

## Workshop Manual Audi A3 2004 ➤

4-cylinder direct injection engine (1.8 ltr., 2.0 ltr. 4-valve TFSI)

Engine ID	BYT	BZB	CAW B	CBF A	CCT A	CCZ A	CDA A	BPU	
-----------	-----	-----	----------	----------	----------	----------	----------	-----	--

Edition 09.2016



# 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.

## 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

21 - Turbocharging/supercharging

24 - Mixture preparation - injection

26 - Exhaust system

28 - Ignition 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

<b>00 - Technical data</b> .....	<b>1</b>
<b>1 Identification</b> .....	<b>1</b>
1.1 Engine identification number/engine data .....	1
<b>2 Safety precautions</b> .....	<b>2</b>
2.1 Safety precautions when working on the fuel supply system .....	2
2.2 Safety precautions when working on vehicles with start/stop system .....	2
2.3 Safety precautions when using testers and measuring instruments during a road test .....	3
2.4 Safety precautions when working on the subframe .....	3
2.5 Safety precautions when working on the ignition system .....	3
2.6 Safety precautions when working on the cooling system .....	4
<b>3 General repair instructions</b> .....	<b>5</b>
3.1 Rules for cleanliness .....	5
3.2 Foreign particles in engine .....	5
3.3 Contact corrosion .....	5
3.4 Routing and attachment of pipes, hoses and wiring .....	6
3.5 Installing radiators, condensers and charge air coolers .....	6
3.6 Checking vacuum system .....	6
<b>10 - Removing and installing engine</b> .....	<b>7</b>
<b>1 Removing engine</b> .....	<b>7</b>
<b>2 Separating engine and manual gearbox</b> .....	<b>27</b>
<b>3 Separating engine and dual clutch gearbox</b> .....	<b>29</b>
<b>4 Securing engine to assembly stand</b> .....	<b>32</b>
<b>5 Installing engine</b> .....	<b>34</b>
<b>6 Assembly mountings</b> .....	<b>39</b>
6.1 Exploded view - assembly mountings .....	39
6.2 Checking adjustment of assembly mountings (engine/gearbox mountings) .....	40
6.3 Adjusting assembly mountings .....	40
<b>13 - Crankshaft group</b> .....	<b>47</b>
<b>1 Cylinder block (pulley end)</b> .....	<b>47</b>
1.1 Exploded view - poly V-belt drive .....	47
1.2 Removing and installing poly V-belt .....	49
1.3 Removing and installing tensioner for poly V-belt .....	51
1.4 Removing and installing bracket for ancillaries .....	54
1.5 Removing and installing vibration damper .....	55
<b>2 Cylinder block (gearbox end)</b> .....	<b>63</b>
2.1 Exploded view - cylinder block (gearbox end) .....	63
2.2 Removing and installing dual-mass flywheel .....	64
2.3 Removing and installing sealing flange (gearbox end) .....	65
<b>3 Crankshaft</b> .....	<b>68</b>
3.1 Exploded view - crankshaft .....	68
3.2 Removing and installing sender wheel .....	69
3.3 Allocation of main bearing shells .....	70
3.4 Crankshaft dimensions .....	71
3.5 Measuring axial clearance of crankshaft .....	71
3.6 Measuring radial clearance of crankshaft .....	72
3.7 Extracting and driving in needle bearing for crankshaft .....	73
<b>4 Balance shaft</b> .....	<b>76</b>
4.1 Exploded view - balance shaft .....	76
4.2 Removing and installing balance shaft .....	77



4.3	Renewing oil seal for balance shaft (inlet side)	83
<b>5</b>	<b>Pistons and conrods</b>	<b>85</b>
5.1	Exploded view - pistons and conrods	85
5.2	Removing and installing pistons	86
5.3	Separating parts of new conrod	88
5.4	Checking pistons and cylinder bores	88
5.5	Measuring radial clearance of conrods	90
<b>15</b>	<b>Cylinder head, valve gear</b>	<b>91</b>
<b>1</b>	<b>Timing chain cover, camshaft control valve 1 N205</b>	<b>91</b>
1.1	Exploded view - timing chain cover, camshaft control valve 1 N205	91
1.2	Removing and installing camshaft control valve 1 N205	93
1.3	Removing and installing timing chain cover (top)	93
1.4	Renewing timing chain cover (bottom)	94
1.5	Renewing oil seal for vibration damper	98
<b>2</b>	<b>Chain drive</b>	<b>101</b>
2.1	Exploded view - camshaft timing chain	101
2.2	Removing and installing bearing saddle	102
2.3	Removing and installing camshaft timing chain	106
2.4	Exploded view - balance shaft timing chain	116
2.5	Removing and installing drive chain for balance shaft	118
2.6	Checking valve timing	120
<b>3</b>	<b>Cylinder head</b>	<b>123</b>
3.1	Exploded view - cylinder head, engine codes BYT, BPU	123
3.2	Removing and installing cylinder head, engine codes BYT, BPU	126
3.3	Exploded view - cylinder head, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA	148
3.4	Removing and installing cylinder head, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA	151
<b>4</b>	<b>Checking compression</b>	<b>173</b>
<b>5</b>	<b>Valve gear</b>	<b>175</b>
5.1	Exploded view - valve gear, engine codes BYT, BPU	175
5.2	Removing and installing camshafts, engine codes BYT, BPU	178
5.3	Exploded view - valve gear, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA	193
5.4	Removing and installing camshafts, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA	195
5.5	Renewing valve stem oil seals with cylinder head installed	209
5.6	Renewing valve stem oil seals with cylinder head removed	213
5.7	Checking valve guides	217
<b>17</b>	<b>Lubrication</b>	<b>218</b>
<b>1</b>	<b>Sump and oil pump</b>	<b>218</b>
1.1	Exploded view - sump/oil pump	218
1.2	Removing and installing oil level and oil temperature sender G266	222
1.3	Removing and installing coarse oil separator, engine codes BYT, BPU	222
1.4	Removing and installing coarse oil separator, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA	223
1.5	Removing and installing sump (bottom section)	223
1.6	Removing and installing oil pump	226
1.7	Removing and installing sump (top section)	228
1.8	Removing and installing valve for oil pressure control N428, engine codes CDAA, CCZA	233
<b>2</b>	<b>Oil filter, engine oil cooler and oil pressure switch - engine codes BYT, BPU, BZB, CAWB, CBFA, CCTA</b>	<b>234</b>
2.1	Exploded view - oil filter, engine oil cooler, oil pressure switch	234
2.2	Removing and installing engine oil cooler	235

2.3	Checking oil pressure and oil pressure switch	236
2.4	Engine oil	237
2.5	Checking oil level	237
<b>3</b>	<b>Oil filter, engine oil cooler and oil pressure switches - engine codes CDAA, CCZA</b>	<b>238</b>
3.1	Exploded view - oil filter, engine oil cooler, oil pressure switches	238
3.2	Removing and installing engine oil cooler	239
3.3	Removing and installing oil pressure switch F22	240
3.4	Removing and installing oil pressure switch for reduced oil pressure F378	241
3.5	Checking oil pressure switch	242
3.6	Checking oil pressure	242
3.7	Engine oil	243
3.8	Checking oil level	243
<b>19</b>	<b>Cooling</b>	<b>244</b>
<b>1</b>	<b>Parts of cooling system (on engine)</b>	<b>244</b>
1.1	Connection diagram - coolant hoses	244
1.2	Draining and filling cooling system	247
1.3	Checking cooling system for leaks	252
<b>2</b>	<b>Coolant pump/thermostat assembly</b>	<b>255</b>
2.1	Exploded view - coolant pump/thermostat	255
2.2	Exploded view - continued coolant circulation pump V51	257
2.3	Removing and installing continued coolant circulation pump V51	257
2.4	Removing and installing toothed belt for coolant pump	258
2.5	Removing and installing coolant pump	261
2.6	Removing and installing thermostat	263
2.7	Checking thermostat	266
2.8	Removing and installing coolant temperature sender G62	266
<b>3</b>	<b>Coolant pipes</b>	<b>269</b>
3.1	Exploded view - coolant pipes	269
3.2	Removing and installing coolant pipes (front)	269
3.3	Removing and installing small coolant pipe	273
<b>4</b>	<b>Radiator/radiator fans</b>	<b>275</b>
4.1	Exploded view - radiator and radiator fans	275
4.2	Removing and installing radiator cowl	277
4.3	Removing and installing radiator fans	279
4.4	Removing and installing radiator	279
4.5	Installing radiator identification sensor G611 , engine codes CBFA, CCTA	281
<b>21</b>	<b>Turbocharging/supercharging</b>	<b>282</b>
<b>1</b>	<b>Turbocharger</b>	<b>282</b>
1.1	Exploded view - turbocharger	282
1.2	Fitting hose connections with plug-in connectors	288
1.3	Removing and installing turbocharger, engine codes BYT, BPU	288
1.4	Checking vacuum unit for turbocharger, engine codes BYT, BPU	294
1.5	Removing and installing turbocharger, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA	296
1.6	Checking vacuum unit for turbocharger, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA	302
1.7	Removing and installing vacuum unit for turbocharger (1.8 ltr. engine only)	304
1.8	Adjusting vacuum unit for turbocharger (1.8 ltr. engine only)	304
<b>2</b>	<b>Charge air system</b>	<b>310</b>
2.1	Diagram of turbocharger system, engine codes BYT, BPU	310
2.2	Diagram of turbocharger system, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA	311
2.3	Exploded view - charge air cooling	312
2.4	Removing and installing charge pressure sender G31	313



2.5	Checking charge air system for leaks	313
2.6	Removing and installing charge air cooler	315
<b>24</b>	<b>Mixture preparation - injection</b>	<b>318</b>
<b>1</b>	<b>Injection system</b>	<b>318</b>
1.1	Technical data	318
1.2	Overview of fitting locations - injection system	318
1.3	Removing and installing engine cover panel	325
1.4	Removing and installing cover with oil separator - engine code BYT	325
<b>2</b>	<b>Air cleaner</b>	<b>327</b>
2.1	Exploded view - air cleaner	327
2.2	Removing and installing air filter element	328
2.3	Removing and installing air cleaner housing	329
<b>3</b>	<b>Intake manifold</b>	<b>331</b>
3.1	Exploded view - intake manifold	331
3.2	Exploded view - fuel rail	333
3.3	Removing and installing intake manifold with fuel rail	334
<b>4</b>	<b>High-pressure pump</b>	<b>341</b>
4.1	Exploded view - high-pressure pump	341
4.2	Removing and installing high-pressure pump	342
<b>5</b>	<b>Injectors</b>	<b>344</b>
5.1	Removing and installing injectors	344
5.2	Cleaning injectors	349
<b>6</b>	<b>Senders and sensors</b>	<b>351</b>
6.1	Removing and installing air mass meter G70	351
6.2	Checking fuel pressure sender G247	351
6.3	Removing and installing fuel pressure sender G247	354
6.4	Checking fuel pressure and residual pressure (up to high-pressure pump)	356
6.5	Removing and installing throttle valve module J338	358
6.6	Cleaning throttle valve module J338	359
6.7	Checking intake manifold change-over function	359
6.8	Checking dual non-return valve	361
<b>7</b>	<b>Lambda probes</b>	<b>363</b>
7.1	Exploded view - Lambda probe	363
7.2	Removing and installing Lambda probe	367
<b>8</b>	<b>Engine control unit</b>	<b>374</b>
8.1	Wiring and component check with test box V.A.G 1598/42	374
8.2	Renewing engine control unit J623	376
<b>26</b>	<b>Exhaust system</b>	<b>380</b>
<b>1</b>	<b>Components of exhaust system</b>	<b>380</b>
1.1	Exploded view - silencers	380
1.2	Separating centre and rear silencers	382
1.3	Removing and installing front exhaust pipe with catalytic converter	383
1.4	Aligning exhaust system	385
1.5	Checking exhaust system for leaks	386
<b>2</b>	<b>Exhaust manifold</b>	<b>387</b>
<b>3</b>	<b>Secondary air system - engine code CBFA</b>	<b>388</b>
3.1	Exploded view - secondary air system	388
3.2	Removing and installing secondary air pump motor V101	388
3.3	Removing and installing combination valve for secondary air system	389
<b>28</b>	<b>Ignition system</b>	<b>391</b>
<b>1</b>	<b>Servicing ignition system</b>	<b>391</b>

1.1	Test data .....	391
1.2	Exploded view - ignition system .....	391
1.3	Removing and installing ignition coils with output stages .....	392
1.4	Removing knock sensor 1 G61 .....	394
1.5	Removing and installing engine speed sender G28 .....	394
1.6	Removing and installing Hall sender G40 .....	396



**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.



Audi A3 2004 ►

**Audi** 4-cylinder direct injection engine (1.8 ltr., 2.0 ltr. 4-valve TFSI) - Edition 09.2016

---



**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.



## 00 – Technical data

### 1 Identification

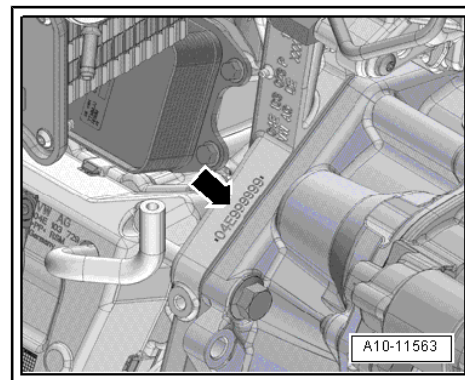
(ARL004881; Edition 09.2016)

⇒ [“1.1 Engine identification number/engine data”, page 1](#)

#### 1.1 Engine identification number/engine data

##### Engine number

- ◆ The engine number (“engine code” and “serial number”) is located on the left side at the joint between engine and gearbox -arrow-.
- ◆ Additionally there is a sticker on the toothed belt cover (top) with engine code and serial number.
- ◆ Engine codes starting with the letter “C” have four letters (previously three letters).
- ◆ The first 3 characters of the engine code stand for the engine capacity and the mechanical construction and design. They are stamped onto the cylinder block together with the serial number.
- ◆ The 4th character indicates the power output and torque of the engine and is determined by the engine control unit.
- ◆ The engine code can be found on the type plate (in versions for some countries only) and on the vehicle data sticker and the engine control unit.
- ◆ Fitting locations of the type plate (certain countries only) and the vehicle data sticker ⇒ Maintenance ; Booklet 808 .



For engine data refer to ⇒ **Technical data for engines; Rep. gr. 00 ; Overview of engines .**

**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.



## 2 Safety precautions

⇒ ["2.1 Safety precautions when working on the fuel supply system", page 2](#)

⇒ ["2.2 Safety precautions when working on vehicles with start/stop system", page 2](#)

⇒ ["2.3 Safety precautions when using testers and measuring instruments during a road test", page 3](#)

⇒ ["2.4 Safety precautions when working on the subframe", page 3](#)

⇒ ["2.5 Safety precautions when working on the ignition system", page 3](#)

⇒ ["2.6 Safety precautions when working on the cooling system", page 4](#)

### 2.1 Safety precautions when working on the fuel supply system

#### Risk of injury - fuel system operates under high pressure

The fuel system is pressurised. There is a risk of injury as fuel may spray out.

Information in this document is provided for informational purposes only. It is not intended for use for repair 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.

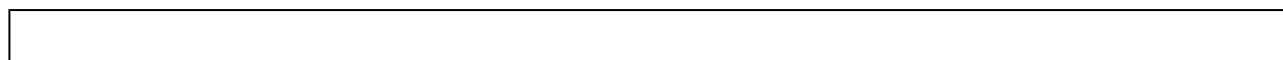
Before opening the fuel system:

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

#### Risk of fire due to escaping fuel

If the battery is connected, the door contact switch activates the fuel pump when the driver's door is opened. Escaping fuel may ignite, causing a fire.

- Before opening the fuel system, disconnect power supply to fuel pump.



### 2.2 Safety precautions when working on vehicles with start/stop system

#### Risk of injury - engine may start unexpectedly

On vehicles with the start/stop system activated, the engine may start unexpectedly. A message in the instrument cluster indicates whether the start/stop system is activated.

- Deactivate start/stop system by switching off ignition.

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

### Risk of injury if test equipment is not secured

If an accident occurs and the front passenger's airbag is triggered, test equipment which is not secured adequately may be catapulted through the vehicle with potentially serious consequences.


- Secure test equipment on the rear seat with a strap.

Or

- Have a second mechanic operate test equipment on the rear seat.

## 2.4 Safety precautions when working on the subframe

Please note the following warnings when working on the subframe:

 **Caution**

*Risk of damage to running gear components.*

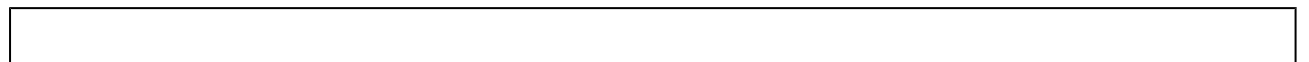
- ◆ *The vehicle must NOT be lowered onto its wheels if the engine/gearbox mountings, steering rack or subframe cross brace are not properly installed.*
- ◆ *The vehicle must NOT be supported by applying a trolley jack or similar to the subframe or subframe cross brace.*

## 2.5 Safety precautions when working on the ignition system

### Risk of injury due to electric shock

When the engine is running, there are high voltage levels in the ignition system. There is a risk of electric shock when touching the ignition system!

- Never touch or disconnect ignition wiring when the engine is running or being turned at cranking speed.



### Risk of damage to components

Washing the engine or connecting/disconnecting electrical wiring may result in components being damaged if the engine is running.

- Switch off ignition before connecting/disconnecting electrical wiring.
- Switch off ignition before cleaning engine.



## 2.6 Safety precautions when working on the cooling system

### Risk of scalding as hot coolant can escape

The cooling system is under pressure when the engine is hot. Hot steam/hot coolant can escape - risk of scalding.

- Put on protective gloves.
- Put on safety goggles.
- Release pressure (cover filler cap on coolant expansion tank with a cloth and open carefully).



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”, page 5](#)

⇒ [“3.2 Foreign particles in engine”, page 5](#)

⇒ [“3.3 Contact corrosion”, page 5](#)

⇒ [“3.4 Routing and attachment of pipes, hoses and wiring”, page 6](#)

⇒ [“3.5 Installing radiators, condensers and charge air coolers”, page 6](#)

⇒ [“3.6 Checking vacuum system”, page 6](#)

#### 3.1 Rules for cleanliness

Even small quantities of dirt can lead to defects. For this reason, please observe the following rules when working on the fuel supply system, injection system and turbocharger:

- ◆ Carefully clean connection points and the surrounding area with engine cleaner or brake cleaner and dry thoroughly before opening.
- ◆ Immediately seal open lines and connections with clean plugs, for example from engine bung set - VAS 6122- .
- ◆ Place removed parts on a clean surface and cover them. Use only lint-free cloths.
- ◆ Carefully cover or seal open components if repairs cannot be carried out immediately.
- ◆ Only install clean components; replacement parts should only be unpacked immediately prior to installation. Do not use parts that have not been stored in their packing (e.g. in tool boxes etc.).
- ◆ When the system is open, do not work with compressed air and do not move the vehicle.
- ◆ 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 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.

#### 3.3 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 fitted.

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 .

##### Please note:

- ◆ We recommend using only genuine replacement parts; these have been tested and are compatible with aluminium.

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.



- ◆ We recommend the use of Audi accessories.
- ◆ Damage caused by contact corrosion is not covered by warranty.

### 3.4 Routing and attachment of pipes, hoses and wiring

- ◆ Mark fuel lines, hydraulic lines, vacuum lines, lines for activated charcoal filter 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).

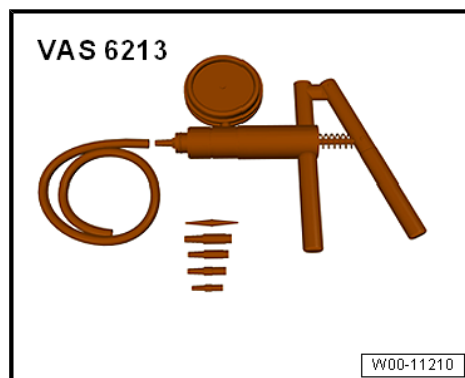
### 3.5 Installing radiators, condensers and charge air coolers

Even when the radiator, condenser and charge air cooler 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, condenser or charge air cooler.

### 3.6 Checking vacuum system

#### Special tools and workshop equipment required

- ◆ Hand vacuum pump - VAS 6213-



#### Procedure

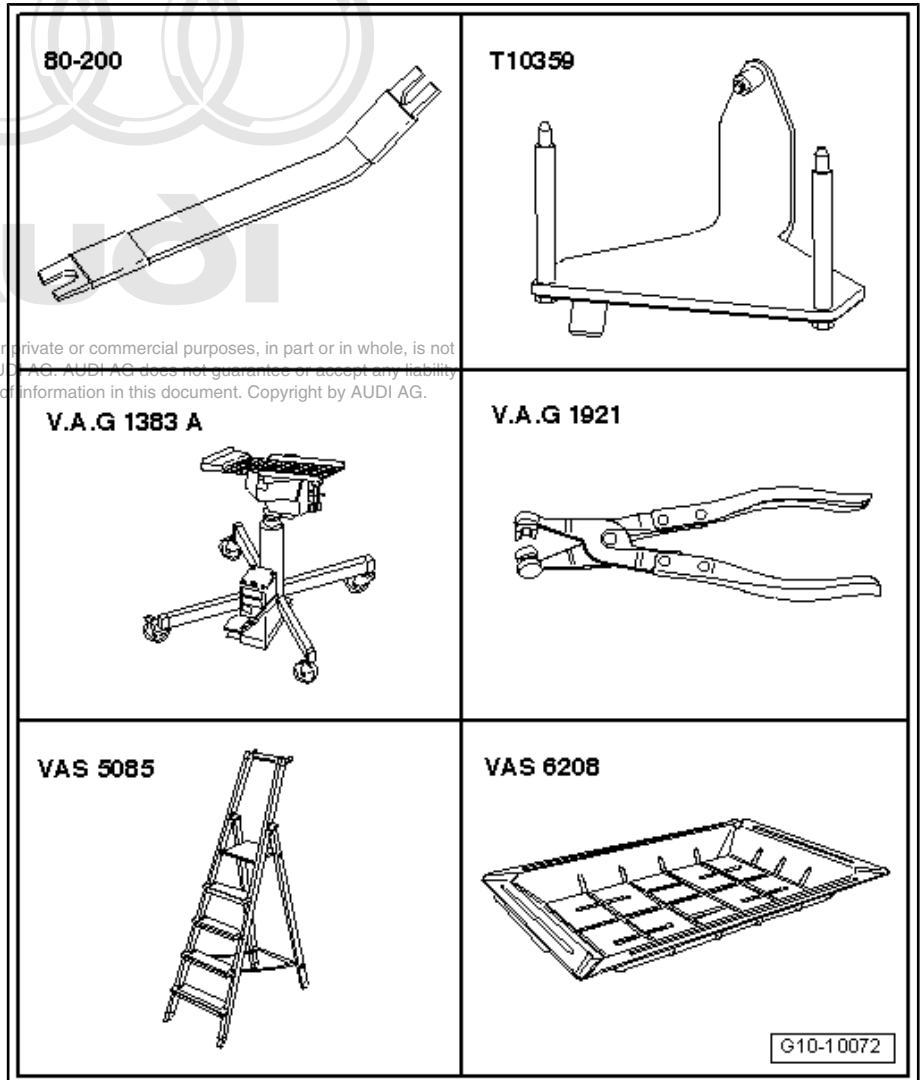
- Check all vacuum lines in the complete vacuum system for:
  - ◆ Cracks
  - ◆ Traces of animal bites
  - ◆ Kinked or crushed lines
  - ◆ Porous or leaking lines
- Check vacuum line to solenoid valve and from solenoid valve to corresponding component.
- If a fault is stored in the event memory, check 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 the hand vacuum pump - VAS 6213- or if the pressure drops again immediately, check the hand vacuum pump and connecting hoses for leaks.

# 10 – Removing and installing engine

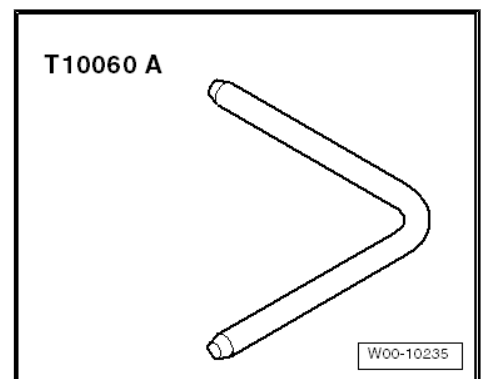
## 1 Removing engine

### Special tools and workshop equipment required

- ◆ Removal lever - 80 - 200-
- ◆ Engine bracket - T10359-
- ◆ Engine and gearbox jack - V.A.G 1383 A-
- ◆ Hose clip pliers - V.A.G 1921-
- ◆ Stepladder - VAS 5085-
- ◆ Drip tray for workshop hoist - VAS 6208-

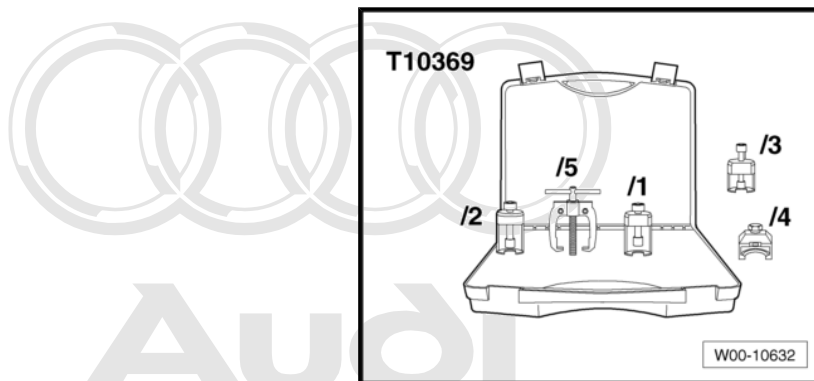


- ◆ Locking pin - T10060A-



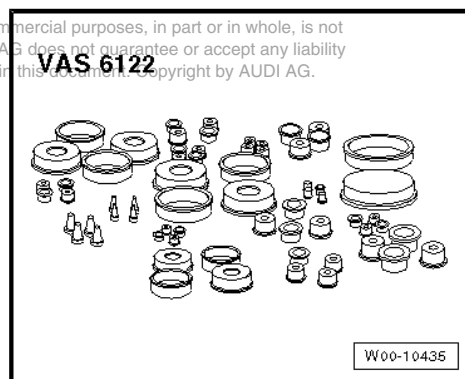


◆ Tool set for wiper arms - T10369-



◆ Engine bung set - VAS 6122-

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.

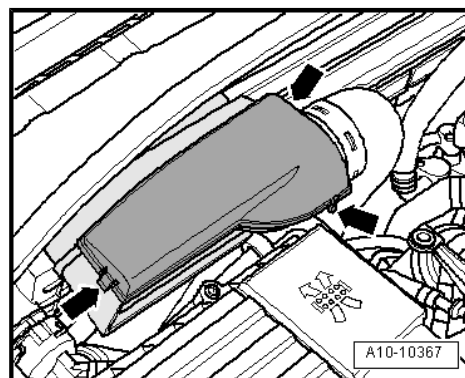


Procedure



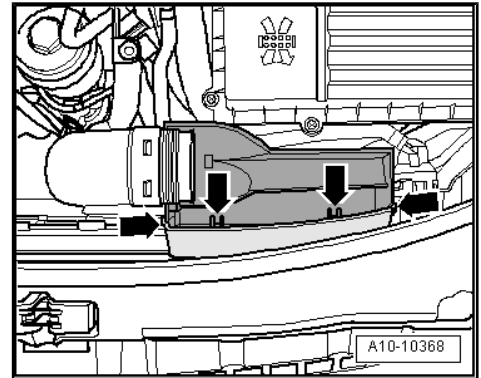
Note

- ◆ *The engine is removed from underneath together with the gearbox.*
  - ◆ *Fit cable ties in the original positions when installing.*
  - ◆ *Collect drained coolant in a clean container for re-use or disposal.*
  - ◆ *All open inlet and exhaust ports must be sealed with suitable plugs (e.g. from engine bung set - VAS 6122- ).*
- Pull cover off air duct (release clips on sides) -arrows-.





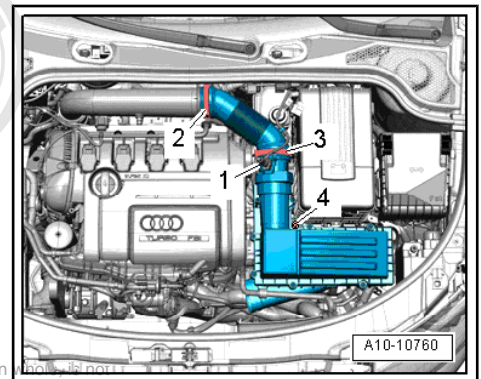
- Unclip air duct at the bottom by releasing clips -arrows-.
- Detach air duct at bottom together with air hose.



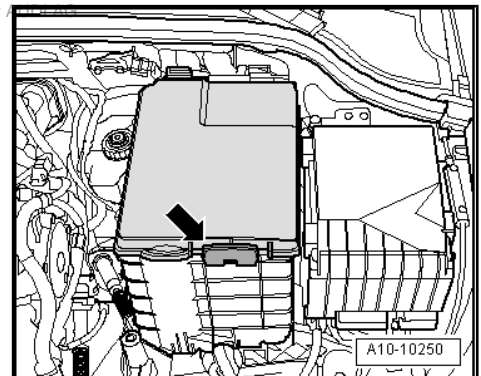
- Unplug electrical connector -1- at air mass meter - G70- .
- Detach air hose -2-.
- Unscrew bolt -4- and remove air cleaner housing.

 **Note**

-Item 3- can be disregarded.



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

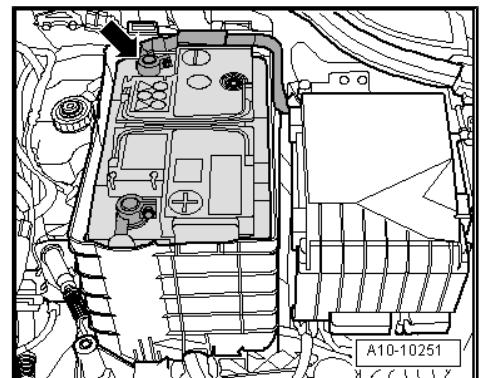


 **Caution**

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

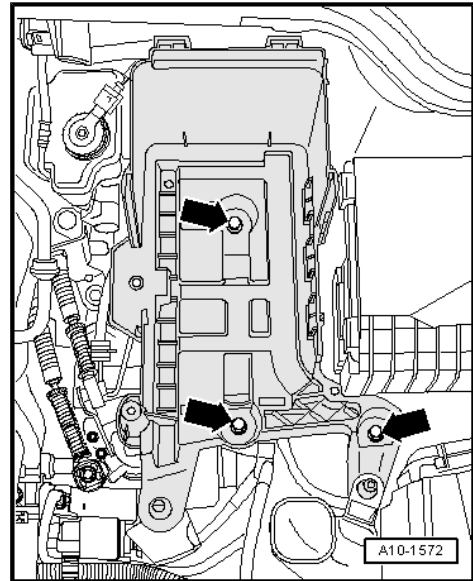
◆ *Observe notes on procedure for disconnecting the battery.*

- With ignition switched off, disconnect battery earth cable -arrow-.
- Remove battery => Electrical system; Rep. gr. 27 .





- Remove battery tray -arrows-.

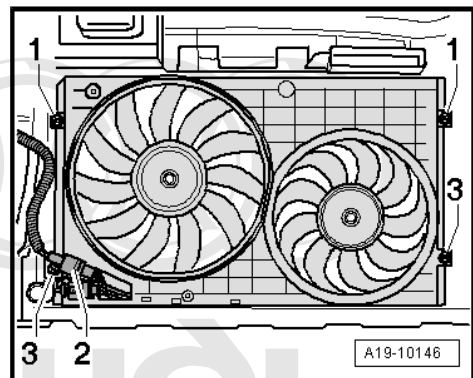


- Remove bolts -1- for radiator cowl from above.



**Note**

Disregard items marked -2 and 3-.



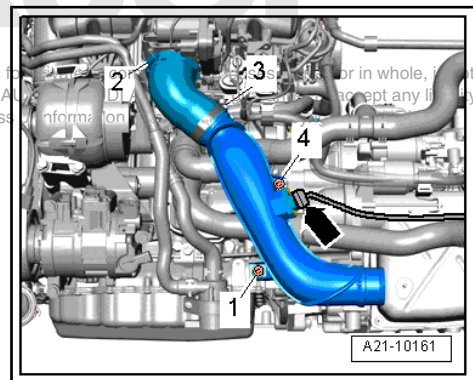
- Release hose clip -2-.
- Remove bolt -4-.
- Unplug electrical connector -arrow- and move wiring clear.

Protected by copyright. Copying or reproduction in whole or in part is prohibited without the prior written permission of Audi AG. All rights reserved. Information is provided for informational purposes only. Audi AG is not responsible for the correctness of the information.



**Note**

Disregard items marked -1 and 3-.



**WARNING**

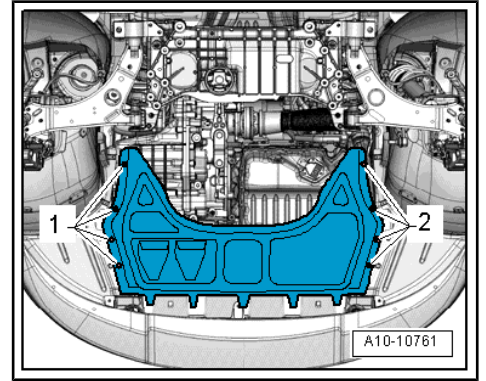
*The cooling system is under pressure when the engine is hot. Hot steam/hot coolant can escape - risk of scalding.*

*Danger of scalding skin and other parts of the body.*

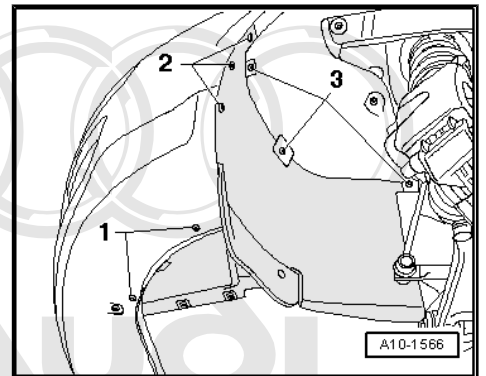
- Put on protective gloves.
- Put on safety goggles.
- Release pressure (cover filler cap on coolant expansion tank with a cloth and open carefully).

- Open filler cap on coolant expansion tank.

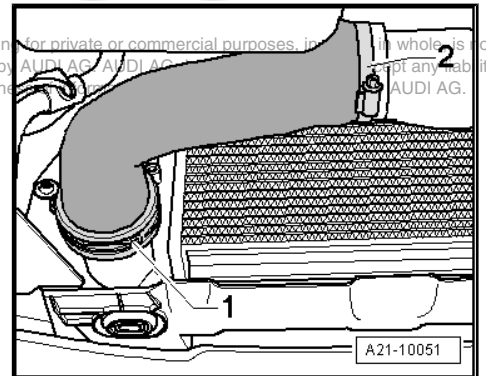
- Remove both front wheels.
- Release fasteners -1 and 2- and remove centre noise insulation.



- Release fasteners -1, 2, 3- and remove noise insulation (left and right).



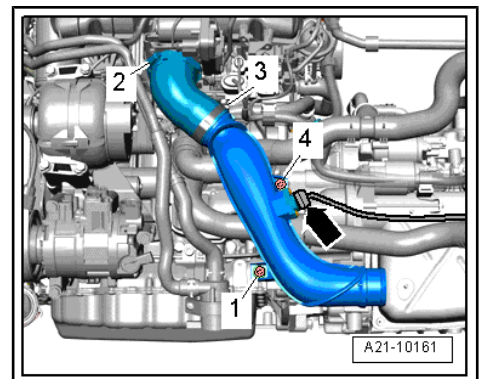
- Remove air pipe -item 1 and 2-.



- Remove bolt -1- and take out air pipe downwards.

 **Note**

*Disregard items marked -2, 3, 4 and arrow-.*



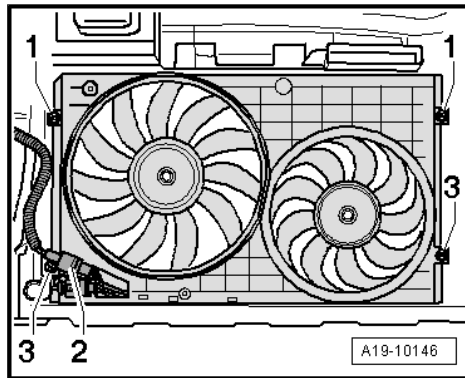


- Unplug electrical connector -2-.
- Remove bolts -3- and take out air cowl downwards.

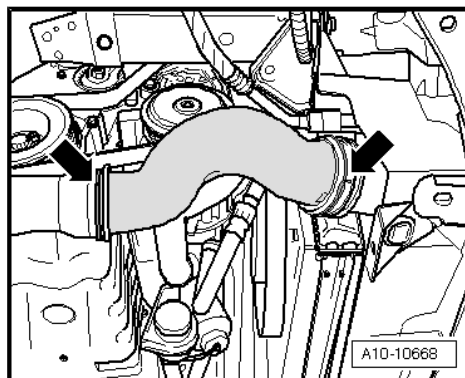


**Note**

-Item 1- can be disregarded.



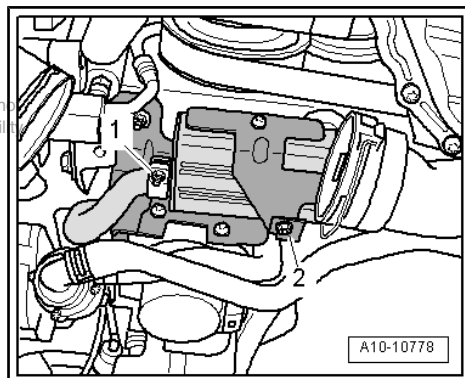
- Remove air hose -arrows-.



**Vehicles with auxiliary heater:**

- Slacken clip -1- and remove bolt -2-.
- Detach exhaust silencer for auxiliary heater.

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.



**All vehicles:**

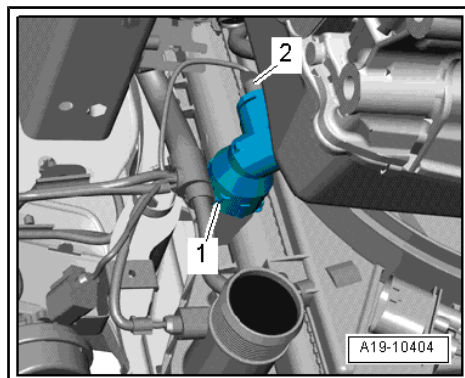
- Unplug electrical connector -2- for radiator outlet coolant temperature sender - G83- .



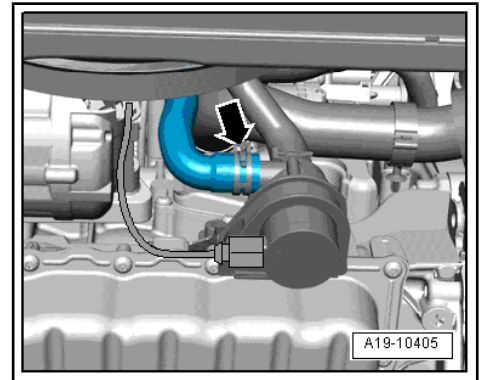
**Note**

Collect drained coolant in a clean container for re-use or disposal.

- Place drip tray for workshop hoist - VAS 6208- beneath engine.
- Pull off retaining clip, remove coolant hose -1- and drain off coolant.



- Disconnect coolant hose from continued coolant circulation pump - V51- -arrow- and drain off remaining coolant.



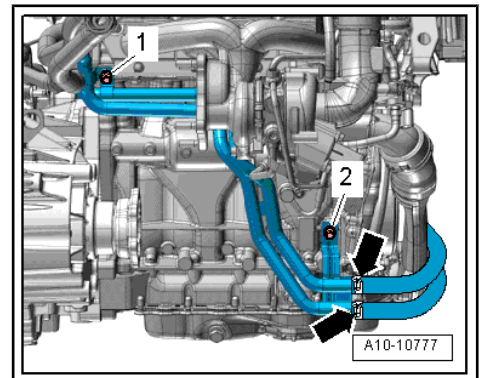
#### Vehicles with auxiliary heater:

- Disconnect coolant hoses -arrows- and drain off remaining coolant.



Note

Disregard items marked -1 and 2-.



#### All vehicles:

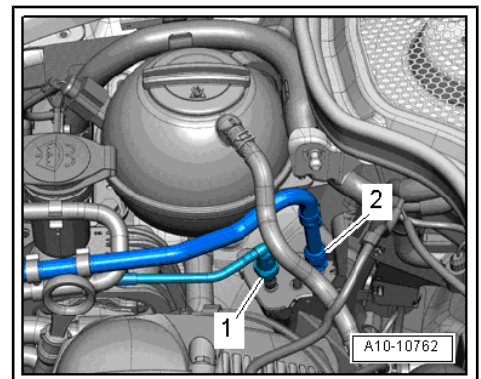


#### WARNING

*The fuel system is pressurised.*

*Risk of injury as fuel may spray out.*

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



#### Caution

*Observe rules for cleanliness when working on the fuel supply system => page 5.*

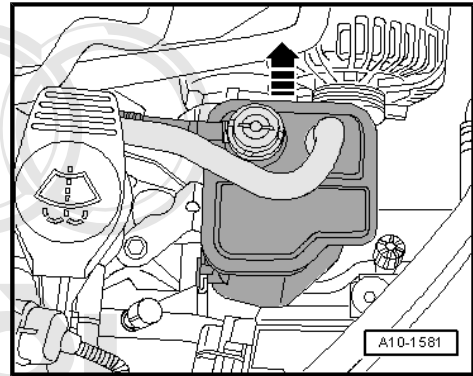
- Disconnect fuel supply hose -2- by pressing release ring.

- Disconnect vacuum line -1- going to activated charcoal filter (press release tab).

Protected by copyright. Copying for private or commercial purposes, in particular without permission, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the accuracy of the information in this document. Copyright © 2016 Audi AG.



- Pull activated charcoal filter upwards and out of bracket -arrow- and place on engine.

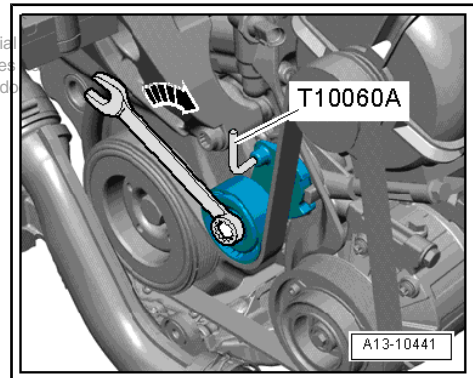


**Caution**

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

*Wrong direction of rotation for a used poly V-belt can lead to irreparable damage.*

- ◆ *Before removing the poly V-belt mark the direction of rotation with chalk or a felt-tip pen for re-installation.*



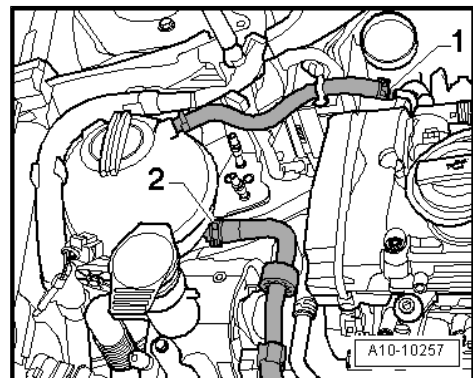
- To slacken poly V-belt turn tensioner in direction of -arrow-.
- Remove poly V-belt and release tensioner.



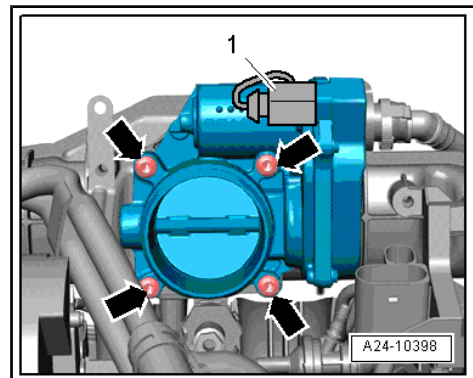
**Note**

*Disregard locking pin - T10060 A- .*

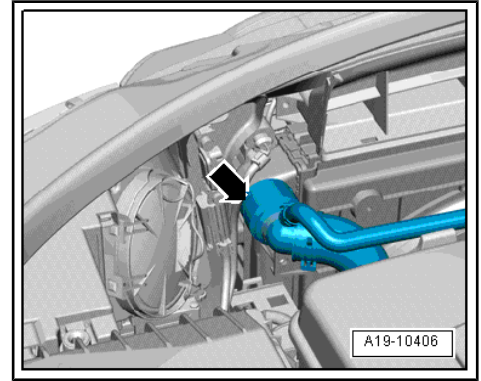
- Detach coolant hoses -1 and 2-.



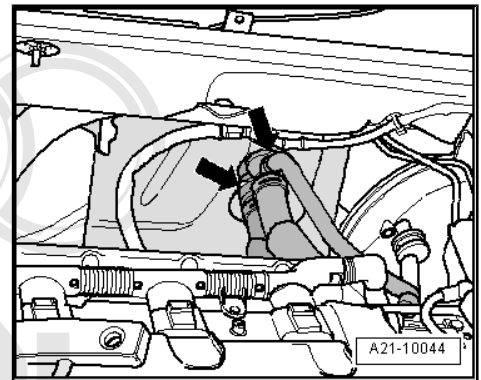
- Unplug electrical connector -1- at throttle valve module - J338- .
- Unscrew bolts -arrows- and detach throttle valve module - J338- .



- Detach coolant hose at top of radiator -arrow-.

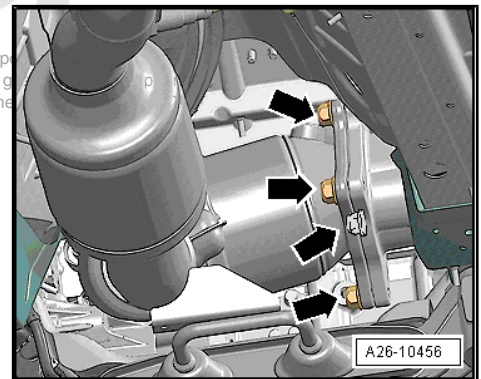


- Detach coolant hoses going to heat exchanger -arrows-.

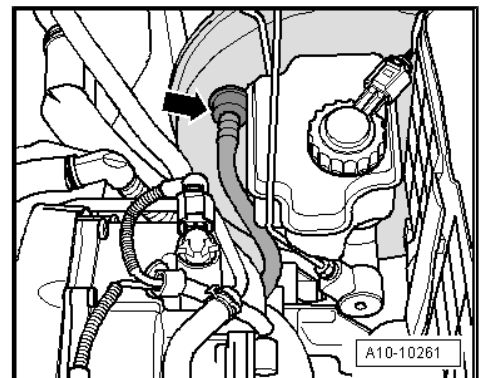


- Remove nuts (accessible from above) -arrows- securing front exhaust pipe to turbocharger.

Protected by copyright. Copying for private or commercial purposes is not permitted unless authorised by AUDI AG. AUDI AG does not give any warranty with respect to the correctness of information in this document.

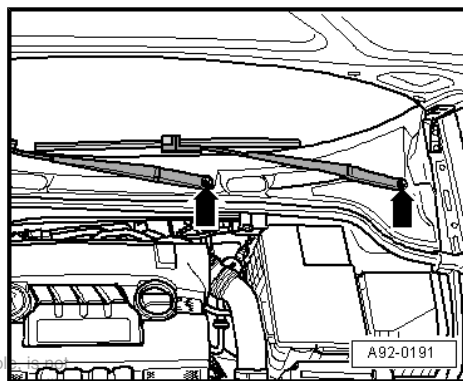


- Detach vacuum hose from brake servo -arrow-.



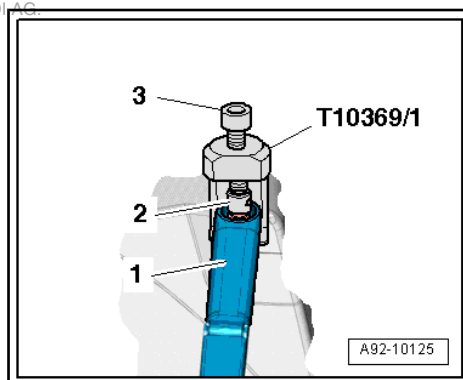


- Pry off caps on windscreen wiper arms with a screwdriver.
- Loosen nuts -arrows- several turns.

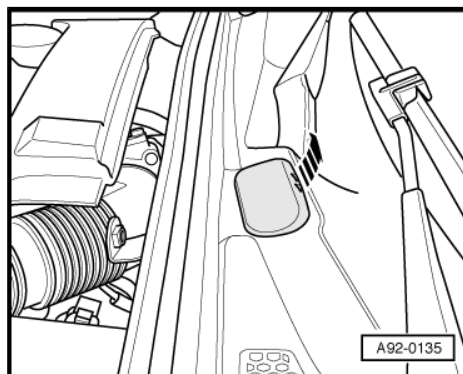


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Apply puller - T10369/1- to wiper arm -1-, as shown in illustration.
- Apply thrust piece -2- onto wiper shaft.
- Turn bolt -3- in clockwise direction until wiper arm is pulled off wiper shaft.
- Remove nuts and detach windscreen wiper arms.



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

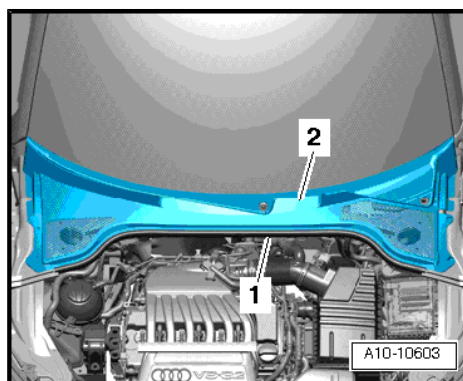


- Pull off seal -1-.

**Caution**

**Risk of damage to plenum chamber cover.**

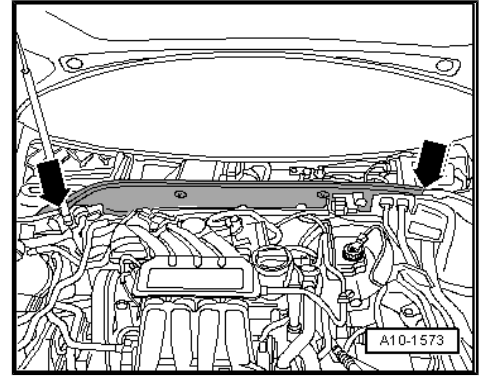
◆ **Apply a small quantity of soap solution to transition between windscreen and plenum chamber cover -2-. Then, starting at edge of windscreen, carefully pull plenum chamber cover upwards off retainer at windscreen.**



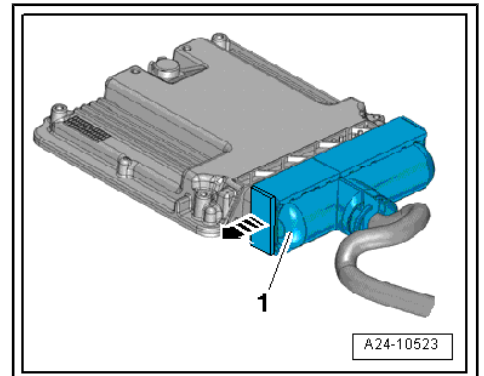
- Detach plenum chamber cover -2- by pulling it carefully off retainer at windscreen.



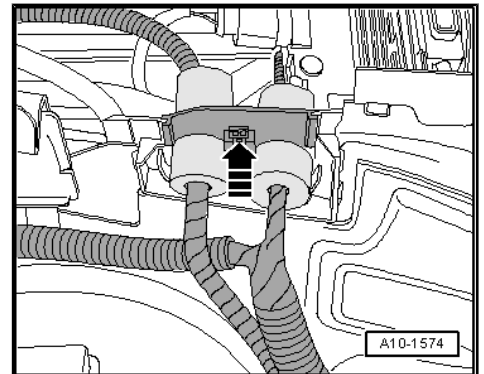
- Move clear engine wiring harness at rear of plenum chamber partition panel.
- Remove plenum chamber partition panel -arrows-.



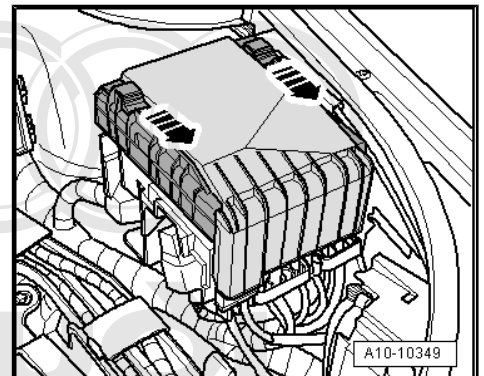
- Remove engine control unit => [page 376](#) .
- Unplug electrical connector -1- for engine wiring harness -arrow-.



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



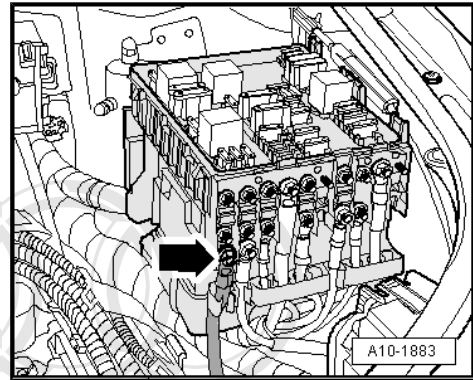
- Slide the two clips in the direction of the -arrows- and remove cover from electronics box in engine compartment.



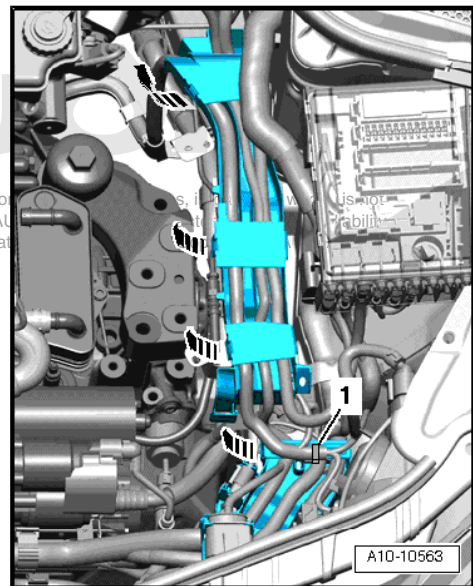
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- Unscrew terminal 30 wire -arrow- from electronics box in engine compartment and move it clear.

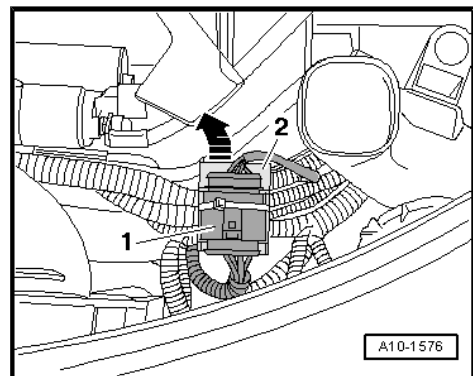


- Open wiring duct brackets -arrows-.
- Cut open cable tie -1-.



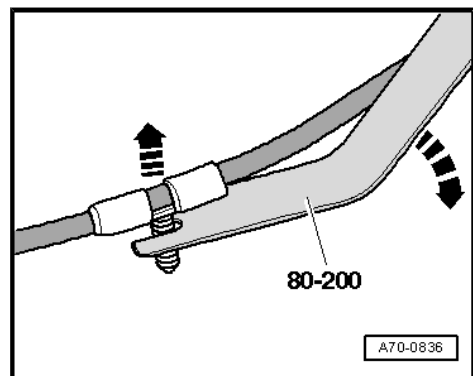
Protected by copyright. Copying for private or permitted unless authorised by AUDI AG. AU with respect to the correctness of informat

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



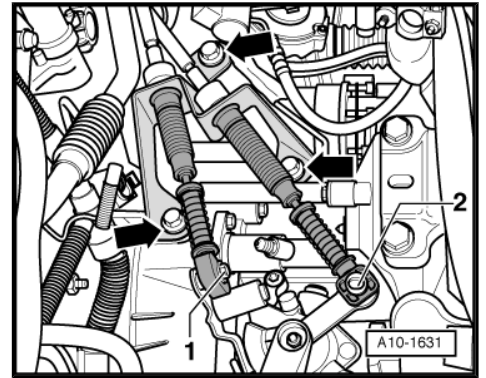
**Note**

Use removal lever - 80 - 200- to lever out the wiring clips.

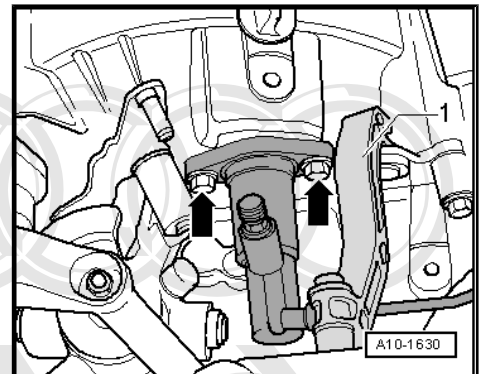



**Vehicles with manual gearbox:**

- Detach cable support bracket from gearbox -arrows-.
- Unclip circlip -1- from gear selector cable and circlip -2- from selector lever cable.
- Pull selector cable end-pieces with selector cables off gearbox selector lever and gear selector relay lever.
- Tie selector cables with cable support bracket to one side.



- Detach brace -1-.
- Move clear hydraulic line going to clutch slave cylinder.
- Detach clutch slave cylinder -arrows- and place to one side. Do not open pipes.

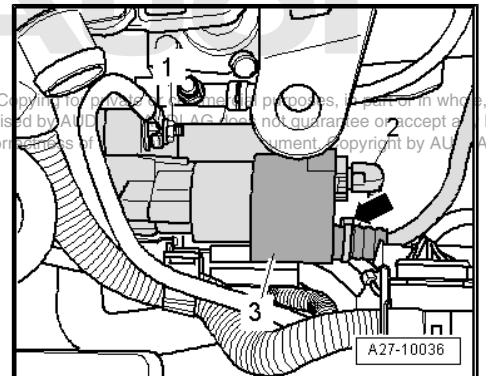


 **Caution**

*Avoid damage to clutch slave cylinder.*

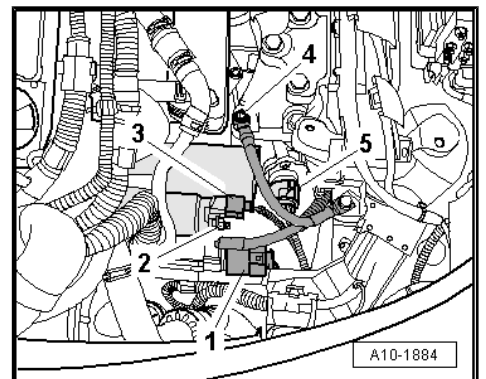
*◆ Do not operate clutch pedal with slave cylinder removed.*

- If fitted, cut open cable tie -arrow- for protective sleeve.
- Unplug electrical connector -2-.
- Push back protective cover and unscrew B+ cable at starter solenoid switch
- Unscrew earth wire -1-.



**Vehicles with dual clutch gearbox:**

- Unplug electrical connectors -1, 3, 5-.
- Detach protective sleeve and remove electrical wire -2- at starter solenoid switch.
- Unscrew earth wire -4-.





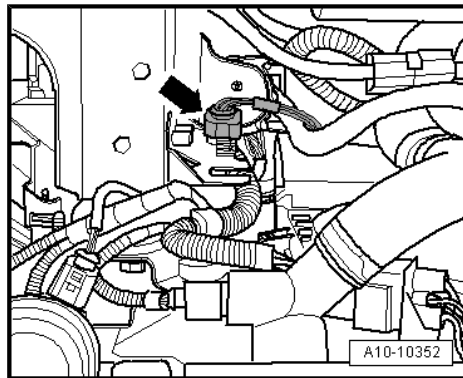
**All vehicles:**

- Unplug electrical connector -arrow- at longitudinal member (bottom left).

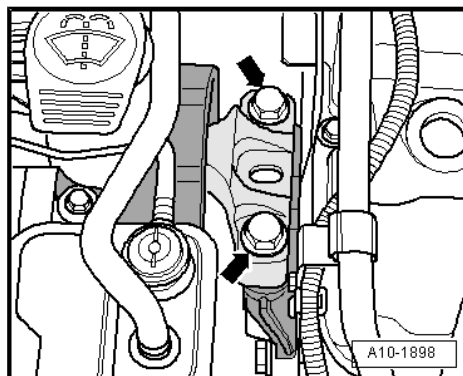


**Note**

*For illustration purposes, the installation position is shown from below.*

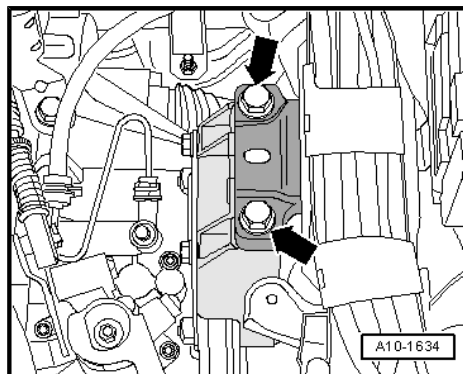


- Loosen bolts -arrows- of assembly mounting at engine approx. 2 turns.



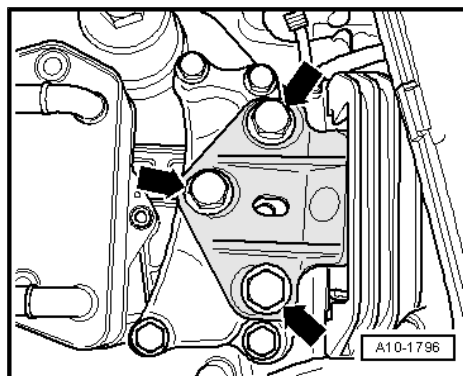
**Vehicles with manual gearbox:**

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



**Vehicles with dual clutch gearbox:**


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



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.

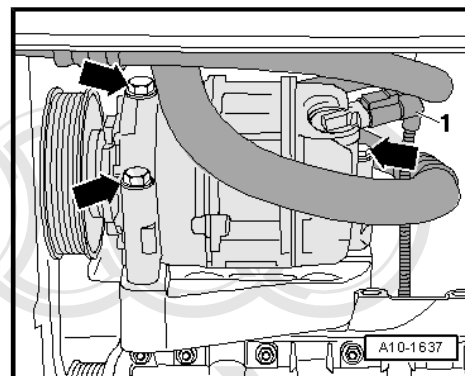
**All vehicles:**

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


 **WARNING**

*Risk of injury caused by refrigerant.*

◆ *The air conditioner refrigerant circuit must not be opened.*



- Remove bolts -arrows- for air conditioner compressor.

 **Caution**

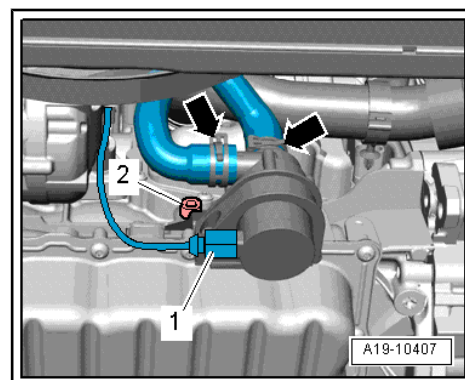
*Danger of damage to refrigerant lines and hoses.*

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

- Tie up air conditioner compressor together with refrigerant hoses to longitudinal member (refrigerant hoses remain connected).
- Remove bolt -2- at bracket for continued coolant circulation pump - V51- .

 **Note**

- ◆ *The continued circulation coolant pump - V51- remains installed.*
- ◆ *Disregard items marked -1 and arrows-.*

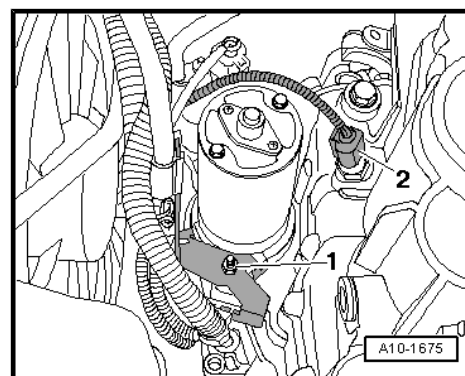


**Vehicles with manual gearbox:**

- Unplug electrical connector at reversing light switch - F4- .
- Unscrew nut -1- and detach bracket for electrical wiring.

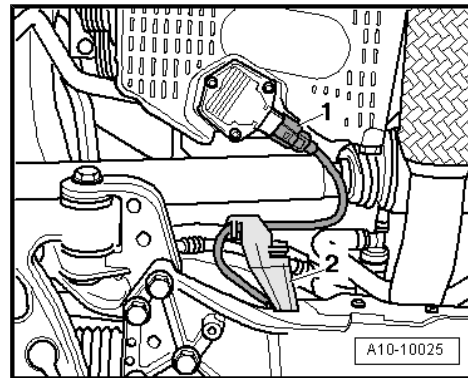
**All vehicles:**

- Move clear electrical wiring harnesses to body.



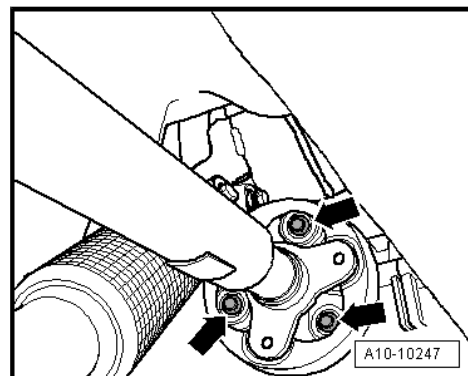


- Unplug electrical connector -1- for oil level and oil temperature sender - G266- .
- Unclip bracket -2- for wire to oil level and oil temperature sender - G266- from subframe.
- Detach connector for Lambda probe ⇒ [page 367](#) and move clear.



**Four-wheel drive:**

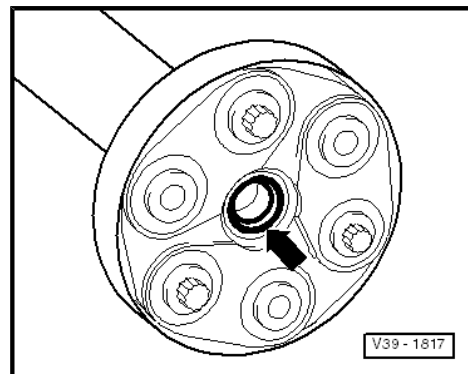
- Mark position of flexible coupling and flange for bevel box in relation to each other for re-installation.
- Remove bolts -arrows- for flexible coupling for propshaft at bevel box (counterhold using a suitable lever at triangular flange).



**Caution**

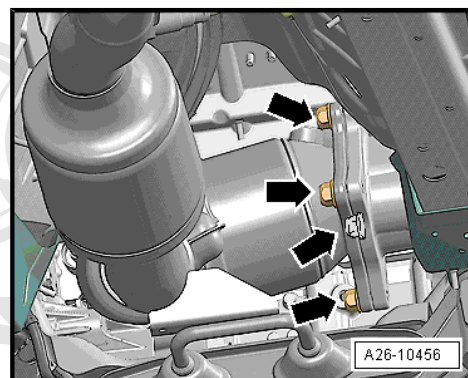
***Make sure not to damage the oil seal -arrow- in the propshaft flange.***

- ◆ ***Push the propshaft horizontally to the rear and towards the right side of vehicle as far as possible.***



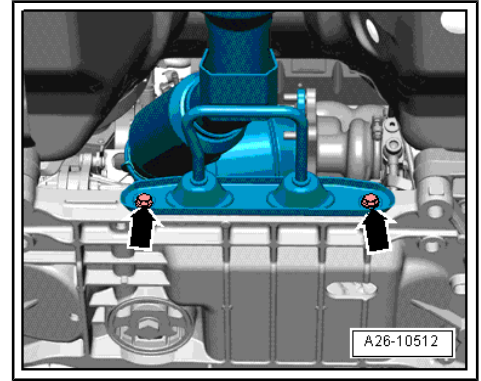
**Continued for all vehicles:**

- Unscrew remaining nuts (accessible from below) securing front exhaust pipe to turbocharger -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.

- Unbolt bracket for exhaust system -arrows-.

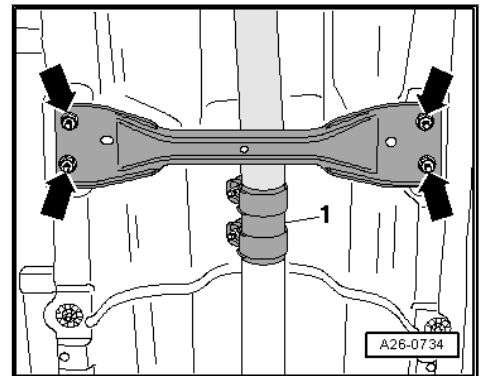


- Remove front cross member for underbody -arrows-.

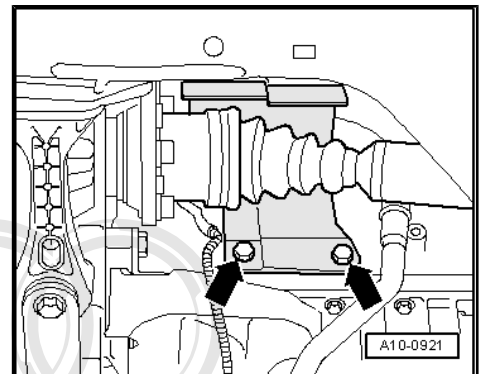
**Caution**

*Avoid damage to flexible joints.*

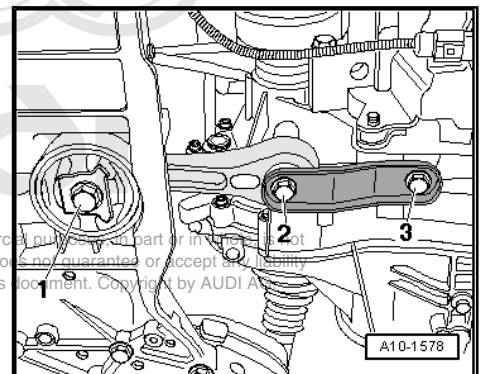
◆ *Do not bend flexible joints in front exhaust pipe more than 10°.*



- Loosen clamp -1- and push to rear.
- Detach front exhaust pipe with catalytic converter.
- Remove heat shield for drive shaft (right-side) -arrows-.
- Unbolt drive shafts (left and right) from gearbox flange shafts.



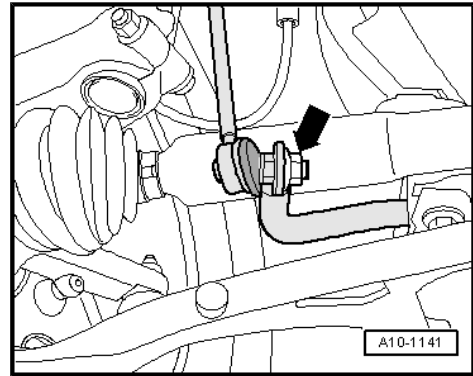
- Remove bolts -1, 2, 3- and remove pendulum support.



Protected by copyright. Copying for private or commercial purposes or 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.

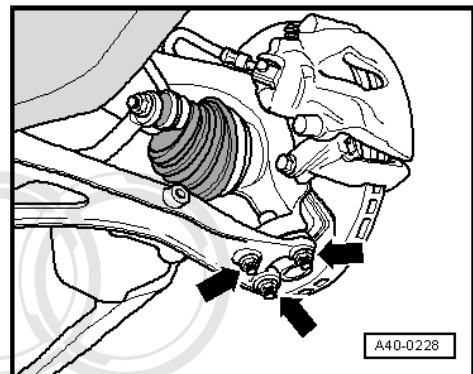


- Remove nuts -arrow- on both sides and detach coupling rod from anti-roll bar.



**Vehicles with dual clutch gearbox:**

- Unscrew nuts -arrows- on swivel joint (left-side).
- If fitted, remove bolt on bracket for front left vehicle level sender - G78- .
- Detach swivel joint from wishbone.

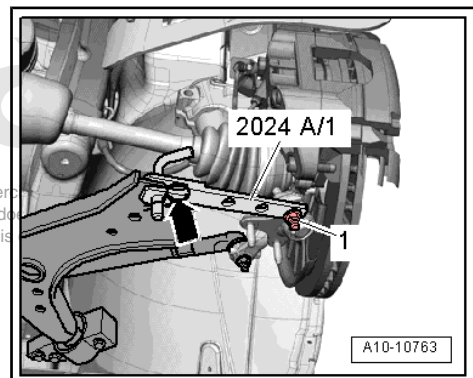


- Swing suspension strut (left-side) outwards and support with extension -2024 A /1- as shown in illustration.

**WARNING**

**Accident risk from loose components of support bracket.**

◆ **Secure retaining pin and swivel joint with locking pin -arrow- and nut -1-.**



**Vehicles with manual gearbox:**

- Tie up drive shaft (left-side) as far as possible.

**Note**

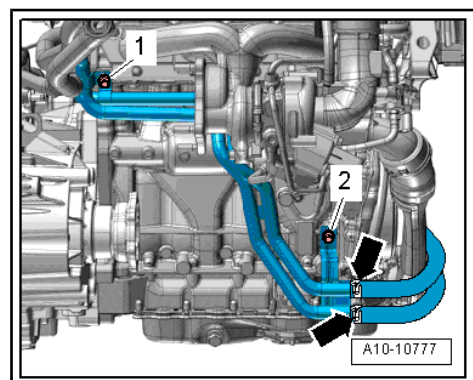
*Take care not to damage the surface coating of the drive shaft.*

**Vehicles with auxiliary heater:**

- Unscrew bolts -1 and 2- and move coolant pipes to the left.

**Note**

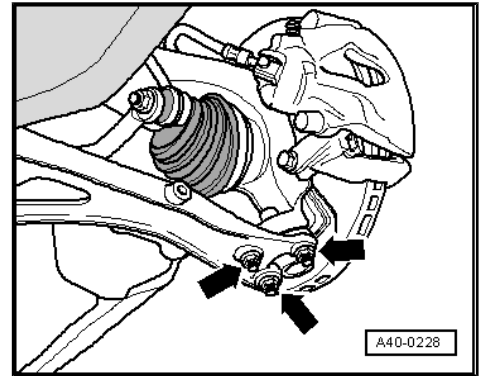
*Disregard -arrows-.*



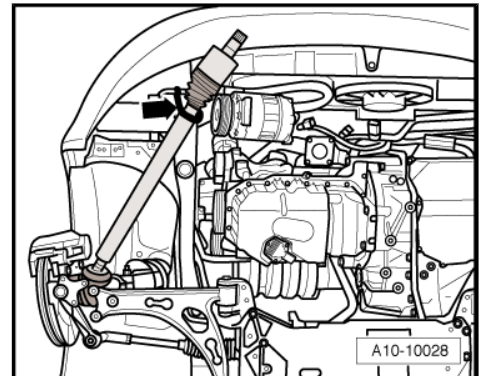


**All vehicles:**

- Unscrew nuts -arrows- on swivel joint (right-side).
- Detach swivel joint from wishbone.



- Pivot drive shaft (right-side) forwards; to do so, push engine/gearbox assembly slightly forwards.
- Tie up drive shaft to longitudinal member -arrow-.

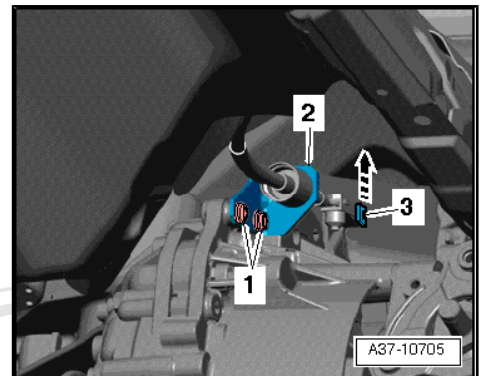


 **Note**

*Take care not to damage the surface coating of the drive shaft.*

**Vehicles with dual clutch gearbox:**

- Remove bolts -1- securing support bracket for selector lever cable.
- Pull off securing clip -3- -arrow- and remove selector lever cable from gearbox.

