this publication may be reproduced without the written permission of AUDI AG.

- Loosen bolts -arrows- on balance shaft assembly, working from outside inwards, and then remove balance shaft assembly.
- Remove intermediate plate.

Installing sump

- ◆ Silicone sealant ⇒ Parts catalogue
- Chain tensioner must be pre-tensioned ⇒ [page 173](#).



Note

- ◆ *The intermediate plate must always be renewed.*
- ◆ *Note the use-by date of the sealant.*
- ◆ *The balance shaft assembly with intermediate plate and sump must be installed and the securing bolts tightened immediately after the silicone sealant has been applied.*
- Remove sealant residue from cylinder block using a flat scraper.
- Cut off tube nozzle at front marking (diameter of nozzle approx. 3 mm).
- Apply silicone sealant onto clean sealing surface of new intermediate plate as illustrated.

Note the following:

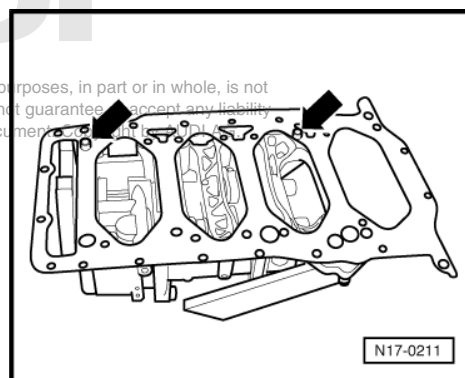
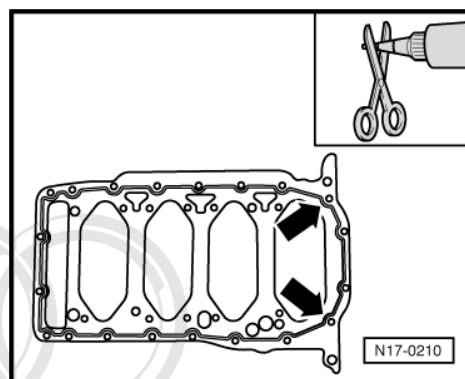
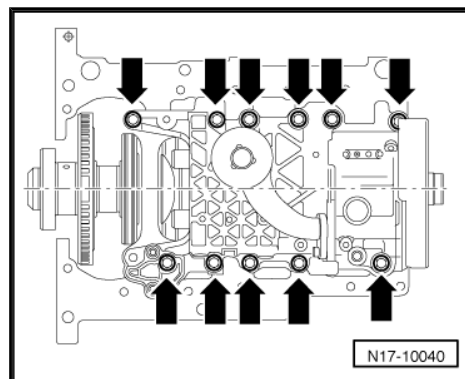
- ◆ The bead of sealant must be 2...3 mm thick.
- ◆ The bead of sealant must pass round the inside of the bolt holes as shown in the illustration -arrows-.
- ◆ The bead of sealant must be applied on the cylinder block side. No sealant is required on the sump side.



Note

The bead of sealant must not be thicker than specified, otherwise excess sealant can enter the sump and block the strainer in the oil intake pipe.

- Fit intermediate plate onto dowel sleeves on balance shaft assembly as shown -arrows-.

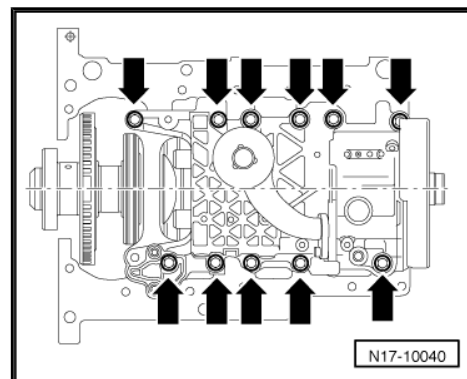


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee, accept any liability with respect to the correctness of information in this document.

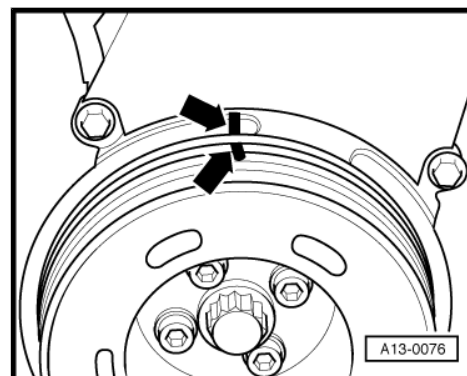
- Install oil pump with balance shaft assembly and intermediate plate. Tighten securing bolts -arrows- to 15 Nm + $\frac{1}{4}$ turn (90°) further, working from inside outwards.

**Note**

Note different bolt lengths [⇒ page 161](#).



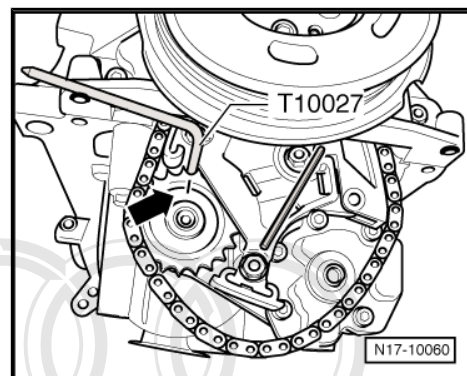
- Turn crankshaft to TDC of No. 1 cylinder.



- Marking on chain sprocket of balance shaft -arrow- must be positioned opposite the locating hole. Use locking pin - T10027- to lock chain sprocket in this position. Place chain on chain sprocket of balance shaft.
- Install oil pump chain sprocket and hand-tighten the bolt.

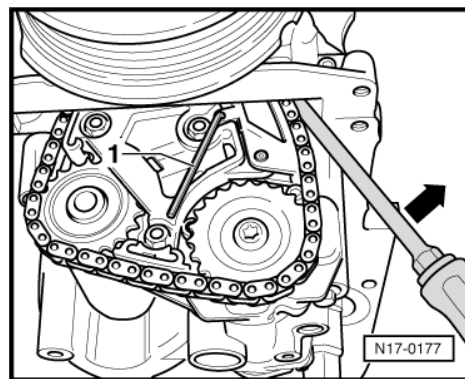
**Note**

The oil pump chain sprocket can only be installed correctly in one position. When installing, you may **ONLY** turn the oil pump.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Remove locking pin -T10027- and Allen key -1-. Secure oil pump chain sprocket. Counterhold on central bolt of vibration damper.
- Fit sump immediately and tighten bolts as follows:
 - 1 - Pre-tighten all bolts securing sump to cylinder block very lightly in diagonal sequence.
 - 2 - Lightly pre-tighten bolts securing sump to gearbox.
 - 3 - Tighten all bolts securing sump to cylinder block slightly further in diagonal sequence.
 - 4 - Torque down bolts securing sump to gearbox.
 - 5 - Torque down all bolts securing sump to cylinder block in diagonal sequence.



Note

- ◆ *When installing sump with engine removed from vehicle, ensure that sump is positioned flush with cylinder block at fly-wheel end.*
- ◆ *After fitting sump assembly, the sealant must dry for approx. 30 minutes. Then (and only then) fill the engine with engine oil.*

Further assembly is basically carried out in reverse order of dismantling.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by Audi AG. Audi AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Tightening torque

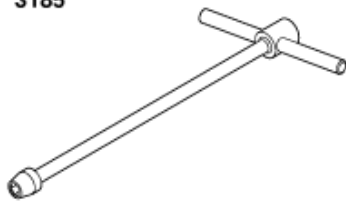
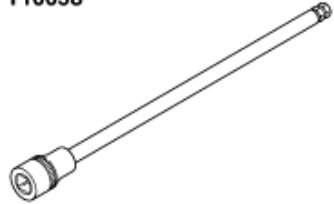
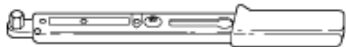
Component	Nm
Balance shaft assembly	15 + 90° ¹⁾ ²⁾
Chain sprocket to oil pump	20 + 90° ¹⁾ ²⁾
Oil pipe to balance shaft assembly	10
Sump to cylinder block	15
Sump to gearbox	45
Oil drain plug	30

- ¹⁾ 90° = a quarter of a turn
- ²⁾ Renew nuts/bolts

1.4 Removing and installing sump, engine code BVY, BVZ

Special tools and workshop equipment required

- ◆ T-bar and socket, 10 mm -3185-
- ◆ Allen key, long reach - T10058-
- ◆ Torque wrench -V.A.G 1331-
- ◆ Flat scraper

3185 	T10058 
V.A.G 1331 	

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

W17-0030

Removing sump

- Remove noise insulation tray ⇒ General body repairs, exterior; Rep. gr. 50 ; Noise insulation .
- Drain off engine oil.



Note

Please observe requirements for disposal.

- Remove bolts securing sump to gearbox.
- Unplug 3-pin connector from oil level and oil temperature sender -G266- , if fitted.
- Slacken sump bolts at flywheel end using T-bar and socket, 10 mm -3185- and remove bolts using Allen key, long reach - T10058- .
- Remove remaining bolts and take off sump. If necessary, loosen sump by striking lightly with a rubber hammer.

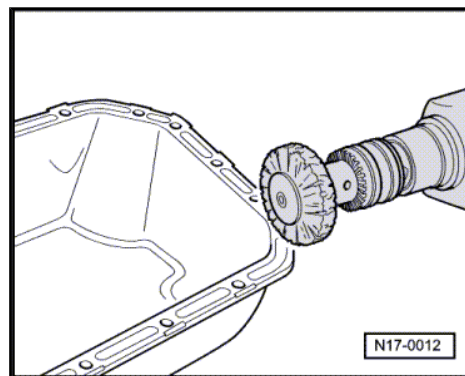
- Remove sealant residue from cylinder block using a flat scraper.
- Remove remaining sealant from sump (with rotating plastic brush or similar).

Installing sump



Note

- ◆ *Note the use-by date of the sealant.*
- ◆ *The sump and the balance shaft assembly with spacer plate must be installed and the securing bolts tightened immediately after the silicone sealant has been applied.*
- Clean the sealing surfaces. The sealing surfaces must be free of oil and grease.



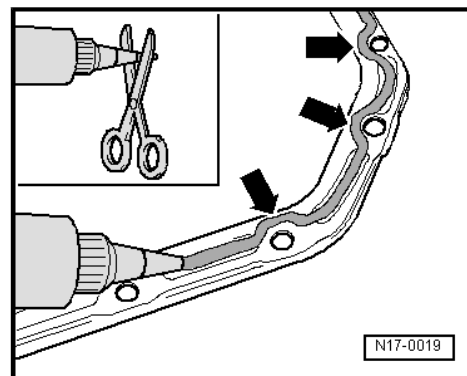
Audi

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Cut off tube nozzle at front marking (diameter of nozzle approx. 3 mm).
- Apply silicone sealant onto clean sealing surface of sump as illustrated. Sealant bead must:
 - ◆ be 2 ... 3 mm thick.
 - ◆ pass around bolt holes on inside as shown in illustration -arrows-.

**Note**

- ◆ *The bead of sealant must not be thicker than specified, otherwise excess sealant can enter the sump and block the strainer in the oil intake pipe.*
- ◆ *When installing the sump with the gearbox removed from the vehicle, make sure the sump is flush with the cylinder block.*
- ◆ *When installing the sump with the gearbox installed in the vehicle, make sure the sump makes contact with the gearbox.*
- ◆ *After fitting sump assembly, the sealant must dry for approx. 30 minutes. Then (and only then) fill the engine with engine oil.*



- Fit sump immediately and tighten bolts as follows:
 - 1 - Very lightly tighten all bolts securing sump to cylinder block in diagonal sequence.
 - 2 - Lightly tighten bolts securing sump to gearbox.
 - 3 - Tighten all bolts securing sump to cylinder block slightly further in diagonal sequence.
 - 4 - Tighten bolts securing sump to gearbox to 40 Nm.
 - 5 - Tighten all bolts securing sump to cylinder block in diagonal sequence to 15 Nm.

**Note**

- ◆ *When installing sump with engine removed from vehicle, ensure that sump is positioned flush with cylinder block at fly-wheel end.*
- ◆ *After fitting sump assembly, the sealant must dry for approx. 30 minutes. Then (and only then) fill the engine with engine oil.*

Protected by Copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Further assembly is basically carried out in reverse order of dismantling.

Tightening torque

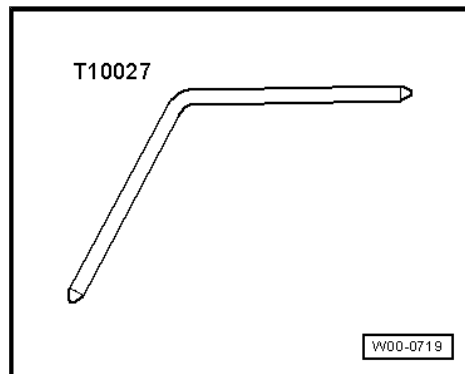
Component	Nm
Sump to cylinder block	15
Sump to gearbox	45
Oil drain plug	30

- ¹⁾ 90° = a quarter of a turn
- ²⁾ Renew nuts/bolts

1.5 Removing and installing oil pump with balance shaft assembly, engine code BVY, BVZ

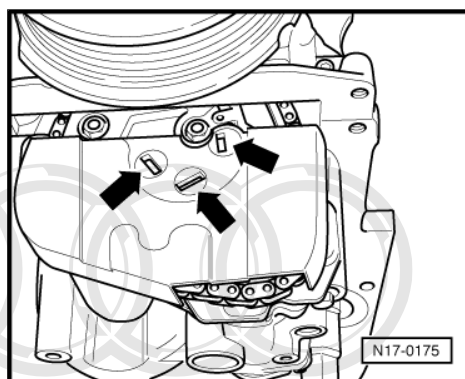
Special tools and workshop equipment required

- ◆ Locking pin -T10027-

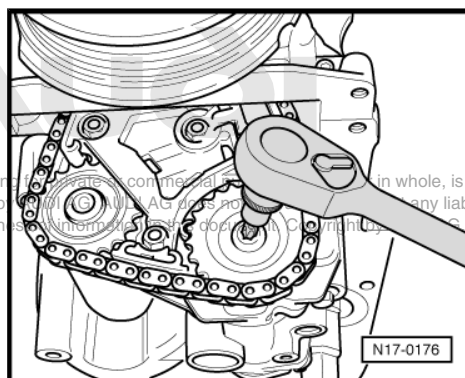


Removing

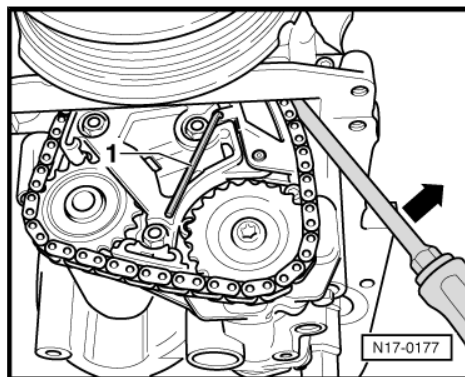
- Remove sump: engine codes BVY, BVZ ⇒ [page 166](#) .
- Pull off chain guard. Retaining tabs can be released with a small screwdriver (insert in openings -arrows-).



- Loosen bolt on oil pump chain sprocket. Counterhold on central bolt of vibration damper.

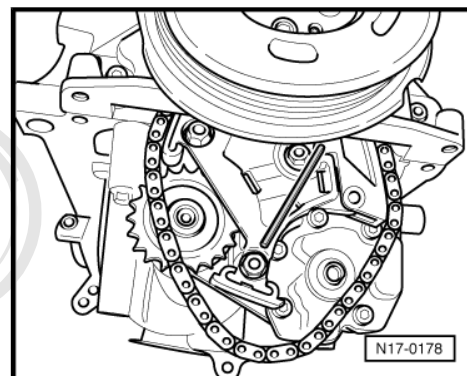


- Use screwdriver to slacken chain rail -arrow- and lock it in position using a 3 mm Allen key -1-.



Protected by copyright. Copying for private or commercial use, in whole or in part, is not permitted unless authorised by Audi AG. Audi AG does not accept any liability with respect to the correctness, uniformity or completeness of the information.

- Detach oil pump chain sprocket and disengage chain at balance shaft drive.



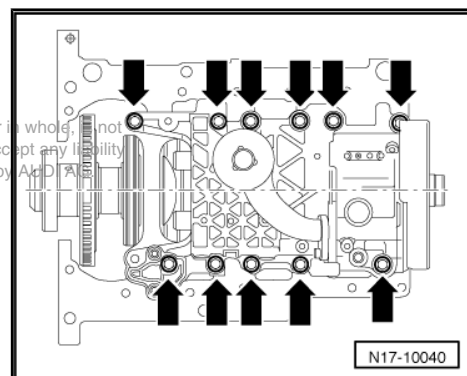
- Loosen bolts -arrows- on balance shaft assembly, working from outside inwards, and then remove balance shaft assembly.

- Remove intermediate plate.

Pre-tensioning chain tensioner ⇒ [page 173](#)

Installing

- ◆ Silicone sealant ⇒ Parts catalogue
- Chain tensioner must be pre-tensioned ⇒ [page 173](#).



Note

- ◆ *The intermediate plate must always be renewed.*
- ◆ *Note the use-by date of the sealant.*
- ◆ *The balance shaft assembly with intermediate plate and sump must be installed and the securing bolts tightened immediately after the silicone sealant has been applied.*

- Remove sealant residue from cylinder block using a flat scraper.
- Cut off tube nozzle at front marking (diameter of nozzle approx. 3 mm).
- Apply silicone sealant onto clean sealing surface of new intermediate plate as illustrated.

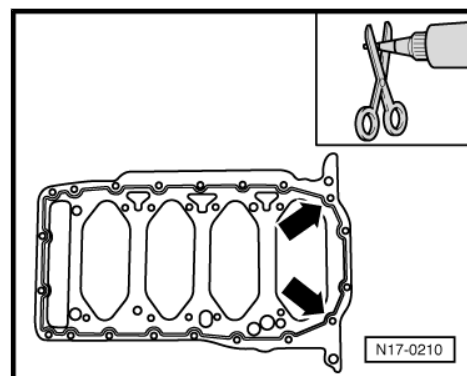
Note the following:

- ◆ The bead of sealant must be 2...3 mm thick.
- ◆ The bead of sealant must pass round the inside of the bolt holes as shown in the illustration -arrows-.
- ◆ The bead of sealant must be applied on the cylinder block side. No sealant is required on the sump side.

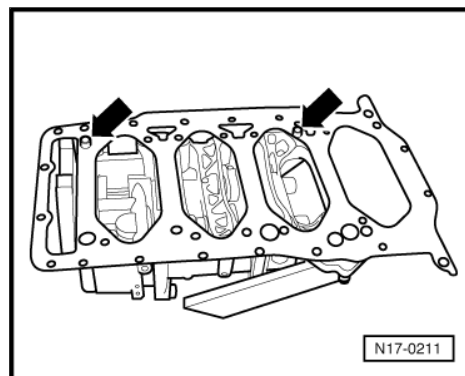


Note

The bead of sealant must not be thicker than specified, otherwise excess sealant can enter the sump and block the strainer in the oil intake pipe.



- Fit intermediate plate onto dowel sleeves on balance shaft assembly as shown -arrows-.

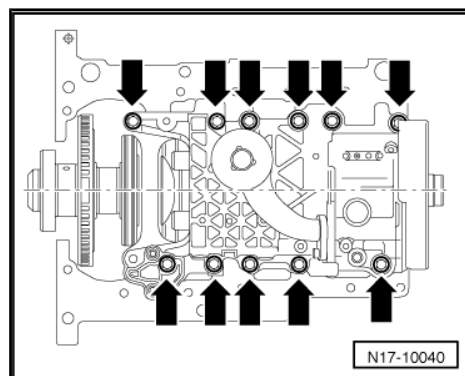


- Install oil pump with balance shaft assembly and intermediate plate. Tighten securing bolts -arrows- to 15 Nm + 1/4 turn (90°) further, working from inside outwards.



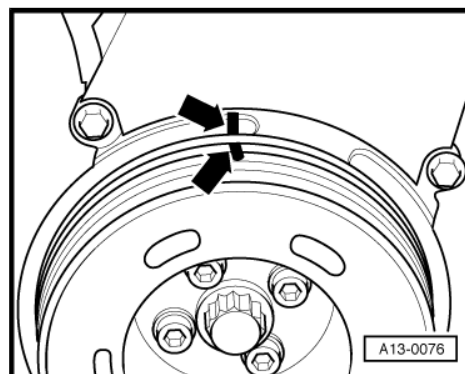
Note

Note different bolt lengths ⇒ [page 161](#) .



- Turn crankshaft to TDC of No. 1 cylinder.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

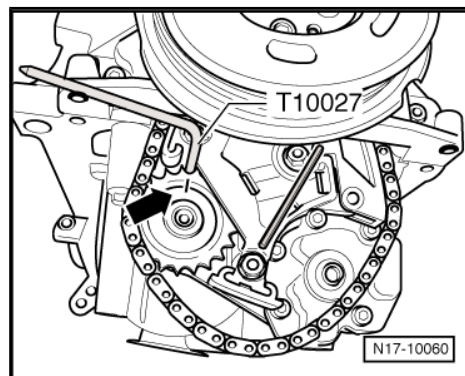


- Marking on chain sprocket of balance shaft -arrow- must be positioned opposite the locating hole. Use locking pin - T10027- to lock chain sprocket in this position. Place chain on chain sprocket of balance shaft.
- Install oil pump chain sprocket and hand-tighten the bolt.



Note

The oil pump chain sprocket can only be installed correctly in one position. When installing, you may ONLY turn the oil pump.



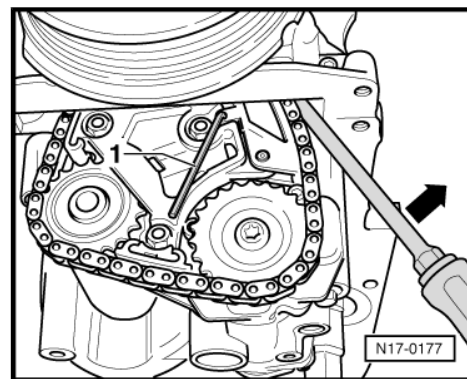
- Remove locking pin -T10027- and Allen key -1-. Secure oil pump chain sprocket. Counterhold on central bolt of vibration damper.

Further assembly is basically carried out in reverse order of dismantling.

Tightening torque

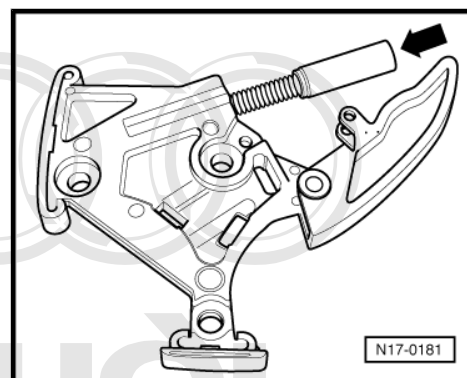
Component	Nm
Balance shaft assembly	15 + 90° ¹⁾ . 2)
Chain sprocket to oil pump	20 + 90° ¹⁾ 2)
Oil pipe to balance shaft assembly	10
Sump to cylinder block	15
Sump to gearbox	45
Oil drain plug	30

- ¹⁾ 90° = a quarter of a turn
- ²⁾ Renew nuts/bolts



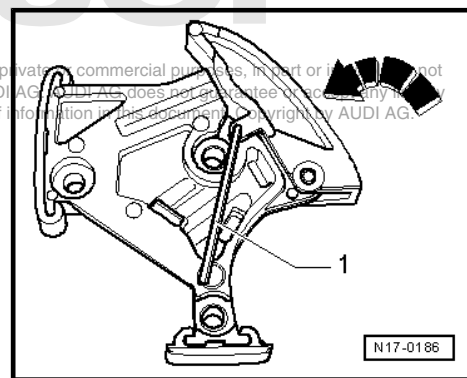
1.6 Pre-tensioning chain tensioner

- Compress piston by hand -arrow-.



- Press chain rail in direction of arrow and lock in position using a 3 mm Allen key -1-.

Protected by copyright. Copying for private or commercial purposes, in part or in full, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



1.7 Oil filter bracket - exploded view

Sump with balance shaft housing - exploded view ⇒ [page 157](#)

Balance shaft assembly with oil pump - exploded view
⇒ [page 159](#)

1 - Pipe

- ☐ For crankcase breather

2 - Spring-type clip

3 - Oil filter bracket

- ☐ With pressure relief valve, approx. 4 bar
- ☐ Removing and installing
⇒ [page 181](#)

4 - Seal

- ☐ Renew

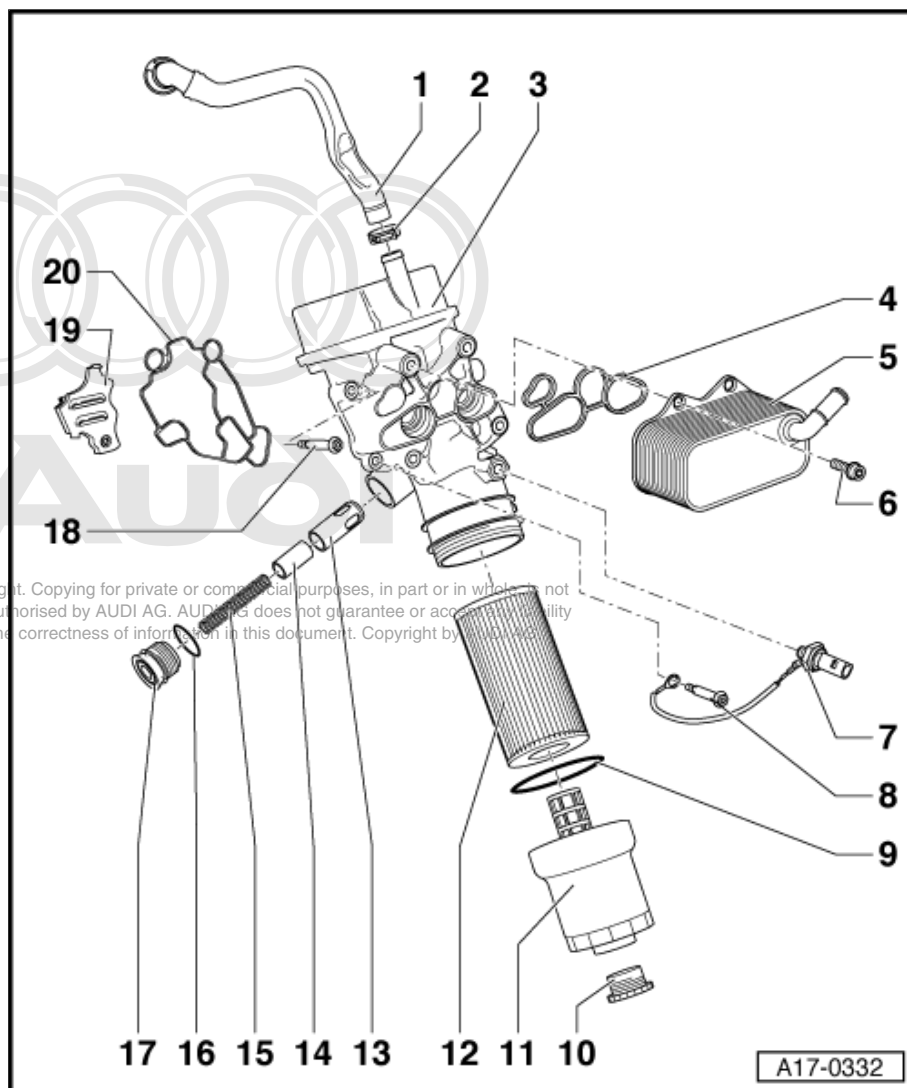
5 - Oil cooler

- ☐ See note ⇒ [page 157](#)
- ☐ Ensure clearance from surrounding components
- ☐ Connection diagram for coolant hoses, engine code AXW, BLX, BHD, BLY, BLR, BMB
⇒ [page 186](#)
- ☐ Connection diagram for coolant hoses, engine code BVY, BVZ
⇒ [page 189](#)
- ☐ Removing and installing
⇒ [page 178](#)

6 - 15 Nm

7 - Oil pressure switch, 20 Nm

- ☐ 0.7 bar - brown
- ☐ Checking ⇒ [page 176](#)
- ☐ Tightening torque 21



Nm

8 - 15 Nm

- ☐ With earth wire for oil pressure switch

9 - Seal

- ☐ Renew
- ☐ Lubricate with engine oil
- ☐ Installation position ⇒ [page 175](#)

10 - Screw plug

11 - Oil filter housing

- ☐ Remove and install with oil filter tool -3417- or 36 mm socket
- ☐ Draining ⇒ [page 176](#)

12 - Oil filter element

- ☐ Observe change intervals ⇒ Maintenance ; Booklet 808

13 - Cylinder

- ☐ For pressure relief valve, approx. 4 bar

14 - Piston

- ☐ For pressure relief valve, approx. 4 bar

15 - Spring

- ☐ For pressure relief valve, approx. 4 bar

16 - Seal

- ☐ Renew

17 - Screw plug, 15 Nm

- ☐ Loosen with socket T70 -T10128-

18 - 15 Nm

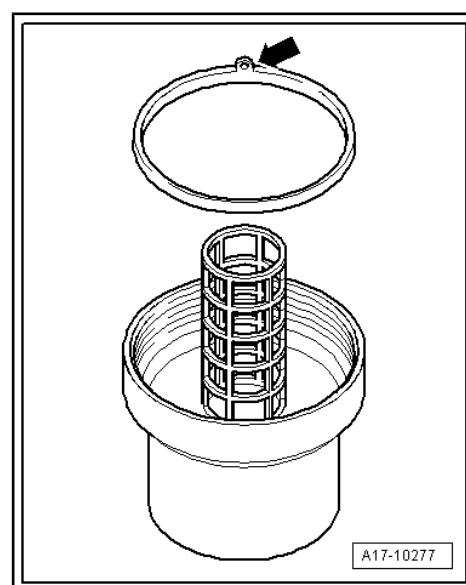
19 - Baffle plate

20 - Seal

- ☐ Renew

Installation position of seal

Lug -arrow- faces upwards



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

1.8 Draining oil filter housing



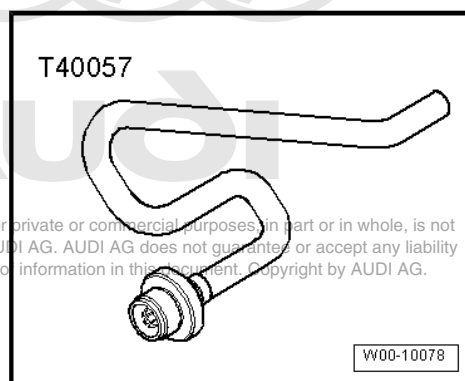
Note

A valve in the oil filter housing will be opened when the oil drain adapter -T40057- is screwed in. The valve will be closed again as soon as the oil drain adapter -T40057- is unscrewed.