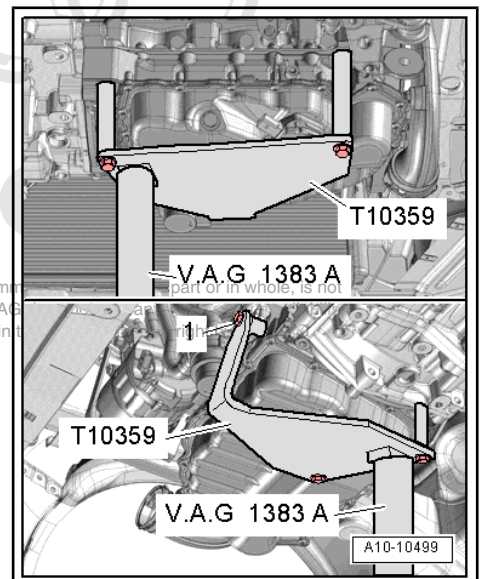


 **Note**

- ◆ *Take care not to bend or kink selector lever cable.*
- ◆ *-Item 2- can be disregarded.*

**All vehicles:**

- Attach engine bracket -T10359- with bolt -1- to cylinder block (tighten to approx. 20 Nm).



 **Note**

*Tapped hole for bolt -1- secures continued coolant circulation pump - V51- .*

- Insert engine and gearbox jack - **V.A.G 1383 A** - in engine bracket -T10359- .

Protected by copyright. Copying for private or commercial use is not permitted unless authorised by AUDI AG. AUDI AG is not responsible for any damage or information in this manual.



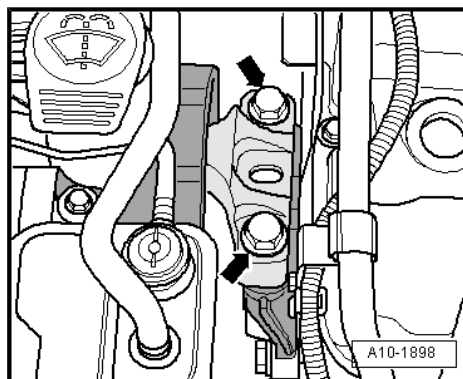
- Raise engine/gearbox assembly slightly.



**Note**

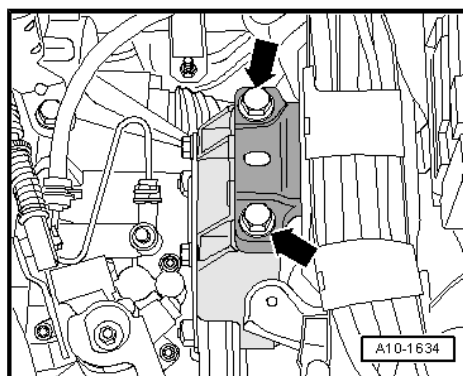
*To unscrew bolts for assembly mounting use stepladder - VAS 5085- .*

- Remove bolts for engine mounting from engine support -arrows-.



**Vehicles with manual gearbox:**

- Remove bolts for gearbox mounting from gearbox bracket -arrows-.



**Vehicles with dual clutch gearbox:**

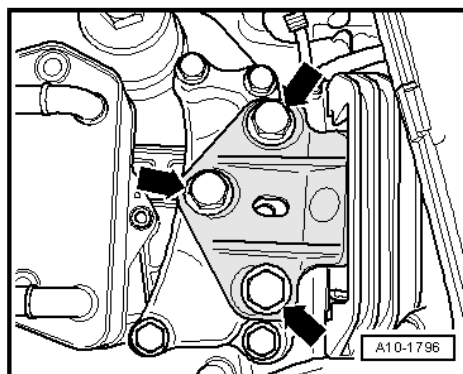
- Remove bolts for gearbox mounting from gearbox bracket -arrows-.

**All vehicles:**



**Note**

- ◆ *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 and to left as possible, and lower gradually.

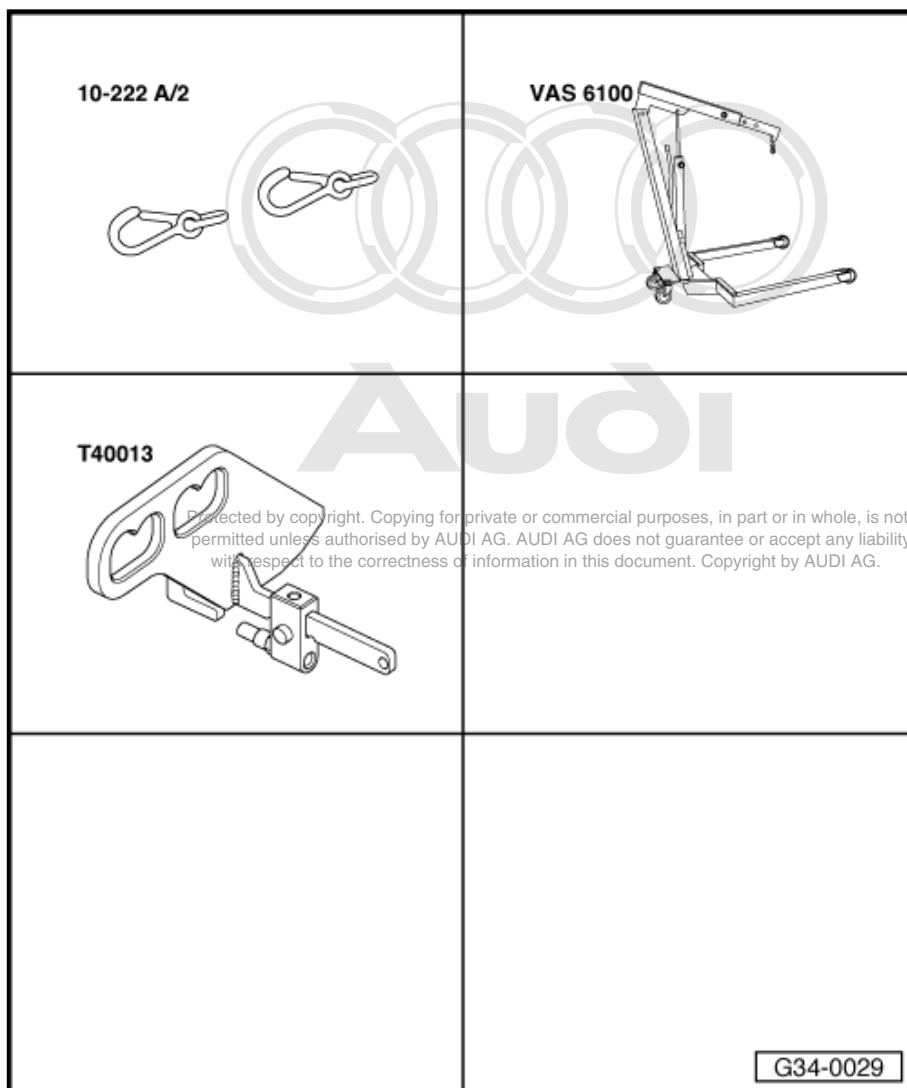


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

## 2 Separating engine and manual gearbox

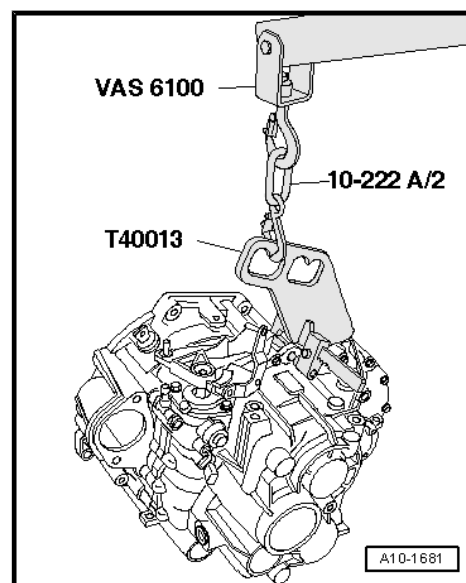
### Special tools and workshop equipment required

- ◆ Hooks - 10 - 222 A /2-
- ◆ Workshop hoist - VAS 6100-
- ◆ Lifting tackle - T40013-



### Procedure

- Engine/gearbox assembly removed and attached to engine support.
- Attach lifting tackle - T40013- to gearbox and close lock.
- Attach workshop hoist - VAS 6100- with hooks - 10 - 222 A / 2- to the lifting tackle.





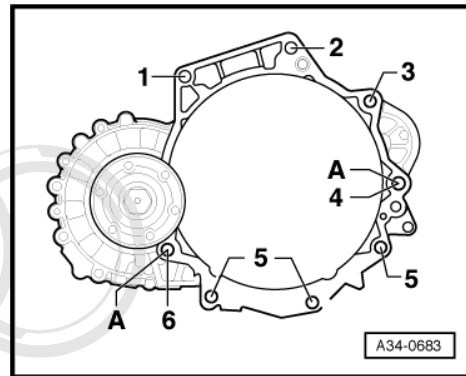
- Remove bolts -3 and 4- and detach starter.
- Remove bolts -1, 2, 5, 6, 7, 8- securing gearbox to engine.



**Note**

*Disregard -item A-*.

- Detach gearbox from engine.

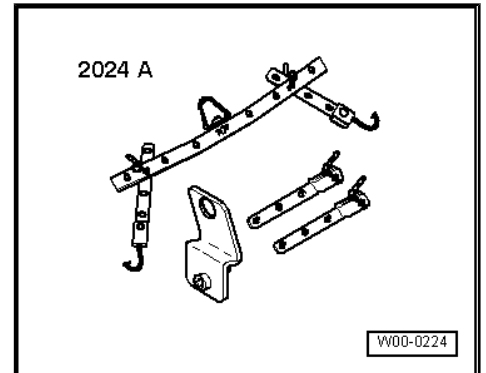


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

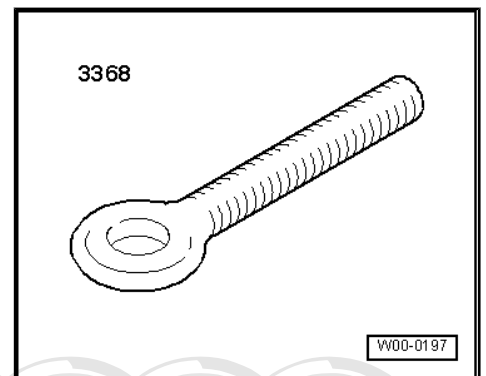
### 3 Separating engine and dual clutch gearbox

#### Special tools and workshop equipment required

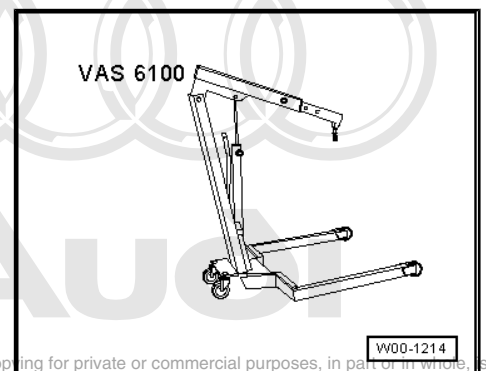
- ◆ Lifting tackle - 2024 A-



- ◆ Eye-head bolt - 3368-



- ◆ Workshop hoist - VAS 6100-

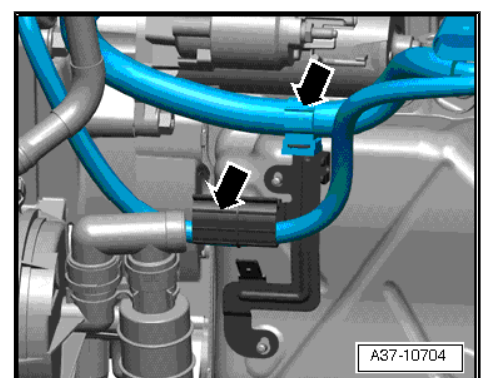


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- ◆ Self-locking flange nut (M10)

#### Procedure

- Engine/gearbox assembly removed and attached to engine support -T10359- .
- Move clear electrical wiring -arrows-.



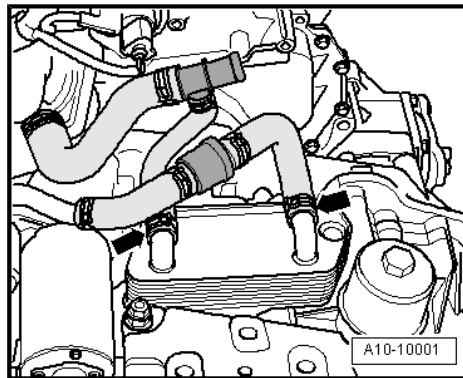


- Detach coolant hoses from gear oil cooler -arrows-.

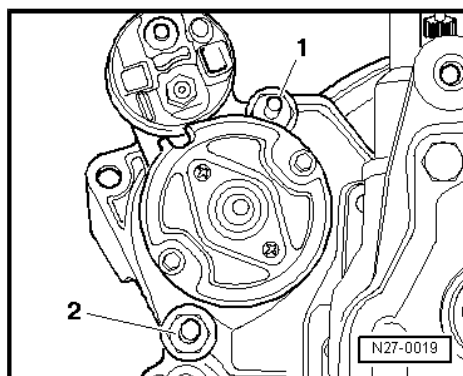


**Note**

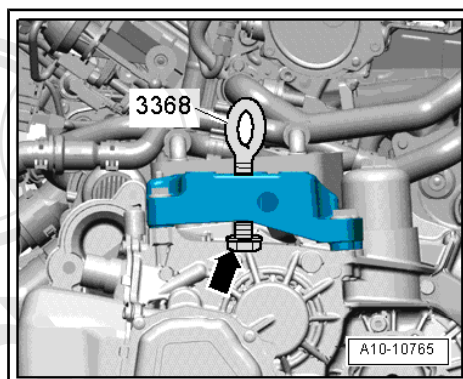
Seal off open pipes/lines and connections with clean plugs or protective caps to prevent dirt from entering.



- Remove bolts -1 and 2- and detach starter.



- Screw eye-head bolt - 3368- several turns into gearbox bracket and secure with self-locking flange nut M10 -arrow-.



- Attach lifting tackle - 2024 A- to gearbox and workshop hoist - VAS 6100- as shown in illustration

by copyright. Copying for private or commercial purposes 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**

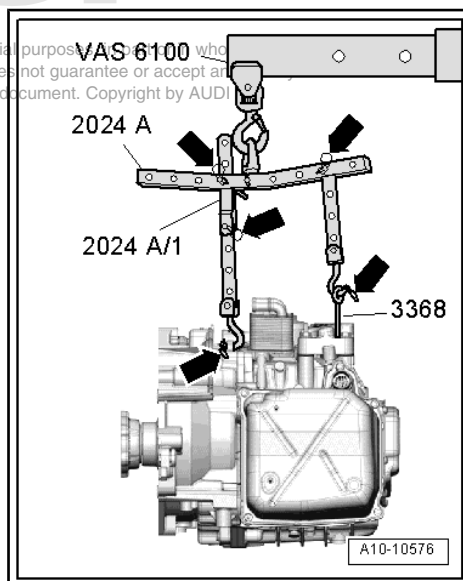
To adjust to the centre of gravity of the assembly, the perforated rails of the support hooks must be positioned as shown.



**WARNING**

Accident risk from loose components of lifting tackle.

- ◆ The support hooks and retaining pins on the lifting tackle must be secured with locking pins -arrows-.



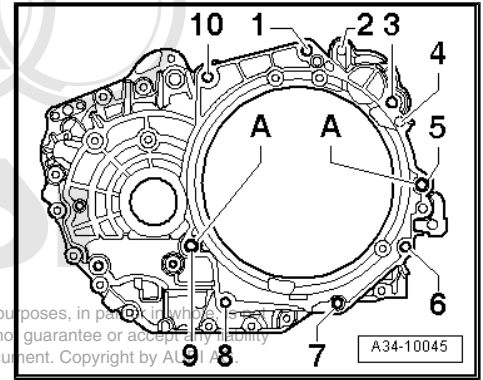
- Raise gearbox slightly.

- Remove bolts -1, 3, 5, 6, 7, 8, 9, 10- securing gearbox to engine.

**i** Note

*Disregard items marked -2, 4 and A-*

- Detach gearbox from engine.



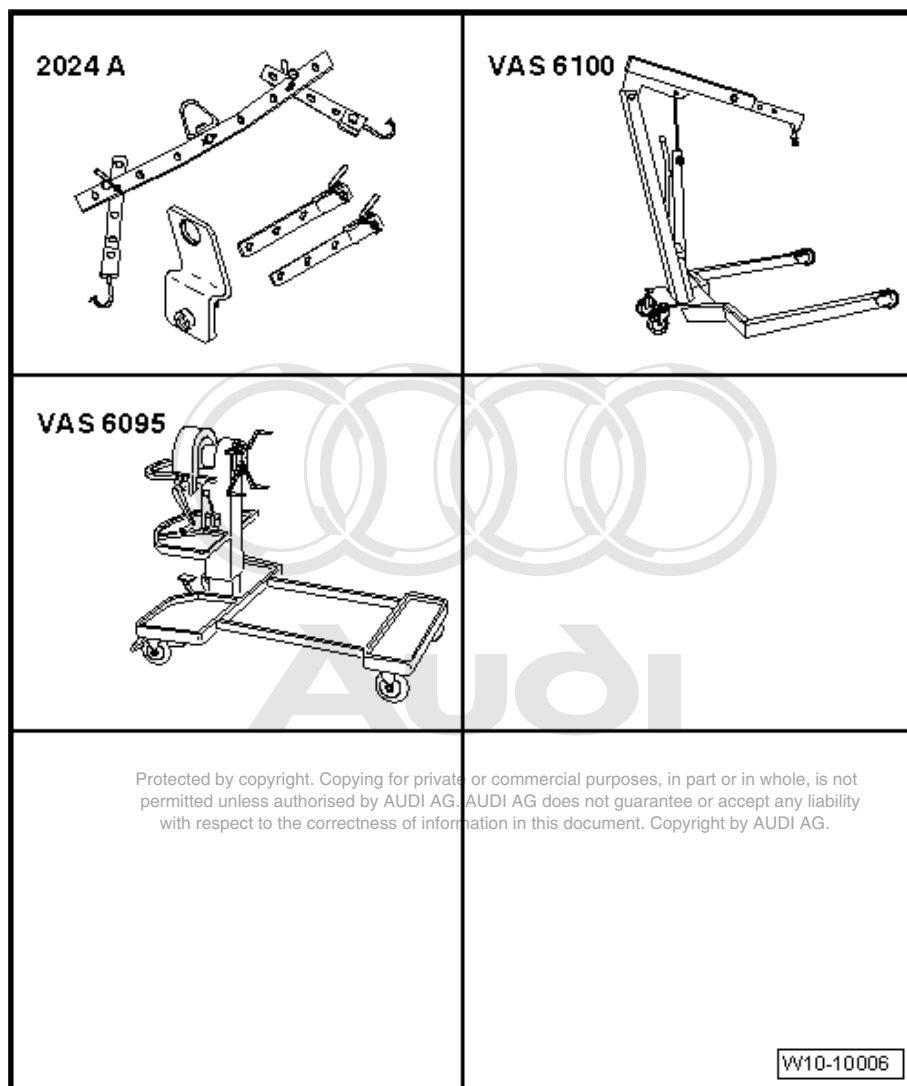
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG



## 4 Securing engine to assembly stand

### Special tools and workshop equipment required

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



### Procedure

- Gearbox detached from engine
  - ⇒ [“2 Separating engine and manual gearbox”, page 27](#) or
  - ⇒ [“3 Separating engine and dual clutch gearbox”, page 29](#) .
- Remove engine cover panel -arrows-.



- Engage lifting tackle - 2024 A- on engine and workshop hoist - VAS 6100- .

 **Note**

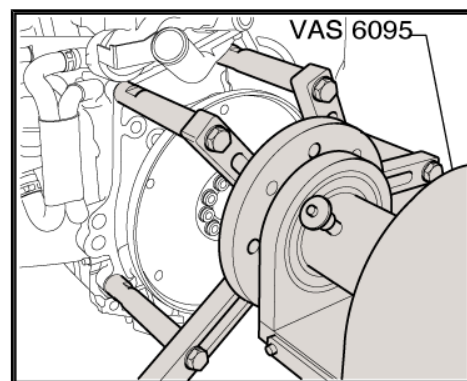
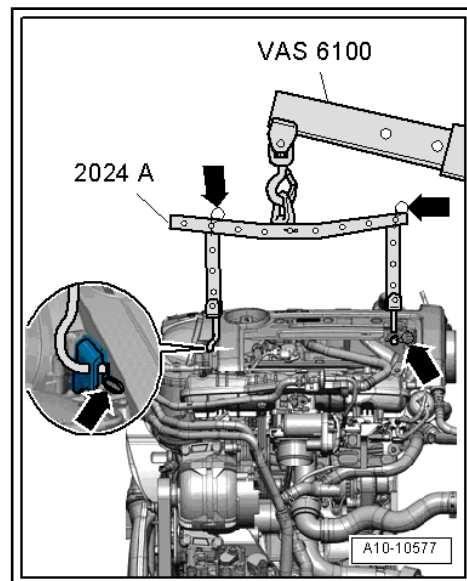
*To adjust to the centre of gravity of the assembly, the perforated rails of the support hooks must be positioned as shown.*

 **WARNING**

**Accident risk from loose components of lifting tackle.**

- ◆ **The support hooks and retaining pins on the lifting tackle must be secured with locking pins -arrows-.**

- Lift engine off engine and gearbox jack - VAS 6100- using workshop hoist - V.A.G 1383 A- .
- Secure engine to engine and gearbox support - VAS 6095- (gearbox end) as shown in illustration.



**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.



## 5 Installing engine

### Tightening torques



#### Note

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

### Tightening torques

⇒ ["6.1 Exploded view - assembly mountings", page 39](#)

### Further tightening torques

Component		Nm
Bolts/nuts	M6	10
	M7	15
	M8	22
	M10	40
	M12	65

- ◆ Assembly mountings
- ◆ Securing manual gearbox or dual clutch gearbox to engine ⇒ Rep. gr. 34 ; Removing and installing gearbox; Tightening torques for gearbox
- ◆ Securing automatic gearbox to engine ⇒ Rep. gr. 37 ; Removing and installing gearbox; Tightening torques for gearbox
- ◆ Securing starter to gearbox ⇒ Electrical system; Rep. gr. 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 for the content of this document. Copyright by AUDI AG.

### Procedure

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

- Engine attached to engine bracket -T10359- .



#### Note

- ◆ *Renew self-locking nuts and bolts.*
- ◆ *Renew bolts which are tightened to a specified angle as well as seals and gaskets.*
- ◆ *Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ Electronic parts catalogue .*
- ◆ *Fit cable ties in the original positions when installing.*
- If not already fitted, install dowel sleeves for centring engine and gearbox in cylinder block.

### Vehicles with manual gearbox:

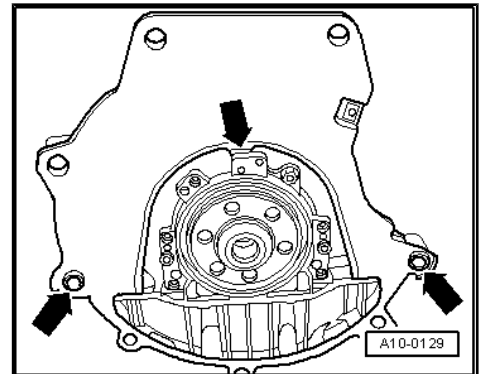
- Remove needle bearing in crankshaft if fitted  
⇒ ["3.7 Extracting and driving in needle bearing for crankshaft", page 73](#) .

**Vehicles with dual clutch gearbox:**

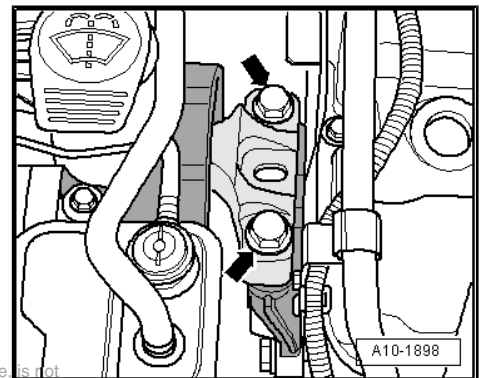
- Install needle bearing if not fitted in crankshaft  
 => "3.7 Extracting and driving in needle bearing for crankshaft",  
 page 73 .

**All vehicles:**

- Ensure that intermediate plate is engaged on sealing flange and pushed onto dowel sleeves -arrows-.
- Secure gearbox to engine.
- Guide engine/gearbox assembly into body.



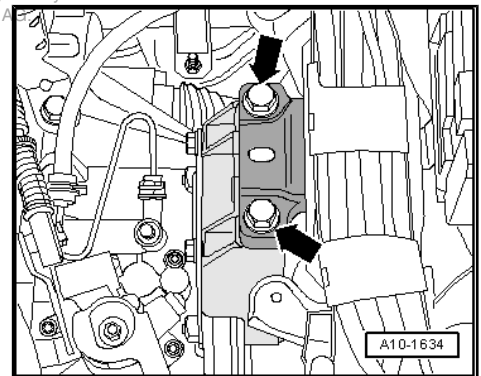
- Tighten bolts securing engine mounting to engine support -arrows- initially hand-tight.



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 the accuracy or completeness of information in this document. Copyright by AUDI AG.

**Vehicles with manual gearbox:**

- Tighten bolts securing gearbox mounting to gearbox bracket -arrows- initially hand-tight.





**Vehicles with dual clutch gearbox:**

- Tighten bolts securing gearbox mounting to gearbox bracket -arrows- initially hand-tight.

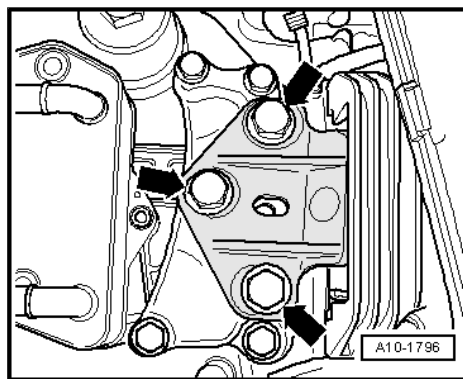
**All vehicles:**



**Note**

*The bolts are tightened to final torque only after adjusting the assembly mountings ⇒ [page 39](#).*

- Detach engine support -T10359- from engine.
- Install drive shafts ⇒ Rep. gr. 40 .
- Install heat shield for drive shaft ⇒ Rep. gr. 39 .
- Install swivel joints ⇒ Rep. gr. 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.

- Install pendulum support ⇒ [page 39](#) .

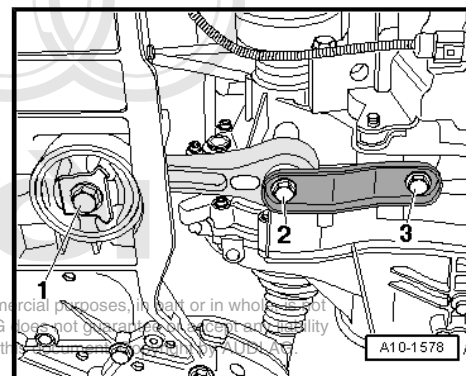
**Vehicles with manual gearbox:**

- Installing and adjusting selector mechanism ⇒ Rep. gr. 34 .

 **Caution**

*Avoid damage to clutch slave cylinder.*

◆ *Do not operate clutch pedal with slave cylinder removed.*



- Install clutch slave cylinder ⇒ Rep. gr. 30 .

**Vehicles with dual clutch gearbox:**


- Install selector lever cable ⇒ Rep. gr. 34 .

**Vehicles with auxiliary heater:**

- Install coolant pipes and exhaust silencer ⇒ Rep. gr. 82 .

**All vehicles:**

- Install front exhaust pipe with catalytic converter ⇒ [page 383](#) .
- Align the exhaust system so it is free of stress ⇒ [page 385](#) .
- Install continued coolant circulation pump - V51- ⇒ [page 257](#) .
- Install air conditioner compressor ⇒ Rep. gr. 87 .
- Install radiator cowl ⇒ [page 277](#) .
- Install poly V-belt ⇒ [page 49](#) .
- Install starter ⇒ Electrical system; Rep. gr. 27 .
- Install throttle valve module - J338- ⇒ [page 358](#) .
- Adjust assembly mountings ⇒ [page 40](#) .
- Electrical connections and routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Install battery ⇒ Electrical system; Rep. gr. 27 .
- Install wiper arms ⇒ Electrical system; Rep. gr. 92 .
- Check oil level ⇒ Maintenance ; Booklet 808 .

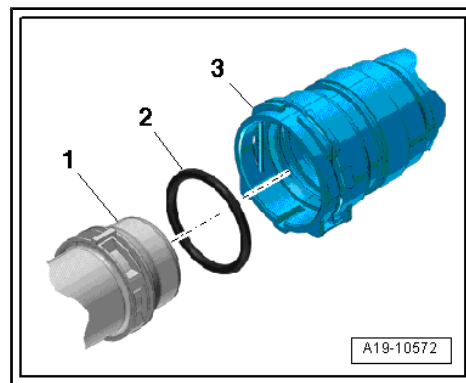
 **Caution**

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

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



- Connect coolant hose with plug-in connector ⇒ [page 277](#) .
- Fill up with coolant ⇒ [page 248](#) .
- After renewing engine, misfire adaptations must be reset. To do so, select 01 - Reset adaptations misfires in Guided Functions mode of ⇒ Vehicle diagnostic tester.



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.

## 6 Assembly mountings

⇒ "6.1 Exploded view - assembly mountings", page 39

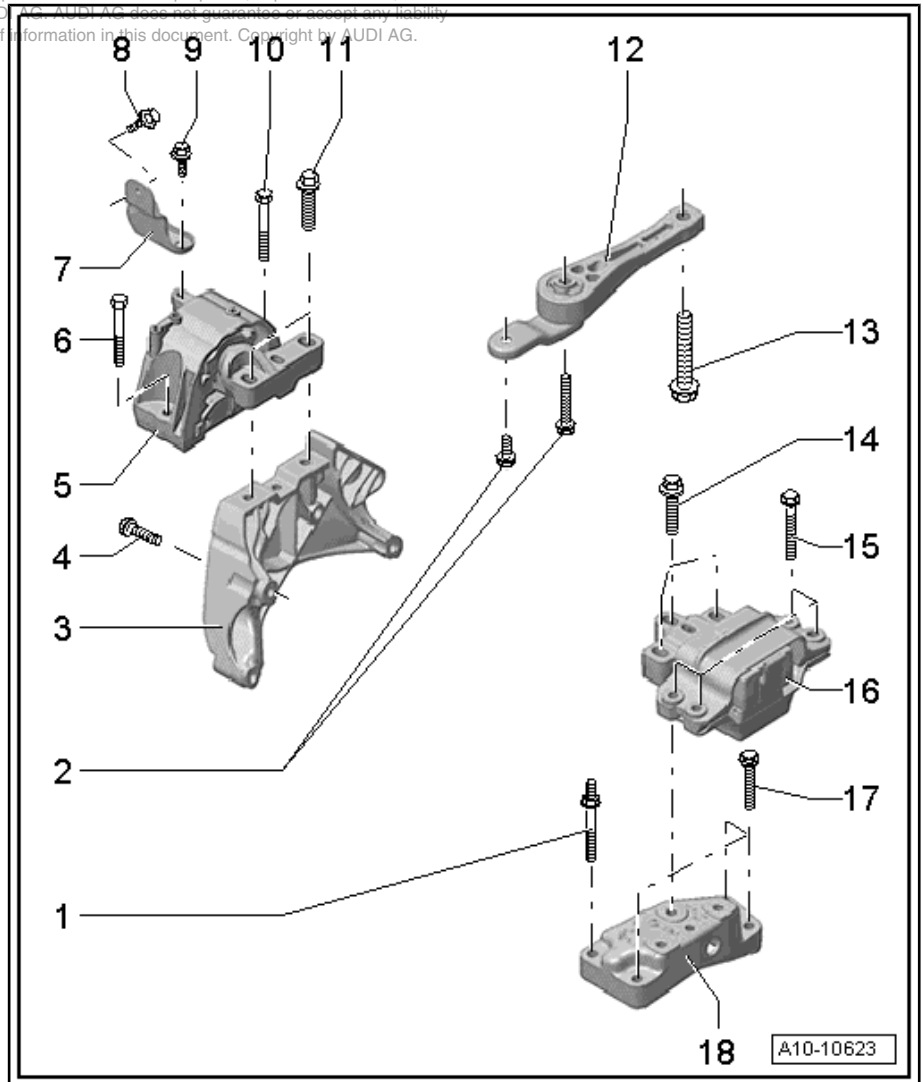
⇒ "6.2 Checking adjustment of assembly mountings (engine/gearbox mountings)", page 40

⇒ "6.3 Adjusting assembly mountings", page 40

### 6.1 Exploded view - assembly mountings

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 - Bolt**
- Bracket to gearbox
  - Tightening torque ⇒ Rep. gr. 34
- 2 - Bolts**
- Pendulum support to gearbox
  - Tightening torque ⇒ Rep. gr. 34
- 3 - Engine support**
- 4 - Bolt**
- Engine support to engine
  - Renew
  - 40 Nm + turn +180° further
- 5 - Engine mounting**
- 6 - Bolt**
- Engine mounting to body
  - Renew
  - 40 Nm + turn 90° further
- 7 - Connecting bracket**
- 8 - Bolt**
- Connecting bracket to engine mounting
  - Renew
  - 20 Nm + turn 90° further
- 9 - Bolt**
- Connecting bracket to body
  - Renew
  - 20 Nm + turn 90° further
- 10 - Bolt**
- Engine mounting to body
  - Renew
  - 40 Nm + turn 90° further
- 11 - Bolts**
- Engine mounting to engine support
  - Renew
  - 60 Nm + turn 90° further





## 12 - Pendulum support

### 13 - Bolt

- Pendulum support to subframe
- Tightening torque ⇒ Rep. gr. 34

### 14 - Bolt

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

### 15 - Bolt

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

### 16 - Gearbox mounting

- Illustration shows version for dual clutch gearbox

### 17 - Bolt

- Gearbox bracket to gearbox
- Tightening torque ⇒ Rep. gr. 34

### 18 - Gearbox bracket

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.

## 6.2 Checking adjustment of assembly mountings (engine/gearbox mountings)

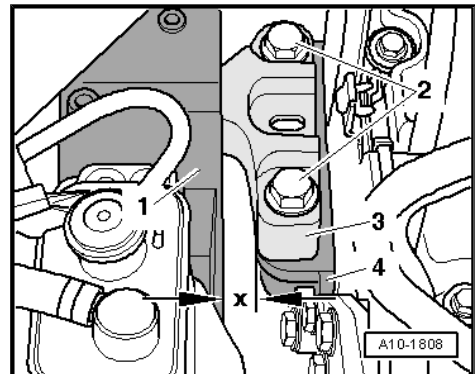
### Procedure

- Check distances at mounting (right-side) for engine and gearbox:
- The two bolt heads -2- must be parallel with edge of support arm -3- for engine mounting.
- There must be a distance of -x- = 16 mm between engine mounting -1- and engine support -4-.

### Note

*Distance -x- = 16 mm can also be checked with a metal rod of suitable size, or similar.*

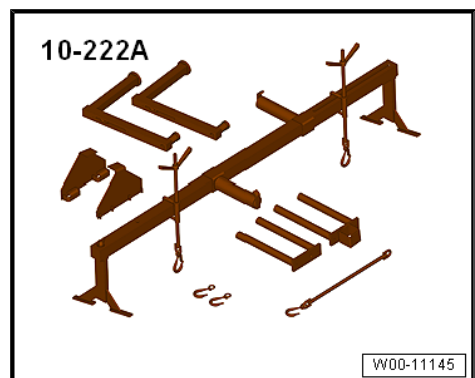
- If the distance measured is too large or small, the assembly mountings must be adjusted ⇒ [page 40](#).



## 6.3 Adjusting assembly mountings

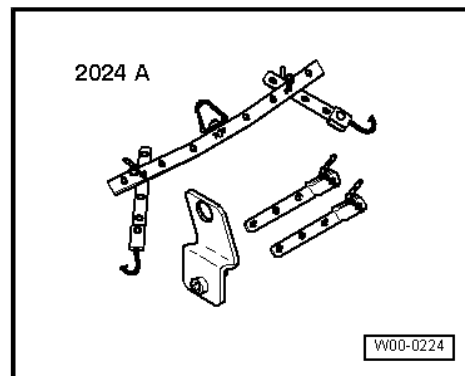
### Special tools and workshop equipment required

- ◆ Support bracket - 10 - 222 A- with spindle - 10 - 222 A /11- and adapter - 10 - 222 A /20-

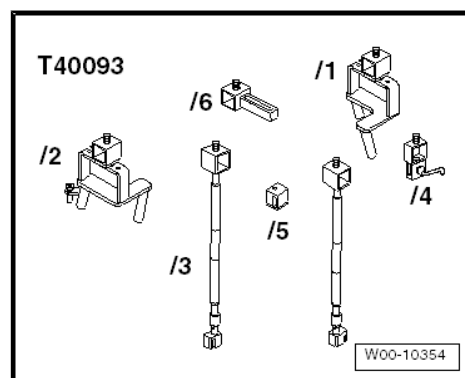




◆ Lifting tackle - 2024 A-



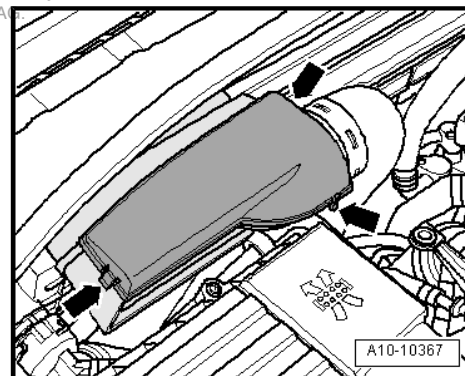
◆ Engine support supplement set - T40093-



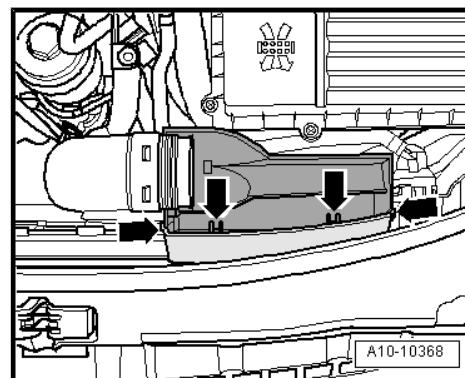
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG

**Adjusting**

- Tightening torques  
 ⇒ ["6.1 Exploded view - assembly mountings", page 39](#)
- Pull cover off air duct (release clips on sides) -arrows-.



- Unclip air duct at the bottom by releasing clips -arrows-.
- Detach air duct at bottom together with air hose.



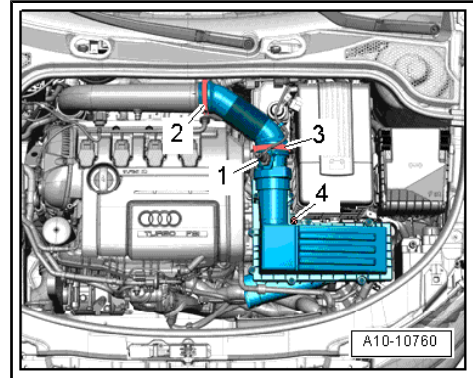


- Unplug electrical connector -1- at air mass meter - G70- .
- Detach air hose -2-.
- Unscrew bolt -4- and remove air cleaner housing.



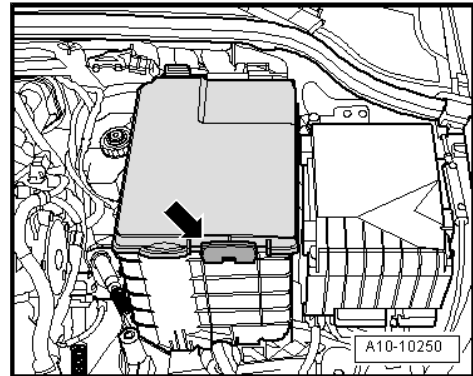
**Note**

-Item 3- can be disregarded.



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

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

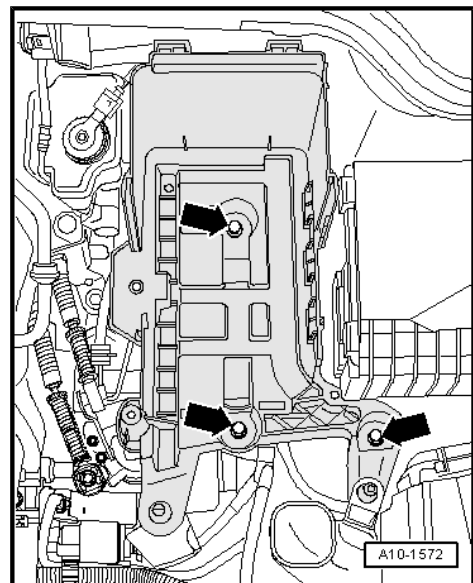
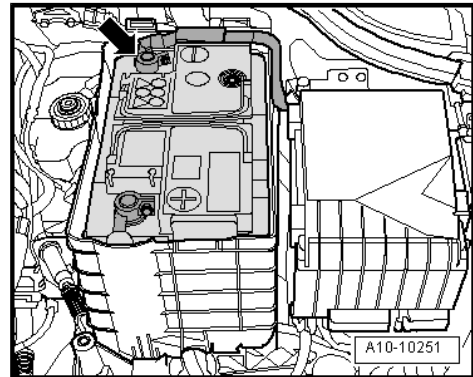


**Caution**

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

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

- With ignition switched off, disconnect battery earth cable -arrow-.
- Remove battery ⇒ Electrical system; Rep. gr. 27 .
- Remove battery tray -arrows-.

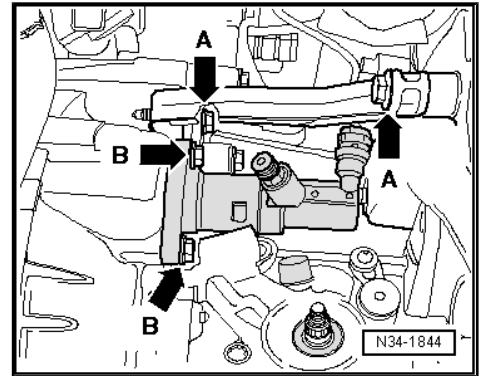


**Vehicles with manual gearbox:**

- Remove gearbox support -arrows A-.

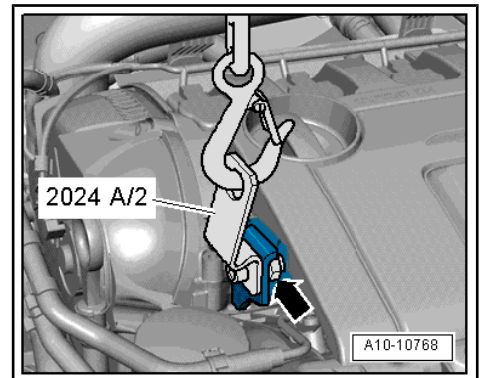


*Disregard -arrows B-.*



**All vehicles:**

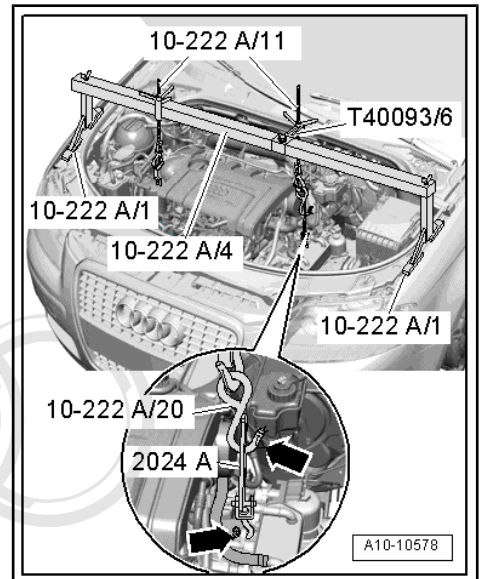
- Secure lifting eye -2024 A/2- to engine lifting eye using flange nut -arrow-.



- Position support bracket - 10 - 222 A- on top of body flanges using the following tools:

- ◆ Rack - 10 - 222 A /1- (2x)
- ◆ Spindle - 10 - 222 A /11- (2x)
- ◆ Adapter - 10 - 222 A /20-
- ◆ Support hook from -2024 A-
- ◆ Adapter -T40093/6-

- Attach spindle - 10 - 222 A /11- with adapter - 10 - 222 A /20- and support hook from -2024 A- to gearbox lifting eye.



**WARNING**

***Accident risk from loose components of support bracket.***

- ◆ ***The support hooks and retaining pins on the support bracket must be secured with locking pins -arrows-.***

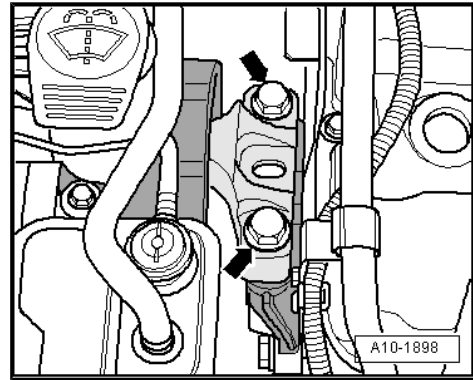
- Hook spindle - 10 - 222 A /11- with lifting eye -2024 A /2- onto engine lifting eye.
- Take up weight of engine/gearbox assembly by evenly tightening two spindles.

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.

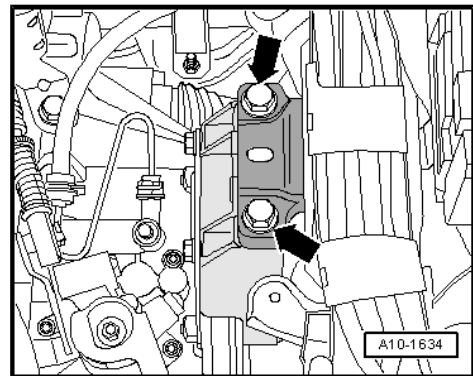


**Vehicles with manual gearbox:**

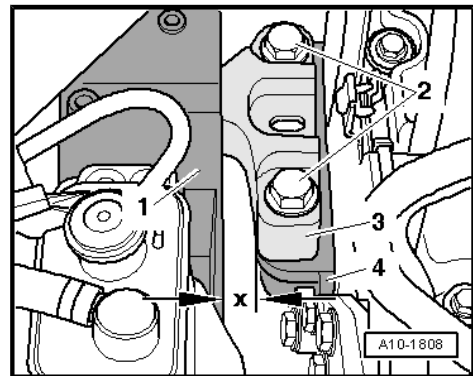
- Remove bolts for engine mounting from engine support -arrows- one by one and renew (if they were not renewed when installing engine).
- Initially fit bolts hand-tight.



- Remove bolts for gearbox mounting from gearbox bracket -arrows- one by one and renew (if they were not renewed when installing engine).



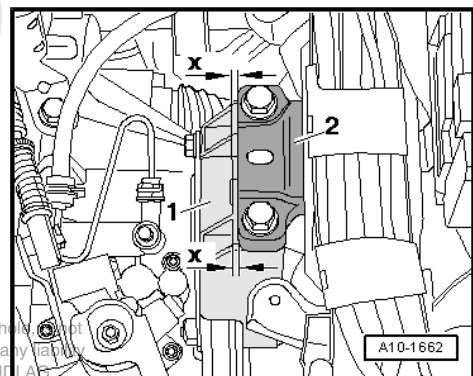
- Using a tyre iron, adjust engine/gearbox assembly between engine support -1- and support arm -3- of engine mounting until the specifications listed below are obtained:
- The two bolt heads -2- must be parallel with edge of support arm -3- for engine mounting.
- There must be a distance of -x- = 16 mm between engine mounting -1- and engine support -4-.



**Note**

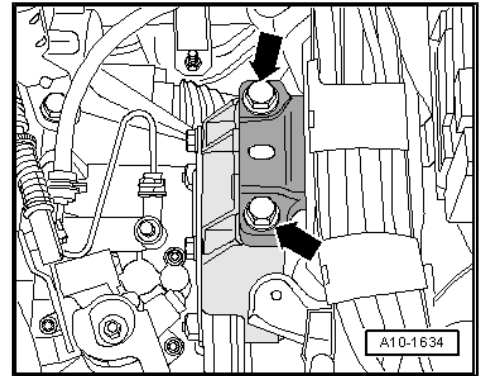
*Distance -x- = 16 mm can also be checked with a metal rod of suitable size, or similar.*

- Tighten bolts securing engine mounting to engine support.
- Ensure that edges of support arm (on gearbox side) -1- and gearbox mounting -2- are parallel.
- Dimension -x- must be identical on both sides of mounting.



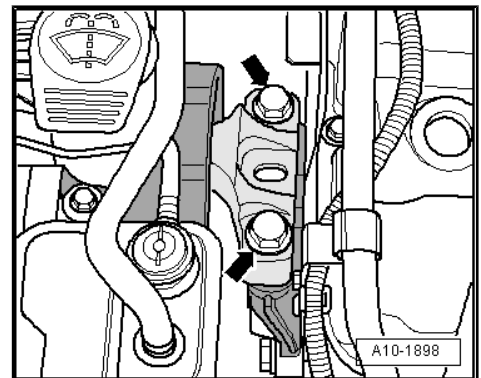
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Tighten bolts securing gearbox mounting to gearbox bracket -arrows-.

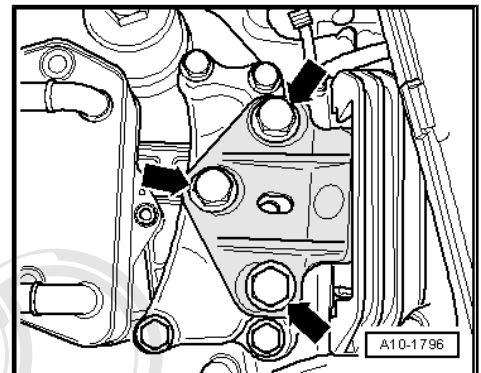


**Vehicles with dual clutch gearbox:**

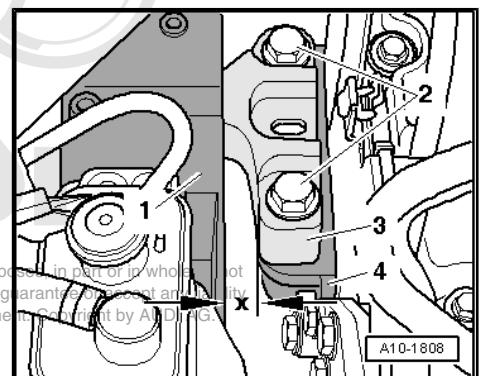
- Remove bolts for engine mounting from engine support -arrows- one by one and renew (if they were not renewed when installing engine).
- Initially fit bolts hand-tight.



- Remove bolts for gearbox mounting from gearbox bracket -arrows- one by one and renew (if they were not renewed when installing engine).



- Using a tyre iron, adjust engine/gearbox assembly between engine support -1- and support arm -3- of engine mounting until the specifications listed below are obtained:
  - The two bolt heads -2- must be parallel with edge of support arm -3- for engine mounting.
  - There must be a distance of -x- = 16 mm between engine mounting -1- and engine support -4-.



**Note**

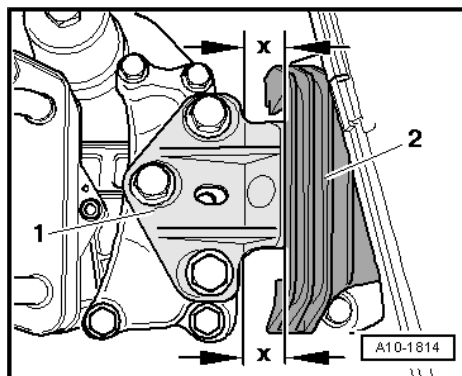
Protected by copyright. Copying for private or commercial purposes in part or in whole is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee the exact accuracy with respect to the correctness of information in this document. Copyright by Audi AG.

*Distance -x- = 16 mm can also be checked with a metal rod of suitable size, or similar.*

- Tighten bolts securing engine mounting to engine support.



- Ensure that edges of support arm (on gearbox side) -1- and gearbox mounting -2- are parallel.
- Dimension -x- must be identical on both sides of mounting.

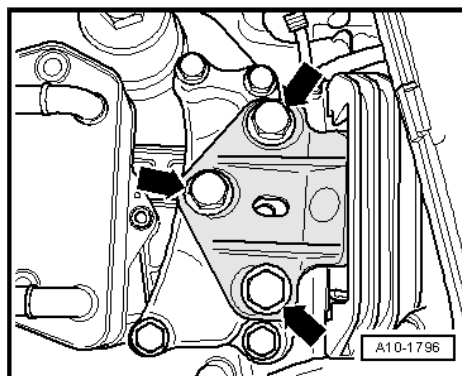


- Tighten bolts securing gearbox mounting to gearbox bracket -arrows-.

**All vehicles:**

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

- Install battery ⇒ Electrical system; Rep. gr. 27 .
- Install air cleaner housing ⇒ [page 329](#) .



**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.

## 13 – Crankshaft group

### 1 Cylinder block (pulley end)

- ⇒ [“1.1 Exploded view - poly V-belt drive”, page 47](#)
- ⇒ [“1.2 Removing and installing poly V-belt”, page 49](#)
- ⇒ [“1.3 Removing and installing tensioner for poly V-belt”, page 51](#)
- ⇒ [“1.4 Removing and installing bracket for ancillaries”, page 54](#)
- ⇒ [“1.5 Removing and installing vibration damper”, page 55](#)

#### 1.1 Exploded view - poly V-belt drive

##### 1 - Vibration damper

- With poly V-belt pulley
- Removing and installing  
 ⇒ [“1.5 Removing and installing vibration damper”, page 55](#)

##### 2 - O-ring

- Not available as replacement part; supplied together with bolt

##### 3 - Bolt

- Renew
- Lubricate O-ring with oil
- 150 Nm + turn 90° further

##### 4 - Poly V-belt

- Check for wear
- Do not kink



##### Caution

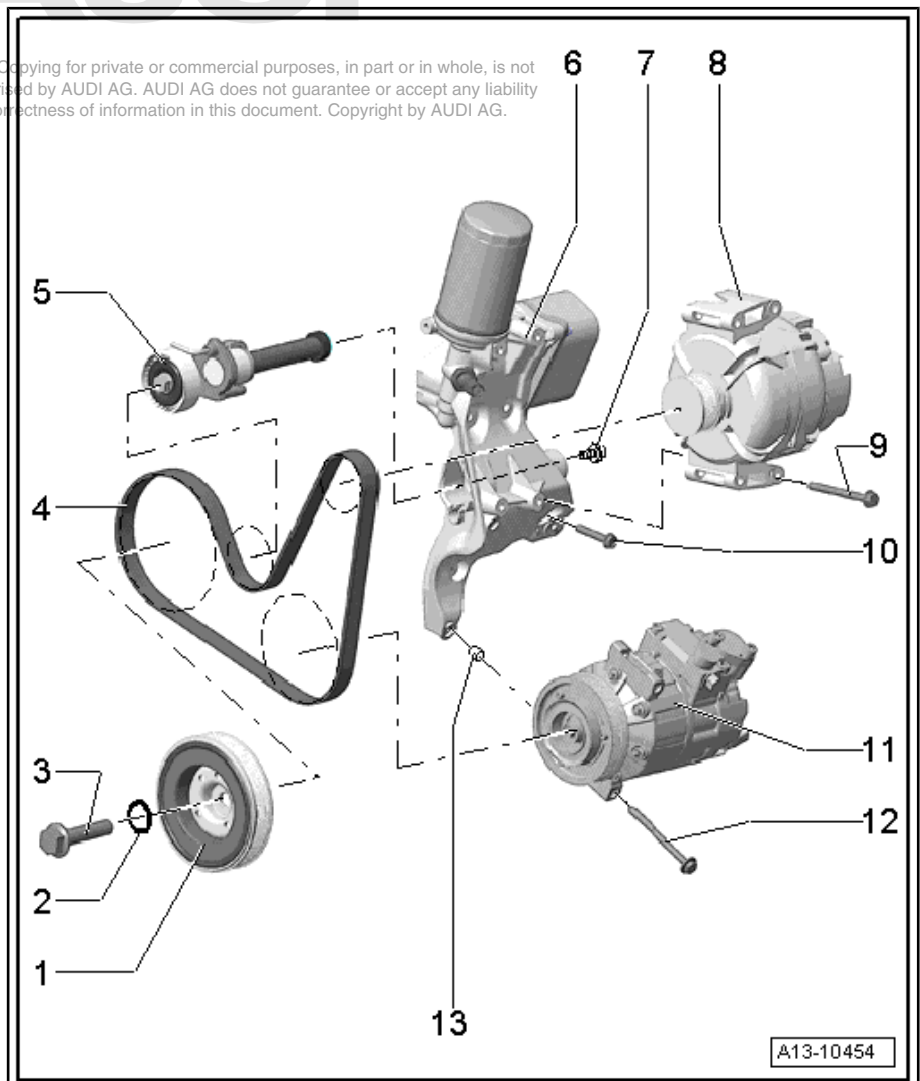
*Wrong direction of rotation for a used poly V-belt can lead to irreparable damage.  
 Before removing the poly V-belt mark the direction of rotation with chalk or a felt-tip pen for re-installation.*

- Removing and installing  
 ⇒ [“1.2 Removing and installing poly V-belt”, page 49](#)

- When installing, make sure it is properly seated on pulleys.

##### 5 - Tensioner for poly V-belt

- Pivot with open-end spanner to slacken poly V-belt
- Lock in position with locking pin - T10060 A- .
- Components of tensioner for poly V-belt ⇒ [page 48](#)



- ❑ Removing and installing ⇒ [“1.3 Removing and installing tensioner for poly V-belt”, page 51](#)

## 6 - Bracket for ancillaries

- ❑ With oil filter and engine oil cooler
- ❑ Removing and installing bracket for ancillaries  
⇒ [“1.4 Removing and installing bracket for ancillaries”, page 54](#)
- ❑ Removing and installing engine oil cooler ⇒ [“2.2 Removing and installing engine oil cooler”, page 235](#)

## 7 - Bolt

- ❑ 10 Nm

## 8 - Alternator

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

## 9 - Bolt

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

## 10 - Bolt

- ❑ Tightening sequence ⇒ [page 49](#)

## 11 - Air conditioner compressor

- ❑ Do not unscrew or disconnect refrigerant hoses or pipes
- ❑ Removing and installing ⇒ Rep. gr. 87

## 12 - Bolt

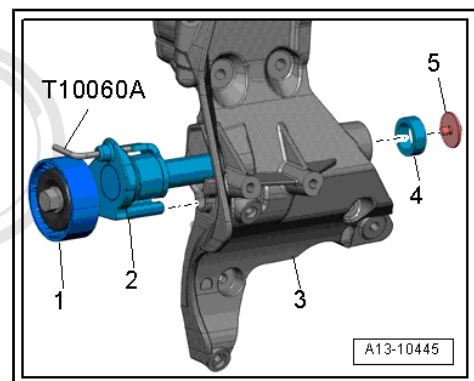
- ❑ 25 Nm

## 13 - Dowel sleeve

- ❑ For air conditioner compressor

## Components of tensioner for poly V-belt

- 1 - Tensioner for poly V-belt
- 2 - Support element
- 3 - Bracket for ancillaries
- 4 - Centring sleeve
- 5 - Bolt

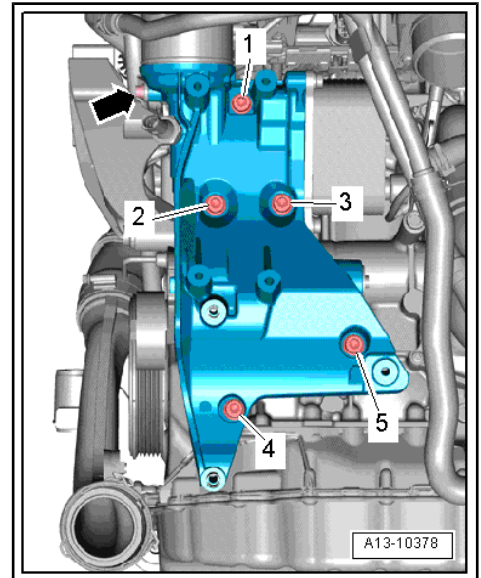
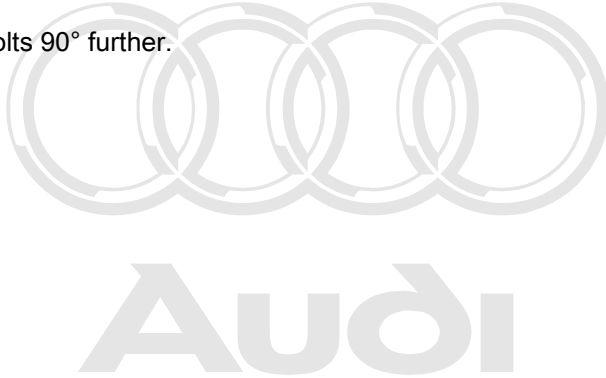


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



### Tightening sequence on bracket for ancillaries

- Fit bracket for ancillaries (first tighten bolt -4-).
- Tighten bolts in the sequence -1 ... 5- in 3 stages as follows:
  1. Tighten bolts hand tight.
  2. Tighten bolts to 20 Nm.
  3. Turn bolts 90° further.

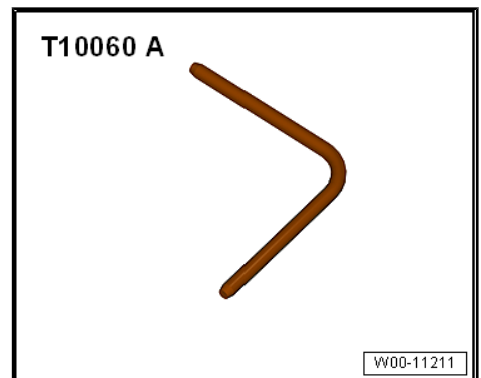


## 1.2 Removing and installing poly V-belt

### Special tools and workshop equipment required

- ◆ 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 for errors or omissions in this document. Copyright by AUDI AG.

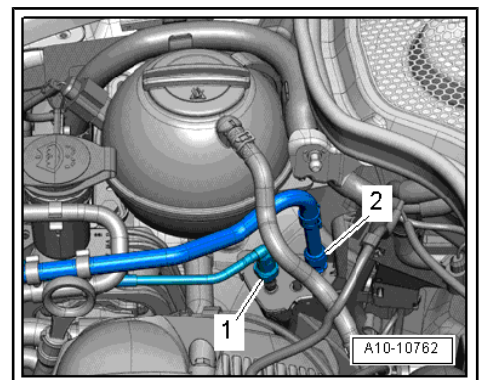


### Removing

- Disconnect vacuum line -1- going to activated charcoal filter (press release tab).
- Move clear vacuum line on coolant pipe.

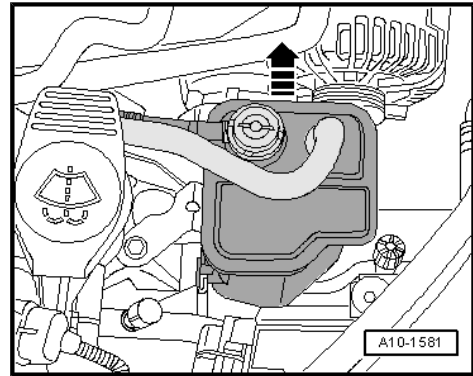


-Item 2- can be disregarded.





- Pull activated charcoal filter upwards out of the bracket -arrow- and place to side (pipes/hoses remain attached).

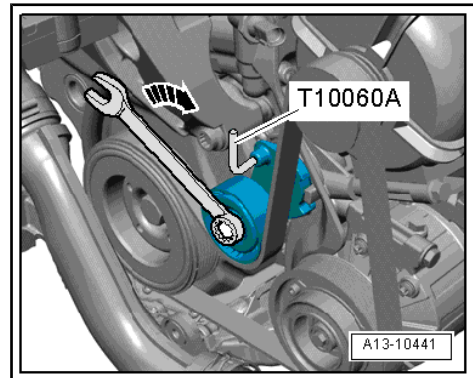


**Caution**

*Wrong direction of rotation for a used poly V-belt can lead to irreparable damage.*

- ◆ *Before removing the poly V-belt mark the direction of rotation with chalk or a felt-tip pen for re-installation.*

- To slacken poly V-belt turn tensioner in direction of -arrow-.
- Lock tensioner with locking pin - T10060 A- .
- Take off poly V-belt.



**Installing**

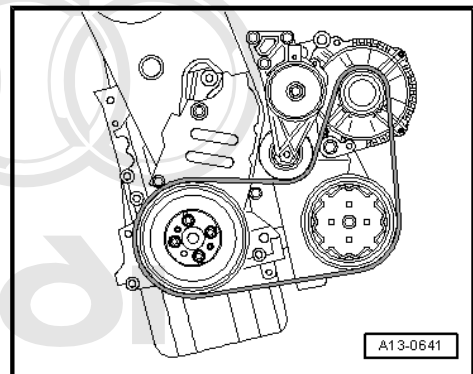
Installation is carried out in the reverse order; note the following:



**Note**

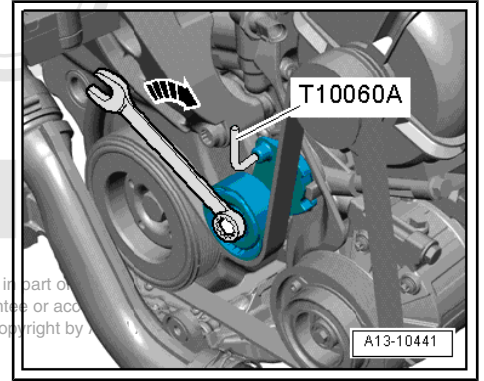
*Fit alternator and air conditioner compressor before fitting poly V-belt.*

- Fit the poly V-belt onto the crankshaft and air conditioner compressor and alternator pulleys.



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.

- Hold tensioner with ring spanner and remove locking pin - T10060 A- .
- Release tensioner.
- Check that poly V-belt is properly seated.
- Start engine and check that poly V-belt runs properly.

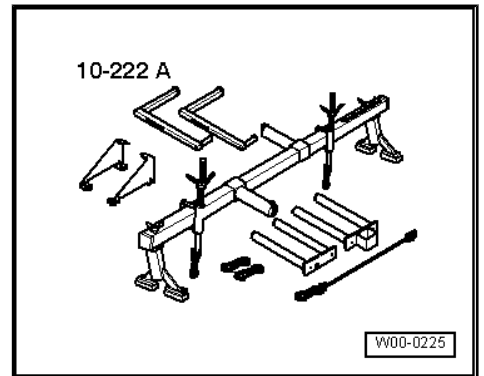


Protected by copyright. Copying for private or commercial purposes, in part or in full, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by Audi AG.

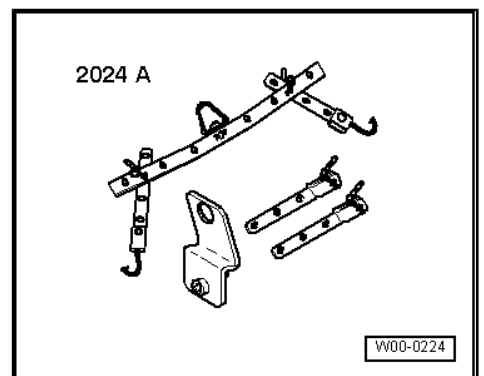
### 1.3 Removing and installing tensioner for poly V-belt

#### Special tools and workshop equipment required

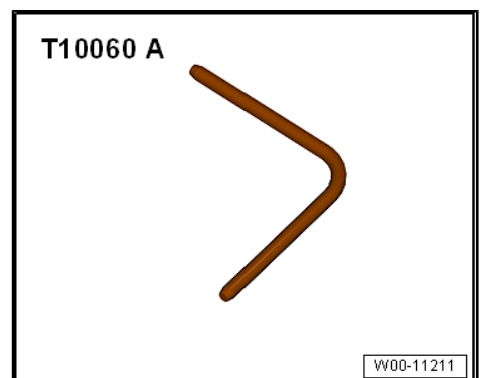
- ◆ Support bracket - 10 - 222 A- with spindle - 10 - 222 A /11-



- ◆ Lifting tackle - 2024 A-



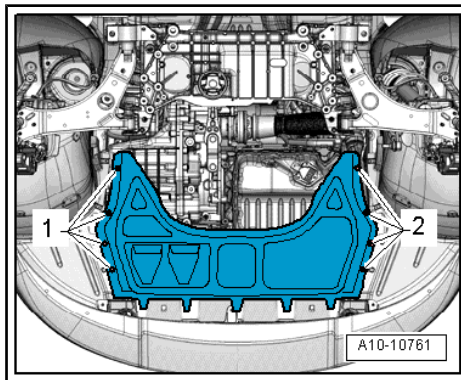
- ◆ Locking pin - T10060 A-





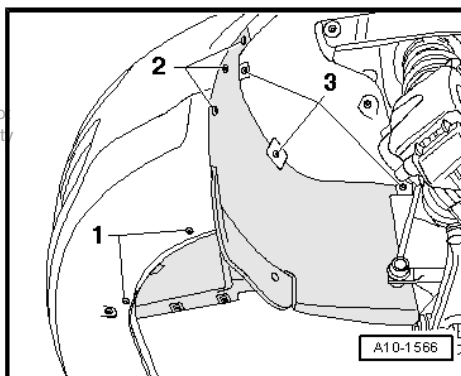
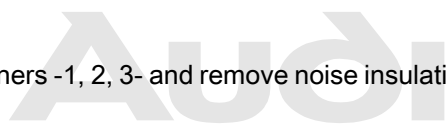
### Removing

- Release fasteners -1 and 2- and remove centre noise insulation.



- Release fasteners -1, 2, 3- and remove noise insulation (right-side).

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.

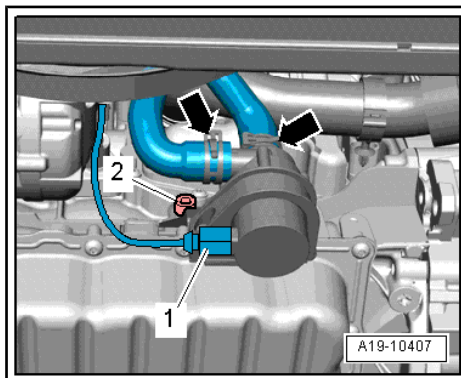


- Remove bolt -2- at bracket for continued coolant circulation pump - V51- .



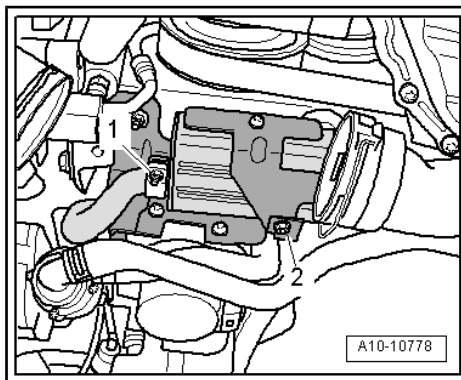
### Note

*Disregard items marked -1 and arrows-.*



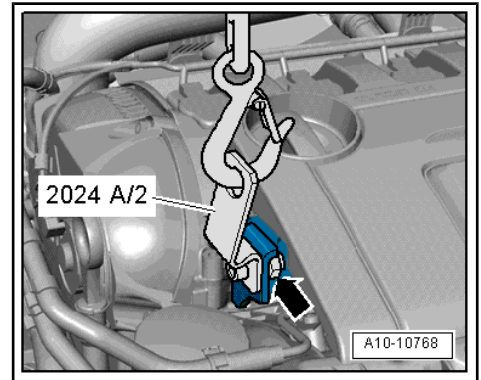
### Vehicles with auxiliary heater:

- Slacken clip -1- and remove bolt -2-.
- Detach exhaust silencer for auxiliary heater.



**All vehicles:**

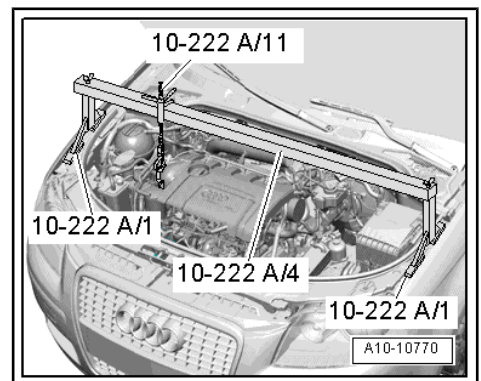
- Secure lifting eye -2024 A /2- to engine lifting eye using flange nut -arrow-.



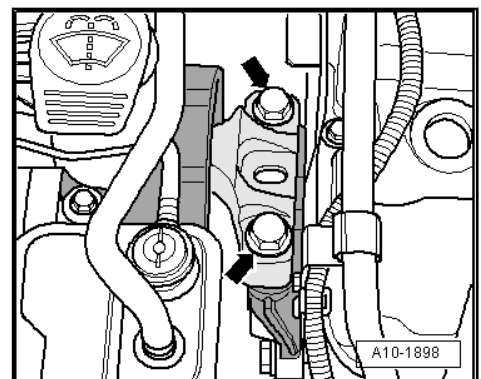
- Position support bracket - 10 - 222 A- on top of body flanges using the following tools:


- ◆ Rack - 10 - 222 A /1- (2x)
- ◆ Spindle - 10 - 222 A /11-

- Take up weight of engine with spindle.



- Remove bolts -arrows- of assembly mounting at engine.
- Lower engine by approx. 55 mm.

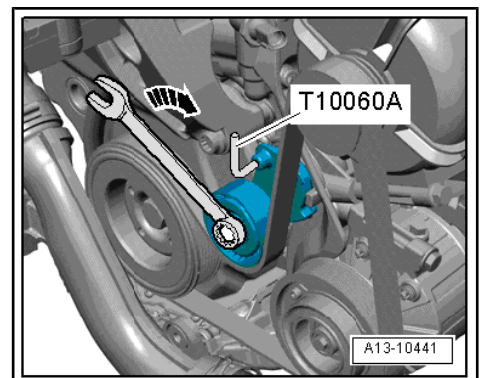


 **Caution**

***Wrong direction of rotation for a used poly V-belt can lead to irreparable damage.***

◆ ***Before removing the poly V-belt mark the direction of rotation with chalk or a felt-tip pen for re-installation.***

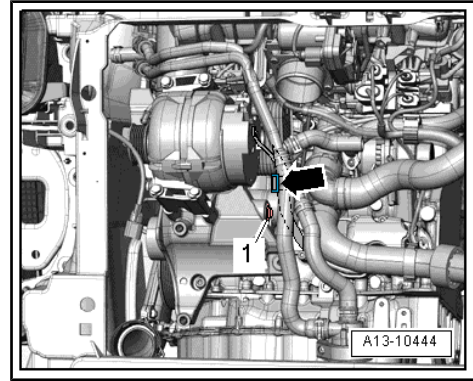
- To slacken poly V-belt turn tensioner in direction of -arrow-.
- Lock tensioner with locking pin - T10060 A- .
- Detach poly V-belt from tensioner.



Printed with 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.



- Move clear electrical wiring harness -arrow-.
- Remove bolt -1- and take off tensioner for poly V-belt from bracket for ancillaries.

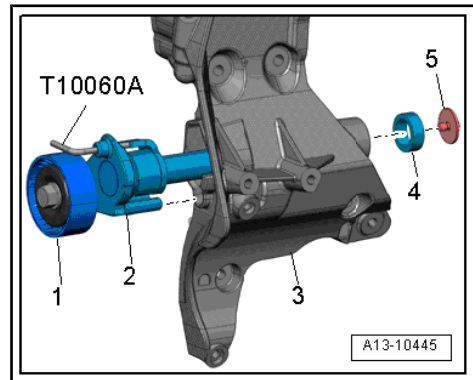


### Installing

- Tightening torque  
⇒ ["1.1 Exploded view - poly V-belt drive", page 47](#)

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

- Insert tensioner -1- for poly V-belt in bracket for ancillaries -3- and tighten bolt -5-.
- Note installation position of support element -2-: fit lug of support element in hole on bracket for ancillaries.
- Note position of centring sleeve -4-.
- Install poly V-belt ⇒ [page 49](#) .
- Install continued coolant circulation pump - V51- ⇒ [page 257](#) .
- Adjust assembly mountings ⇒ [page 40](#) .