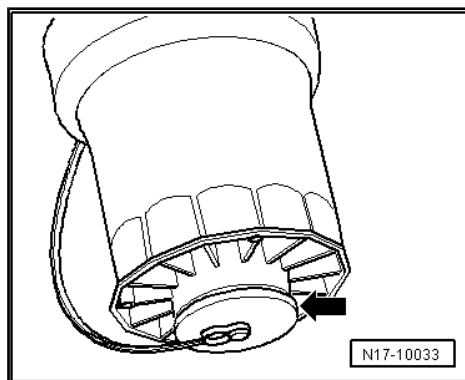
Special tools and workshop equipment required

- ◆ Oil drain adapter -T40057-

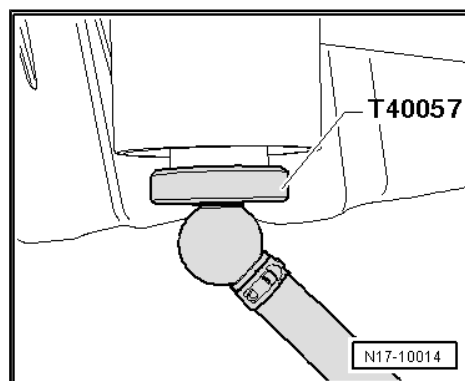
Protected by copyright. Copying for private or commercial purposes in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



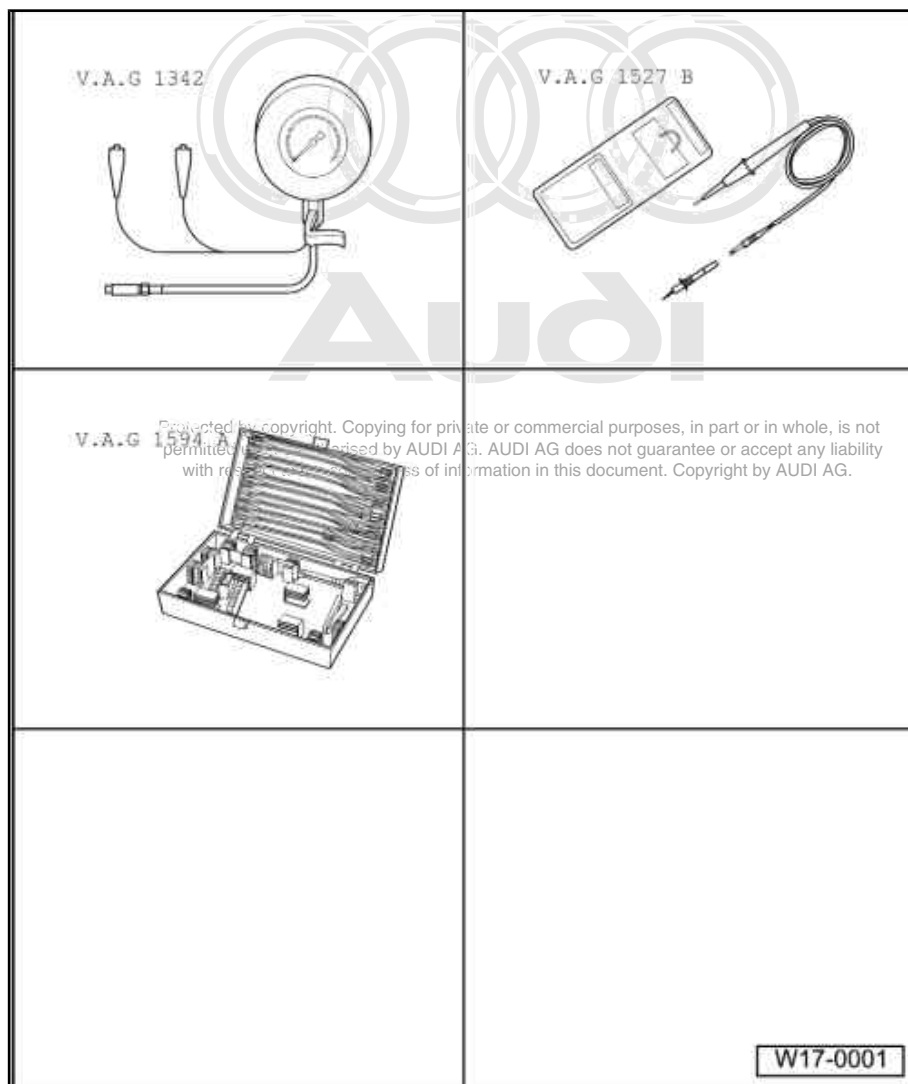
- Unscrew dust cap from oil filter housing -arrow-.



- Direct hose of oil drain adapter -T40057- into a drip tray and screw oil drain adapter -T40057- into oil filter housing.
- Allow engine oil to drain off.



1.9 Checking oil pressure and oil pressure switch



Special tools and workshop equipment required

- ◆ Oil pressure tester -V.A.G 1342-
- ◆ Voltage tester -V.A.G 1527 B-
- ◆ Auxiliary measuring set -V.A.G 1594 C-

Test requirements

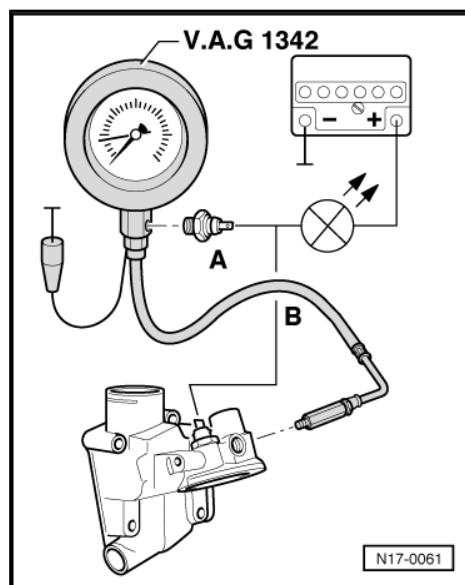
- Engine oil level OK, checking ⇒ Maintenance ; Booklet 808 .
- Oil pressure warning lamp must light up for approx. 3 seconds when ignition is switched on.
- In vehicles with auto-check system, the „OK“ display must light up (select symbol).
- Engine oil temperature at least 80 °C (radiator fan must have run once).

Test sequence

- Remove the oil pressure switch -F1- -A- and screw it onto tester.
- Screw tester into oil filter bracket in place of oil pressure switch -F1- .
- Connect brown wire of tester to earth (-).
- Connect voltage tester -V.A.G 1527 B- with test leads from auxiliary measuring set -V.A.G 1594 C- to battery positive (+) and to oil pressure switch -B-. LED must not light up.
- If LED lights up, renew oil pressure switch -F1- .

If the LED does not light up:

- Start engine and run at increased speed: at 1.2 ... 1.6 bar pressure the LED should light up, otherwise renew oil pressure switch.
- Increase engine speed further. At 2,000 rpm and an oil temperature of 80 °C the oil pressure should be between 2.7 ... 4.5 bar.



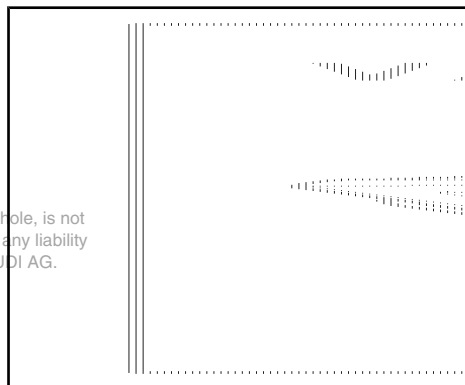
Tightening torques

Component	Nm
Oil pressure switch -F1- to oil filter bracket	21

1.10 Removing and installing oil cooler

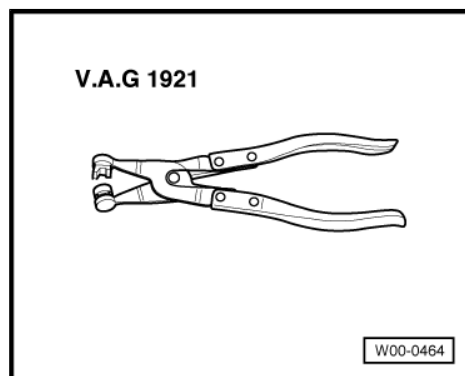
Special tools and workshop equipment required

- ◆ Drip tray for workshop hoist -VAS 6208-



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- ◆ Hose clip pliers -V.A.G 1921-



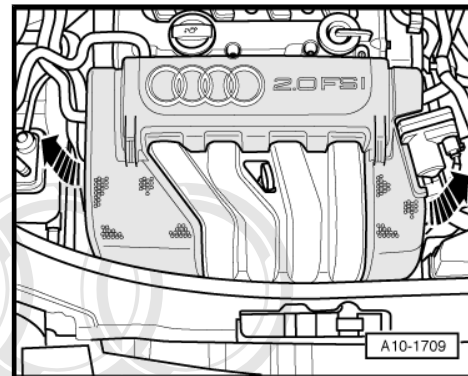
Removing



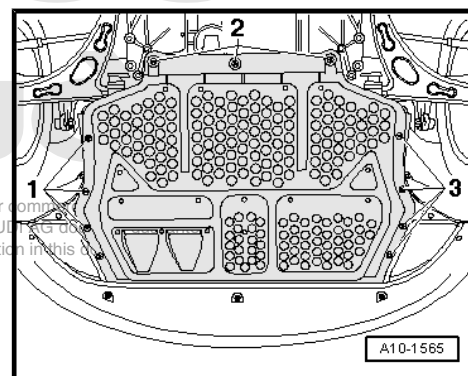
WARNING

Hot steam/hot coolant may escape when opening expansion tank. Cover cap with cloth and open carefully.

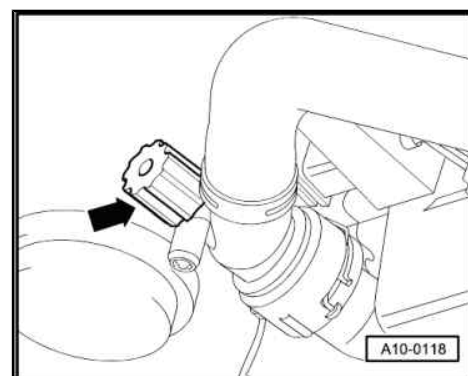
- Open filler cap on coolant expansion tank
- Lift off engine cover panel -arrows-.



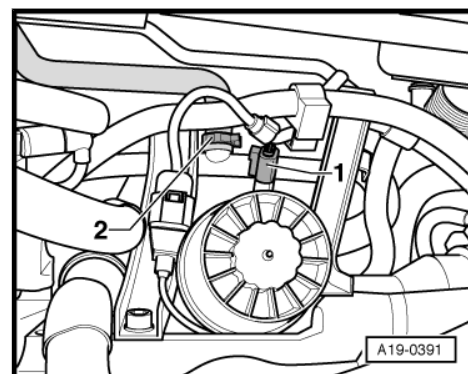
- Remove noise insulation (centre) - fasteners -1 ... 3-.
- Place drip tray for workshop hoist -VAS 6208- beneath engine.



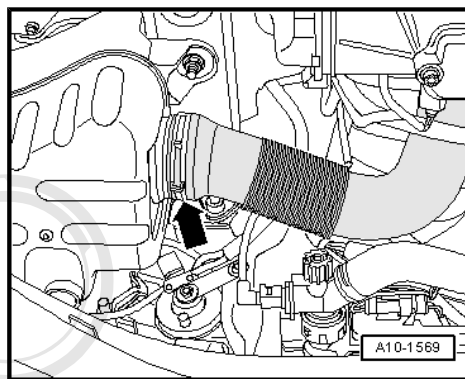
- Turn drain plug -arrow- on radiator anti-clockwise, if necessary fit drain hose to connection.



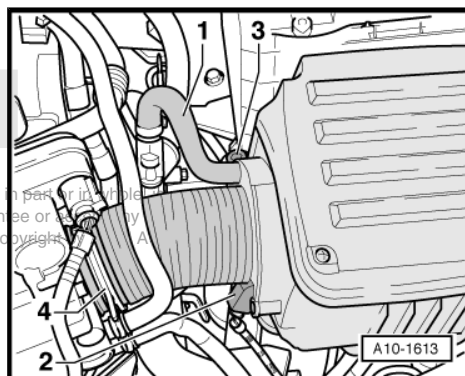
- Unplug electrical connector -1- from oil pressure sender.
- Also disconnect bottom coolant hose at coolant pipe -2-, and drain off remaining coolant.



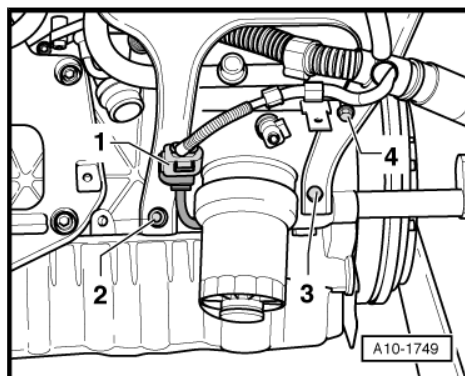
- Disconnect air intake hose -arrow- at bottom of resonator (loosen hose clip using hose clip pliers -V.A.G 1921-).



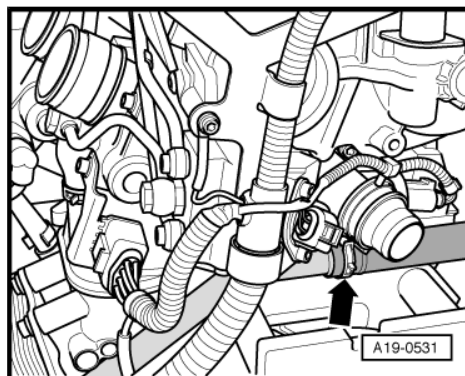
- Detach hose -1- from air cleaner housing.
- Unplug electrical connector -2- from air cleaner housing.
- Remove bolt -3-.
- Disconnect air intake hose -4- from throttle valve unit (loosen hose clip using hose clip pliers -V.A.G 1921-).
- Take out air cleaner housing.
- Remove intake manifold and fuel rail ⇒ Rep. gr. 24 .



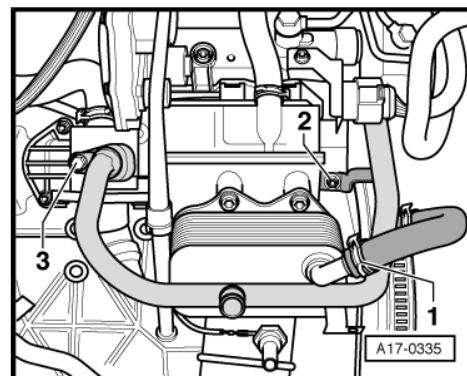
- Detach electrical connector -1- from retainer and move wire clear.
- Detach electrical wiring from support for intake manifold.
- Unscrew bolts -2 ... 4- and remove support for intake manifold.



- Detach coolant hose -arrow- from coolant pipe.



- Detach coolant hose -1- from coolant pipe.
- Remove bolts -2- and -3- and detach coolant pipe.



- Remove oil cooler -arrows-.

Installing

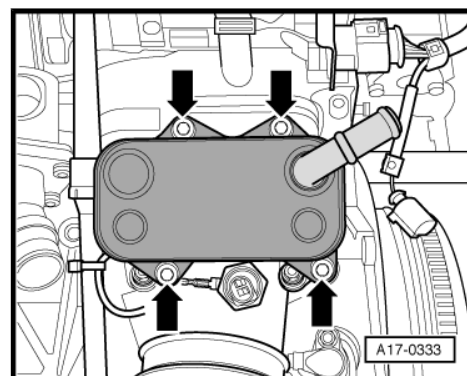
Installation is carried out in the reverse order; note the following:



Note

- ◆ *Renew gaskets and seals.*
- ◆ *Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ Parts catalogue .*

- Fill up with coolant ⇒ [page 190](#) .



Tightening torques

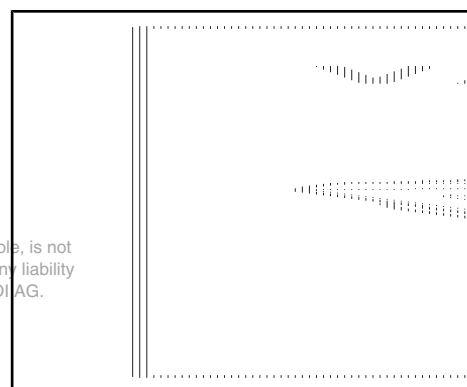
Component	Nm
Coolant pipe to cylinder block	10
Coolant pipe to thermostat housing	10
Oil cooler to oil filter bracket	25

1.11 Removing and installing oil filter bracket

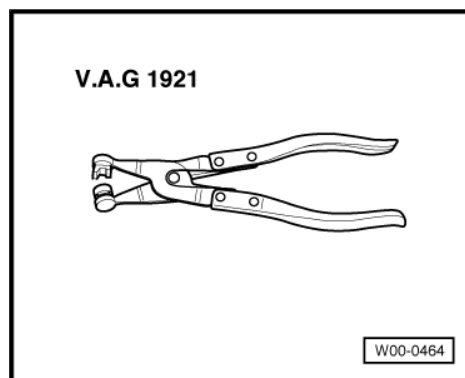
Special tools and workshop equipment required

- ◆ Drip tray for workshop hoist -VAS 6208-

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- ◆ Hose clip pliers -V.A.G 1921-



Removing

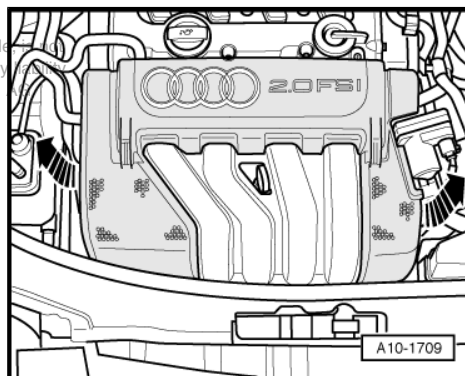


WARNING

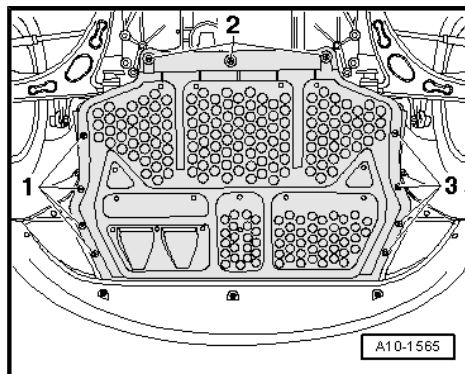
Hot steam/hot coolant may escape when opening expansion tank. Cover cap with cloth and open carefully.

- Open filler cap on coolant expansion tank
- Lift off engine cover panel -arrows-.

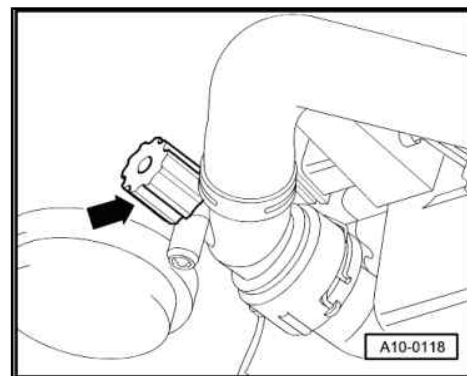
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is prohibited without the written permission of Audi AG. Audi AG does not guarantee or accept any liability for errors or omissions with respect to the correctness of information in this document. Copyright by Audi AG.



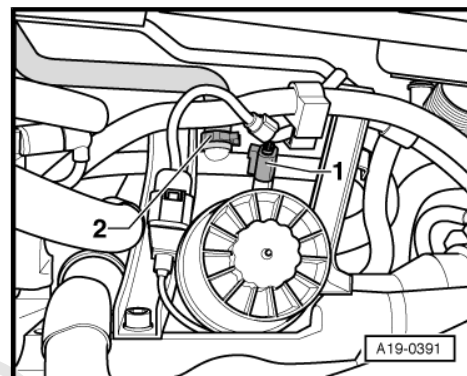
- Remove noise insulation (centre) - fasteners -1 ... 3-.
- Place drip tray for workshop hoist -VAS 6208- beneath engine.



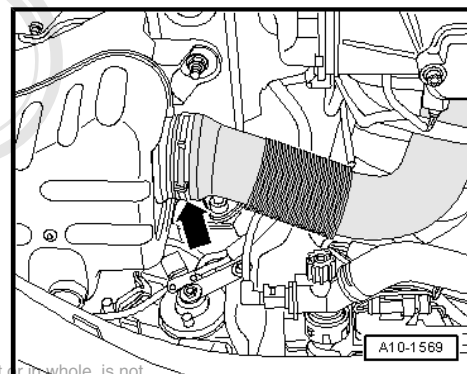
- Turn drain screw -arrow- on radiator anti-clockwise. If necessary fit drain hose on connection.



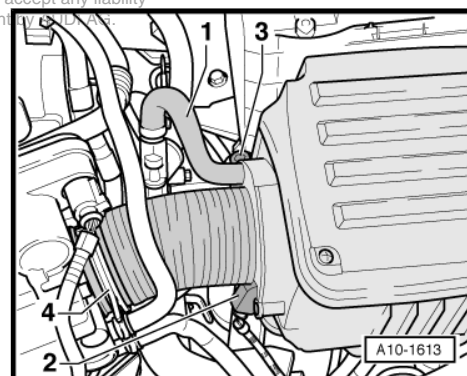
- Unplug electrical connector -1- from oil pressure sender.
- Also disconnect bottom coolant hose at coolant pipe -2-, and drain off remaining coolant.



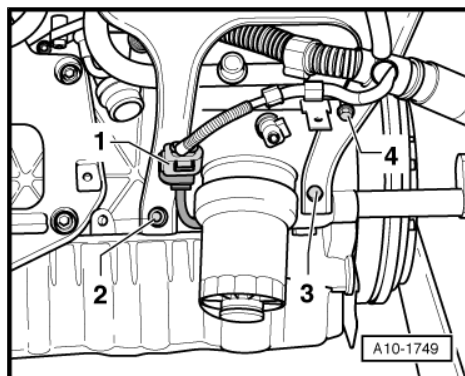
- Disconnect air intake hose -arrow- at bottom of resonator (loosen hose clip using hose clip pliers -V.A.G 1921-).



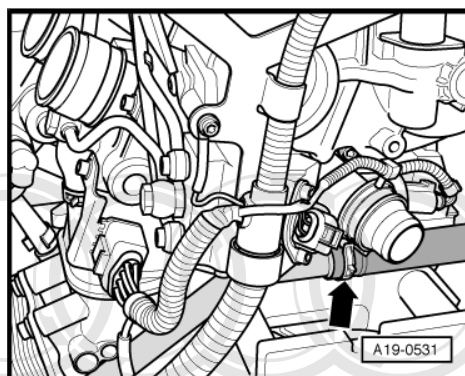
- Detach hose -1- from air cleaner housing.
- Unplug electrical connector -2- from air cleaner housing.
- Remove bolt -3-.
- Disconnect air intake hose -4- from throttle valve unit (loosen hose clip using hose clip pliers -V.A.G 1921-).
- Take out air cleaner housing.
- Remove intake manifold and fuel rail ⇒ Motronic direct injection and ignition system (4-cylinder); Repair group 24; Servicing injection system .



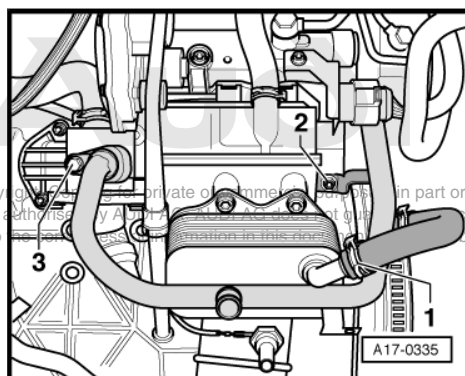
- Detach electrical connector -1- from retainer and move wire clear.
- Detach electrical wiring from support for intake manifold.
- Unscrew bolts -2 ... 4- and remove support for intake manifold.



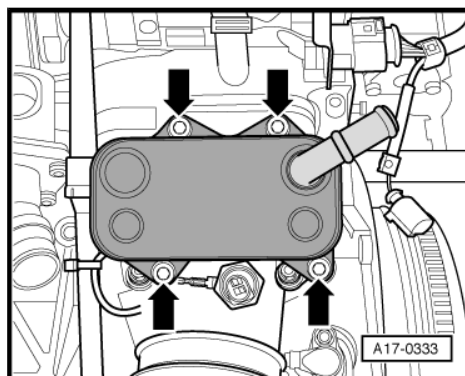
- Detach coolant hose -arrow- from coolant pipe.



- Detach coolant hose -1- from coolant pipe.
- Remove bolts -2- and -3- and detach coolant pipe.



- Remove oil cooler -arrows-.



Protected by copyright. Any reproduction, in part or in whole, is not permitted unless authorized by Audi AG. No liability is accepted by Audi AG with respect to the information in this document.

- Unscrew bolts -1 ... 2- and detach oil filter bracket.

Installing

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



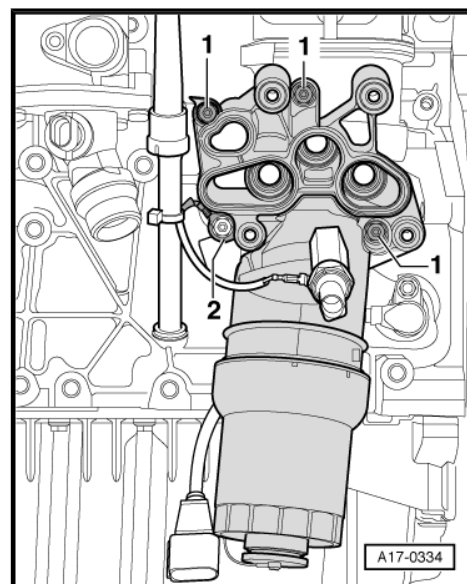
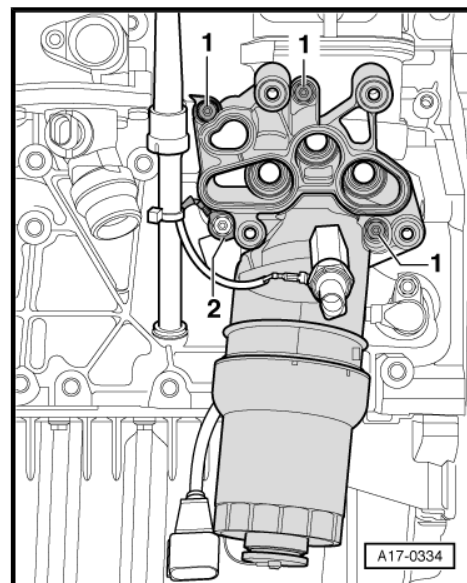
Note

- ◆ *Renew gaskets and seals.*
- ◆ *Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ Parts catalogue.*
- Install baffle plate ⇒ [Item 19 \(page 175\)](#) .