## 1.4 Removing and installing bracket for ancillaries

### Removing

- Drain coolant ⇒ [page 247](#) .
- Remove poly V-belt ⇒ [page 49](#) .
- Remove alternator ⇒ Electrical system; Rep. gr. 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.

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

**WARNING**

*Risk of injury caused by refrigerant.*

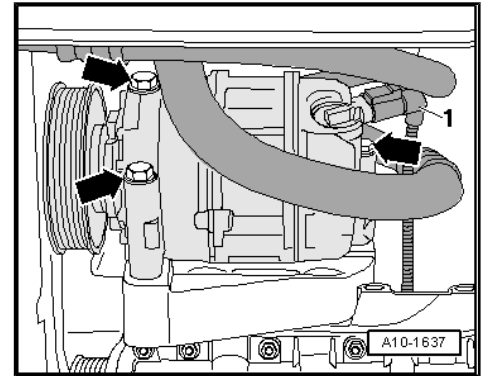
- ◆ *The air conditioner refrigerant circuit must not be opened.*

- Remove bolts -arrows- for air conditioner compressor.

**Caution**

*Danger of damage to refrigerant lines and hoses.*

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



- Tie up air conditioner compressor together with refrigerant hoses to longitudinal member (refrigerant hoses remain connected).
- Remove bolt -arrow- for dipstick guide tube.
- Unscrew bolts -1 ... 5- and detach bracket for ancillaries from coolant pump housing.

**Installing**

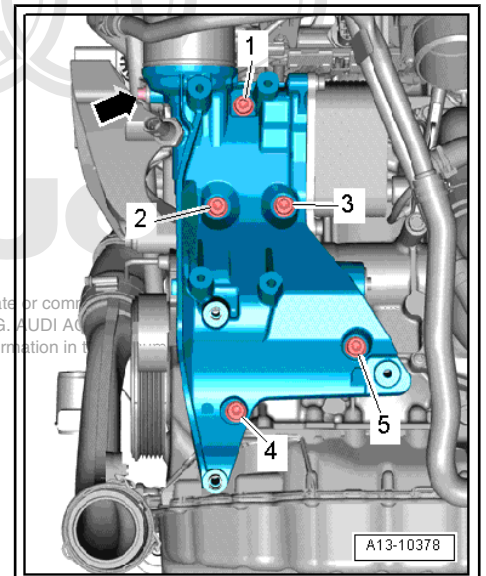
- Tightening torque  
⇒ ["1.1 Exploded view - poly V-belt drive", page 47](#)

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

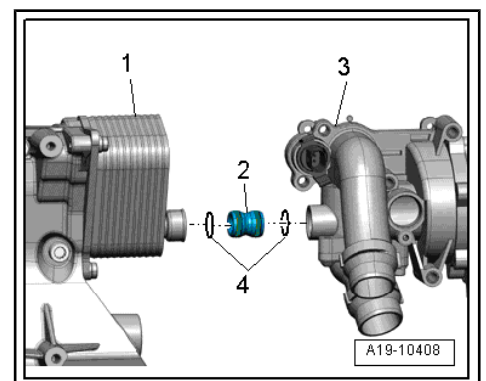
**Note**

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

- ◆ *Renew the bolts tightened with specified tightening angle.*
- ◆ *Renew O-rings and gaskets.*



- Lubricate O-rings -4- with coolant additive, for coolant additive refer to ⇒ [Electronic parts catalogue](#) .
- Insert connection -2- into coolant pump housing -3-.
- Push bracket for ancillaries -1- onto connection, fit bolts and tighten ⇒ [page 49](#) .
- Install air conditioner compressor ⇒ Rep. gr. 87 .
- Install alternator ⇒ Electrical system; Rep. gr. 27 .
- Install poly V-belt ⇒ [page 49](#) .
- Fill up with coolant ⇒ [page 248](#) .

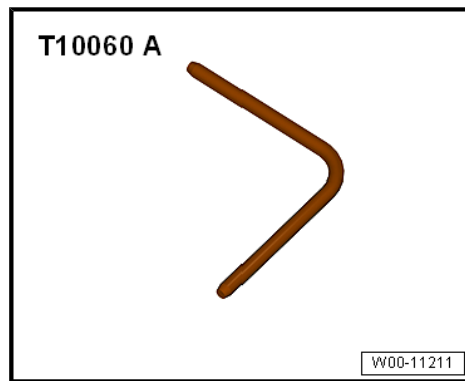


## 1.5 Removing and installing vibration damper

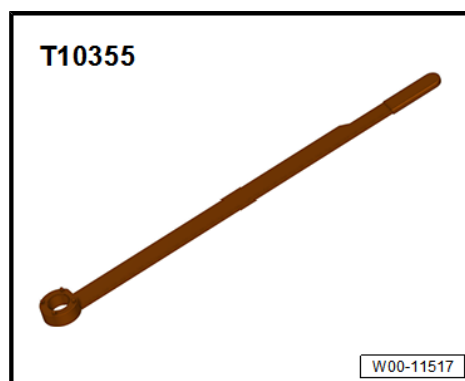
Special tools and workshop equipment required



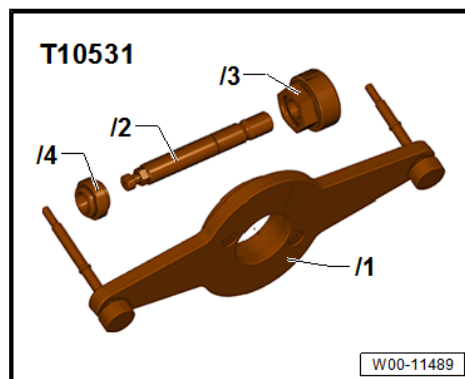
◆ Locking pin - T10060 A-



◆ Counterhold tool - T10355-



◆ Assembly tool - T10531-



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.

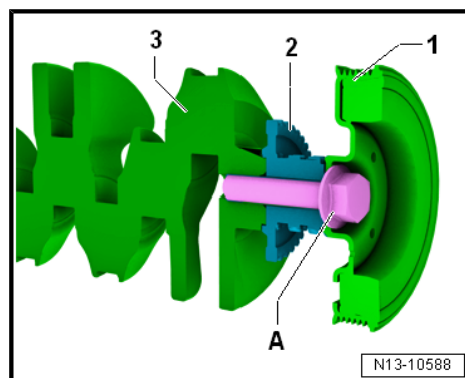
Components of assembly tool - T10531- :

- ◆ Bracket - T10531/1-
- ◆ Clamping pin - T10531/2-
- ◆ Turning-over tool - T10531/3-
- ◆ Flange nut - T10531/4-



**Note**

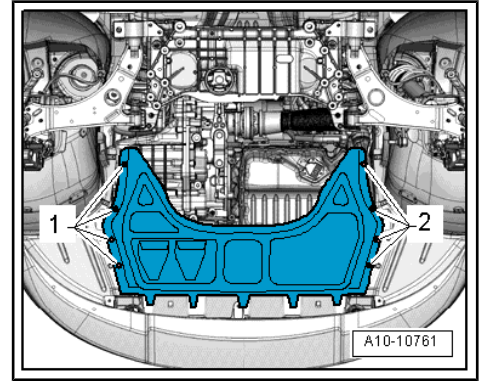
*The securing bolt for the vibration damper -A- secures the vibration damper -1-, timing chain sprocket -2- and crankshaft -3- to each other. Before removing the securing bolt, the timing chain sprocket must be secured to the crankshaft as described below.*



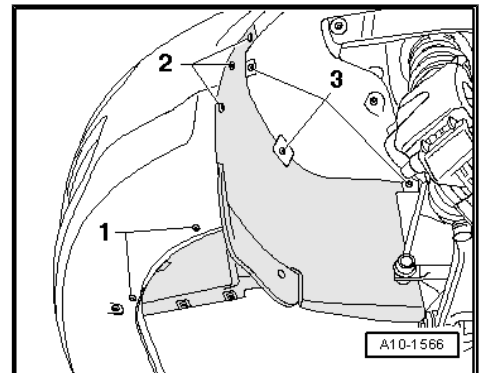


### Removing

- Release fasteners -1 and 2- and remove centre noise insulation.

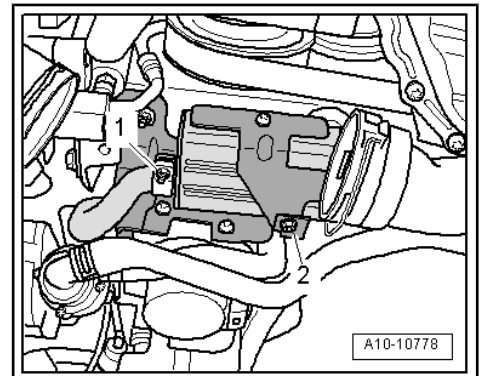


- Release fasteners -1, 2, 3- and remove noise insulation (right-side).



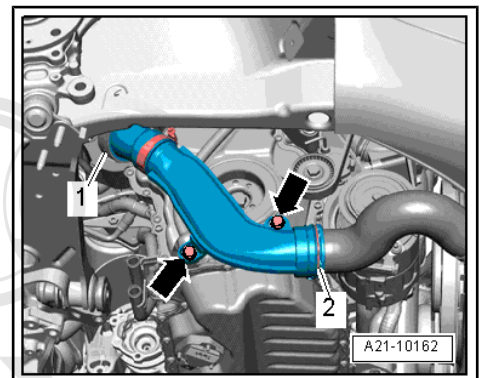
### Vehicles with auxiliary heater:

- Slacken clip -1- and remove bolt -2-.
- Detach exhaust silencer for auxiliary heater.



### All vehicles:

- Remove bolts -arrows-.
- Remove air pipe (lift clips -items 1 and 2-).



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.



**Caution**

*Wrong direction of rotation for a used poly V-belt can lead to irreparable damage.*

- ◆ *Before removing the poly V-belt mark the direction of rotation with chalk or a felt-tip pen for re-installation.*

- To slacken poly V-belt turn tensioner in direction of -arrow-.
- Lock tensioner with locking pin - T10060 A- .
- Remove poly V-belt from pulley on vibration damper.
- Turn vibration damper to "TDC" position -arrow- using counterhold tool - T10355- .
- Notch on vibration damper must align with arrow marking on cover for timing chains (bottom).

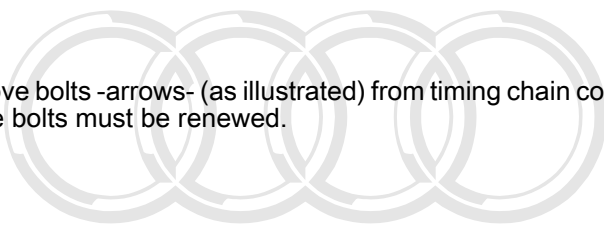
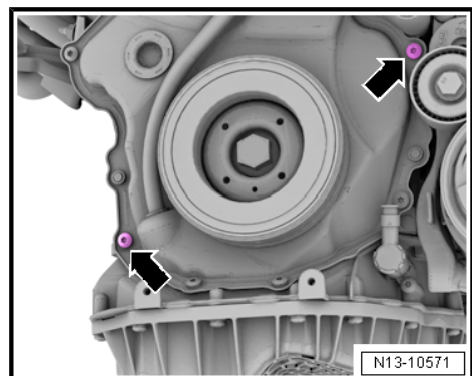
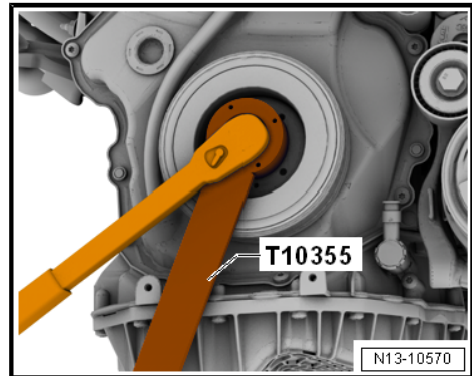
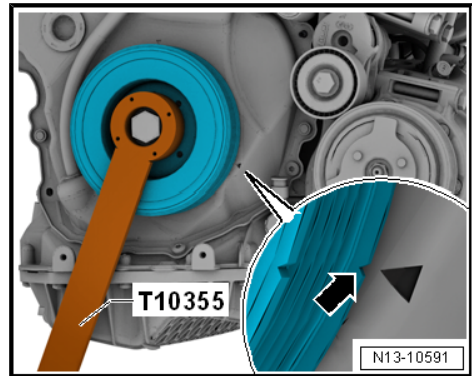
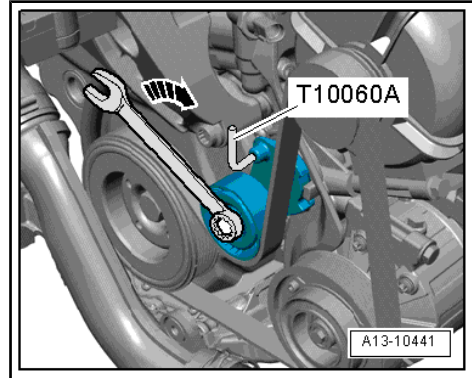


**Caution**

*Do not loosen securing bolt for vibration damper by more than a half turn at this stage.*

- Loosen bolt for vibration damper by approx. a half turn using counterhold tool - T10355- .
- If vibration damper has been twisted out of position, correct TDC position.

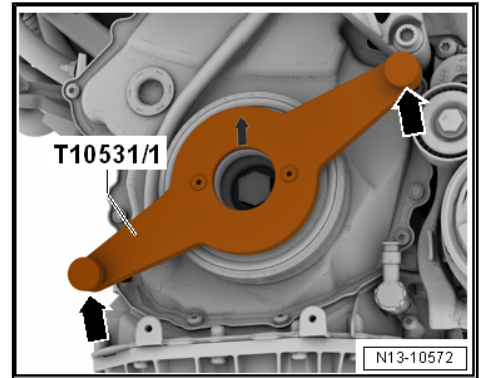
- Remove bolts -arrows- (as illustrated) from timing chain cover. These bolts must be renewed.



**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.

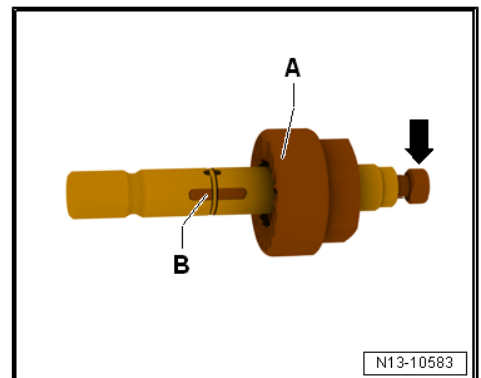
- Apply support - T10531/1- (as illustrated) to vibration damper and secure hand-tight with knurled screws -arrows-.
- Remove bolt for vibration damper completely.



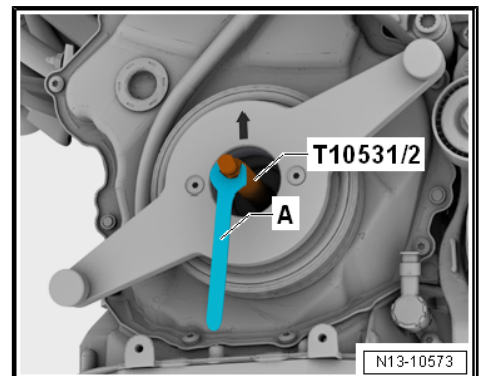
- Check whether turning-over tool -A- slides easily over clamps -B-. Turn tensioning bolt -arrow- if necessary.

**i** Note

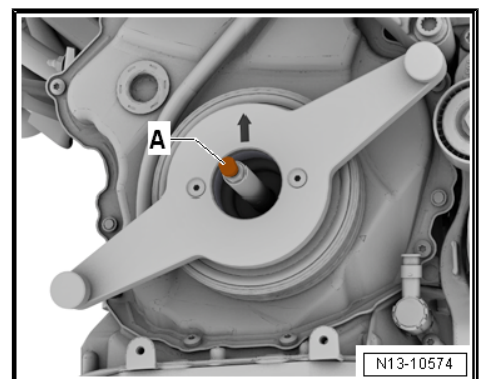
*Do not turn the tensioning bolt from this stage onwards; otherwise the clamping pin - T10531/2- will get stuck when it is screwed into the crankshaft.*



- Screw clamping pin - T10531/2- into crankshaft and hand-tighten with open-end spanner, 12 mm -A-.

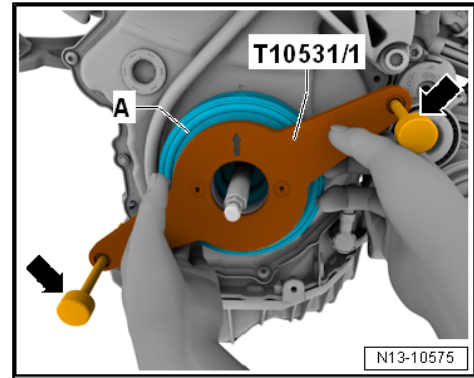


- Hand-tighten tensioning bolt -A- to secure chain sprocket to crankshaft.



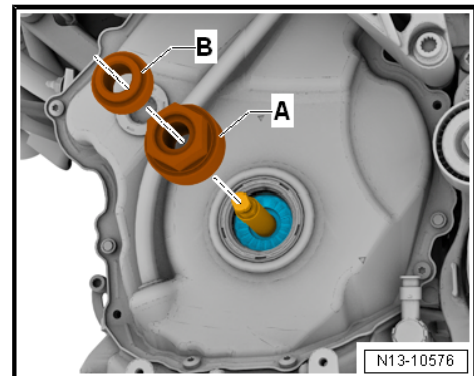
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Remove knurled screws -arrows-. Detach support - T10531/1- and vibration damper -A-.

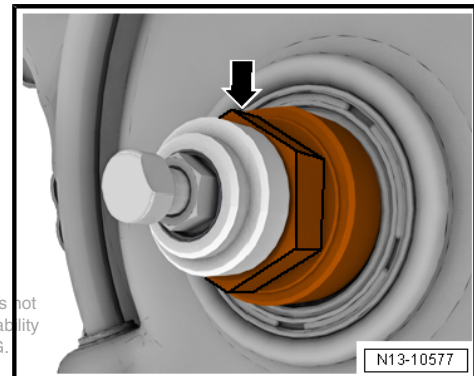


#### If crankshaft needs to be rotated without vibration damper:

- Fit turning-over tool -A- onto clamping pin (pay attention to tooth-shaped profile on chain sprocket). In TDC position, flat surface of tool faces upwards.
- Tighten turning-over tool with flange nut -B-.



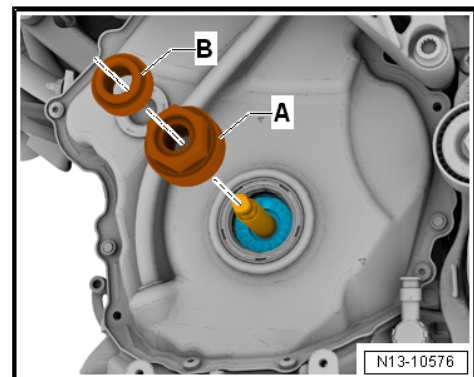
- Crankshaft can now be rotated at hexagon flats -arrow-.



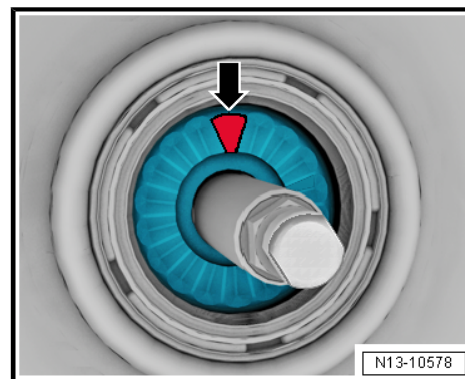
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

#### Installing vibration damper:

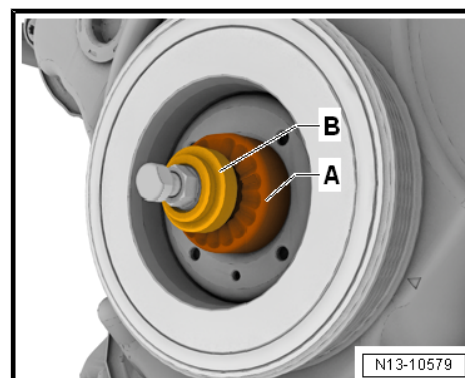
- If necessary, detach flange nut -B- and turning-over tool -A- from clamping pin.



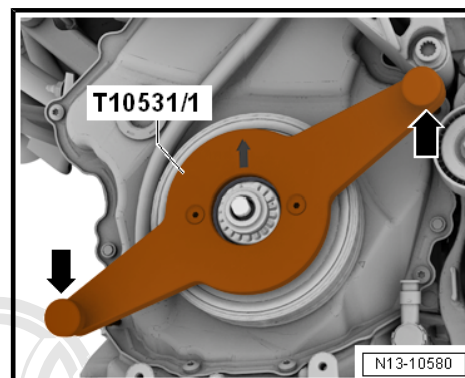
- Fit vibration damper in TDC position (pay attention to tooth-shaped profile -arrow- on chain sprocket).



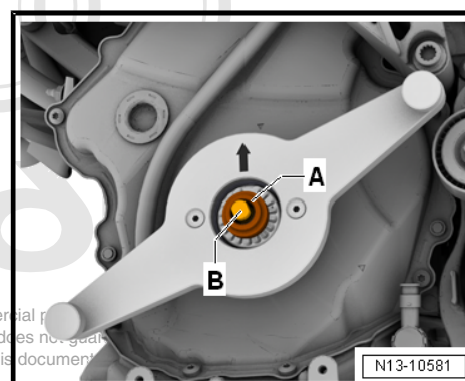
- Fit turning-over tool -A- onto clamping pin so that hexagon flats face towards vibration damper.
- Screw flange nut -B- on while moving vibration damper back and forth slightly to check whether vibration damper is seated correctly in tooth-shaped profile. Tighten flange nut until vibration damper can no longer be rotated.



- Apply support - T10531/1- (as illustrated) to vibration damper and secure hand-tight with knurled screws -arrows-.



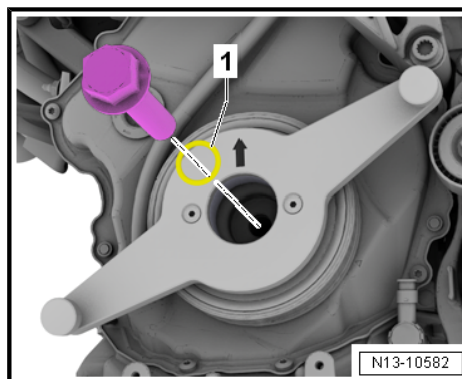
- Unscrew flange nut -A- and loosen tensioning bolt -B-.
- Unscrew clamping pin and remove with turning-over tool.



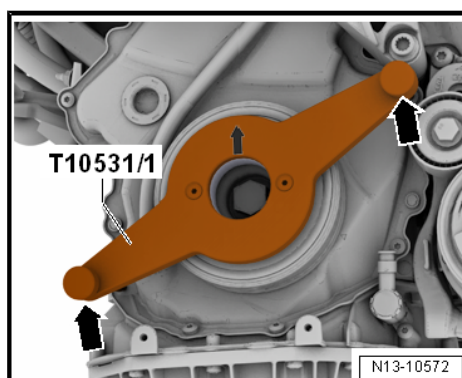
Protected by copyright. Copying for private or commercial purposes is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee the correctness of information in this document.



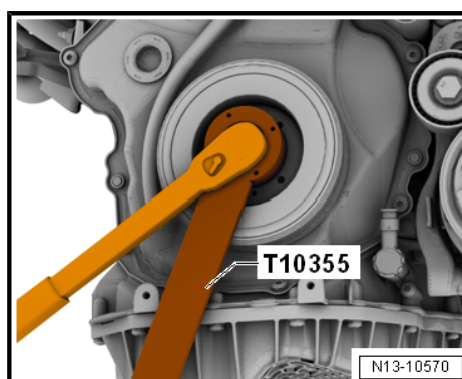
- Screw in new bolt for vibration damper with lubricated O-ring -1- hand-tight.



- Remove knurled screws -arrows- and detach support - T10531/1- .



- Tighten bolt for vibration damper using counterhold tool - T10355- .

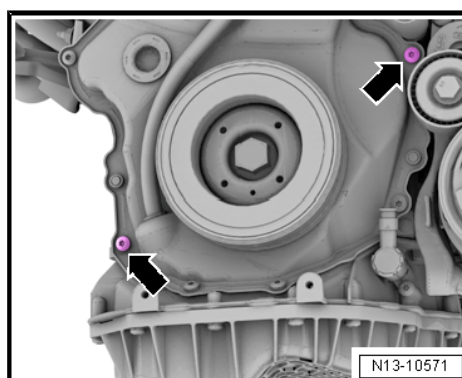


- Screw in new securing bolts -arrows-.



**Note**

- ◆ *Renew bolt for vibration damper.*
- ◆ *The O-ring -1- is supplied with the bolt; lubricate with engine oil before installing.*
- ◆ *Hose connections and air pipes and hoses must be free of oil and grease before assembly.*



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

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**

- ◆ ⇒ ["1.1 Exploded view - poly V-belt drive", page 47](#) .
- ◆ ⇒ ["1.1 Exploded view - timing chain cover, camshaft control valve 1 N205", page 91](#)

## 2 Cylinder block (gearbox end)

⇒ "2.1 Exploded view - cylinder block (gearbox end)", page 63

⇒ "2.2 Removing and installing dual-mass flywheel", page 64

⇒ "2.3 Removing and installing sealing flange (gearbox end)", page 65

### 2.1 Exploded view - cylinder block (gearbox end)

#### 1 - Dual-mass flywheel

- Removing and installing  
⇒ page 64
- Can only be installed in one position. Holes are off-set

#### 2 - Dowel sleeve

#### 3 - Sealing flange with oil seal

- Renewing ⇒ page 65
- Do not lubricate/grease sealing lip of oil seal
- Before installing, remove oil residue from crankshaft journal with a clean cloth.

#### 4 - Cylinder block

#### 5 - Bolt

- Renew
- Tightening sequence with 8 bolts  
⇒ page 64
- Tightening sequence with 6 bolts  
⇒ page 64

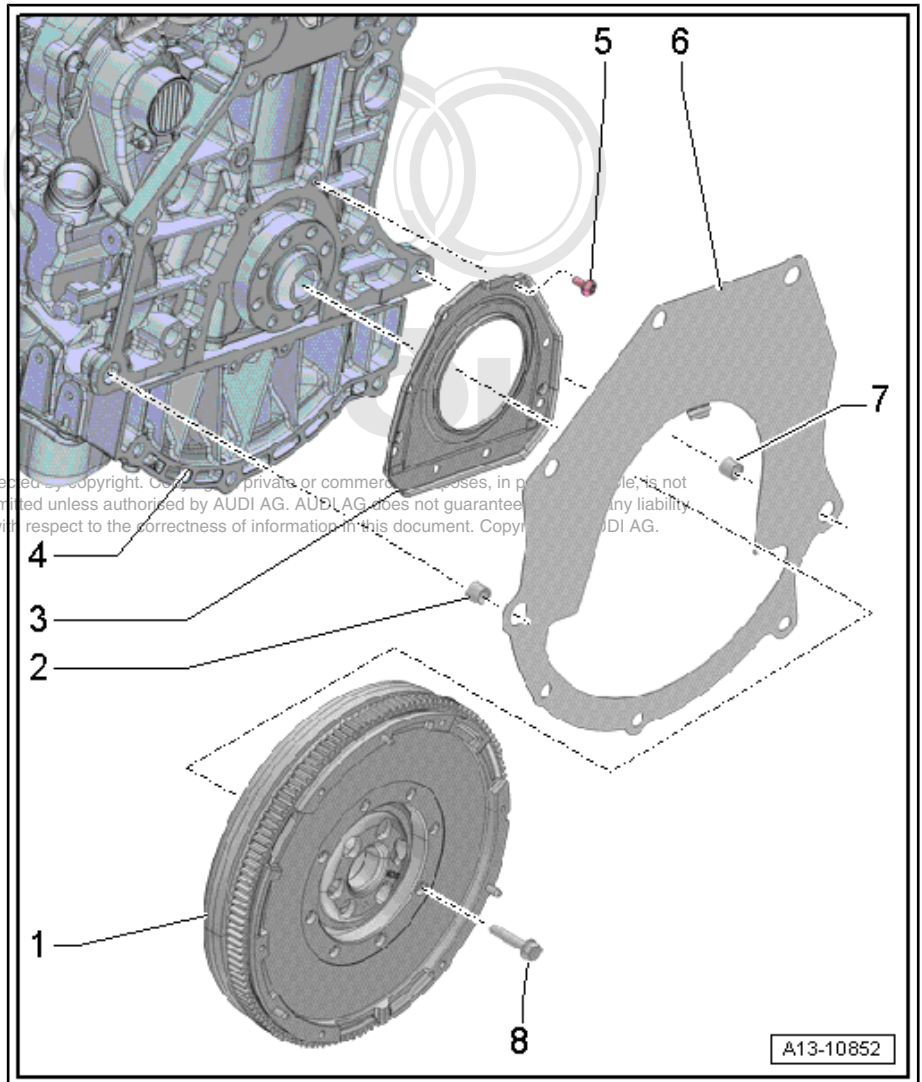
#### 6 - Intermediate plate

- Must be positioned on dowel sleeves
- Do not damage/bend when assembling
- Is fitted onto sealing flange ⇒ page 64

#### 7 - Dowel sleeve

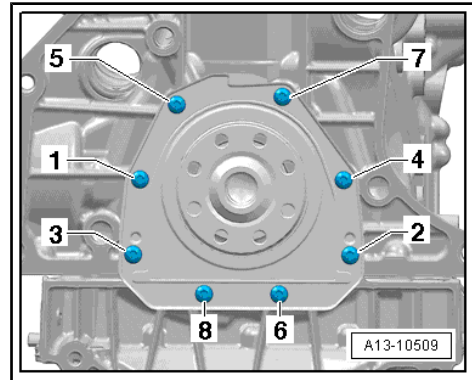
#### 8 - Bolt

- For dual-mass flywheel
- 60 Nm + turn 90° further
- Renew



**Sealing flange (gearbox end) - tightening sequence with 8 bolts**

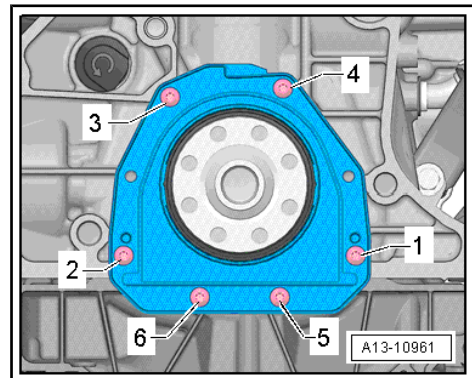
- Tighten bolts -1 to 8- in the sequence shown:
- 1. Screw in bolts hand-tight.
- 2. Tighten bolts to 9 Nm.

**Sealing flange (gearbox end) - tightening sequence with 6 bolts**

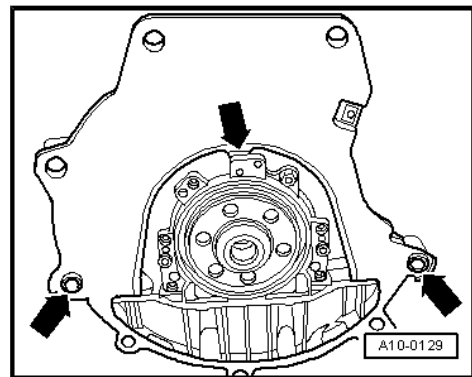
- Tighten new bolts -1 to 6- in the sequence shown:
- 1. Screw in bolts hand-tight.
- 2. Tighten bolts to 4 Nm + turn 45° further.

**Note**

Only 6 bolts are fitted; 2 bolt holes remain free.

**Installing intermediate plate**

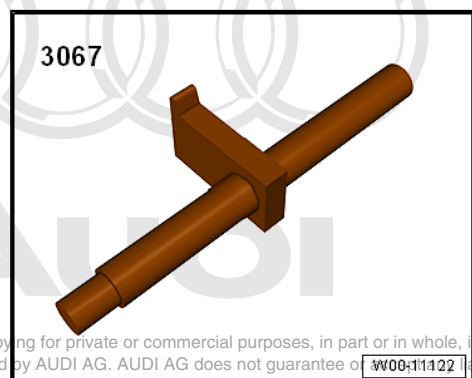
- Fit intermediate plate on sealing flange and push onto dowel sleeves -arrows-.



## 2.2 Removing and installing dual-mass fly-wheel

**Special tools and workshop equipment required**

- ◆ Counterhold tool - 3067-



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 of liability with respect to the correctness of information in this document. Copyright by AUDI AG.



## Removing

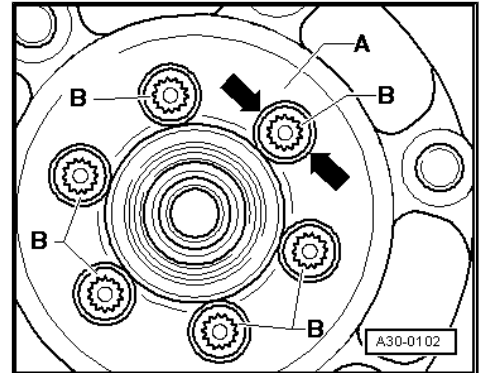


### Caution

*To prevent damage to the dual-mass flywheel when removing, the bolts -B- must not be removed with an impact wrench or similar. The bolts may only be removed by hand using conventional tools.*

- Mark position of dual-mass flywheel in relation to engine.
- 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 dual-mass flywheel -arrows-. The flywheel will otherwise be damaged as the bolts are screwed out further.

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.

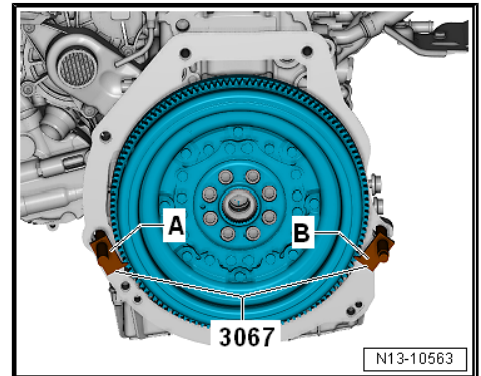


- Insert counterhold tool - 3067- in hole on cylinder block -B-.
- Unbolt dual-mass flywheel.

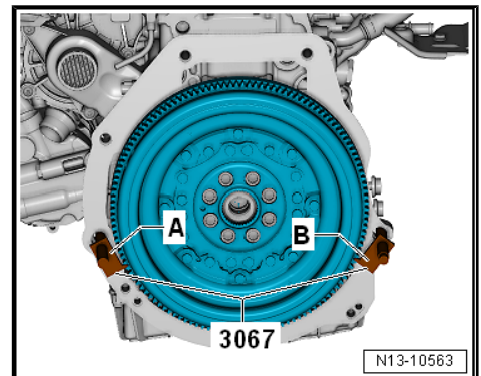
## Installing

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

- Tightening torque  
 ⇒ ["2.1 Exploded view - cylinder block \(gearbox end\)", page 63](#)
- Use new securing bolts.



- Insert counterhold - 3067- in hole on cylinder block -A-.



## 2.3 Removing and installing sealing flange (gearbox end)

Special tools and workshop equipment required



◆ Assembly sleeve - T20097-



- ◆ Electric drill with plastic brush attachment
- ◆ Safety goggles
- ◆ Sealant → Electronic parts catalogue

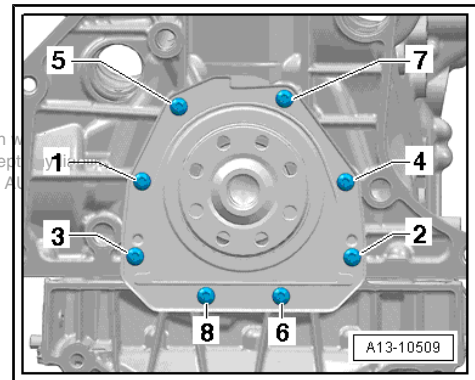
**Removing**

- Gearbox removed
- Remove dual-mass flywheel ⇒ [page 64](#) .
- Remove bolts -1 ... 8-. (Some versions may only have six bolts.)
- Release sealing flange from bonded joint.

**Installing**

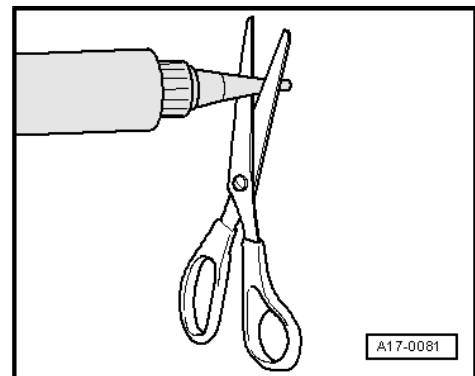
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by Audi AG.

- **Tightening torques** ⇒ ["2.1 Exploded view - cylinder block \(gearbox end\)", page 63](#)
- ◆ Silicone sealant: ⇒ Electronic parts catalogue .



**Note**

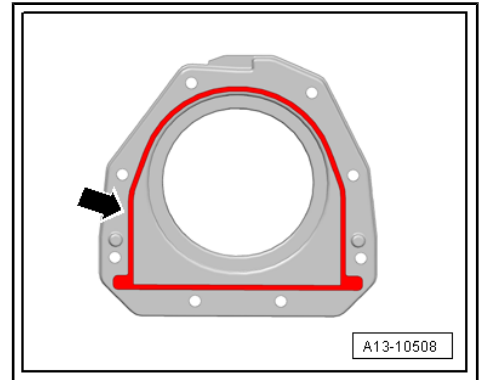
- ◆ *Note the expiry date of the silicone sealant.*
- ◆ *The sealing flange must be installed within 5 minutes after applying silicone sealant.*
- Remove sealant remaining on cylinder block with flat scraper.
- Cut off nozzle of tube at front marking (∅ of nozzle approx. 2 mm).



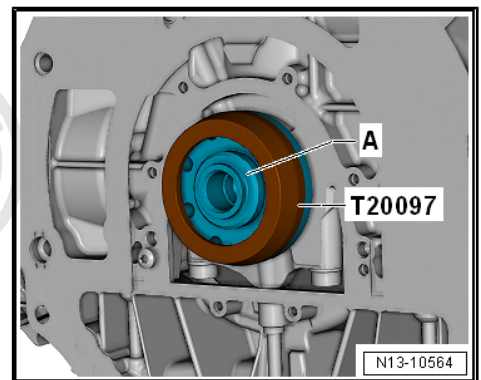
- Apply silicone sealant onto clean sealing surface of new cover, as illustrated.
- ◆ Thickness of sealant bead: 2 ... 3 mm.

**i** Note

- ◆ *The sealing flange must be installed within 5 minutes after applying silicone sealant.*
- ◆ *The bead of sealant must not be thicker than specified, otherwise excess sealant can enter the sump and obstruct the strainer in the oil intake pipe.*



- Fit guide sleeve - T20097- onto crankshaft journal -A-.
- Push sealing flange over guide sleeve - T20097- onto crankshaft journal and tighten bolts; tightening sequence:
- ◆ Cover with 8 bolts ⇒ [page 64](#)
- ◆ Cover with 6 bolts ⇒ [page 64](#)
- After installing sealing flange, wait about 30 minutes for sealant to dry. Then (and only then) fill the engine with engine oil.



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

- Install dual-mass flywheel ⇒ [page 64](#) .

**Tightening torques**

- ◆ Cover with 8 bolts  
 ⇒ [Fig. "Sealing flange \(gearbox end\) - tightening sequence with 8 bolts"](#) , [page 64](#)
- ◆ Cover with 6 bolts  
 ⇒ [Fig. "Sealing flange \(gearbox end\) - tightening sequence with 8 bolts"](#) , [page 64](#)
- ◆ Tightening torques  
 ⇒ ["2.1 Exploded view - cylinder block \(gearbox end\)"](#), [page 63](#)

### 3 Crankshaft

- ⇒ "3.1 Exploded view - crankshaft", page 68
- ⇒ "3.2 Removing and installing sender wheel", page 69
- ⇒ "3.3 Allocation of main bearing shells", page 70
- ⇒ "3.4 Crankshaft dimensions", page 71
- ⇒ "3.5 Measuring axial clearance of crankshaft", page 71
- ⇒ "3.6 Measuring radial clearance of crankshaft", page 72
- ⇒ "3.7 Extracting and driving in needle bearing for crankshaft", page 73

#### 3.1 Exploded view - crankshaft



Note

Secure engine to repair stand using engine and gearbox support - VAS 6095- when dismantling/assembling engine ⇒ [page 32](#).

##### 1 - Cylinder block

##### 2 - Bearing shell for cylinder block

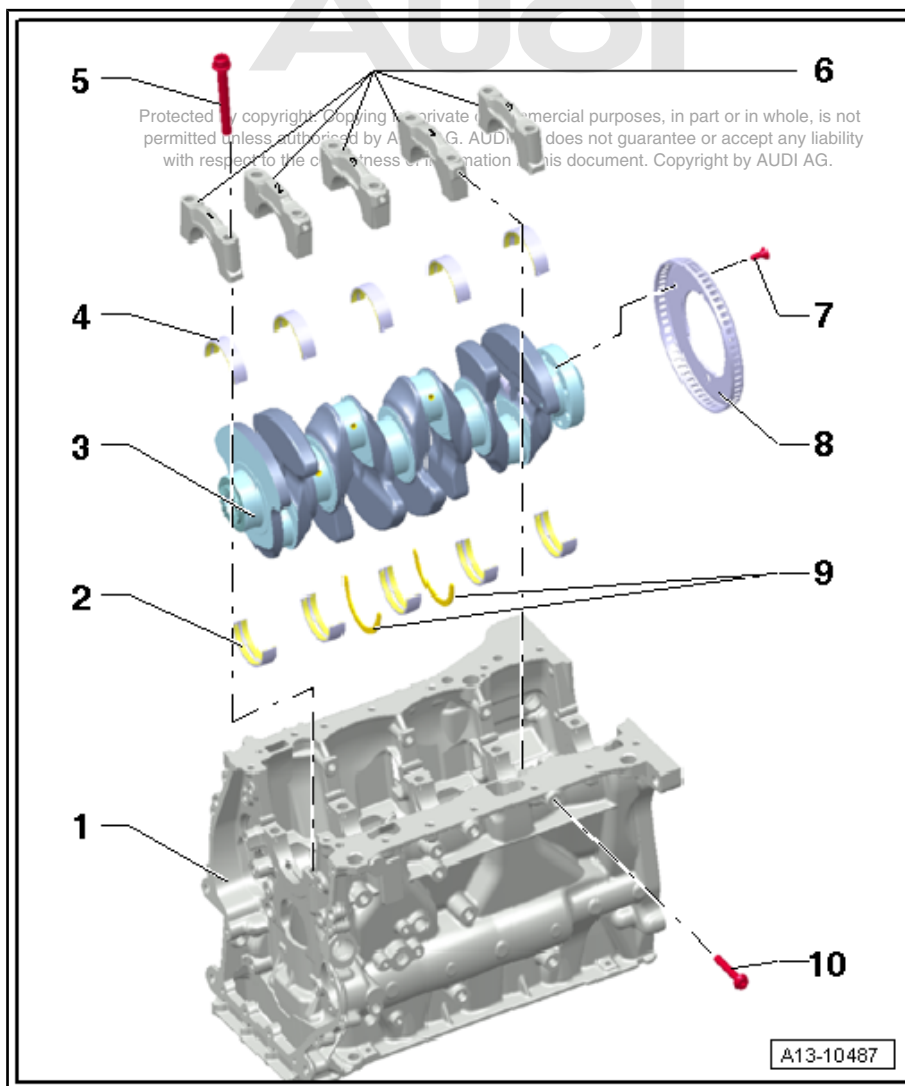
- With oil groove
- Renew used bearing shells
- Identification of crankshaft bearing shells ⇒ [page 70](#)

##### 3 - Crankshaft

- After removing, place it down so that the sender wheel -item 8- is not damaged and the crankshaft does not rest on the sender wheel
- If crankshaft is renewed, new bearing shells must be assigned to bearing caps ⇒ [page 70](#)
- Axial clearance ⇒ [page 71](#)
- Radial clearance ⇒ [page 72](#)
- Crankshaft dimensions ⇒ [page 71](#)

##### 4 - Bearing shell for bearing cap

- Without oil groove
- Renew used bearing shells
- Classification of crankshaft bearing shells ⇒ [page 70](#)



A13-10487

### 5 - Bolt

- Renew
- Use old bolts when measuring radial clearance
- Tightening sequence ⇒ [page 69](#)

### 6 - Bearing caps

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

### 7 - Bolt

- 10 Nm + turn 90° further
- Renew
- Sender wheel must be renewed if bolts are loosened ⇒ [page 69](#)

### 8 - Sender wheel

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

### 9 - Thrust washers

- For bearing No. 3

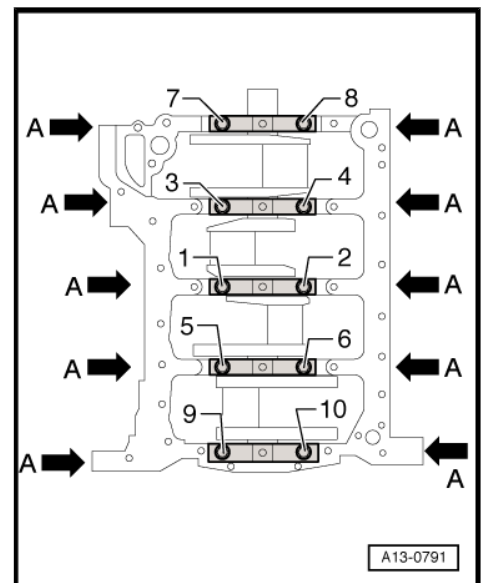
### 10 - Bolt

- Renew
- Tightening sequence ⇒ [page 69](#)

### Crankshaft - tightening sequence

– Tighten crankshaft bolts in the sequence -1 ... 5- as follows:

1. Screw in bolts -1 ... 10- and -arrows A- hand-tight.
2. Initially tighten bolts -1 ... 10- to 65 Nm.
3. Turn bolts -1 ... 10- 90° further using a rigid wrench.
4. Initially tighten bolts -arrows A- to 20 Nm.
5. Turn bolts -arrows A- 90° further using a rigid wrench.



### 3.2 Removing and installing sender wheel

Remove engine

- Remove sealing flange (gearbox end) ⇒ [page 65](#) .
- Remove sump (top section) ⇒ [page 228](#) .
- Remove balance shaft timing chain ⇒ [page 118](#) .
- Unbolt conrod bearing caps.
- Remove crankshaft bearing caps.
- Remove crankshaft and unbolt sender wheel.



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

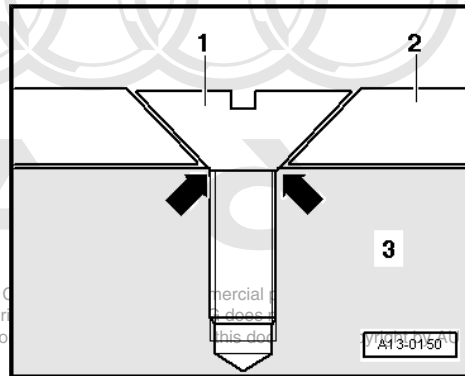
**Note**

- ◆ *If the countersunk bolts are tightened a second time, the seats for the bolt heads in the sender wheel will be deformed to such an extent that the bolt heads make contact with the crankshaft -3- -arrows- and the sender wheel beneath the bolts will be loose.*
- ◆ *Sender wheel can only be fitted in one position because holes are offset.*

- Tightening torque

⇒ ["3.1 Exploded view - crankshaft", page 68](#)

- After renewing sender wheel, misfire adaptations must be reset. To do so, select `01 - Reset adaptations misfires` in `Guided Functions` mode of ⇒ Vehicle diagnostic tester.



Protected by copyright. C  
permitted unless author  
this doc

e, is not  
y liability  
AG.

### 3.3 Allocation of main bearing shells

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 lower sealing surface or end of cylinder block indicate which bearing shell is to be fitted in cylinder block (top bearing shell) at each location.

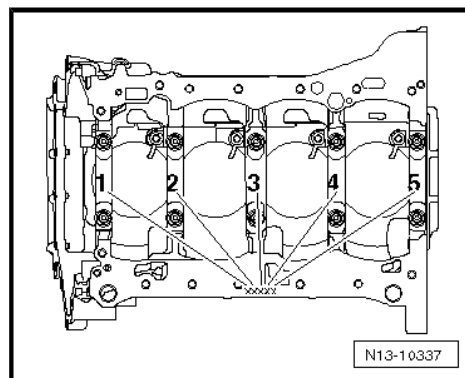
Letter codes on crankshaft indicate which bearing shell is to be fitted in bearing cap (bottom bearing shell).

The first letter stands for bearing cap 1, the second letter for bearing cap 2, etc.

**Marking on bearing shell for cylinder block:**

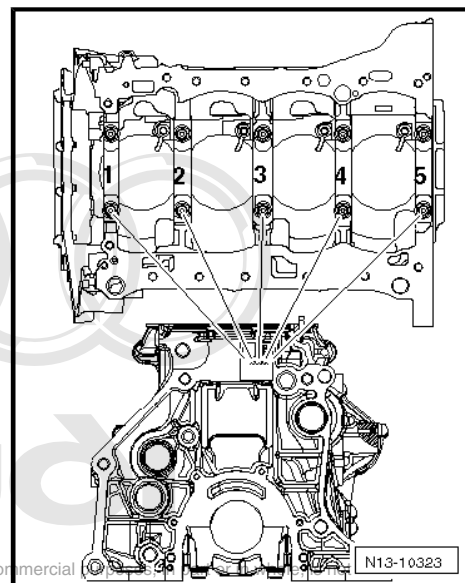
**Note**

*Markings on cylinder block are applied either onto sealing surface for sump or gearbox end of cylinder block.*



Marking on cylinder block refers to top bearing shell (bearing shell for cylinder block).

- Note down letters and refer to table for colour code to be fitted.



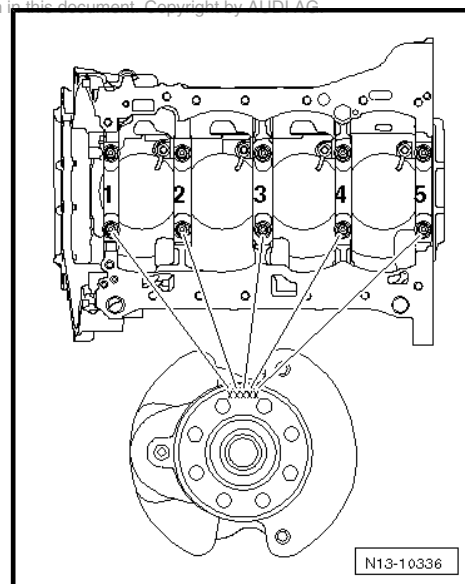
Protected by copyright. Copying for private or commercial purposes is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

### Marking on bearing shell for bearing cap:

Marking on crankshaft refers to bottom bearing shell (bearing shell for bearing cap).

- Note down letters and refer to table for colour code to be fitted.

S	=	Black
R	=	Red
G	=	Yellow
B	=	Blue
W	=	White



## 3.4 Crankshaft dimensions

(in mm)

Honing dimension 1)	Crankshaft main bearing journal Ø	Conrod journal Ø
Basic dimension	58.00	47.80

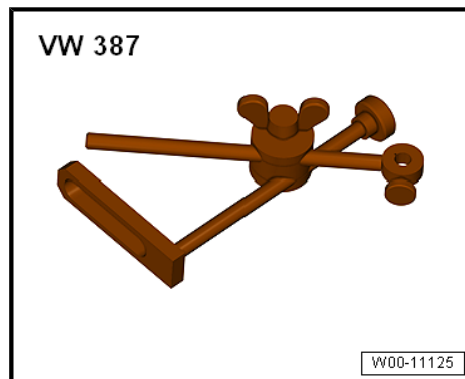
1) There is currently no provision for machining used crankshafts.

## 3.5 Measuring axial clearance of crankshaft

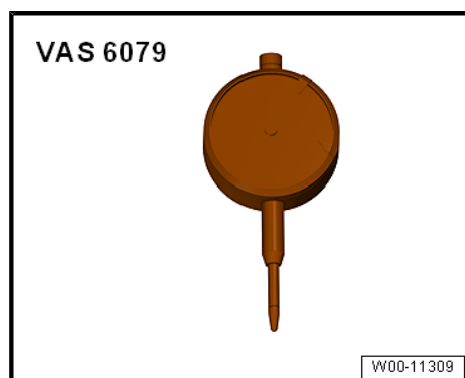
Special tools and workshop equipment required



- ◆ Universal dial gauge bracket - VW 387-



- ◆ Dial gauge - VAS 6079-

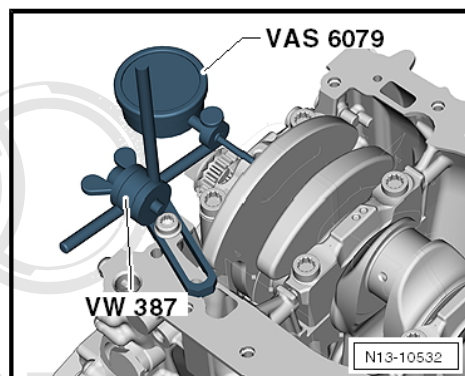


#### Procedure

- Bolt dial gauge - VAS 6079- with universal dial gauge bracket - VW 387- onto cylinder block and set it against crank web.
- Press crankshaft against dial gauge by hand and set gauge to "0".
- Push crankshaft away from dial gauge and read off value.

Axial clearance:

- New: 0.07 ... 0.23 mm.
- Wear limit: 0.30 mm.



### 3.6 Measuring radial clearance of crankshaft

#### Special tools and workshop equipment required

- ◆ Plastigage

#### Procedure



Note

*Renew used bearing shells.*

- Remove crankshaft bearing caps and clean bearing caps and journals.
- Place a length of Plastigage corresponding to the width of the bearing on the bearing journal or bearing shell.
- The Plastigage must be positioned in the centre of the bearing shell.



- Fit crankshaft bearing caps and secure with old bolts -1 ... 10- => [page 69](#) without rotating crankshaft.

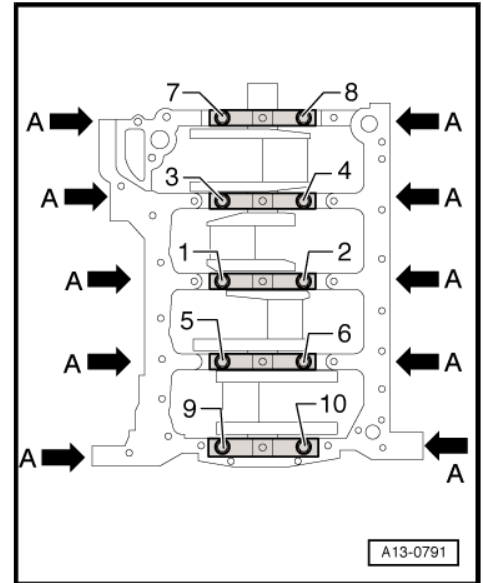
**i** Note

*Disregard bolts indicated by -arrows A-*

- Remove crankshaft bearing caps again.
- Compare width of Plastigage with measurement scale.

Radial clearance:

- New: 0.017 ... 0.037 mm.
- Wear limit: 0.15 mm.
- When carrying out final assembly, renew bolts.



### 3.7 Extracting and driving in needle bearing for crankshaft

Only fitted on vehicles with dual clutch gearbox

Special tools and workshop equipment required

- ◆ Counter-support, e.g. Kukko - 22/1-

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.



- ◆ Internal puller, e.g. Kukko - 21/2-



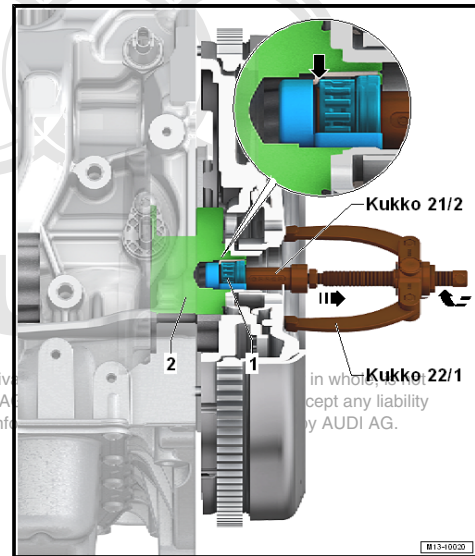


◆ Drift - VW 207 C-



**Extracting needle bearing**

- Pull needle bearing -1- out of crankshaft -2- using commercially available internal puller (e.g. Kukko - 21/2-) and counter-support (e.g. Kukko - 22/1-).
- Internal puller must be positioned behind needle roller -arrow-.



Protected by copyright. Copying for private use is permitted unless authorised by AUDI AG. In no event shall AUDI AG be liable for any damage with respect to the correctness of information.

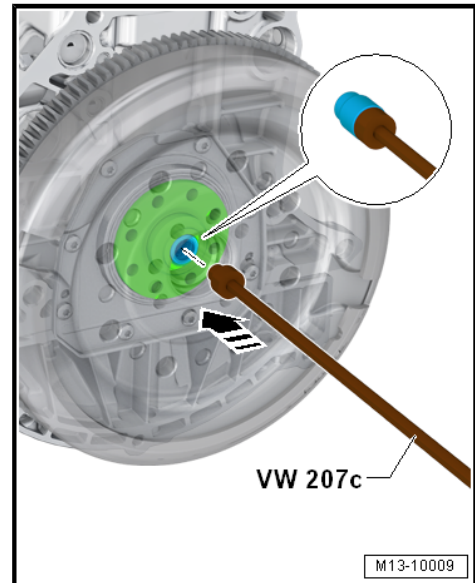
**Installing**



**Note**

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

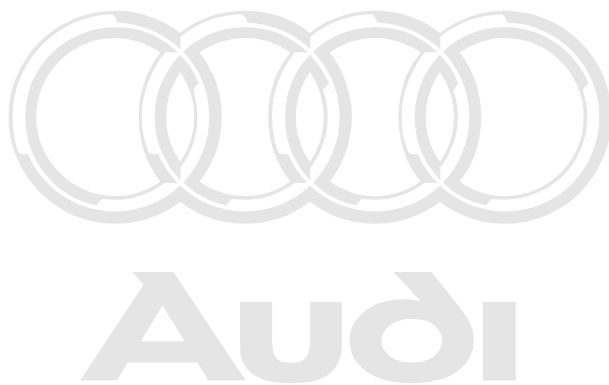
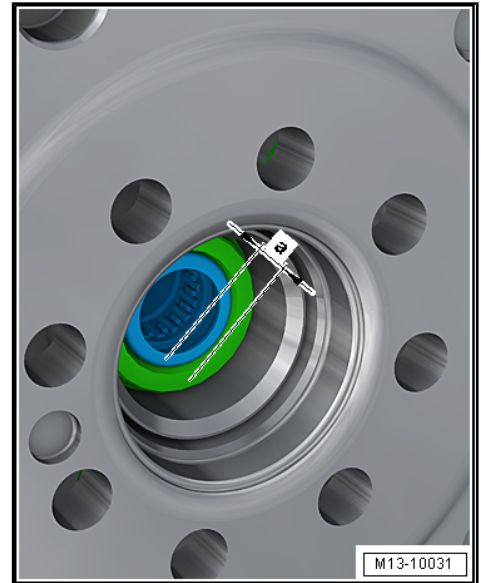
- Clean bearing seat in crankshaft and grease lightly.
- Drive needle bearing into crankshaft with drift - VW 207 C- until it reaches installation depth.



Installation depth: dimension -a- = 2.0 mm



*Renew needle bearing if you drive it in too far (needle bearing is damaged when it is pulled out again).*



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 Balance shaft

⇒ "4.1 Exploded view - balance shaft", page 76

⇒ "4.2 Removing and installing balance shaft", page 77

⇒ "4.3 Renewing oil seal for balance shaft (inlet side)", page 83

### 4.1 Exploded view - balance shaft

#### 1 - Bolt

- Renew
- 9 Nm

#### 2 - Balance shaft

- Inlet side
- Always renew after removal
- Lubricate bearing with engine oil
- Renewing ⇒ [page 77](#)

#### 3 - Balance shaft

- Exhaust side
- Always renew after removal
- Lubricate bearing with engine oil
- Renewing ⇒ [page 80](#)

#### 4 - Bolt

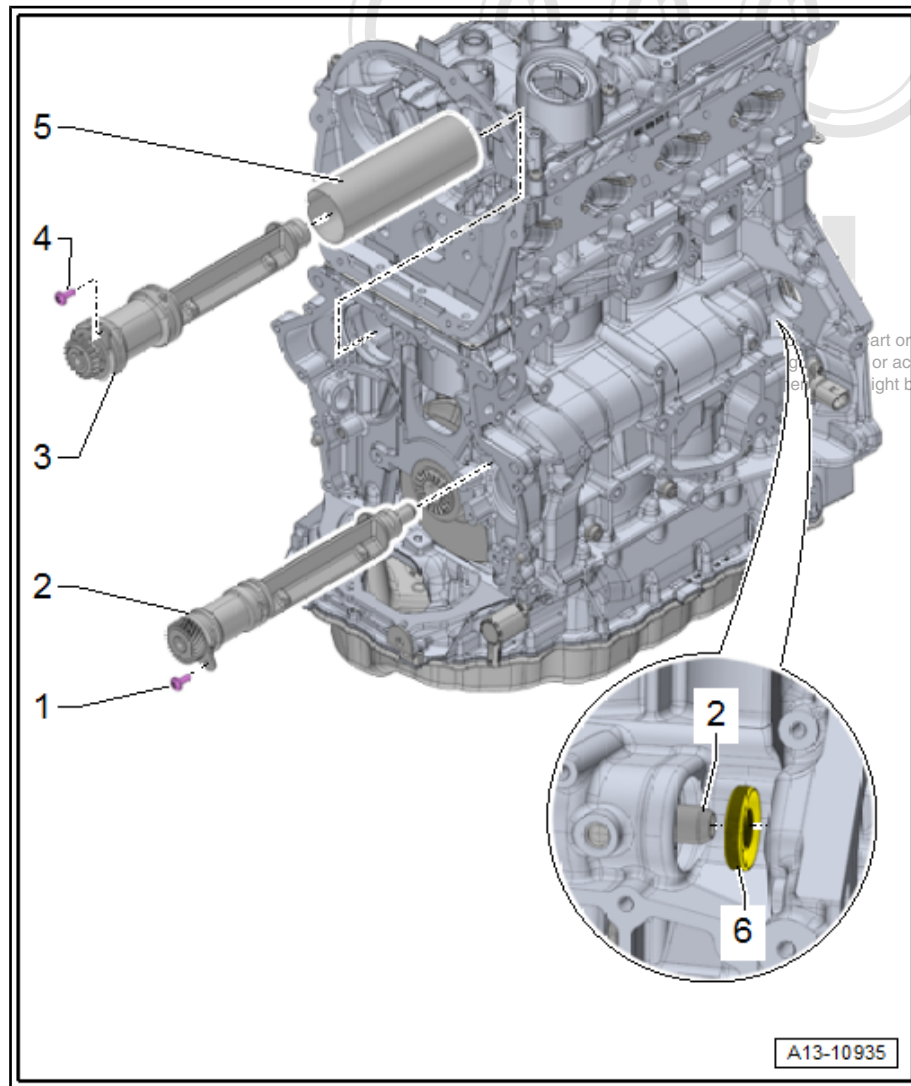
- Renew
- 9 Nm

#### 5 - Tube for balance shaft

- Installation position ⇒ [page 76](#)

#### 6 - Oil seal for coolant pump drive

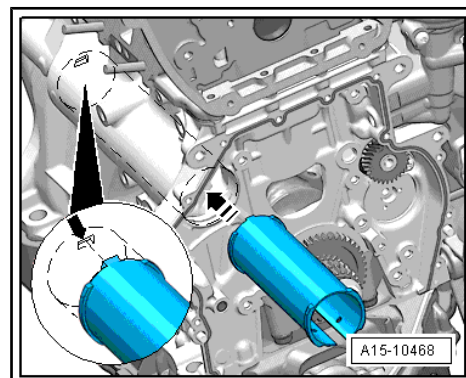
- Renewing ⇒ [page 83](#)



part on whole, is not or accept any liability light by AUDI AG.

#### Tube for balance shaft - installation position

- Lug on tube for balance shaft must engage in slot -arrow-.



## 4.2 Removing and installing balance shaft

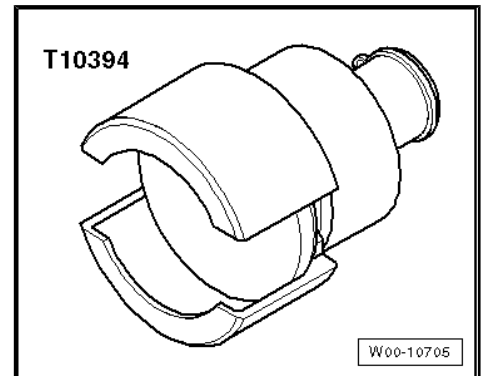
⇒ [“4.2.1 Removing and installing balance shaft \(inlet side\)”, page 77](#)

⇒ [“4.2.2 Removing and installing balance shaft \(exhaust side\)”, page 80](#)

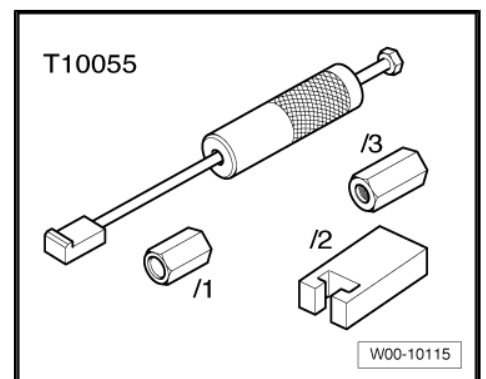
### 4.2.1 Removing and installing balance shaft (inlet side)

Special tools and workshop equipment required

◆ Puller - T10394-



◆ Puller - T10055-



#### Removing



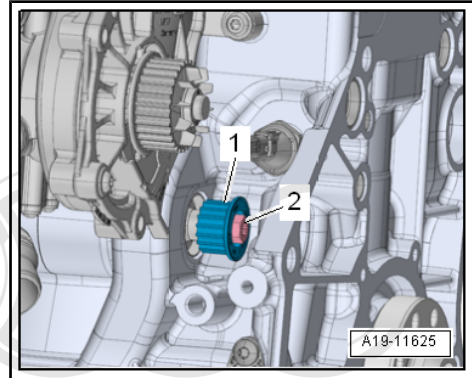
*Always renew balance shaft for inlet camshaft after removal.*

- Remove toothed belt for coolant pump ⇒ [page 258](#) .
- Remove timing chain cover (top) ⇒ [page 93](#) .
- Remove timing chain cover (bottom) ⇒ [page 94](#) .
- Remove camshaft timing chain ⇒ [page 106](#) .
- Remove balance shaft timing chain ⇒ [page 118](#) .

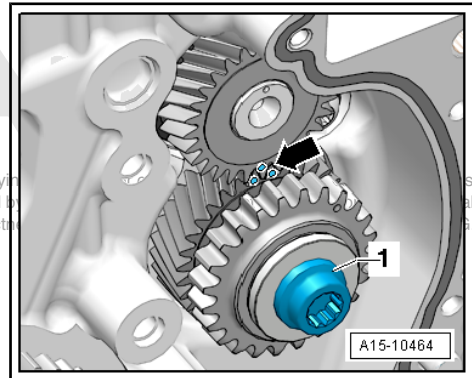
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted, unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- Remove bolt -2-.
- Detach drive sprocket -1- for toothed belt for coolant pump.



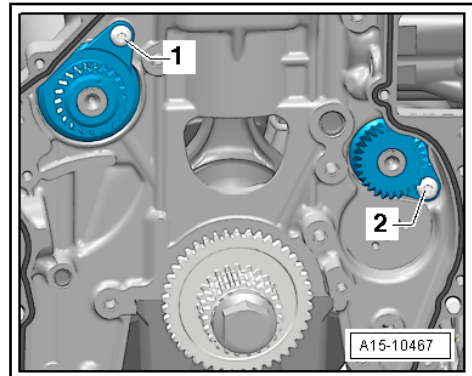
- Remove idler gear -1-.



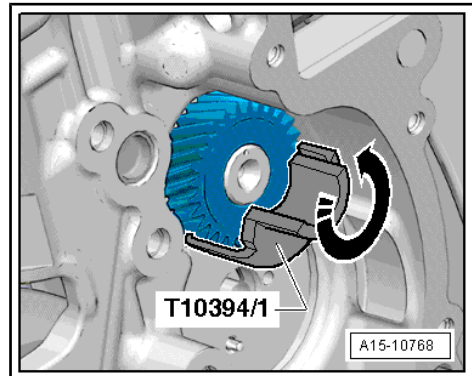
Protected by copyright. Copying is not permitted unless authorised by Audi AG with respect to the correctness of the information.

is not liability for

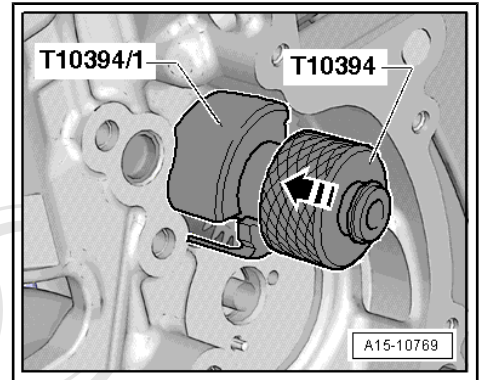
- Remove bolt -2- securing balance shaft for inlet camshaft.



- Insert half shell - T10394/1- of puller - T10394- and turn upwards in direction of arrow.



- Insert puller - T10394- and press locking collar in direction of -arrow-.



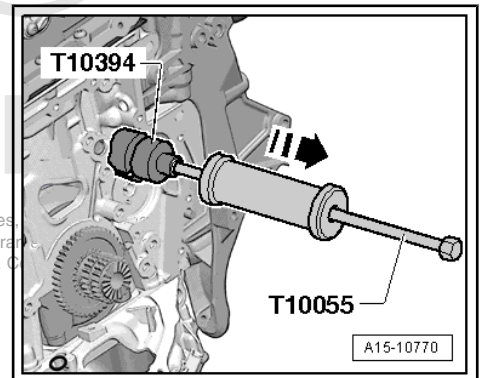
- Screw puller - T10055- into puller - T10394- and knock out balance shaft in direction of -arrow-.

### Installing

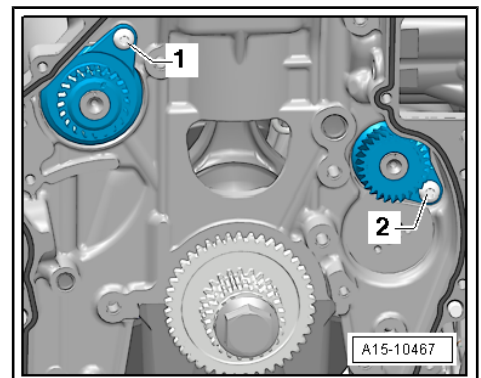


#### Note

*It might be necessary to cool the balance shaft before installing due to the minimal clearance between balance shaft and cylinder block. Check if it is possible to insert the balance shaft into the cylinder block without applying force. If this is not the case, the balance shaft must be cooled before installing.*



- Put new balance shaft for 30 minutes into freezer compartment or spray with chilling agent (commercially available) if necessary.
- Lubricate balance shaft bearing with engine oil.
- Install new balance shaft for inlet camshaft and tighten bolt -2-.



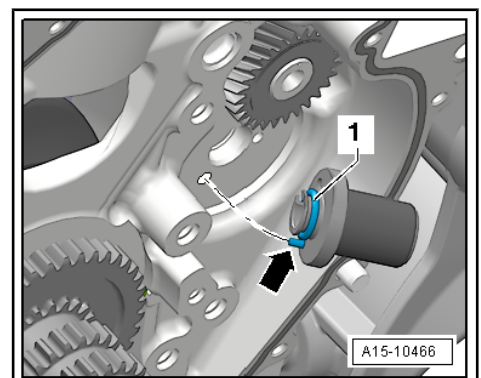
- Renew O-ring -1- and lubricate with engine oil.
- Lubricate bearing mounting with engine oil and install; dowel pin -arrow- for bearing mounting must engage in bore in cylinder block.



#### Caution

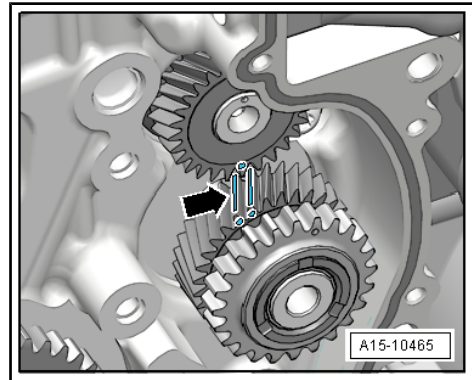
*Always renew idler gear. If this is not done, there is no backlash, which causes engine damage.*

*The new idler gear has a special lubricant coating which wears off after a short running period and thus automatically creates the specified backlash.*





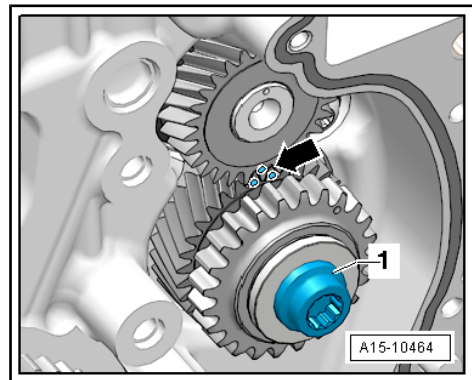
- Mark faces of gear teeth of idler gear with paint marker -arrow-.
- Insert idler gear; marking on balance shaft must be positioned between markings on faces of gear teeth.



- Tighten bolt -1- for idler gear: tightening sequence ⇒ [page 118](#) .
- Check markings on idler gear/balance shaft -arrow-.

Further assembly is basically carried out in reverse order of dismantling. Note the following:

- Install balance shaft timing chain ⇒ [page 118](#) .
- Install camshaft timing chain ⇒ [page 106](#) .
- Install timing chain cover (bottom) ⇒ [page 94](#) .
- Install timing chain cover (top) ⇒ [page 93](#) .
- Renew oil seal for balance shaft (inlet side) ⇒ [page 83](#) .
- Install toothed belt for coolant pump ⇒ [page 258](#) .



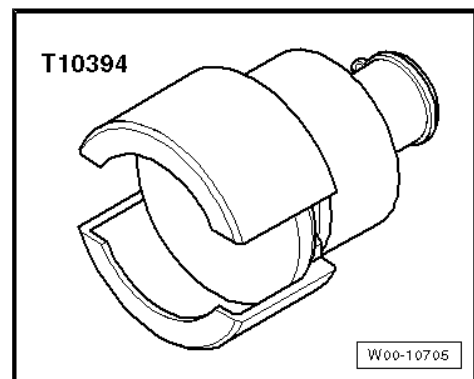
#### Tightening torques

- ◆ ⇒ [“2.4 Exploded view - balance shaft timing chain”, page 116](#)
- ◆ ⇒ [“4.1 Exploded view - balance shaft”, page 76](#)

### 4.2.2 Removing and installing balance shaft (exhaust side)

#### Special tools and workshop equipment required

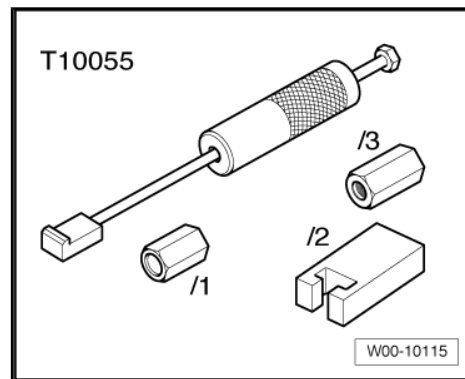
- ◆ Puller - T10394-



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.



◆ Puller - T10055-

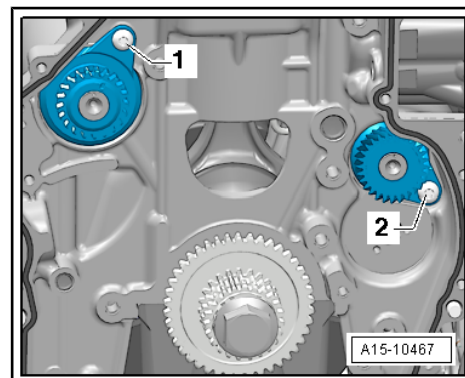


Removing

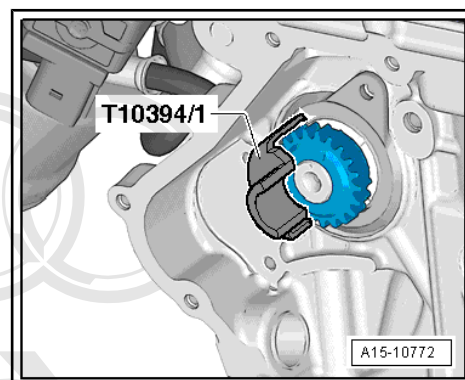
**i** Note

*Always renew balance shaft for exhaust camshaft after removal.*

- Remove timing chain cover (top) ⇒ [page 93](#) .
- Remove timing chain cover (bottom) ⇒ [page 94](#) .
- Remove camshaft timing chain ⇒ [page 106](#) .
- Remove balance shaft timing chain ⇒ [page 118](#) .
- Remove bolt -1- securing balance shaft for outlet camshaft.

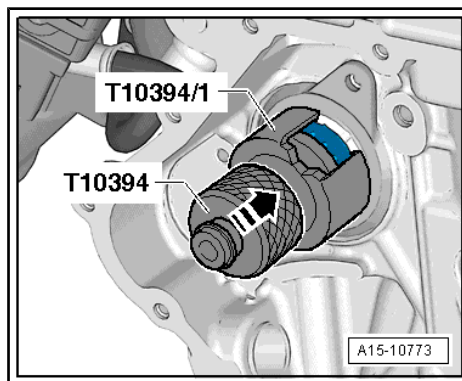


- Insert half shell -T10394/1- from puller - T10394- .





- Insert puller - T10394- and press locking collar in direction of -arrow-.



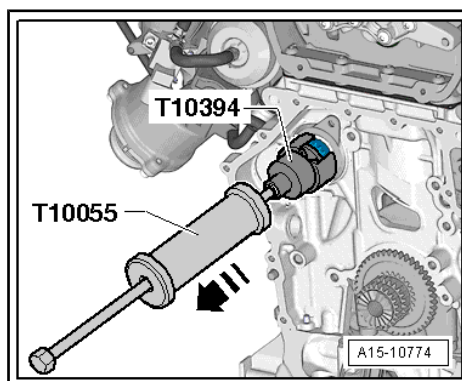
- Screw puller - T10055- into puller - T10394- and knock out balance shaft.

### Installing



#### Note

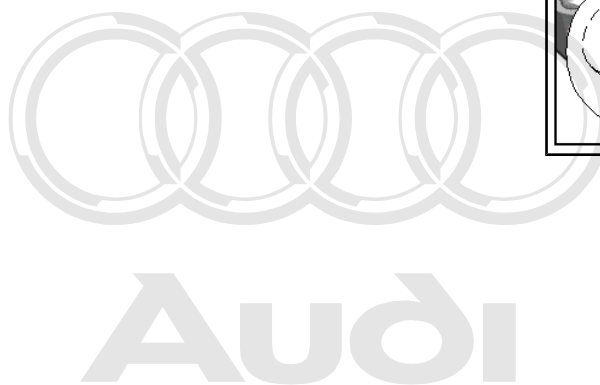
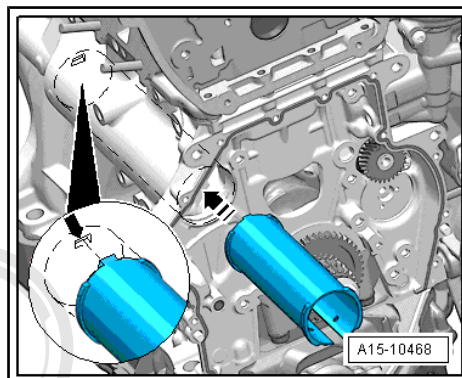
*It might be necessary to cool the balance shaft before installing due to the minimal clearance between balance shaft and cylinder block. Check if it is possible to insert the balance shaft into the cylinder block without applying force. If this is not the case, the balance shaft must be cooled before installing.*



- Check installation position of tube for balance shaft -arrow-.

Lug -arrow- must engage in slot.

- Put new balance shaft for 30 minutes into freezer compartment or spray with chilling agent (commercially available) if necessary.
- Lubricate balance shaft bearing 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.

- Install new balance shaft for exhaust camshaft.
- Make sure that balance shaft is in full contact with crankcase before tightening bolt -1-.

**i** Note

Repeat insertion of tube for balance shaft if the balance shaft is not in full contact.

Further assembly is basically carried out in reverse order of dismantling. Note the following:

- Install balance shaft timing chain ⇒ [page 118](#) .
- Install camshaft timing chain ⇒ [page 106](#) .
- Install timing chain cover (bottom) ⇒ [page 94](#) .
- Install timing chain cover (top) ⇒ [page 93](#) .

**Tightening torques**

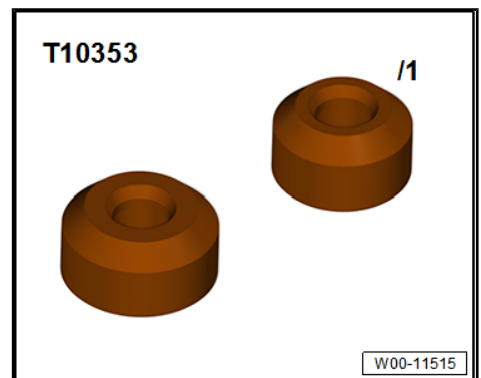
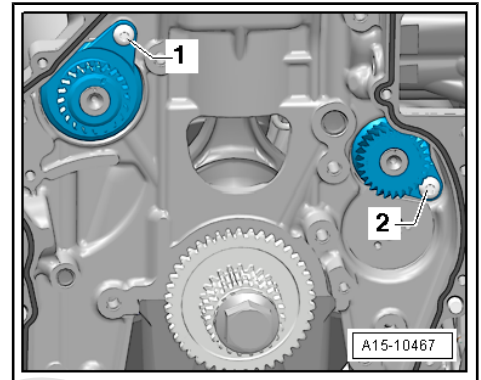
- ◆ ⇒ "2.4 Exploded view - balance shaft timing chain", [page 116](#)
- ◆ ⇒ "4.1 Exploded view - balance shaft", [page 76](#)

### 4.3 Renewing oil seal for balance shaft (inlet side)

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.

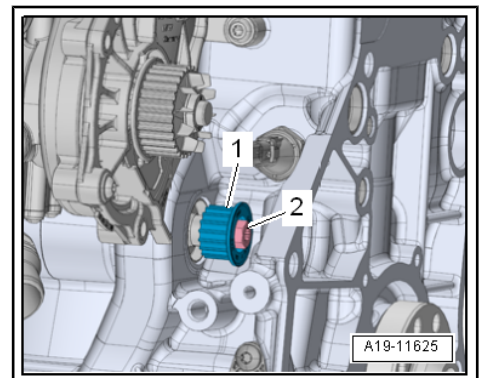
**Special tools and workshop equipment required**

- ◆ Thrust piece - T10353-



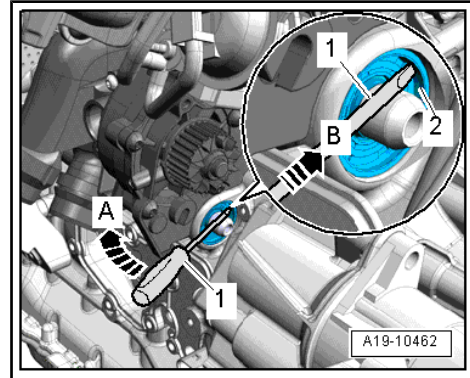
**Procedure**

- Remove toothed belt for coolant pump ⇒ [page 258](#) .
- Unscrew bolt -2- and detach drive sprocket -1- for toothed belt for coolant pump.

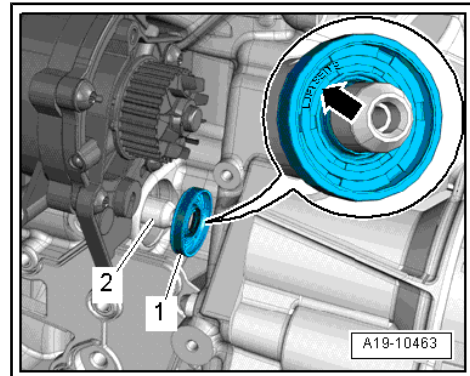




- Press screwdriver -1- firmly onto section -2- of oil seal -arrow B-.
- Lever out oil seal -arrow A-.
- Clean contact surface and sealing surface.



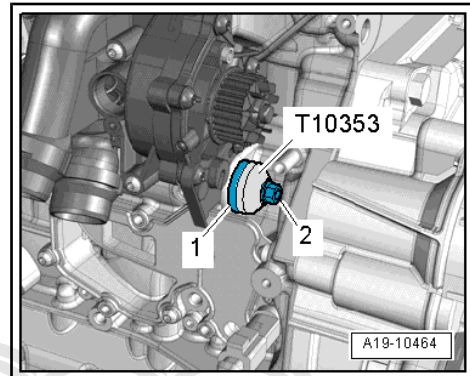
- Lubricate sealing surface of balance shaft -2- with gear oil.
- Fit oil seal -1- onto balance shaft.
- The marking "Luftseite" ("Outside") -arrow- should be legible from the outside.

**Caution**

*Risk of damage to thread.*

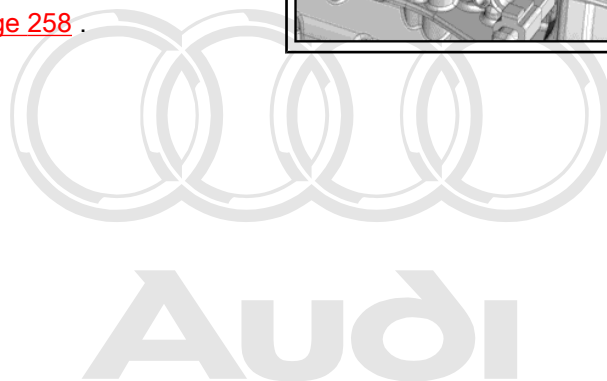
- ◆ *The drive sprocket bolt has a left-hand thread.*

- Apply thrust piece - T10353- to oil seal -1- and press into cylinder block as far as stop using bolt -2- (take care not to tilt oil seal).
- Install toothed belt for coolant pump ⇒ [page 258](#) .
- Install small coolant pipe ⇒ [page 273](#) .

**Note**

*Do not reuse coolant.*

- Fill up with coolant ⇒ [page 248](#) .



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.

## 5 Pistons and conrods

⇒ "5.1 Exploded view - pistons and conrods", page 85

⇒ "5.2 Removing and installing pistons", page 86

⇒ "5.3 Separating parts of new conrod", page 88

⇒ "5.4 Checking pistons and cylinder bores", page 88

⇒ "5.5 Measuring radial clearance of conrods", page 90

### 5.1 Exploded view - pistons and conrods

#### 1 - Conrod bolts

- M8: 30 Nm + turn 90° further
- M9: 45 Nm + turn 90° further
- Renew
- Lubricate threads and contact surface
- Use old bolts when measuring radial clearance

#### 2 - 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 allocation -A-
- Installation position: Marking -B- faces towards pulley end
- Separating parts of new conrod ⇒ page 88

#### 3 - Bearing shells

- Installation position ⇒ page 86
- Renew used bearing shells
- Lubricate before installing

Axial clearance when new: 0.10 ... 0.35 mm; wear limit: 0.40 mm

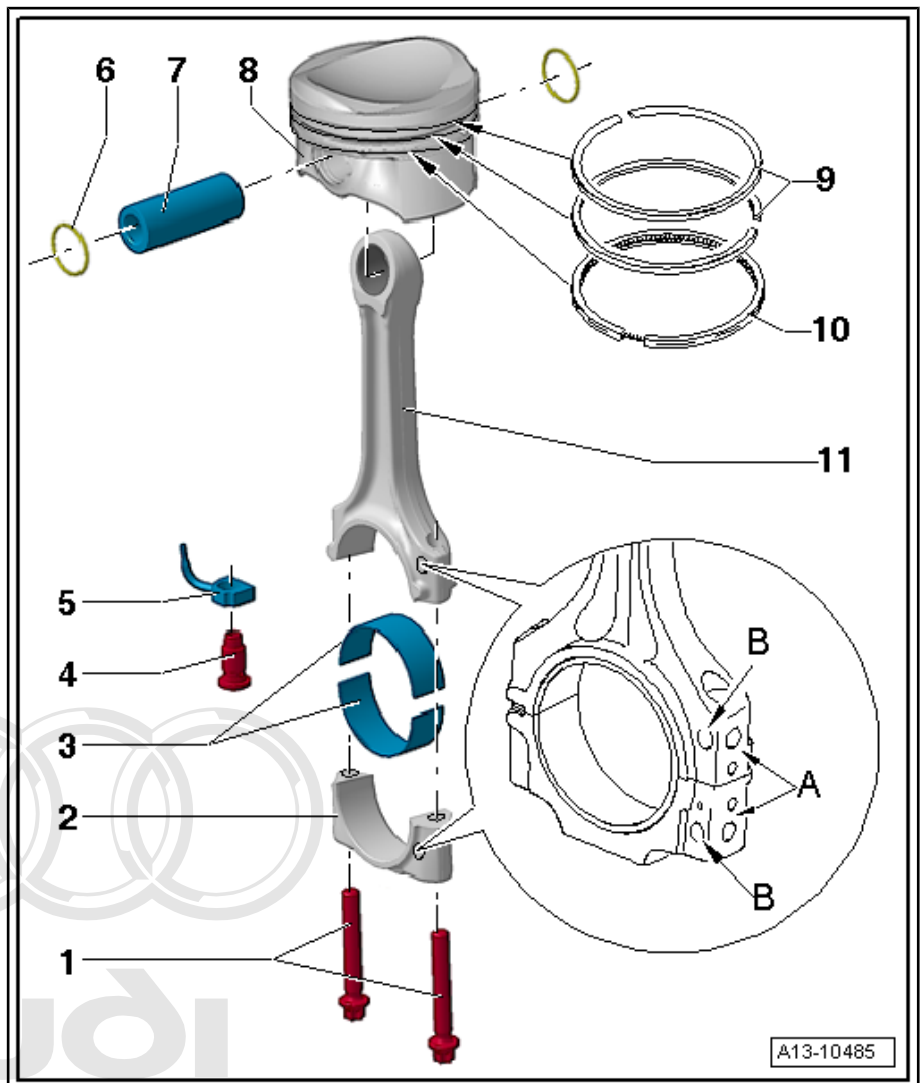
Check radial clearance with Plastigage - (new): 0.02 ... 0.06 mm; wear limit: 0.09 mm. Do not turn crankshaft when measuring radial clearance

#### 4 - Pressure relief valve

- 27 Nm

#### 5 - Oil spray jet

- For piston cooling



## 6 - Circlip

- Renew

## 7 - Piston pin

- Lubricate before installing

## 8 - Piston

- Removing and installing ⇒ [page 86](#)
- Mark installation position and cylinder number
- Arrow on piston crown points to pulley end
- Checking pistons and cylinder bores ⇒ [page 88](#)

## 9 - Compression rings

- Use piston ring pliers (commercially available) to remove and install
- Offset gaps by 120°
- Installation position: "TOP" or "R" must face towards piston crown
- Checking ring gap ⇒ [page 89](#)
- Checking ring-to-groove clearance ⇒ [page 89](#)

## 10 - Oil scraper ring

- 2 parts
- Install with gap offset by 120° to next compression ring
- "TOP" or "R" must face towards piston crown
- Checking ring gap ⇒ [page 89](#)
- Ring-to-groove clearance cannot be checked

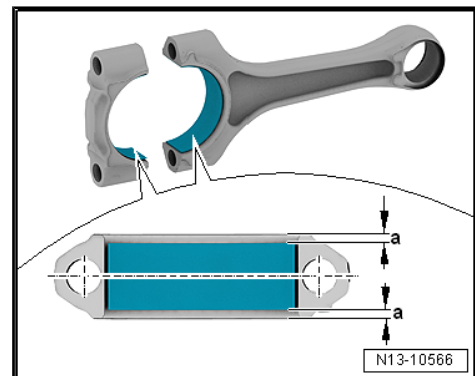
## 11 - Conrod

- Only renew as a complete set
- Mark cylinder allocation -A-
- Installation position: Marking -B- faces towards pulley end
- Separating parts of new conrod ⇒ [page 88](#)
- Measuring radial clearance ⇒ [page 90](#)

### Installation position of bearing shell

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

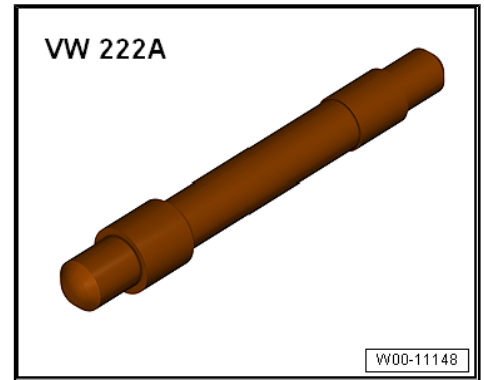
Dimension -a- must be identical on both sides.



## 5.2 Removing and installing pistons

Special tools and workshop equipment required

◆ Drift - VW 222 A-



◆ Piston ring clamp, commercially available

**Removing**

- Remove engine ⇒ [page 7](#) .
- Secure engine to engine and gearbox support - VAS 6095- ⇒ [page 32](#) .
- Remove cylinder head:
  - ◆ ⇒ ["3.2 Removing and installing cylinder head, engine codes BYT, BPU", page 126](#)
  - ◆ ⇒ ["3.4 Removing and installing cylinder head, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA", page 151](#)
- Remove sump (top section) ⇒ [page 228](#) .
- Mark installation position and cylinder number of piston.
- Mark installation position and cylinder number of conrod ⇒ [Item 11 \(page 86\)](#) .
- 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 torques** ⇒ ["5.1 Exploded view - pistons and conrods", page 85](#)

**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 8 \(page 86\)](#) .

- Install conrod bearing cap; note installation position ⇒ [Item 2 \(page 85\)](#) .
- Install cylinder head:
  - ◆ ⇒ [“3.2 Removing and installing cylinder head, engine codes BYT, BPU”, page 126](#)
  - ◆ ⇒ [“3.4 Removing and installing cylinder head, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA”, page 151](#)
- Install sump (upper section) ⇒ [page 228](#) .

### 5.3 Separating parts of new conrod

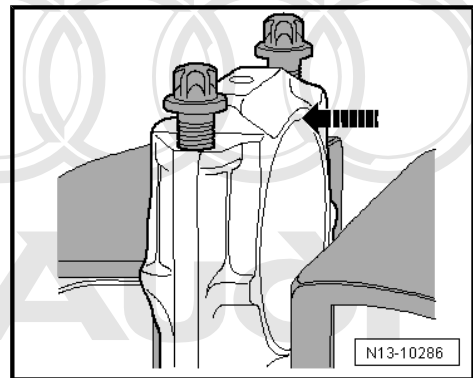
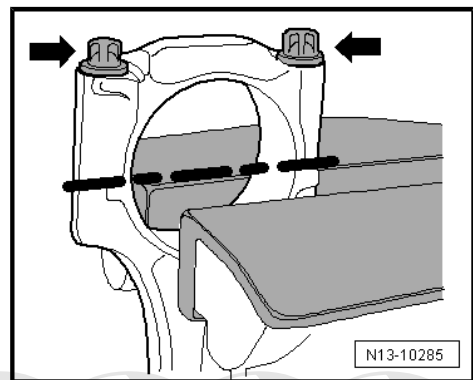
It is possible that the two parts of a new conrod are not completely separated as intended. If it is not possible to take off the conrod bearing cap by hand, proceed as follows:

- Mark cylinder number of conrod ⇒ [Item 11 \(page 86\)](#) .
- Clamp the conrod lightly in a vice using aluminium jaw covers as shown in illustration.



#### Note

- ◆ *To avoid any risk of damage, the conrod should only be clamped lightly.*
- ◆ *The conrod is clamped in a position below the dotted line.*
- Unscrew the two bolts -arrows-. approx. 5 turns.
- Using a plastic hammer, carefully knock conrod bearing cap loose in direction of -arrow-.



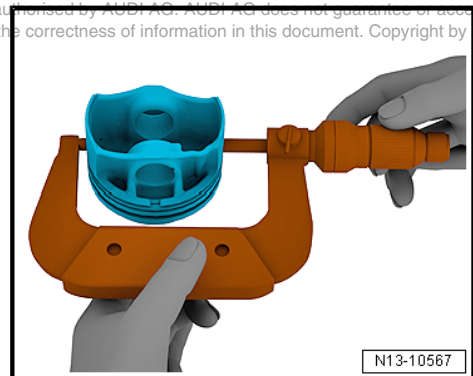
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorized by AUDI AG. AUDI AG does not guarantee or accept any liability in respect to the correctness of information in this document. Copyright by AUDI AG.

### 5.4 Checking pistons and cylinder bores

#### Checking piston

- Using a micrometer (75 ... 100 mm), measure approx. 15 mm from the lower edge, perpendicular to the piston pin axis.
- ◆ Difference between actual and nominal diameter: not more than 0.04 mm.

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

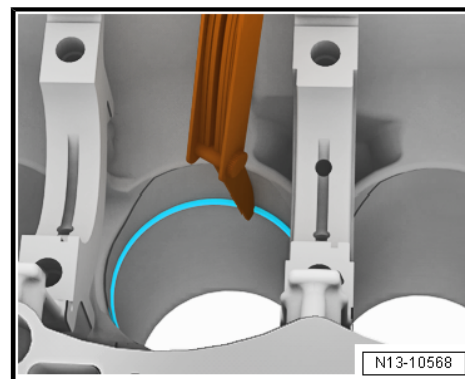




### Checking piston ring gap

- Insert piston ring at right angle to cylinder wall from above and push down into lower cylinder opening approx. 15 mm from bottom of cylinder. Use a piston without rings to push ring into bore.

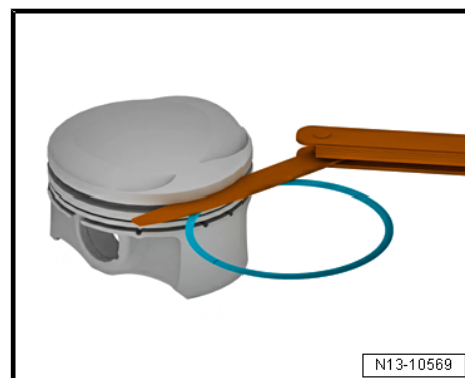
Piston ring Dimensions in mm	New	Wear limit
Compression ring	0.20 ... 0.40	0.80
Oil scraper ring	0.25 ... 0.50	0.80



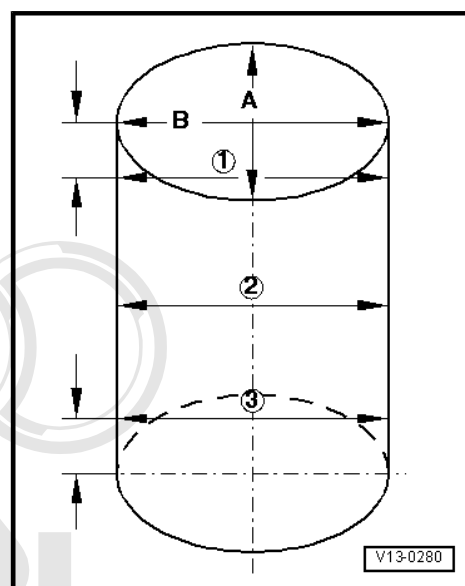
### Checking ring-to-groove clearance

- Clean groove in piston before checking clearance.

Piston ring Dimensions in mm	New	Wear limit
1st compression ring	0.06 ... 0.09	0.20
2nd compression ring	0.03 ... 0.06	0.15
Oil scraper rings	Cannot be measured	



### Checking cylinder bore



### Special tools and workshop equipment required

- ◆ Cylinder gauge - VAS 6078-

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.



#### Caution

***Machining (rebor-ing, honing, grinding) cylinder bore with workshop equipment is not permitted. The surface of the cylinder bore is damaged by machining.***

- 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.

		Cylinder bore Ø
Basic dimension	mm	82.51

**Note**

*Measuring the cylinder bores must not be done when the cylinder block is mounted to the engine and gearbox stand - VAS 6095- , as incorrect measurements may result.*

## 5.5 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 cap and secure with old bolts  
⇒ [Item 1 \(page 85\)](#) without rotating crankshaft.
- Remove conrod bearing cap again.
- Compare width of Plastigage with measurement scale.

### Radial clearance:

- New: 0.02 ... 0.06 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 Timing chain cover, camshaft control valve 1 - N205-

⇒ [“1.1 Exploded view - timing chain cover, camshaft control valve 1 N205”, page 91](#)

⇒ [“1.2 Removing and installing camshaft control valve 1 N205”, page 93](#)

⇒ [“1.3 Removing and installing timing chain cover \(top\)”, page 93](#)

⇒ [“1.4 Renewing timing chain cover \(bottom\)”, page 94](#)

⇒ [“1.5 Renewing oil seal for vibration damper”, page 98](#)

#### 1.1 Exploded view - timing chain cover, camshaft control valve 1 - N205-

##### 1 - O-ring

- Renew
- Lubricate before installing

##### 2 - Guide tube for oil dipstick

##### 3 - Bolt

- 9 Nm

##### 4 - Bolt

- 9 Nm

##### 5 - Camshaft control valve 1 - N205-

- Removing and installing ⇒ [page 93](#)

##### 6 - Oil seal

- Lubricate before installing
- Renew if damaged

##### 7 - Bolt

- Tightening sequence ⇒ [page 92](#)

##### 8 - Timing chain cover (top)

- Removing and installing ⇒ [page 92](#)

##### 9 - Gasket

- Renew if damaged

##### 10 - O-ring

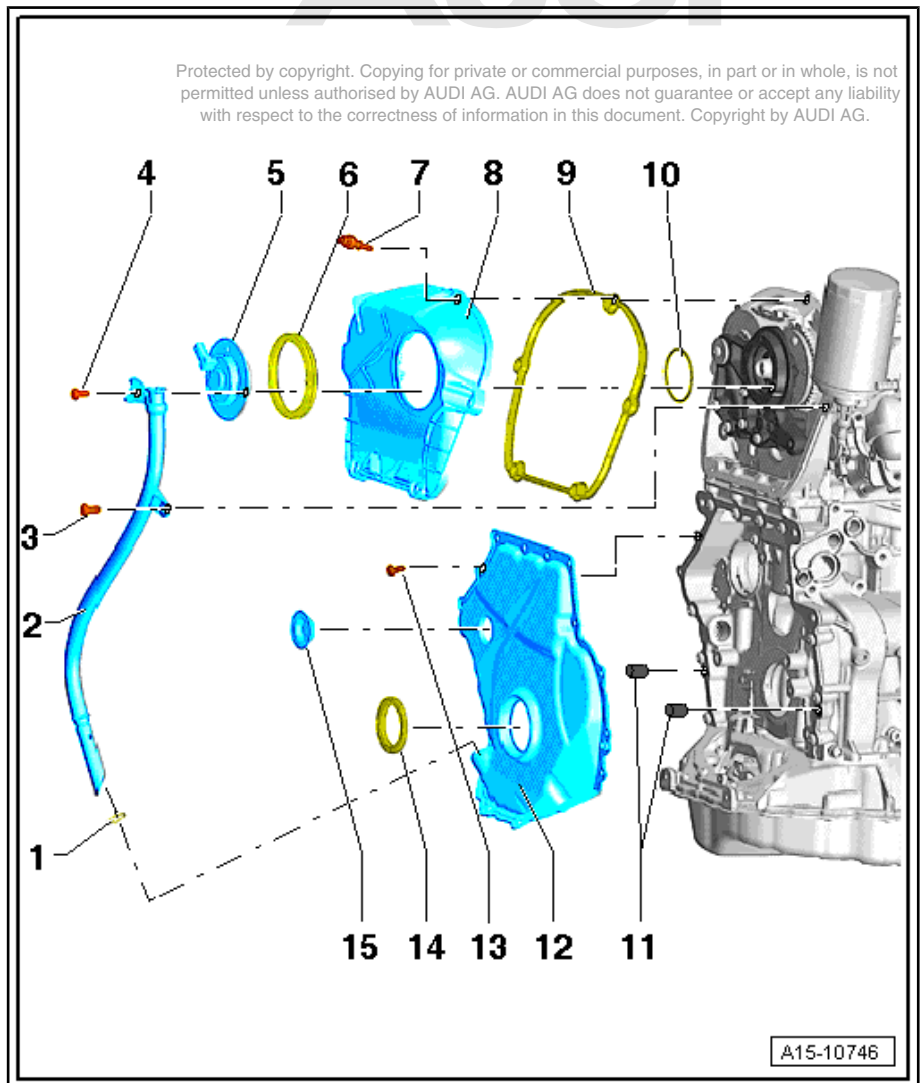
- Renew
- Lubricate before installing

##### 11 - Dowel pins

- For centring cover

##### 12 - Timing chain cover (bottom)

- Renewing ⇒ [page 94](#)



### 13 - Bolt

- Renew
- Tightening sequence with 15 bolts ⇒ [page 92](#)
- Tightening sequence with 8 bolts ⇒ [page 93](#)

### 14 - Oil seal

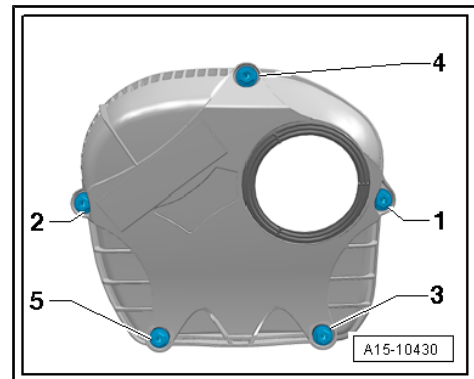
- For vibration damper
- Renewing ⇒ [page 98](#)

### 15 - Sealing plug

- Renew

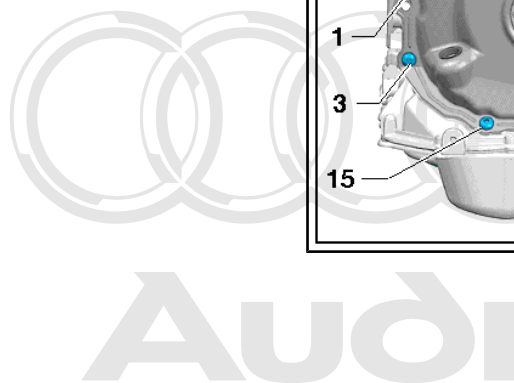
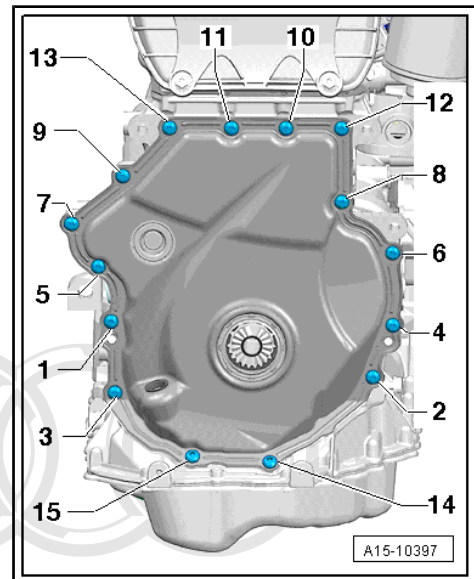
### Timing chain cover (top) - tightening sequence

- Tighten bolts -1 to 5- in the sequence shown:
1. Tighten bolts to 9 Nm.



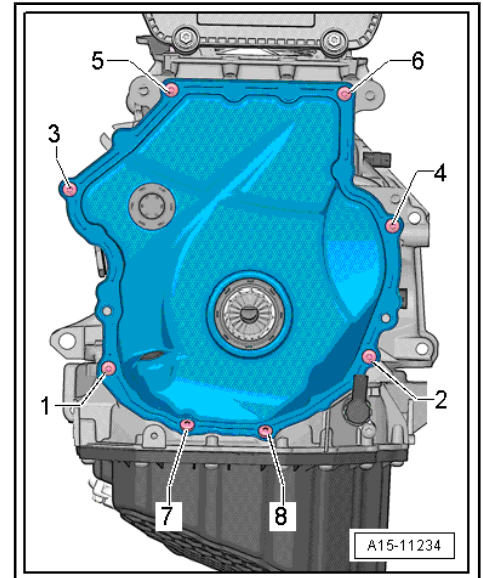
### Timing chain cover (bottom), tightening sequence with 15 bolts

- Tighten bolts -1 to 15- in two stages in the sequence shown:
- 1. Tighten bolts to 8 Nm.
- 2. Turn bolts 45° further.



### Timing chain cover (bottom), tightening sequence with 8 bolts

- Tighten bolts -1 to 8- in two stages in the sequence shown:
- 1. Tighten bolts to 4 Nm.
- 2. Turn bolts 45° further.



## 1.2 Removing and installing camshaft control valve 1 - N205-

### Removing

- Detach connector from camshaft control valve 1 - N205- -1-.
- Unscrew bolts -arrows- and remove camshaft control valve 1 - N205- .

### Installing

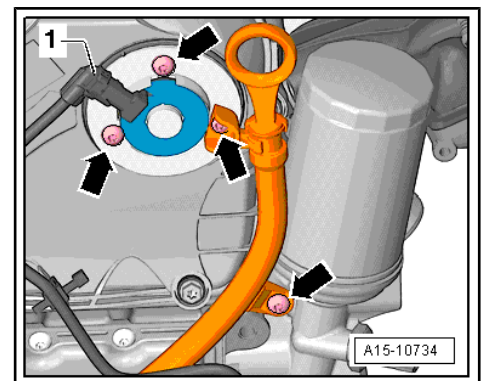
- Tightening torque  
 ⇒ ["1.1 Exploded view - timing chain cover, camshaft control valve 1 N205", page 91](#)

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

**i** Note

*Renew O-ring.*

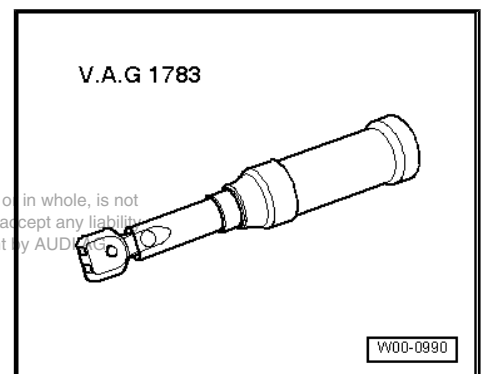
- Lubricate oil seal and O-ring with engine oil.



## 1.3 Removing and installing timing chain cover (top)

### Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1783-



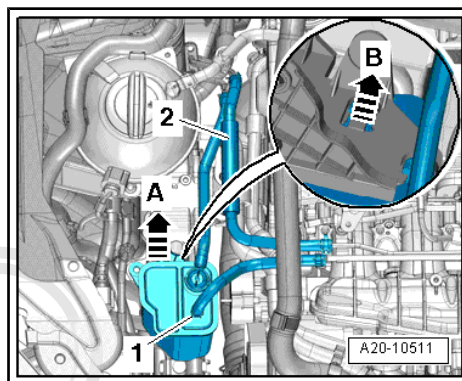
- ◆ Open-end spanner insert AF 10 - V.A.G 1783/1-

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.

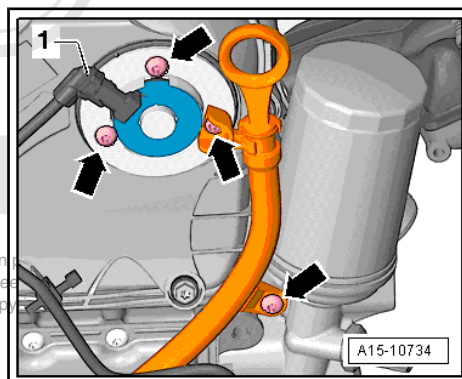


### Removing

- Release activated charcoal filter -arrow B-, lift off -arrow A- and move clear to one side.



- Detach connector from camshaft control valve 1 - N205- -1-.
- Unscrew bolts -arrows- and remove camshaft control valve 1 - N205- .



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

- Unscrew bolts -1 to 5- and remove timing chain cover (top).

### Installing

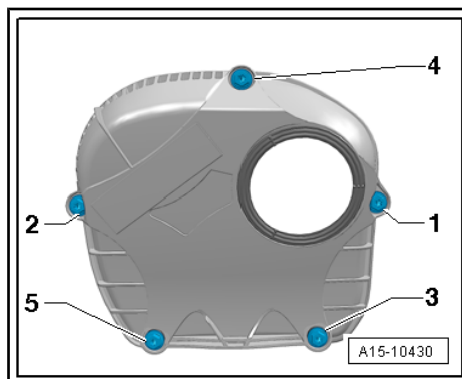
- Tightening torque  
=> ["1.1 Exploded view - timing chain cover, camshaft control valve 1 N205", page 91](#)

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

**Note**

*Renew O-ring.*

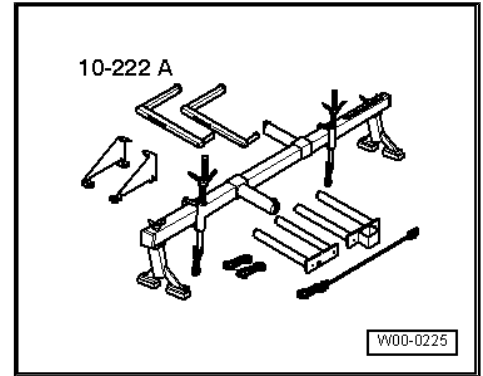
- Lubricate oil seal and O-ring with engine oil.
- Install timing chain cover (top) using torque wrench - V.A.G 1783- and open-end spanner insert AF 10 - V.A.G 1783/1- , tightening sequence => [page 92](#)
- Install camshaft control valve 1 - N205- => [page 93](#) .



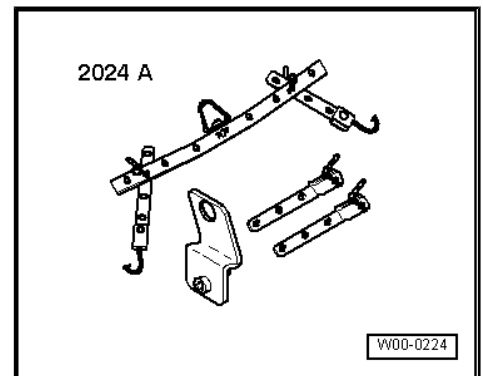
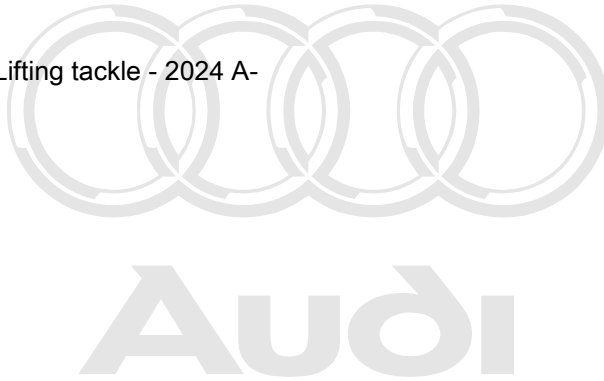
## 1.4 Renewing timing chain cover (bottom)

Special tools and workshop equipment required

- ◆ Support bracket - 10 - 222 A- with spindle - 10 - 222 A /11-

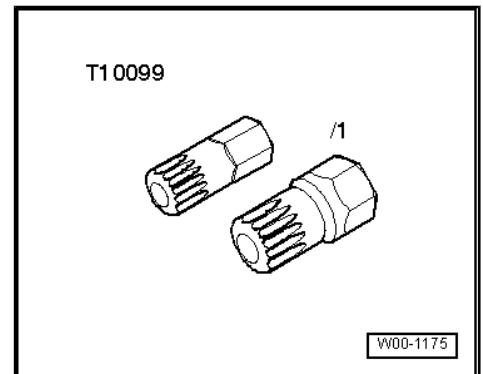


- ◆ Lifting tackle - 2024 A-



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.

- ◆ Bits - T10099-



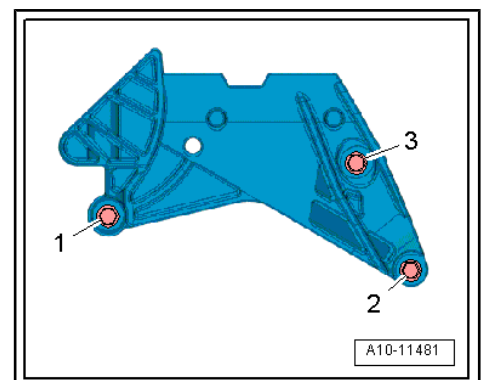
### Removing

- Remove vibration damper  
 ⇒ [“1.5 Removing and installing vibration damper”, page 55](#) .
- Remove tensioner for poly V-belt  
 ⇒ [“1.3 Removing and installing tensioner for poly V-belt”, page 51](#) .
- Unscrew bolts -1 ... 3- with bits - T10099- and detach engine support.



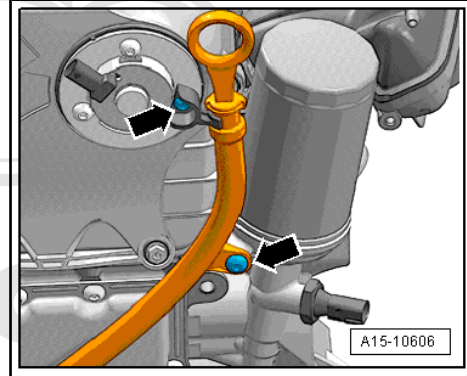
### Note

*If necessary, raise or lower engine slightly before detaching engine support.*



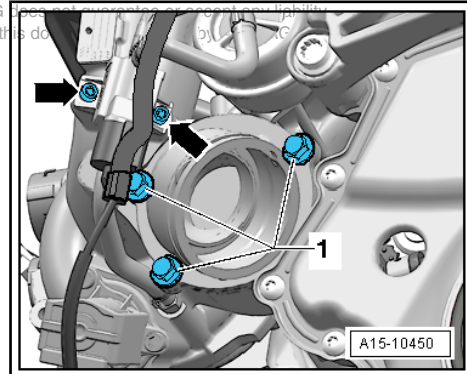


- Remove bolts -arrows- and detach guide tube for oil dipstick from timing chain cover.



- Remove charge pressure control solenoid valve -N75- from turbocharger -arrows-.
- Remove connection for turbocharger -1-.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted without the prior written consent of AUDI AG. The AUDI AG logo is a registered trademark of AUDI AG. The Audi name and logo are registered trademarks of AUDI AG. The Audi name and logo are registered trademarks of AUDI AG. The Audi name and logo are registered trademarks of AUDI AG. with respect to the correctness of information in this document.



- Remove bolts -1 ... 15-.



**Note**

*Some versions have only 8 bolts.*

- Prise off timing chain cover (bottom).

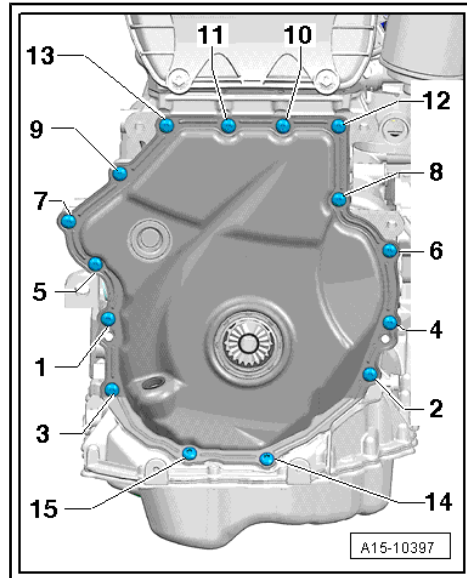
**Installing**

- ◆ Silicone sealant: => Electronic parts catalogue .



**Note**

- ◆ *Note the expiry date of the silicone sealant.*
- ◆ *The cover must be installed within 5 minutes after applying the silicone sealant.*
- ◆ *Renew the bolts tightened with specified tightening angle.*
- ◆ *Renew seals, gaskets and self-locking nuts.*



**Caution**

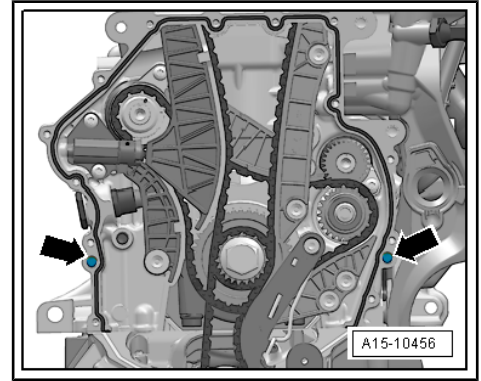
**Protect lubrication system against contamination.**

- ◆ *Cover exposed parts of the engine.*

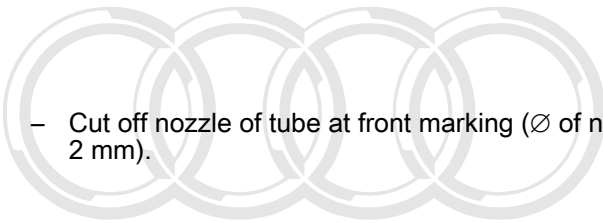
- Remove sealant remaining on cylinder block with flat scraper.
- Clean surfaces; they must be free of oil and grease.



- Check that both dowel pins are fitted in cover -arrows-.

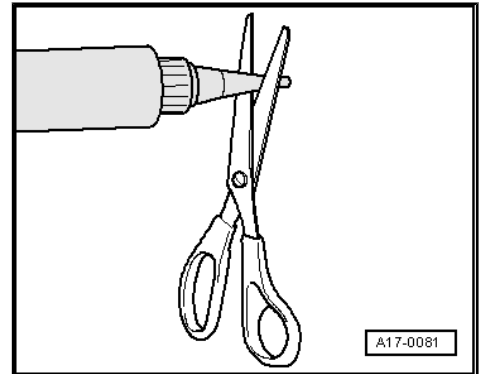


- Cut off nozzle of tube at front marking ( $\varnothing$  of nozzle approx. 2 mm).



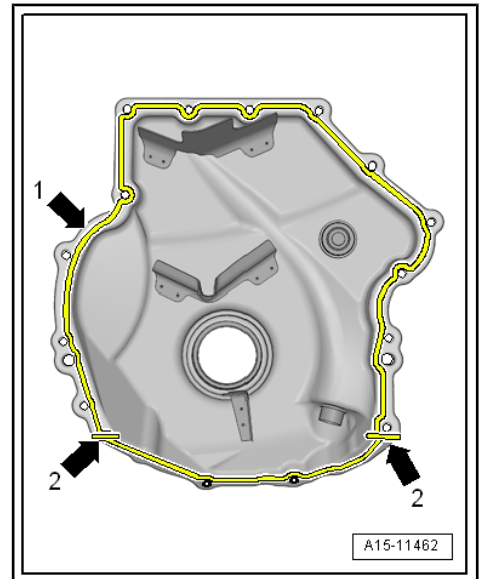
Audi

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.



#### Cover with 15 bolts

- Apply silicone sealant onto clean sealing surface -arrow 1- and onto edges -arrow 2- of new cover, as illustrated.
- ◆ Thickness of sealant bead: 2 ... 3 mm



### Cover with 8 bolts

- Apply silicone sealant onto clean sealing surface -arrow 1- and onto edges -arrow 2- of new cover, as illustrated.
- ◆ Thickness of sealant bead: 2 ... 3 mm



#### Note

- ◆ *The cover must be installed within 5 minutes after applying the silicone sealant.*
- ◆ *The bead of sealant must not be thicker than specified, otherwise excess sealant can enter the sump and obstruct the strainer in the oil intake pipe.*
- Immediately fit timing chain cover and tighten bolts:
- ◆ Cover with 15 bolts ⇒ [page 92](#)
- ◆ Cover with 8 bolts ⇒ [page 93](#)



#### Note

*After fitting cover, let sealant dry for approx. 30 minutes. Then (and only then) fill the engine with engine oil.*

- Check oil level ⇒ Maintenance ; Booklet 808 .

Perform further installation in reverse order, paying attention to the following:

- Adjust assembly mountings  
⇒ [“6.3 Adjusting assembly mountings”, page 40](#) .

### Tightening torques

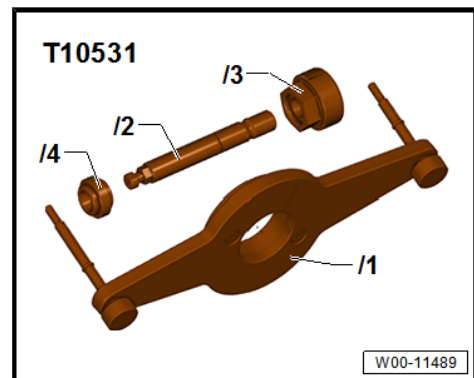
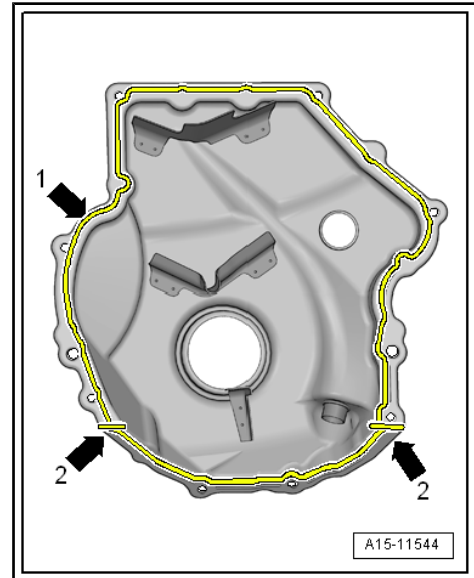
- ◆ ⇒ [“1.1 Exploded view - timing chain cover, camshaft control valve 1 N205”, page 91](#)
- ◆ ⇒ [“1.1 Exploded view - turbocharger”, page 282](#)
- ◆ ⇒ [“6.1 Exploded view - assembly mountings”, page 39](#)

## 1.5 Renewing oil seal for vibration damper

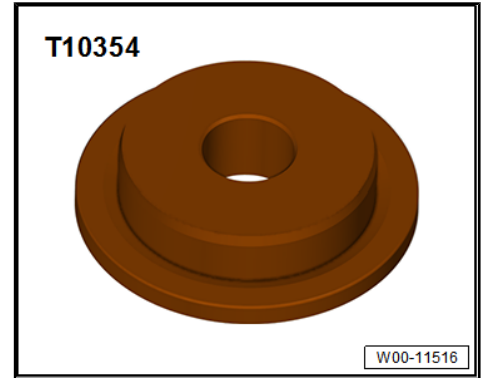
### Special tools and workshop equipment required

- ◆ Flange nut - 10531/4- from assembly tool - T10531-

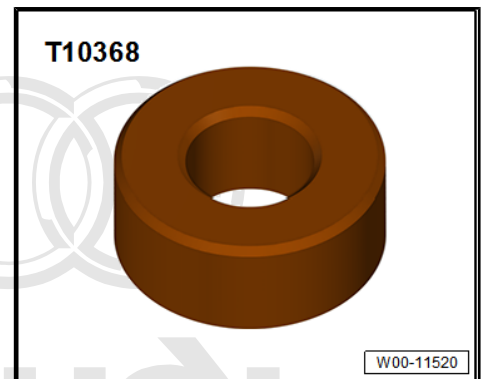
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



◆ Thrust piece - T10354-



◆ Thrust piece - T10368-

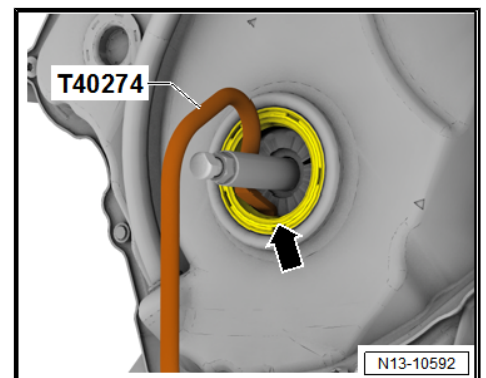


◆ Extractor tool - T40274-



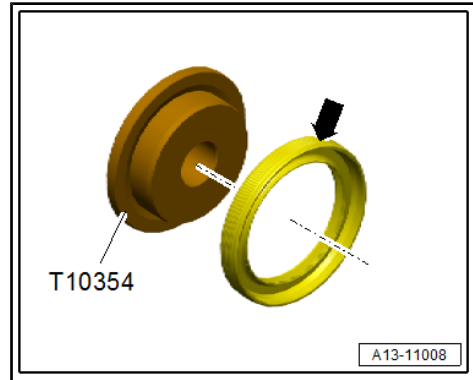
**Removing**

- Remove vibration damper  
⇒ ["1.5 Removing and installing vibration damper", page 55](#) .
- Pry out oil seal -arrow- using extractor hook - T40274- .
- Clean contact surface and sealing surface.

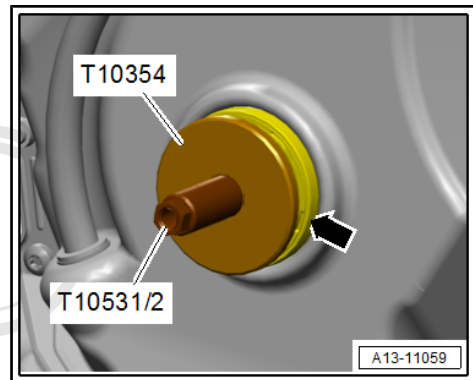




- Fit oil seal -arrow- onto thrust piece - T10354- .
- Closed side of oil seal faces thrust piece - T10354- .



- Slide oil seal -arrow- with thrust piece - T10354- onto clamping pin - T10531/2- and position on timing chain cover (bottom).



- Also fit thrust pad - T10375- and tighten flange nut - 10531/4- .
- Drive oil seal in as far as stop using thrust piece - T10354- .



**Note**

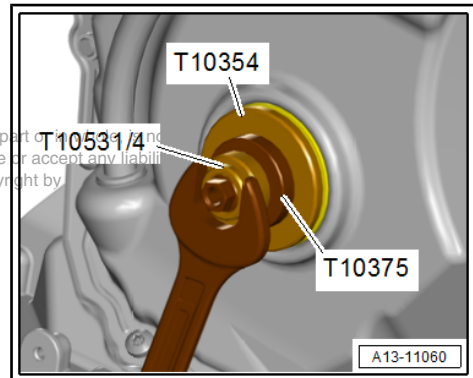
Protected by copyright. Copying for private or commercial purposes, in part or in full, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by Audi AG.

*Renew bolt with O-ring for vibration damper.*

- Install vibration damper  
⇒ ["1.5 Removing and installing vibration damper", page 55](#) .

**Tightening torques**

- ◆ ⇒ ["1.1 Exploded view - poly V-belt drive", page 47](#)



## 2 Chain drive

⇒ [“2.1 Exploded view - camshaft timing chain”, page 101](#)

⇒ [“2.3 Removing and installing camshaft timing chain”, page 106](#)

⇒ [“2.2 Removing and installing bearing saddle”, page 102](#)

⇒ [“2.4 Exploded view - balance shaft timing chain”, page 116](#)

⇒ [“2.5 Removing and installing drive chain for balance shaft”, page 118](#)

⇒ [“2.6 Checking valve timing”, page 120](#)

Information, including technical data, 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 Exploded view - camshaft timing chain

#### 1 - Bolt

- 9 Nm

#### 2 - Chain tensioner

- Exerts spring pressure
- Before removing, lock in place using locking pin - T40011-

#### 3 - Tensioning rail for timing chain

#### 4 - Guide pin

- 20 Nm

#### 5 - Bolt

- 9 Nm

#### 6 - Timing valve

- Left-hand thread
- 35 Nm
- Depending on version, use assembly tool - T10352- or assembly tool - T10352/1A- for removal

#### 7 - Bolt

- Renew
- M6: 8 Nm + turn 90° further
- M8: 20 Nm + turn 90° further

#### 8 - Washer

#### 9 - Bearing saddle

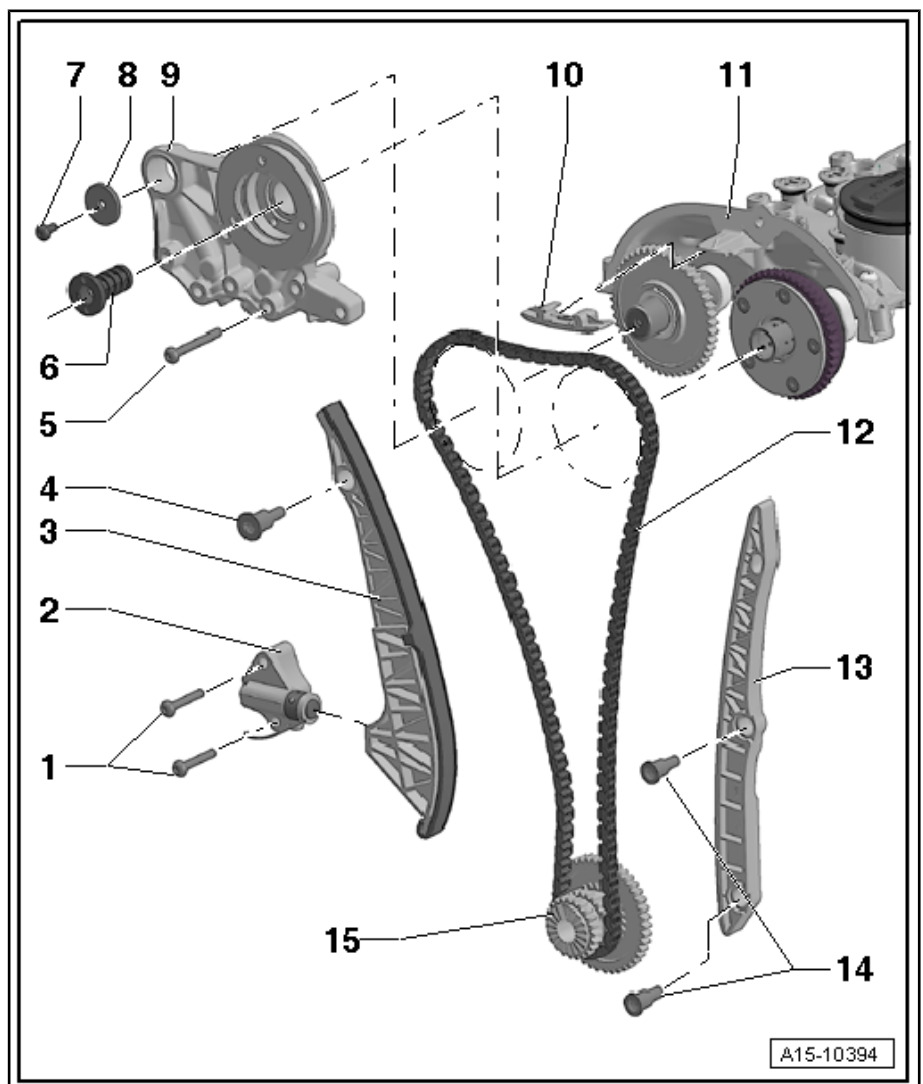
- Removing and installing  
⇒ [page 102](#)

#### 10 - Guide rail for camshaft timing chain

#### 11 - Camshaft housing

#### 12 - Camshaft timing chain

- Before removing, mark running direction with paint





**13 - Guide rail for camshaft timing chain**

**14 - Guide pin**

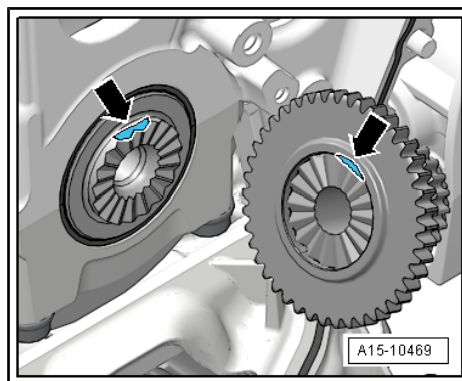
- 20 Nm

**15 - Three-part chain sprocket assembly**

- Crankshaft
- Installation position => [page 102](#)

**Three-part chain sprocket assembly - installation position**

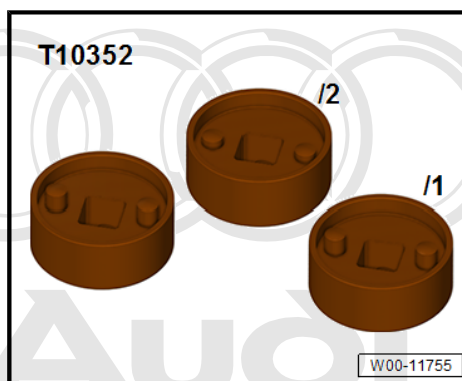
- The two sections -arrows- must be aligned.



**2.2 Removing and installing bearing saddle**

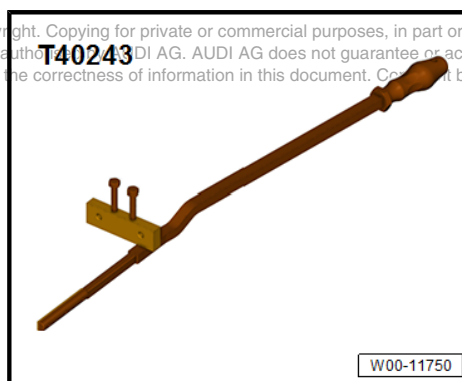
**Special tools and workshop equipment required**

- ◆ Assembly tool - T10352-

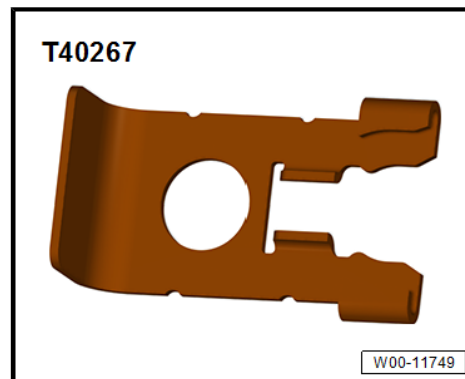


- ◆ Assembly lever - T40243-

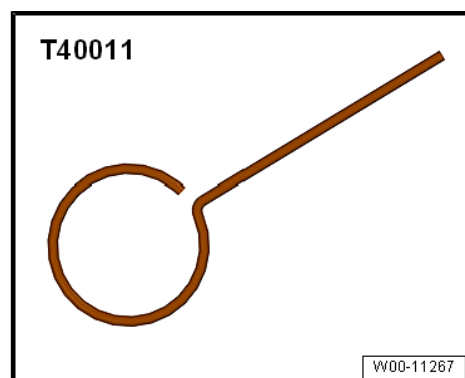
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorized by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright © 2016 by AUDI AG.



- ◆ Locking tool - T40267-



- ◆ Locking pin - T40011-



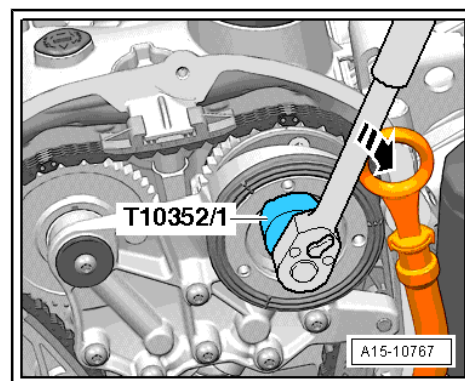
### Removing

- Remove timing chain cover (top) ⇒ [page 93](#) .

**Caution**

*Risk of damage to thread.*

- ◆ *The timing valves have a left-hand thread.*



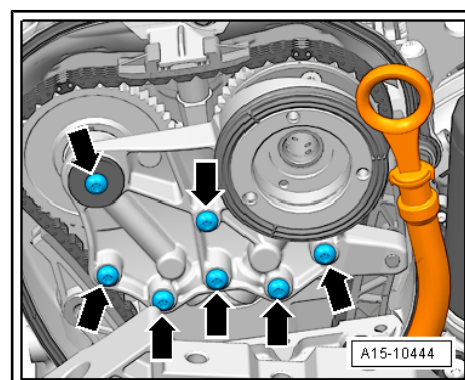
- Depending on version, turn assembly tool - T10352- or assembly tool - T10352/1A- in direction of -arrow- to remove timing valve.

- Remove bolts -arrows-.

**WARNING**

*Risk of damage to bearing saddle.*

- ◆ *Detach bearing saddle carefully without tilting it.*

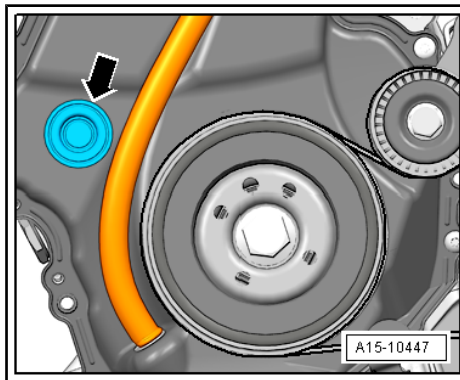


- Detach bearing saddle.

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.



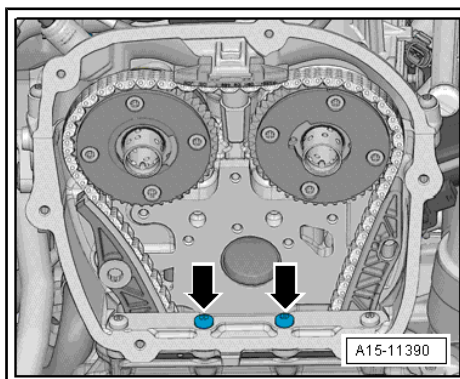
- Remove sealing plug -arrow-.



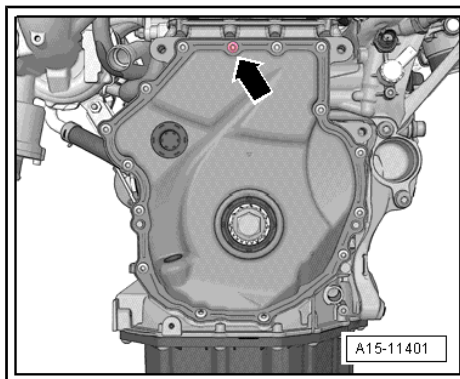
- Remove bolts -arrows-.



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.



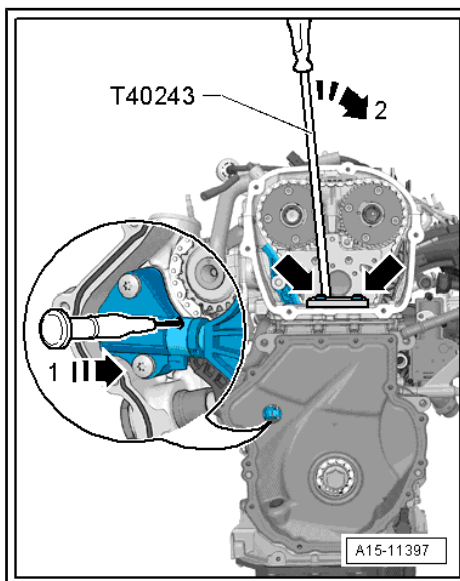
- Remove bolt -arrow-.



Depending on version, 2 different chain tensioners may be installed.

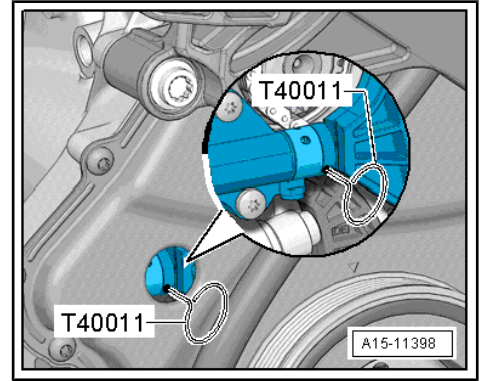
**Version 1**

- Screw in lever - T40243- -arrows-.
- Lift locking element for chain tensioner; to do so, insert scriber or suitable screwdriver in hole of chain tensioner in direction of -arrow 1-, press lever - T40243- slowly in direction of -arrow 2- and hold in place.



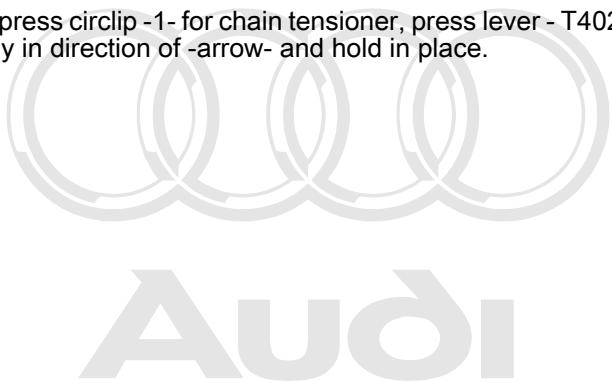


- Hold chain tensioner in position with locking pin - T40011- .

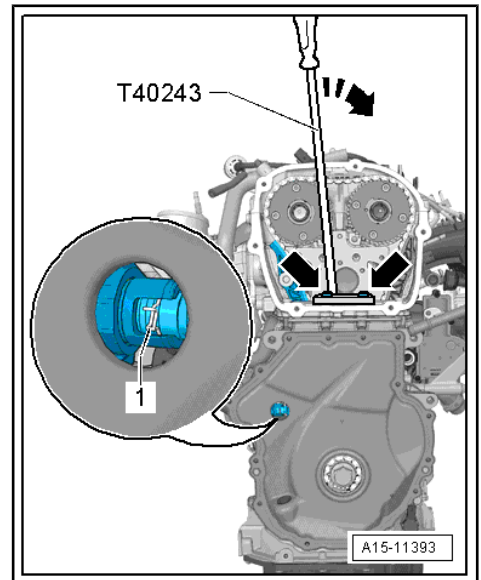


### Version 2

- Screw in lever - T40243- -arrows-.
- Compress circlip -1- for chain tensioner, press lever - T40243- slowly in direction of -arrow- and hold in place.



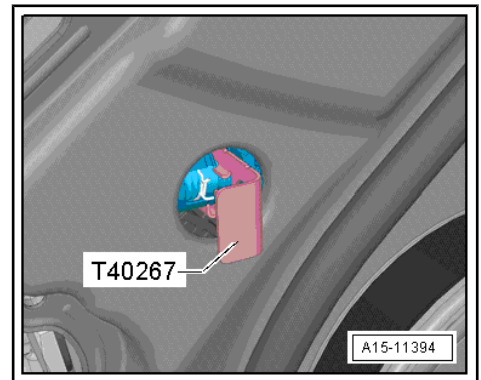
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- Hold chain tensioner in position with locking tool - T40267- .

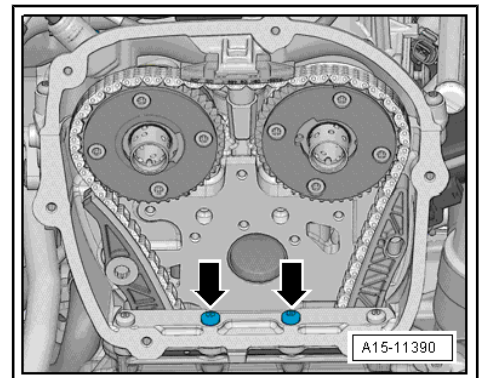
### All versions

- Remove lever - T40243- .

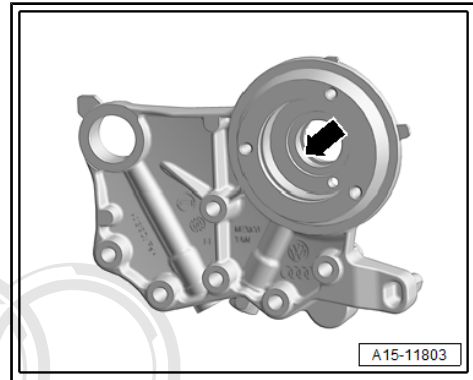


### Installing

- Fit and tighten bolts -arrows-. Tightening torque  
 => [Item 2 \(page 124\)](#)



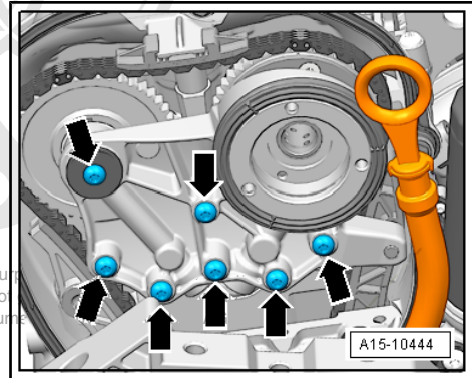
- Lubricate hole -arrow- with engine oil.

**WARNING**

*Risk of damage to bearing saddle.*

- ◆ *Carefully attach bearing saddle without tilting it.*

- Attach bearing saddle and screw in bolts -arrows- hand-tight.
- Depending on version, remove locking pin T40011- or locking tool - T40267- .
- Tighten bolts -arrows- for bearing saddle ⇒ [page 101](#) .



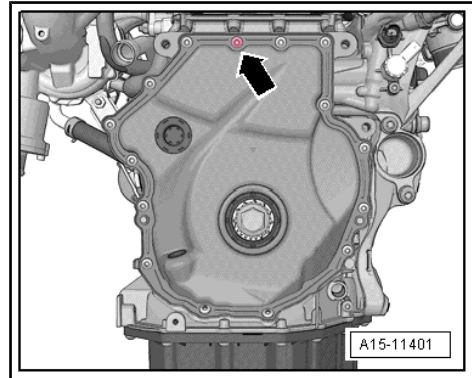
- Screw in bolt -arrow-.
- Install timing valve ⇒ [Item 6 \(page 101\)](#) .

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

- Install timing chain cover (top) ⇒ [page 93](#) .