- Install oil filter bracket with bolts -1-.
- Screw in bolt -2- with earth wire for oil pressure switch.
- Fill up with coolant ⇒ [page 190](#) .

Tightening torques

Component	Nm
Coolant pipe to cylinder block	10
Coolant pipe to thermostat housing	10
Oil cooler to oil filter bracket	25
Oil filter housing to cylinder block	22



19 – Cooling

1 Removing and installing parts of cooling system



WARNING

Hot steam/hot coolant may escape when opening expansion tank. Cover cap with cloth and open carefully.



Note

- ◆ *The cooling system is under pressure when the engine is hot. If necessary, relieve pressure before commencing repair work.*
- ◆ *Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ Parts catalogue .*
- ◆ *Hose clip pliers -V.A.G 1921- or spring-type clip pliers -VAS 5024 A- are recommended for use in installing spring-type clips.*
- ◆ *Renew gaskets and seals.*
- ◆ *The arrow markings on coolant pipes and on ends of hoses must align.*
- ◆ *Vehicles with engine code BVY, BVZ and are not fitted with a map-controlled engine cooling thermostat -F265- .*

1.1 Connection diagram for coolant hoses without auxiliary heater, engine code AXW, BLX, BHD, BLY, BLR, BMB

Connection diagram for coolant hoses with auxiliary heater, engine code AXW, BLX, BHD, BLY, BLR, BMB ⇒ [page 188](#)

1 - Radiator

- ☐ Removing and installing
⇒ [page 216](#)
- ☐ If renewed, refill system
with fresh coolant

2 - Map-controlled engine cooling thermostat -F265-

- ☐ Checking ⇒ [page 204](#)
- ☐ Removing and installing
⇒ [page 197](#)
- ☐ With hose connection
- ☐ Starts to open at approx.
105°C

3 - Coolant pump

- ☐ Removing and installing
⇒ [page 206](#)

4 - Cylinder head/cylinder block

- ☐ If renewed, refill system
with fresh coolant

5 - Expansion tank

- ☐ With filler cap
- ☐ Testing pressure relief
valve in filler cap
⇒ [page 219](#)

6 - Exhaust gas recirculation valve**7 - Heat exchanger (for heating system)**

- ☐ If renewed, refill system
with fresh coolant

8 - Hose

- ☐ For automatic gearbox only

9 - Gear oil cooler

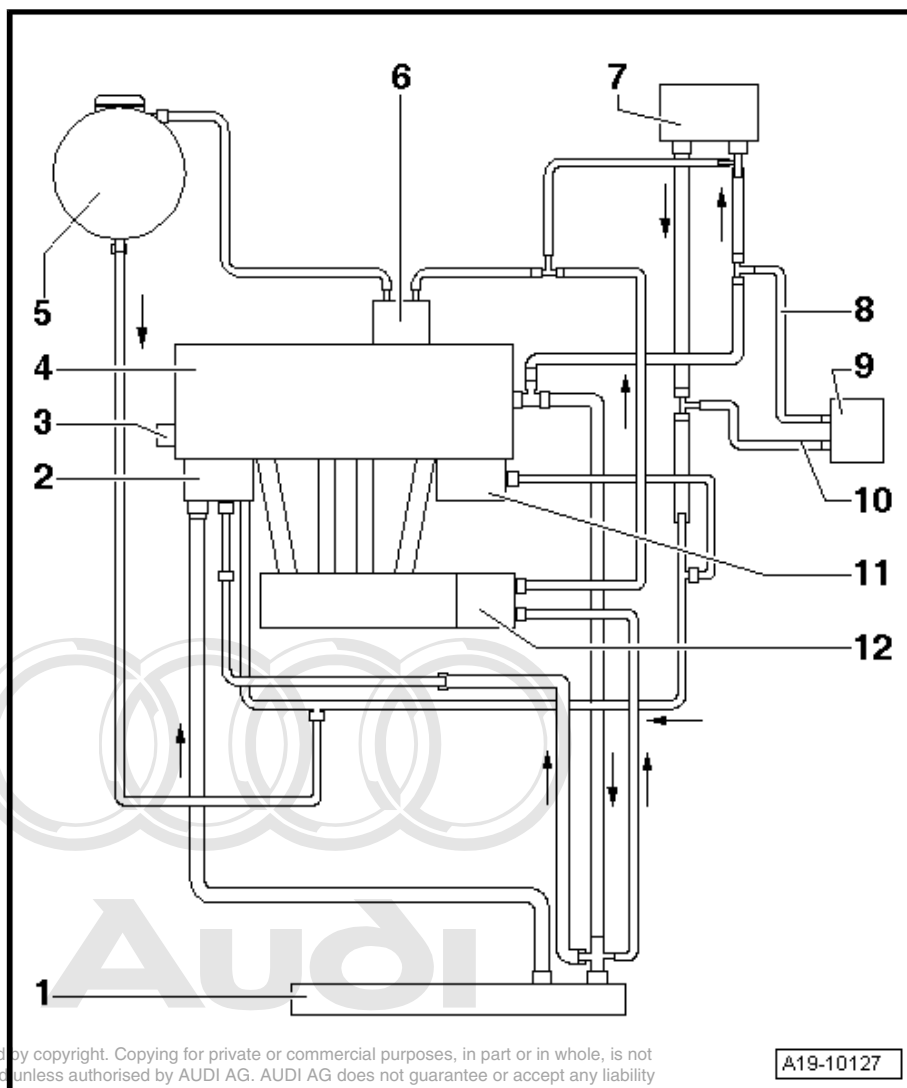
- ☐ For automatic gearbox only

10 - Hose

- ☐ For automatic gearbox only

11 - Oil cooler

- ☐ Removing and installing ⇒ [page 178](#)

12 - Intake manifold with heating for throttle valve housing

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

A19-10127

1.2 Connection diagram for coolant hoses with auxiliary heater, engine code AXW, BLX, BHD, BLY, BLR, BMB

1 - Radiator

- ☐ Removing and installing
⇒ [page 216](#)
- ☐ If renewed, refill system with fresh coolant

2 - Auxiliary heater

3 - Map-controlled engine cooling thermostat -F265-

- ☐ Checking ⇒ [page 204](#)
- ☐ Removing and installing
⇒ [page 197](#)
- ☐ With hose connection
- ☐ Starts to open at approx. 105°C

4 - Coolant pump

- ☐ Removing and installing
⇒ [page 206](#)

5 - Cylinder head/cylinder block

- ☐ If renewed, refill system with fresh coolant

6 - Expansion tank

- ☐ With filler cap
- ☐ Testing pressure relief valve in filler cap
⇒ [page 219](#)

7 - Exhaust gas recirculation valve

8 - Non-return valve

- ☐ Integrated in hose, may not be visible from outside.

9 - Heat exchanger (for heating system)

- ☐ If renewed, refill system with fresh coolant

10 - Heater coolant shut-off valve -N279-

11 - Non-return valve

- ☐ Integrated in hose, may not be visible from outside.

12 - Hose

- ☐ For automatic gearbox only

13 - Gear oil cooler

- ☐ For automatic gearbox only

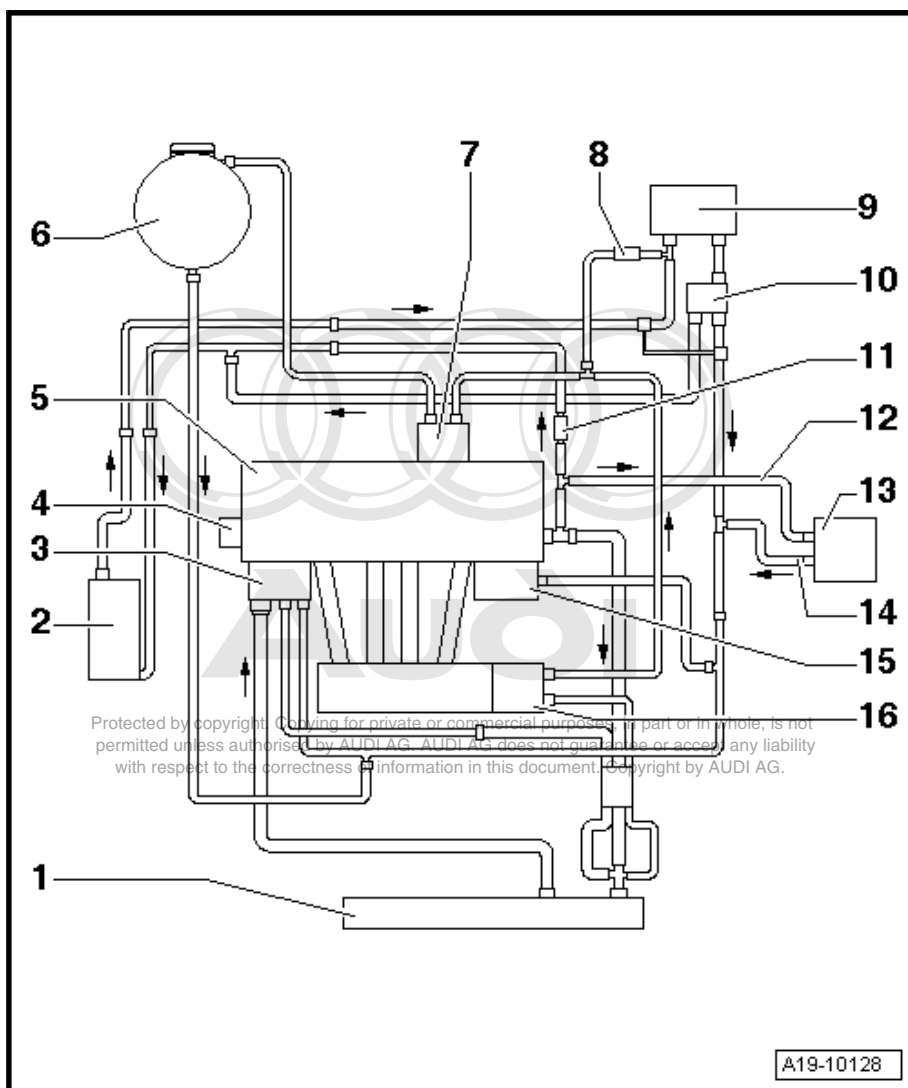
14 - Hose

- ☐ For automatic gearbox only

15 - Oil cooler

- ☐ Removing and installing ⇒ [page 178](#)

16 - Intake manifold with heating for throttle valve housing



1.3 Connection diagram for coolant hoses, engine code BVY, BVZ

1 - Expansion tank

- ☐ With filler cap
- ☐ Checking pressure relief valve in filler cap
⇒ [page 219](#)

2 - Exhaust gas recirculation valve -N18-

- ☐ Not fitted on engine code BVZ

3 - Heat exchanger (for heating system)

- ☐ If renewed, refill system with fresh coolant

4 - Gear oil cooler

- ☐ Only on vehicles with automatic gearbox

5 - Oil cooler

6 - Radiator

- ☐ Removing and installing
⇒ [page 216](#)
- ☐ If renewed, refill system with fresh coolant

7 - Distributor housing with thermostat

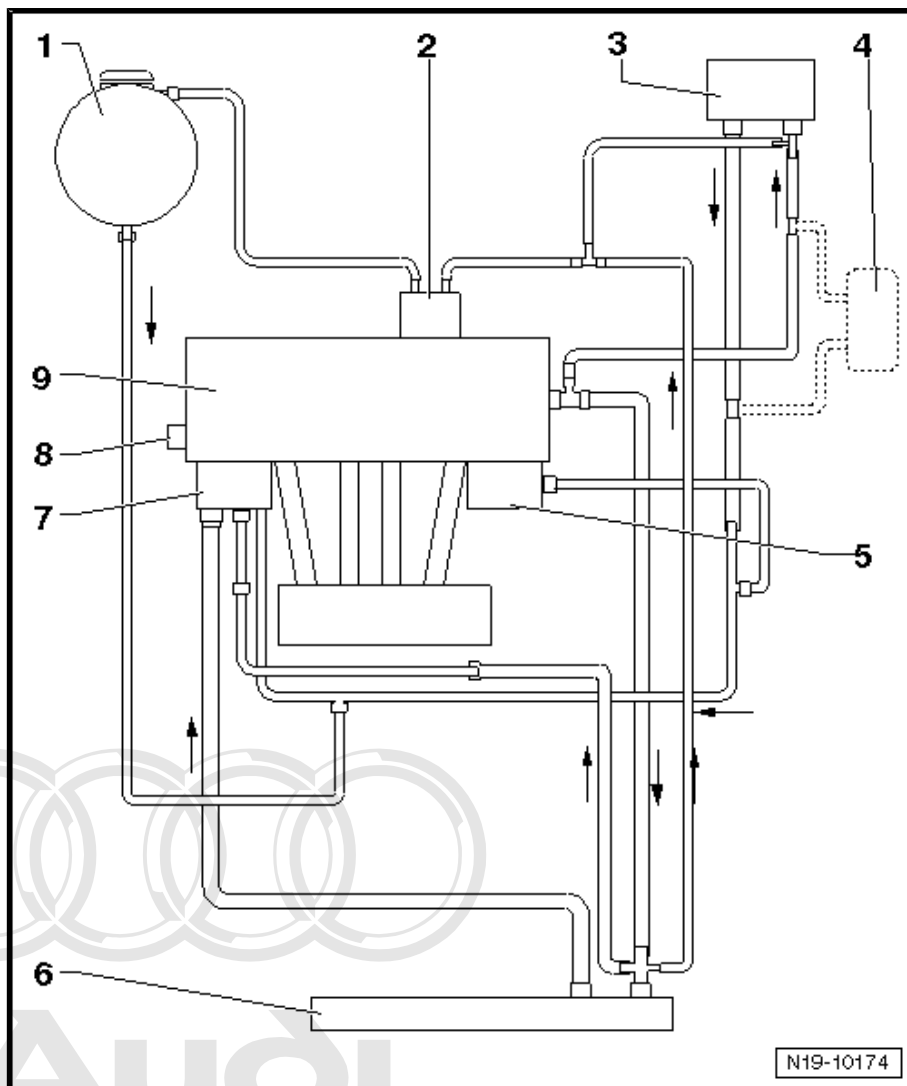
- ☐ Checking thermostat
⇒ Vehicle diagnostic tester „Function and component selection“

8 - Coolant pump

- ☐ Removing and installing
⇒ [page 206](#)

9 - Cylinder head/cylinder block

- ☐ If renewed, refill system with fresh coolant



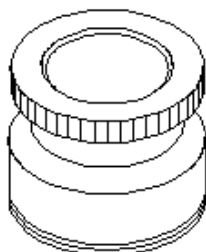
This document is not to be used for commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

1.4 Draining and filling cooling system

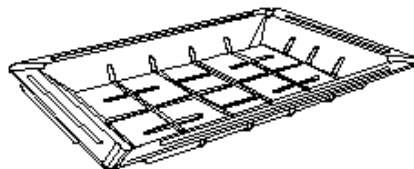
Special tools and workshop equipment required

- ◆ Adapter for cooling system tester -V.A.G 1274/8-
- ◆ Drip tray for workshop hoist -VAS 6208-
- ◆ Hose clip pliers - V.A.G 1921-
- ◆ Cooling system charge unit -VAS 6096-
- ◆ Refractometer -T10007-

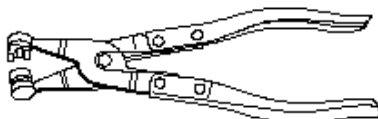
V.A.G 1274/8



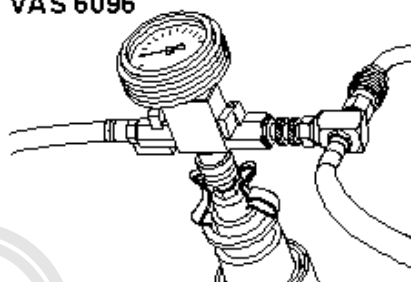
VAS 6208



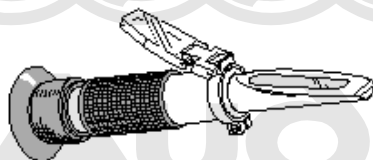
V.A.G 1921



VAS 6096



T10007



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

G19-10005

Draining



Note

Collect drained coolant in a clean container for re-use or disposal.

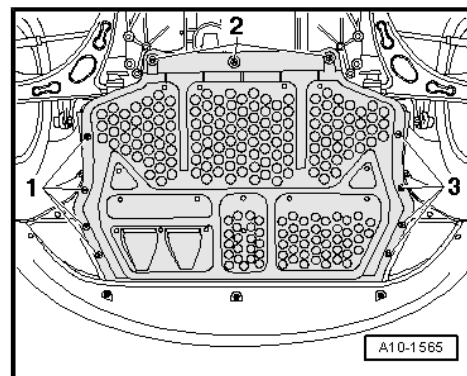


WARNING

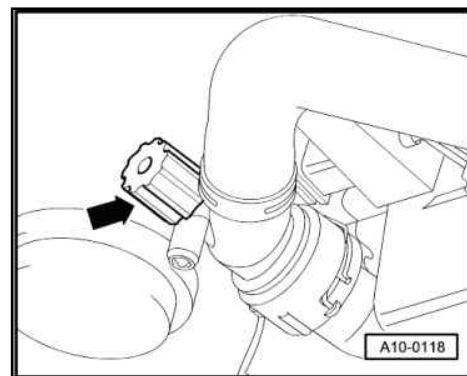
Hot steam/hot coolant may escape when opening expansion tank. Cover cap with cloth and open carefully.

- Open filler cap on coolant expansion tank

- Remove noise insulation (centre) - fasteners -1 ... 3-.
- Place drip tray for workshop hoist -VAS 6208- beneath engine.



- Turn drain plug -arrow- on radiator anti-clockwise, if necessary fit drain hose to connection.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

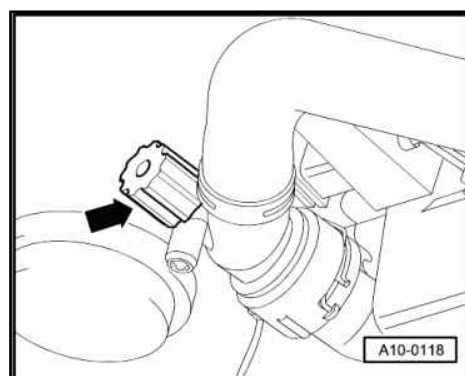
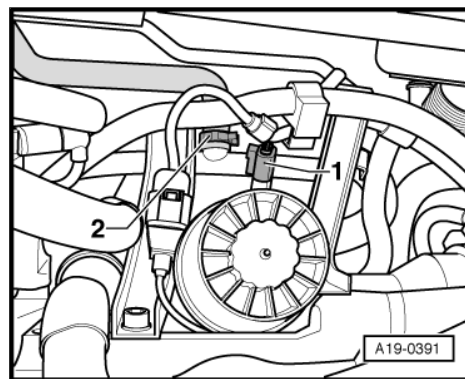
- Unplug electrical connector -1- from oil pressure sender.
- Also disconnect bottom coolant hose at coolant pipe -2-, and drain off remaining coolant.

Filling

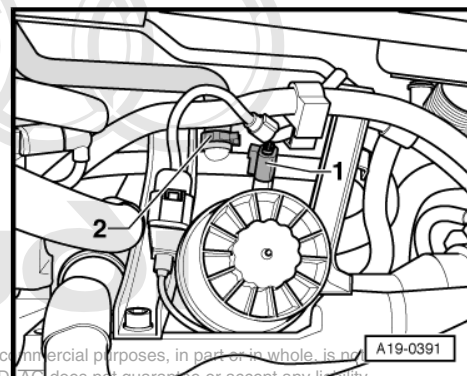


Note

- ◆ The cooling system is filled all year round with a mixture of water and coolant additive. Mixture ratio ⇒ [page 193](#).
 - ◆ Use only the coolant additive listed in the ⇒ Electronic parts catalogue. Other coolant additives could seriously impair in particular the anti-corrosion properties. The resulting damage could lead to loss of coolant and consequently to serious engine damage.
 - ◆ The specified coolant (based on recommended mixture ratio) ⇒ [page 193](#) prevents frost and corrosion damage and stops scaling. Such additives also raise the boiling point of the coolant. For these reasons the cooling system must be filled all year round with the correct coolant additive.
 - ◆ Because of its high boiling point, the coolant improves engine reliability under heavy loads, particularly in countries with tropical climates.
 - ◆ Frost protection is required down to about -25°C (in countries with arctic climate: down to about -35°C).
 - ◆ The coolant concentration must not be reduced by adding water even in warmer seasons and in warmer countries. The coolant concentration must be at least 40 %.
 - ◆ If greater frost protection is required in very cold climates, the concentration of coolant additive can be increased, but only up to 60% (this gives frost protection to about -40°C). If the concentration exceeds 60%, frost protection decreases again and cooling efficiency is also impaired.
 - ◆ Use only clean tap water for mixing coolant.
 - ◆ If the radiator, heat exchanger, cylinder head, cylinder head gasket or cylinder block have been renewed, do not re-use old the coolant.
 - ◆ Contaminated or dirty coolant must not be used again.
 - ◆ For checking anti-freeze protection in cooling system, use refractometer -T10007-.
- Close drain plug -arrow-.



- Attach coolant hose (bottom) at coolant pipe -2-.
- Plug in the oil pressure sender connector -1-.

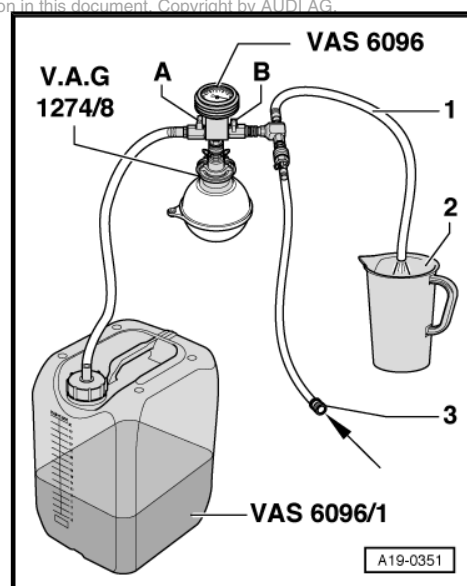


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Fill reservoir of cooling system charge unit -VAS 6096- with at least 8 litres of premixed coolant (based on recommended ratio) ⇒ [page 193](#)

Recommended mixture ratio for coolant

- Coolant (40 %) and water (60 %) for frost protection to -25°C
- Coolant (50 %) and water (50 %) for frost protection to -35°C
- ◆ Coolant ⇒ Electronic parts catalogue
- Screw adapter for cooling system tester -V.A.G 1274/8- onto coolant expansion tank.
- Fit cooling system charge unit -VAS 6096- onto adapter for cooling system tester -V.A.G 1274/8- .
- Run vent hose -1- into a small container -2-. (The vented air draws along a small amount of coolant, which should be collected.)
- Close the two valves -A- and -B- (levers at right angles to direction of flow).
- Connect hose -3- to compressed air.
- Pressure: 6 ... 10 bar



- Open valve -B- (lever in direction of flow).

The suction jet pump generates a partial vacuum in the cooling system.

- The needle on the gauge should move into the green zone.
- Additionally open valve -A- briefly (lever in direction of flow) so that the hose of cooling system charge unit -VAS 6096- is filled with coolant.
- Close valve -A- again.
- Leave valve -B- open for another 2 minutes.

The suction jet pump will continue generating a vacuum in the cooling system.

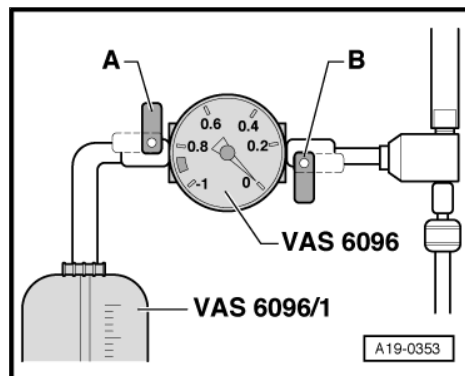
- The needle on the gauge should remain in the green zone.
- Close valve -B-.
- The needle on the gauge should stop in the green zone. The vacuum level in the cooling system is then sufficient for subsequent filling.

If the needle does not reach the green zone, repeat the process.

If the vacuum level drops, there is a leak in the cooling system.

- Detach compressed air hose.
- Open valve -A-.

The vacuum in the cooling system causes the coolant to be drawn out of the cooling system charge unit -VAS 6096- ; the cooling system is then filled.

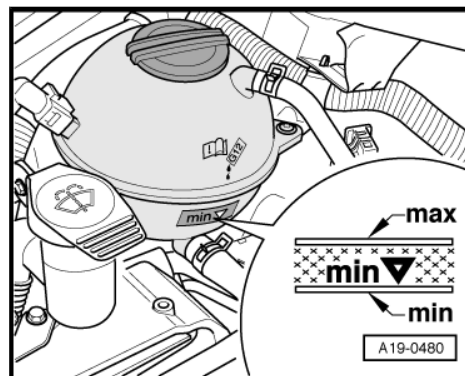


- Check the coolant level and top up coolant as far as the max mark.
- Start engine, run for 2 minutes (maximum) at approx. 1500 rpm and top up coolant to overflow hole on expansion tank with engine running.
- Fit expansion tank cap.
- Run engine until radiator fan cuts in.



WARNING

Hot steam/hot coolant may escape when opening expansion tank. Cover cap with cloth and open carefully.

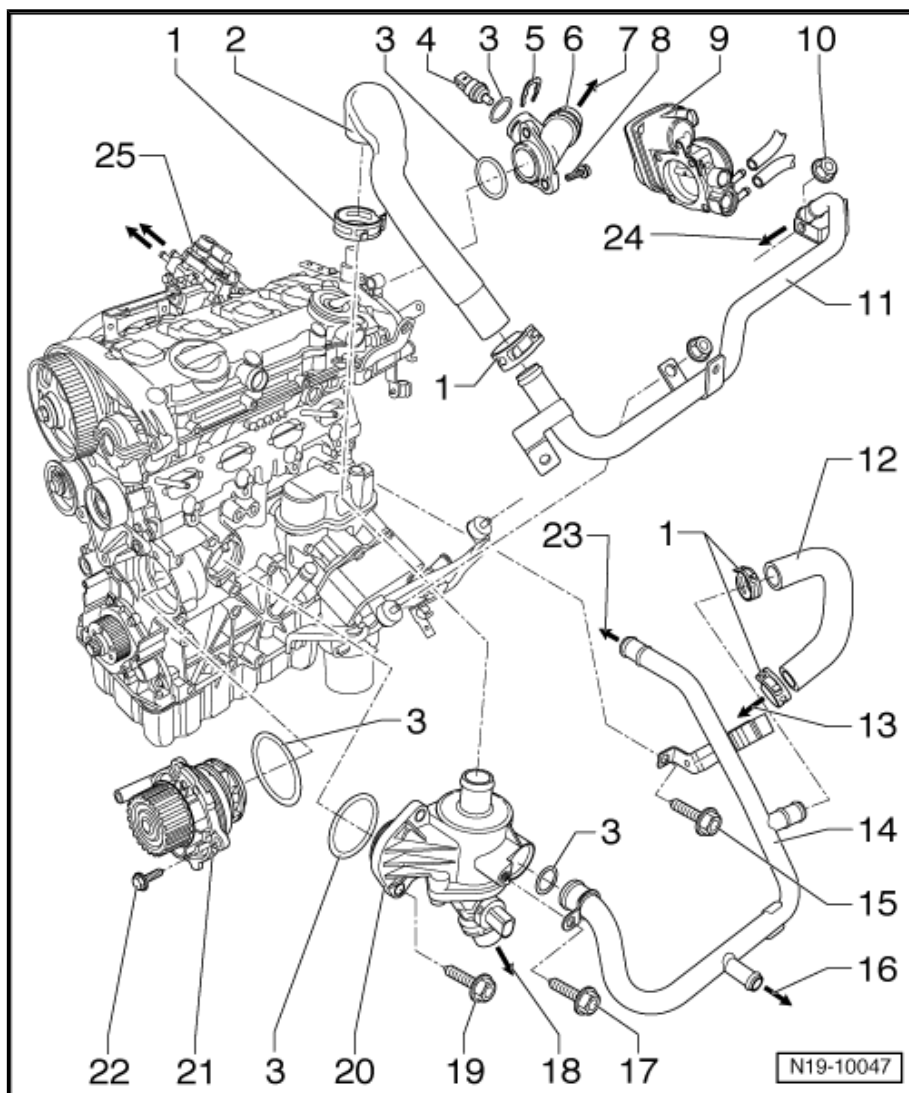


- Check coolant level and top up if necessary. When the engine is at normal operating temperature, the coolant level should be on the max. mark; when the engine is cold, between the min. and max. marks.
- Switch off engine.

1.5 Parts of cooling system (on engine) - exploded view, engine code AXW, BLX, BHD, BLY, BLR, BMB

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

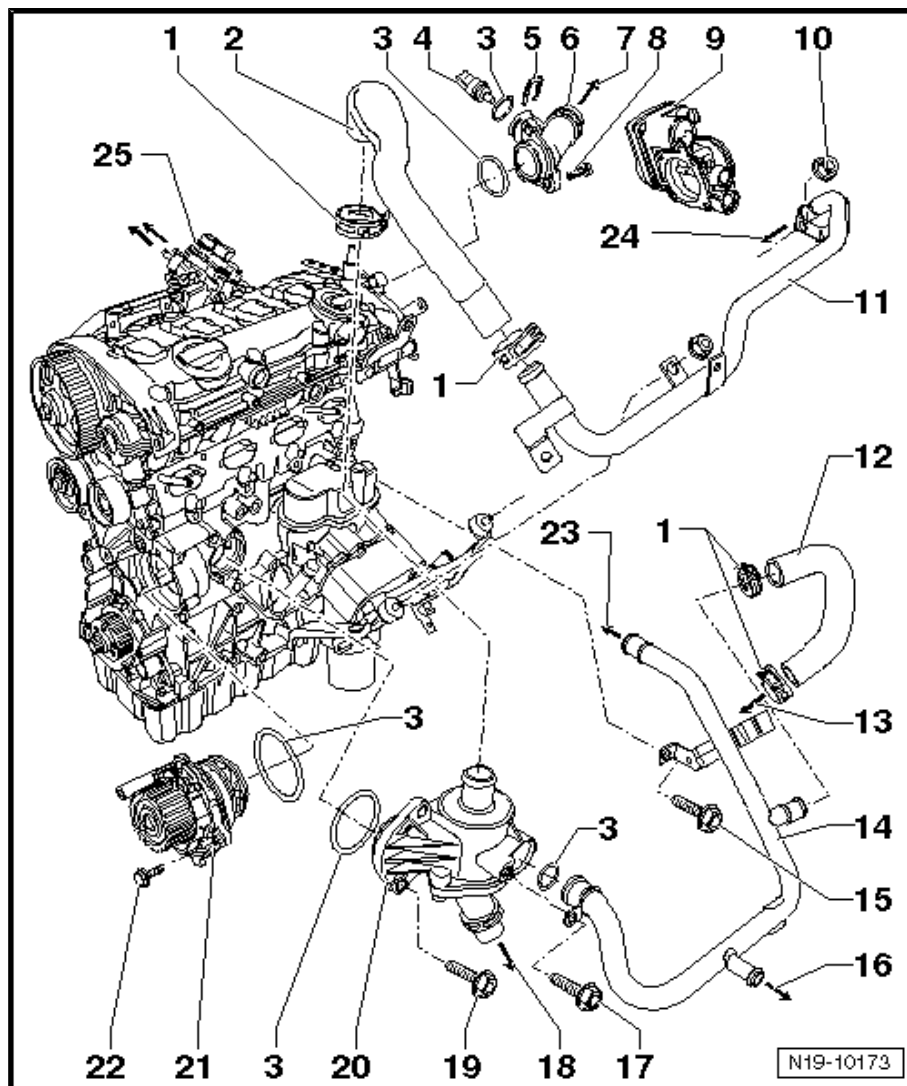
- 1 - Spring-type clip
- 2 - Connecting hose
- 3 - O-ring
 - ☐ Renew
- 4 - Coolant temperature sender -G62-
- 5 - Retaining clip
- 6 - Connection
- 7 - To top of radiator
- 8 - 10 Nm
- 9 - Throttle valve module - J338-
 - ☐ Heated by coolant
- 10 - 15 Nm
- 11 - Coolant pipe
- 12 - Connecting hose
- 13 - To oil cooler
- 14 - Coolant pipe
- 15 - 15 Nm
- 16 - To expansion tank
- 17 - 10 Nm
- 18 - Hose to bottom of radiator
- 19 - 15 Nm
- 20 - Coolant distributor housing
 - ☐ With map-controlled engine cooling thermostat -F265-
 - ☐ Dismantling ⇒ [page 197](#)
- 21 - Coolant pump
 - ☐ Removing and installing ⇒ [page 206](#)
- 22 - 15 Nm
- 23 - To heat exchanger (for heating system)
- 24 - To coolant hose (going to top of radiator)
- 25 - Exhaust gas recirculation valve -N18-
 - ☐ Water-cooled



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

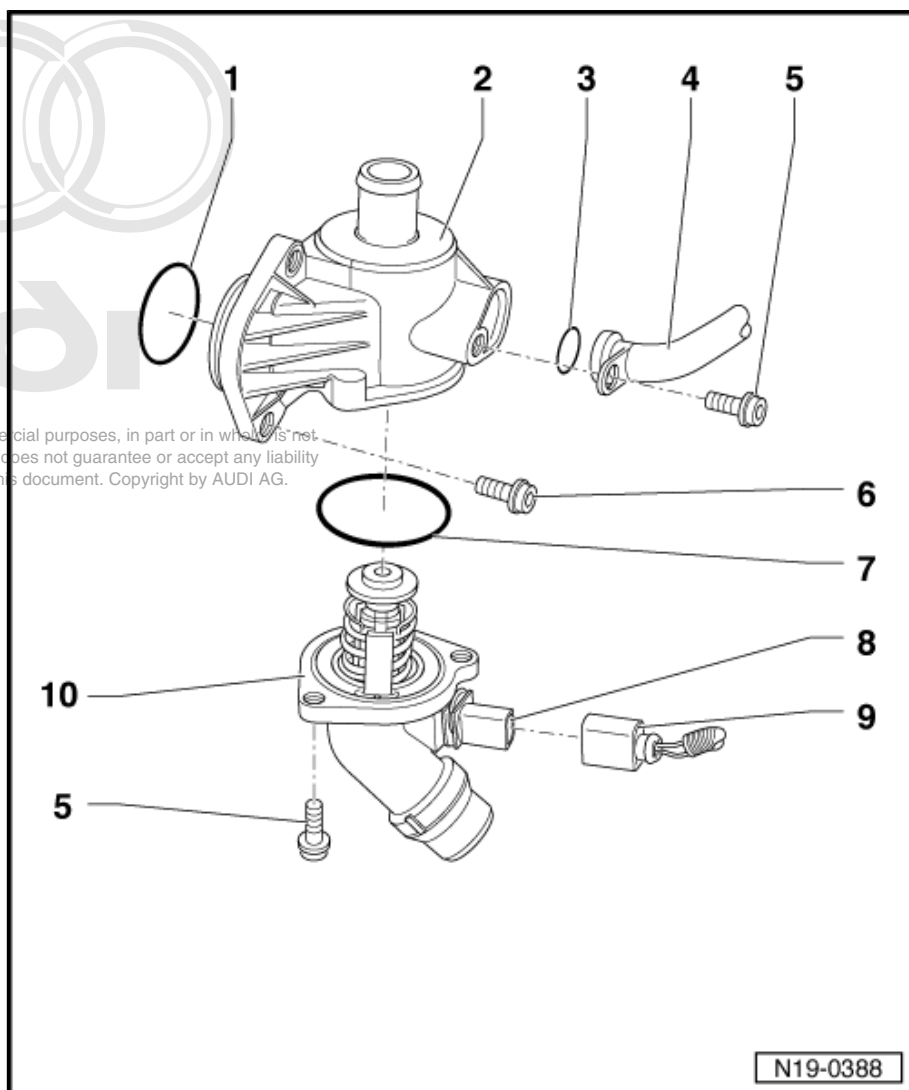
1.6 Parts of cooling system (on engine) - exploded view, engine code BVY, BVZ

- 1 - Spring-type clip
- 2 - Connecting hose
- 3 - O-ring
 - ☐ Renew
- 4 - Coolant temperature sender -G62-
- 5 - Retaining clip
- 6 - Connection
- 7 - To top of radiator
- 8 - 10 Nm
- 9 - Throttle valve module - J338-
- 10 - 15 Nm
- 11 - Coolant pipe
- 12 - Connecting hose
- 13 - To oil cooler
- 14 - Coolant pipe
- 15 - 15 Nm
- 16 - To expansion tank
- 17 - 10 Nm
- 18 - Hose to bottom of radiator
- 19 - 15 Nm
- 20 - Distributor housing with thermostat
 - ☐ Checking thermostat
⇒ Vehicle diagnostic tester „Function and component selection“
 - ☐ Starts to open at 87 °C
- 21 - Coolant pump
 - ☐ Removing and installing ⇒ [page 206](#)
- 22 - 15 Nm
- 23 - To heat exchanger (for heating system)
- 24 - To coolant hose (going to top of radiator)
- 25 - Exhaust gas recirculation valve -N18-
 - ☐ Water-cooled



1.7 Coolant distributor housing with thermostat - exploded view, engine code AXW, BLX, BHD, BLY, BLR, BMB

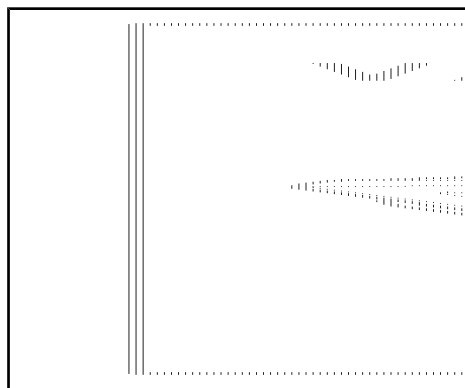
- 1 - O-ring
 - ☐ Renew
- 2 - Coolant distributor housing
- 3 - O-ring
 - ☐ Renew
- 4 - Coolant pipe (bottom)
- 5 - 10 Nm
- 6 - 15 Nm
- 7 - Seal
 - ☐ Renew
- 8 - Heating element connection
- 9 - Connector
- 10 - Map-controlled engine cooling thermostat -F265-
 - ☐ Checking ⇒ [page 204](#)
 - ☐ With hose connection
 - ☐ Starts to open at approx. 105°C
 - ☐ Removing and installing ⇒ [page 197](#)



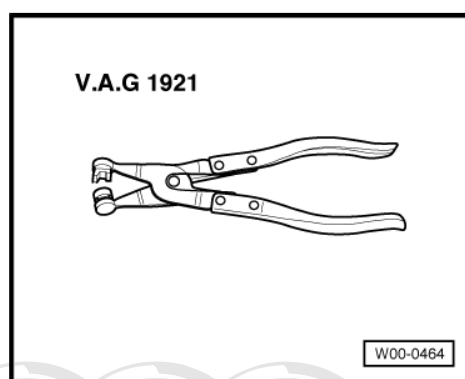
1.8 Removing and installing map-controlled engine cooling thermostat -F265- , engine code AXW, BLX, BHD, BLY, BLR, BMB

Special tools and workshop equipment required

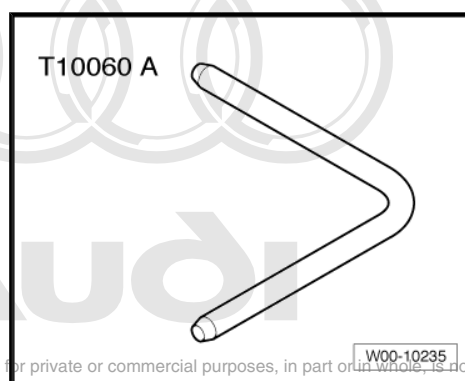
- ◆ Drip tray for workshop hoist -VAS 6208-



- ◆ Hose clip pliers -V.A.G 1921-



- ◆ Locking pin -T10060A-



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

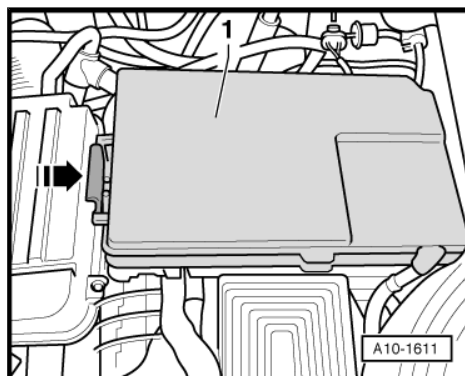
Removing

- Remove cover -1- over battery. To do so, press release tab -arrow-.

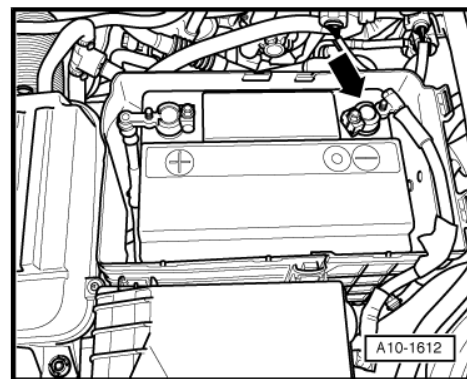


WARNING

Observe notes on procedure for disconnecting battery ⇒ Electrical system; Repair group 27.



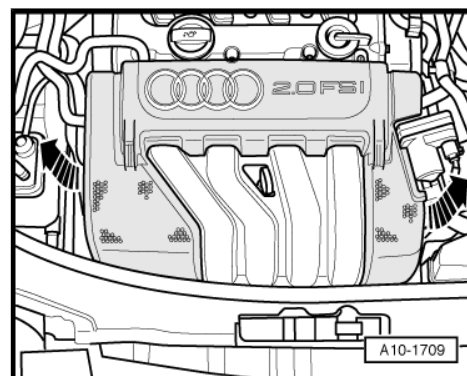
- With ignition switched off, disconnect battery earth cable -arrow-.



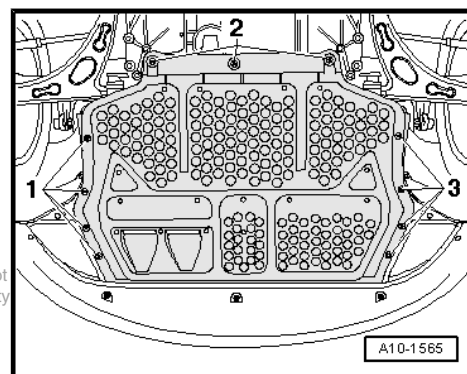
- Lift off engine cover panel -arrows-.

**WARNING**

Hot steam/hot coolant may escape when opening expansion tank. Cover cap with cloth and open carefully.

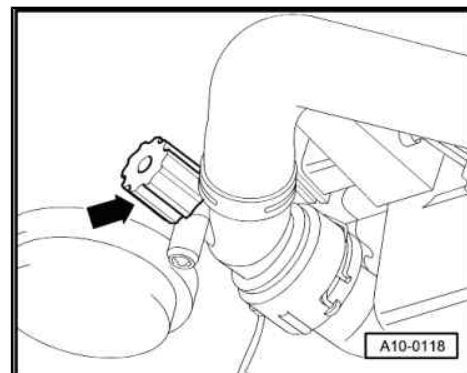


- Open filler cap on coolant expansion tank
- Remove noise insulation (centre) - fasteners -1 ... 3-.
- Place drip tray for workshop hoist -VAS 6208- beneath engine.

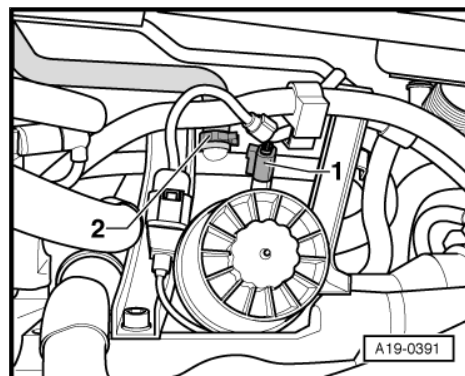


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Turn drain plug -arrow- on radiator anti-clockwise, if necessary fit drain hose to connection.



- Unplug electrical connector -1- from oil pressure sender.
- Also disconnect bottom coolant hose at coolant pipe -2-, and drain off remaining coolant.

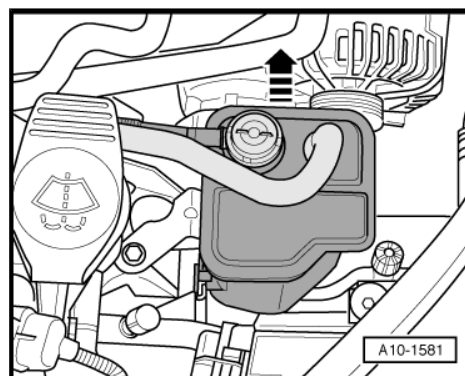


- Lift out activated charcoal filter from retainer -in direction of arrow- with pipes connected and lay aside.

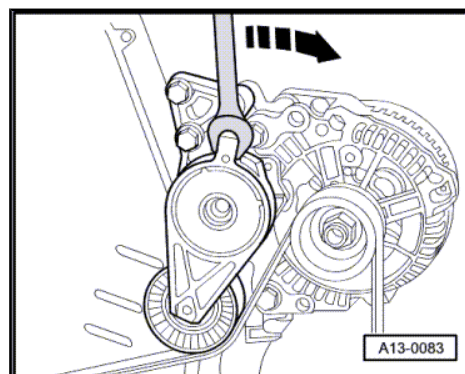


Note

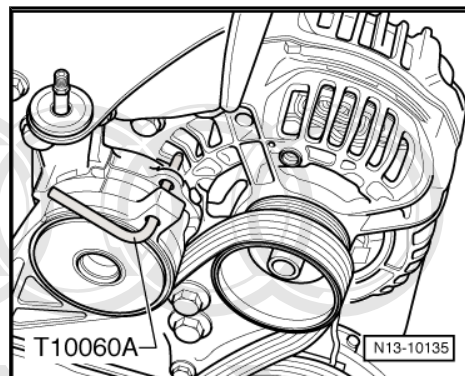
Before removing, mark direction of rotation of poly V-belt with chalk or felt-tip pen. If the belt runs in the opposite direction when it is refitted, this can cause breakage.



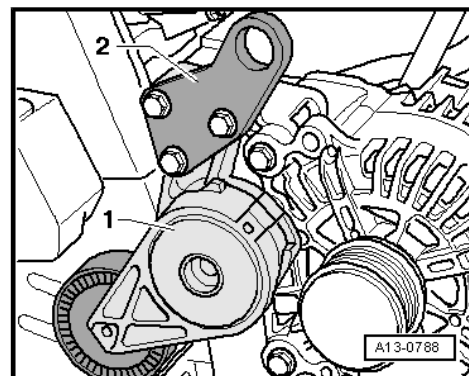
- To slacken poly V-belt, turn tensioner in -direction of arrow-.



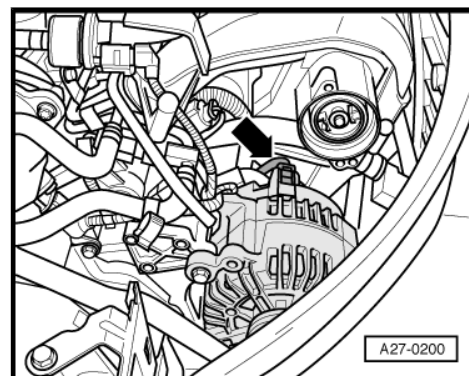
- Lock tensioner in position with locking pin -T10060A- .
- Take off poly V-belt.



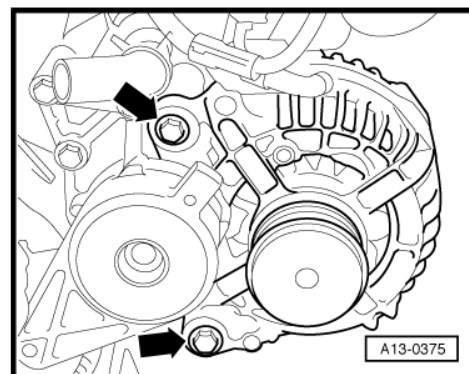
- Remove tensioner -1- for poly V-belt and engine lifting eye -2-.



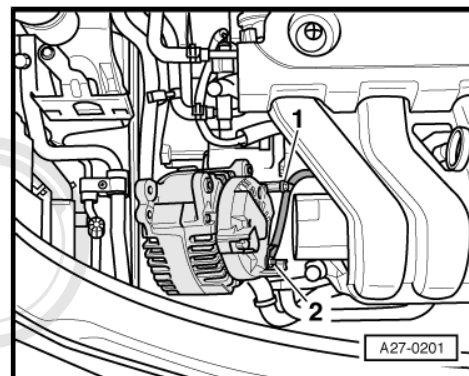
- Unplug electrical connector -arrow-.



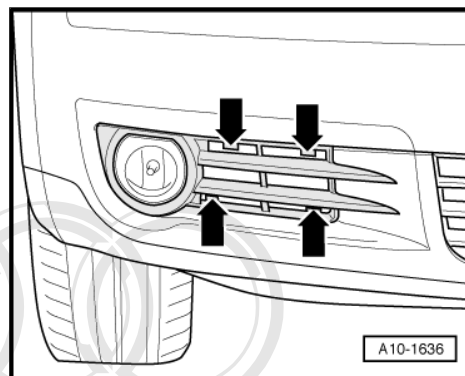
- Unscrew the bolts -arrows- and remove alternator from bracket for ancillaries.
- Swivel alternator towards right side of vehicle with wiring connected.



- Unscrew wire -2- at alternator.
- Unscrew wire clamp -1- at alternator.



- Press the release tabs -arrows- and detach air intake grille.



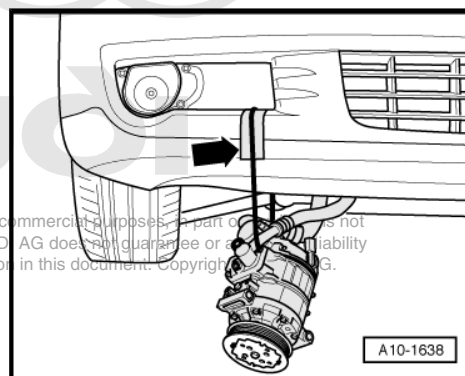
- Protect bumper from scratches using adhesive tape -arrow-.



WARNING

The air conditioner refrigerant circuit must not be opened.

Protected by copyright. Copying for private or commercial purposes, in part or in full, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept liability with respect to the correctness of information in this document. Copyright © 2012 AUDI AG.

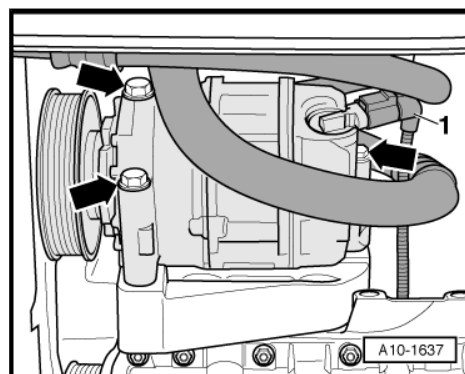


- Unplug electrical connector -1- for magnetic clutch on air conditioner compressor.
- Remove bolts -arrows- for air conditioner compressor.

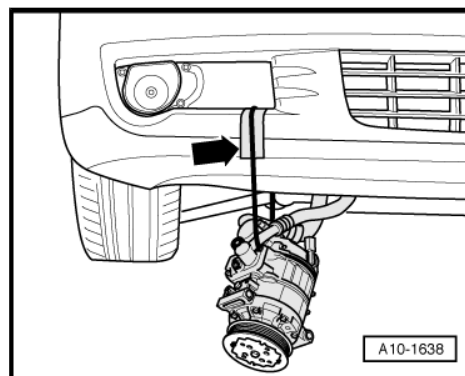


Note

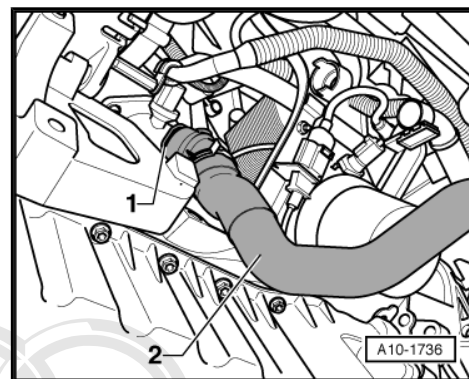
To prevent damage to the air conditioner compressor and refrigerant pipes/hoses, ensure that the pipes and hoses are not stretched, kinked or bent.



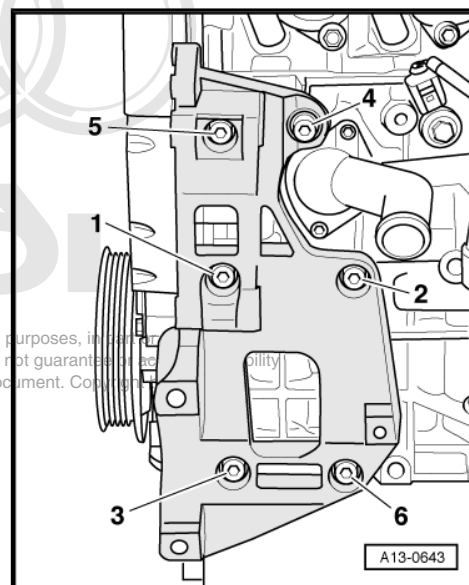
- Tie up air conditioner compressor together with the connected refrigerant hoses to bumper.



- Detach coolant hose -2-; to do so, pull out retaining clip -1-.



- Detach bracket for ancillaries: bolts -1 ... 6-.



Protected by copyright. Copying for private or commercial purposes, in particular for advertising or promotional purposes, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee the accuracy of the information in this document. Copyright © 2012 Audi AG

- Unplug electrical connector -1-.
- Remove map-controlled engine cooling thermostat -F265-
-arrows-.

Installing

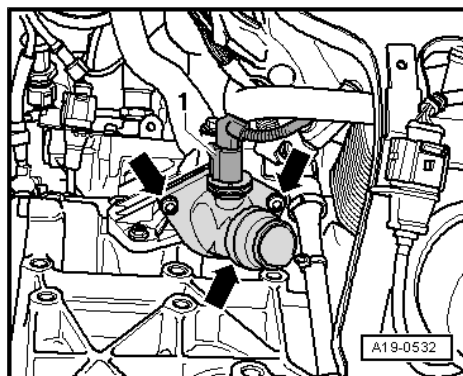
Installation is carried out in the reverse order; note the following:



Note

Renew O-ring.

- Clean and smoothen sealing surface for O-ring.
- Coat new O-ring with coolant.
- Install bracket for ancillary units ⇒ [page 44](#)
- Fill up with coolant ⇒ [page 190](#) .
- Install alternator ⇒ Electrical system; Repair group 27 .
- Install air conditioner compressor ⇒ Air conditioning; Rep. gr. 87 .
- Install poly V-belt ⇒ [page 41](#) .
- Connect battery. Procedures required ⇒ Electrical system; Repair group 27 .



Component	Nm
Thermostat to cylinder block	15
Bracket for ancillaries to cylinder block	45 ¹⁾
Tensioner for poly V-belt to bracket for ancillaries	23

- ¹⁾ Install using locking fluid; for locking fluid refer to ⇒ Parts catalogue .

1.9 Checking map-controlled engine cooling thermostat -F265- , engine code AXW, BLX, BHD, BLY, BLR, BMB

Special tools and workshop equipment required

- ◆ Auxiliary measuring set -V.A.G 1594C-

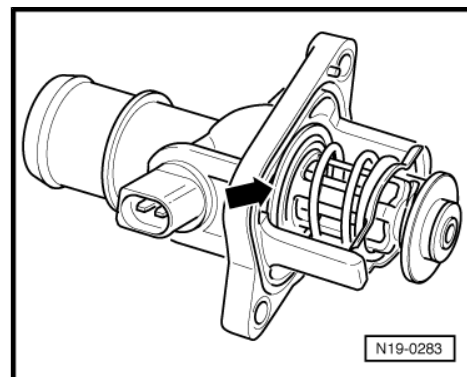
Protected by copyright. Copying for private use is permitted unless authorised by AUDI AG with respect to the correctness of info



- Remove map-controlled engine cooling thermostat -F265-
⇒ [page 197](#) .

**Note**

- ◆ *Draining coolant* ⇒ [page 190](#)
 - ◆ *Always renew seals and gaskets.*
 - ◆ *Filling with coolant* ⇒ [page 190](#)
 - Check thermostat when cold. The large valve disc must seal off the connection flange all the way round.
- If not:
- Renew map-controlled engine cooling thermostat -F265- .