**Tightening torques**

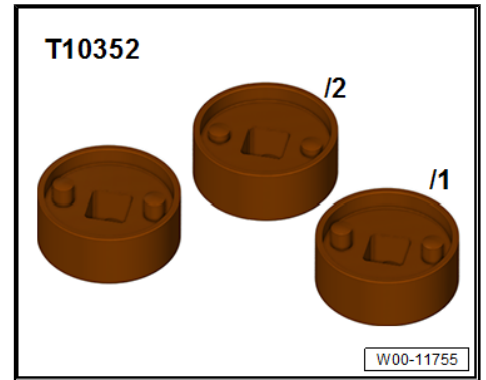
- ◆ ⇒ [“2.1 Exploded view - camshaft timing chain”, page 101](#)
- ◆ ⇒ [“1.1 Exploded view - timing chain cover, camshaft control valve 1 N205”, page 91](#)
- ◆ ⇒ [“3.1 Exploded view - cylinder head, engine codes BYT, BPU”, page 123](#)
- ◆ ⇒ [“3.3 Exploded view - cylinder head, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA”, page 148](#)



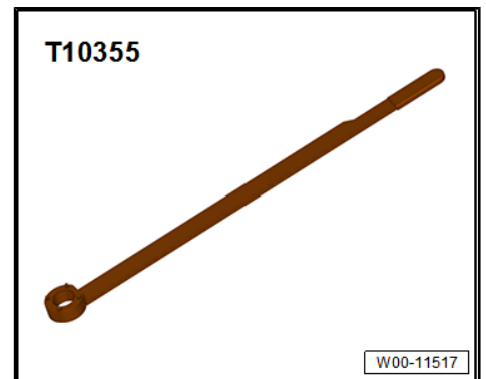
## 2.3 Removing and installing camshaft timing chain

Special tools and workshop equipment required

◆ Removal tool - T10352-



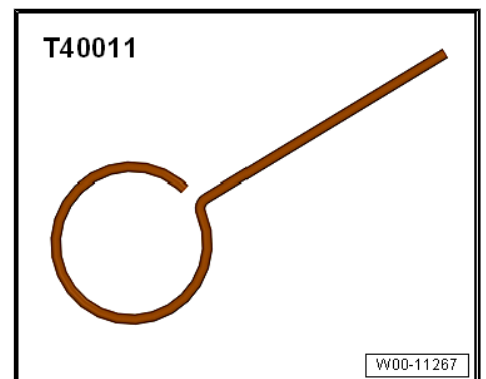
◆ Counterhold tool - T10355-



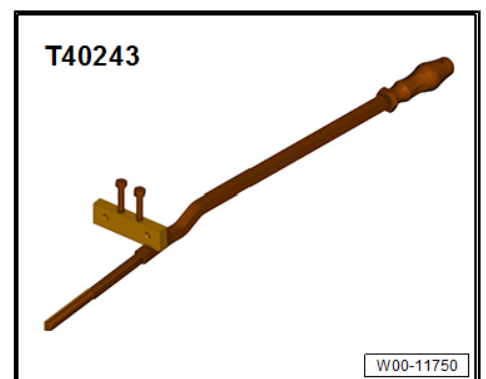
◆ Locking pin - T40011-



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.

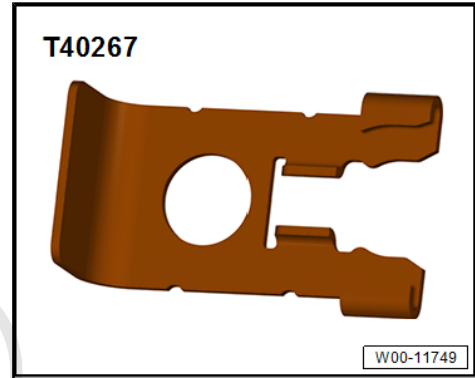


◆ Assembly lever - T40243-

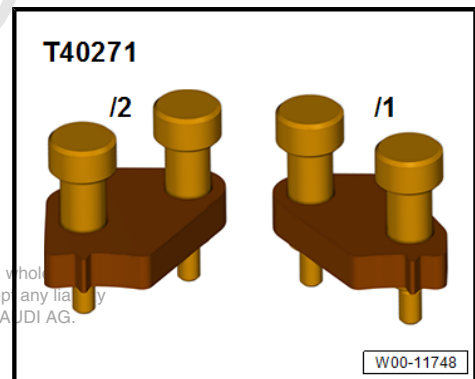




- ◆ Locking tool - T40267-

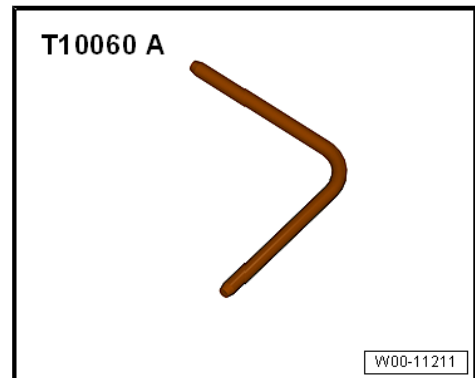


- ◆ Camshaft clamp - T40271-



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.

- ◆ Locking pin - T10060 A-



### Removing

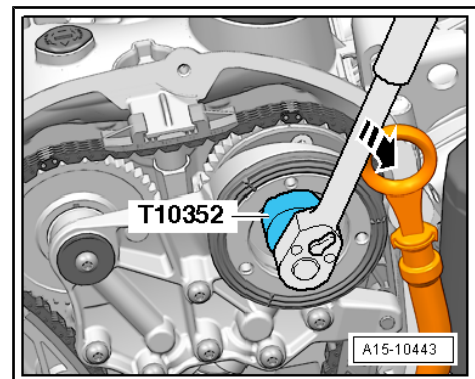
- Remove timing chain cover (top) ⇒ [page 93](#) .




### Caution

*The timing valve has a left-hand thread.*

- Depending on version, turn assembly tool - T10352- or assembly tool - T10352/1A- in direction of -arrow- to remove timing valve.



- Remove bolts -arrows-.

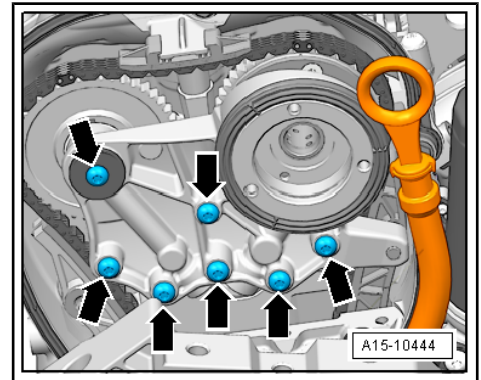


**WARNING**

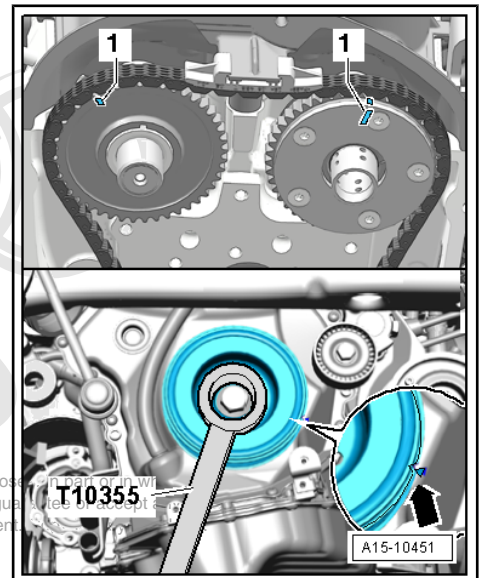
*Risk of damage to bearing saddle.*

◆ *Detach bearing saddle carefully without tilting it.*

- Detach bearing saddle.

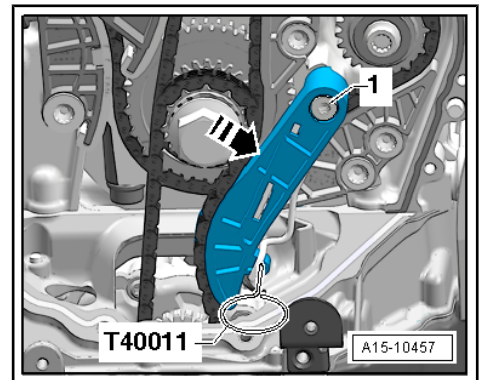


- Turn vibration damper to "TDC" position using counterhold tool - T10355- .
- Notch on vibration damper and marking on cover for timing chains (bottom) must be aligned -arrow-.
- The markings -1- on the camshafts must face upwards.
- Remove timing chain cover (bottom) => [page 94](#) .

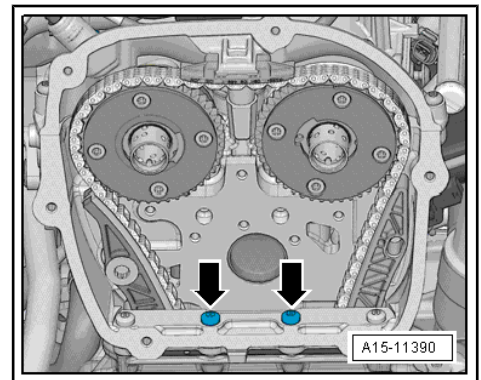


Protected by copyright. Copying for private or commercial purposes is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee the correctness of information in this document.

- Press oil pump chain tensioner in direction of -arrow- and lock in place using locking pin - T40011- .
- Remove oil pump chain tensioner -1-.
- Detach drive chain for oil pump.



- Remove bolts -arrows-.

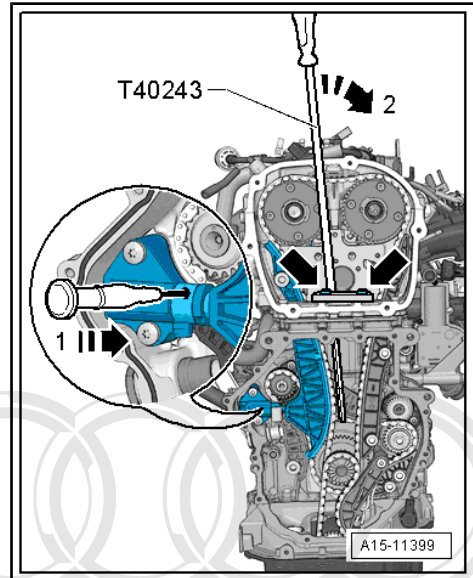




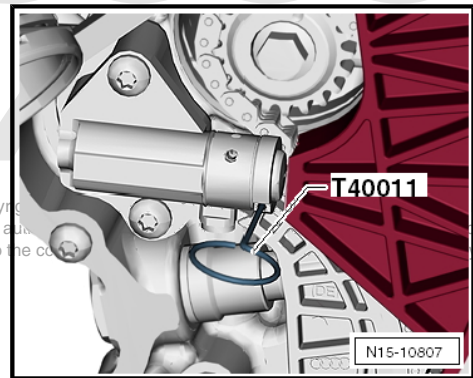
Depending on version, 2 different chain tensioners may be installed.

**Version 1**

- Screw in assembly lever - T40243- -arrows-.
- Lift locking element for chain tensioner; to do so, insert scriber or suitable screwdriver in hole of chain tensioner in direction of -arrow 1- and hold in place.
- Push assembly lever - T40243- slowly in direction of -arrow 2- and hold in place.



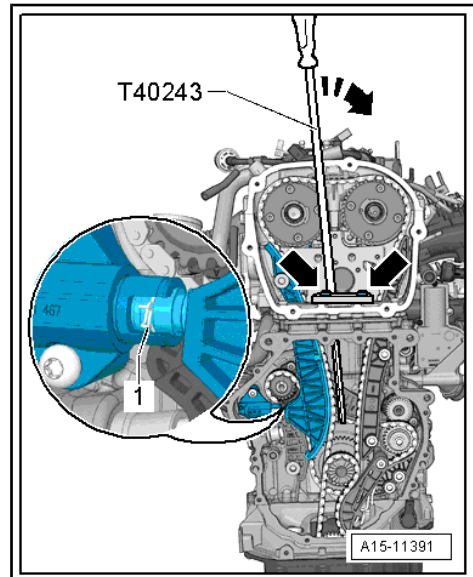
- Hold chain tensioner in position with locking pin - T40011- .



Protected by copyright. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without the prior written permission of Audi AG. Audi AG is not liable for any damage or liability.

**Version 2**

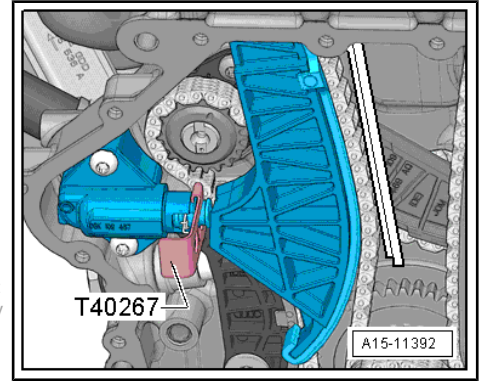
- Screw in assembly lever - T40243- -arrows-.
- Compress and hold circlip -1- for chain tensioner.
- Push assembly lever - T40243- slowly in direction of -arrow- and hold in place.



- Hold chain tensioner in position with locking tool - T40267- .

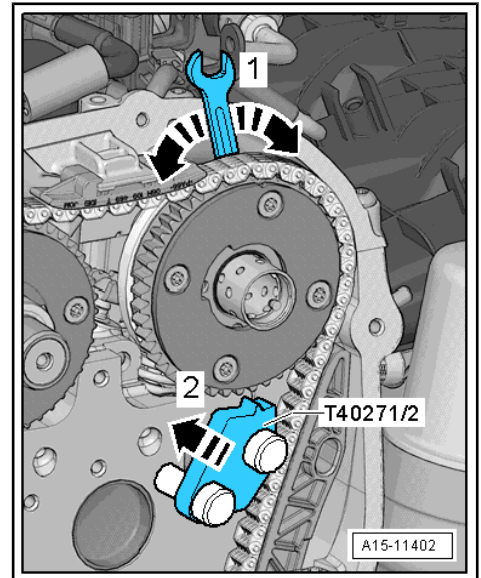


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

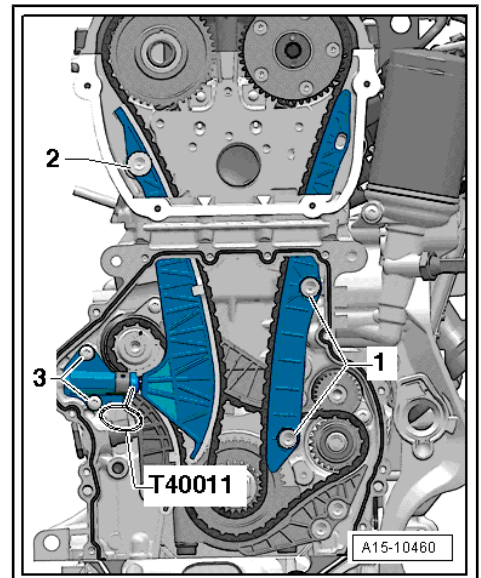


**All versions**

- Remove assembly lever - T40243- .
- Bolt camshaft clamp - T40271/2- onto cylinder head and slide into teeth on chain sprocket in direction of -arrow 2-; if necessary, use spanner to turn inlet camshaft in direction of -arrow 1-.

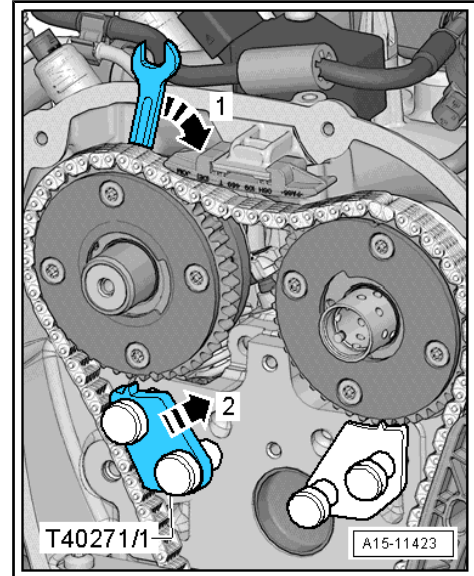


- Remove tensioning rail for timing chain -2-.

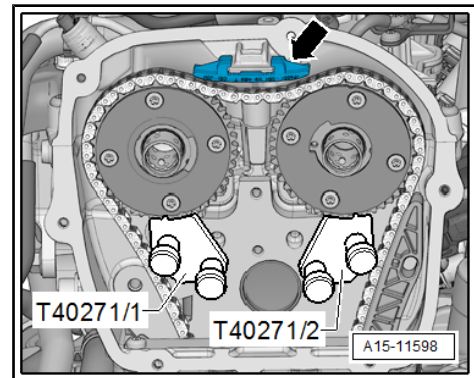




- Bolt camshaft clamp - T40271/1- onto cylinder head.
- Use spanner to turn exhaust camshaft in direction of -arrow 1- and slide camshaft clamp - T40271/1- into teeth on chain sprocket in direction of -arrow 2-.



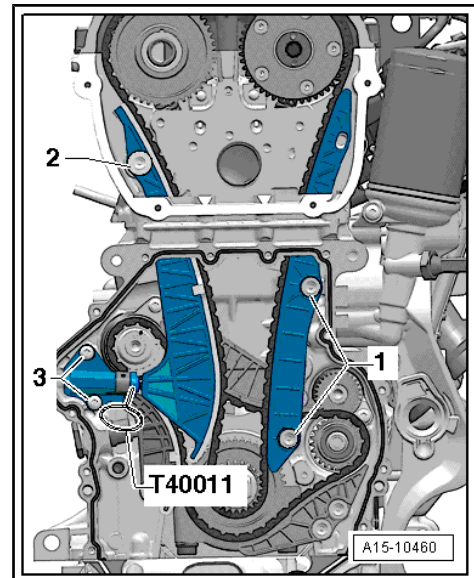
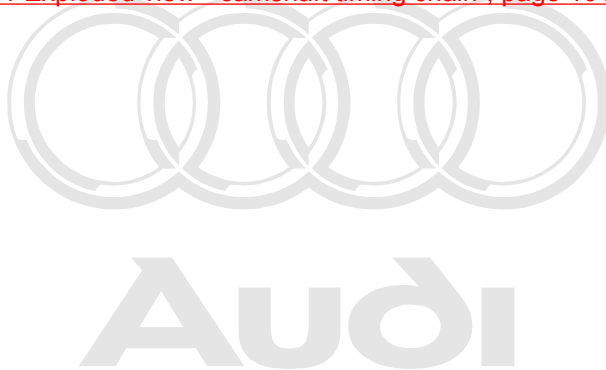
- Use screwdriver to release catch and press off top guide rail -arrow- towards front.



- Remove guide rail for camshaft timing chain -1-.
- Remove timing chain.

### Installing

- Tightening torques  
⇒ ["2.1 Exploded view - camshaft timing chain", page 101](#)



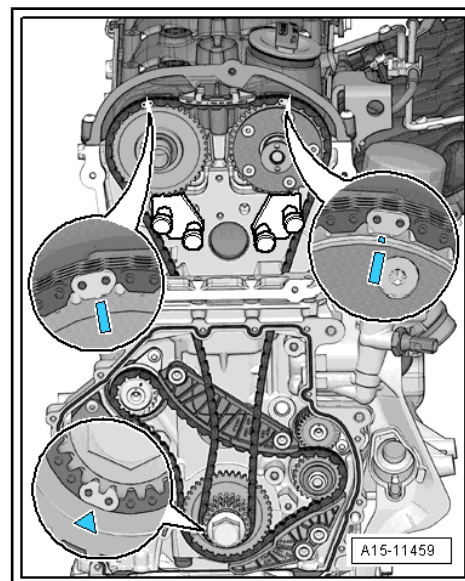
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



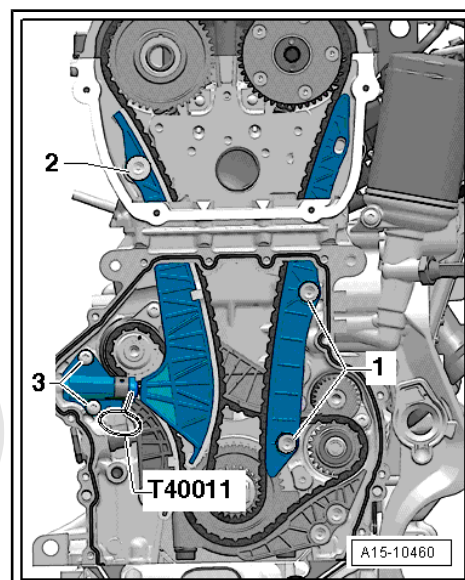
**i** Note

*The timing chain links with coloured markings must be positioned at the markings on the chain sprockets.*

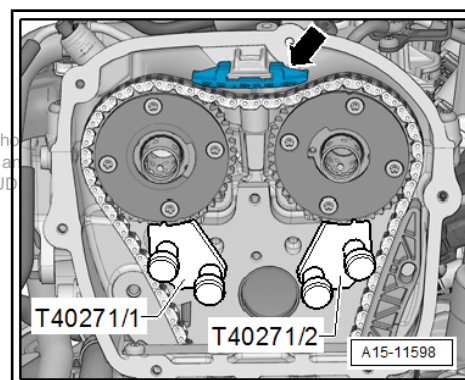
- Fit timing chain onto inlet camshaft.
- Fit timing chain onto exhaust camshaft.
- Fit timing chain onto crankshaft and hold in place.



- Fit guide rail for camshaft timing chain and tighten bolts -1-.



- Install top guide rail -arrow-.

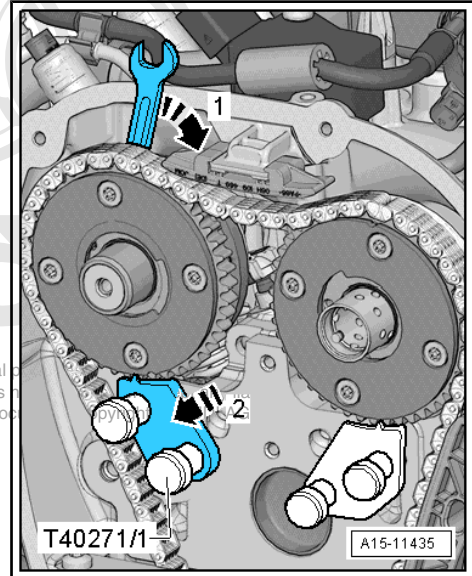


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

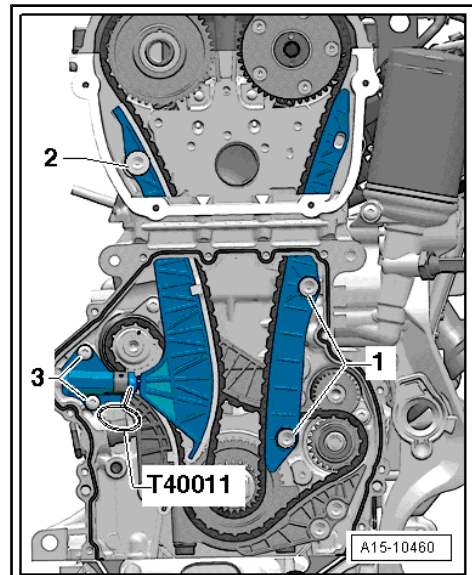




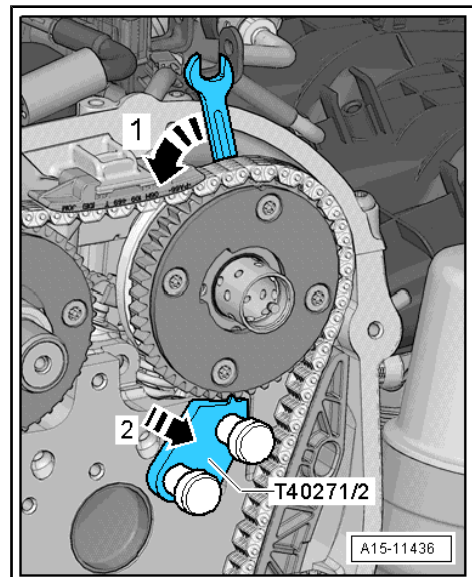
- Turn exhaust camshaft in direction of -arrow 1- and slide camshaft clamp - T40271/1- out of teeth on chain sprocket in direction of -arrow 2- and release camshaft.
- Remove camshaft clamp - T40271/1- .



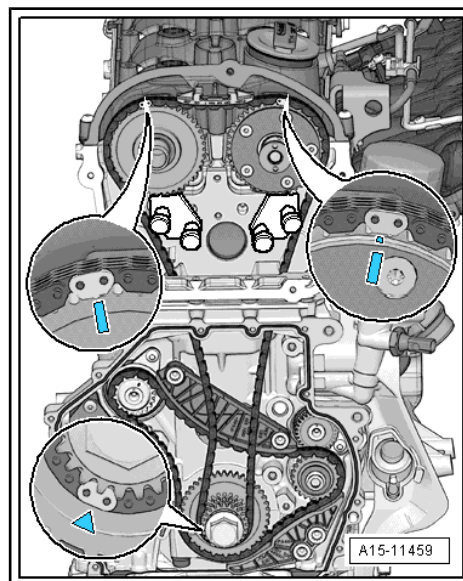
- Fit tensioning rail for timing chain and tighten bolt -2-.



- Turn inlet camshaft in direction of -arrow 1- and slide camshaft clamp - T40271/2- out of teeth on chain sprocket in direction of -arrow 2- and release camshaft.
- Remove camshaft clamp - T40271/2- .



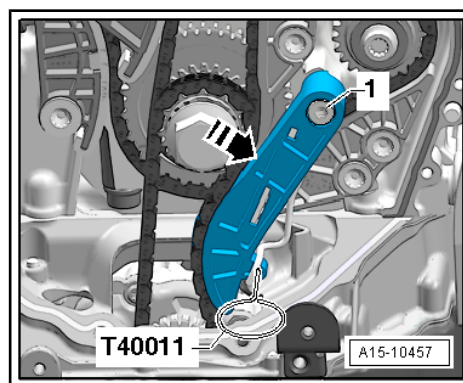
- Check that timing chain links with coloured markings are aligned with markings on chain sprockets.



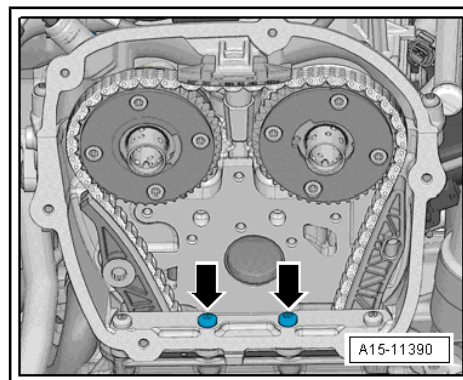
- Install drive chain for oil pump and chain tensioner. Tighten bolt -1- and remove locking pin - T40011- .



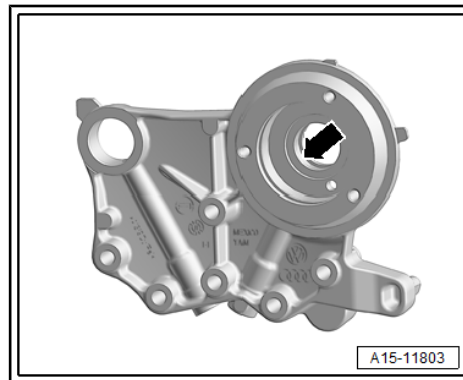
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- Fit and tighten bolts -arrows-.



- Lubricate hole -arrow- with engine oil.

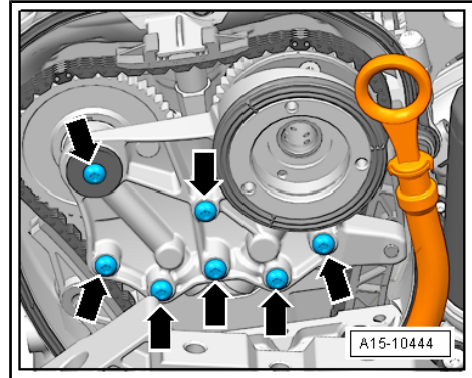


**WARNING**

*Risk of damage to bearing saddle.*

◆ *Detach bearing saddle carefully without tilting it.*

- Attach bearing saddle and screw in bolts -arrows- hand-tight.
- Depending on version, remove locking pin - T40011- or locking tool - T40267- .
- Tighten bolts -arrows- for bearing saddle ⇒ [page 101](#) .
- Install timing valve ⇒ [Item 6 \(page 101\)](#) .
- Install timing chain cover (bottom) ⇒ [page 94](#) .

**Note**

*Due to the ratio, the timing chain links with coloured markings are no longer aligned after the engine has been turned. The valve timing must therefore be checked with the dial gauge.*

- Turn engine two rotations in normal direction of rotation and check valve timing ⇒ [page 120](#) .

Perform further installation in reverse order, paying attention to the following:

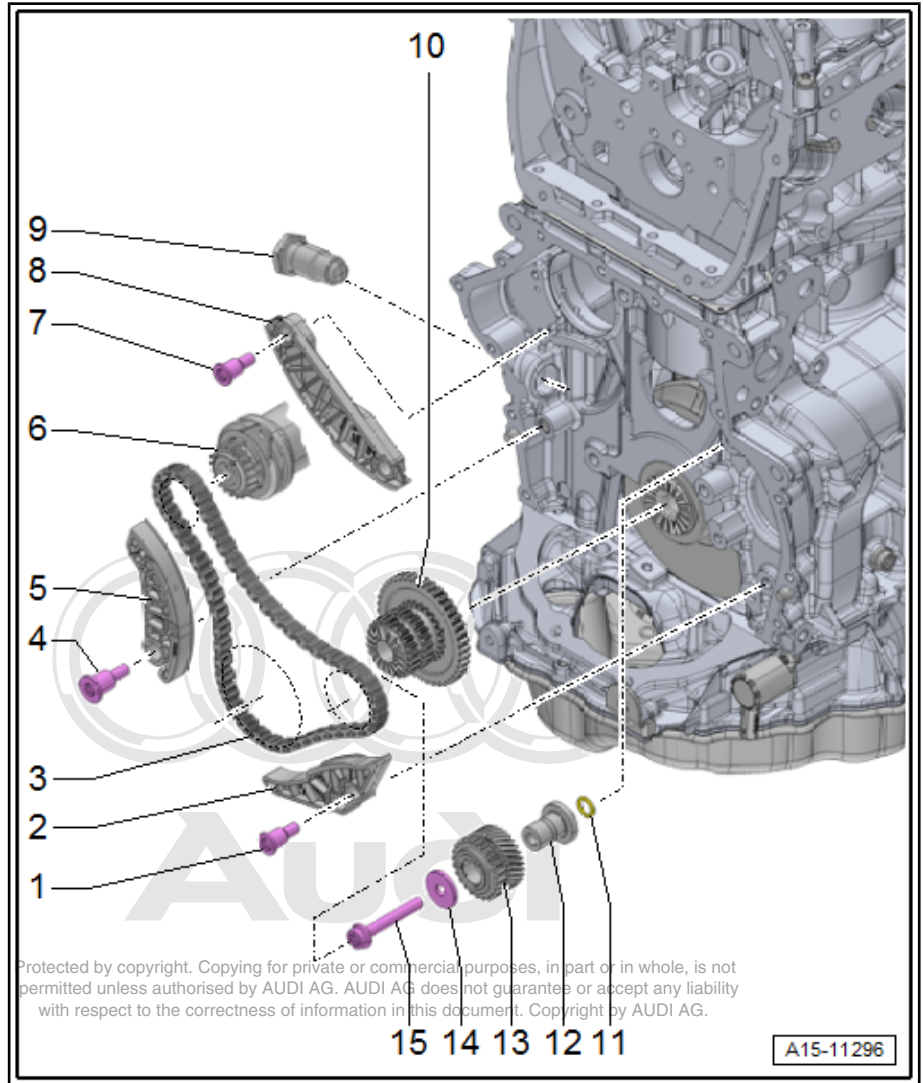
- Install timing chain cover (top) ⇒ [page 93](#) .
- Install poly V-belt tensioner ⇒ [page 51](#) .
- Install poly V-belt ⇒ [page 49](#) .
- Adjust assembly mountings ⇒ [page 40](#) .

## 2.4 Exploded view - balance shaft timing chain



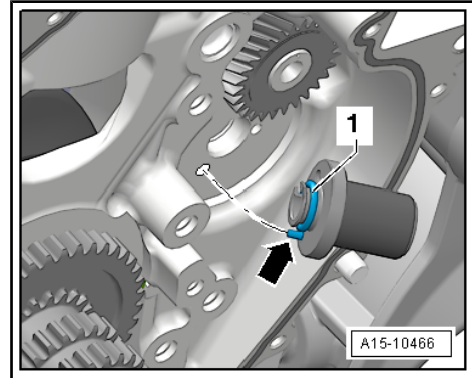
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- 1 - Guide pin**
  - 20 Nm
- 2 - Guide rail**
  - For timing chain
- 3 - Timing chain**
  - Removing ⇒ [page 118](#)
- 4 - Guide pin**
  - 20 Nm
- 5 - Tensioning rail**
  - For drive chain for balance shafts
- 6 - Balance shaft**
  - Exhaust side
  - Always renew after removal
  - Lubricate bearing with engine oil
  - Renewing ⇒ [page 80](#)
- 7 - Guide pin**
  - 20 Nm
- 8 - Guide rail**
  - For timing chain
- 9 - Chain tensioner**
  - 85 Nm
  - Apply sealant to seal
- 10 - Three-part chain sprocket assembly**
  - Installation position ⇒ [page 102](#)
- 11 - O-ring**
  - Lubricate with engine oil
- 12 - Bearing mounting**
  - Lubricate with engine oil
  - Installation position ⇒ [page 118](#)
- 13 - Idler gear**
  - If bolt ⇒ [Item 15 \(page 117\)](#) has been loosened, idler gear must be renewed
- 14 - Washer**
- 15 - Bolt**
  - Renew
  - If bolt has been loosened, idler gear ⇒ [Item 13 \(page 117\)](#) must be renewed
  - Tightening sequence ⇒ [page 118](#)



### Bearing mounting - installation position

- Renew O-ring -1- and lubricate with oil.
- Dowel pin -arrow- for bearing mounting must engage in bore in cylinder block.
- Lubricate bearing mounting.



### Idler gear - tightening sequence



#### Caution

*Always renew idler gear. If this is not done, there is no backlash, which causes engine damage.*

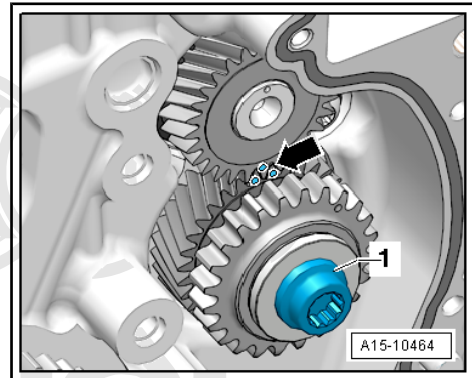
*The new idler gear has a special lubricant coating which wears off after a short running period and thus automatically creates the specified backlash.*

- Secure with new bolt as follows:

1. Tighten with torque wrench initially to 10 Nm.
2. Turn idler gear.

Idler gear must be without play; otherwise **loosen bolt and tighten again.**

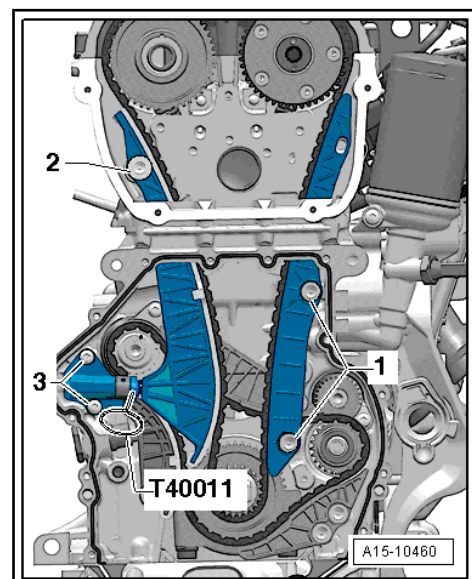
3. Tighten with torque wrench to 25 Nm.
4. Use rigid wrench to turn 90° further.



## 2.5 Removing and installing drive chain for balance shaft

### Removing

- Remove camshaft timing chain => [page 106](#).
- Remove chain tensioner for camshaft timing chain -3-.



- Remove chain tensioner for balance shaft timing chain -1-.
- Remove tensioning rail -2-.
- Remove guide rail -3-.
- Remove guide rail -4-.
- Remove timing chain.

### Installing

- Tightening torques  
 ⇒ ["2.4 Exploded view - balance shaft timing chain", page 116](#)

- Turn idler gear/balance shaft to markings -arrow-.

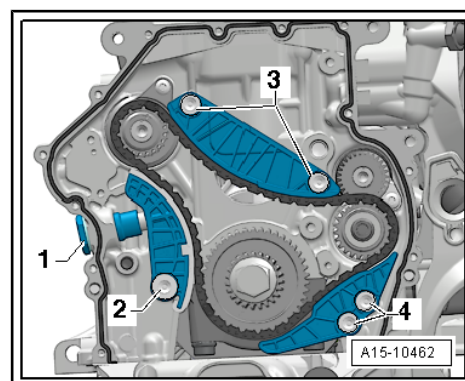
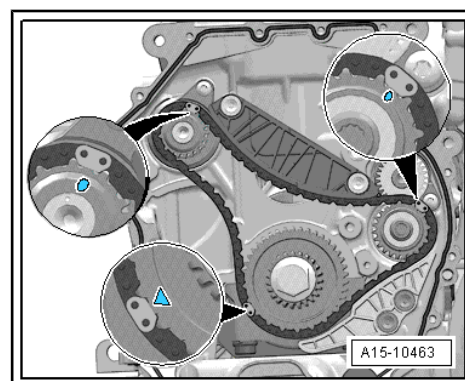
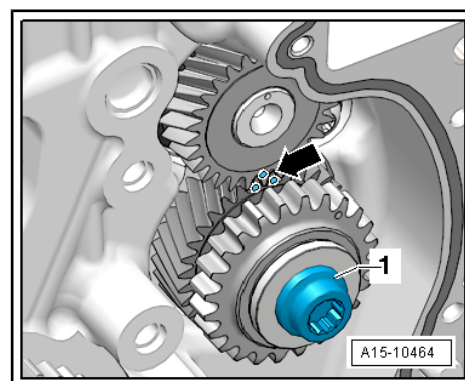
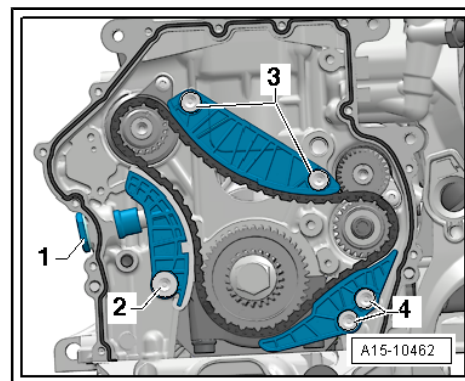


### Note

*The timing chain links with coloured markings must be positioned at the markings on the chain sprockets.*

- Fit timing chain; the timing chain links with coloured markings must be positioned at the markings on the chain sprockets.

- Fit guide rail for timing chain and tighten bolts -4-.
- Fit guide rail for timing chain and tighten bolts -3-.
- Fit tensioning rail for timing chain and tighten bolt -2-.
- Apply sealant to seal of chain tensioner -1-; for sealant, refer to ⇒ Electronic parts catalogue (ETKA) .
- Screw in chain tensioner for timing chain -1-.

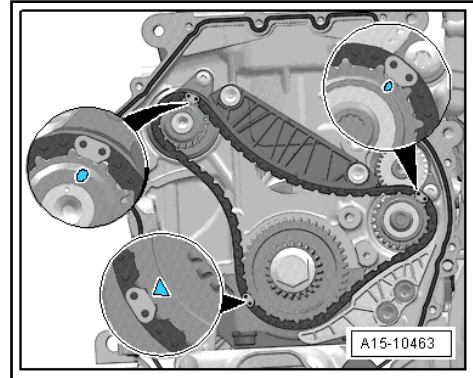


**Audi**

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.



- Check adjustment again.



- Check markings on idler gear/balance shaft -arrow-

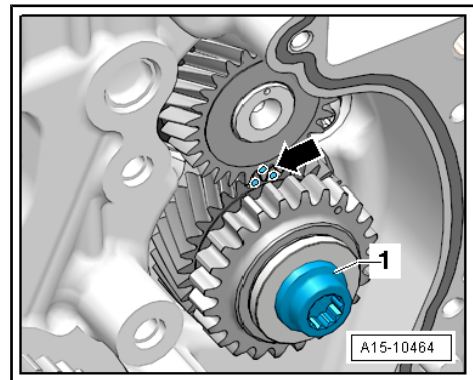


**Note**

*For illustration purposes, the markings on the idler gear for balance shaft are shown with the chain removed.*

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

- Install camshaft timing chain ⇒ [page 106](#) .
- Install timing chain cover (bottom) ⇒ [page 94](#) .
- Install timing chain cover (top) ⇒ [page 93](#) .
- Install poly V-belt tensioner ⇒ [page 51](#) .
- Install poly V-belt ⇒ [page 49](#) .
- Adjust assembly mountings ⇒ [page 40](#) .



## 2.6 Checking valve timing

### Special tools and workshop equipment required

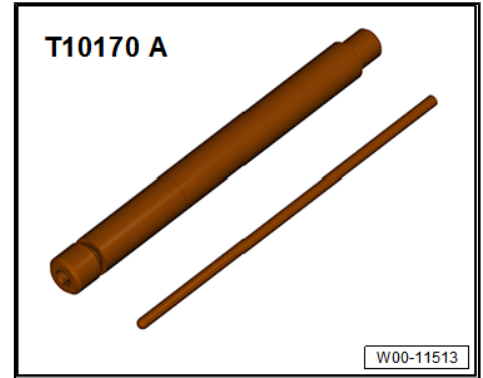
- ◆ Dial gauge - VAS 6079-



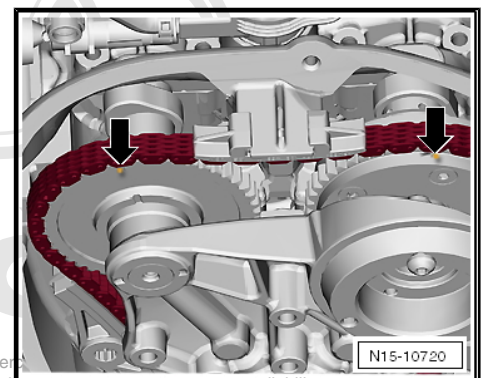
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



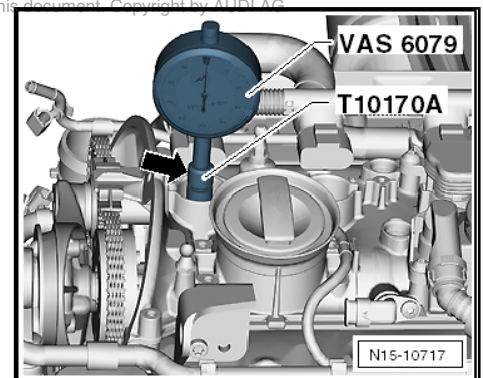
◆ Adapter for dial gauge - T10170 A-



- Remove timing chain cover (top) ⇒ [page 93](#) .
- Remove noise insulation ⇒ Rep. gr. 66 .
- Using 24 mm socket, turn crankshaft via vibration damper in normal direction of rotation until markings -arrows- are almost at top.
- Remove spark plug on cylinder 1.



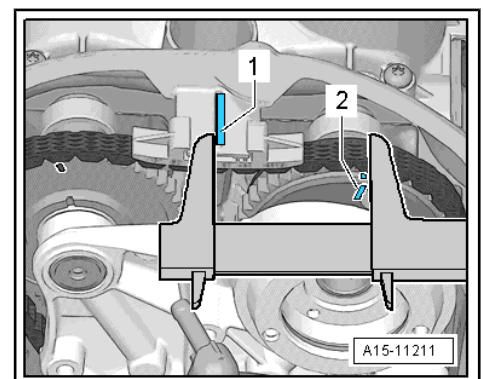
- Screw dial gauge adapter - T10170/A- into spark plug thread as far as stop.
- Insert dial gauge - VAS 6079- with extension - T10170A/1- as far as stop and secure with locking nut -arrow-.
- Turn crankshaft slowly in normal direction of engine rotation until needle in dial gauge has reached maximum position. When needle has moved to maximum position (i.e. turning point in dial gauge), piston is at »TDC«.



**i** Note

- ◆ *To turn the vibration damper, use a ratchet with 24 mm socket.*
- ◆ *If the crankshaft has been turned beyond the "TDC" position, it must again be turned two rotations in normal direction of engine rotation. Do not turn engine in opposite direction to normal rotation.*

- Measure distance from left outer edge of rib -1- to marking -2- on inlet camshaft.
- Specification: 61 ... 64 mm.





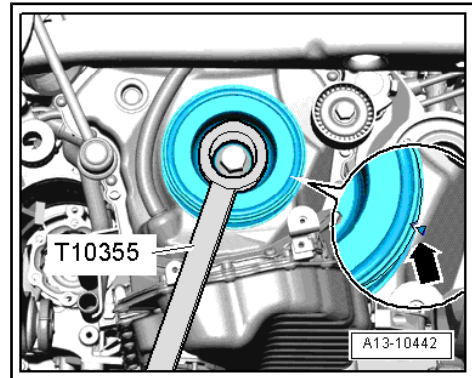
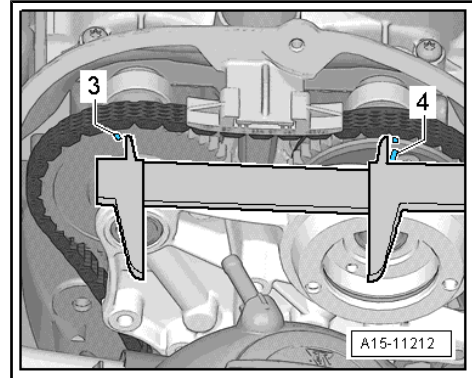
- If specification is obtained, measure distance between marking on exhaust camshaft -3- and marking on inlet camshaft -4-.
- Specification: 124 ... 126 mm.



**Note**

*If the timing chain is one tooth out of position, this results in a deviation of approx. 6 mm from specification. The timing chain must be refitted if it is not in the correct position.*

- Notch on vibration damper must align with arrow marking on timing chain cover (bottom) -arrow-.



**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.

### 3 Cylinder head

⇒ [“3.1 Exploded view - cylinder head, engine codes BYT, BPU”, page 123](#)

⇒ [“3.2 Removing and installing cylinder head, engine codes BYT, BPU”, page 126](#)

⇒ [“3.3 Exploded view - cylinder head, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA”, page 148](#) .

⇒ [“3.4 Removing and installing cylinder head, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA”, page 151](#)

#### 3.1 Exploded view - cylinder head, engine codes BYT, BPU



##### Note

- ◆ *Renew the cylinder head bolts.*
- ◆ *During assembly, renew oil seals and gaskets as well as self-locking nuts and bolts that are tightened by turning through to a specified angle.*
- ◆ *The plastic protectors fitted to protect the open valves must only be removed immediately before fitting the cylinder head.*
- ◆ *After fitting a new cylinder head or cylinder head gasket, change the engine oil and the coolant in the entire cooling 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.



**1 - Cylinder head gasket**

- Renew
- Note installation position: part number must face cylinder head

**2 - Bolt**

- Tightening sequence ⇒ [page 125](#)

**3 - Cylinder head**

- Removing and installing ⇒ [page 126](#)
- Checking for distortion ⇒ [page 126](#)

**4 - Cylinder head bolt**

- Renew
- Note correct sequence when loosening ⇒ [page 125](#)
- Note correct sequence when tightening ⇒ [page 125](#)

**5 - Bracket**

**6 - Bolt**

- 7 Nm

**7 - O-ring**

- Renew
- Lubricate with engine oil

**8 - Sealing plug**

**9 - Heat shield**

**10 - Bolt**

- 20 Nm

**11 - Bolt**

- 20 Nm

**12 - Bolt**

- Tightening sequence ⇒ [page 126](#)

**13 - Sealing cap**

- With seal

**14 - Engine cover panel**

**15 - Oil separator**

**16 - Gasket**

- Renew if damaged or leaking

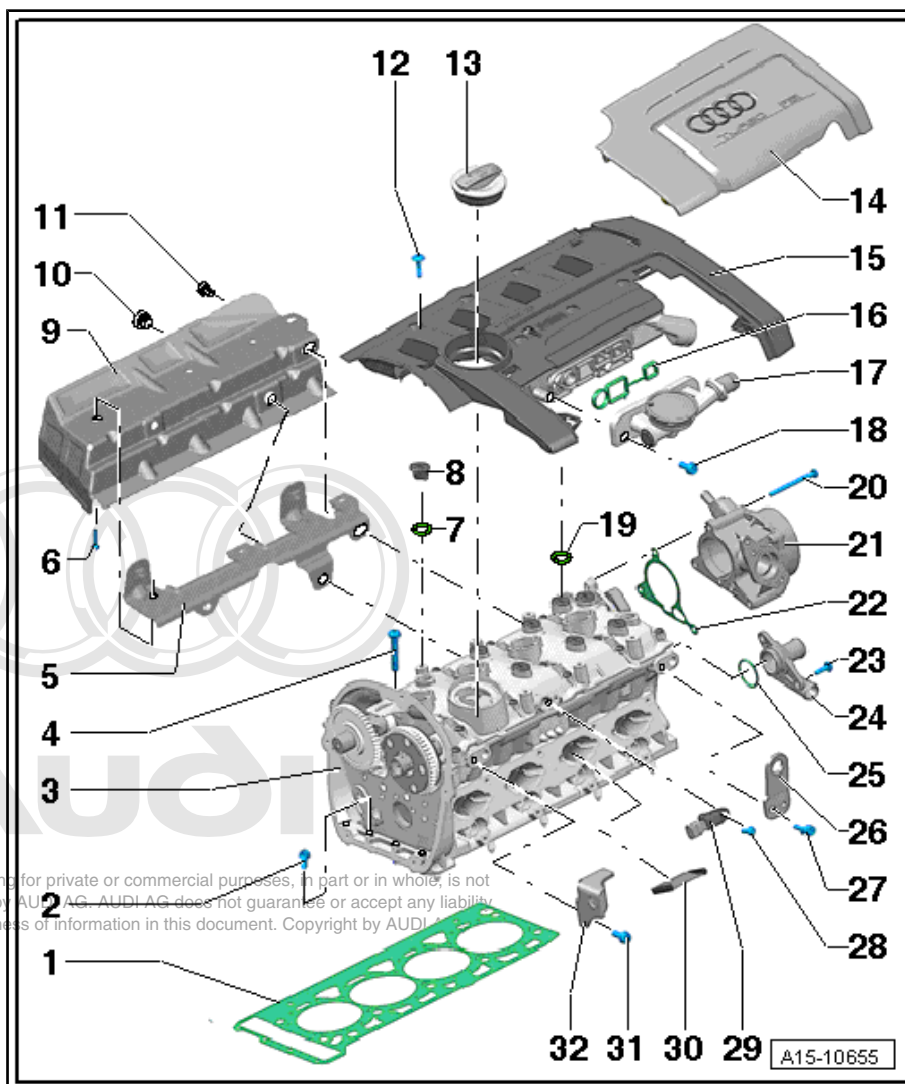
**17 - Valve housing**

**18 - Bolt**

- 4.2 Nm

**19 - O-ring**

- Renew
- Lubricate 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.

**20 - Bolt**

- Tightening torque ⇒ Rep. gr. 47

**21 - Vacuum pump**

- Removing and installing ⇒ Rep. gr. 47

**22 - Gasket**

- Renew

**23 - Bolt**

- 9 Nm

**24 - Connection**

**25 - O-ring**

- Renew
- Lubricate with coolant

**26 - Transport plate**

**27 - Bolt**

- 25 Nm

**28 - Bolt**

- 9 Nm

**29 - Hall sender - G40-**

**30 - Separating plate**

**31 - Bolt**

- 25 Nm

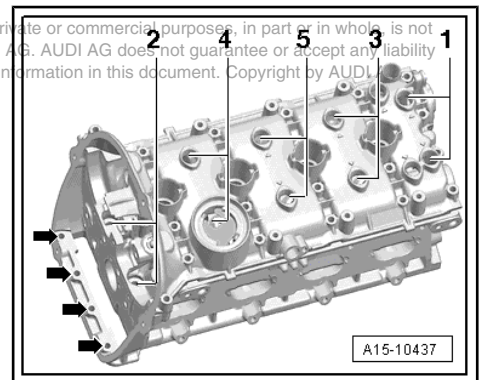
**32 - Transport plate**



**Slackening cylinder head bolts**

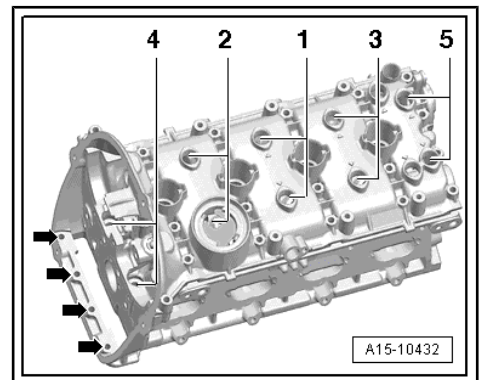
- Remove bolts -arrows-.
- Slacken cylinder head bolts in the sequence -1 ... 5-.

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 sequence for cylinder head**

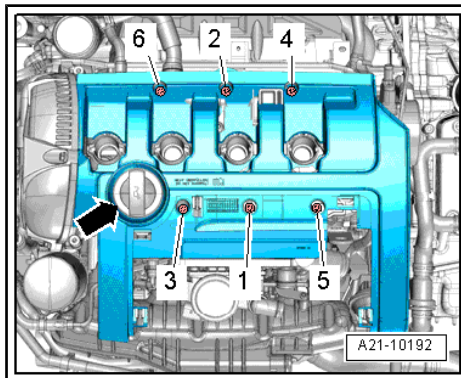
- Tighten cylinder head bolts in the sequence -1 ... 5- as follows:
1. Tighten with torque wrench initially to 40 Nm.
  2. Use rigid wrench to turn 90° further.
  3. Use rigid wrench to turn 90° further.
  4. Pre-tighten bolts -arrows- to 8 Nm.
  5. Turn bolts -arrows- 90° further using a rigid wrench.





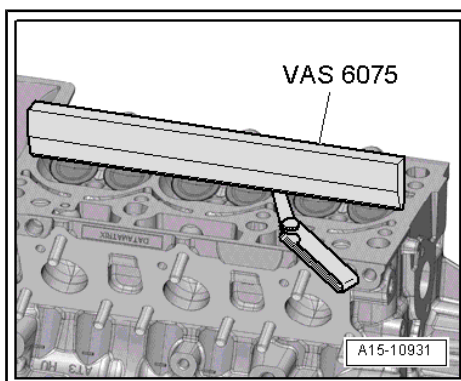
### Tightening sequence for oil separator

- Tighten bolts in the sequence -1 ... 6- to 11 Nm.



### Checking cylinder head for distortion

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



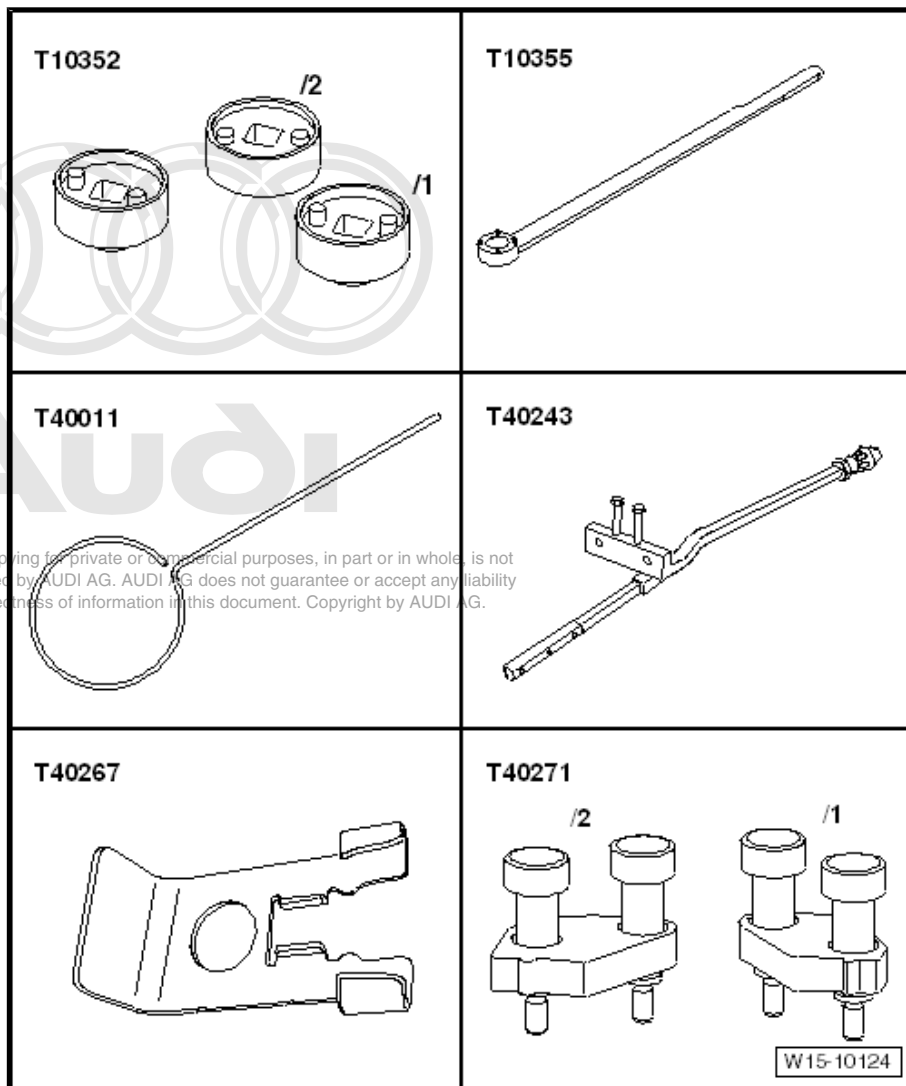
## 3.2 Removing and installing cylinder head, engine codes BYT, BPU



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.

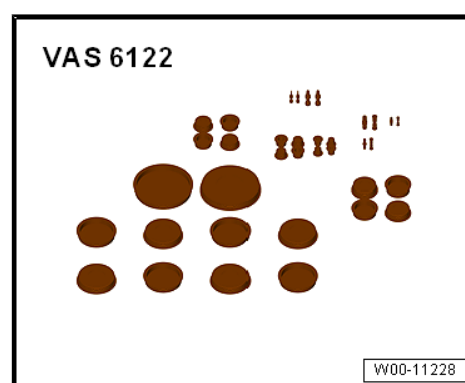
**Special tools and workshop equipment required**

- ◆ Assembly tool - T10352-
- ◆ Counterhold tool - T10355-
- ◆ Locking pin - T40011-
- ◆ Assembly lever - T40243-
- ◆ Locking tool - T40267-
- ◆ Camshaft clamp - T40271-



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.

- ◆ Engine bung set - VAS 6122-

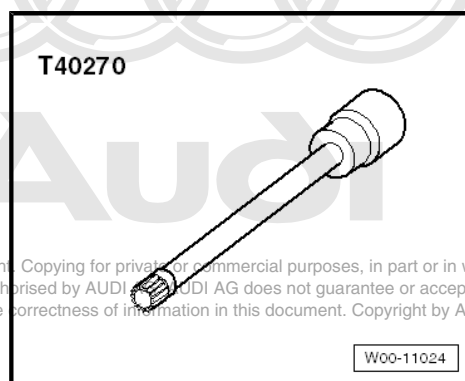




- ◆ Special wrench (Polydrive) - T10070-



- ◆ Bit XZN 12 - T40270-



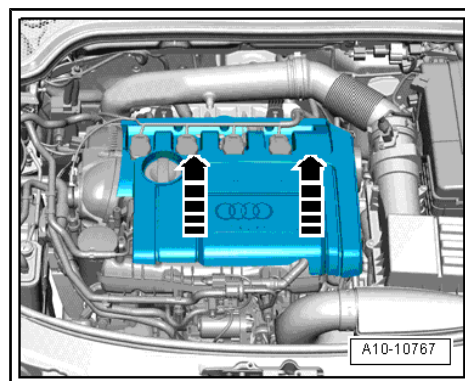
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

## Removing



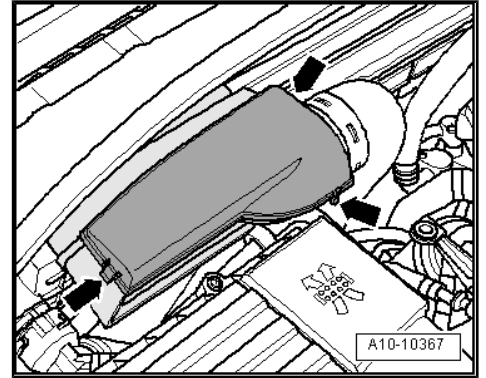
### Note

- ◆ *Fit cable ties in the original positions when installing.*
  - ◆ *All open inlet and exhaust ports must be sealed with suitable plugs (e.g. from engine bung set - VAS 6122- ).*
- Remove engine cover panel -arrows-.



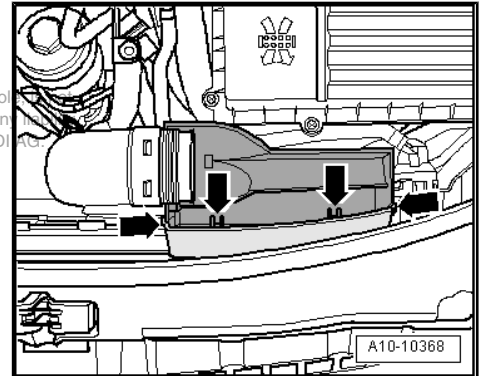


- Pull cover off air duct (release clips on sides) -arrows-.



- Unclip air duct at the bottom by releasing clips -arrows-.
- Detach air duct at bottom together with air hose.

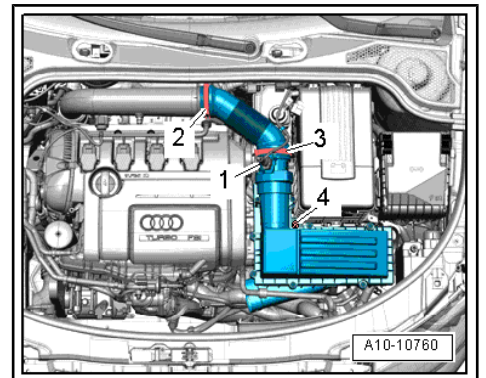
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- Unplug electrical connector -1- at air mass meter - G70- .
- Detach air hose -2-.
- Unscrew bolt -4- and remove air cleaner housing.

**i** Note

*-Item 3- can be disregarded.*





- Release hose clip -2-.
- Remove bolt -4-.
- Unplug electrical connector -arrow- and move wiring clear.



Note

Disregard items marked -1 and 3-.

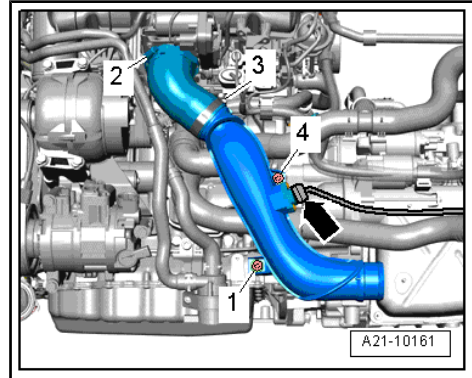


WARNING

The cooling system is under pressure when the engine is hot. Hot steam/hot coolant can escape - risk of scalding.

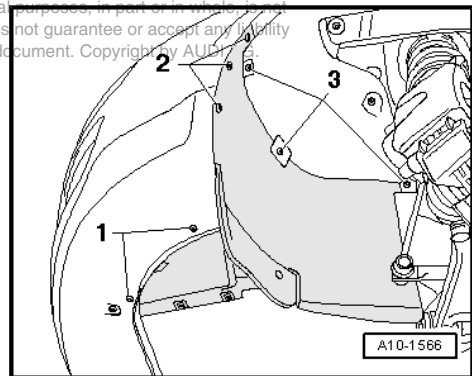
Danger of scalding skin and other parts of the body.

- Put on protective gloves.
- Put on safety goggles.
- Release pressure (cover filler cap on coolant expansion tank with a cloth and open carefully).

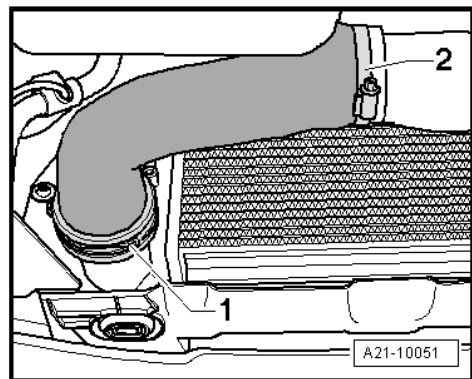


- Open filler cap on coolant expansion tank.
- Remove front exhaust pipe with catalytic converter => "1.3 Removing and installing front exhaust pipe with catalytic converter", page 383 .
- Remove front right wheel.
- Remove noise insulation => Rep. gr. 66 .
- Release fasteners -1, 2, 3- and remove noise insulation (right-side).

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.



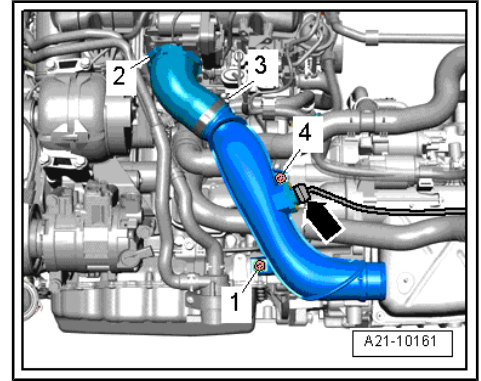
- Remove air pipe -item 1 and 2-.
- Drain coolant => page 247 .



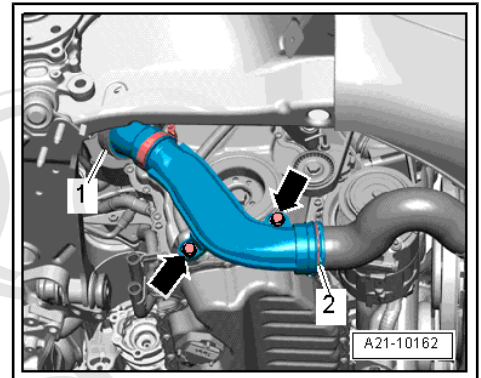
- Remove bolt -1- and take out air pipe downwards.

**i** Note

*Disregard items marked -2, 3, 4 and arrow-.*

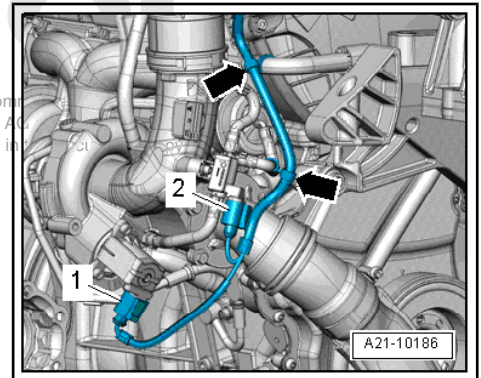


- Remove bolts -arrows-.
- Remove air pipe (lift clips -items 1 and 2-).



- Unplug electrical connectors -1 and 2- and move wiring clear -arrows-.

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

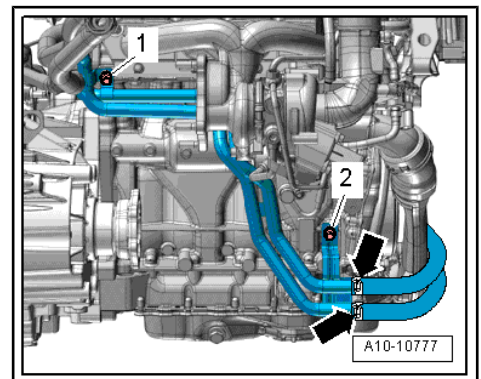


**Vehicles with auxiliary heater:**

- Unscrew bolts -1 and 2- and move coolant pipes to the left.

**i** Note

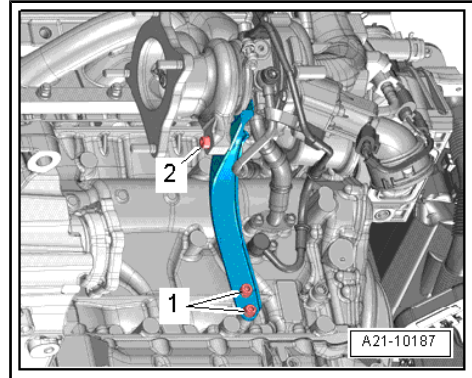
*Disregard -arrows-.*





**All vehicles:**

- Remove bolts -1- and 2- and detach support for turbocharger.



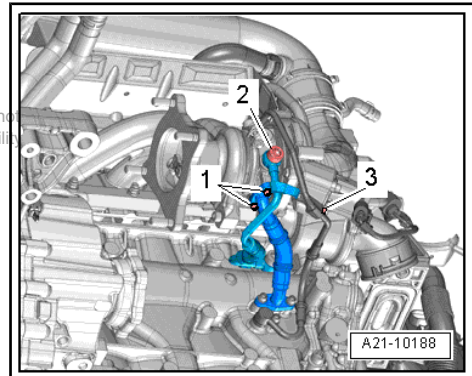
- Remove banjo bolt -2- and move coolant pipe clear to one side.
- Remove bolts -1- on oil return line.
- Remove bolt -3- on oil supply line.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted without the 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.



**Note**

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



- Press release tabs, detach air hose -2- and swivel to side.
- Remove bolts -arrows- for air pipe.

**Rest-of-world vehicles:**

- Press release tabs and detach crankcase breather hose -1- from air pipe.
- Release hose clip -3- and detach air pipe.

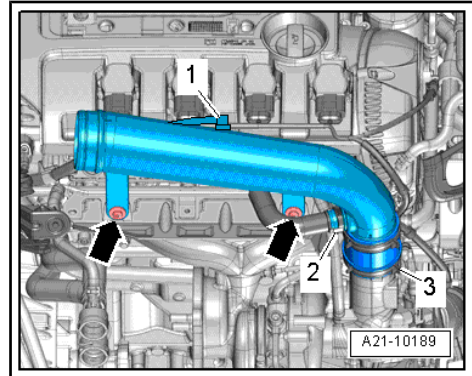
**USA models:**



**Caution**

***Risk of violating emission legislation applying to USA models.***

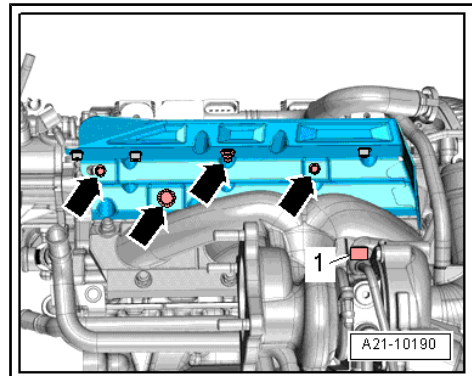
- ◆ ***Do NOT open hose connection -1-.***



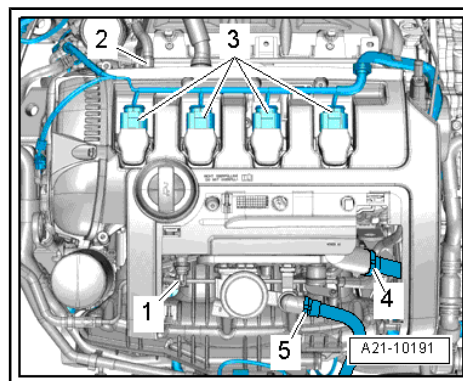
- Release hose clip -3- and move air pipe with crankcase breather hose -1- clear to one side (hose remains connected).

**All vehicles:**

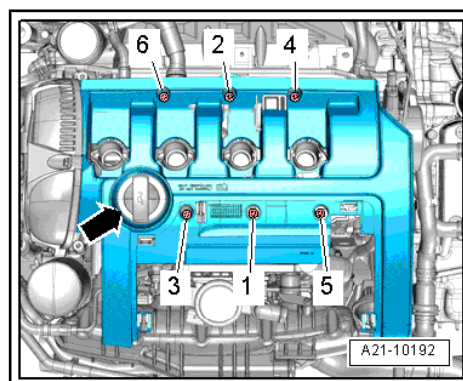
- Remove oil supply line from turbocharger -1-.



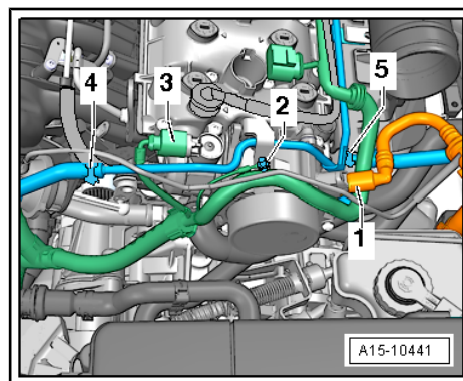
- Detach air hoses -1, 2, 4, 5-.
- Remove ignition coils -3- => [page 392](#) .



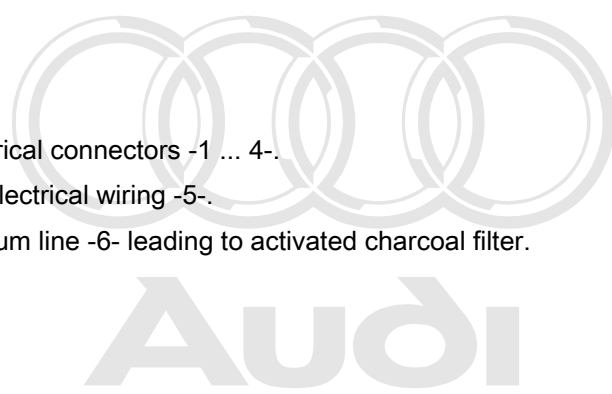
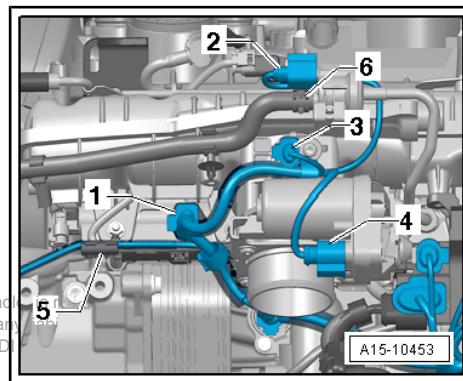
- Remove filler cap -arrow-.
- Remove bolts -1 ... 6- and detach oil separator from cylinder head cover.
- Move vacuum line clear.
- Fit filler cap.



- Detach vacuum hose from vacuum pump -1- and move clear.
- Unscrew earth wire -2-.
- Detach electrical connector -3- and move wiring harness clear.
- Disconnect coolant hoses -4 and 5-.
- Disconnect coolant hoses on rear of cylinder head.



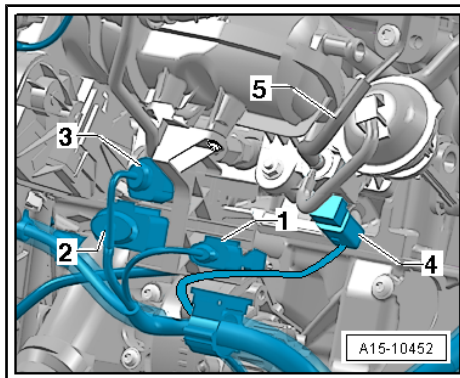
- Unplug electrical connectors -1 ... 4-.
- Move clear electrical wiring -5-.
- Detach vacuum line -6- leading to activated charcoal filter.



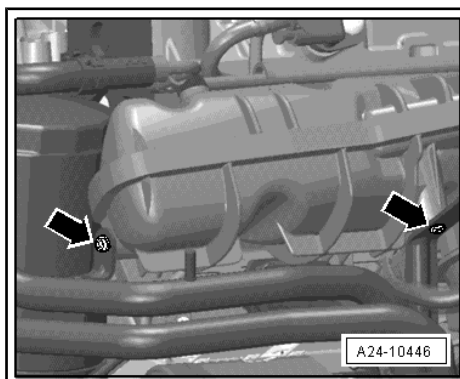
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



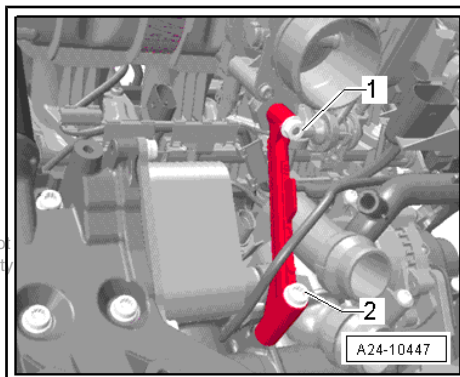
- Unplug electrical connectors -1- and detach connectors from retainer.
- Unplug electrical connectors -2 ... 4-.
- Detach vacuum line -5-.



- Detach coolant pipe from intake manifold; to do so, unscrew bolts -arrows-.



- Remove intake manifold support (remove securing nut -1- and bolt -2-).
- Remove oil filter.