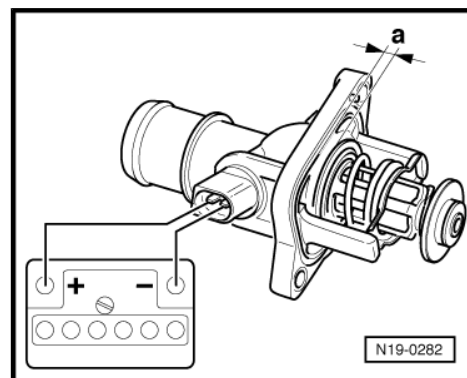


- Connect contacts of map-controlled engine cooling thermostat -F265- with battery using test leads from auxiliary measuring set -V.A.G 1594C-. Using pliers, carefully place thermostat vertically into a pot of boiling coolant up to flange.

**WARNING**

Do not touch metal parts of thermostat as they get hot – risk of burns!

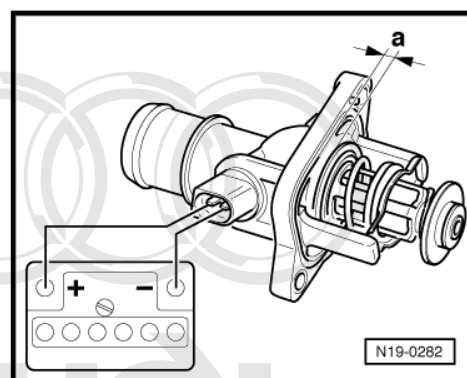
The electric heating element now additionally heats the wax in the thermostat.



- Check whether the minimum travel of 7 mm is attained after 10 minutes -arrows-.

If 7 mm travel is attained:

- Disconnect voltage supply from battery.

**Note**

Do not expose to air during test. The expansion element could otherwise be damaged!

If the minimum travel is not attained:

- Renew map-controlled engine cooling thermostat -F265- .

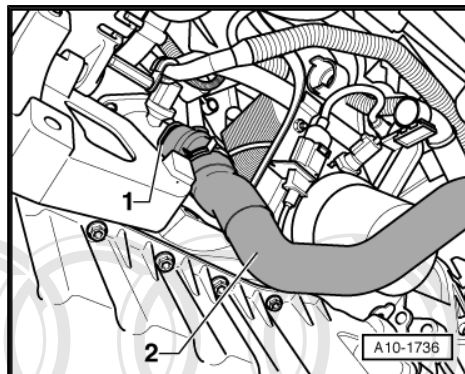
1.10 Removing and installing coolant distributor housing with thermostat, engine code BVY, BVZ

**Note**

Checking thermostat ⇒ Vehicle diagnostic tester „Function and component selection“

Removing:

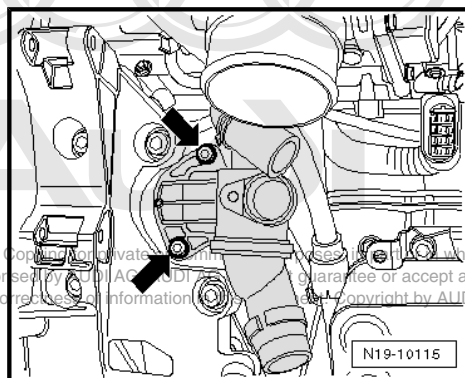
- Remove alternator ⇒ Electrical system; Rep. gr. 27 ; Alternator .
- Remove coolant pipes ⇒ [page 210](#) .
- Detach coolant hose -2- from coolant distributor housing; to do so, pull out retaining clip -1-.



- Unscrew bolts -arrows- and remove coolant distributor housing with thermostat from engine.

Installing:

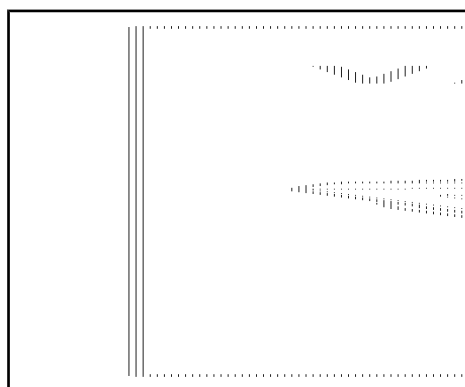
- Clean sealing surface for O-ring.
- Renew O-ring and lubricate with coolant.
- Fit coolant distributor housing on cylinder block and tighten bolts evenly to 15 Nm.
- Further assembly is basically carried out in reverse order of dismantling.



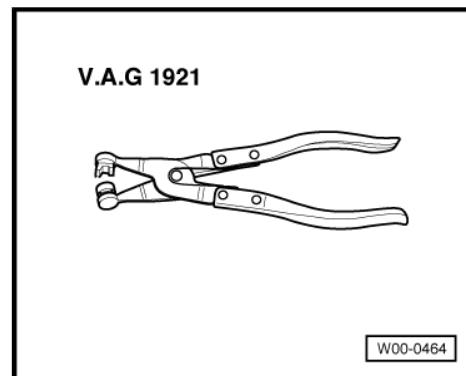
1.11 Removing and installing coolant pump

Special tools and workshop equipment required

- ◆ Drip tray for workshop hoist -VAS 6208-



- ◆ Hose clip pliers -V.A.G 1921-



Removing

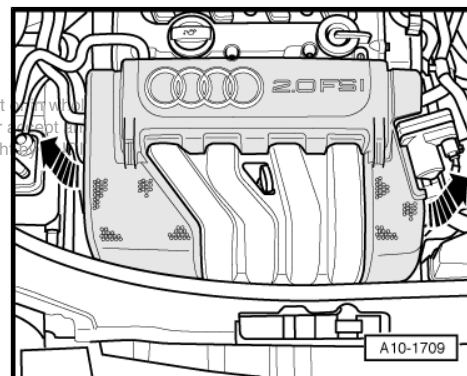


WARNING

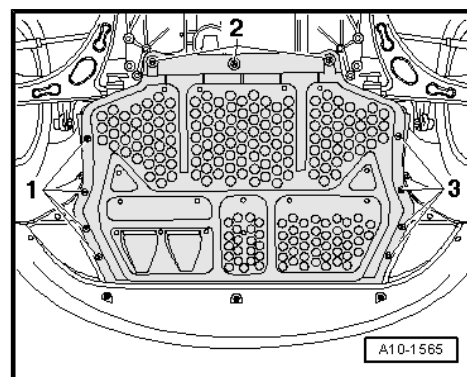
Hot steam/hot coolant may escape when opening expansion tank. Cover cap with cloth and open carefully.

- Open filler cap on coolant expansion tank
- Lift off engine cover panel -arrows-.

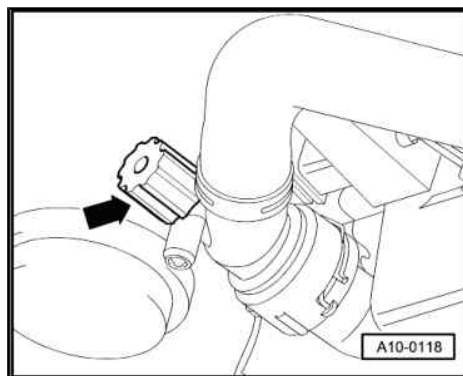
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright © 2002 Audi AG



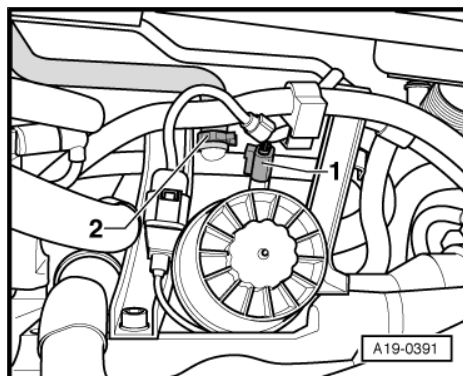
- Remove noise insulation (centre) - fasteners -1 ... 3-.
- Place drip tray for workshop hoist -VAS 6208- beneath engine.



- Turn drain plug -arrow- on radiator anti-clockwise, if necessary fit drain hose to connection.



- Unplug electrical connector -1- from oil pressure sender.
- Also disconnect bottom coolant hose at coolant pipe -2-, and drain off remaining coolant.

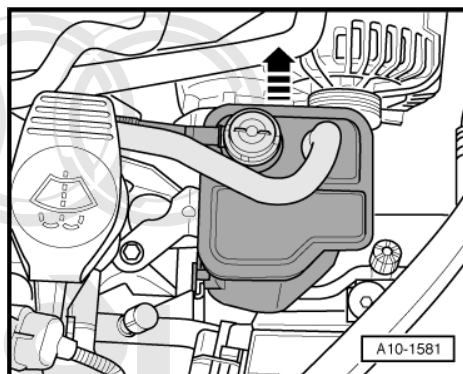


- Lift out activated charcoal filter from retainer -in direction of arrow- with pipes connected and lay aside.



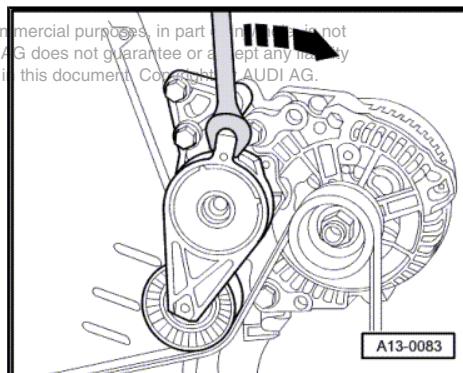
Note

Before removing, mark direction of rotation of poly V-belt with chalk or felt-tip pen. If the belt runs in the opposite direction when it is refitted, this can cause breakage.

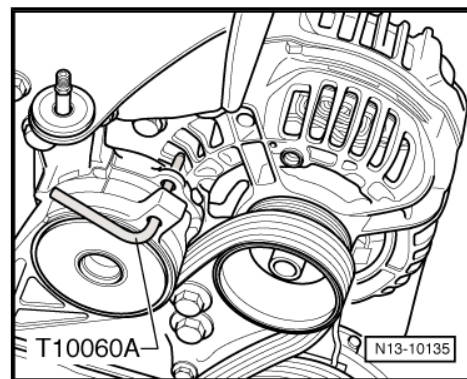


- To slacken poly V-belt, turn tensioner in -direction of arrow-

Protected by copyright. Copying for private or commercial purposes, in part or in full, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright © AUDI AG.



- Lock tensioner in position with locking pin -T10060A- .
- Take off poly V-belt.
- Remove locking pin -T10060A- from tensioner for poly V-belt.
- Remove toothed belt: engine codes AXW, BMB, BHD
 ⇒ [page 81](#) , engine codes BLX, BLY, BLR, BVY, BVZ
 ⇒ [page 92](#) .

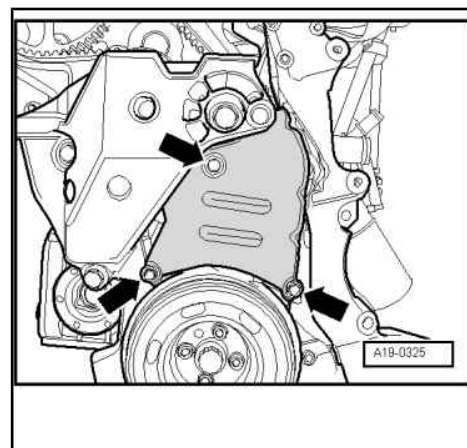


- Remove the centre toothed belt cover -arrows-.



Note

- ◆ *The belt pulley and toothed belt cover (bottom) do not have to be removed.*
- ◆ *The toothed belt should be left in position on the crankshaft sprocket.*
- ◆ *Before removing coolant pump, cover toothed belt with a cloth to protect against coolant.*

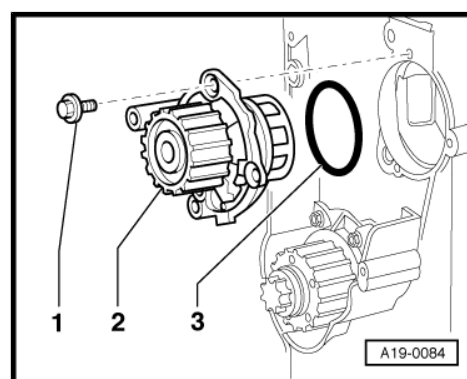


- Unscrew coolant pump securing bolts -1- and remove coolant pump -2-.
- Remove O-ring -3-.

Installing

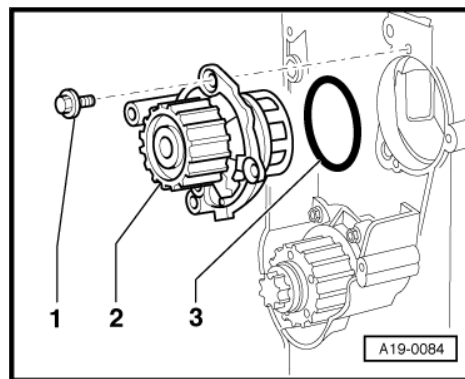
Installation is carried out in the reverse order; note the following:

- Clean and smoothen sealing surface for O-ring.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Moisten new O-ring -3- with coolant.
- Fit coolant pump -2-.
- Installation position: Sealing plug in housing faces downwards.
- Tighten bolts -1- for coolant pump to 15 Nm.
- Install toothed belt: engine codes AXW, BMB, BHD
⇒ [page 81](#) , engine codes BLX, BLY, BLR, BVY, BVZ
⇒ [page 92](#) .
- Install poly V-belt ⇒ [page 41](#) .
- Fill up with coolant ⇒ [page 190](#) .



Tightening torques

Component	Nm
Coolant pump to cylinder block	15
Toothed belt cover (centre) to cylinder block	10 ¹⁾

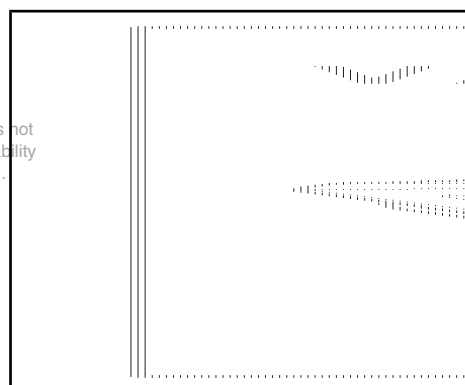
- ¹⁾ Install using locking fluid; for locking fluid refer to ⇒ Parts catalogue .

1.12 Removing and installing coolant pipe

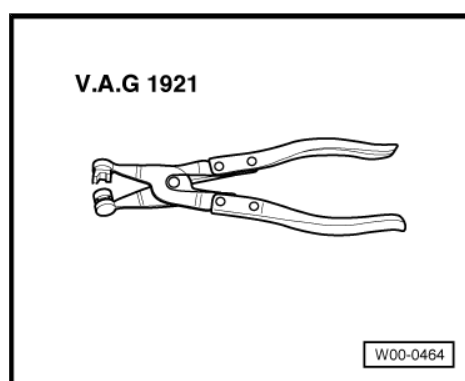
Special tools and workshop equipment required

- ◆ Drip tray for workshop hoist -VAS 6208-

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- ◆ Hose clip pliers -V.A.G 1921-



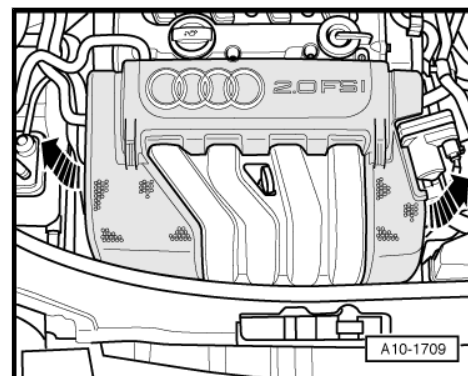
Removing



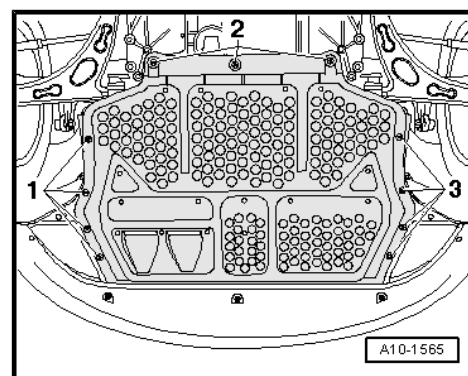
WARNING

Hot steam/hot coolant may escape when opening expansion tank. Cover cap with cloth and open carefully.

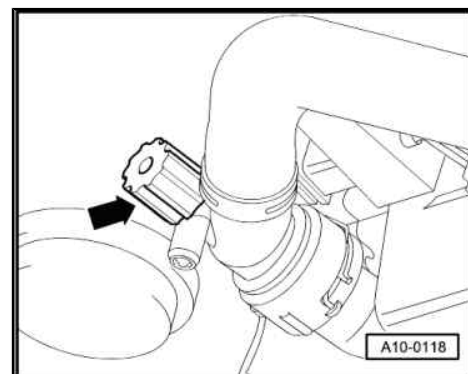
- Open filler cap on coolant expansion tank
- Lift off engine cover panel -arrows-.



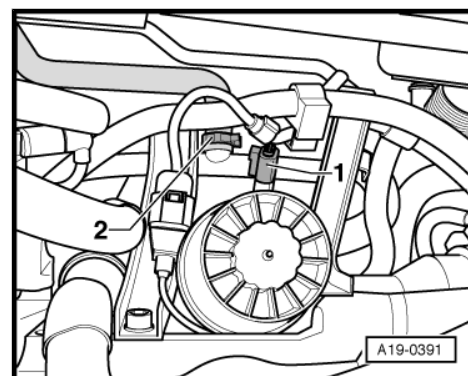
- Remove noise insulation (centre) - fasteners -1 ... 3-.
- Place drip tray for workshop hoist -VAS 6208- beneath engine.



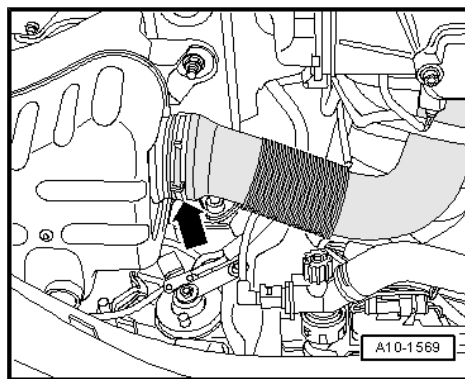
- Turn drain screw -arrow- on radiator anti-clockwise. If necessary fit drain hose on connection.



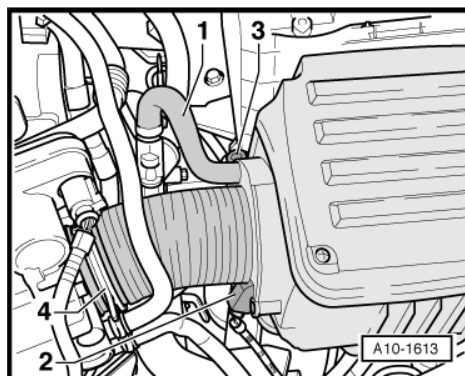
- Unplug electrical connector -1- from oil pressure sender.
- Also disconnect bottom coolant hose at coolant pipe -2- and drain off remaining coolant.



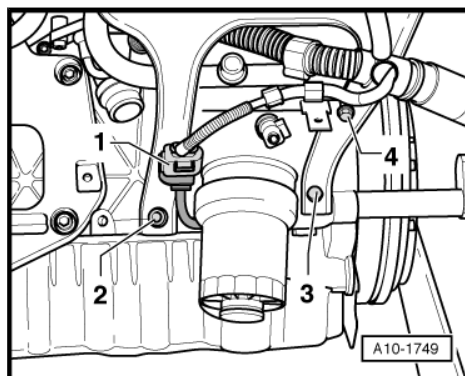
- Disconnect air intake hose -arrow- at bottom of resonator (loosen hose clip using hose clip pliers -V.A.G 1921-).



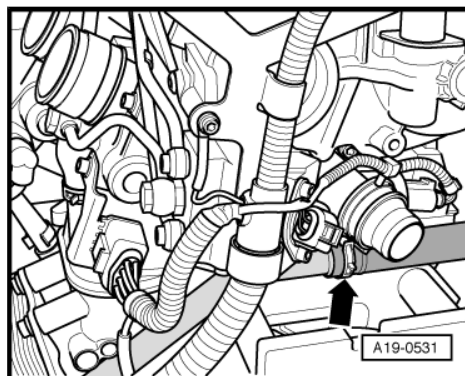
- Detach hose -1- from air cleaner housing.
- Unplug electrical connector -2- from air cleaner housing.
- Remove bolt -3-.
- Disconnect air intake hose -4- from throttle valve unit (loosen hose clip using hose clip pliers -V.A.G 1921-).
- Take out air cleaner housing.
- Remove intake manifold ⇒ Motronic direct injection and ignition system (4-cylinder); Rep. Gr. 24; Servicing injection system .



- Detach electrical connector -1- from retainer and move wire clear.
- Detach electrical wiring from bracket.
- Unscrew bolts -2 ... 4- and remove support for intake manifold.



- Detach coolant hose -arrow- from coolant pipe.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Detach coolant hose -1- from coolant pipe.
- Remove bolts -2 ... 3- and detach coolant pipe.

Installing

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



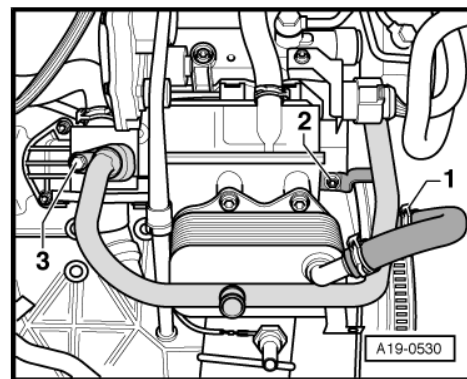
Note

- ◆ *Renew gaskets and seals.*
- ◆ *Lubricate O-rings with coolant.*
- ◆ *Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ Parts catalogue .*

- Install intake manifold ⇒ Rep. gr. 24 .
- Fill up with coolant ⇒ [page 190](#) .

Tightening torques

Component	Nm
Coolant pipe to cylinder block	10
Coolant pipe to thermostat housing	10



1.13 Parts of cooling system (on body) - exploded view



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

1 - Coolant hose (top)

- ☐ To connection at cylinder head

2 - O-ring

- ☐ Renew if damaged

3 - Radiator

- ☐ Removing and installing [⇒ page 216](#)
- ☐ If renewed, change coolant in entire system

4 - Seal

5 - Filler cap

- ☐ Check with cooling system tester -V.A.G 1274- and adapter for cooling system tester -V.A.G 1274/9- .
- ☐ The pressure relief valve should open at a pressure of 1.4 ... 1.6 bar.

6 - Connector

7 - 5 Nm

8 - Expansion tank

- ☐ Carry out leak test of cooling system with cooling system tester - V.A.G 1274- and adapter for cooling system tester -V.A.G 1274/8-

9 - Bracket

- ☐ For radiator

10 - 5 Nm

11 - Mounting

12 - 10 Nm

13 - Radiator cowl

14 - 5 Nm

15 - Radiator fan 2 -V177-

- ☐ Removing and installing [⇒ page 215](#)

16 - Connector

17 - Radiator fan -V7-

- ☐ Removing and installing [⇒ page 215](#)
- ☐ With radiator fan control unit -J293-

18 - Coolant hose (bottom)

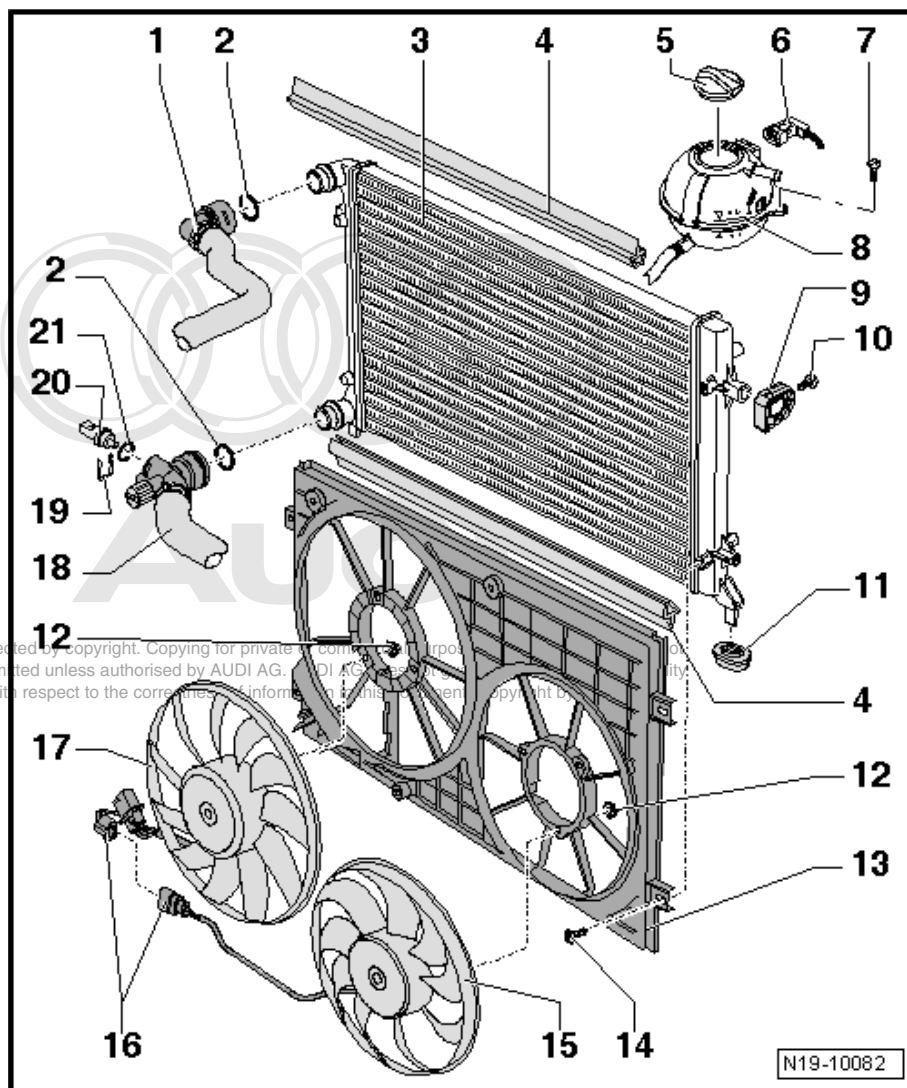
- ☐ To connection for thermostat

19 - Retaining clip

20 - Radiator outlet coolant temperature sender -G83-

21 - O-ring

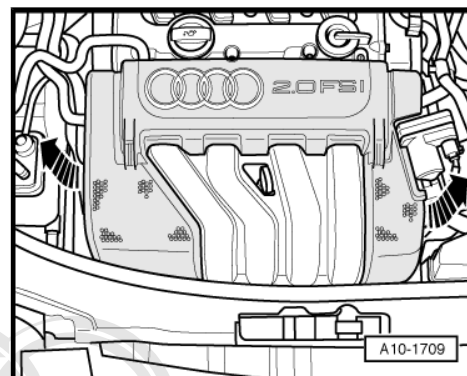
- ☐ Renew



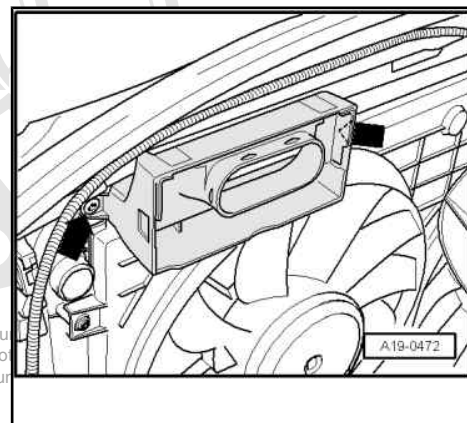
1.14 Removing and installing radiator fan - V7- and radiator fan 2 -V177-

Removing

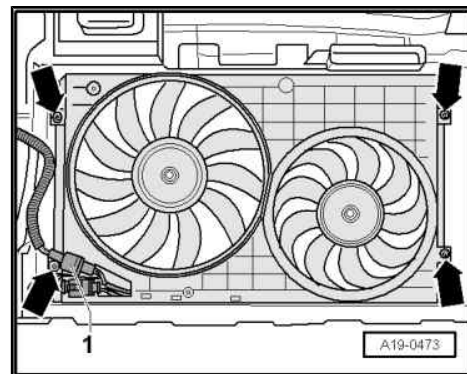
- Remove engine cover panel -arrows-.
- Detach air hose (going to resonator) at lock carrier.



- Unscrew air duct at lock carrier -arrows-.



- Unplug electrical connector -1-.
- Unscrew bolts -arrows- and remove radiator cowl.