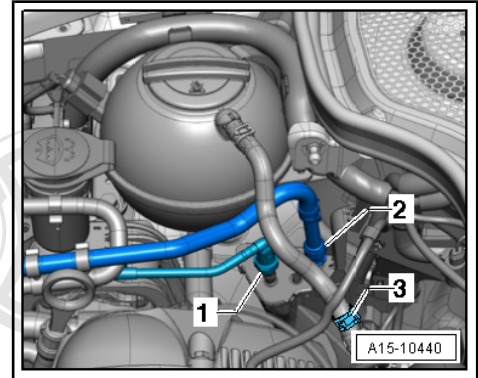


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

**⚠ WARNING**

*The fuel system is pressurised.  
 Risk of injury as fuel may spray out.*

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

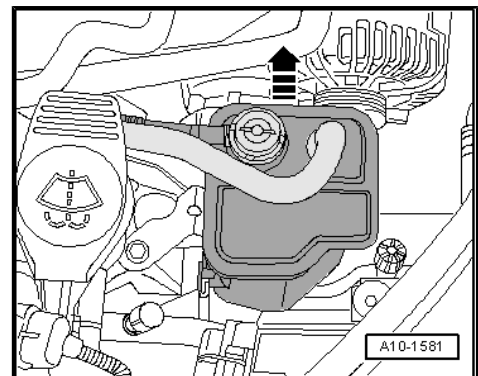


**⚠ Caution**

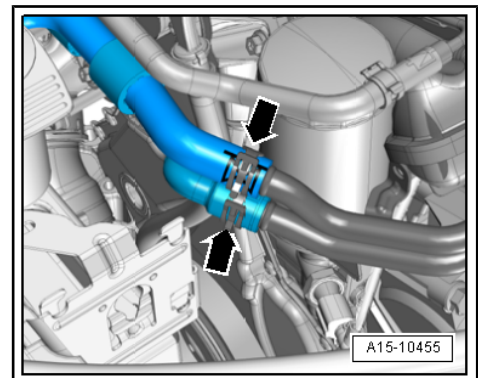
*Protect fuel system against contamination.*

◆ **Rules for cleanliness when working on the injection system ⇒ page 5.**

- Disconnect fuel supply hose -2- by pressing release ring.
- Disconnect vacuum line -1- going to activated charcoal filter (press release tab).
- Detach coolant hose -3-.
- Pull activated charcoal filter upwards and out of bracket -arrow- and place on engine.

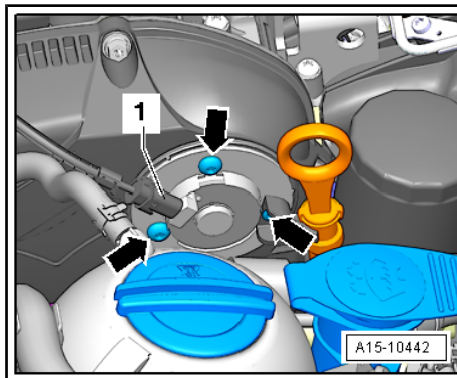


- Disconnect coolant hoses -arrows- and move clear.

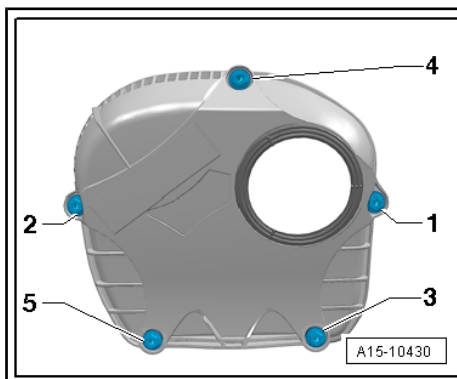




- Detach connector from camshaft control valve 1 - N205- -1-.
- Unscrew bolts -arrows- and remove camshaft control valve 1 - N205- .

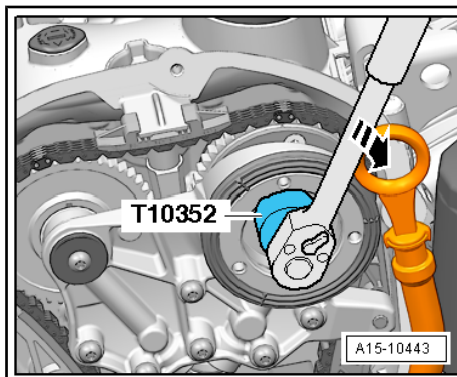


- Unscrew bolts -1 to 5- and remove timing chain cover (top).



**Caution**  
*The timing valve has a left-hand thread.*

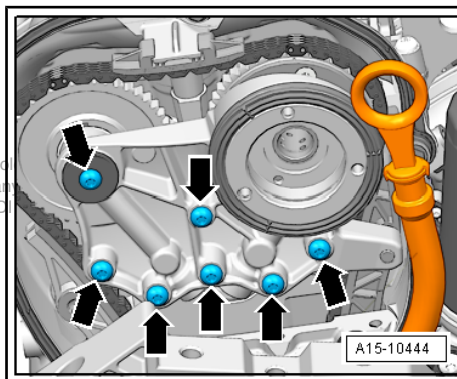
- Depending on version, turn assembly tool - T10352- or assembly tool - T10352/1A- in direction of -arrow- to remove timing valve.



- Remove bolts -arrows-.

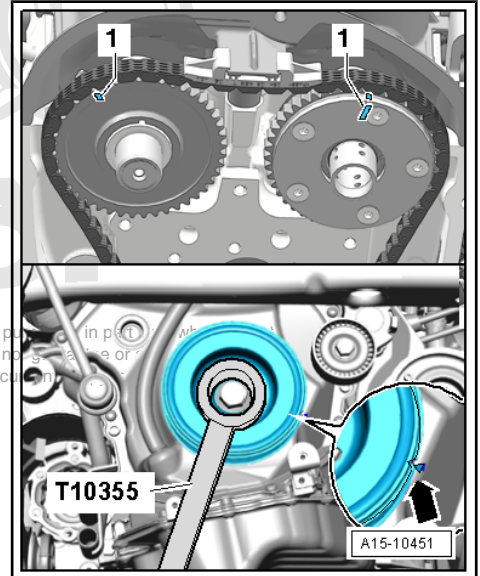
**WARNING**  
**Risk of damage to bearing saddle**  
 ♦ *Detach bearing saddle carefully without tilting it.*

- Detach bearing saddle.



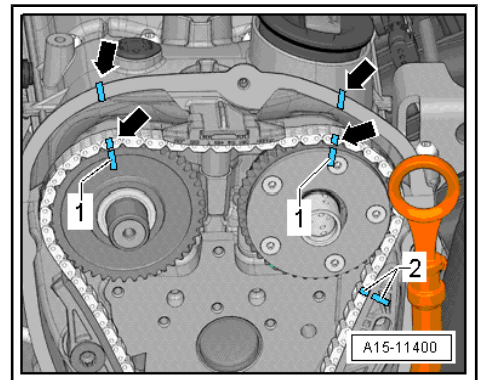


- Turn vibration damper to "TDC" position using counterhold tool - T10355- .
- Notch on vibration damper and marking on cover for timing chains (bottom) must be aligned -arrow-.
- The markings -1- on the camshafts must face upwards.

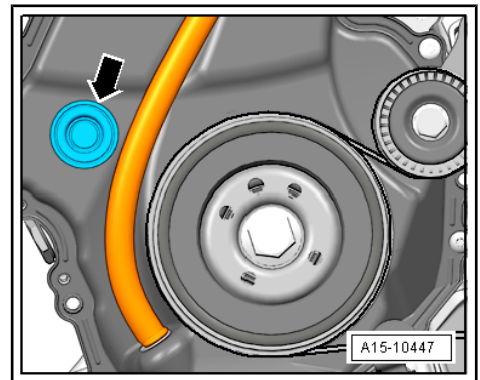


Protected by copyright. Copying for private or commercial purposes is not permitted unless authorised by AUDI AG. AUDI AG does not accept any liability with respect to the correctness of information in this document.

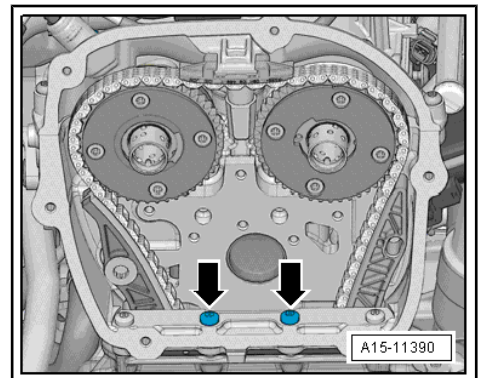
- Use a waterproof pen to mark camshaft timing chain and cylinder head -arrows- relative to markings on chain sprockets -1-.
- Use a waterproof pen to mark camshaft timing chain relative to guide rail of timing chain -2- as well.



- Remove sealing plug -arrow-.

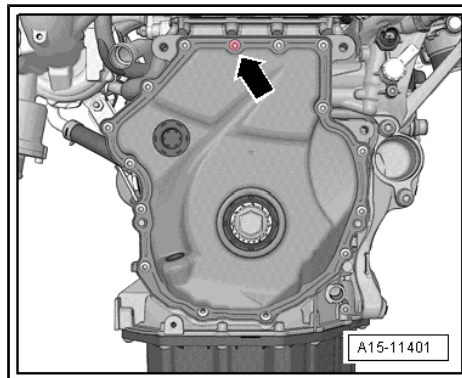


- Remove bolts -arrows-.





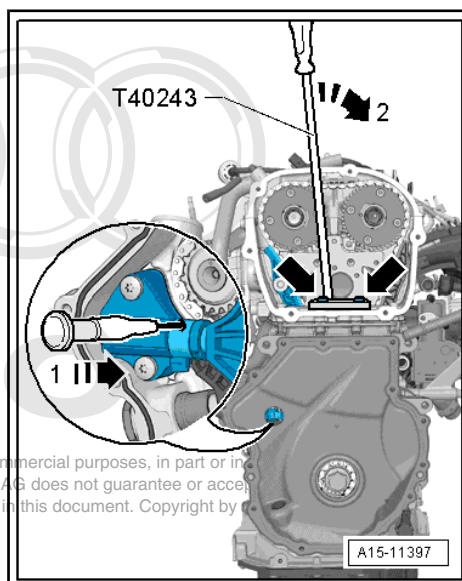
- If fitted, remove bolt -arrow-.



Depending on version, 2 different chain tensioners may be installed.

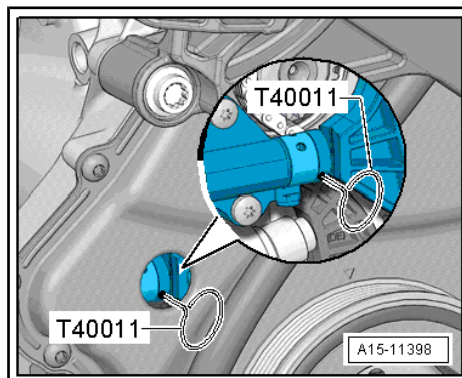
**Version 1**

- Screw in assembly lever - T40243- -arrows-.
- Lift locking element for chain tensioner; to do so, insert scribe or suitable screwdriver in hole of chain tensioner in direction of -arrow 1-, press assembly lever - T40243- slowly in direction of -arrow 2- and hold in place.



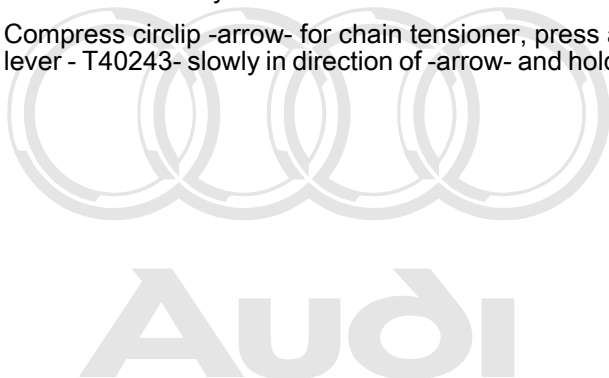
Protected by copyright. Copying for private or commercial purposes, in part or in full, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by Audi AG

- Hold chain tensioner in position with locking pin - T40011- .

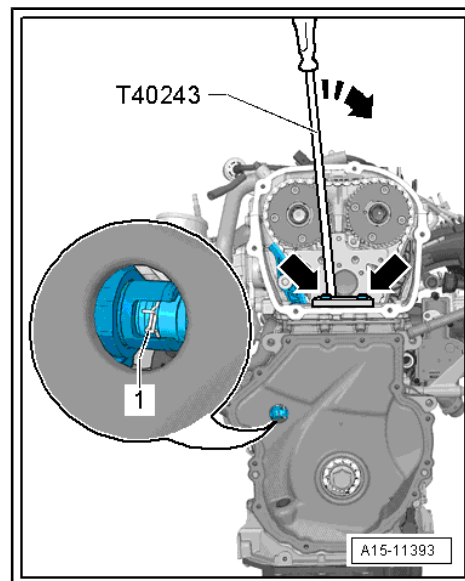


### Version 2

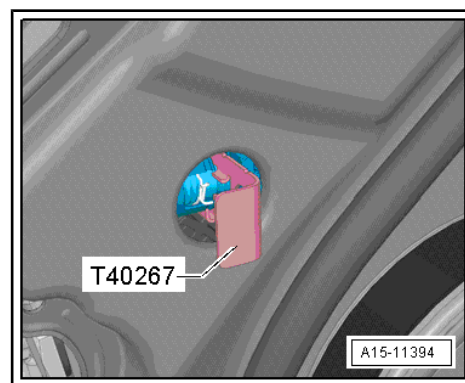
- Screw in assembly lever - T40243- -arrows-.
- Compress circlip -arrow- for chain tensioner, press assembly lever - T40243- slowly in direction of -arrow- and hold in place.



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.

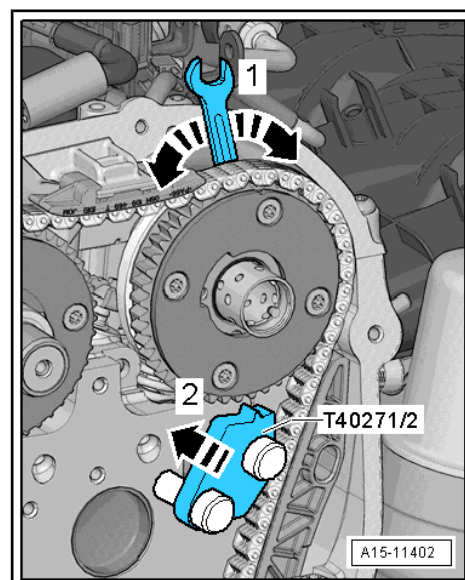


- Hold chain tensioner in position with locking tool - T40267- .



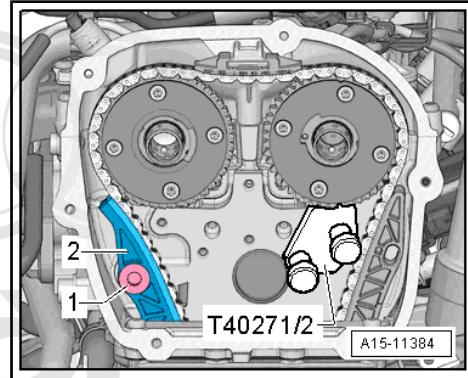
### All versions

- Remove assembly lever - T40243- .
- Bolt camshaft clamp - T40271/2- onto cylinder head and slide into teeth on chain sprocket in direction of -arrow 2-; if necessary, use spanner to turn inlet camshaft in direction of -arrow 1-.

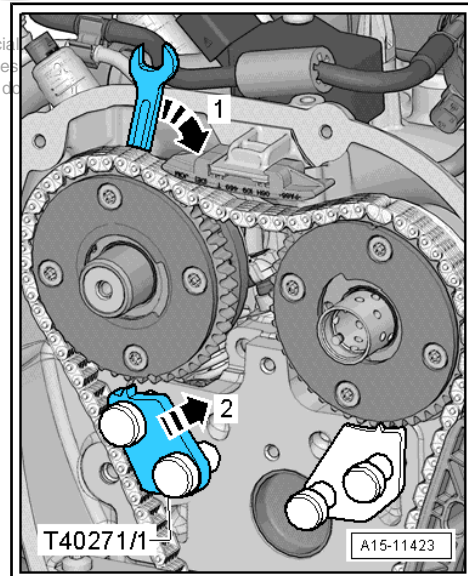




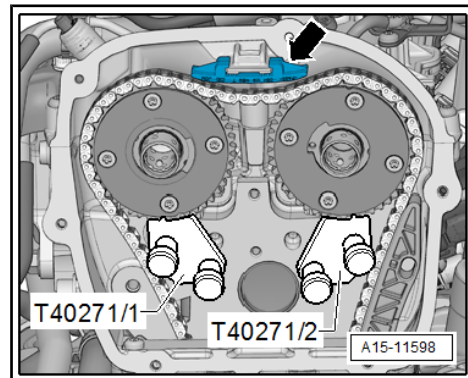
- Remove bolt -1- and guide tensioning rail -2- downwards.



- Bolt camshaft clamp - T40271/1- onto cylinder head.
- Use spanner to turn exhaust camshaft in direction of -arrow 1- and slide camshaft clamp -T40271/1- into teeth on chain sprocket in direction of -arrow 2-.



- Use screwdriver to release catch and press off top guide rail -arrow- towards front.
- Remove camshaft timing chain from camshaft sprockets.



**Caution**

*Risk of damage to valves and piston crowns.*

- ◆ *Do not turn the crankshaft after the camshaft timing chain has been removed from the cylinder head.*

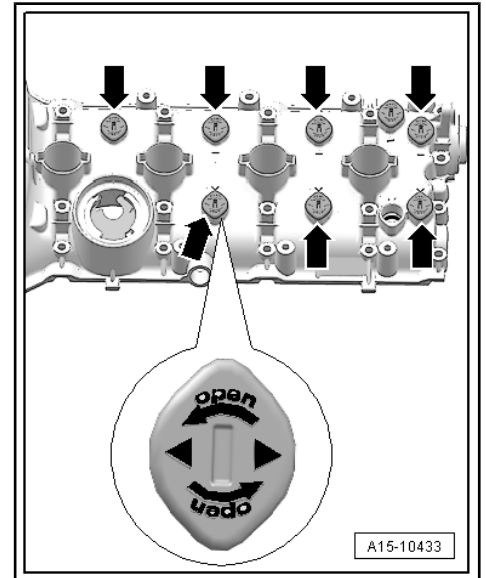
- Turn sealing plugs -arrows- 90° anti-clockwise -arrow- and re-move.



**Caution**

*Risk of damage to valves and piston crowns.*

- ◆ *Do not turn the crankshaft after the camshaft timing chain has been removed from the cylinder head.*



**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.



- Remove bolts -arrows-.
- Use special wrench (Polydrive) - T10070- or bit XZN 12 - T40270- to remove cylinder head bolts in the sequence -1 ... 5-.



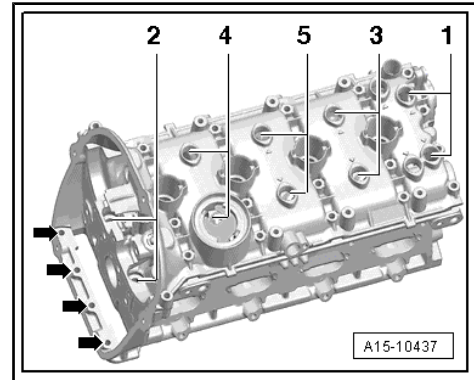
#### Note

- ◆ *Make sure all hoses/pipes and wiring on component are disconnected.*
- ◆ *Make sure tensioning rail and guide rail are not damaged when lifting off cylinder head.*

- Take off cylinder head.
- Place cylinder head onto soft surface (foam plastic).

#### Installing

- Tightening torques  
=> ["3.1 Exploded view - cylinder head, engine codes BYT, BPU", page 123](#)



#### Caution

##### *Risk of damage to sealing surfaces.*

- ◆ *Carefully remove sealant residue from cylinder head and cylinder block.*
- ◆ *Ensure that no long scores or scratches are made on the surfaces.*

##### *Risk of damage to cylinder block.*

- ◆ *No oil or coolant must be allowed to remain in the blind holes for the cylinder head bolts in the cylinder block.*

##### *Ensure that cylinder head gasket seals properly.*

- ◆ *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 the cylinder head gasket very carefully to prevent damage to the silicone coating or the indented area of the gasket.*

##### *Risk of damage to open valves.*

- ◆ *When installing an exchange cylinder head, the plastic protectors fitted to protect the open valves should not be removed until the cylinder head is ready to be fitted.*

##### *Risk of damage to valves and piston crowns after working on valve gear.*

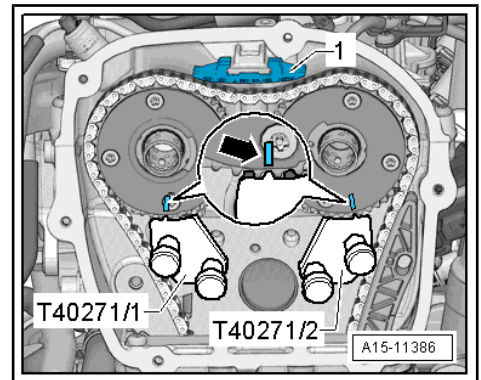
- ◆ *Turn the engine carefully at least 2 rotations to ensure that none of the valves make contact when the starter is operated.*

**i Note**

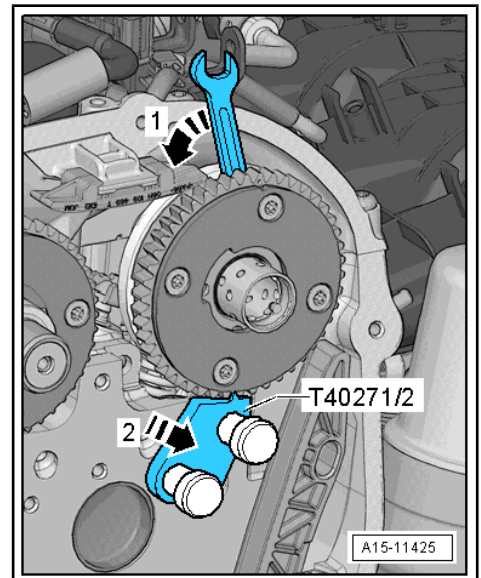
- ◆ Renew the bolts tightened with specified tightening angle.
- ◆ Renew self-locking nuts as well as seals, gaskets and O-rings.
- ◆ When installing an exchange cylinder head, the contact surfaces between the hydraulic compensation elements, roller rocker fingers and cams must be oiled before installing the camshafts.
- ◆ Hose connections and air pipes and hoses must be free of oil and grease before assembly.
- ◆ Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ *Electronic parts catalogue* .
- ◆ To ensure that the charge air hoses can be properly secured at their connections, spray rust remover onto the worm thread of used hose clips before installing.
- ◆ After fitting a new cylinder head or cylinder head gasket, change the engine oil and the coolant in the entire cooling system.

**If using a new cylinder head**

- Mark camshaft chain sprockets relative to camshaft clamp - T40271/1- and camshaft clamp - T40271/2- -arrows-.

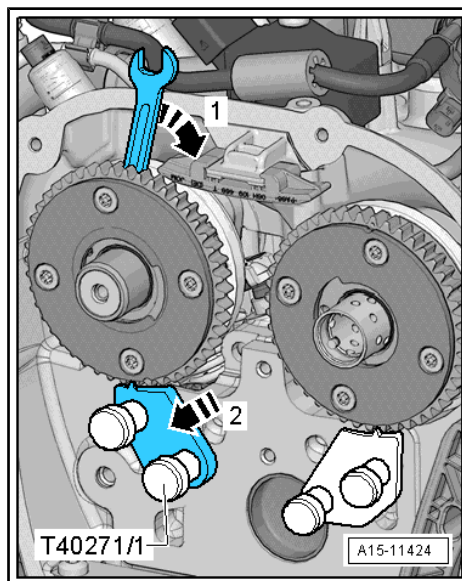


- Use spanner to turn inlet camshaft in direction of -arrow 1- and slide camshaft clamp - T40271/2- out of teeth on chain sprocket in direction of -arrow 2- and move camshaft into rest position.
- Remove camshaft clamp - T40271/2- .



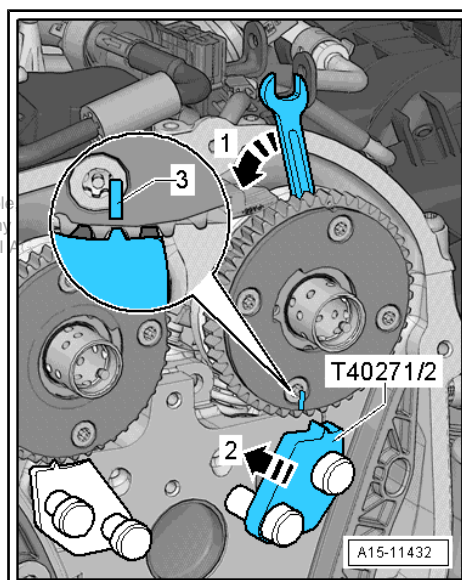


- Use spanner to turn exhaust camshaft in direction of -arrow 1- and slide camshaft clamp - T40271/1- out of teeth on chain sprocket in direction of -arrow 2- and move camshaft into rest position.
- Remove camshaft clamp - T40271/1- .
- Transfer markings made on old camshafts onto new camshafts.

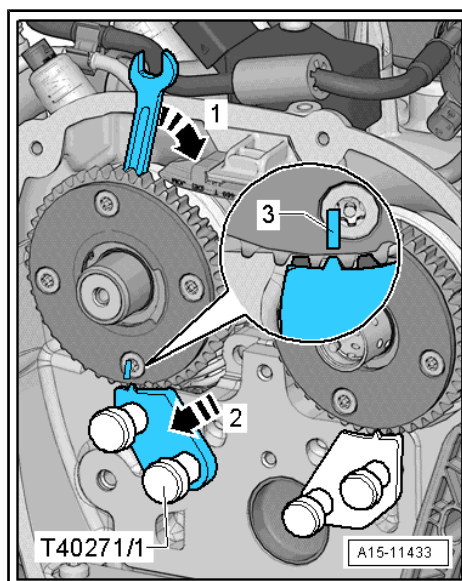


- Bolt camshaft clamp - T40271/2- onto cylinder head.
- Turn inlet camshaft in direction of -arrow 1- until marking -3- aligns with camshaft clamp - T40271/2- .
- Slide camshaft clamp - T40271/2- into teeth of chain sprocket in direction of -arrow 2-.

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.



- Bolt camshaft clamp - T40271/1- onto cylinder head.
- Turn exhaust camshaft in direction of -arrow 1- until marking -3- aligns with camshaft clamp - T40271/1- .
- Slide camshaft clamp - T40271/1- into teeth of chain sprocket in direction of -arrow 2-.





**All vehicles:**

- 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.

**WARNING**

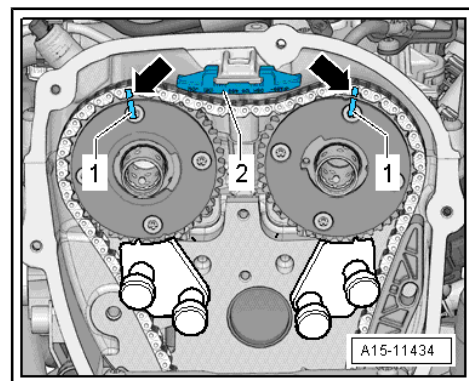
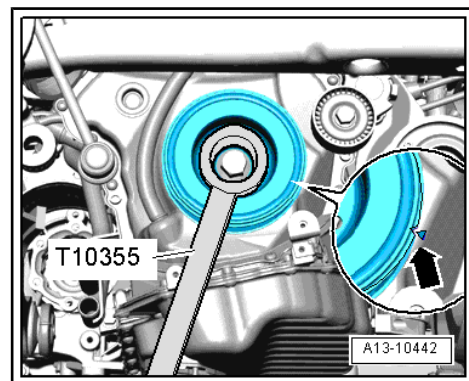
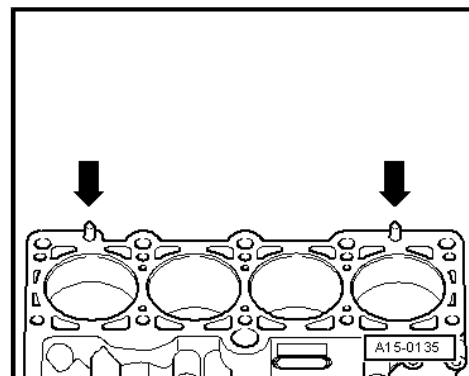
**Make sure that components are not damaged by the timing chain when rotating the crankshaft.**

- If crankshaft has been rotated: set No. 1 cylinder piston to top dead centre and then turn crankshaft back slightly.
- Fit cylinder head.
- Insert and hand-tighten cylinder head bolts.
- Tightening sequence for cylinder head ⇒ [page 125](#)

**Note**

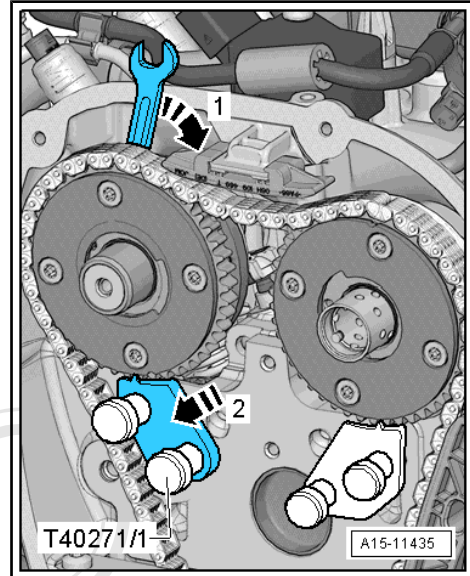
*Cylinder head bolts do not have to be torqued down again later after repair work.*

- Turn vibration damper to "TDC" position -arrow- using counterhold tool - T10355- .
- Notch on vibration damper must align with arrow marking on cover for timing chains (bottom).
- Fit timing chain; to do so, position markings on chain links -arrows- at markings on chain sprockets -1-.
- Install top guide rail -2-.

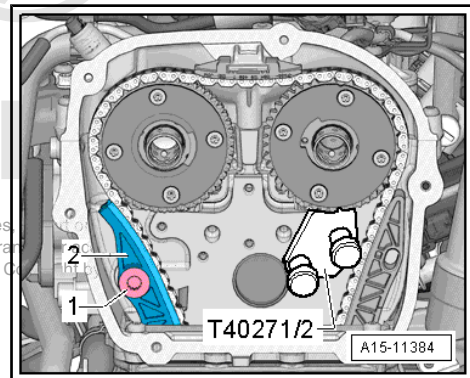




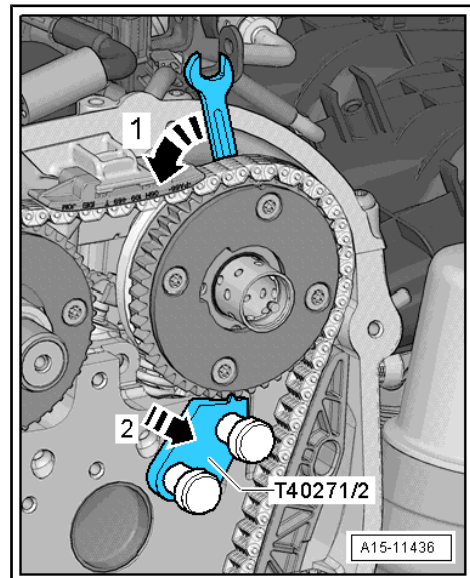
- Turn exhaust camshaft in direction of -arrow 1- and slide camshaft clamp - T40271/1- out of teeth on chain sprocket in direction of -arrow 2- and release camshaft.
- Remove camshaft clamp - T40271/1- .



- Move guide rail -2- upwards and screw in bolt -1-.



- Turn inlet camshaft in direction of -arrow 1- and slide camshaft clamp - T40271/2- out of teeth on chain sprocket in direction of -arrow 2- and release camshaft.
- Remove camshaft clamp - T40271/2- .

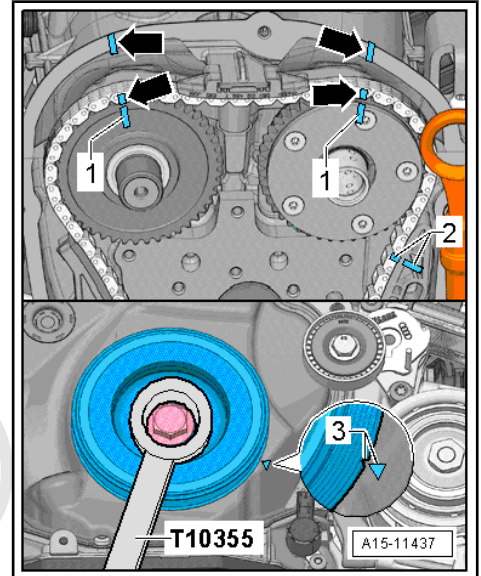


Protected by copyright. Copying for private or commercial purposes permitted unless authorised by AUDI AG. AUDI AG does not guarantee with respect to the correctness of information in this document. ©

- Check valve timing; markings on camshaft timing chain and cylinder head -arrows- must align with markings on chain sprockets -1-.
- Markings on camshaft timing chain and on guide rail for camshaft timing chain -2- must be opposite one another.
- Notch on vibration damper must align with marking on cover for timing chain (bottom) -3-.

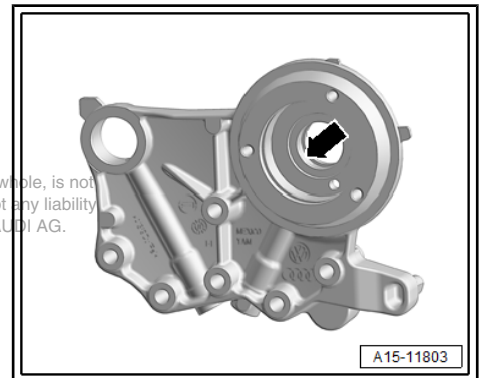
**i Note**

If the markings you have made are no longer visible, check the valve timing => [page 120](#).



- Lubricate hole -arrow- 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.

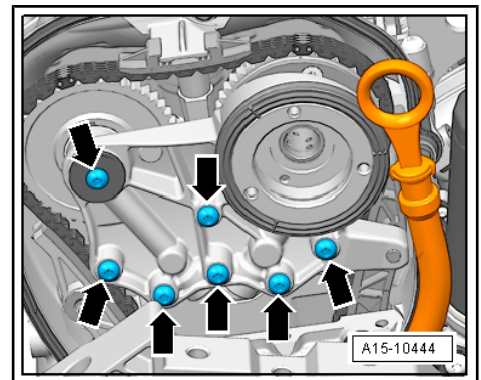


**WARNING**

*Risk of damage to bearing saddle.*

- ◆ *Detach bearing saddle carefully without tilting it.*

- Attach bearing saddle and screw in bolts -arrows- hand-tight.
- Depending on version, remove locking pin - T40011- or locking tool - T40267- .
- Tighten bolts -arrows- for bearing saddle => [page 101](#) .

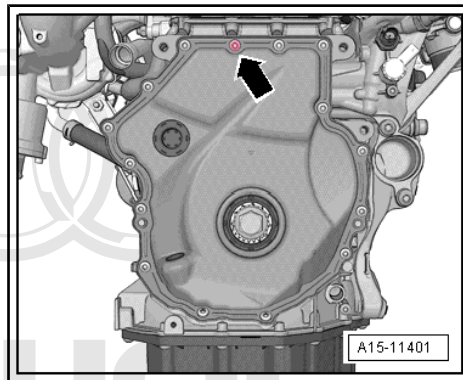




- Screw in bolt -arrow-.
- Install timing valve ⇒ [Item 6 \(page 101\)](#) .

The remaining installation steps are carried out in the reverse sequence. Note the following points:

- Install timing chain cover (top) ⇒ [page 93](#) .
- Install ignition coils ⇒ [page 392](#) .
- Change engine oil ⇒ Maintenance ; Booklet 808 .
- Fill cooling system with fresh coolant ⇒ [page 247](#) .



**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.

### 3.3 Exploded view - cylinder head, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA



**Note**

- ◆ *Renew the cylinder head bolts.*
- ◆ *During assembly, renew oil seals and gaskets as well as self-locking nuts and bolts that are tightened by turning through to a specified angle.*
- ◆ *The plastic protectors fitted to protect the open valves must only be removed immediately before fitting the cylinder head.*
- ◆ *After fitting a new cylinder head or cylinder head gasket, change the engine oil and the coolant in the entire cooling system.*

**1 - Cylinder head gasket**

- Renew
- Note installation position: part number must face cylinder head

**2 - Bolt**

- 25 Nm

**3 - Transport plate**

**4 - Bolt**

- Tightening sequence  
⇒ [page 151](#)

**5 - Cylinder head**

- Removing and installing  
⇒ [page 151](#)
- Checking for distortion  
⇒ [page 151](#)

**6 - Cylinder head bolt**

- Renew
- Note correct sequence when loosening  
⇒ [page 151](#)
- Note correct sequence when tightening  
⇒ [page 151](#)

**7 - O-ring**

- Renew
- Lubricate with engine oil

**8 - Sealing plug**

- 5 Nm
- With ball head for engine cover panel

**9 - Sealing cap**

- With seal

**10 - O-ring**

- Renew
- Lubricate with engine oil

**11 - Sealing plug**

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not 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.

**12 - Bracket**

**13 - Bolt**

- 9 Nm

**14 - Heat shield**

**15 - Bolt**

- 20 Nm

**16 - Bolt**

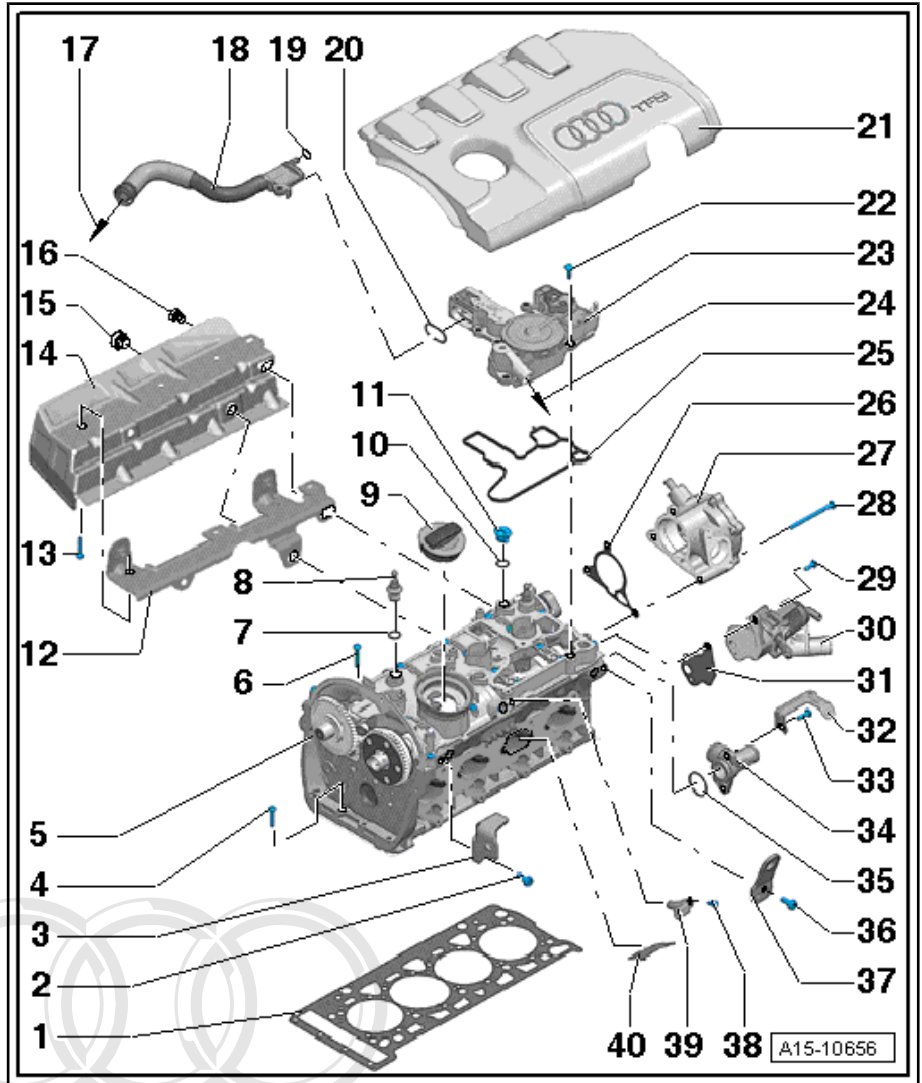
- 20 Nm

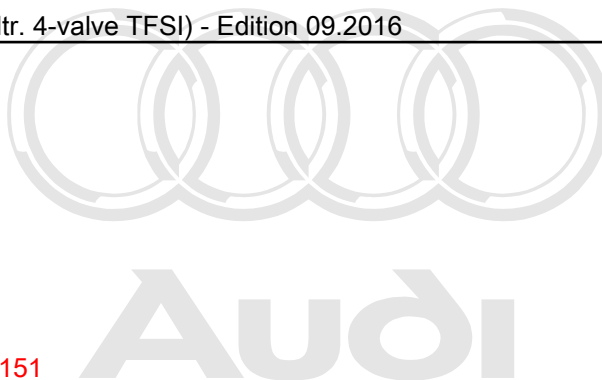
**17 - To intake manifold/turbocharger**

**18 - Breather pipe**

**19 - O-ring**

- Not available as replacement part





**20 - Seal**

- Not available as replacement part

**21 - Engine cover panel**

**22 - Bolt**

- Tightening sequence ⇒ [page 151](#)

**23 - Crankcase breather**

- Note correct sequence when tightening ⇒ [page 151](#)

**24 - To intake manifold**

**25 - Gasket**

- Renew if damaged

**26 - Gasket**

- Renew if damaged

**27 - Vacuum pump**

- Removing and installing ⇒ Rep. gr. 47

**28 - Bolt**

- Tightening torque ⇒ Rep. gr. 47

**29 - 9 Nm**

- Engine code CBFA only

**30 - Combination valve for secondary air system**

- Engine code CBFA only

**31 - Gasket**

- Engine code CBFA only
- Renew

**32 - Bracket**

**33 - Bolt**

- 9 Nm

**34 - Connection**

**35 - O-ring**

- Renew
- Lubricate with coolant

**36 - Bolt**

- 25 Nm

**37 - Transport plate**

**38 - Bolt**

- 9 Nm

**39 - Hall sender - G40-**

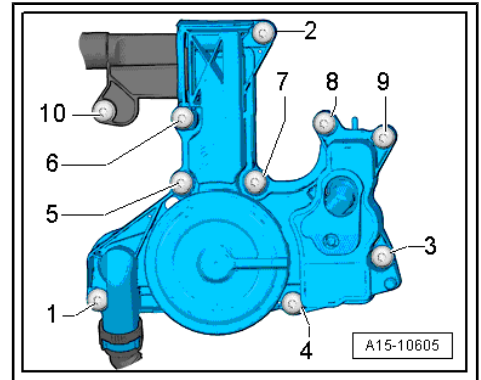
**40 - Separating plate**

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.

### Crankcase breather system - tightening torque

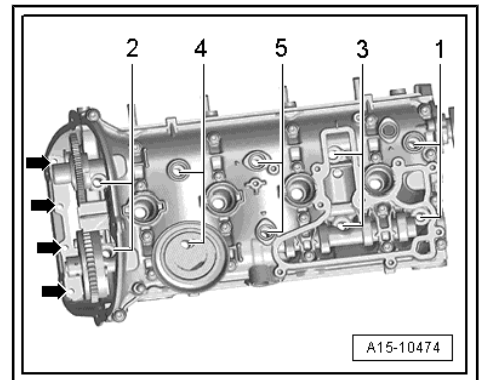
#### Note

- ◆ *The bolts are thread-forming bolts. When renewing the cylinder head, it is important that you use only genuine bolts since the cylinder head is supplied without threaded holes for attachment of the crankcase breather.*
- ◆ *Do NOT make threaded holes using a thread tap.*
- Tighten bolts for crankcase breather system in the sequence -1 ... 10- to 11 Nm.



### Slackening cylinder head bolts

- Remove bolts -arrows-.
- Slacken cylinder head bolts in the sequence -1 ... 5-.

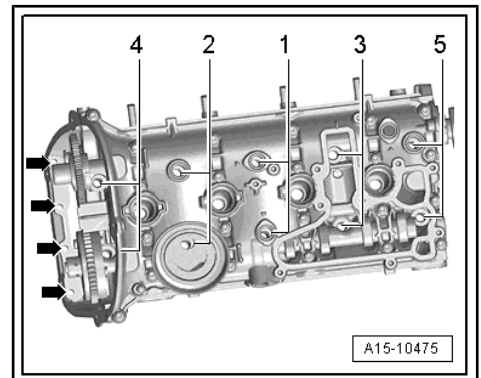


### Tightening sequence for cylinder head

- Tighten cylinder head bolts in the sequence -1 ... 5- as follows:

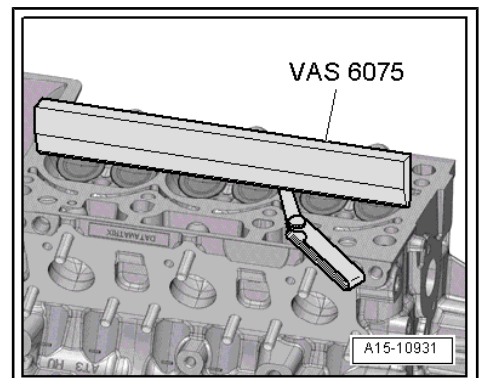
1. Tighten with torque wrench initially to 40 Nm.
2. Use rigid wrench to turn 90° further.
3. Use rigid wrench to turn 90° further.
4. Pre-tighten bolts -arrows- to 8 Nm.
5. Turn bolts -arrows- 90° further using a rigid wrench.

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



### Checking cylinder head for distortion

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

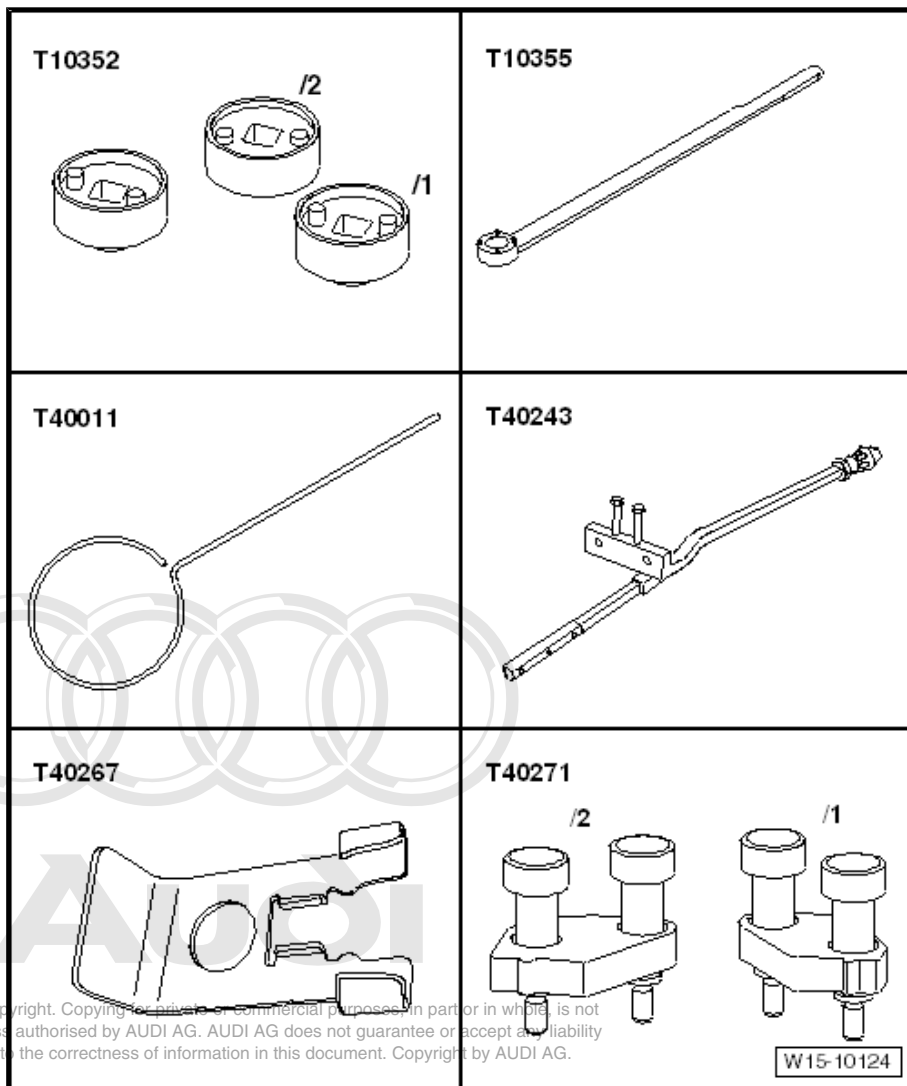


## 3.4 Removing and installing cylinder head, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA

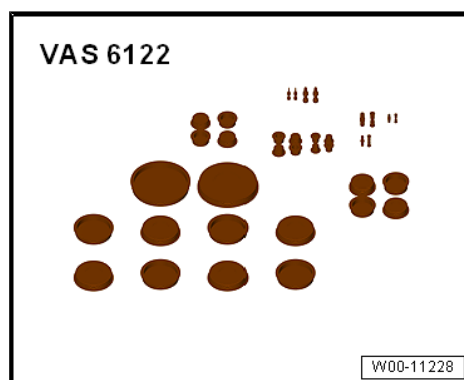


**Special tools and workshop equipment required**

- ◆ Assembly tool - T10352-
- ◆ Counterhold tool - T10355-
- ◆ Locking pin - T40011-
- ◆ Assembly lever - T40243-
- ◆ Locking tool - T40267-
- ◆ Camshaft clamp - T40271-



- ◆ Engine bung set - VAS 6122-

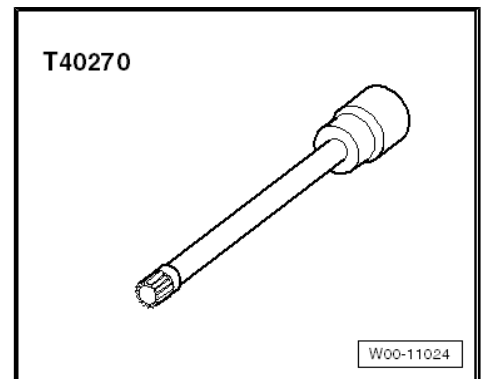




- ◆ Special wrench (Polydrive) - T10070-



- ◆ Bit XZN 12 - T40270-



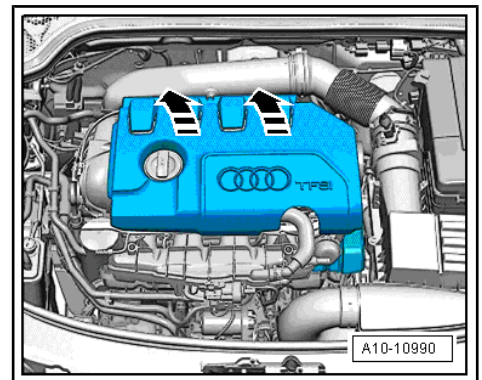
## Removing



### Note

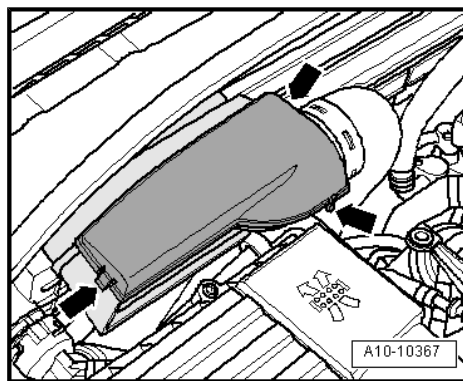
- ◆ *Fit cable ties in the original positions when installing.*
  - ◆ *All open inlet and exhaust ports must be sealed with suitable plugs (e.g. from engine bung set - VAS 6122- ).*
- Remove engine cover panel -arrows-.

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.

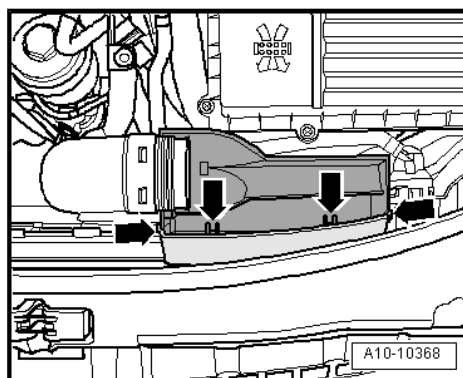




- Pull cover off air duct (release clips on sides) -arrows-.



- Unclip air duct at the bottom by releasing clips -arrows-.
- Detach air duct at bottom together with air hose.

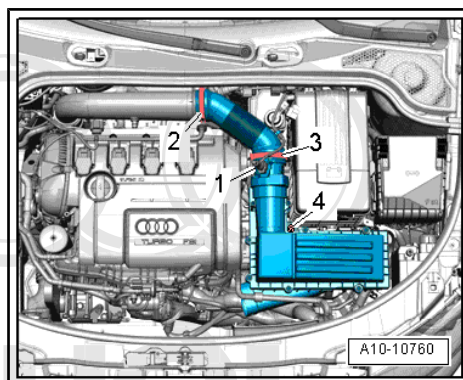


- Unplug electrical connector -1- at air mass meter - G70- .
- Detach air hose -2-.
- Unscrew bolt -4- and remove air cleaner housing.



**Note**

*-Item 3- can be disregarded.*

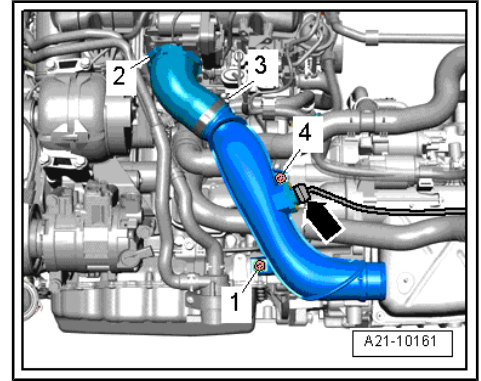


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Release hose clip -2-.
- Remove bolt -4-.
- Unplug electrical connector -arrow- and move wiring clear.

**i** Note

Disregard items marked -1 and 3-.



**WARNING**

*The cooling system is under pressure when the engine is hot. Hot steam/hot coolant can escape - risk of scalding.*

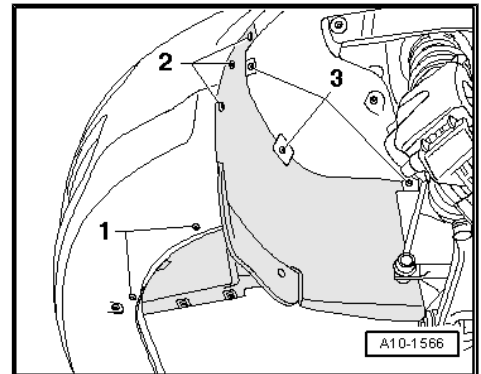
*Danger of scalding skin and other parts of the body.*

- Put on protective gloves.
- Put on safety goggles.
- Release pressure (cover filler cap on coolant expansion tank with a cloth and open carefully).

- Open filler cap on coolant expansion tank.
- Remove front exhaust pipe with catalytic converter => [page 383](#) .
- Remove front right wheel.
- Remove noise insulation => Rep. gr. 66 .
- Release fasteners -1, 2, 3- and remove noise insulation (right-side).

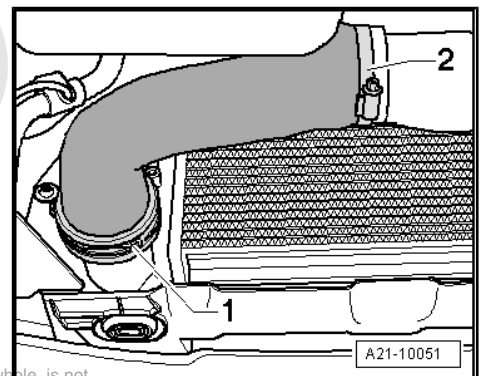
**Cabriolet**

- Remove noise insulation frame => Rep. gr. 50 .



**All vehicles:**

- Remove air pipe -item 1 and 2-.
- Drain coolant => [page 247](#) .



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.

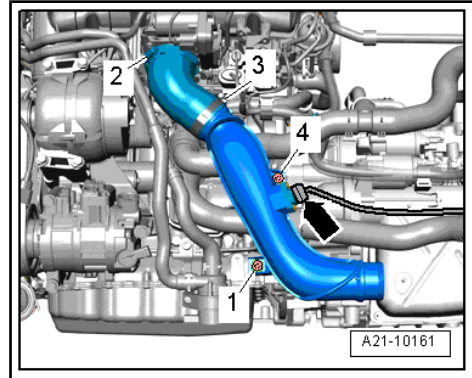


- Remove bolt -1- and take out air pipe downwards.

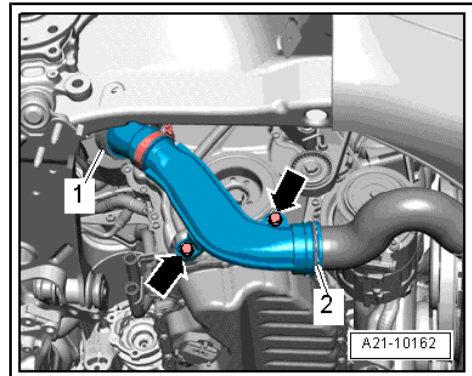


**Note**

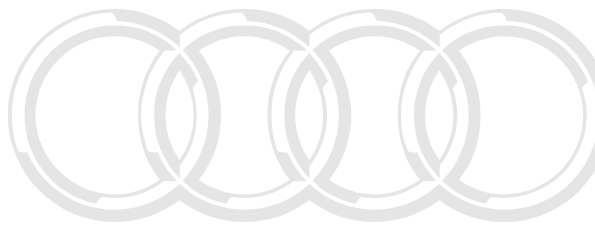
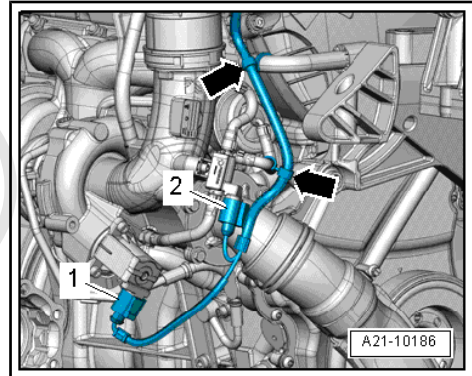
*Disregard items marked -2, 3, 4 and arrow-.*



- Remove bolts -arrows-.
- Remove air pipe (lift clips -items 1 and 2-).



- Unplug electrical connectors -1 and 2- and move wiring clear -arrows-.



**Vehicles with auxiliary heater:**

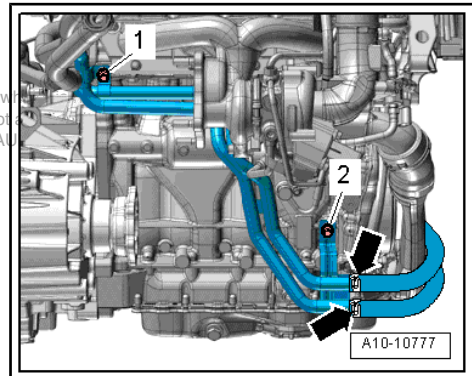
- Unscrew bolts -1 and 2- and move coolant pipes to the left.



**Note**

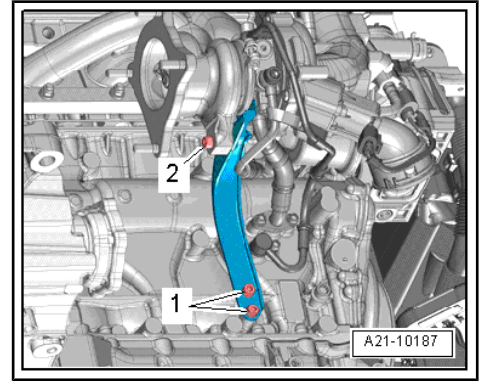
*Disregard -arrows-.*

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.

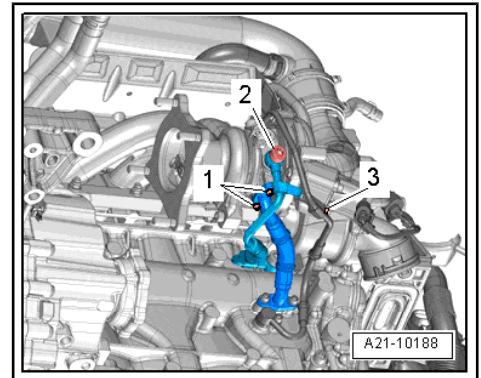


**All vehicles:**

- Remove bolts -1 and 2- and detach support for turbocharger.



- Remove banjo bolt -2- and move coolant pipe clear to one side.
- Remove bolts -1- on oil return line.
- Remove bolt -3- on oil supply line.



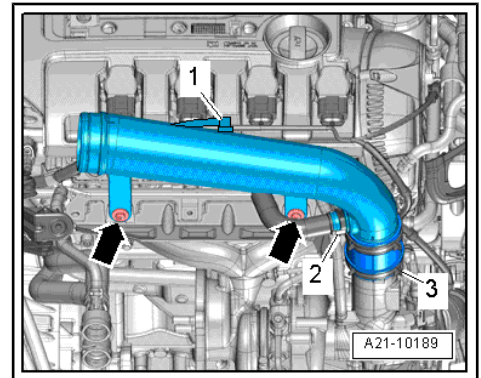
**Note**

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


- Press release tabs, detach air hose -2- and swivel to side.
- Remove bolts -arrows- for air pipe.

**Rest-of-world vehicles:**

- Press release tabs and detach crankcase breather hose -1- from air pipe.
- Release hose clip -3- and detach air pipe.



**USA models:**



**Caution**

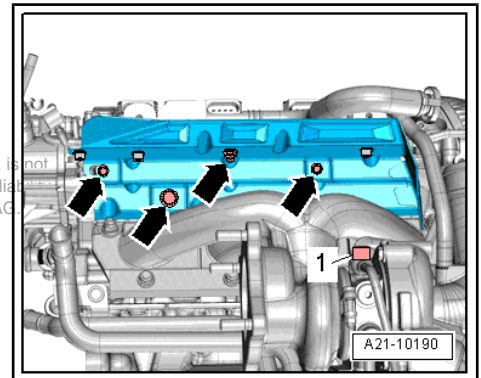
*Risk of violating emission legislation applying to USA models.*

◆ **Do NOT open hose connection -1-.**

- Release hose clip -3- and move air pipe with crankcase breather hose -1- clear to one side (hose remains connected).

**All vehicles:**

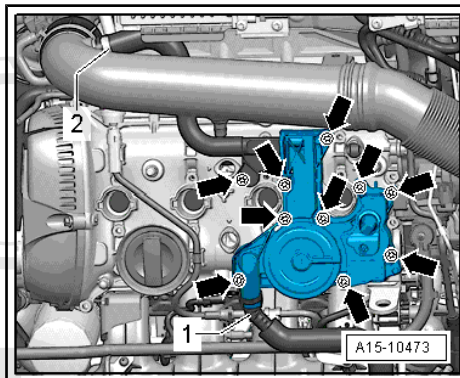
- Remove oil supply line from turbocharger -1-.
- Remove ignition coils ⇒ [page 392](#) .



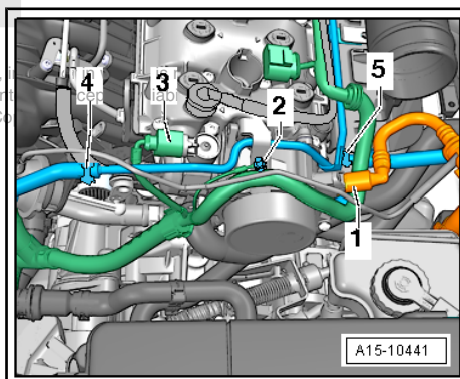
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- Disconnect crankcase breather hoses -1 and 2-
- Remove bolts -arrows- and detach crankcase breather.

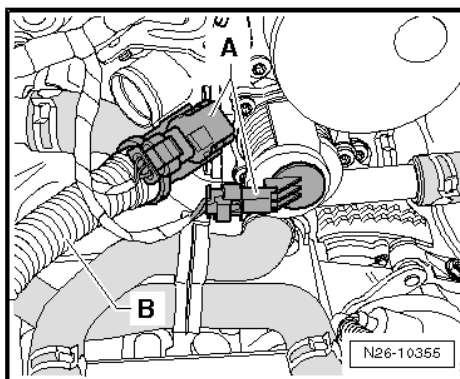


- Detach vacuum hose from vacuum pump -1- and move clear.
- Unscrew earth wire -2-
- Detach electrical connector -3- and move wiring harness clear.
- Disconnect coolant hoses -4 and 5-



**Engine code CBFA:**

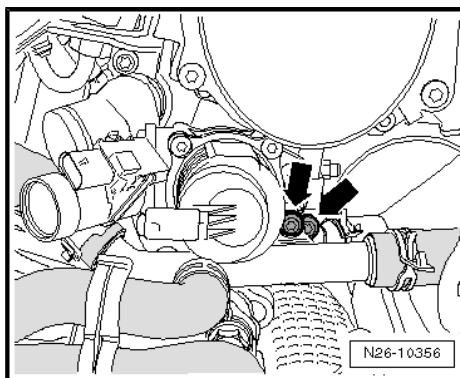
- Disconnect electrical connector -A- and hose -B- from combination valve for secondary air system.



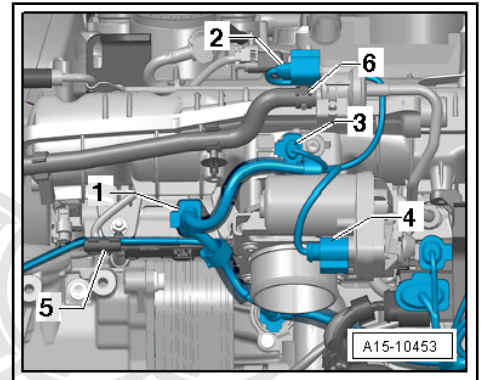
- Remove bolts -arrows- and detach coolant pipe.

**All vehicles:**

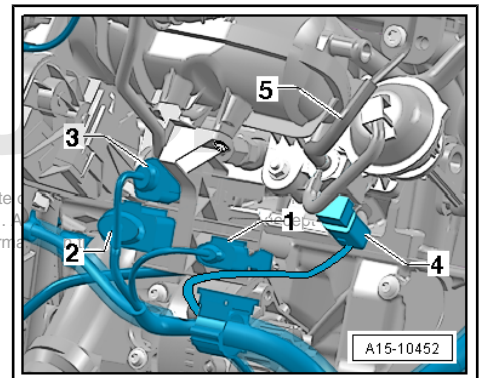
- Disconnect coolant hoses on rear of cylinder head.



- Unplug electrical connectors -1 ... 4-.
- Move electrical wire -5- clear.
- Detach vacuum line -6- leading to activated charcoal filter.

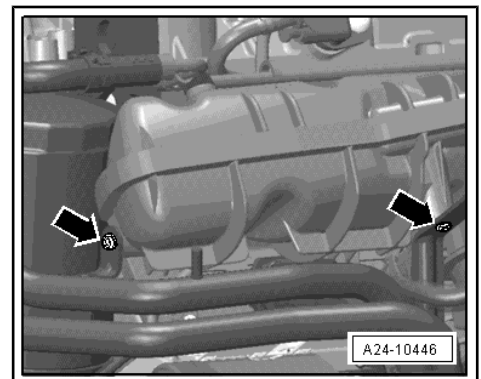


- Unplug electrical connectors -1- and detach connectors from retainer.
- Unplug electrical connectors -2 ... 4-.
- Detach vacuum line -5-.

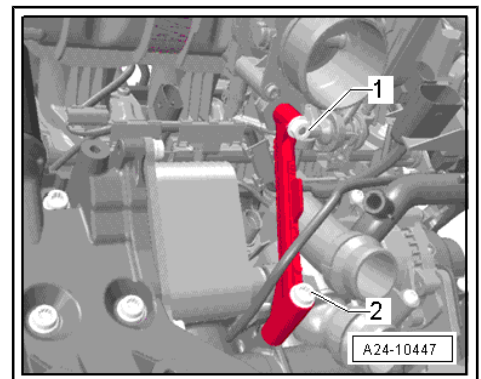


Protected by copyright. Copying for private use is permitted unless authorised by AUDI AG. All rights reserved with respect to the correctness of information.

- Detach coolant pipe from intake manifold; to do so, unscrew bolts -arrows-.



- Remove intake manifold support (remove securing nut -1- and bolt -2-).
- Remove oil filter.

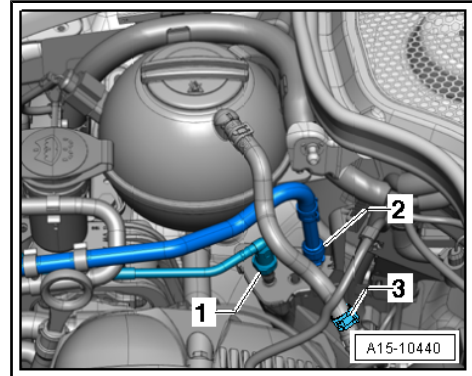


**WARNING**

*The fuel system is pressurised.*

*Risk of injury as fuel may spray out.*

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

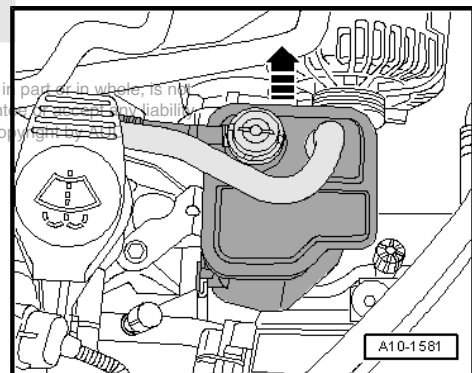
**Caution**

*Protect fuel system against contamination.*

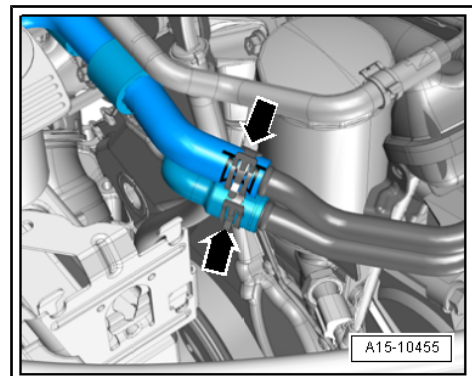
- ◆ *Rules for cleanliness when working on the injection system ⇒ [page 5](#).*

- Disconnect fuel supply hose -2- by pressing release ring.
- Disconnect vacuum line -1- going to activated charcoal filter (press release tab).
- Detach coolant hose -3-.
- Pull activated charcoal filter upwards and out of bracket -arrow- and place on 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 the accuracy or liability with respect to the correctness of information in this document. Copyright © Audi AG 2016.

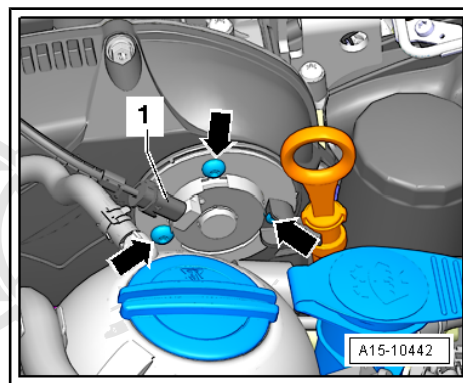


- Disconnect coolant hoses -arrows- and move clear.

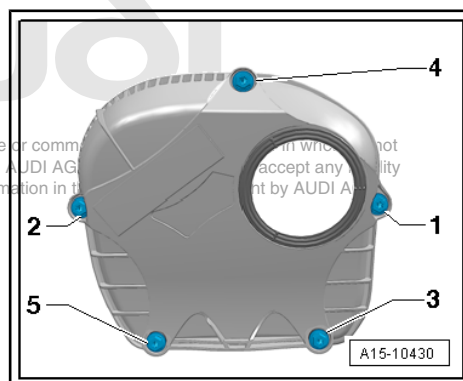




- Detach connector from camshaft control valve 1 - N205- -1-.
- Unscrew bolts -arrows- and remove camshaft control valve 1 - N205- .

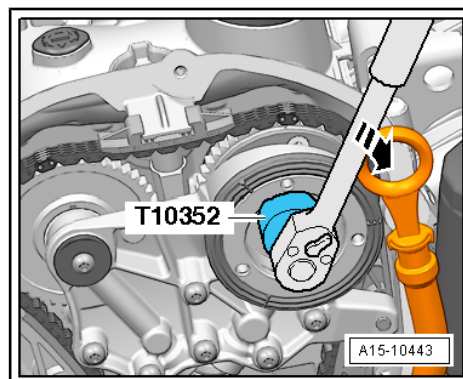


- Unscrew bolts -1 to 5- and remove timing chain cover (top).



**Caution**  
*The timing valve has a left-hand thread.*

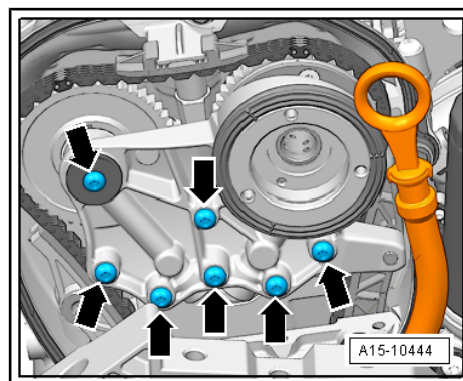
- Depending on version, turn assembly tool - T10352- or assembly tool - T10352/1A- in direction of -arrow- to remove timing valve.



- Remove bolts -arrows-.

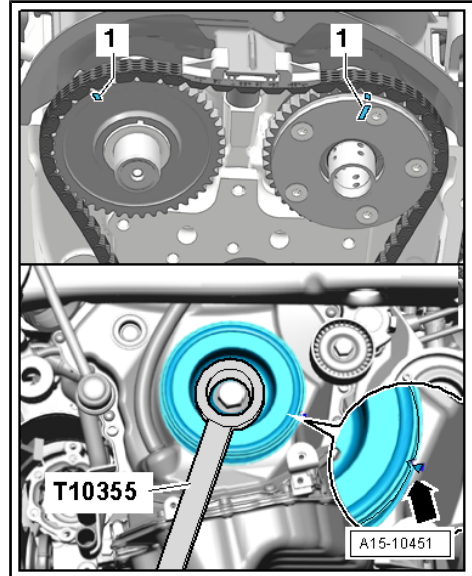
**WARNING**  
*Risk of damage to bearing saddle.*  
 ♦ *Detach bearing saddle carefully without tilting it.*

- Detach bearing saddle.

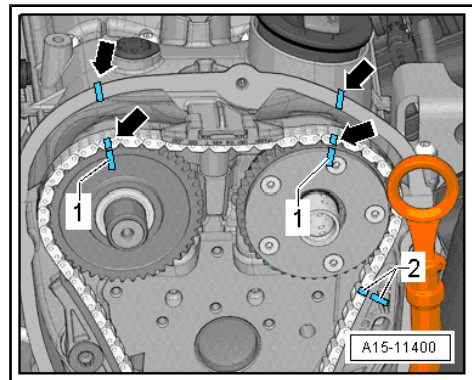




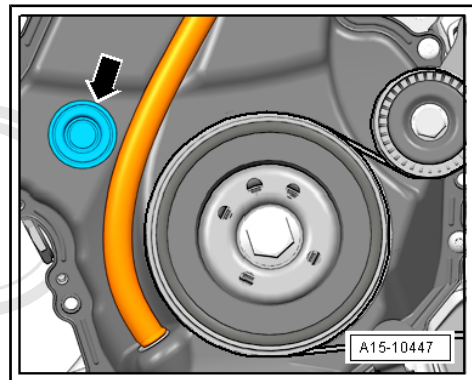
- Turn vibration damper to "TDC" position using counterhold tool - T10355- .
- Notch on vibration damper and marking on cover for timing chains (bottom) must be aligned -arrow-.
- The markings -1- on the camshafts must face upwards.