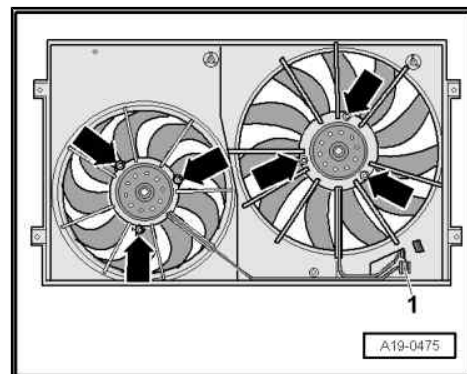
- Unplug electrical connector -1-.
- Move wiring clear.
- Unscrew nuts -arrows- and remove fans.

Installing

Install in reverse order.

Tightening torques

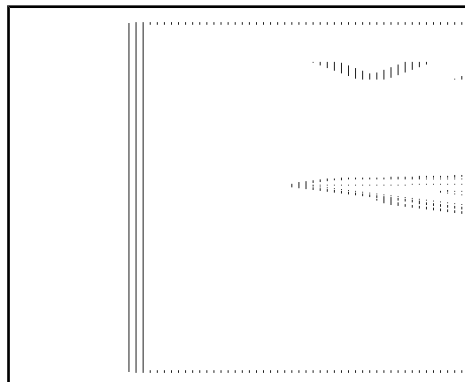
Component	Nm
Radiator fan to radiator cowl	10
Radiator cowl to radiator	10



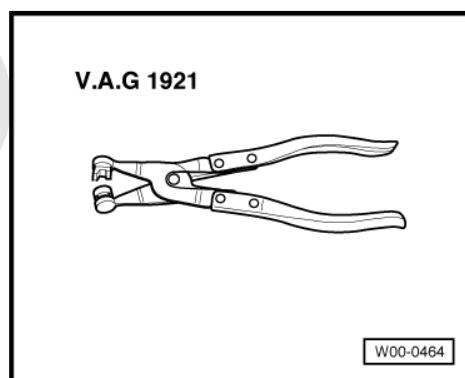
1.15 Removing and installing radiator

Special tools and workshop equipment required

- ◆ Drip tray for workshop hoist -VAS 6208-



- ◆ Hose clip pliers -V.A.G 1921-



Removing

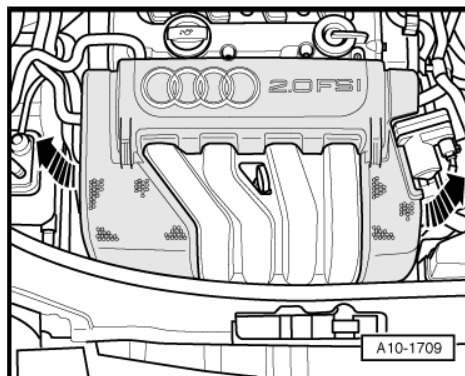
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



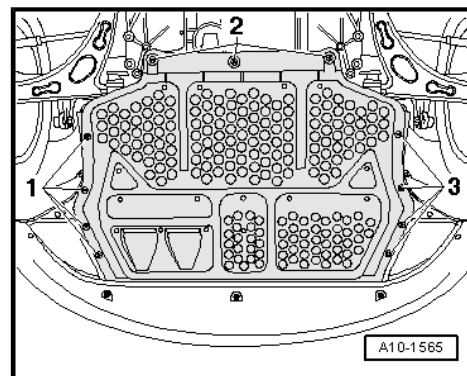
WARNING

Hot steam/hot coolant may escape when opening expansion tank. Cover cap with cloth and open carefully.

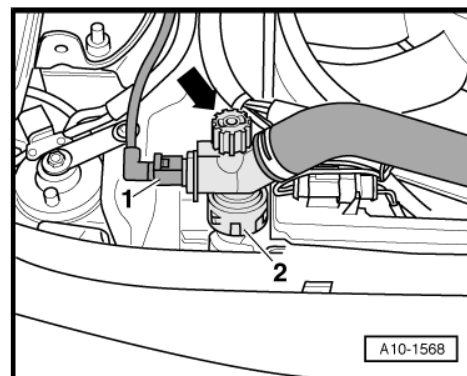
- Open filler cap on coolant expansion tank
- Remove engine cover panel -arrows-.



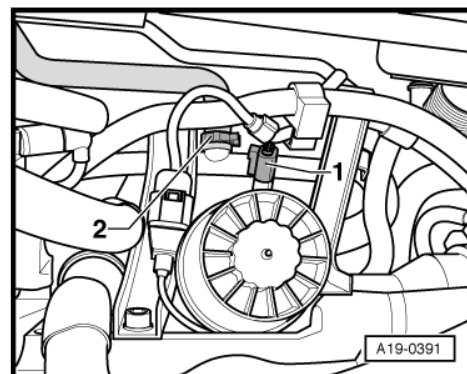
- Remove noise insulation (centre) - fasteners -1 ... 3-.



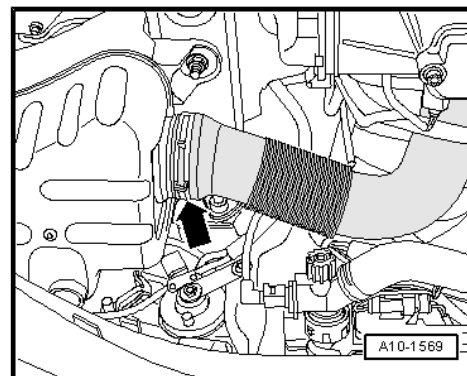
- Unplug electrical connector -1- from coolant temperature sender at radiator outlet.
- Place drip tray for workshop hoist -VAS 6208- beneath engine.
- Turn drain plug -arrow- on radiator anti-clockwise, if necessary fit drain hose to connection.
- Pull off retaining clip for bottom coolant hose and detach coolant hose -2- from radiator.



- Unplug electrical connector -1- from oil pressure sender.
- Also disconnect bottom coolant hose at coolant pipe -2-, and drain off remaining coolant.

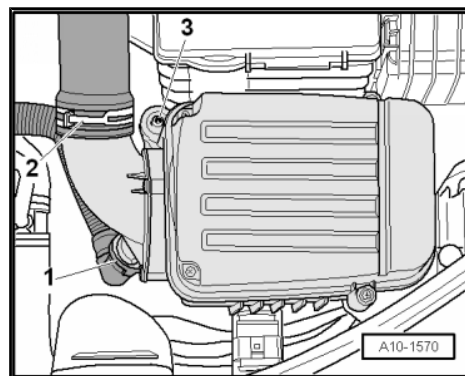


- Disconnect air hose -arrow- at bottom of resonator.
- Remove front bumper ⇒ Rep. gr. 63 .

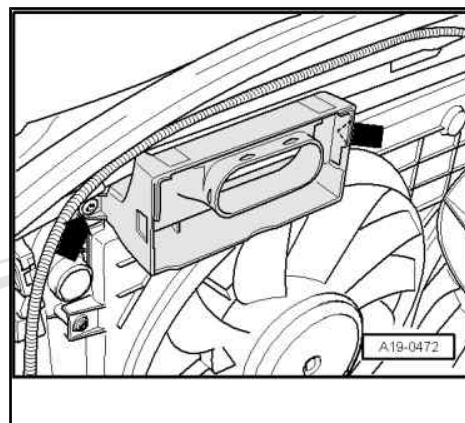


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

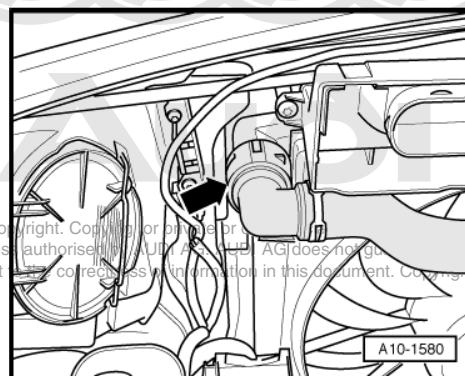
- Disconnect hoses -1- and -2- from air cleaner housing.
- Remove bolt -3-.
- Take out air cleaner housing.
- Detach air hose (going to resonator) at lock carrier.



- Unscrew air duct at lock carrier -arrows-.



- Detach top coolant hose from radiator -arrow-.



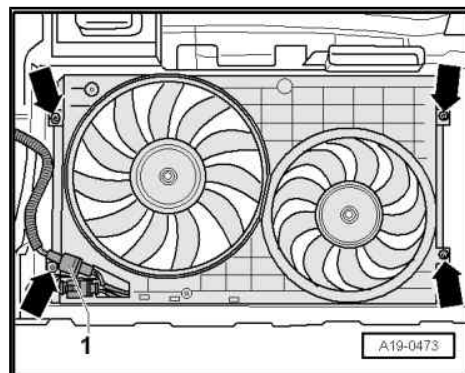
- Unplug electrical connector -1-.
- Unscrew bolts -arrows- and remove radiator cowl.
- Unbolt air ducts on left and right sides of radiator.


WARNING

The air conditioner refrigerant circuit must not be opened.


Note

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



- Unscrew securing bolts -2- for the condenser.
- Remove bolts -1- at radiator.
- Swivel radiator slightly towards rear.
- Detach radiator upwards and take it out from below.

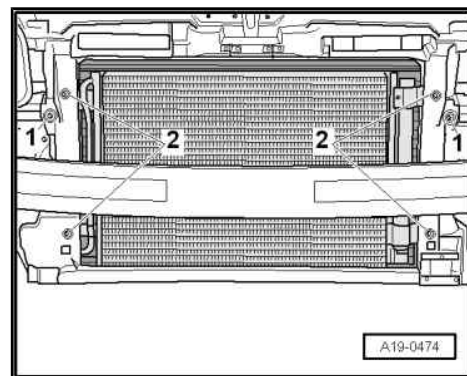
Installing

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

- Install front bumper ⇒ Body Repairs; Rep. gr. 63 ; .
- Fill up with coolant ⇒ [page 190](#) .

Tightening torques

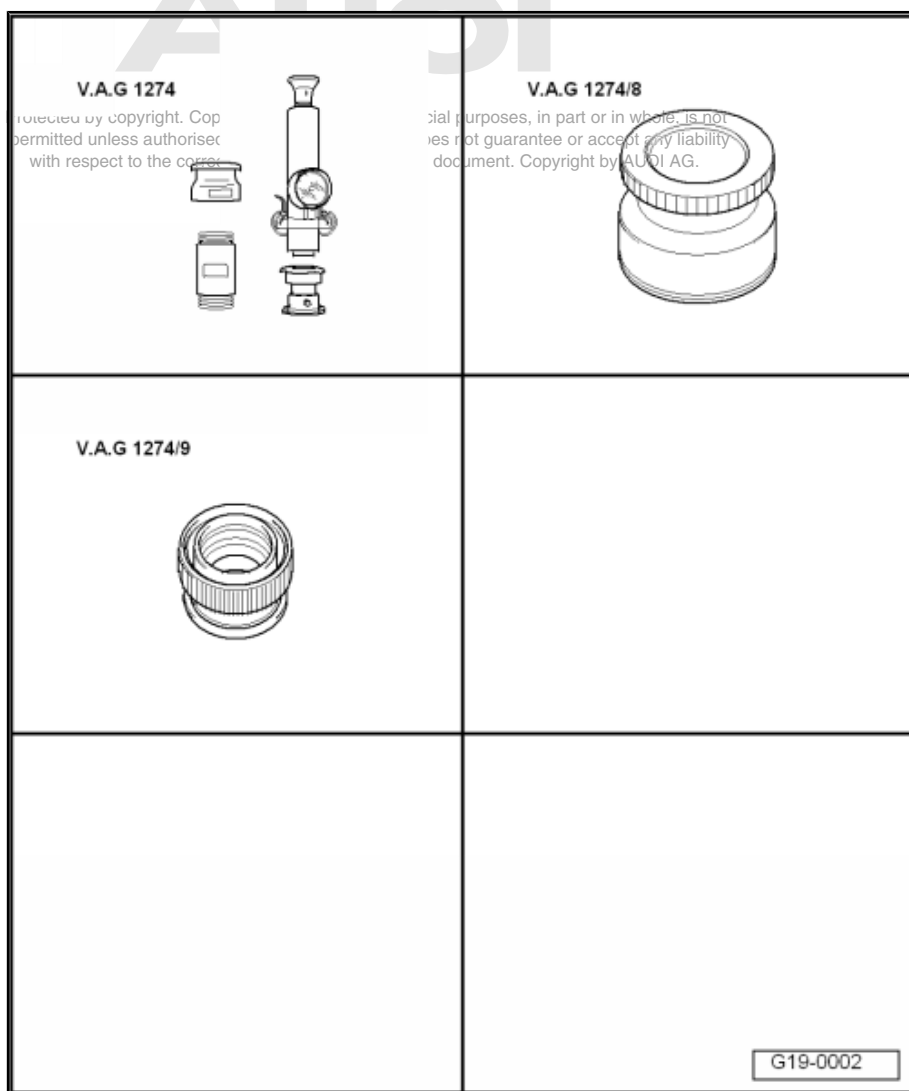
Component	Nm
Radiator to bracket	10
Condenser to radiator	10
Radiator cowl to radiator	10



1.16 Checking cooling system for leaks

Special tools and workshop equipment required

- ◆ Cooling system tester - V.A.G 1274-
- ◆ Adapter for cooling system tester -V.A.G 1274/8-
- ◆ Adapter for cooling system tester -V.A.G 1274/9-



Test condition

- Engine must be warm.

Test sequence**WARNING**

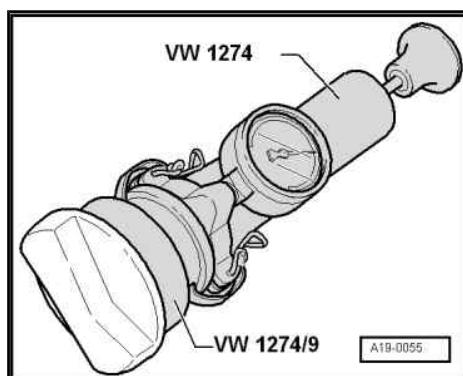
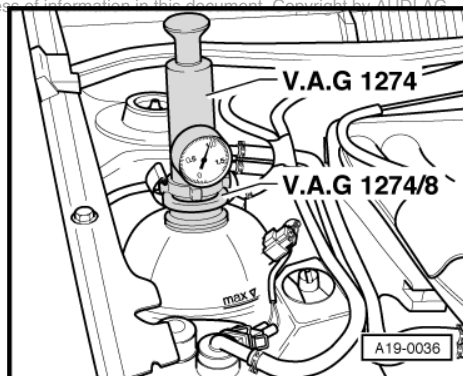
Hot steam/hot coolant may escape when opening expansion tank. Cover cap with cloth and open carefully.

- Open filler cap on coolant expansion tank
- Fit cooling system tester -V.A.G 1274- with adapter for cooling system tester -V.A.G 1274/8- on coolant expansion tank.
- Using hand pump on tester, build up a pressure of approx. 1.0 bar.
- If this pressure is not maintained, locate and rectify leaks.

Checking pressure relief valve in cap

- Fit cooling system tester -V.A.G 1274- with adapter for cooling system tester -V.A.G 1274/9- on filler cap.
- Operate hand pump.
- ◆ The pressure relief valve should open at a pressure of 1.4 ... 1.6 bar.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG



26 – Exhaust system

1 Removing and installing parts of exhaust system



Note

- ◆ *Vehicles with engine code BLY, BVZ, BHD, BMB comply with emission standard EU 2. On these vehicles some emissions-related components are not fitted, e.g. exhaust gas recirculation system, NOx sensor control unit -J583-, Lambda probe 2 -G108- and Lambda probe 2 after catalytic converter -G131-. Note this when working on the exhaust system.*
- ◆ *Renew gaskets and self-locking nuts.*
- ◆ *After working on the exhaust system, ensure that the system is not under stress and that it has sufficient clearance from the body. If necessary, loosen clamp and align silencers and exhaust pipe so that sufficient clearance is maintained to the body at all points and the mountings are evenly loaded.*

1.1 Exhaust manifold with catalytic converter - exploded view, engine code AXW, BLX, BHD, BLR, BMB



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

1 - Clamp
2 - 10 Nm
3 - Cable guide

- ☐ For Lambda probe

4 - Lambda probe 2 -G108-

- ☐ 55 Nm
- ☐ Bank 2, probe 1
- ☐ Grease only the threads with high-temperature paste. The paste must not penetrate into the slots on the probe body.
- ☐ Colour of connector: brown

5 - 10 Nm
6 - Lambda probe -G39-

- ☐ 55 Nm
- ☐ Bank 1, probe 1
- ☐ Grease only the threads with high-temperature paste. The paste must not penetrate into the slots on the probe body.
- ☐ Colour of connector: black

7 - Bracket
8 - 40 Nm
9 - 25 Nm
10 - Support for exhaust manifold

- ☐ Right-side

11 - Support

- ☐ For catalytic converter

12 - Gasket

- ☐ Renew

13 - Support for exhaust manifold

- ☐ Left-side

14 - Exhaust manifold with catalytic converter

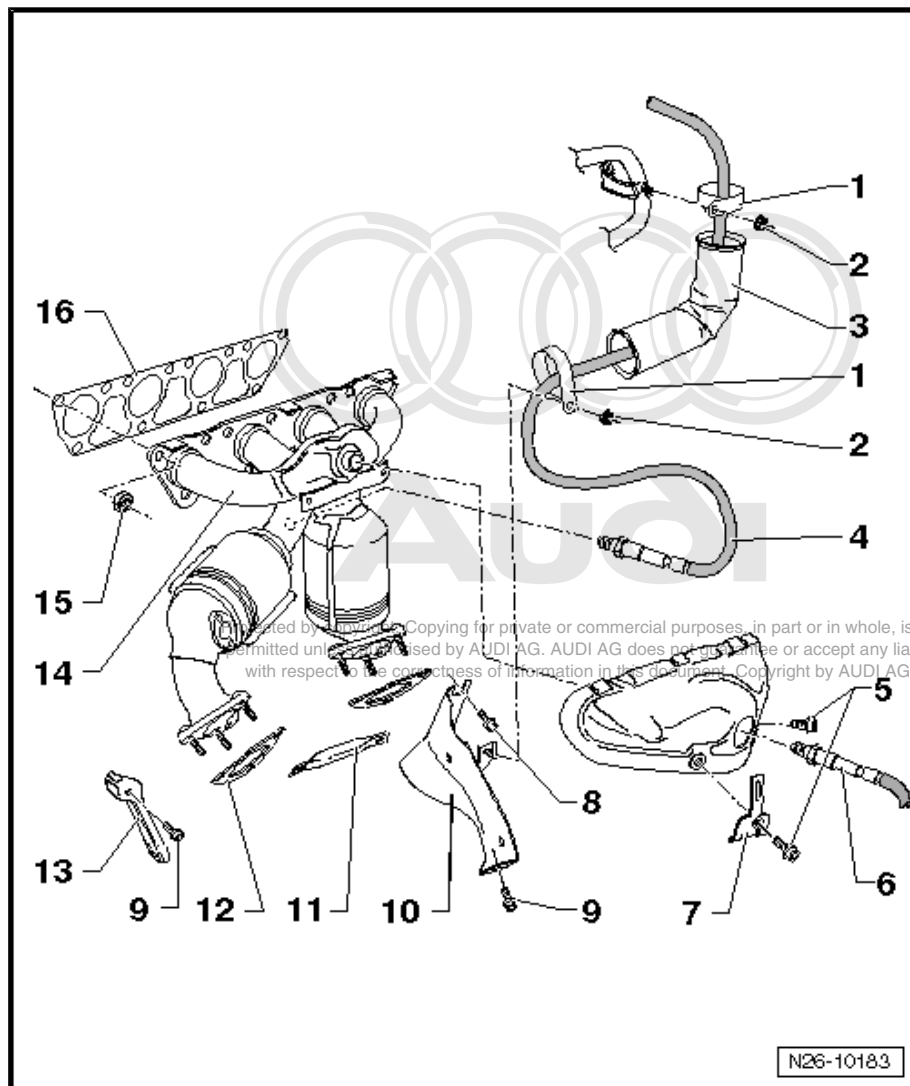
- ☐ Coat studs of exhaust manifold with high-temperature paste
- ☐ Removing and installing ⇒ [page 224](#)

15 - 25 Nm

- ☐ Coat studs of exhaust manifold with high-temperature paste.

16 - Gasket

- ☐ Renew



1.2 Exhaust manifold with catalytic converter - exploded view, engine code BVY

1 - 10 Nm

2 - Lambda probe -G39-

- ☐ 55 Nm
- ☐ Bank 1, probe 1
- ☐ Grease only the threads with high-temperature paste. The paste must not penetrate into the slots on the probe body.
- ☐ Colour of connector: black

3 - Bracket

4 - 40 Nm

5 - 25 Nm

6 - Support for exhaust manifold

- ☐ Right-side

7 - Support

- ☐ For catalytic converter

8 - Gasket

- ☐ Renew

9 - Support for exhaust manifold

- ☐ Left-side

10 - Exhaust manifold with catalytic converter

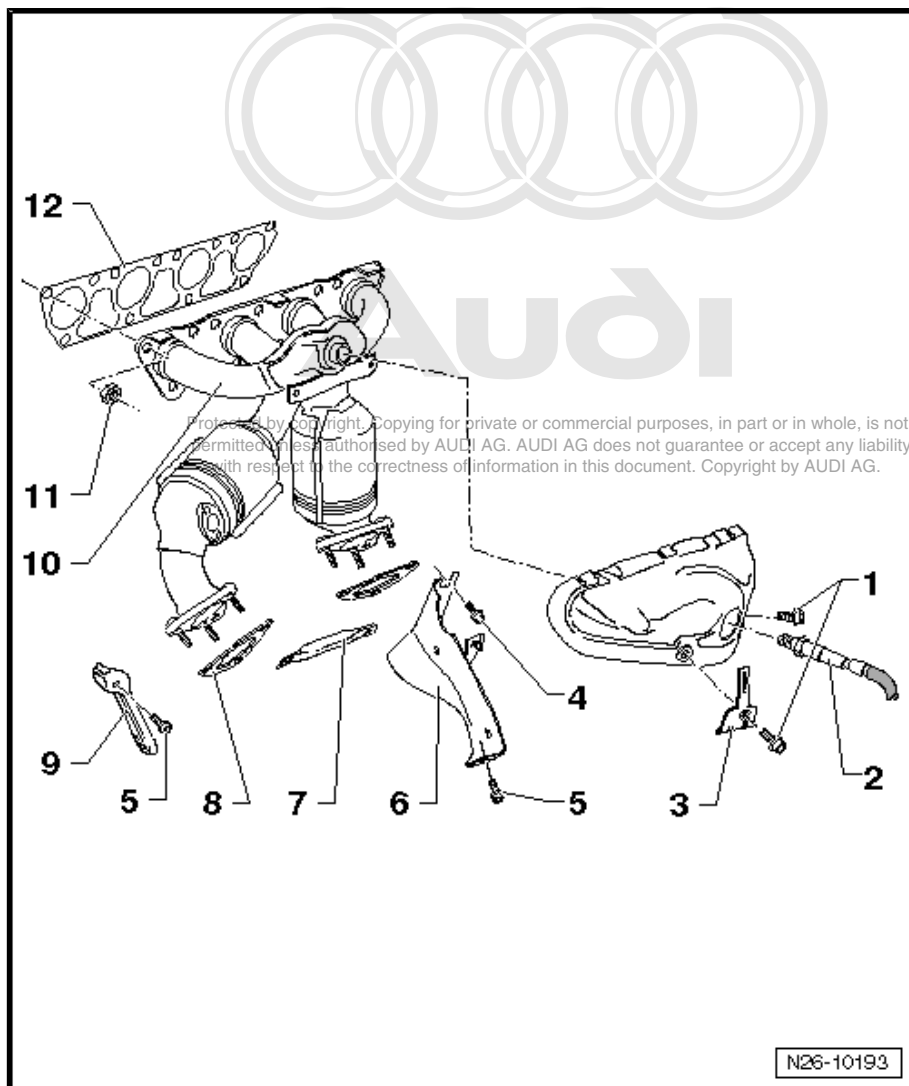
- ☐ Coat studs of exhaust manifold with high-temperature paste
- ☐ Removing and installing
⇒ [page 224](#)

11 - 25 Nm

- ☐ Coat studs of exhaust manifold with high-temperature paste

12 - Gasket

- ☐ Renew



1.3 Exhaust manifold - exploded view, engine code BLY, BVZ

1 - Gasket

- ☐ Renew

2 - Exhaust manifold

- ☐ Coat studs of exhaust manifold with high-temperature paste.
- ☐ Removing and installing
⇒ [page 224](#)

3 - Heat shield

4 - 10 Nm

5 - 40 Nm

6 - 25 Nm

7 - Support for exhaust manifold

- ☐ Right-side

8 - Support

9 - Gasket

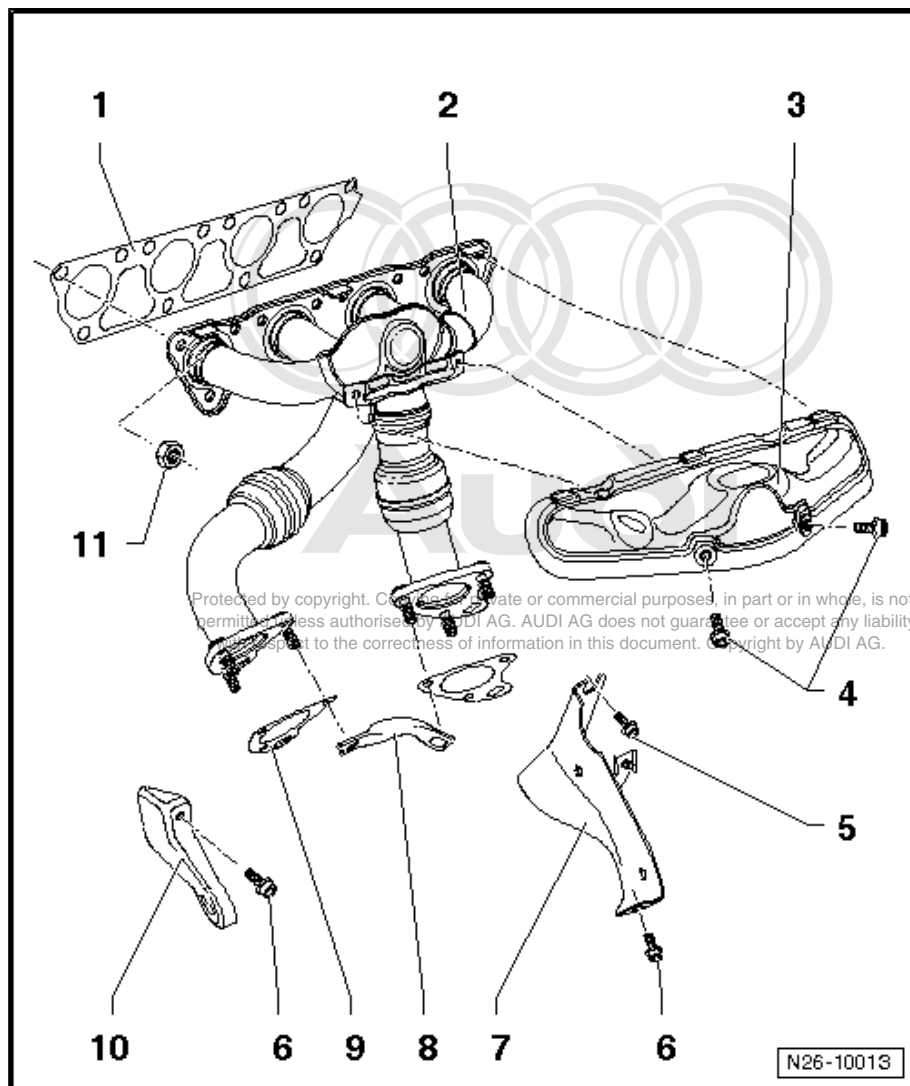
- ☐ Renew

10 - Support for exhaust manifold

- ☐ Left-side

11 - 25 Nm

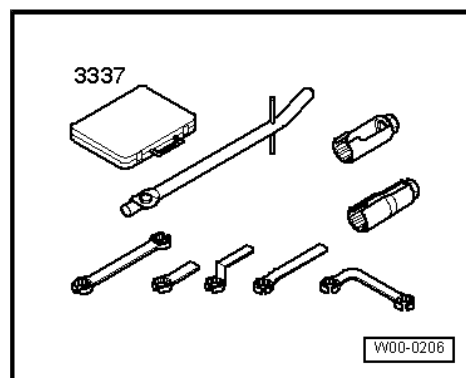
- ☐ Coat studs of exhaust manifold with high-temperature paste.



1.4 Removing and installing exhaust manifold

Special tools and workshop equipment required

- ◆ Lambda probe open ring spanner set -3337-



 Note

- ◆ Vehicles with engine code BLY, BVZ, BHD, BMB comply with emission standard EU 2. On these vehicles some emissions-related components are not fitted, e.g. exhaust gas recirculation system, NOx sensor control unit -J583-, Lambda probe 2 -G108- and Lambda probe 2 after catalytic converter -G131-. Note this when working on the exhaust system.
- ◆ The exhaust manifold is removed from above.