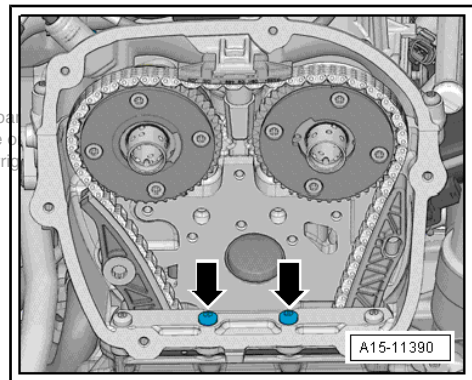
- Use a waterproof pen to mark camshaft timing chain and cylinder head -arrows- relative to markings on chain sprockets -1-.
- Use a waterproof pen to mark camshaft timing chain relative to guide rail of timing chain -2- as well.



- Remove sealing plug -arrow-.

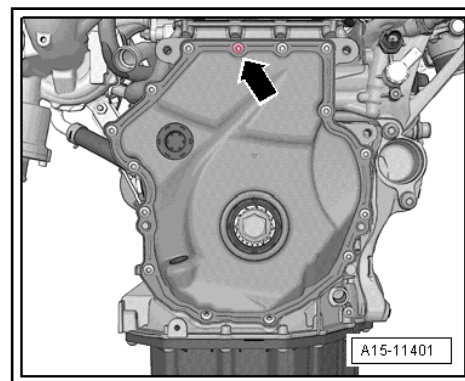


- Remove bolts -arrows-.



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 the accuracy of the information with respect to the correctness of information in this document. Copyright © 2016 Audi AG

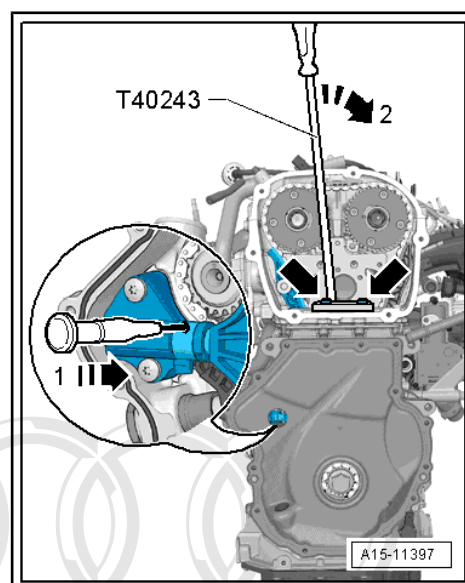
- If fitted, remove bolt -arrow-.



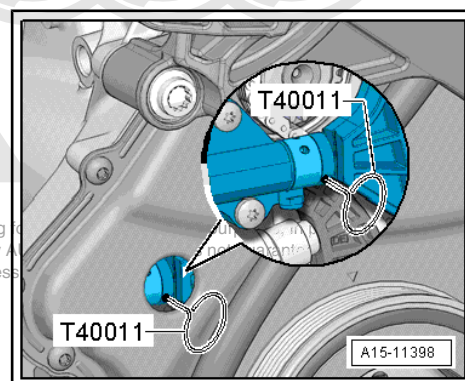
Depending on version, 2 different chain tensioners may be installed.

**Version 1**

- Screw in assembly lever - T40243- -arrows-.
- Lift locking element for chain tensioner; to do so, insert scribe or suitable screwdriver in hole of chain tensioner in direction of -arrow 1-, press assembly lever - T40243- slowly in direction of -arrow 2- and hold in place.



- Hold chain tensioner in position with locking pin - T40011- .

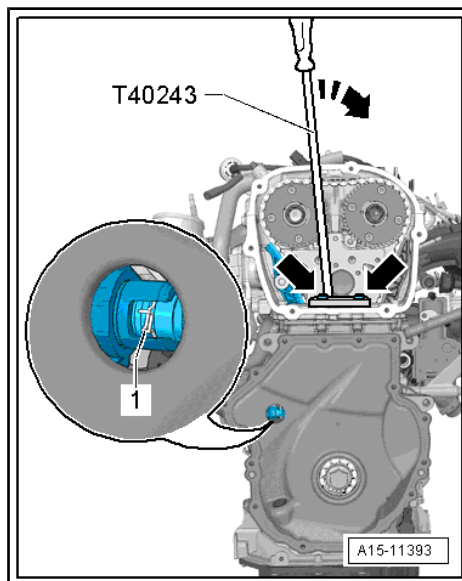


Protected by copyright. Copying or reproduction is not permitted unless authorised by Audi AG. All rights reserved. with respect to the correctness

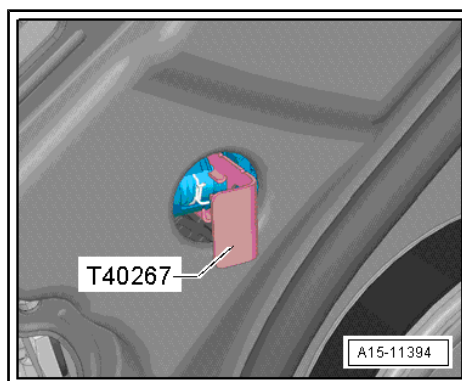


### Version 2

- Screw in assembly lever - T40243- -arrows-.
- Compress circlip -arrow- for chain tensioner, press assembly lever - T40243- slowly in direction of -arrow- and hold in place.

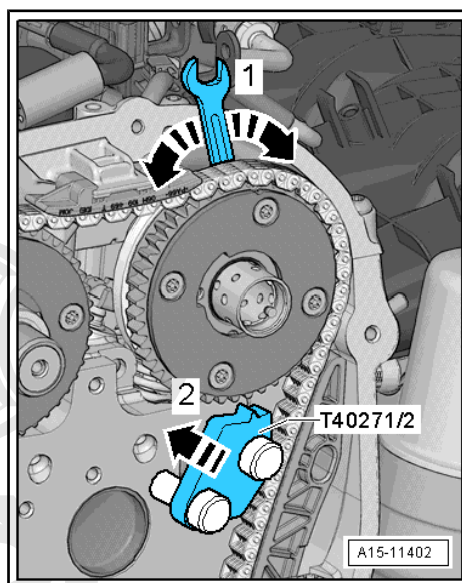


- Hold chain tensioner in position with locking tool - T40267- .



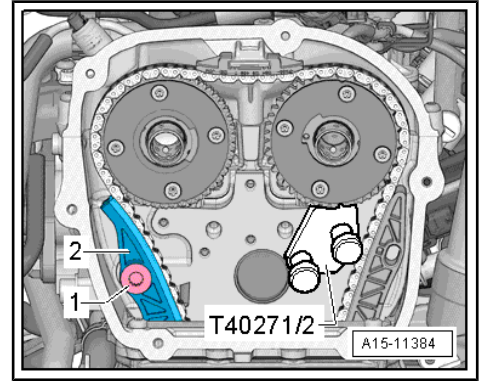
### All versions

- Remove assembly lever - T40243- .
- Bolt camshaft clamp - T40271/2- onto cylinder head and slide into teeth on chain sprocket in direction of -arrow 2-; if necessary, use spanner to turn inlet camshaft in direction of -arrow 1-.

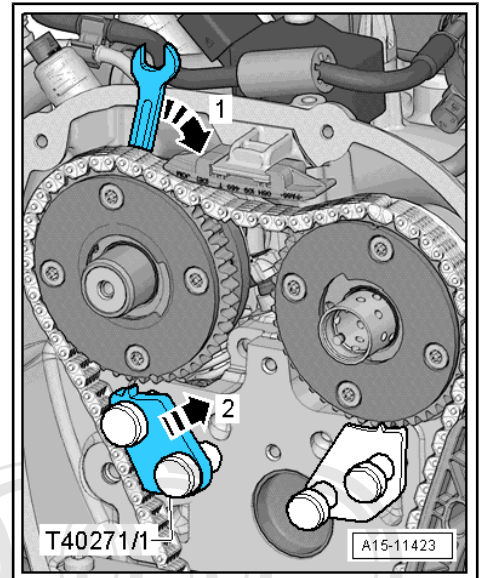


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Remove bolt -1- and guide tensioning rail -2- downwards.



- Bolt camshaft clamp - T40271/1- onto cylinder head.
- Use spanner to turn exhaust camshaft in direction of -arrow 1- and slide camshaft clamp - T40271/1- into teeth on chain sprocket in direction of -arrow 2-.

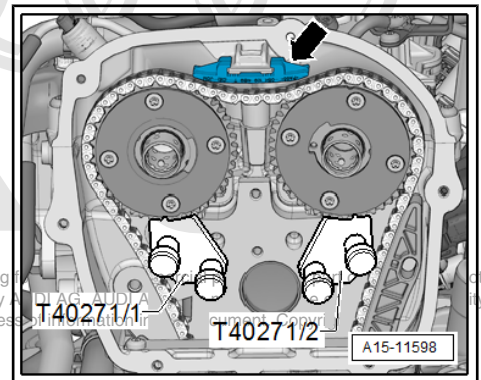


- Use screwdriver to release catch and press off top guide rail -arrow- towards front.
- Remove camshaft timing chain from camshaft sprockets.

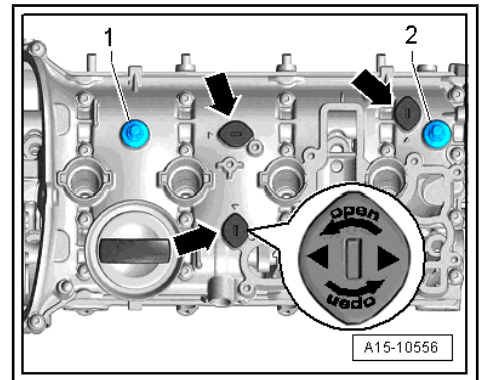
**Caution**

*Risk of damage to valves and piston crowns.*

◆ **Do not turn the crankshaft after the camshaft timing chain has been removed from the cylinder head.**



- Turn sealing plugs -arrows- 90° anti-clockwise -arrow- and remove.
- Unscrew ball heads -1 ... 2-.
- Detach filler cap.





- Remove bolts -arrows-.
- Use special wrench (Polydrive) - T10070- or bit XZN 12 - T40270- to remove cylinder head bolts in the sequence -1 ... 5-.



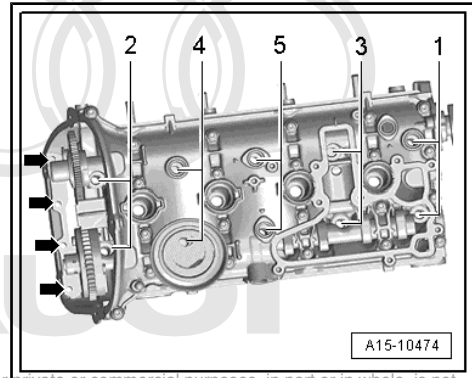
#### Note

- ◆ *Make sure all hoses/pipes and wiring on component are disconnected.*
- ◆ *Make sure tensioning rail and guide rail are not damaged when lifting off cylinder head.*

- Take off cylinder head.
- Place cylinder head onto soft surface (foam plastic).

#### Installing

- Tightening torques  
=> ["3.3 Exploded view - cylinder head, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA", page 148](#)



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.



#### Caution

##### *Risk of damage to sealing surfaces.*

- ◆ *Carefully remove sealant residue from cylinder head and cylinder block.*
- ◆ *Ensure that no long scores or scratches are made on the surfaces.*

##### *Risk of damage to cylinder block.*

- ◆ *No oil or coolant must be allowed to remain in the blind holes for the cylinder head bolts in the cylinder block.*

##### *Ensure that cylinder head gasket seals properly:*

- ◆ *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 the cylinder head gasket very carefully to prevent damage to the silicone coating or the indented area of the gasket.*

##### *Risk of damage to open valves.*

- ◆ *When installing an exchange cylinder head, the plastic protectors fitted to protect the open valves should not be removed until the cylinder head is ready to be fitted.*

##### *Risk of damage to valves and piston crowns after working on valve gear.*

- ◆ *Turn the engine carefully at least 2 rotations to ensure that none of the valves make contact when the starter is operated.*

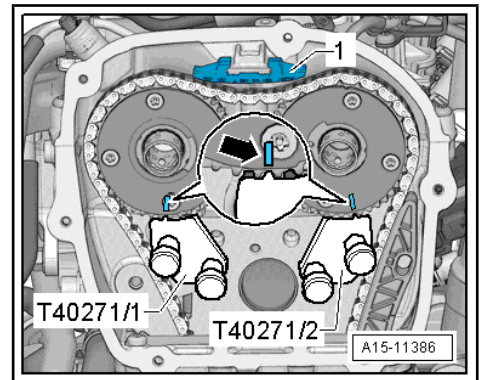
**i** Note

- ◆ Renew the bolts tightened with specified tightening angle.
- ◆ Renew self-locking nuts as well as seals, gaskets and O-rings.
- ◆ When installing an exchange cylinder head, the contact surfaces between the hydraulic compensation elements, roller rocker fingers and cams must be oiled before installing the camshafts.
- ◆ Hose connections and air pipes and hoses must be free of oil and grease before assembly.
- ◆ Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ *Electronic parts catalogue* .
- ◆ To ensure that the charge air hoses can be properly secured at their connections, spray rust remover onto the worm thread of used hose clips before installing.
- ◆ After fitting a new cylinder head or cylinder head gasket, change the engine oil and the coolant in the entire cooling system.

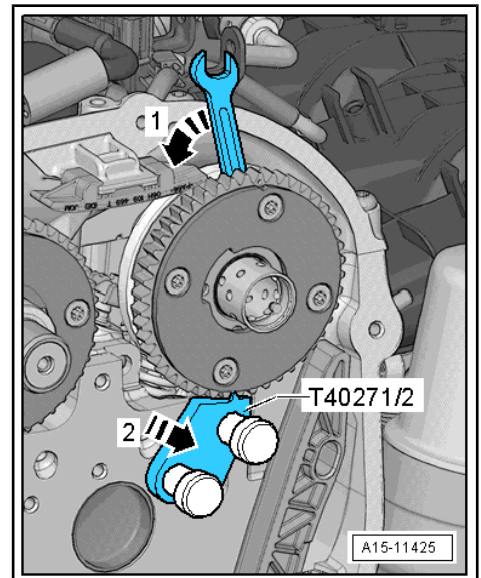
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

**If using a new cylinder head**

- Mark camshaft chain sprockets relative to camshaft clamp - T40271/1- and camshaft clamp - T40271/2- -arrows-.

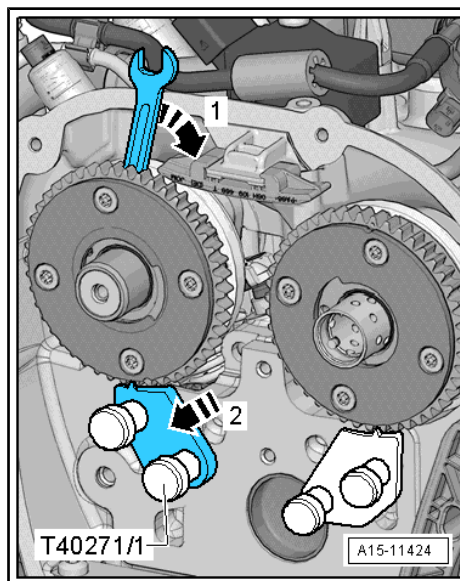


- Use spanner to turn inlet camshaft in direction of -arrow 1- and slide camshaft clamp - T40271/2- out of teeth on chain sprocket in direction of -arrow 2- and move camshaft into rest position.
- Remove camshaft clamp - T40271/2- .

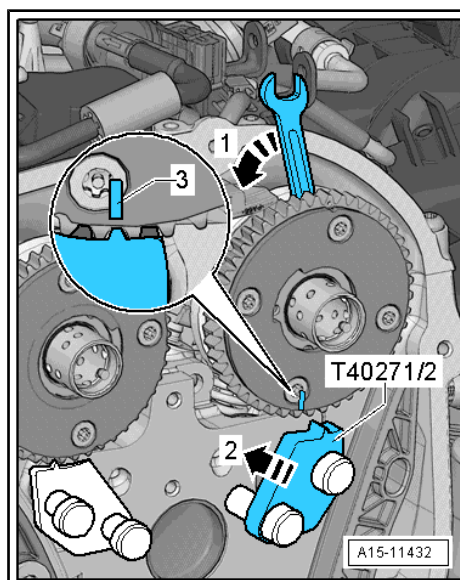




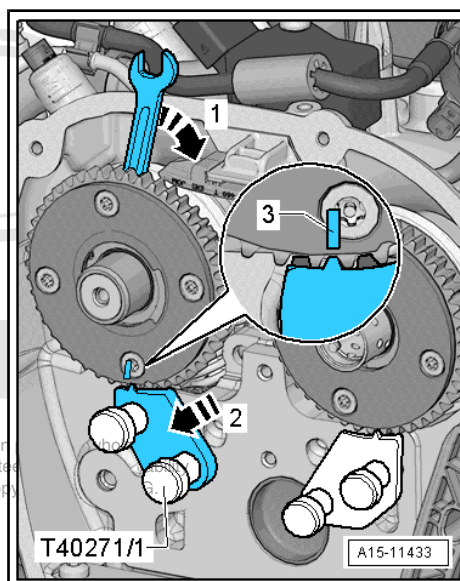
- Use spanner to turn exhaust camshaft in direction of -arrow 1- and slide camshaft clamp - T40271/1- out of teeth on chain sprocket in direction of -arrow 2- and move camshaft into rest position.
- Remove camshaft clamp - T40271/1- .
- Transfer markings made on old camshafts onto new camshafts.



- Bolt camshaft clamp - T40271/2- onto cylinder head.
- Turn inlet camshaft in direction of -arrow 1- until marking -3- aligns with camshaft clamp - T40271/2- .
- Slide camshaft clamp - T40271/2- into teeth of chain sprocket in direction of -arrow 2-.



- Bolt camshaft clamp - T40271/1- onto cylinder head.
- Turn exhaust camshaft in direction of -arrow 1- until marking -3- aligns with camshaft clamp - T40271/1- .
- Slide camshaft clamp - T40271/1- into teeth of chain sprocket in direction of -arrow 2-.




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

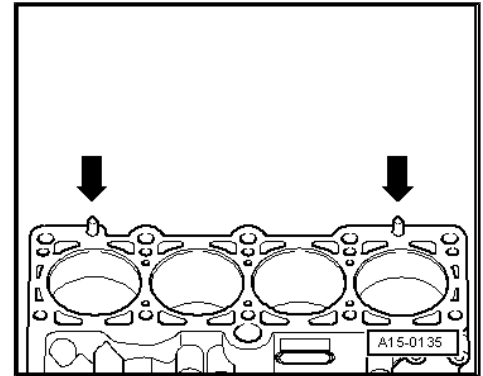


**All vehicles:**

- 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.

 **WARNING**

*Make sure that components are not damaged by the timing chain when rotating the crankshaft.*



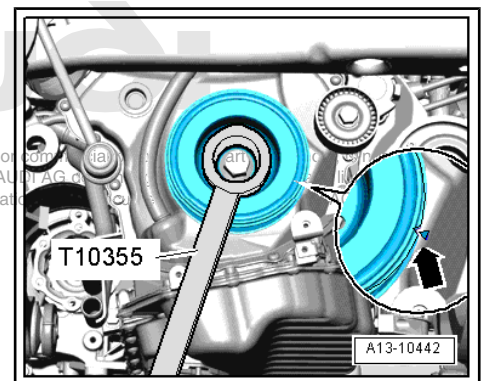
- If crankshaft has been rotated: set No. 1 cylinder piston to top dead centre and then turn crankshaft back slightly.
- Fit cylinder head.
- Insert and hand-tighten cylinder head bolts.
- Tightening sequence for cylinder head => [page 151](#)

 **Note**

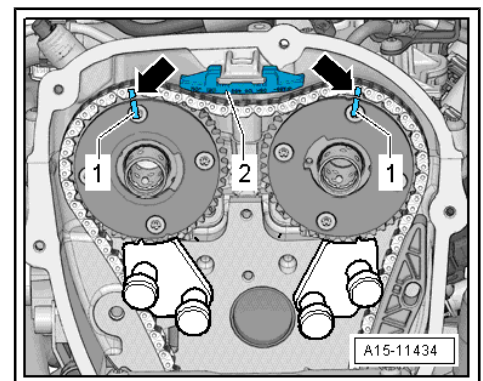
*Cylinder head bolts do not have to be torqued down again later after repair work.*

- Turn vibration damper to "TDC" position -arrow- using counterhold tool - T10355- .
- Notch on vibration damper must align with arrow marking on cover for timing chains (bottom).

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

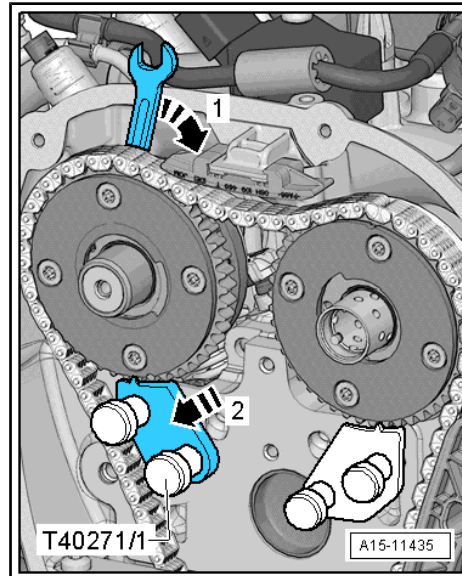


- Fit timing chain; to do so, position markings on chain links -arrows- at markings on chain sprockets -1-.
- Install top guide rail -2-.

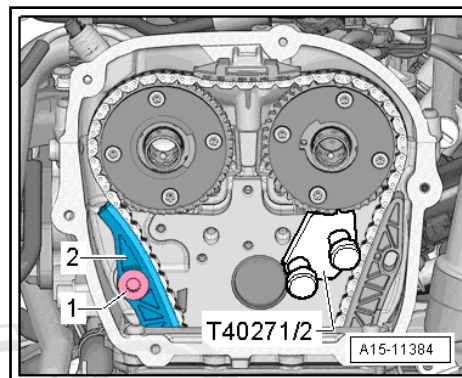




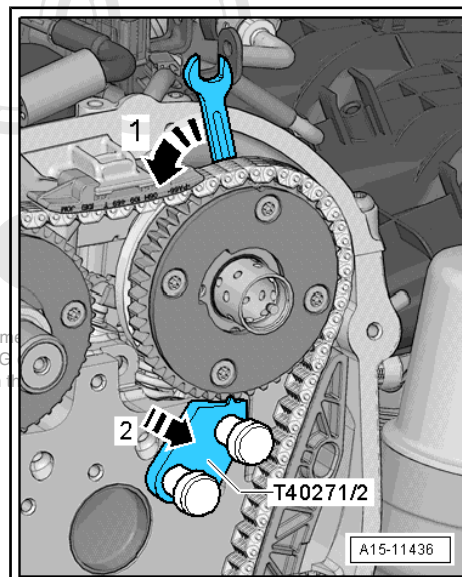
- Turn exhaust camshaft in direction of -arrow 1- and slide camshaft clamp - T40271/1- out of teeth on chain sprocket in direction of -arrow 2- and release camshaft.
- Remove camshaft clamp - T40271/1- .



- Move guide rail -2- upwards and screw in bolt -1-.



- Turn inlet camshaft in direction of -arrow 1- and slide camshaft clamp - T40271/2- out of teeth on chain sprocket in direction of -arrow 2- and release camshaft.
- Remove camshaft clamp - T40271/2- .

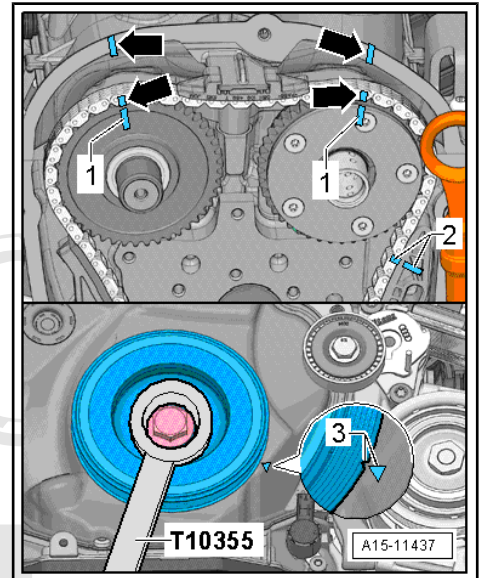


Protected by copyright. Copying for private or commercial use is not permitted unless authorised by AUDI AG. AUDI AG is not liable with respect to the correctness of information in this document.

- Check valve timing; markings on camshaft timing chain and cylinder head -arrows- must align with markings on chain sprockets -1-.
- Markings on camshaft timing chain and on guide rail for camshaft timing chain -2- must be opposite one another.
- Notch on vibration damper must align with marking on cover for timing chain (bottom) -3-.

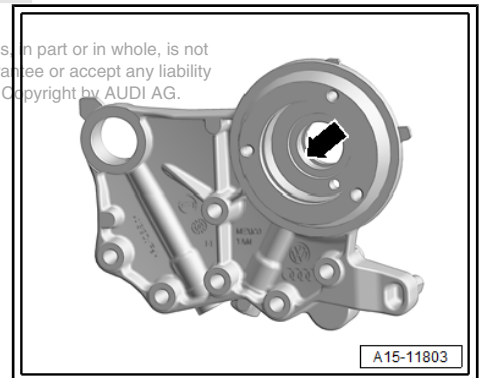
 **Note**

If the markings you have made are no longer visible, check the valve timing => [page 120](#).



- Lubricate hole -arrow- 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.

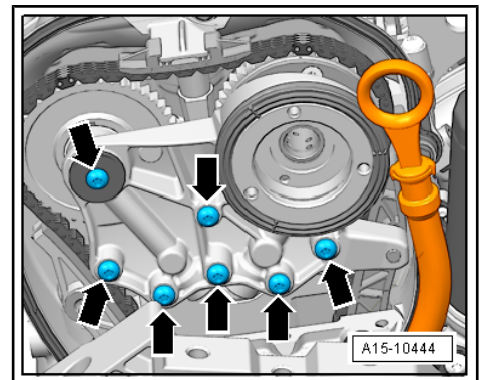


**WARNING**

*Risk of damage to bearing saddle.*

- ◆ *Detach bearing saddle carefully without tilting it.*

- Attach bearing saddle and screw in bolts -arrows- hand-tight.
- Depending on version, remove locking pin - T40011- or locking tool - T40267- .
- Tighten bolts -arrows- for bearing saddle => [page 101](#) .

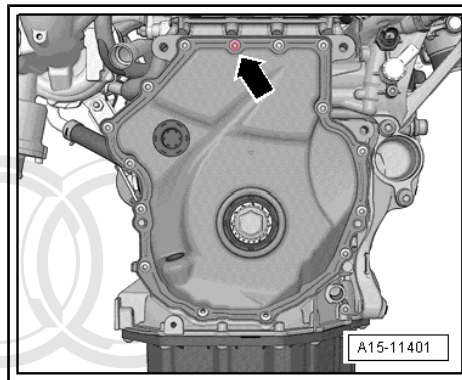




- Screw in bolt -arrow-.
- Install timing valve ⇒ [Item 6 \(page 101\)](#) .
- Use spanner to turn inlet camshaft in direction of -arrow- and fit timing chain.

The remaining installation steps are carried out in the reverse sequence. Note the following points:

- Install timing chain cover (top) ⇒ [page 93](#) .
- Install ignition coils ⇒ [page 392](#) .
- Change engine oil ⇒ Maintenance ; Booklet 808 .
- Fill cooling system with fresh coolant ⇒ [page 247](#) .



**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.

## 4 Checking compression

### Special tools and workshop equipment required

- ◆ Spark plug spanner - 3122 B-



- ◆ Compression tester - V.A.G 1763-



Protected by copyright. Copying for private or commercial use, 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.

### Test sequence

 Note

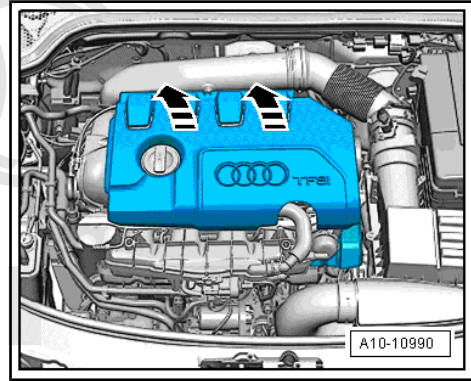
- ◆ *Engine oil temperature at least 30 °C*
- ◆ *Battery voltage at least 12.7 V*



- Remove engine cover panel -arrows-.
- Remove ignition coils ⇒ [page 392](#) .
- Remove spark plugs with spark plug spanner - 3122 B- .
- Check compression pressure with compression tester - V.A.G 1763- and adapter - V.A.G 1763/6- .

**Note**

Using the compression tester: ⇒ *Operating instructions* .



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

This document, in whole or in part, 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.

**Compression pressure:**

New pressure in bar	Wear limit in bar	Permissible difference between cylinders in bar
11.0 ... 14.0	7.0	3.0 (maximum)

- Install spark plugs ⇒ Maintenance ; Booklet 808 .
- Install ignition coils ⇒ [page 392](#) .

**Note**

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

- Entries are stored in the event memory of the engine control unit because electrical connectors have been unplugged and the engine started: Generate readiness code in Guided Functions ⇒ Vehicle diagnostic tester.

## 5 Valve gear

⇒ [“5.1 Exploded view - valve gear, engine codes BYT, BPU”, page 175](#)

⇒ [“5.2 Removing and installing camshafts, engine codes BYT, BPU”, page 178](#)

⇒ [“5.3 Exploded view - valve gear, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA”, page 193](#)

⇒ [“5.4 Removing and installing camshafts, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA”, page 195](#)

Product and process descriptions are subject to change without notice. Audi AG does not accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

⇒ [“5.5 Renewing valve stem oil seals with cylinder head installed”, page 209](#)

⇒ [“5.6 Renewing valve stem oil seals with cylinder head removed”, page 213](#)

⇒ [“5.7 Checking valve guides”, page 217](#)



### Note

- ◆ *Cylinder head and cylinder head cover must be renewed together.*
- ◆ *After installing camshafts, wait for approx. 30 minutes before starting engine. The hydraulic compensation elements must 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.*

### 5.1 Exploded view - valve gear, engine codes BYT, BPU

**1 - Exhaust valve**

- Do not machine, only grinding-in is permitted
- Valve dimensions ⇒ [page 177](#)
- Checking valve guides ⇒ [page 217](#)

**2 - Cylinder head****3 - Valve guide**

- Checking ⇒ [page 217](#)

**4 - Valve stem oil seal**

- Renewing: with cylinder head installed ⇒ [page 209](#), with cylinder head removed ⇒ [page 213](#)

**5 - Valve spring****6 - Valve spring plate****7 - Valve cotters****8 - Hydraulic compensation element**

- With roller rocker finger**
- Do not interchange**
- Lubricate contact surface

**9 - Exhaust camshaft**

- Removing and installing ⇒ [page 178](#)
- Check radial clearance with Plastigage (roller rocker fingers removed)
- Radial clearance: 0.024 ... 0.066 mm
- Runout: max. 0.04 mm

**10 - Cylinder head cover**

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

**11 - Bolt**

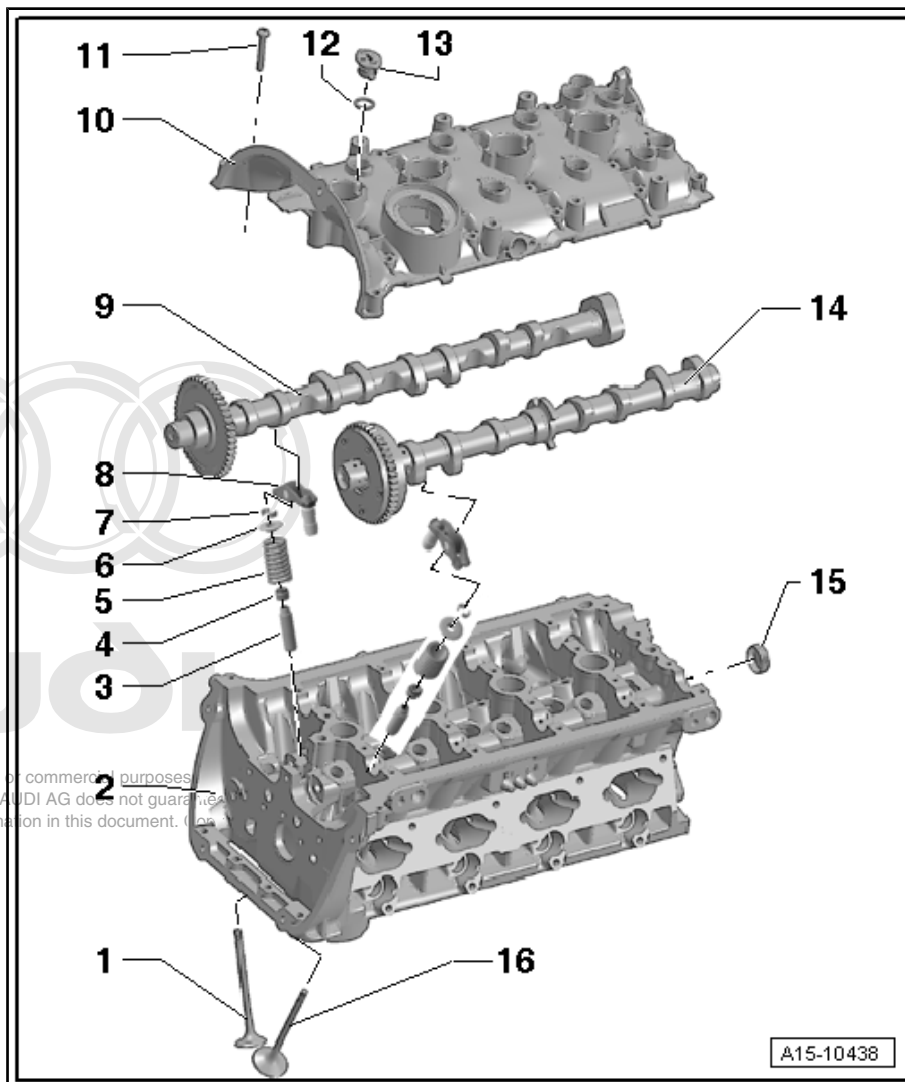
- Renew
- Use old bolts when measuring radial clearance
- Tightening sequence ⇒ [page 177](#)

**12 - O-ring**

- Renew
- Lubricate with engine oil

**13 - Sealing plug****14 - Inlet camshaft**

- Removing and installing ⇒ [page 178](#)
- Check radial clearance with Plastigage (roller rocker fingers removed)
- Radial clearance: 0.024 ... 0.066 mm
- Runout: max. 0.04 mm





### 15 - Sealing cap

- Renew
- Removing sealing cap with cylinder head cover installed: pierce on one side with an awl and pry out
- Driving in ⇒ [page 189](#)

### 16 - Inlet valve

- Do not machine, only grinding-in is permitted
- Valve dimensions ⇒ [page 177](#)
- Checking valve guides ⇒ [page 217](#)

### Tightening sequence for cylinder head cover

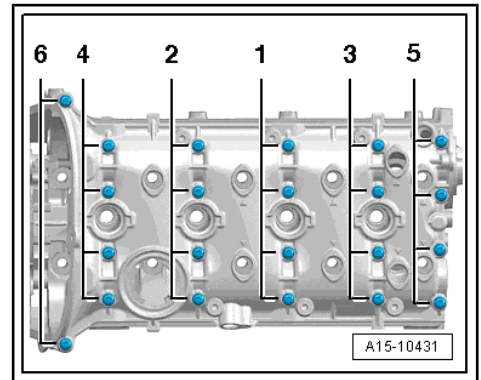
– Renew bolts.

1. Fit bolts in the sequence -1 ... 6- and hand-tighten in several stages.
2. Tighten bolts in the sequence -1 ... 6- to 8 Nm using torque wrench.
3. Turn 90° further in the sequence -1 ... 6- using a rigid wrench.



**Note**

*Take care to keep cylinder head cover straight.*



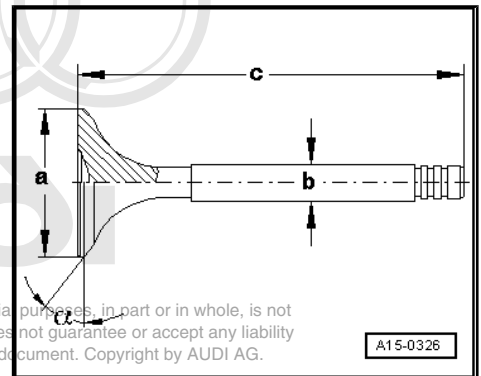
### Valve dimensions



**Note**

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

Dimension		Inlet valve	Exhaust valve
∅ a	mm	33.85 + 0.10	28.0 + 0.1
∅ b	mm	5.98 + 0.01	5.96 + 0.01
c	mm	104.0 + 0.2	101.9 + 0.2
α	∠°	45	45



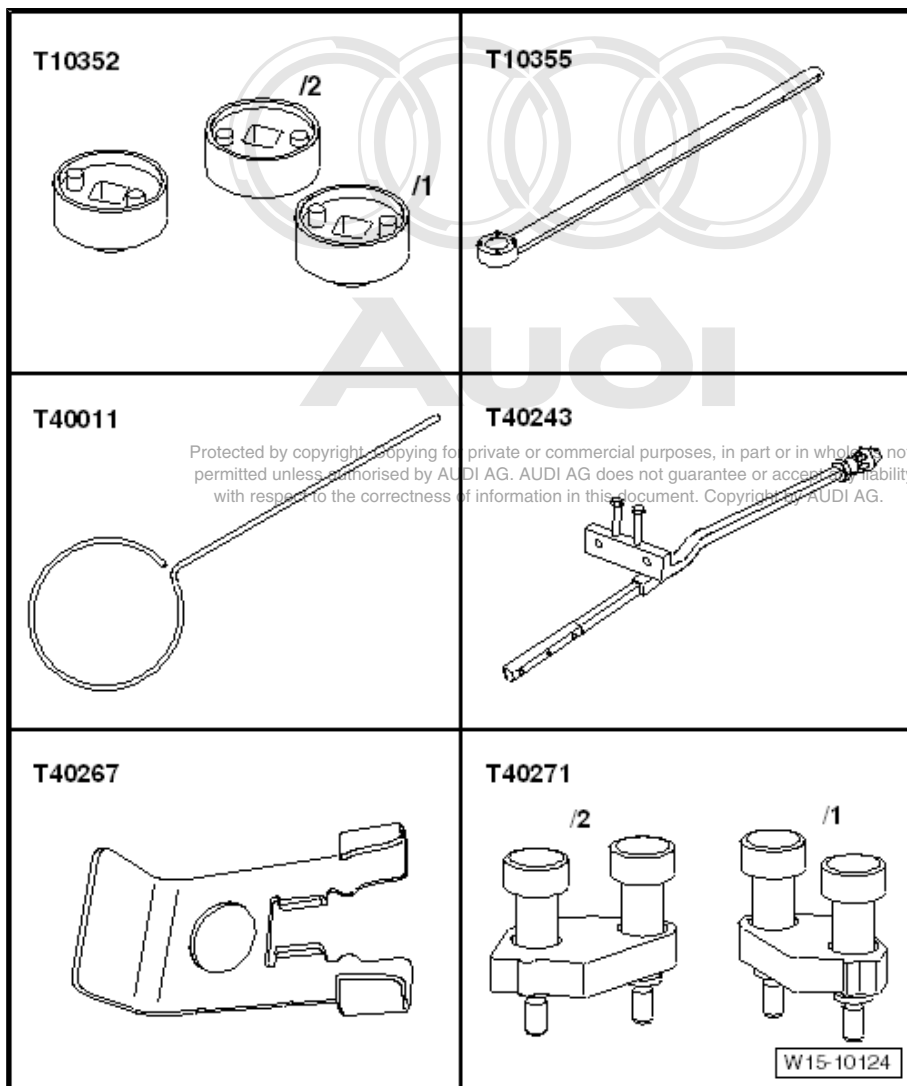
Produced by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorized by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



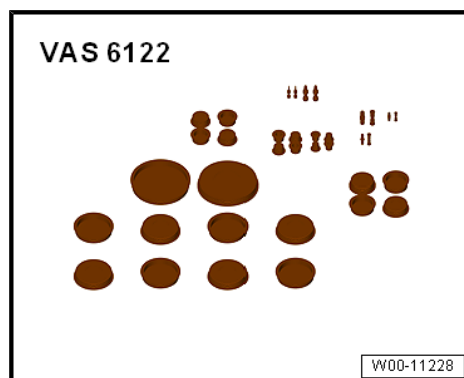
## 5.2 Removing and installing camshafts, engine codes BYT, BPU

### Special tools and workshop equipment required

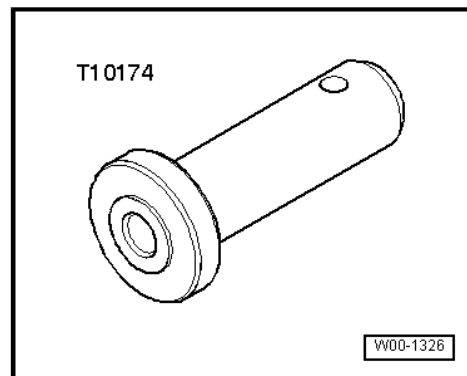
- ◆ Assembly tool - T10352-
- ◆ Counterhold tool - T10355-
- ◆ Locking pin - T40011-
- ◆ Assembly lever - T40243-
- ◆ Locking tool - T40267-
- ◆ Camshaft clamp - T40271-



- ◆ Engine bung set - VAS 6122-



- ◆ Thrust piece - T10174-



## Removing

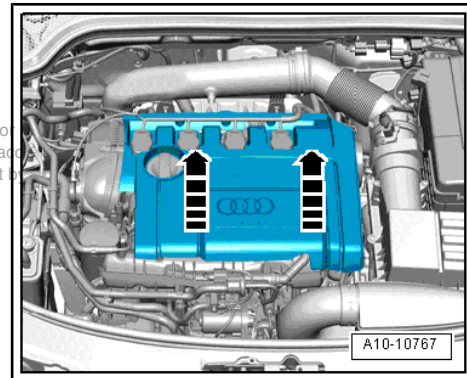


### Note

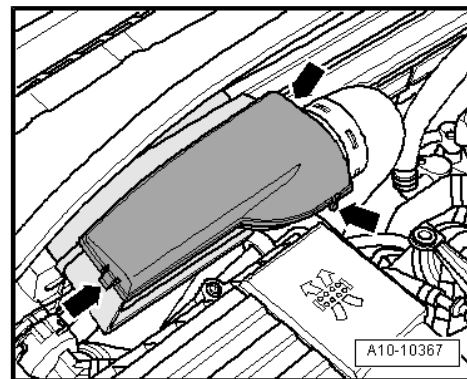
- ◆ *Sealing surfaces at bottom of cylinder head cover and top of cylinder head must not be machined.*
- ◆ *The camshaft bearings are integrated into the cylinder head and cylinder head cover. The timing chain must be slackened before removing the cylinder head cover.*
- ◆ *Renew sealing cap => [Item 15 \(page 177\)](#) if cylinder head cover has been detached.*
- ◆ *Fit cable ties in the original positions when installing.*

## Removing

- Remove engine cover panel -arrows-.



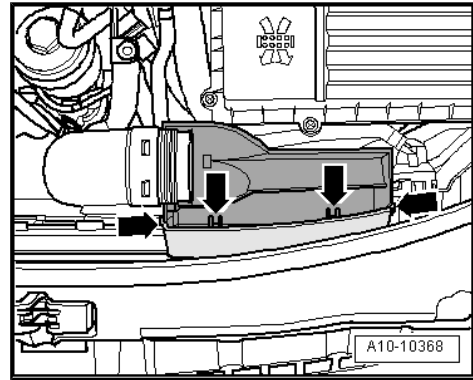
- Pull cover off air duct (release clips on sides) -arrows-.



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.



- Unclip air duct at the bottom by releasing clips -arrows-.
- Detach air duct at bottom together with air hose.

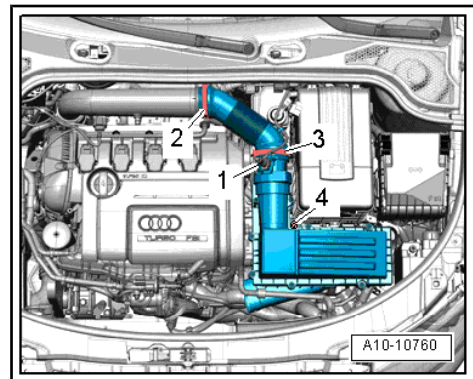


- Unplug electrical connector -1- at air mass meter - G70- .
- Detach air hose -2-.
- Unscrew bolt -4- and remove air cleaner housing.

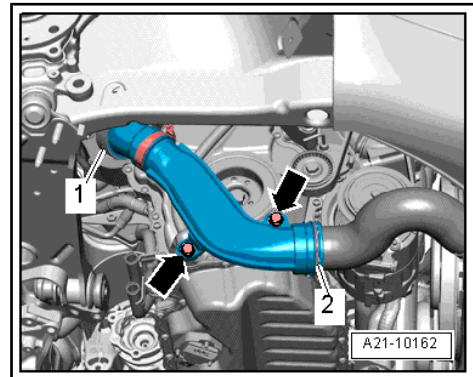


**Note**

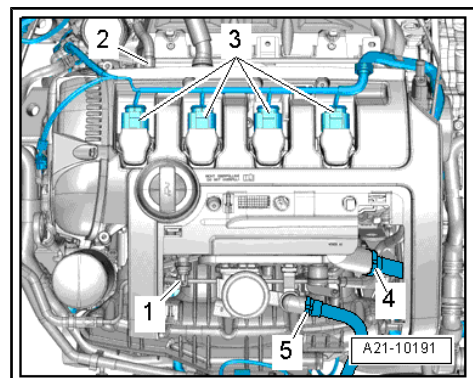
-Item 3- can be disregarded.



- Remove bolts -arrows-.
- Remove air pipe (lift clips -items 1 and 2-).

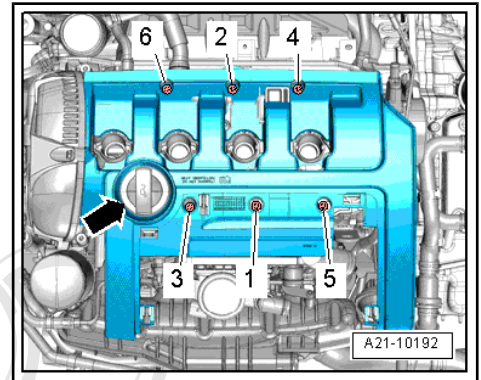


- Detach air hoses -1, 2, 4, 5-.
- Remove ignition coils -3- => [page 392](#) .

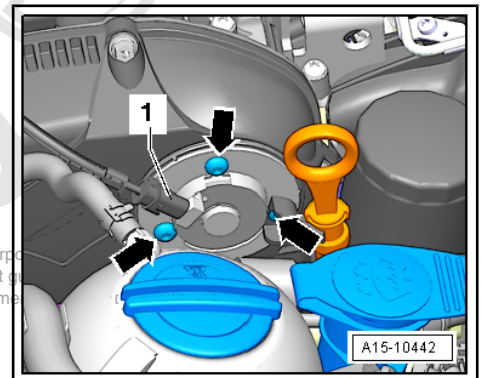


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Remove filler cap -arrow-.
- Remove bolts -1 ... 6- and detach oil separator from cylinder head cover.
- Move vacuum line clear.
- Fit filler cap.

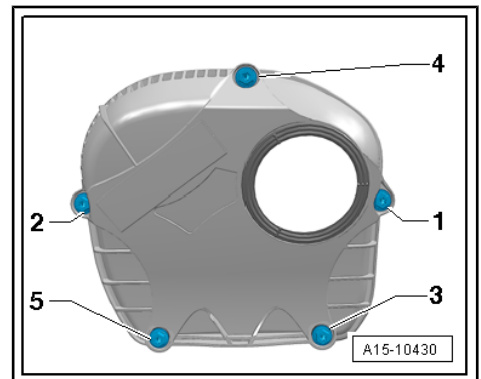


- Detach connector from camshaft control valve 1 - N205- -1-.
- Unscrew bolts -arrows- and remove camshaft control valve 1 - N205- .



Protected by copyright. Copying for private or commercial purposes is not permitted unless authorised by AUDI AG. AUDI AG does not give any warranty with respect to the correctness of information in this document.

- Unscrew bolts -1 to 5- and remove timing chain cover (top).

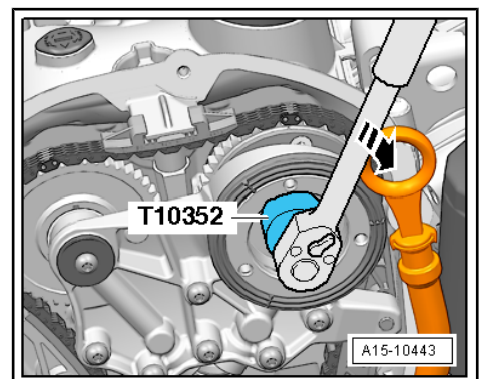




**Caution**


*The timing valve has a left-hand thread.*

- Depending on version, turn assembly tool - T10352- or assembly tool - T10352/1A- in direction of -arrow- to remove timing valve.





- Remove bolts -arrows-.

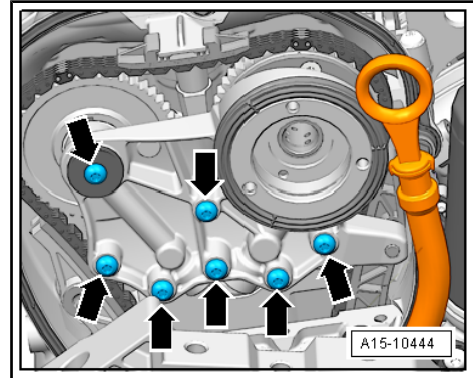


**WARNING**

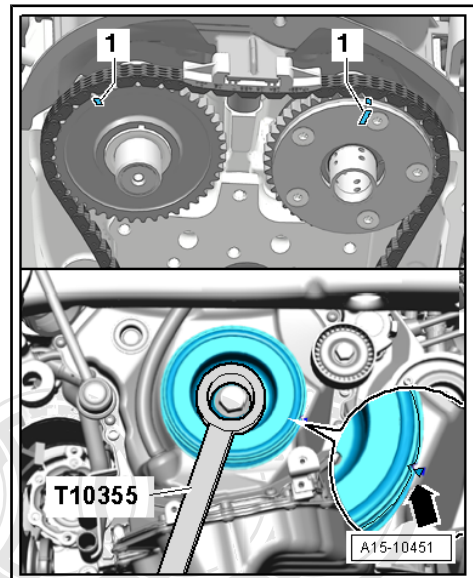
*Risk of damage to bearing saddle.*

◆ *Detach bearing saddle carefully without tilting it.*

- Detach bearing saddle.

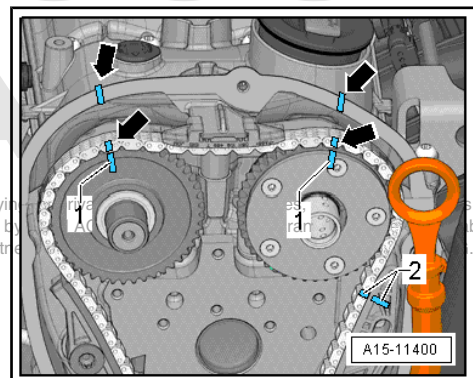


- Turn vibration damper to "TDC" position using counterhold tool - T10355- .
- Notch on vibration damper and marking on cover for timing chains (bottom) must be aligned -arrow-.
- The markings -1- on the camshafts must face upwards.

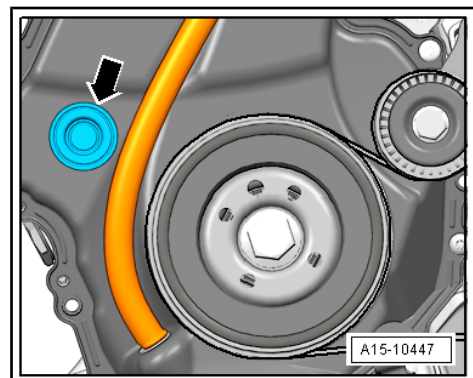


- Use a waterproof pen to mark camshaft timing chain and cylinder head -arrows- relative to markings on chain sprockets -1-.
- Use a waterproof pen to mark camshaft timing chain relative to guide rail of timing chain -2- as well.

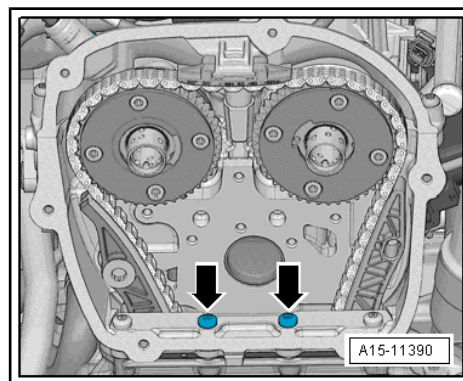
Protected by copyright. Copying or reproduction is not permitted unless authorised by Audi AG with respect to the correctness of the information.



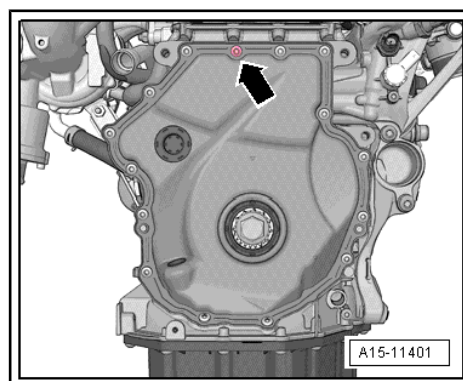
- Remove sealing plug -arrow-.



- Remove bolts -arrows-.



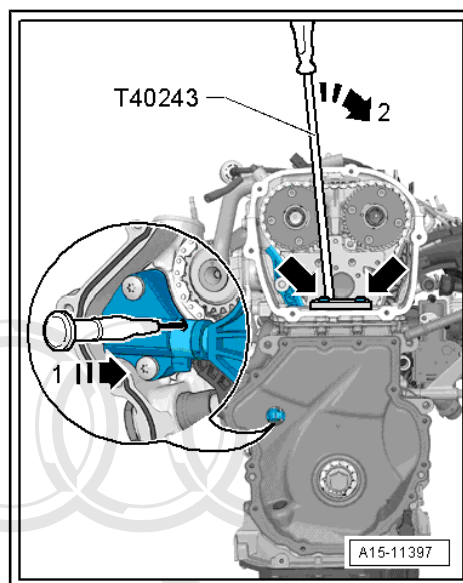
- If fitted, remove bolt -arrow-.



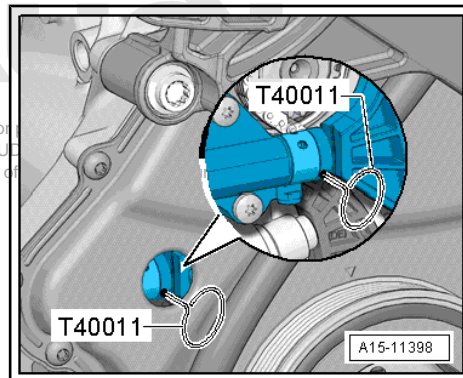
Depending on version, 2 different chain tensioners may be installed.

#### Version 1

- Screw in assembly lever - T40243- -arrows-.
- Lift locking element for chain tensioner; to do so, insert scribe or suitable screwdriver in hole of chain tensioner in direction of -arrow 1-, press assembly lever - T40243- slowly in direction of -arrow 2- and hold in place.



- Hold chain tensioner in position with locking pin - T40011- .

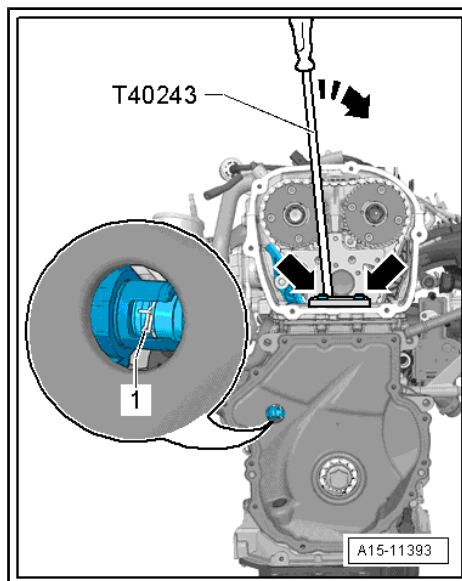


Protected by copyright. Copying for  
 permitted unless authorised by AUDI  
 with respect to the correctness of



**Version 2**

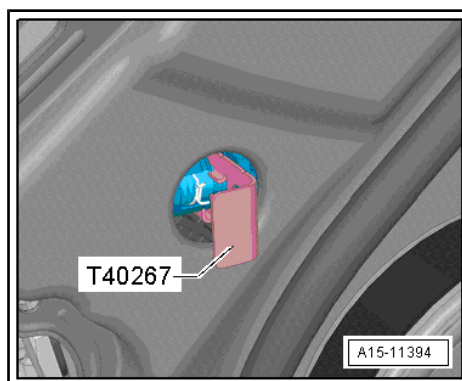
- Screw in assembly lever - T40243- -arrows-.
- Compress circlip -arrow- for chain tensioner, press assembly lever - T40243- slowly in direction of -arrow- and hold in place.



- Hold chain tensioner in position with locking tool - T40267- .

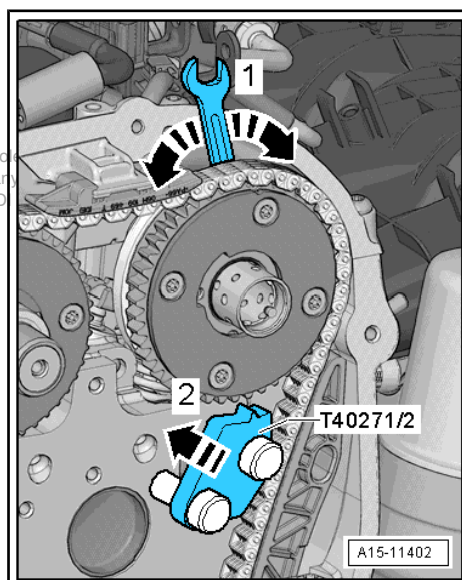
**All versions**

- Remove assembly lever - T40243- .



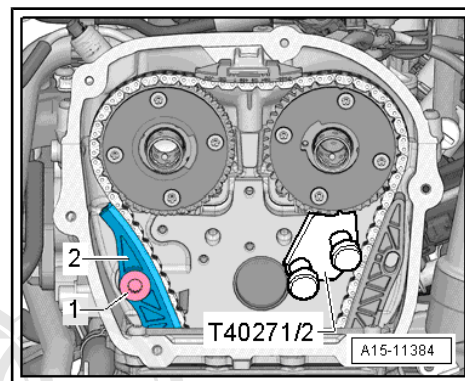
- Bolt camshaft clamp - T40271/2- onto cylinder head and slide into teeth on chain sprocket in direction of -arrow 2-; if necessary, use spanner to turn inlet camshaft in direction of -arrow 1-.

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 or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

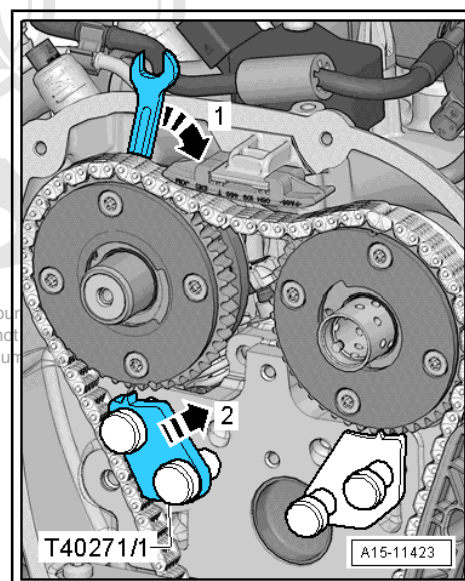




- Remove bolt -1- and guide tensioning rail -2- downwards.



- Bolt camshaft clamp - T40271/1- onto cylinder head.
- Use spanner to turn exhaust camshaft in direction of -arrow 1- and slide camshaft clamp - T40271/1- into teeth on chain sprocket in direction of -arrow 2-.

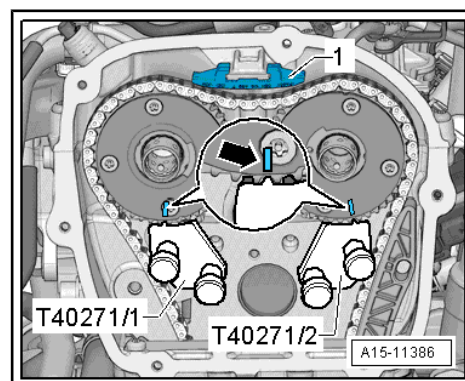


Protected by copyright. Copying for private or commercial purposes is not permitted unless authorised by AUDI AG. AUDI AG does not accept any liability with respect to the correctness of information in this document.

**i Note**

- ◆ *Mark camshafts relative to camshaft clamp - T40271/1- and camshaft clamp - T40271/2- .*
- ◆ *If using new camshafts: Transfer markings made on old camshafts onto new camshafts.*
- ◆ *It will take much more time to install the new camshafts if the markings are not applied.*

- Mark camshaft chain sprockets relative to camshaft clamp - T40271/1- and camshaft clamp - T40271/2- -arrows-.
- Use screwdriver to release catch and press off top guide rail -1- forwards.
- Remove camshaft timing chain from camshaft sprockets.



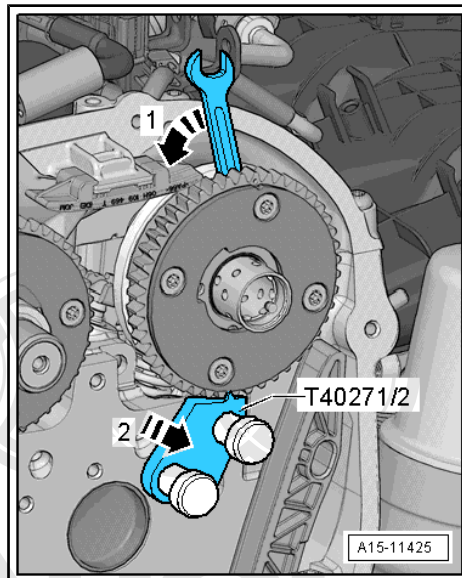
**Caution**

**Risk of damage to valves and piston crowns.**

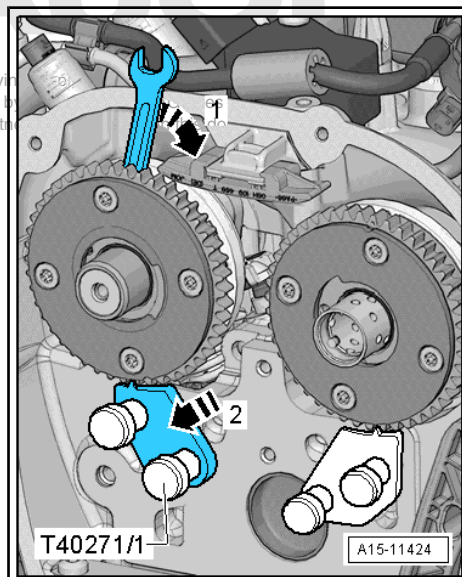
- ◆ *Do not turn the crankshaft after the camshaft timing chain has been removed from the cylinder head.*



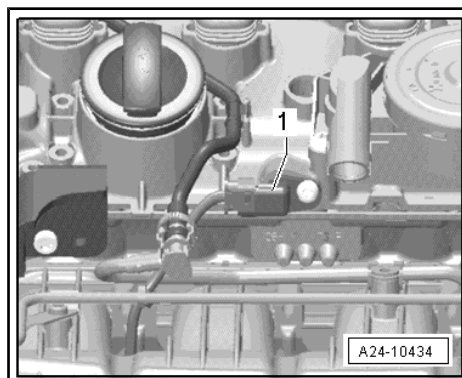
- Use spanner to turn inlet camshaft in direction of -arrow 1- and slide camshaft clamp - T40271/2- out of teeth on chain sprocket in direction of -arrow 2- and move camshaft into rest position.




- Use spanner to turn exhaust camshaft in direction of -arrow 1- and slide camshaft clamp - T40271/1- out of teeth on chain sprocket in direction of -arrow 2- and move camshaft into rest position.



- Unplug connector -1- from Hall sender - G40- .
- Remove high-pressure pump ⇒ [page 342](#) .
- Remove vacuum pump ⇒ Rep. gr. 47 .

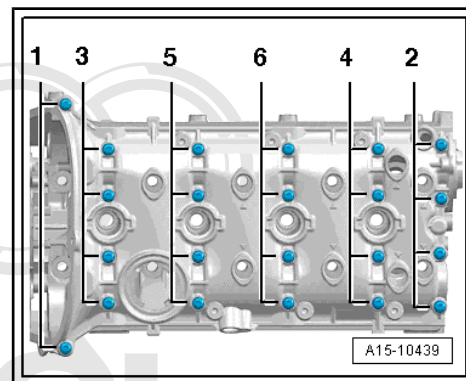


- Remove cylinder head cover bolts in the sequence -1 ... 6-.
- Detach cylinder head cover.
- Detach camshafts.

 **Caution**

*Protect lubrication system and bearings against contamination.*

◆ *Cover exposed parts of the engine.*




### Installing

- Tightening torques  
 ⇒ ["5.1 Exploded view - valve gear engine codes BYT, BPU" page 175](#)

For information only. This document, 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

- ◆ *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.*
  - ◆ *Silicone sealant ⇒ Electronic parts catalogue*
  - ◆ *Note expiry date of silicone sealant.*
  - ◆ *The cover must be installed within 5 minutes after applying the silicone sealant.*
- Remove sealant remaining on cylinder head with flat scraper.

 **WARNING**

*Risk of eye injury.*

◆ *Put on safety goggles.*

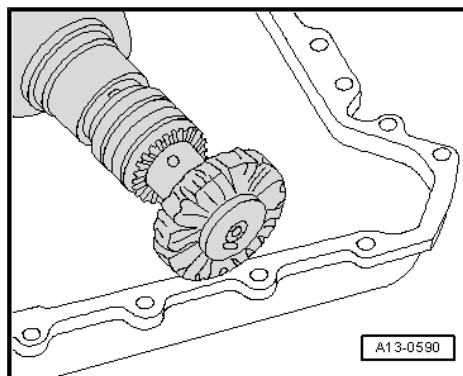
 **Caution**

*Protect lubrication system and bearings against contamination.*

◆ *Cover exposed parts of the engine.*



- Remove sealant residue in groove of cylinder head cover and on sealing surfaces, e.g. using a rotating plastic brush.
- Clean sealing surfaces; they must be free of oil and grease.



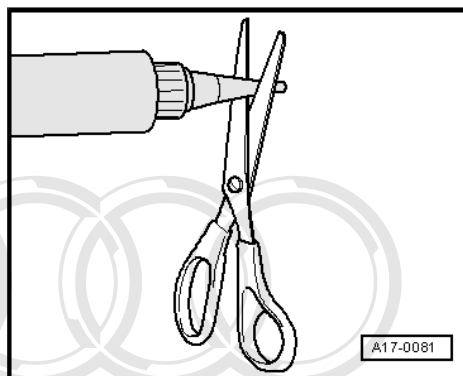
- Cut off nozzle of tube at front marking (Ø of nozzle approx. 2 mm).

**On new camshafts**

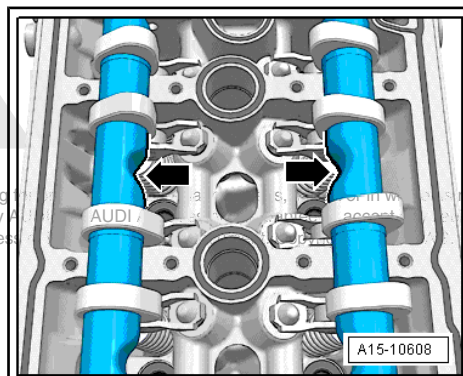
- Transfer markings made on old camshafts onto new camshafts.

**All vehicles:**

- Oil running surfaces of both camshafts.



- Fit camshafts in cylinder head, recesses -arrows- must face each other.
- Renew bolts for cylinder head cover.

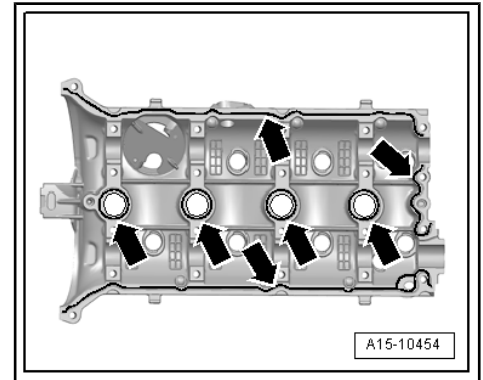


Protected by copyright. Copying or reproduction in any form is prohibited without the written permission of Audi AG. All rights reserved. Audi AG is not liable for any damage or liability arising from the use of this document. The information is provided for informational purposes only and does not constitute an offer or a contract. The information is subject to change without notice. Audi AG is not responsible for any damage or liability arising from the use of this document. The information is provided for informational purposes only and does not constitute an offer or a contract. The information is subject to change without notice.

- Apply silicone sealant onto clean sealing surface of cylinder head cover, as illustrated -arrows-.
- ◆ Thickness of sealant bead: 2 ... 3 mm.

**i** Note

- ◆ *The cylinder head cover must be installed within 5 minutes after applying the silicone sealant.*
- ◆ *The bead of sealant must not be thicker than specified, otherwise excess sealant can enter the sump and obstruct the strainer in the oil intake pipe.*
- ◆ *Note the use-by date of the sealant.*



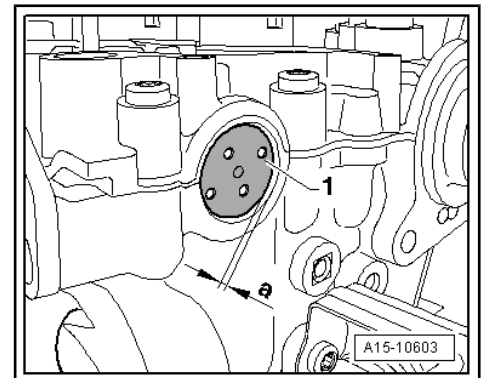
Sealant ⇒ Electronic parts catalogue

- Tighten bolts in several stages; tightening sequence ⇒ [page 177](#).

**i** Note

*Take care to keep cylinder head cover straight.*

- Use thrust piece - T10174- to drive in sealing cap -1- (do not apply sealant).
- a-: 1 ... 2 mm

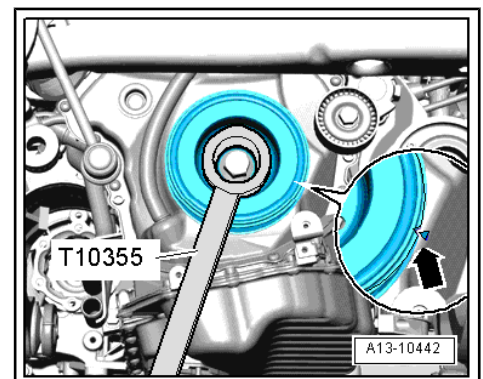


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

**!** WARNING

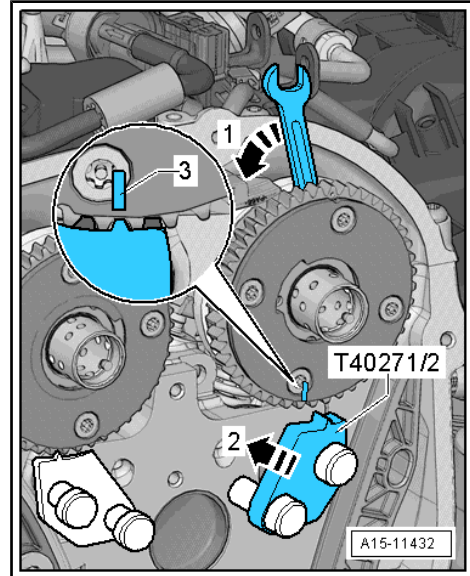
***Make sure that components are not damaged by the timing chain when rotating the crankshaft.***

- Turn vibration damper to "TDC" position -arrow- using counterhold tool - T10355- .
- Notch on vibration damper must align with arrow marking on cover for timing chains (bottom).

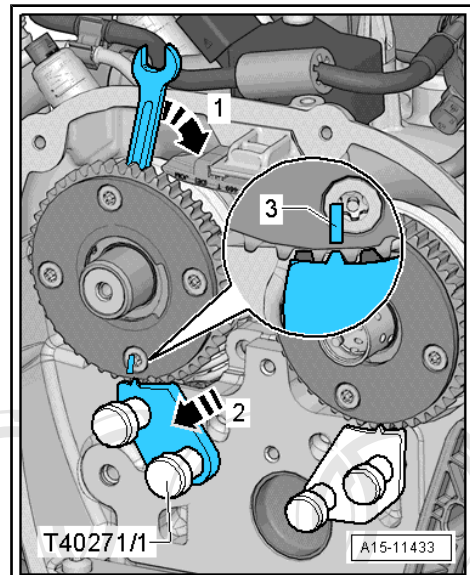




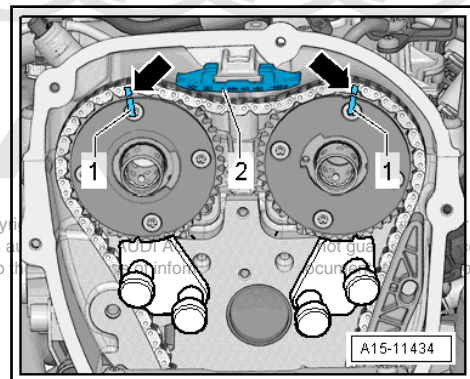
- Turn inlet camshaft in direction of -arrow 1- until marking -3- aligns with camshaft clamp - T40271/2- .
- Slide camshaft clamp - T40271/2- into teeth of chain sprocket in direction of -arrow 2-.



- Turn exhaust camshaft in direction of -arrow 1- until marking -3- aligns with camshaft clamp - T40271/1- .
- Slide camshaft clamp - T40271/1- into teeth of chain sprocket in direction of -arrow 2-.

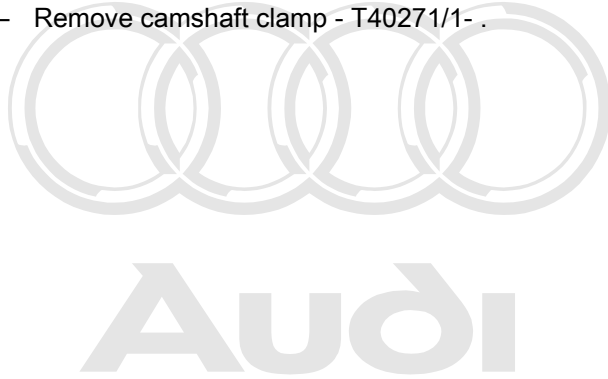


- Fit timing chain; to do so, position markings on chain links -arrows- at markings on chain sprockets -1-.
- Install top guide rail -2-.



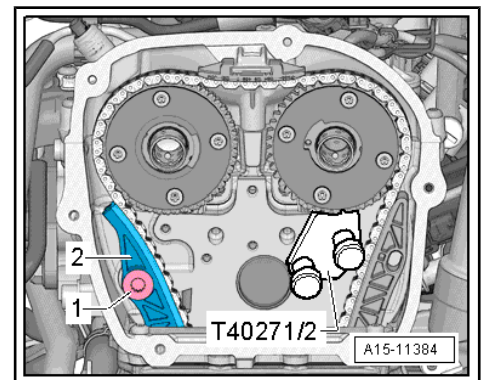
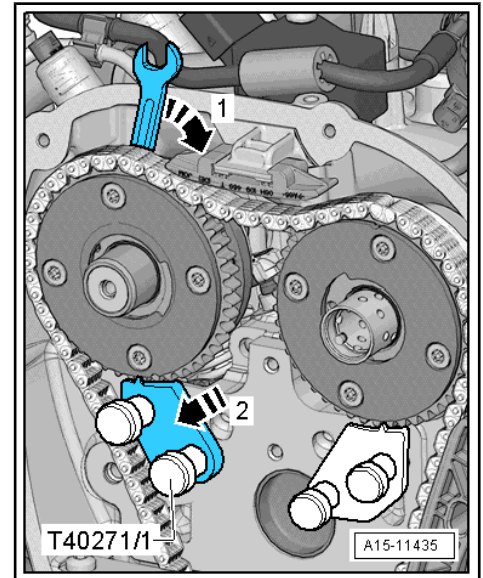
Protected by copyright. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without the prior written permission of Audi AG.