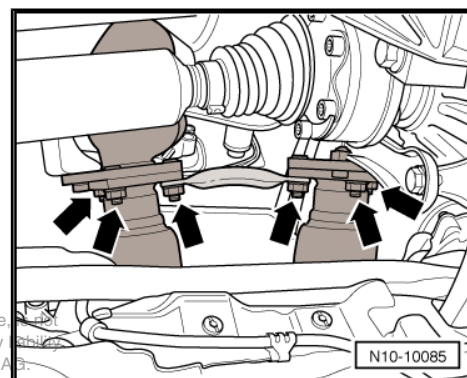
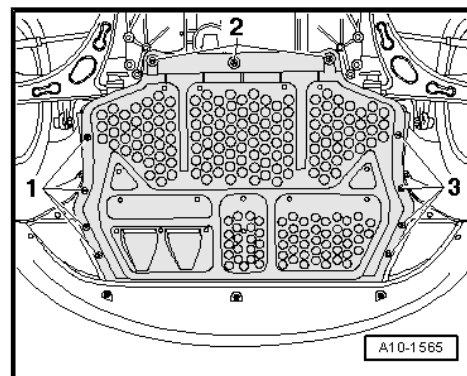
Removing

- Remove noise insulation (centre) - fasteners -1 ... 3-.

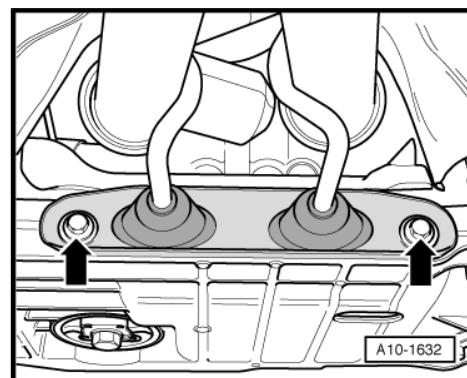
 Note

To avoid damage, the flexible joints in the front exhaust pipe must not be bent more than 10°.

- Remove securing nuts -arrows- on front exhaust pipe/exhaust manifold.

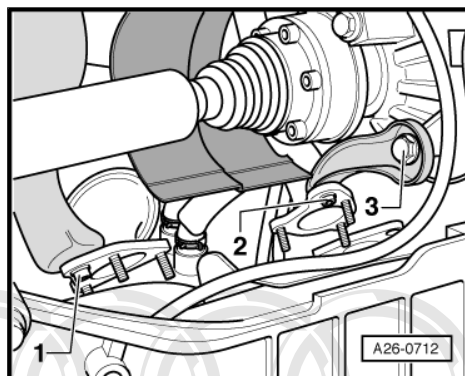


- Unbolt bracket for exhaust system -arrows-.

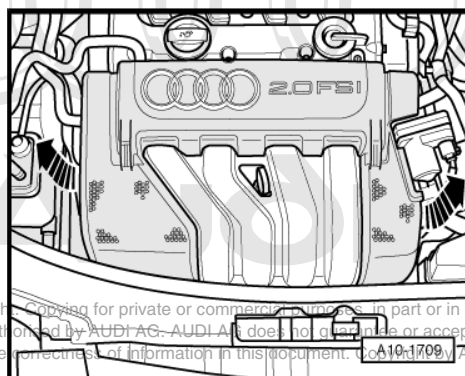


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Loosen bolt -3-.
- Unscrew bolts -1- and -2- securing exhaust manifold support (left and right).

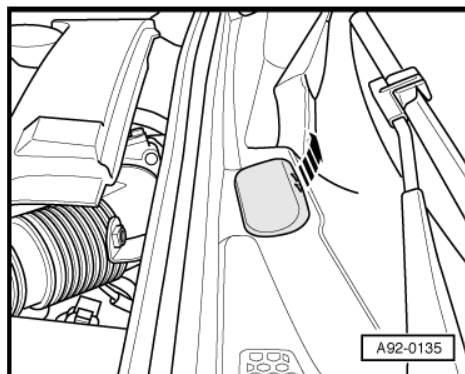


- Lift off engine cover panel -arrows-.
- Use screwdriver to pry off cover caps on wiper arms and unscrew hexagon nuts.
- Pull wiper arms off wiper shafts and remove.



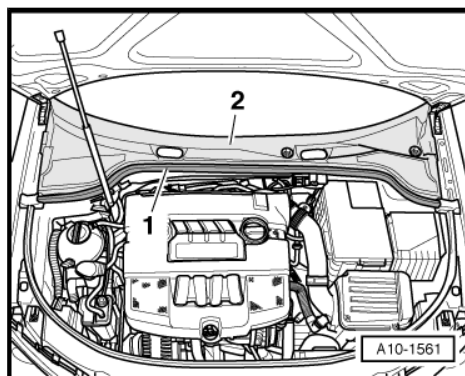
Protected by copyright. Copying for private or commercial purposes in part or in whole, is not permitted unless authorized by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Unclip washer jets -arrow-.
- Push washer jets through assembly opening back into plenum chamber, leaving hoses connected.

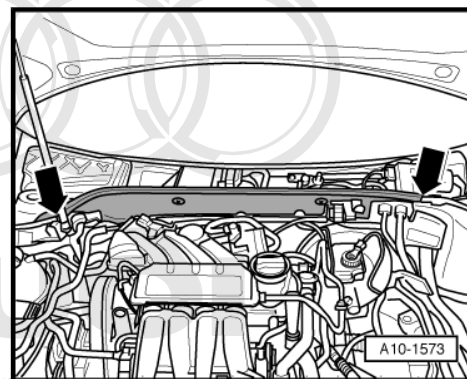


- Pull off rubber seal -1- on plenum chamber cover.
- Detach plenum chamber cover -2-.

Detach engine wiring harness at rear plenum chamber panel.



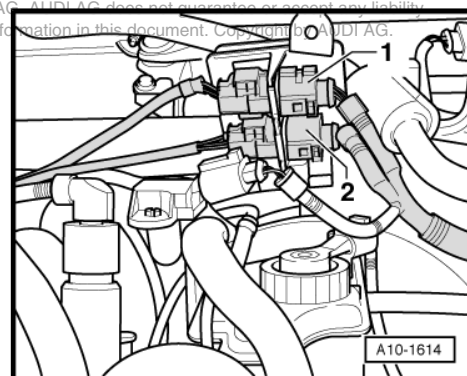
- Remove plenum chamber intermediate plate -arrows-.



- Remove electrical connector -1- for Lambda probe 2 -G108- from bracket and unplug connector.
- Remove electrical connector -2- for Lambda probe -G39- from bracket and unplug connector.

**Note**

Engine code BVY is fitted with only one connector.



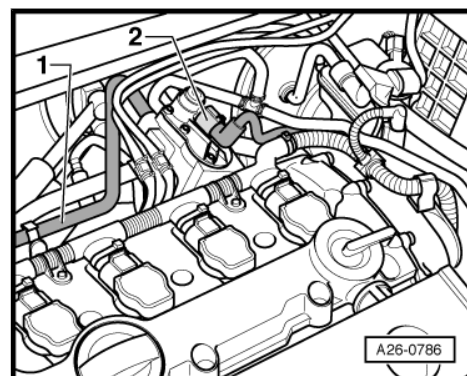
- Unplug electrical connector -1- from exhaust gas recirculation valve with exhaust gas recirculation potentiometer.
- Unclip coolant hose -2-.

Engine code AXW, BLR, BLX:

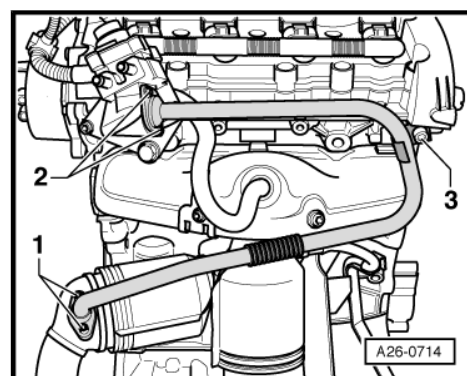
- Remove cable guide ⇒ [Item 3 \(page 222\)](#).

**Note**

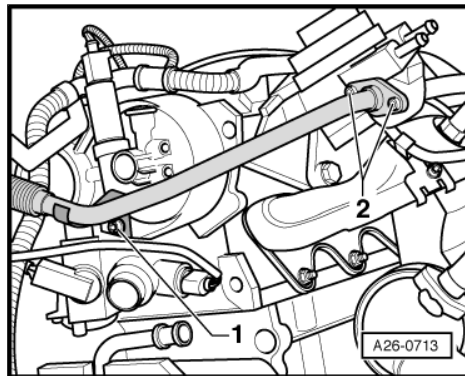
The following removal sequence is shown with the engine removed for ease of illustration.

**All vehicles (continued):**

- Disconnect exhaust gas recirculation pipe -1- from exhaust manifold.
- Disconnect exhaust gas recirculation pipe -2- from exhaust gas recirculation valve.
- Remove exhaust gas recirculation pipe -3-.



- Remove securing bolt -1-.
- Disconnect exhaust gas recirculation pipe -2- from exhaust gas recirculation valve.

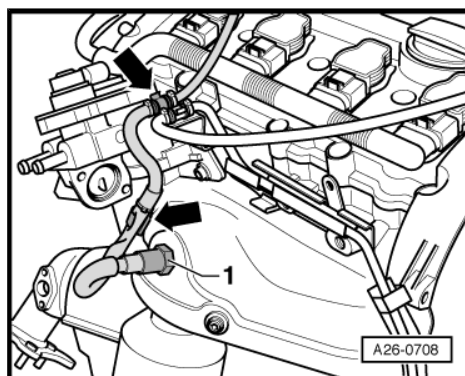


- Move electrical wire of Lambda probe -arrow- clear.
- Remove Lambda probe before catalytic converter -1-.

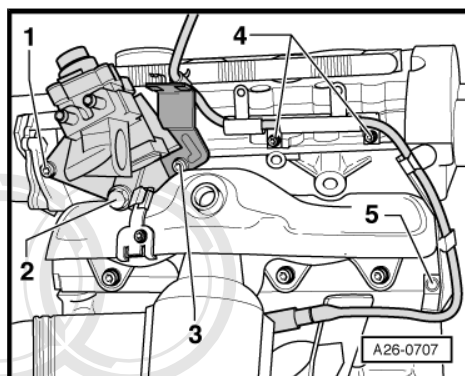


Note

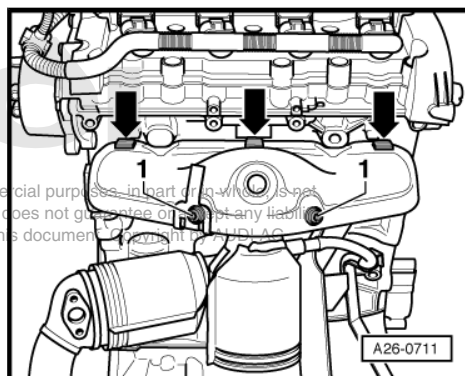
The coolant hoses from the exhaust gas recirculation valve -N18- remain connected.



- Detach exhaust gas recirculation valve -N18- 1 ... 3- and move clear.
- Move electrical wire for Lambda probe (before catalytic converter) clear; unscrew retainers -4- and -5- to do so.



- Remove heat shield above exhaust manifold by removing bolts -1- and detach heat shield -arrows-.



Protected by copyright. Copying for private or commercial purposes in part or in whole is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright © AUDI AG

- Detach the exhaust manifold -arrow- and remove from above.

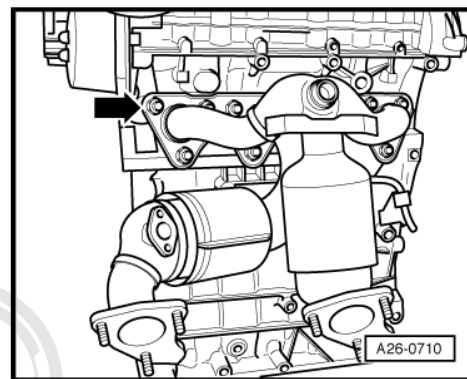
Installing

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



Note

- ◆ Reinstall all cable ties in the same locations when assembling.
- ◆ Renew self-locking nuts and bolts when performing assembly work.
- ◆ Renew all seals and gaskets.
- ◆ Lubricate the threads of the Lambda probe with high-temperature paste. The paste must not penetrate into the slots on the probe body.
- ◆ For high-temperature paste refer to ⇒ Parts catalogue .



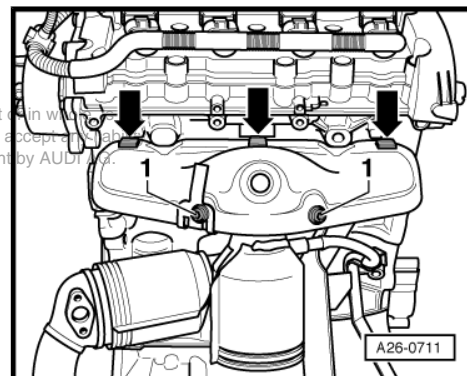
- Fit heat shield -arrows- and bolt heat shield with bracket to exhaust manifold -1-.
- Install Lambda probe ⇒ Rep. gr. 24 .
- Install wiper arms ⇒ Electrical system; Rep. Gr. 92 .

Protected by copyright. Copying for private or commercial purposes, in part or in whole, without the written permission of Audi AG is prohibited. Audi AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by Audi AG.

Tightening torques

Component	Nm
Exhaust manifold to cylinder head	25 ¹⁾ 2)
Heat shield to exhaust manifold	10
Lambda probe	55 ²⁾
Mounting to subframe	25
Front exhaust pipe to exhaust manifold	25 ¹⁾ 2)
EGR connecting pipe to EGR valve	9
EGR connecting pipe to exhaust manifold	9

- ¹⁾ Renew nuts/bolts
- ²⁾ Coat exhaust manifold studs and Lambda probe threads with high-temperature paste; for high-temperature paste refer to ⇒ Parts catalogue



1.5 Exhaust system - exploded view, engine code AXW, BLX

1 - 25 Nm

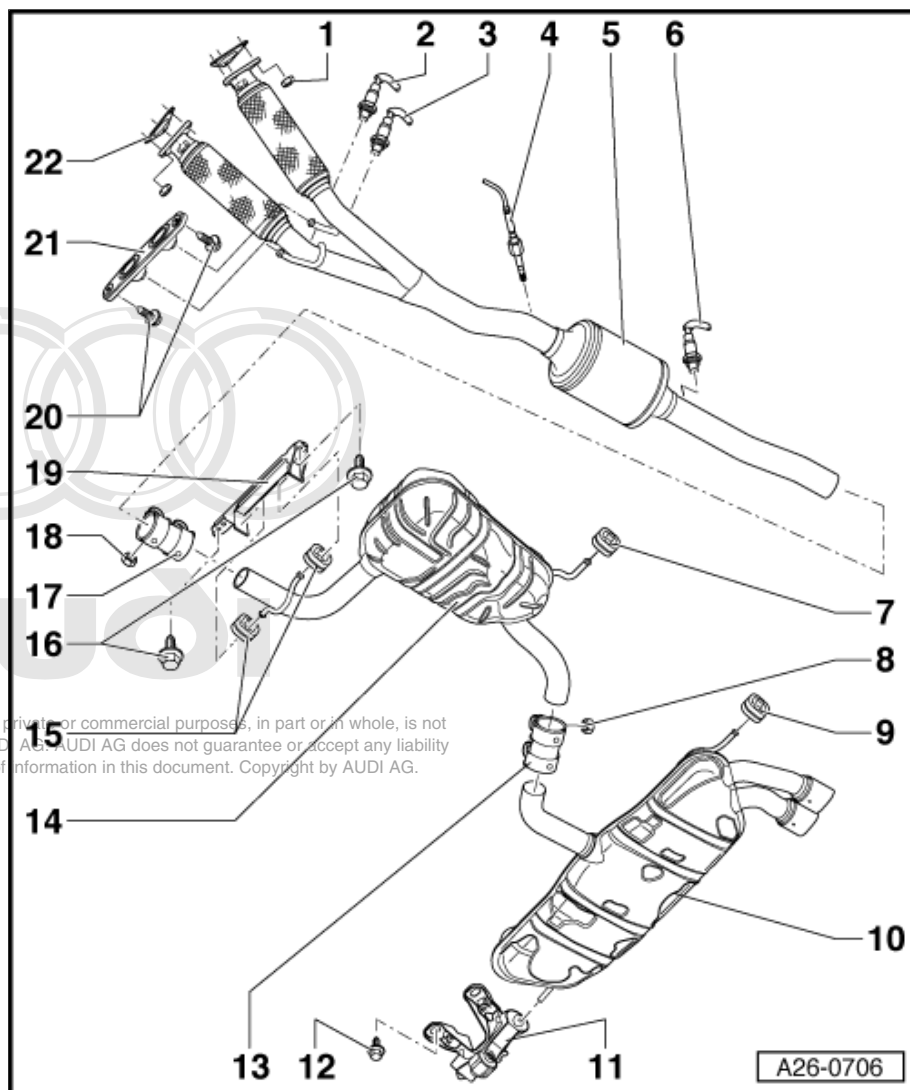
- ☐ Renew
- ☐ Coat studs of exhaust manifold with high-temperature paste
- ☐ High-temperature paste
⇒ Parts catalogue

2 - Lambda probe after catalytic converter -G130-

- ☐ 55 Nm
- ☐ Grease only the threads with high-temperature paste. The paste must not penetrate into the slots on the probe body.
- ☐ High-temperature paste
⇒ Parts catalogue
- ☐ Removing and installing
⇒ Rep. gr. 24
- ☐ Colour of connector:
black

3 - Lambda probe 2 after catalytic converter -G131-

- ☐ 55 Nm
- ☐ Grease only the threads with high-temperature paste. The paste must not penetrate into the slots on the probe body.
- ☐ High-temperature paste
⇒ Parts catalogue
- ☐ Removing and installing
⇒ Rep. gr. 24
- ☐ Colour of connector:



brown

4 - Exhaust gas temperature sender 1 -G235-

- ☐ Tightening torque 45 Nm
- ☐ Removing and installing ⇒ Rep. gr. 24

5 - Catalytic converter

- ☐ With front exhaust pipe
- ☐ Protect against knocks and impact
- ☐ With flexible joint
- ☐ Do not bend flexible joint more than 10° - otherwise it can be damaged
- ☐ Removing and installing ⇒ [page 237](#)
- ☐ Align exhaust system so it is free of stress ⇒ [page 240](#)

6 - NOx sender -G295-

- ☐ Tightening torque 60 Nm
- ☐ Removing and installing ⇒ Rep. gr. 24

7 - Rubber mounting

- ☐ Renew if damaged

8 - 25 Nm

9 - Rubber mounting

- ☐ Renew if damaged

10 - Rear silencer

- ☐ Combined in one unit with centre silencer as original equipment. Can be renewed individually for repair purposes
- ☐ Cutting point ⇒ [page 240](#)
- ☐ Align exhaust system so it is free of stress ⇒ [page 240](#)

11 - Mounting

- ☐ Renew if damaged

12 - 25 Nm

13 - Clamp (rear)

- ☐ For separate replacement of centre and rear silencers
- ☐ Installation position ⇒ [page 232](#)
- ☐ Tighten bolt connections evenly.

14 - Centre silencer

- ☐ Combined in one unit with rear silencer as original equipment. Can be renewed individually for repair purposes
- ☐ Cutting point ⇒ [page 240](#)
- ☐ Align exhaust system so it is free of stress ⇒ [page 240](#)

15 - Rubber mounting

- ☐ Renew if damaged

16 - 25 Nm

17 - Clamp (front)

- ☐ Align exhaust system so it is free of stress before tightening clamp ⇒ [page 240](#)
- ☐ Installation position ⇒ [page 232](#)
- ☐ Tighten bolt connections evenly.

18 - 25 Nm

19 - Mounting

20 - 25 Nm

21 - Mounting

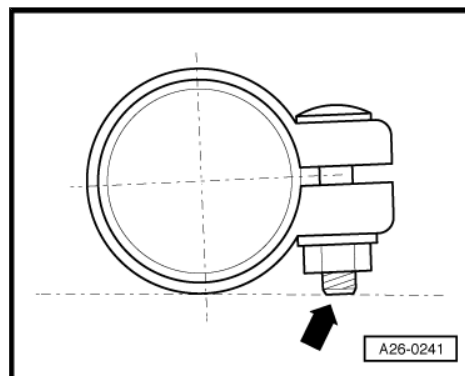
- ☐ Renew if damaged

22 - Gasket

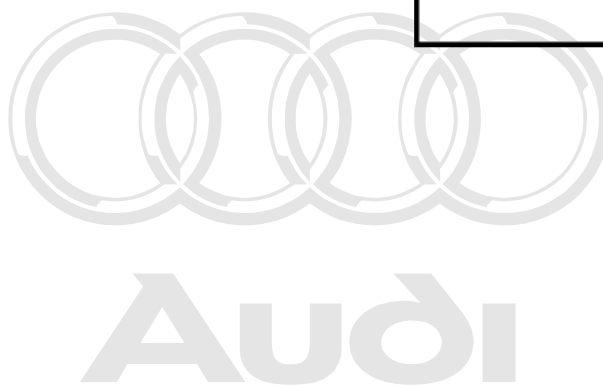
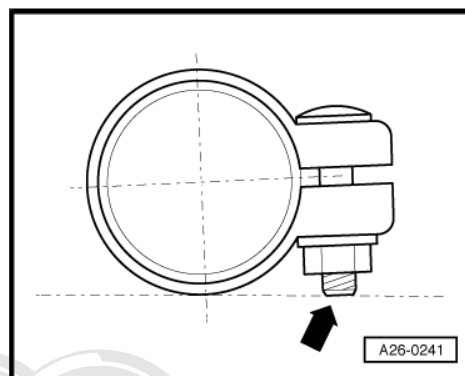
- ☐ Renew

Installation position of front clamp

- Install clamp so that ends of bolts do not protrude beyond bottom of clamp.
- Bolt connection faces to right.

**Installation position of rear clamp**

- Install clamp so that ends of bolts do not protrude beyond bottom of clamp.
- Bolt connection faces to rear



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

1.6 Exhaust system - exploded view, engine code BLR, BVY

1 - 25 Nm

- ☐ Renew
- ☐ Coat studs of exhaust manifold with high-temperature paste

2 - Lambda probe after catalytic converter -G130-

- ☐ 55 Nm
- ☐ Bank 1, probe 2
- ☐ Colour of connector: black
- ☐ Grease only the threads with high-temperature paste. The paste must not penetrate into the slots on the probe body.

3 - Lambda probe 2 after catalytic converter -G131-

- ☐ 55 Nm
- ☐ Engine code BVY: bank 2, probe 1
- ☐ Engine code BLR: bank 2, probe 2
- ☐ Colour of connector: brown
- ☐ Grease only the threads with high-temperature paste. The paste must not penetrate into the slots on the probe body.

4 - Catalytic converter

- ☐ With front exhaust pipe
- ☐ Protect against knocks and impact
- ☐ With flexible joint
- ☐ Do not bend flexible joint more than 10° - otherwise it can be damaged
- ☐ Removing and installing ⇒ [page 237](#)
- ☐ Align exhaust system so it is free of stress ⇒ [page 240](#)

5 - Lambda probe 3 after catalytic converter -G287-

- ☐ 55 Nm
- ☐ Bank 1, probe 3
- ☐ Colour of connector: grey
- ☐ Grease only the threads with high-temperature paste. The paste must not penetrate into the slots on the probe body.

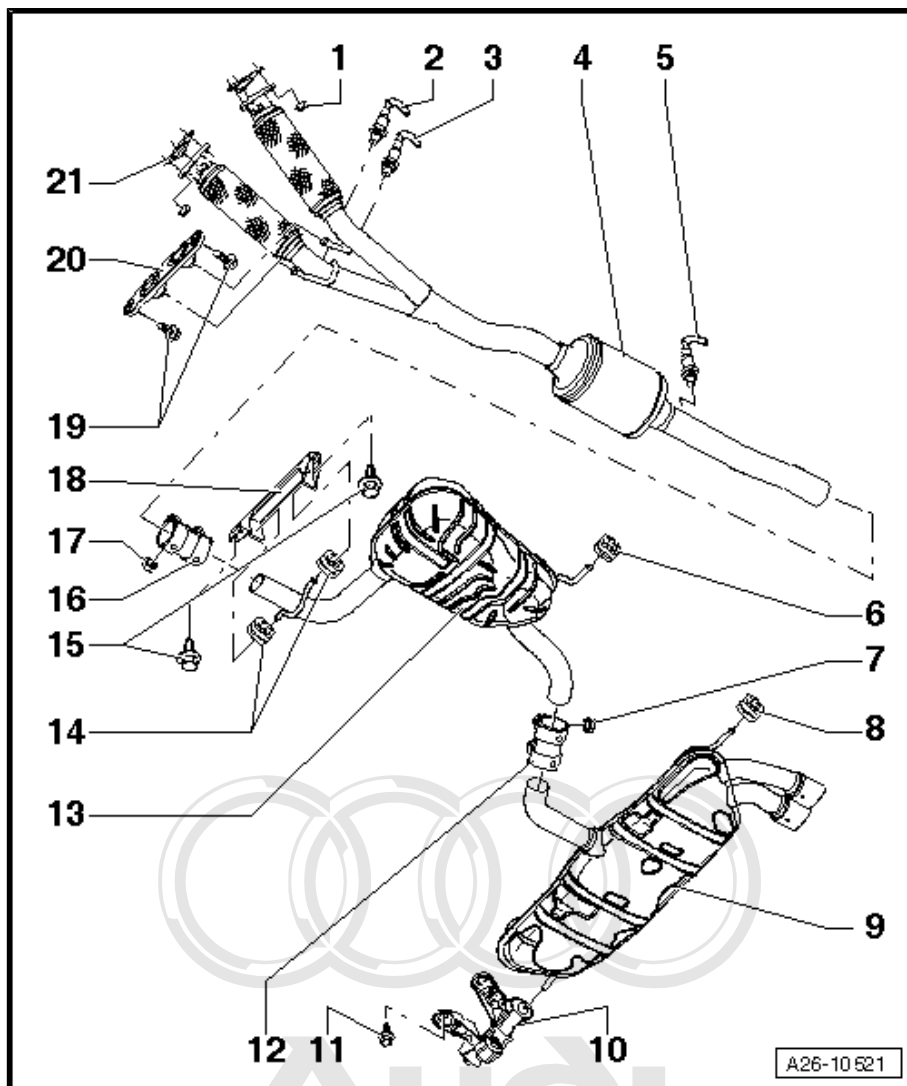
6 - Rubber mounting

- ☐ Renew if damaged

7 - 25 Nm

8 - Rubber mounting

- ☐ Renew if damaged



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

9 - Rear silencer

- ☐ Combined in one unit with centre silencer as original equipment. Can be renewed individually for repair purposes
- ☐ Align exhaust system so it is free of stress ⇒ [page 240](#)
- ☐ Separating exhaust system ⇒ [page 239](#)

10 - Mounting

- ☐ Renew if damaged

11 - 25 Nm

12 - Clamp (rear)

- ☐ For separate replacement of centre and rear silencers
- ☐ Installation position ⇒ [page 235](#)
- ☐ Tighten bolt connections evenly.

13 - Centre silencer

- ☐ Combined in one unit with rear silencer as original equipment. Can be renewed individually for repair purposes
- ☐ Align exhaust system so it is free of stress ⇒ [page 240](#)
- ☐ Separating exhaust system ⇒ [page 239](#)

14 - Rubber mounting

- ☐ Renew if damaged

15 - 25 Nm

16 - Clamp (front)

- ☐ Align exhaust system so it is free of stress before tightening clamp ⇒ [page 240](#)
- ☐ Installation position ⇒ [page 234](#)
- ☐ Tighten bolt connections evenly.

17 - 25 Nm

18 - Mounting

19 - 25 Nm

20 - Mounting

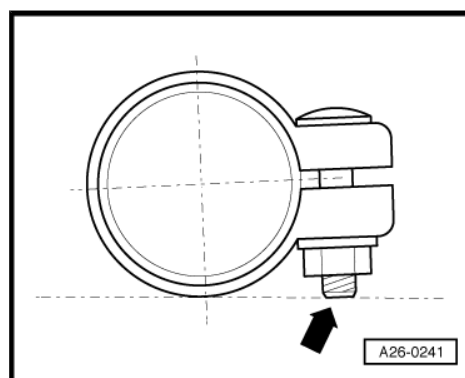
- ☐ Renew if damaged

21 - Gasket

- ☐ Renew

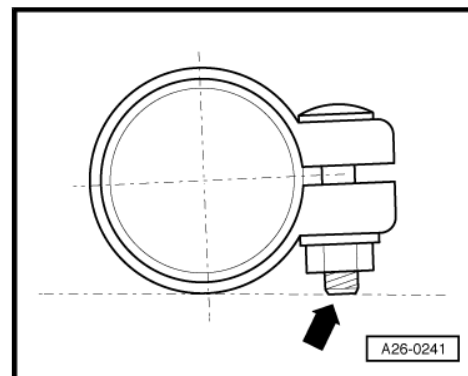
Installation position of front clamp

- Install clamp so that ends of bolts do not protrude beyond bottom of clamp.
- Bolt connection faces to right.



Installation position of rear clamp

- Install clamp so that ends of bolts do not protrude beyond bottom of clamp.
- Bolt connection faces to rear



1.7 Exhaust system - exploded view, engine code BLY, BVZ, BMB, BHD

1 - 25 Nm

- ☐ Renew
- ☐ Coat studs of exhaust manifold with high-temperature paste
- ☐ High-temperature paste
⇒ Parts catalogue

2 - Lambda probe -G39-

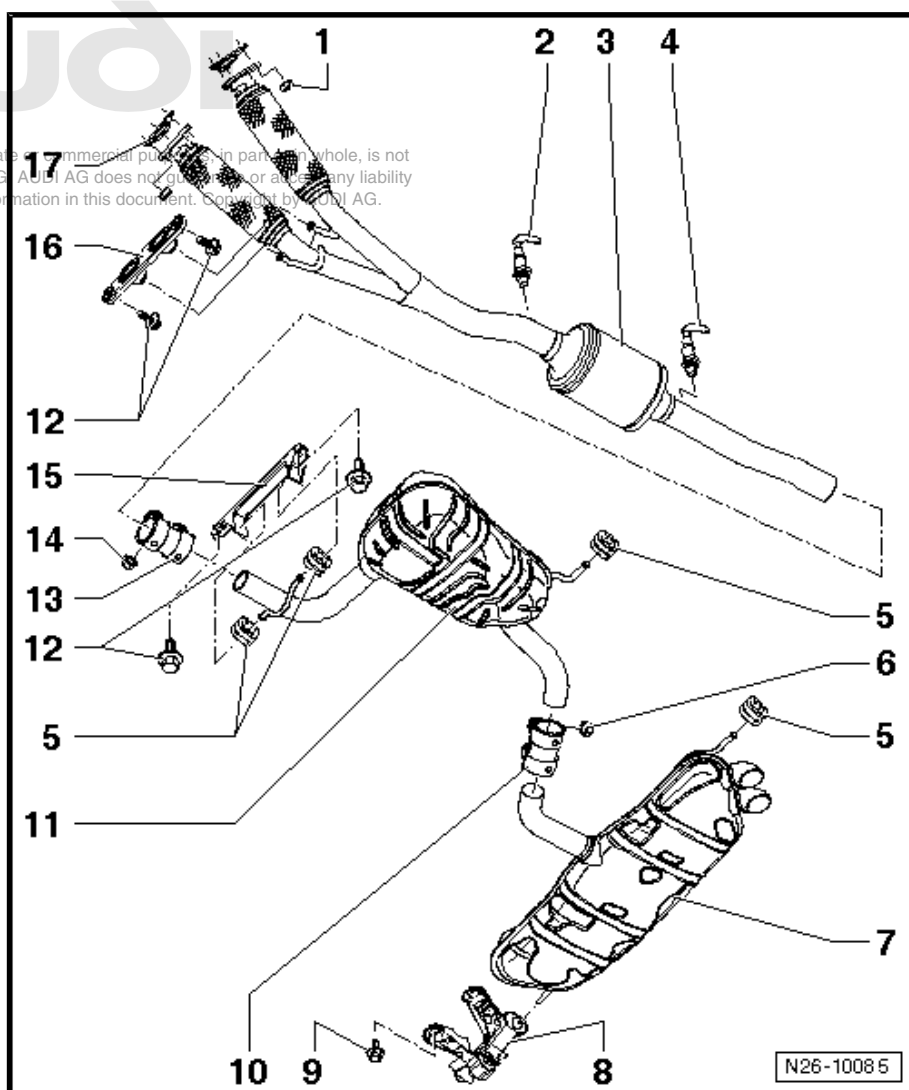
- ☐ 55 Nm
- ☐ Grease only the threads with high-temperature paste. The paste must not penetrate into the slots on the probe body.
- ☐ High-temperature paste
⇒ Parts catalogue
- ☐ Removing and installing
⇒ Rep. gr. 24
- ☐ Colour of connector: black

3 - Catalytic converter

- ☐ With front exhaust pipe
- ☐ Protect against knocks and impact
- ☐ With flexible joint
- ☐ Do not bend flexible joint more than 10° - otherwise it can be damaged
- ☐ Removing and installing
⇒ [page 237](#)
- ☐ Align exhaust system so it is free of stress
⇒ [page 240](#)

4 - Lambda probe after catalytic converter -G130-

- ☐ 55 Nm
- ☐ Grease only the threads with high-temperature paste. The paste must not penetrate into the slots on the probe body.
- ☐ High-temperature paste ⇒ Parts catalogue
- ☐ Removing and installing ⇒ Rep. gr. 24
- ☐ Colour of connector: brown



5 - Rubber mounting

- ☐ Renew if damaged

6 - 25 Nm

7 - Rear silencer

- ☐ Combined in one unit with centre silencer as original equipment. Can be renewed individually for repair purposes
- ☐ Align exhaust system so it is free of stress ⇒ [page 240](#)
- ☐ Separating exhaust system ⇒ [page 240](#)

8 - Mounting

- ☐ Renew if damaged

9 - 25 Nm

10 - Clamp (rear)

- ☐ For separate replacement of centre and rear silencers
- ☐ Installation position ⇒ [page 237](#)
- ☐ Tighten bolt connections evenly.

11 - Centre silencer

- ☐ Combined in one unit with rear silencer as original equipment. Can be renewed individually for repair purposes
- ☐ Align exhaust system so it is free of stress ⇒ [page 240](#)
- ☐ Separating exhaust system ⇒ [page 240](#)

12 - 25 Nm

13 - Clamp (front)

- ☐ Align exhaust system so it is free of stress before tightening clamp ⇒ [page 240](#)
- ☐ Installation position ⇒ [page 236](#)
- ☐ Tighten bolt connections evenly.

14 - 25 Nm

15 - Mounting

16 - Mounting

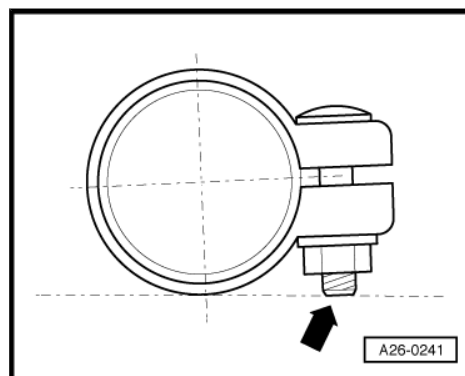
- ☐ Renew if damaged

17 - Gasket

- ☐ Renew

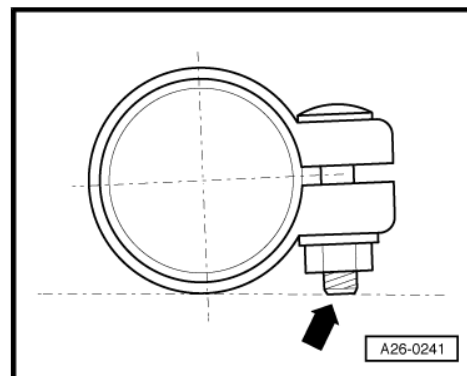
Installation position of front clamp

- Install clamp so that ends of bolts do not protrude beyond bottom of clamp.
- Bolt connection faces to right.



Installation position of rear clamp

- Install clamp so that ends of bolts do not protrude beyond bottom of clamp.
- Bolt connection faces to rear



1.8 Removing and installing front exhaust pipe with catalytic converter

Removing

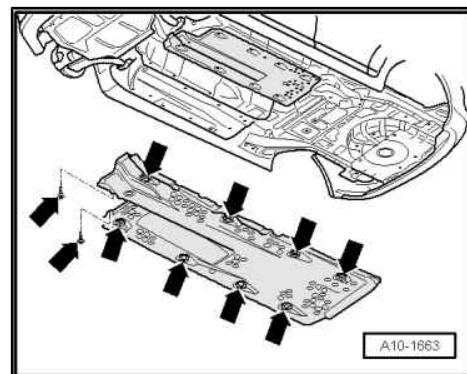


Note

Vehicles with engine code BLY, BVZ, BHD, BMB comply with emission standard EU 2. On these vehicles some emissions-related components are not fitted, e.g. exhaust gas recirculation system, NOx sensor control unit -J583-, Lambda probe 2 -G108- and Lambda probe 2 after catalytic converter -G131-. Note this when working on the exhaust system.

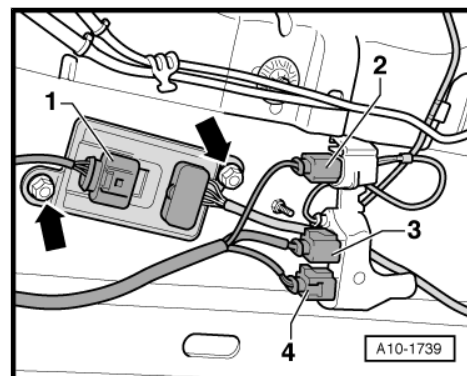
- Remove underbody cover (right-side) -arrows-.

Engine code AXW, BLX:



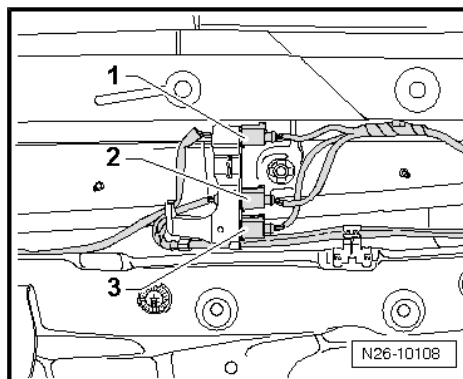
- Unplug electrical connector -1- from NOx sensor control unit -J583-.
- Detach NOx sensor control unit -J583- -arrows- and move wiring with control unit clear.
- Unplug electrical connector -2- for exhaust gas temperature sender 1 -G235- and move wiring clear.
- Unplug electrical connector (black) -3- for Lambda probe after catalytic converter -G130- and move wiring clear.
- Unplug electrical connector (brown) -4- for Lambda probe 2 after catalytic converter -G131- and move wiring clear.

Engine codes BLR, BLY, BVY, BVZ, BHD, BMB:



- Unplug electrical connectors for Lambda probes.

All vehicles (continued):

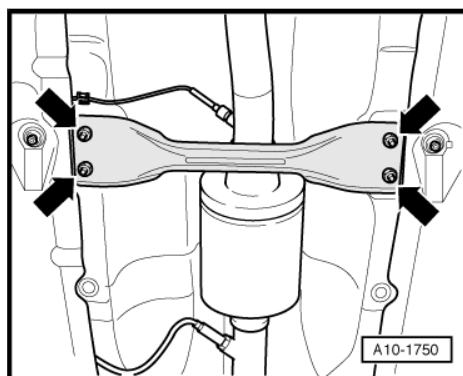


- Remove front cross-piece for underbody -arrows-.

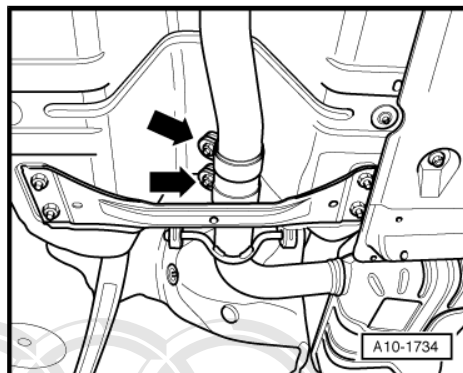


Note

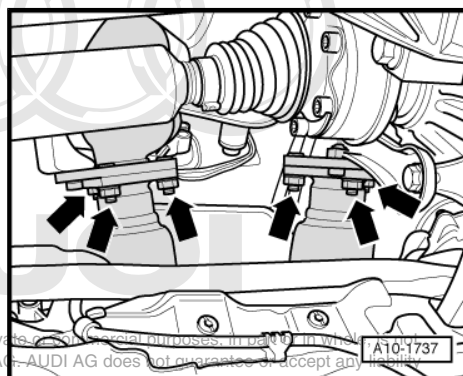
To avoid damage, the flexible joints in the front exhaust pipe must not be bent more than 10°.



- Separate exhaust system at clamp -arrows-.



- Remove securing nuts -arrows- on front exhaust pipe/exhaust manifold.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Unbolt bracket for exhaust system -arrows-.
- Detach front exhaust pipe with catalytic converter.

Installing

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



Note

Renew gaskets and self-locking nuts.

- Align the exhaust system so it is free of stress ⇒ [page 240](#).

Tightening torques

Component	Nm
Front exhaust pipe to exhaust manifold	25 ¹⁾ 2
Drive shaft heat shield to cylinder block	35
Front tunnel cross-piece to body	23

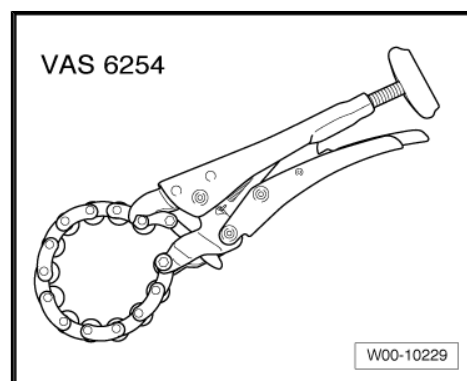
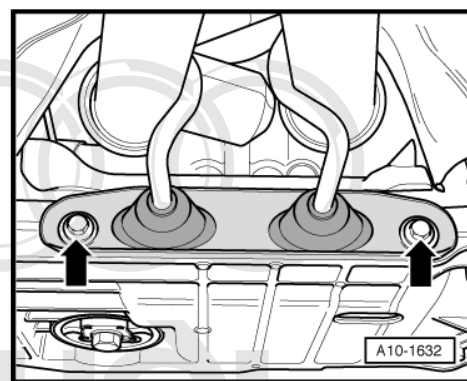
- 1) Renew nuts/bolts
- 2) Lubricate exhaust manifold studs with high-temperature paste. For high-temperature paste refer to ⇒ Parts catalogue.

1.9 Separating centre and rear silencers

- ◆ Vehicles with front-wheel drive only
- ◆ The connecting pipe can be cut through at the cutting point provided in order to renew the centre and rear silencers separately.
- ◆ The cutting point is marked by an indentation on the outside of the exhaust pipe.

Special tools and workshop equipment required

- ◆ Chain pipe cutter -VAS 6254-



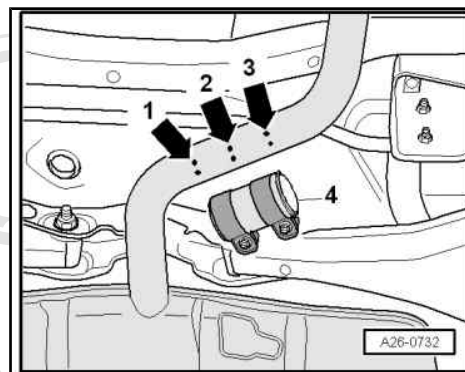
Procedure



WARNING

Wear safety goggles and protective clothing to avoid any risk of injury from sharp metal parts.

- Cut through exhaust pipe at the position marked -arrow 2- using chain pipe cutter -VAS 6254- .
- Position clamp -4- at side marks when installing - arrows -1- and -3-.

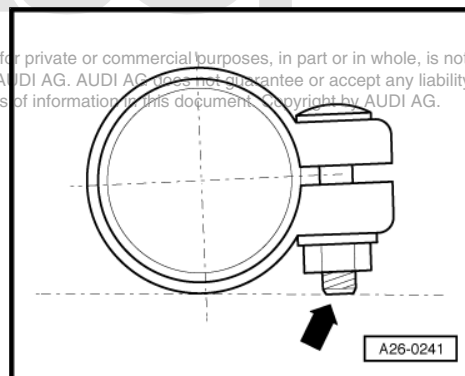


- Install clamp so that the bolt ends do not protrude beyond bottom of clamp -arrow-.
- Bolt connection faces to rear
- Align the exhaust system so it is free of stress ⇒ [page 240](#) .

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

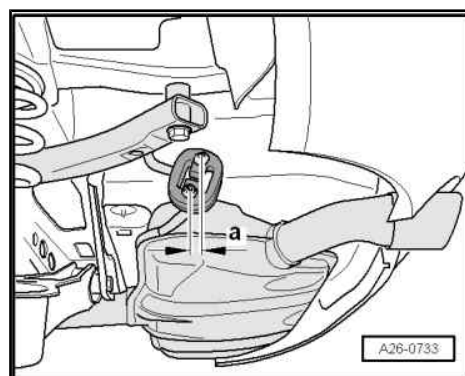
Tightening torques

Component	Nm
Clamp	25



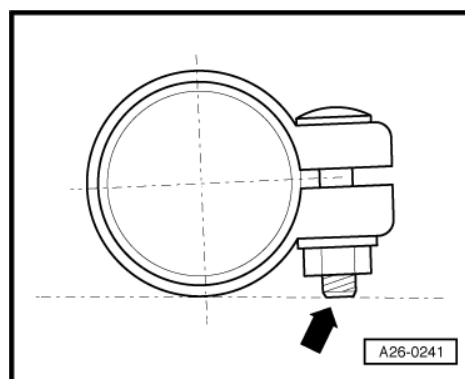
1.10 Stress-free alignment of exhaust system

- The exhaust system must be aligned when it is cool.
- Loosen bolt connections of front clamp
⇒ [Item 17 \(page 231\)](#) .
- Push exhaust system towards front of vehicle -arrow-, so that mounting for rear silencer is preloaded by $a = 5 \dots 11 \text{ mm}$.

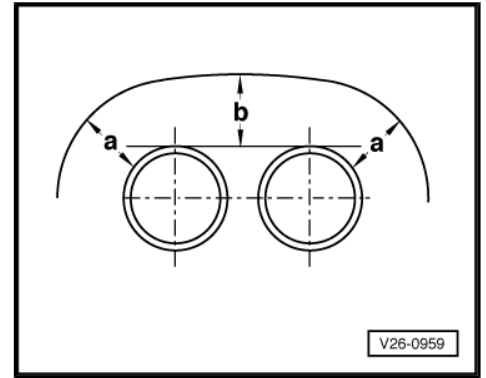


- Fit clamp so that end of bolt does not protrude beyond bottom of clamp.
- Bolt connection faces to right.
- Tighten bolts on clamp evenly to 25 Nm.

Aligning tailpipe:



- Align tailpipes so that distance -a- (left-side) is the same as distance -a- (right-side).
- At the same time, distance -b- must be obtained between bumper cut-out and top of tailpipes:
- ◆ Dimension b = at least 22 mm
- If necessary, unfasten rear silencer mounting to align tailpipes.



1.11 Checking exhaust system for leaks

- Start engine and run at idling speed.
- Plug the tailpipe (e. g. with rags or stopper) and leave plugged until the check is complete.
- Listen for noise at connection points (cylinder head/exhaust manifold, exhaust manifold/front exhaust pipe, etc.) to locate any leaks.
- Rectify any leaks that are found.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

2 Exhaust gas recirculation system, engine code AXW, BLX, BLR, BVY



Note

- ◆ *Under certain operating conditions, exhaust gas is fed into the intake air via the exhaust gas recirculation valve. By means of this mixture, a lowering of the combustion temperature and consequently an improvement of the exhaust gas composition is achieved.*
- ◆ *The exhaust gas recirculation valve is activated by the engine control unit.*
- ◆ *Pulsed actuation makes it possible to obtain any required valve position.*
- ◆ *The exhaust gas recirculation potentiometer signals the current position of the exhaust gas recirculation valve to the engine control unit. The valve and the potentiometer are integrated in a single component.*
- ◆ *If the exhaust gas recirculation valve is blocked in the open position, this is noticeable due to poor idling characteristics.*

Exhaust gas recirculation system - exploded view ⇒ [page 242](#)

2.1 Exhaust gas recirculation system - exploded view

1 - 10 Nm

2 - Connecting pipe

3 - Gasket

☐ Renew

4 - 5 Nm

5 - Bracket

6 - 15 Nm

7 - Exhaust gas recirculation valve -N18-

☐ With exhaust gas recirculation potentiometer - G212-☐ Adapt to engine control unit after renewal. ⇒ Vehicle diagnostic tester; „Guided Function“

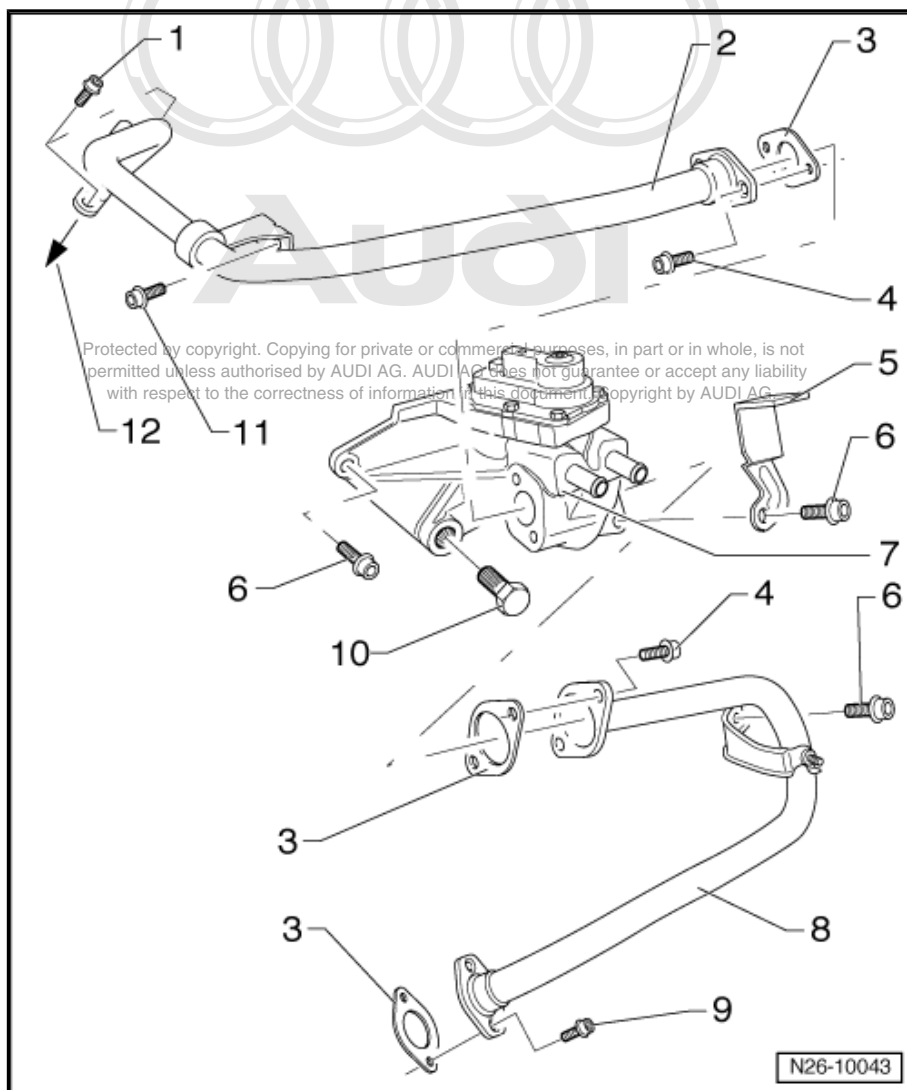
8 - Connecting pipe

9 - 15 Nm

10 - 25 Nm

11 - 10 Nm

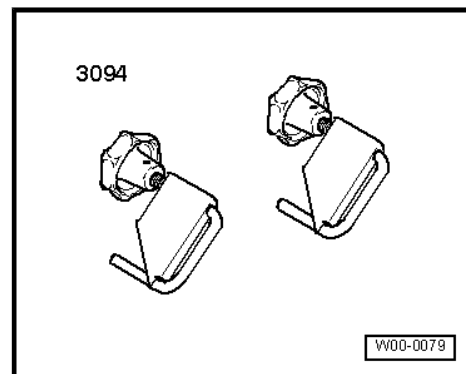
12 - To intake manifold



2.2 Exhaust gas recirculation valve -N18- with exhaust gas recirculation potentiometer -G212-

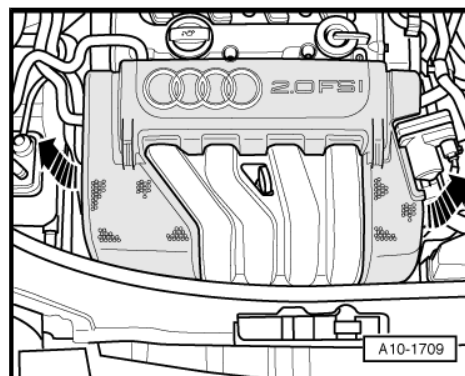
Special tools and workshop equipment required

◆ Special tool 3094

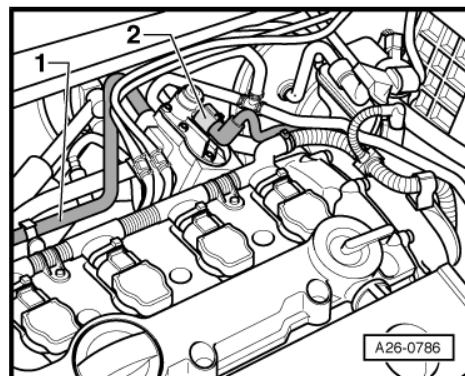


Removing

- Lift off engine cover panel -arrows-.



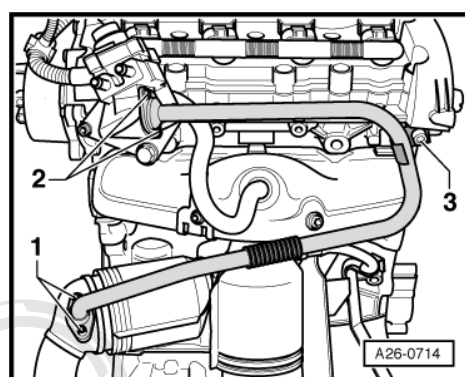
- Clamp off coolant hoses going to exhaust gas recirculation valve with hose clamps up to Ø 25 mm -3094- .
- Detach the coolant pipes -1- from the exhaust gas recirculation valve.
- Unplug electrical connector -2- from exhaust gas recirculation valve with exhaust gas recirculation potentiometer.



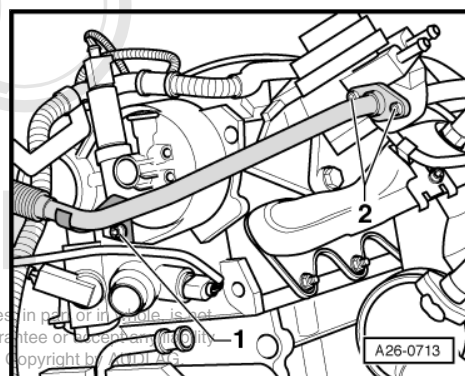
Note

The following removal sequence is shown with the engine removed for ease of illustration.

- Disconnect exhaust gas recirculation pipe -2- from exhaust gas recirculation valve.



- Remove securing bolt -1-.
- Disconnect exhaust gas recirculation pipe -2- from exhaust gas recirculation valve.



Protected by copyright. Copying for private or commercial purposes in print or in electronic form is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept liability with respect to the correctness of information in this document. Copyright by AUDI AG

- Remove exhaust gas recirculation valve -1 ... 3- and move clear.

Installing

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



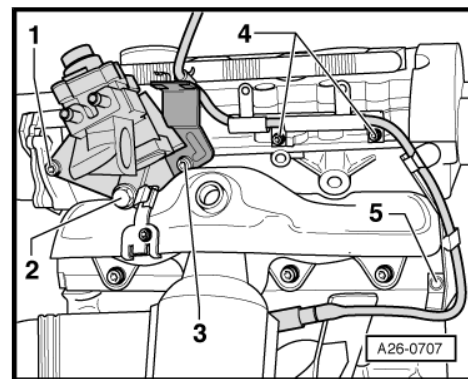
Note

- ◆ Reinstall all cable ties in the same locations when assembling.
- ◆ Renew self-locking nuts and bolts when performing assembly work.
- ◆ Renew all seals and gaskets.

- Fill up with coolant ⇒ [page 190](#) .

Tightening torques

Component		Nm
EGR connecting pipe to EGR valve		9
Exhaust gas recirculation valve	M8	23
	M10	40



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.