- Turn exhaust camshaft in direction of -arrow 1- and slide camshaft clamp - T40271/1- out of teeth on chain sprocket in direction of -arrow 2- and release camshaft.
- Remove camshaft clamp - T40271/1- .

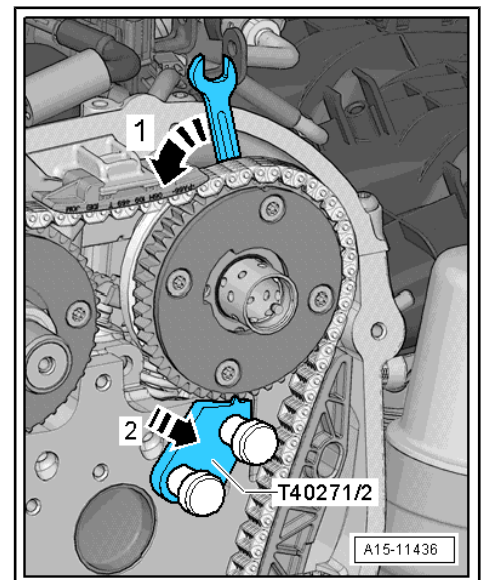


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Move guide rail -2- upwards and screw in bolt -1-.



- Turn inlet camshaft in direction of -arrow 1- and slide camshaft clamp - T40271/2- out of teeth on chain sprocket in direction of -arrow 2- and release camshaft.
- Remove camshaft clamp - T40271/2- .



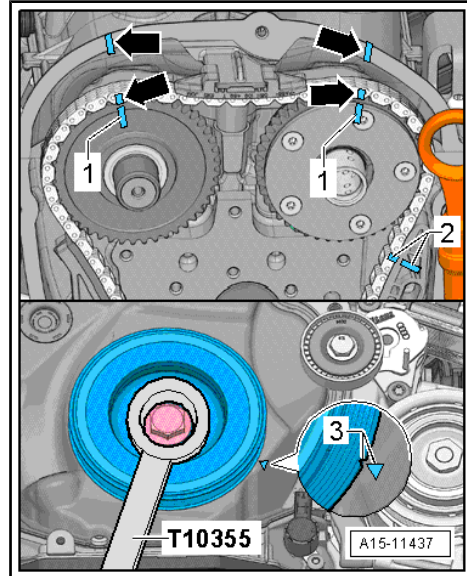


- Check valve timing; markings on camshaft timing chain and cylinder head -arrows- must align with markings on chain sprockets -1-.
- Markings on camshaft timing chain and on guide rail for camshaft timing chain -2- must be opposite one another.
- Notch on vibration damper must align with marking on cover for timing chain (bottom) -3-.

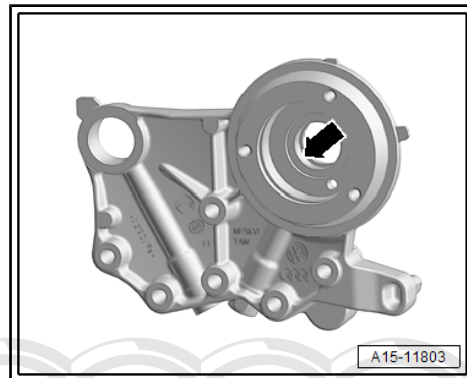


**Note**

If the markings you have made are no longer visible, check the valve timing ⇒ [page 120](#) .



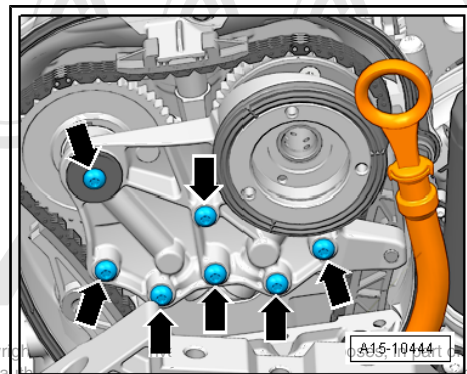
- Lubricate hole -arrow- with engine oil.



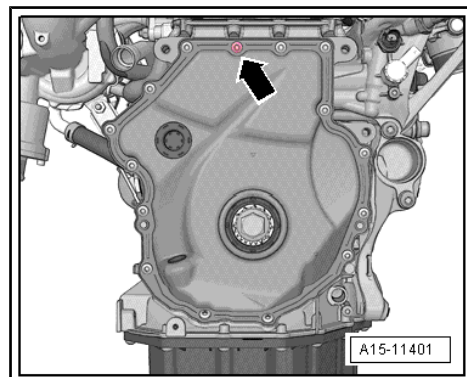
**WARNING**  
*Risk of damage to bearing saddle.*  
 ♦ *Detach bearing saddle carefully without tilting it.*

- Attach bearing saddle and screw in bolts -arrows- hand-tight.
- Depending on version, remove locking pin - T40011- or locking tool - T40267- .
- Tighten bolts -arrows- for bearing saddle ⇒ [page 101](#) .
- Screw in bolt -arrow-.
- Install timing valve ⇒ [Item 6 \(page 101\)](#) .
- Install high-pressure pump ⇒ [page 342](#) .
- Install vacuum pump ⇒ Rep. gr. 47 .
- Install ignition coils ⇒ [page 392](#) .

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



Protected by copyright. All rights reserved. In whole, is not permitted unless a separate agreement has been reached with Audi AG. Audi AG accepts any liability with respect to the correctness of information in this document. Copyright by AUDI AG.





### 5.3 Exploded view - valve gear, engine codes BZB, CAWB, CBFA, CCTA, CDA, CCZA

#### 1 - Exhaust valve

- Do not machine, only grinding-in is permitted
- Valve dimensions  
⇒ [page 195](#)
- Checking valve guides  
⇒ [page 217](#)

#### 2 - Cylinder head

#### 3 - Valve guide

- Checking ⇒ [page 217](#)

#### 4 - Valve stem oil seal

- Renewing: with cylinder head installed  
⇒ [page 209](#), with cylinder head removed  
⇒ [page 213](#)

#### 5 - Valve spring

#### 6 - Valve spring plate

#### 7 - Valve cotters

#### 8 - Hydraulic compensation element

- With roller rocker finger
- Do not interchange
- Lubricate contact surface

#### 9 - Exhaust camshaft

- Removing and installing  
⇒ [page 195](#)
- Check radial clearance with Plastigage (roller rocker fingers removed)
- Radial clearance: 0.024 ... 0.066 mm
- Runout: max. 0.04 mm

#### 10 - Cylinder head cover

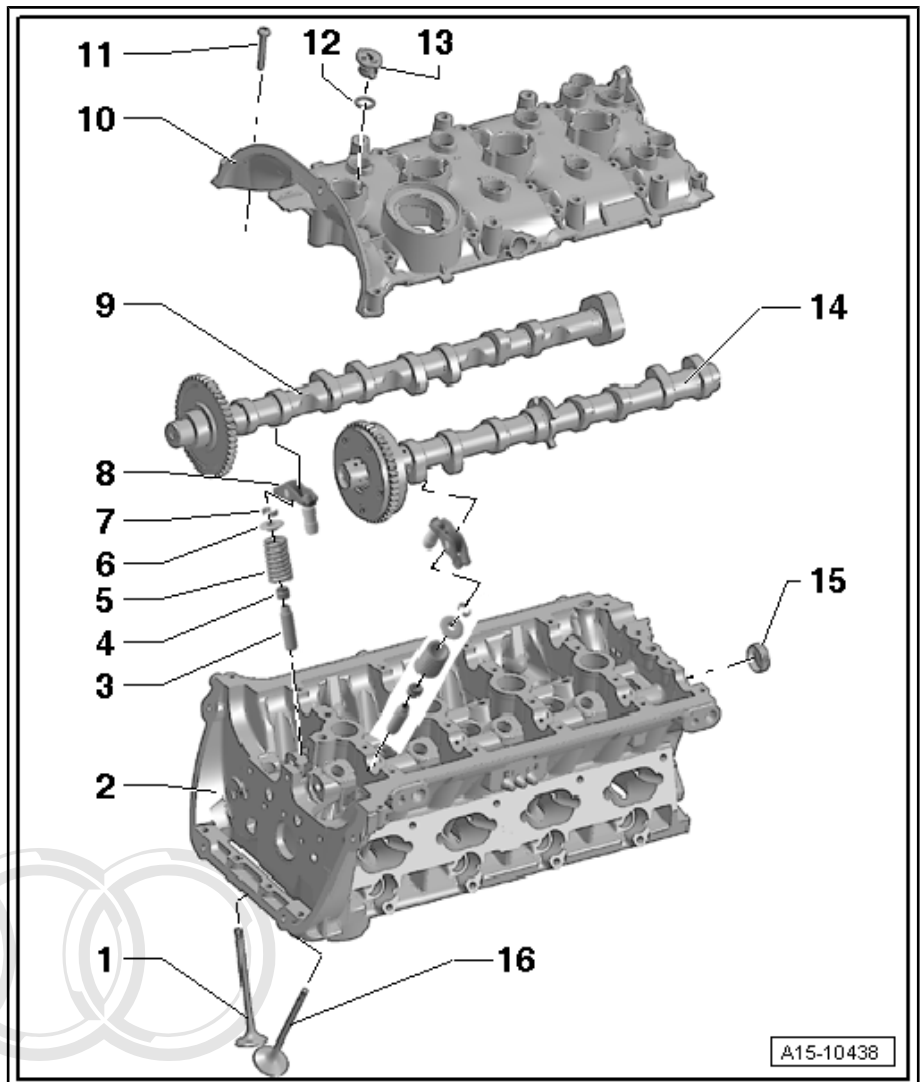
- With integrated camshaft bearings
- Clean sealing surface, machining not permitted
- Remove old sealant residues

#### 11 - Bolt

- Renew
- Slackening ⇒ [page 194](#)
- Use old bolts when measuring radial clearance
- Tightening sequence ⇒ [page 194](#)

#### 12 - O-ring

- Renew
- Lubricate 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 this technical document. Copyright by AUDI AG.



### 13 - Sealing plug

### 14 - Inlet camshaft

- Removing and installing ⇒ [page 195](#)
- Check radial clearance with Plastigage (roller rocker fingers removed)
- Radial clearance: 0.024 ... 0.066 mm
- Runout: max. 0.04 mm

### 15 - Sealing cap

- Renew
- Removing sealing cap with cylinder head cover installed: pierce on one side with an awl and pry out
- Installing ⇒ [page 206](#)

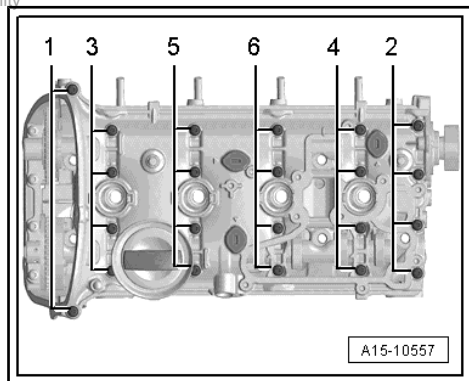
### 16 - Inlet valve

- Do not machine, only grinding-in is permitted
- Valve dimensions ⇒ [page 195](#)
- Checking valve guides ⇒ [page 217](#)

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 the accuracy of information in this document. Copyright by AUDI AG.

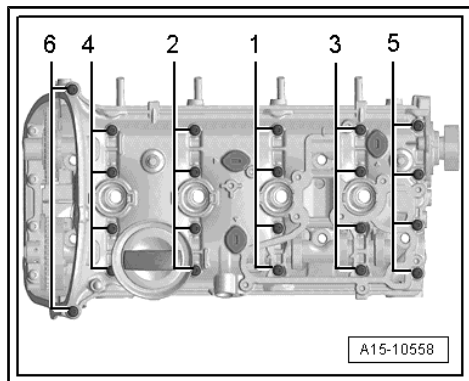
### Loosening cylinder head cover

- Loosen cylinder head cover bolts in the sequence 1 ... 6.



### Tightening sequence for cylinder head cover

- Renew bolts.
- 1. Fit bolts in the sequence -1 ... 6- and hand-tighten in several stages.
- 2. Tighten bolts in the sequence -1 ... 6- to 8 Nm using torque wrench.
- 3. Turn 90° further in the sequence -1 ... 6- using a rigid wrench.



### Note

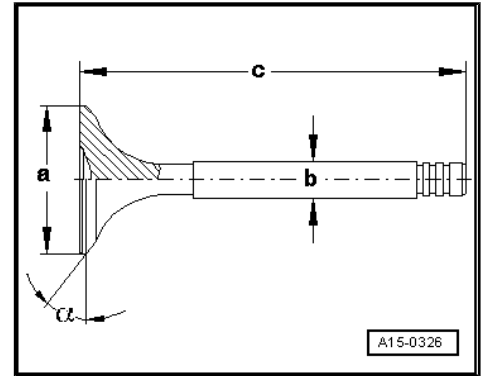
*Take care to keep cylinder head cover straight.*

Valve dimensions

**i** Note

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

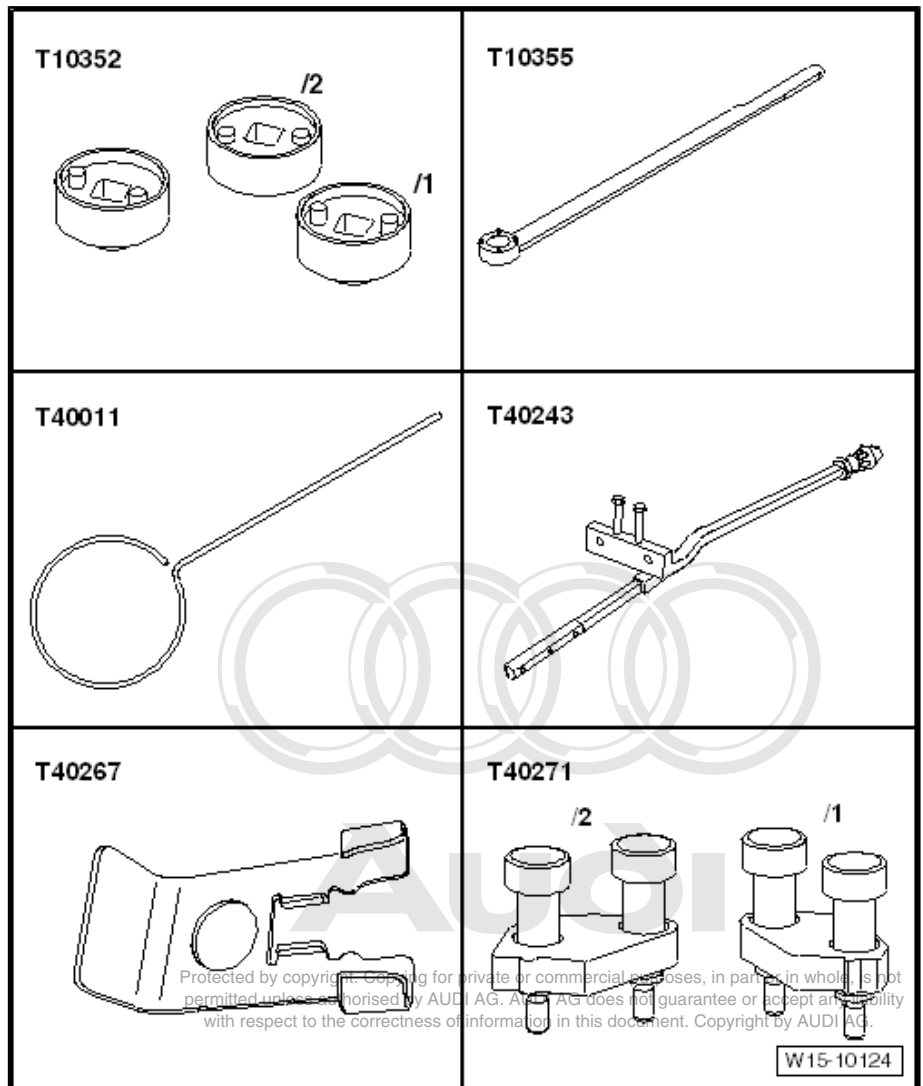
Dimension		Inlet valve	Exhaust valve
∅ a	mm	33.85 + 0.10	28.0 + 0.1
∅ b	mm	5.98 + 0.01	5.96 + 0.01
c	mm	104.0 + 0.2	101.9 + 0.2
α	∠°	45	45



5.4 Removing and installing camshafts, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA

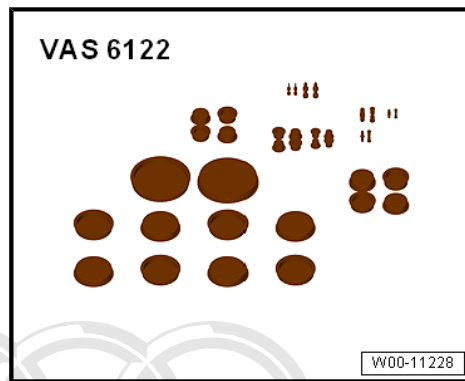
Special tools and workshop equipment required

- ◆ Assembly tool - T10352-
- ◆ Counterhold tool - T10355-
- ◆ Locking pin - T40011-
- ◆ Assembly lever - T40243-
- ◆ Locking tool - T40267-
- ◆ Camshaft clamp - T40271-

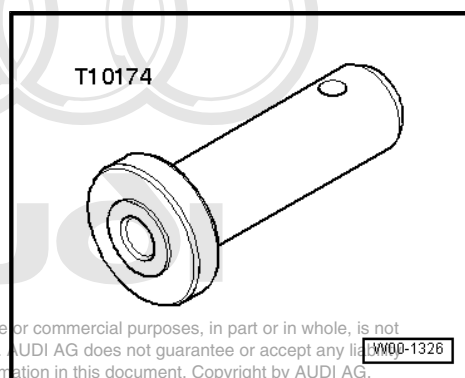




- ◆ Engine bung set - VAS 6122-



- ◆ Thrust piece - T10174-



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

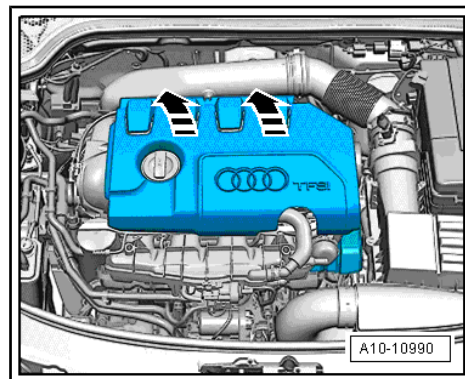


#### Note

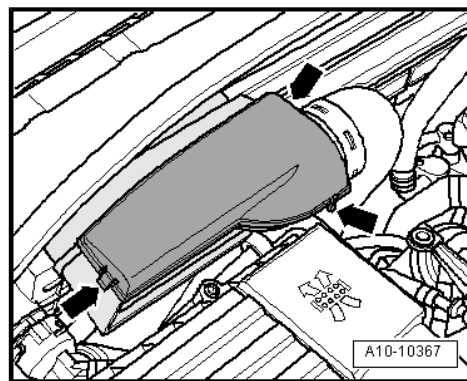
- ◆ *Sealing surfaces at bottom of cylinder head cover and top of cylinder head must not be machined.*
- ◆ *The camshaft bearings are integrated into the cylinder head and cylinder head cover. The timing chain must be slackened before removing the cylinder head cover.*
- ◆ *Renew sealing cap ⇒ [Item 15 \(page 194\)](#) if cylinder head cover has been detached.*
- ◆ *Fit cable ties in the original positions when installing.*

### Removing

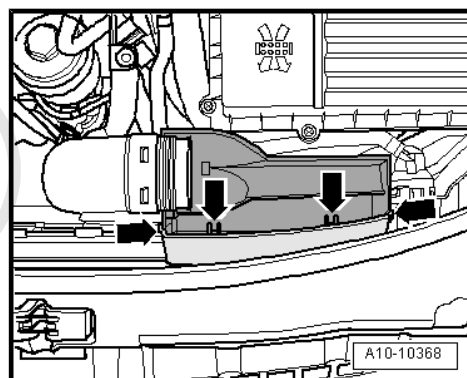
- Remove engine cover panel -arrows-.



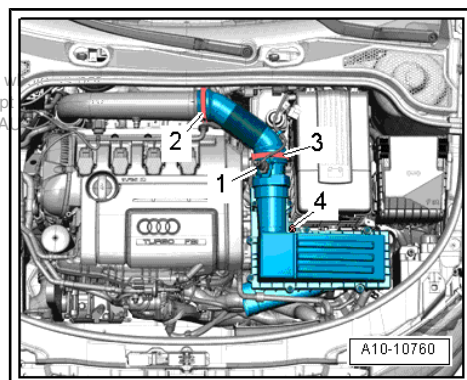
- Pull cover off air duct (release clips on sides) -arrows-.



- Unclip air duct at the bottom by releasing clips -arrows-.
- Detach air duct at bottom together with air hose.



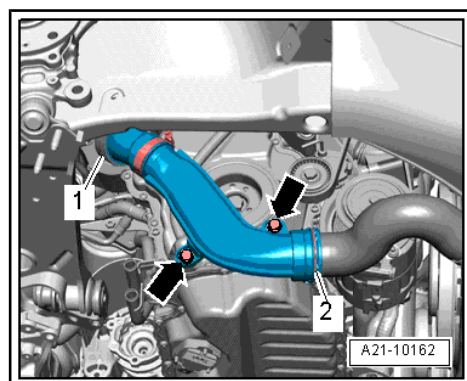
- Unplug electrical connector -1- at air mass meter - G70- .
- Detach air hose -2-.
- Unscrew bolt -4- and remove air cleaner housing.



**i** Note

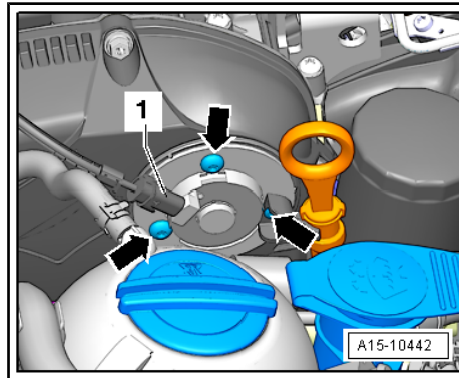
-Item 3- can be disregarded.

- Remove bolts -arrows-.
- Remove air pipe (lift clips -items 1 and 2-).



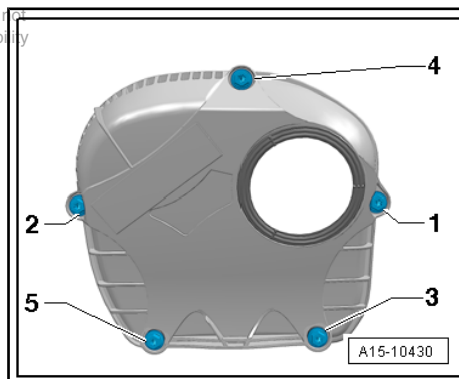


- Detach connector from camshaft control valve 1 - N205- -1-.
- Unscrew bolts -arrows- and remove camshaft control valve 1 - N205- .



- Unscrew bolts -1 to 5- and remove timing chain cover (top).

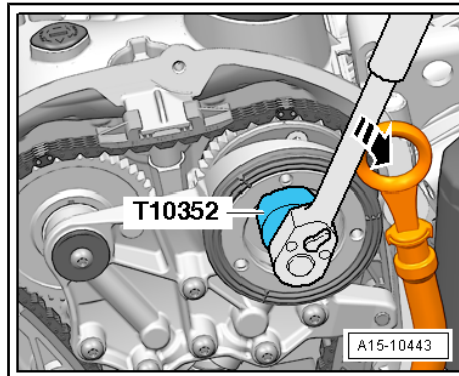
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



**Caution**

*The timing valve has a left-hand thread.*

- Depending on version, turn assembly tool - T10352- or assembly tool - T10352/1A- in direction of -arrow- to remove timing valve.



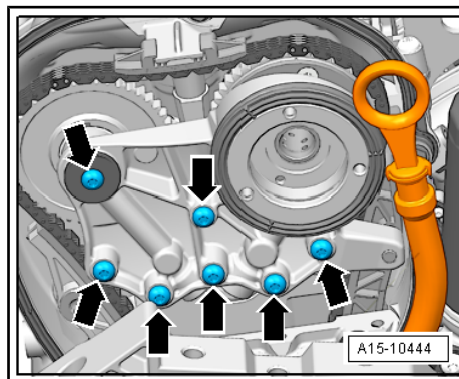
- Remove bolts -arrows-.

**WARNING**

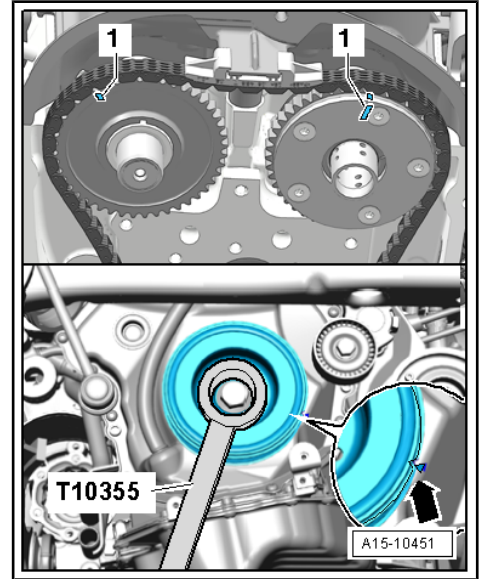
*Risk of damage to bearing saddle.*

◆ *Detach bearing saddle carefully without tilting it.*

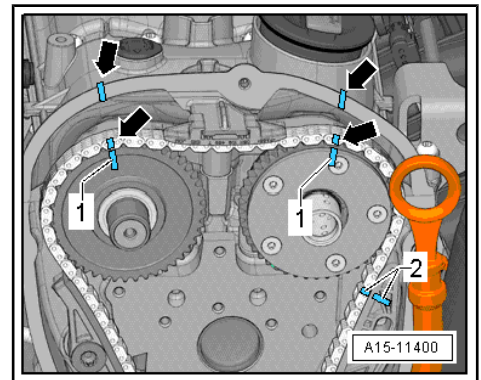
- Detach bearing saddle.



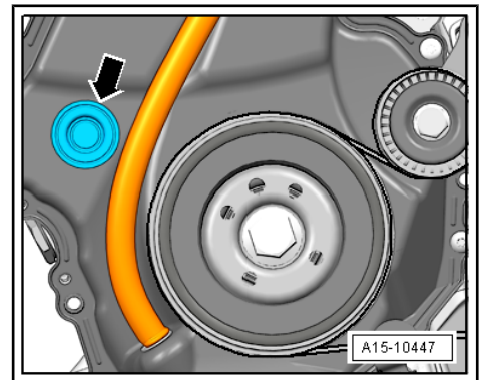
- Turn vibration damper to "TDC" position using counterhold tool - T10355- .
- Notch on vibration damper and marking on cover for timing chains (bottom) must be aligned -arrow-.
- The markings -1- on the camshafts must face upwards.



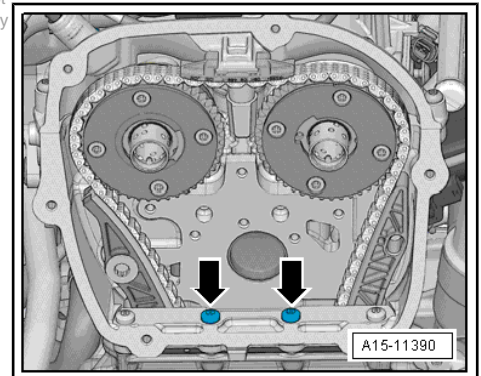
- Use a waterproof pen to mark camshaft timing chain and cylinder head -arrows- relative to markings on chain sprockets -1-.
- Use a waterproof pen to mark camshaft timing chain relative to guide rail of timing chain -2- as well.



- Remove sealing plug -arrow-.

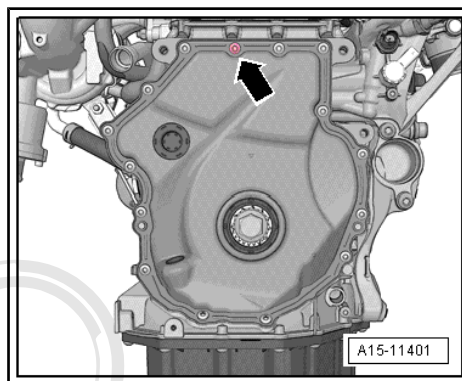


- Remove bolts -arrows- Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.





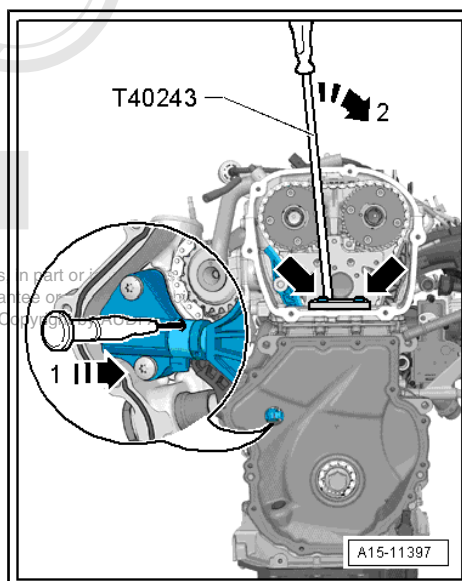
- If fitted, remove bolt -arrow-.



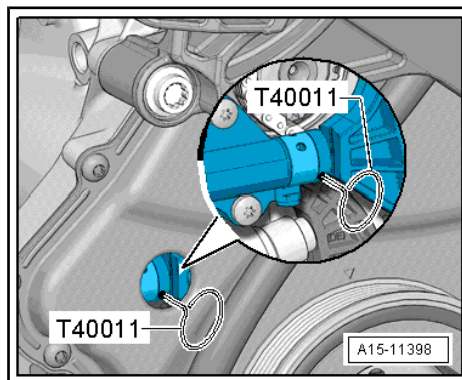
Depending on version, 2 different chain tensioners may be installed.

### Version 1

- Screw in assembly lever - T40243- -arrows-.
- Lift locking element for chain tensioner; to do so, insert scribe or suitable screwdriver in hole of chain tensioner in direction of -arrow 1-, press assembly lever - T40243- slowly in direction of -arrow 2- and hold in place.



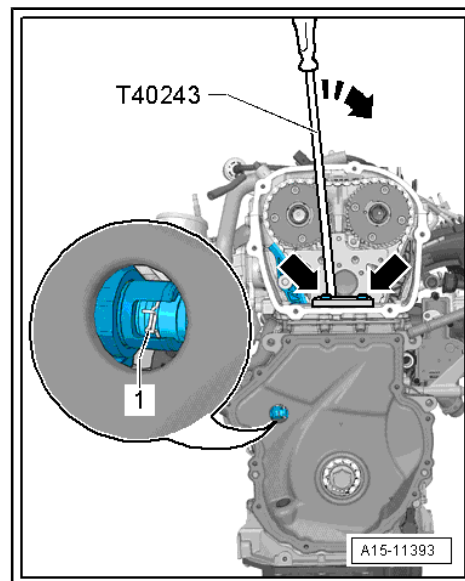
- Hold chain tensioner in position with locking pin - T40011- .



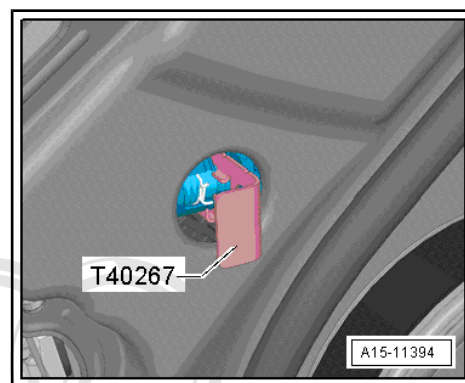


**Version 2**

- Screw in assembly lever - T40243- -arrows-.
- Compress circlip -arrow- for chain tensioner, press assembly lever - T40243- slowly in direction of -arrow- and hold in place.

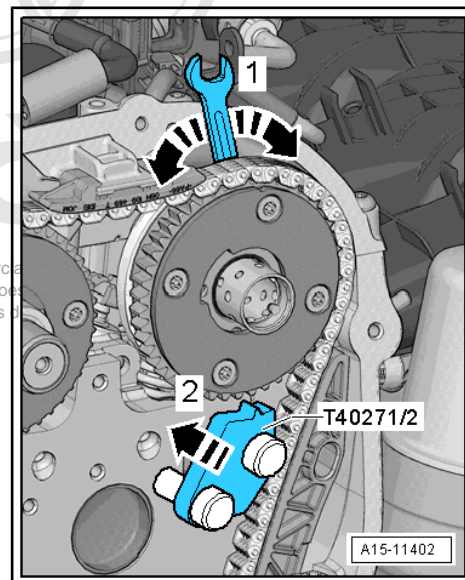


- Hold chain tensioner in position with locking tool - T40267- .



**All versions**

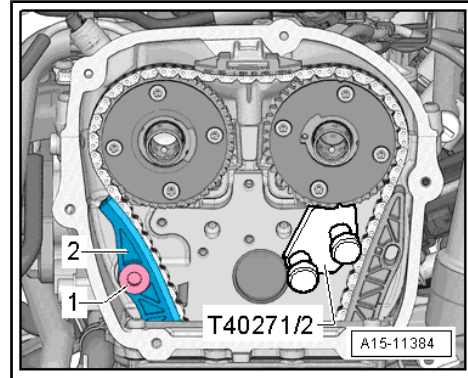
- Remove assembly lever - T40243- .
- Bolt camshaft clamp - T40271/2- onto cylinder head and slide into teeth on chain sprocket in direction of -arrow 2-; if necessary, use spanner to turn inlet camshaft in direction of -arrow 1-.



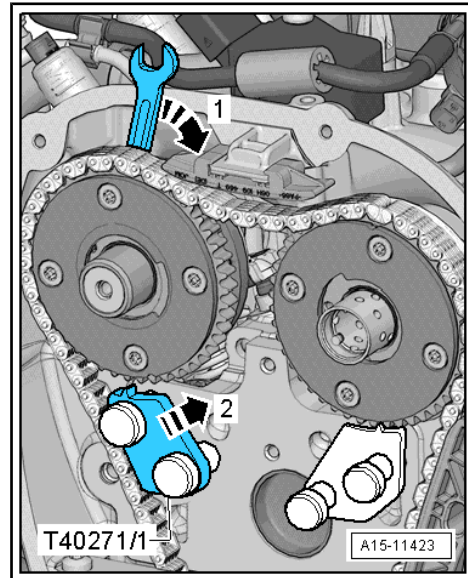
Protected by copyright. Copying for private or commercial use is not permitted unless authorised by AUDI AG. AUDI AG does not accept any liability with respect to the correctness of information in this document.



- Remove bolt -1- and guide tensioning rail -2- downwards.



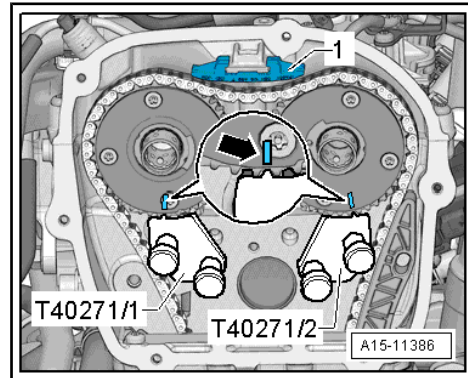
- Bolt camshaft clamp - T40271/1- onto cylinder head.
- Use spanner to turn exhaust camshaft in direction of -arrow 1- and slide camshaft clamp - T40271/1- into teeth on chain sprocket in direction of -arrow 2-.



**Note**

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted. Audi hereby disclaims any liability for errors or omissions in this document. Copyright by AUDI AG.

- ◆ **Mark camshafts relative to camshaft clamp - T40271/1- and camshaft clamp - T40271/2-**
- ◆ *If using new camshafts: Transfer markings made on old camshafts onto new camshafts.*
- ◆ *It will take much more time to install the new camshafts if the markings are not applied.*
- Mark camshaft chain sprockets relative to camshaft clamp - T40271/1- and camshaft clamp - T40271/2- -arrows-.
- Use screwdriver to release catch and press off top guide rail -1- forwards.
- Remove camshaft timing chain from camshaft sprockets.

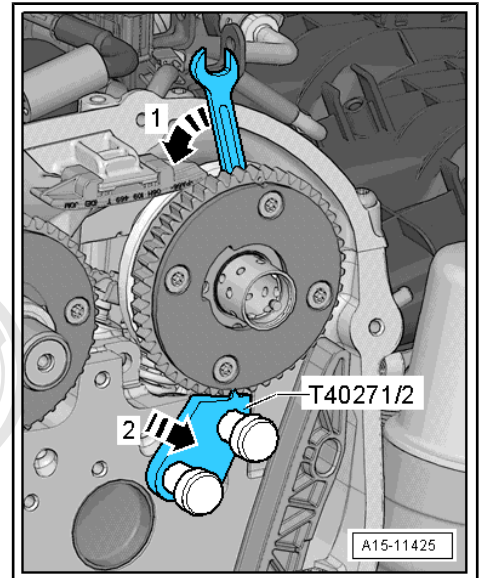


**Caution**

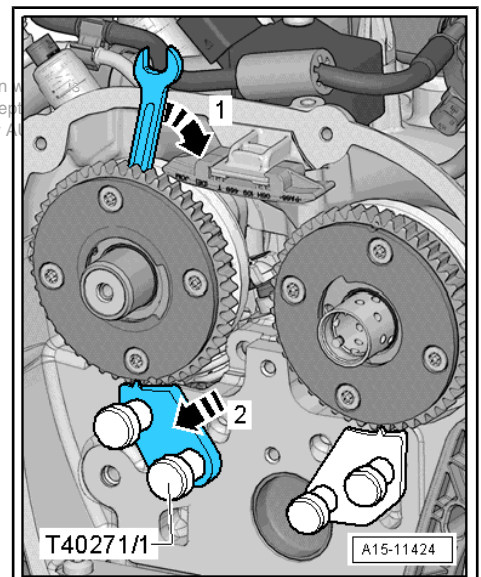
**Risk of damage to valves and piston crowns.**

- ◆ **Do not turn the crankshaft after the camshaft timing chain has been removed from the cylinder head.**

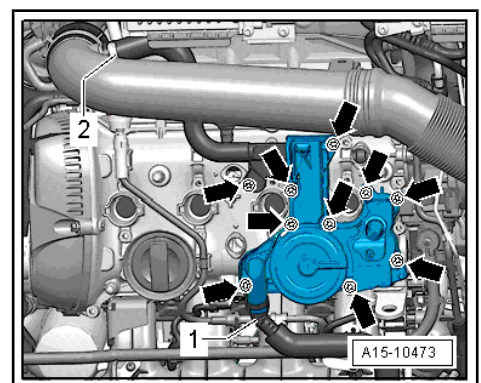
- Use spanner to turn inlet camshaft in direction of -arrow 1- and slide camshaft clamp - T40271/2- out of teeth on chain sprocket in direction of -arrow 2- and move camshaft into rest position.



- Use spanner to turn exhaust camshaft in direction of -arrow 1- and slide camshaft clamp - T40271/1- out of teeth on chain sprocket in direction of -arrow 2- and move camshaft into rest position.
- Remove ignition coils => [page 392](#) .

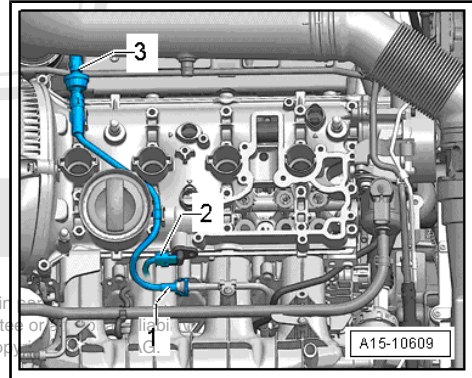


- Disconnect crankcase breather hoses -1 and 2-.
- Remove bolts -arrows- and detach crankcase breather.



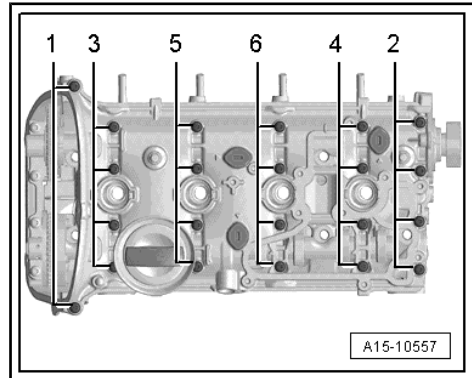


- Detach lines -1 and 3-
- Unplug electrical connector -2- from Hall sender - G40- .
- Remove high-pressure pump ⇒ [page 342](#) .
- Remove vacuum pump ⇒ Rep. gr. 47 .



Protected by copyright. Copying for private or commercial purposes, in whole or in part, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or assume any liability with respect to the correctness of information in this document. Copyright © 2016 Audi AG

- Remove cylinder head cover bolts in the sequence -1 ... 6-
- Detach cylinder head cover.
- Detach camshafts.



**Caution**

*Protect lubrication system and bearings against contamination.*

- ◆ *Cover exposed parts of the engine.*

**Installing**

- Tightening torques  
⇒ ["5.3 Exploded view - valve gear, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA"](#), page 193



**Note**

- ◆ *The sealing surfaces must be free of oil and grease.*
- ◆ *Ensure that all roller rocker fingers contact the valve ends correctly.*
- ◆ *Silicone sealant: ⇒ Electronic parts catalogue .*
- ◆ *Note the expiry date of the silicone sealant.*
- ◆ *The cover must be installed within 5 minutes after applying the silicone sealant.*

- Remove sealant remaining on cylinder head with flat scraper.



**WARNING**

*Risk of eye injury.*

- ◆ *Put on safety goggles.*

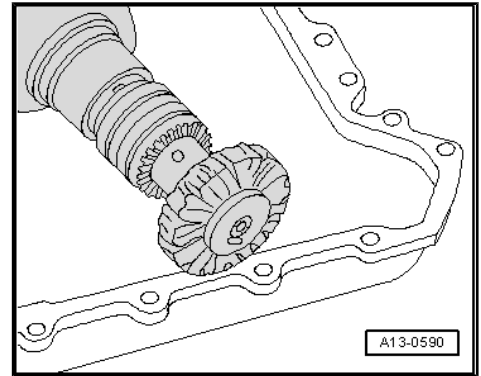


**Caution**

*Protect lubrication system and bearings against contamination.*

- ◆ *Cover exposed parts of the engine.*

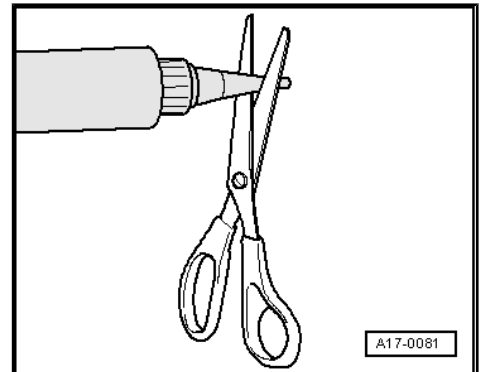
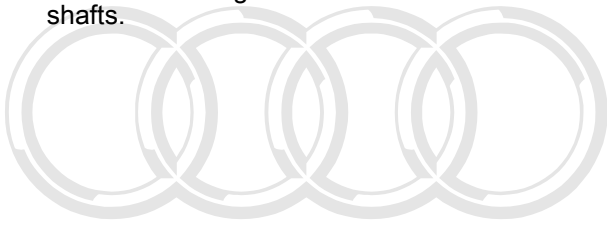
- Remove sealant residue in groove of cylinder head cover and on sealing surfaces, e.g. using a rotating plastic brush.
- Clean sealing surfaces; they must be free of oil and grease.



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

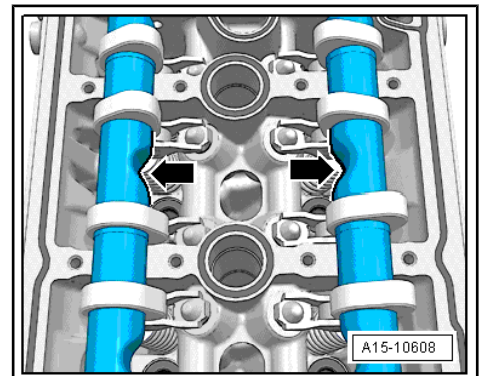
**On new camshafts**

- Transfer markings made on old camshafts onto new camshafts.



**All vehicles:**

- Oil running surfaces of both camshafts.
- Fit camshafts in cylinder head, recesses -arrows- must face each other.



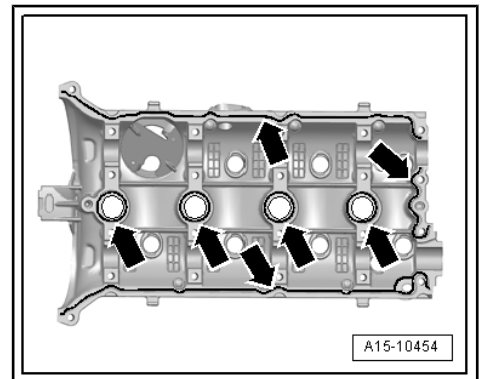
- Renew bolts for cylinder head cover.

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.

- Apply silicone sealant onto clean sealing surface of cylinder head cover, as illustrated -arrows-.
- ◆ Thickness of sealant bead: 2 ... 3 mm.

**i Note**

- ◆ *The cylinder head cover must be installed within 5 minutes after applying the silicone sealant.*
- ◆ *The bead of sealant must not be thicker than specified, otherwise excess sealant can enter the sump and obstruct the strainer in the oil intake pipe.*
- ◆ *Note the use-by date of the sealant.*



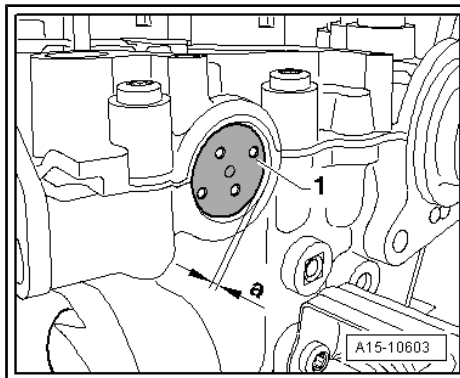
Sealant ⇒ Electronic parts catalogue

- Tighten bolts in several stages; tightening sequence ⇒ [page 194](#).



Note

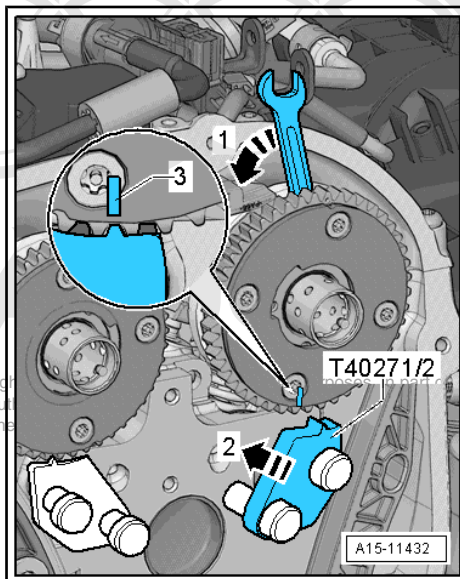
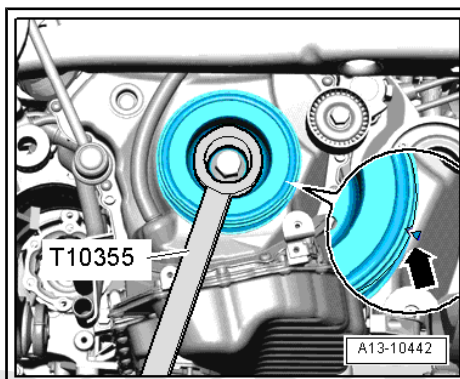
- ◆ Take care to keep cylinder head cover straight.
- ◆ Use thrust piece - T10174- to drive in sealing cap -1- (do not apply sealant).
- ◆ -a-: 1 ... 2 mm



WARNING

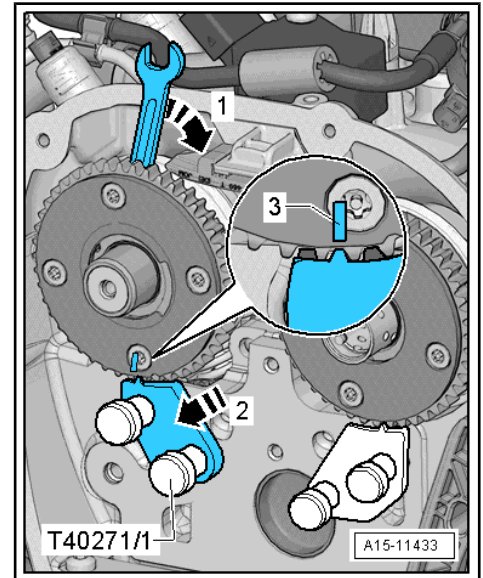
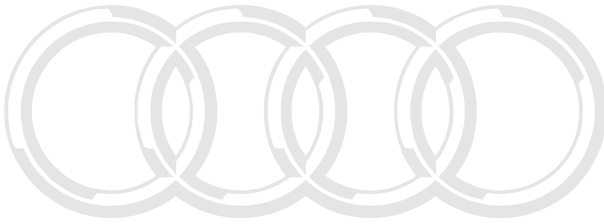
Make sure that components are not damaged by the timing chain when rotating the crankshaft.

- Turn vibration damper to "TDC" position -arrow- using counterhold tool - T10355- .
- Notch on vibration damper must align with arrow marking on cover for timing chains (bottom).
- Turn inlet camshaft in direction of -arrow 1- until marking -3- aligns with camshaft clamp - T40271/2- .
- Slide camshaft clamp - T40271/2- into teeth of chain sprocket in direction of -arrow 2-.



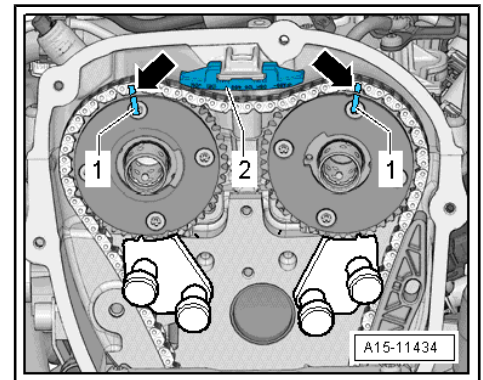
Protected by copyright. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of Audi AG.

- Turn exhaust camshaft in direction of -arrow 1- until marking -3- aligns with camshaft clamp - T40271/1- .
- Slide camshaft clamp - T40271/1- into teeth of chain sprocket in direction of -arrow 2-.

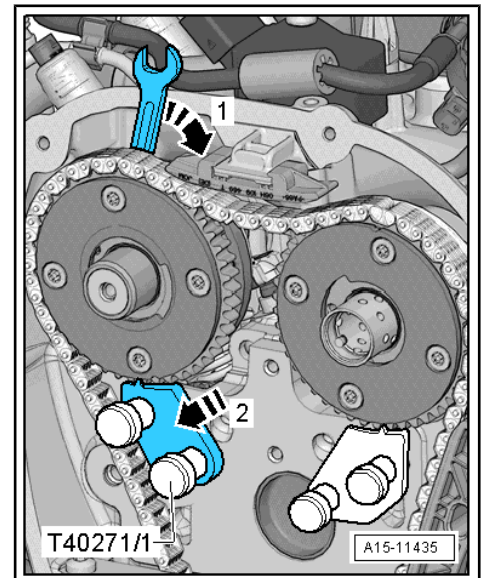


- Fit timing chain; to do so, position markings on chain links -arrows- at markings on chain sprockets -1-.
- Install top guide rail -2-.

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.

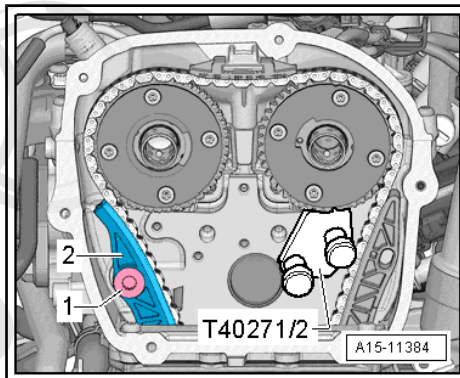


- Turn exhaust camshaft in direction of -arrow 1- and slide camshaft clamp - T40271/1- out of teeth on chain sprocket in direction of -arrow 2- and release camshaft.
- Remove camshaft clamp - T40271/1- .

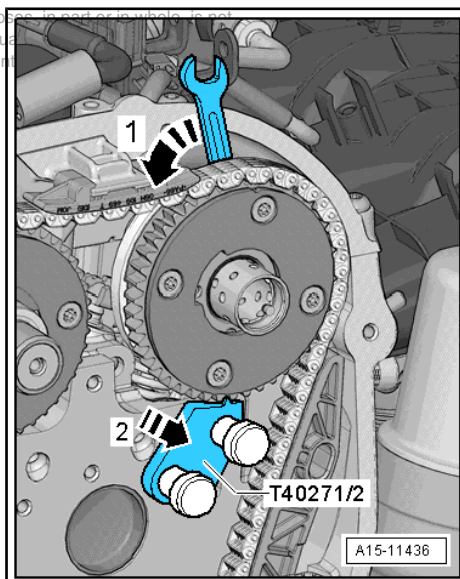




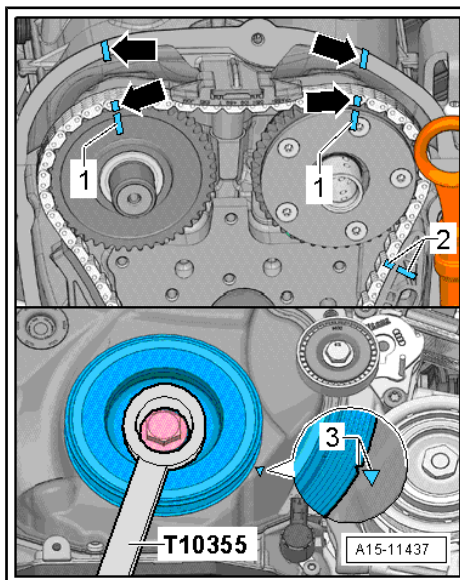
- Move guide rail -2- upwards and screw in bolt -1-.



- Turn inlet camshaft in direction of -arrow 1- and slide camshaft clamp - T40271/2- out of teeth on chain sprocket in direction of -arrow 2- and release camshaft.
- Remove camshaft clamp - T40271/2- .



- Check valve timing; markings on camshaft timing chain and cylinder head -arrows- must align with markings on chain sprockets -1-.
- Markings on camshaft timing chain and on guide rail for camshaft timing chain -2- must be opposite one another.
- Notch on vibration damper must align with marking on cover for timing chain (bottom) -3-.

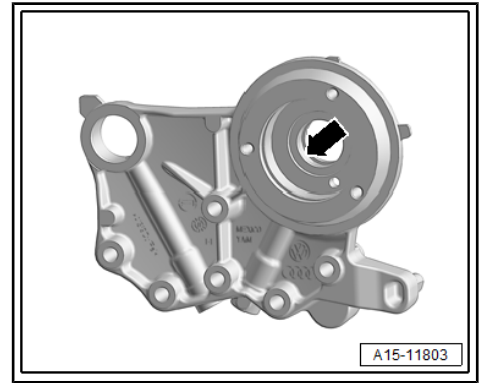


**Note**

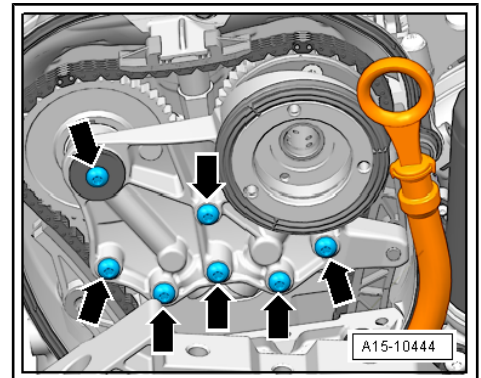
*If the markings you have made are no longer visible, check the valve timing ⇒ [page 120](#) .*



- Lubricate hole -arrow- with engine oil.



**WARNING**  
*Risk of damage to bearing saddle.*  
 ♦ *Detach bearing saddle carefully without tilting it.*

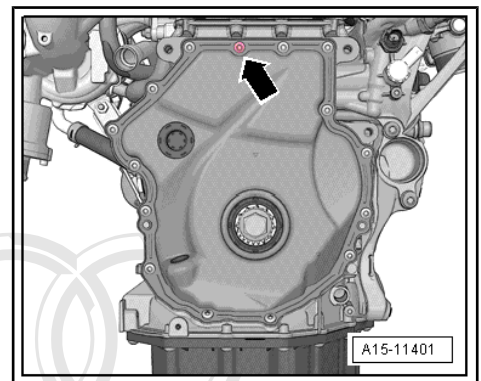


- Attach bearing saddle and screw in bolts -arrows- hand-tight.
- Depending on version, remove locking pin - T40011- or locking tool - T40267- .
- Tighten bolts -arrows- for bearing saddle ⇒ [page 101](#) .

- Screw in bolt -arrow-.
- Install timing valve ⇒ [Item 6 \(page 101\)](#) .

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

- Install vacuum pump ⇒ Rep. gr. 47 .
- Install high-pressure pump ⇒ [page 342](#) .
- Install ignition coils ⇒ [page 392](#) .
- Install timing chain cover (top) ⇒ [page 93](#) .
- Install air cleaner housing ⇒ [page 329](#) .



## 5.5 Renewing valve stem oil seals with cylinder head installed

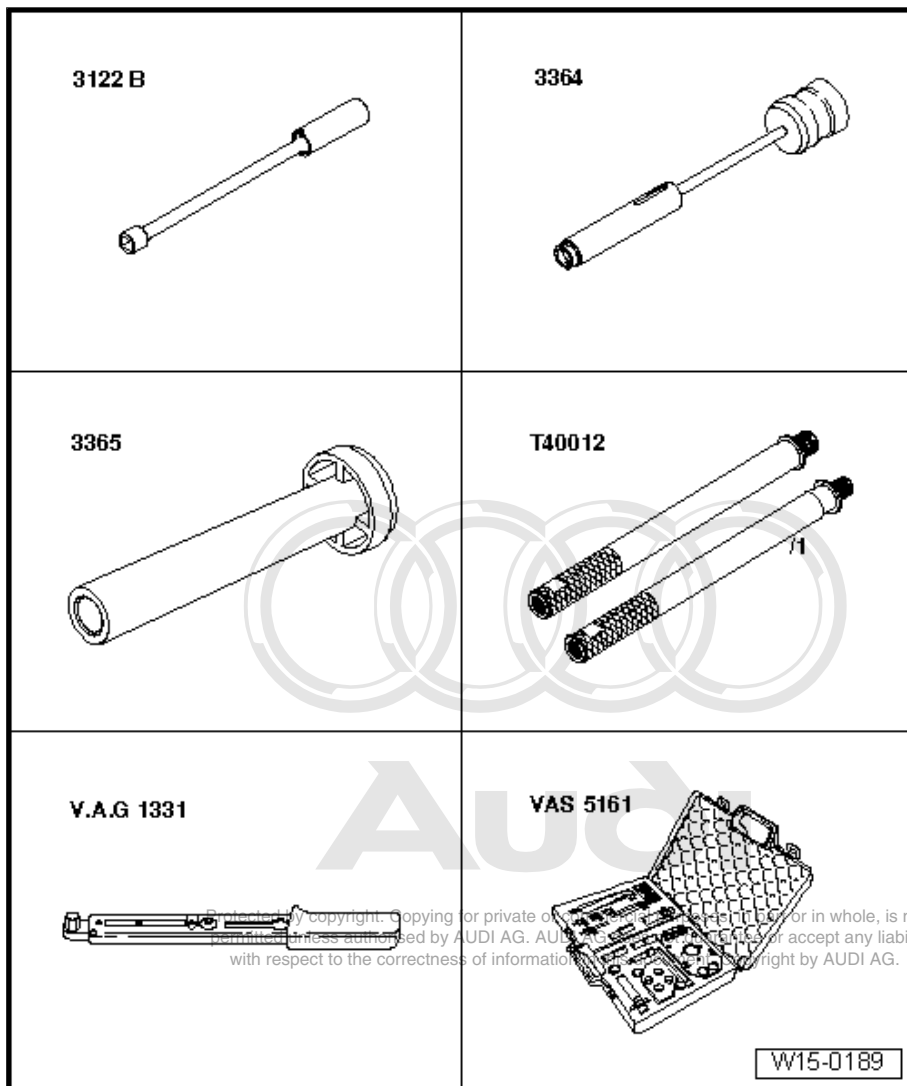


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



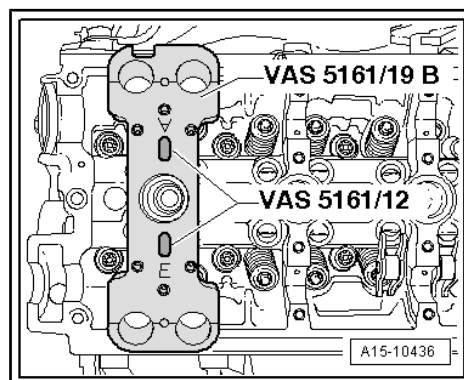
**Special tools and workshop equipment required**

- ◆ Spark plug spanner - 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-

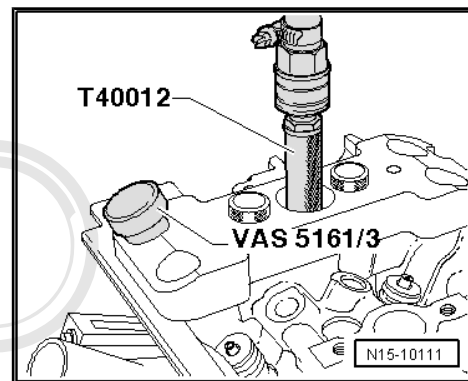


**Removing valve stem oil seals**

- Remove camshafts: engine codes BYT, BPU ⇒ [page 178](#) ; engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA ⇒ [page 195](#) .
- Carefully remove roller rocker fingers and place them on a clean surface. When doing so, make sure that roller rocker fingers are not interchanged.
- Remove spark plugs with spark plug spanner - 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 appropriate cylinder to “bottom dead centre”.

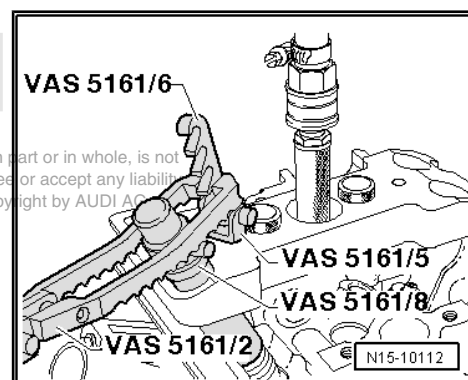


- Screw adapter - T40012- into spark plug thread.
- Connect to compressed air supply of at least 6 bar.
- Knock loose sticking valve cotters using punch - VAS 5161/3- and a plastic-headed hammer.



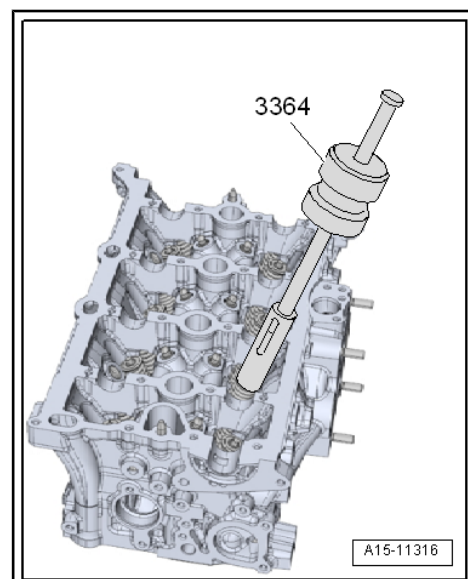
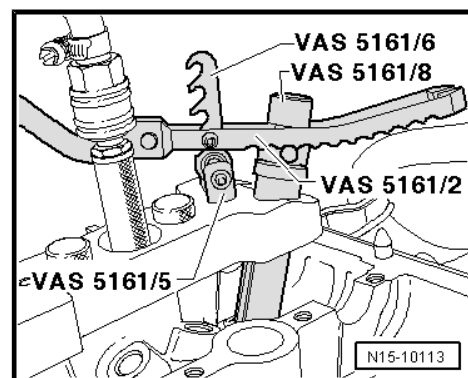
#### For inlet side

- 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- .



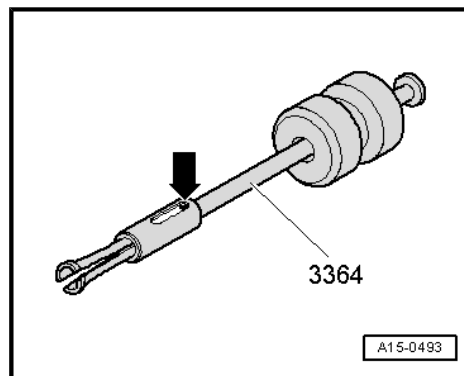
#### For exhaust side

- 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- .

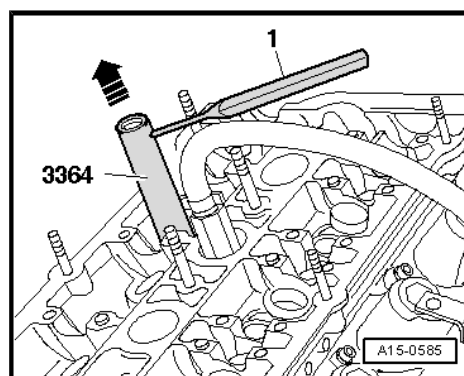




- If valve stem seal puller - 3364- cannot be used on account of restricted space, knock out pin -arrow- with a punch and remove the impact extractor attachment.



- 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

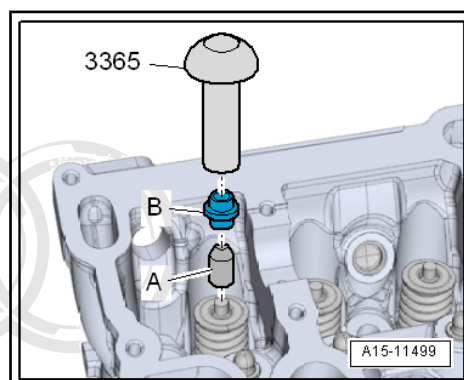


#### Caution

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

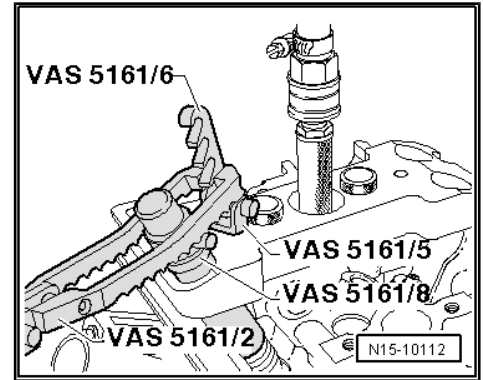
- ◆ **New valve stem oil seals -B- are supplied with plastic sleeve; fit plastic sleeve -A- onto valve stem.**

- To prevent damage to the new valve stem seals -B-, attach plastic sleeve -A- to 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.
- Insert valve spring and valve spring plate.
- Set up removal and installation device for valve cotters - VAS 5161- as shown.

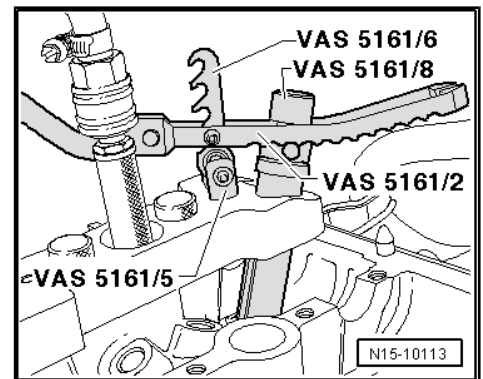


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

For inlet side

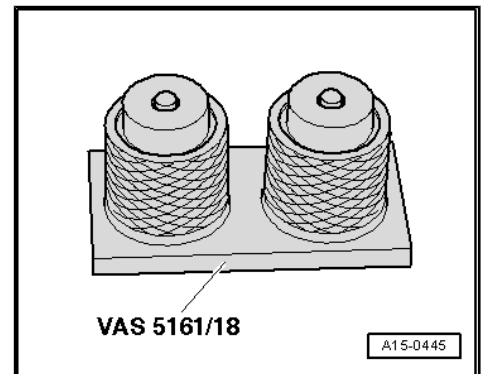


For exhaust side



**i** 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- using pressure fork - VAS 5161/2- . Turn knurled screw of assembly cartridge back and forth while pulling upwards.
- Release pressure fork - VAS 5161/2- with knurled screw in pulled position.
- Detach removal and installation device for valve cotters - VAS 5161- .



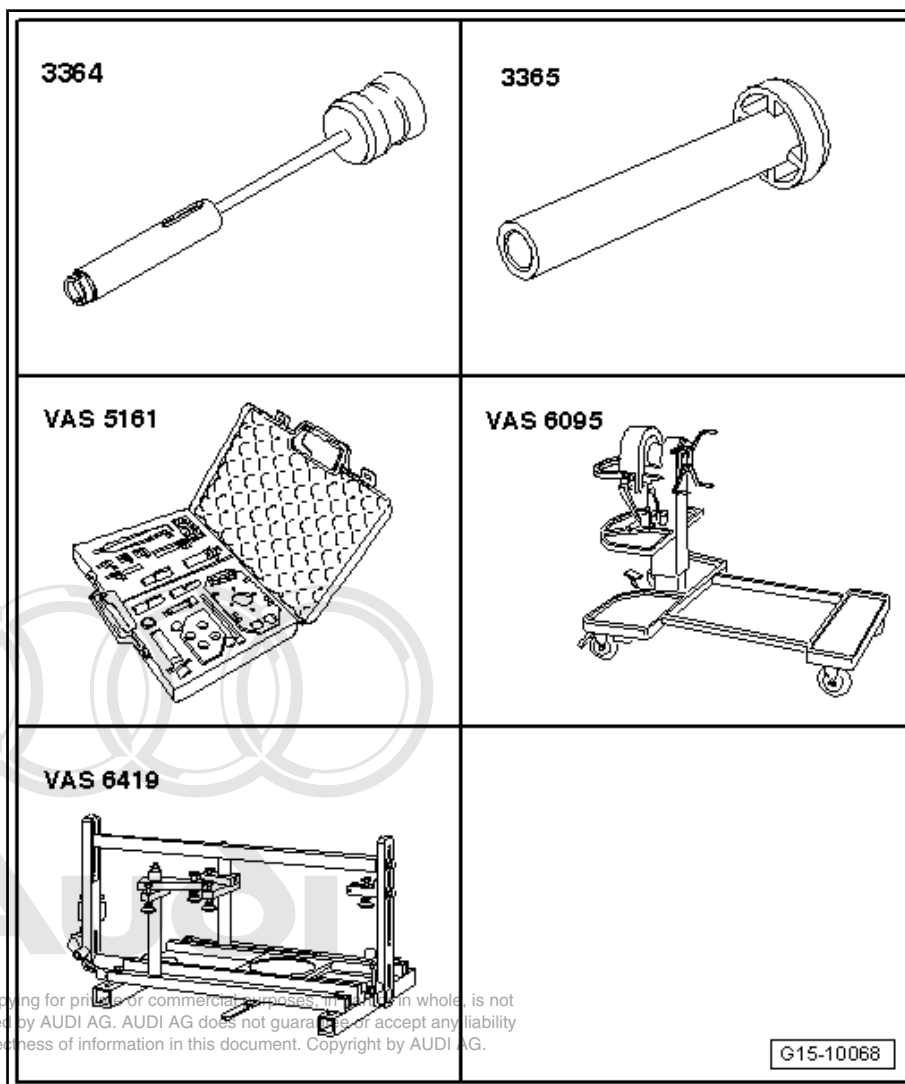
Further assembly is basically carried out in reverse order of dismantling.

- Install camshafts: engine codes BYT, BPU => [page 178](#) ; engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA => [page 195](#) .

## 5.6 Renewing valve stem oil seals with cylinder head removed

**Special tools and workshop equipment required**

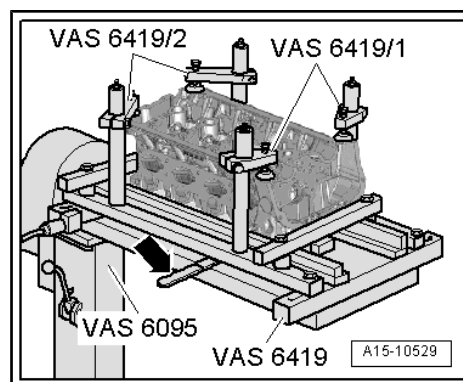
- ◆ Valve stem seal puller - 3364-
- ◆ Valve stem seal fitting tool - 3365-
- ◆ Removal and installation device for valve cotters - VAS 5161-
- ◆ Guide plate for 2.0 ltr. and 3.0 ltr. FSI engine - VAS 5161/19B-
- ◆ Engine and gearbox support - VAS 6095-
- ◆ Cylinder head tensoning device - VAS 6419-



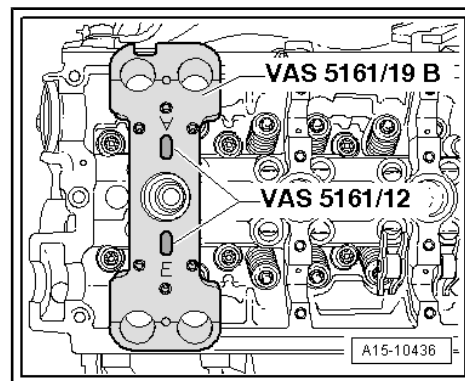
Protected by copyright. Copying for private or commercial purposes, in whole or in part, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

**Procedure**

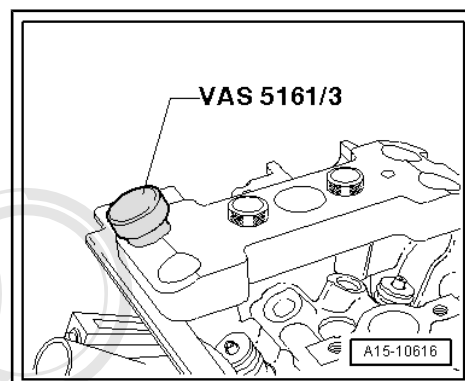
- Remove camshafts ⇒ [page 195](#) .
- Mark original positions of roller rocker fingers and hydraulic compensation elements for re-installation.
- Remove roller rocker fingers together with hydraulic compensation elements and put down on a clean surface.
- Insert cylinder head tensoning device - VAS 6419- into engine and gearbox support - VAS 6095- .
- Secure cylinder head in cylinder head tensoning device - VAS 6419- , as illustrated.
- Connect cylinder head tensoning device - VAS 6419- to compressed air supply.
- 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- .



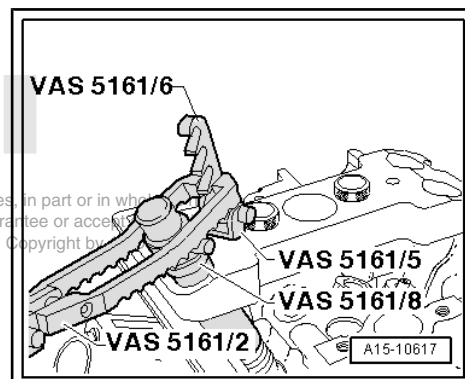
- Apply drift -VAS 5161/3- to guide plate and use plastic-headed hammer to release sticking valve cotters.



- 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.

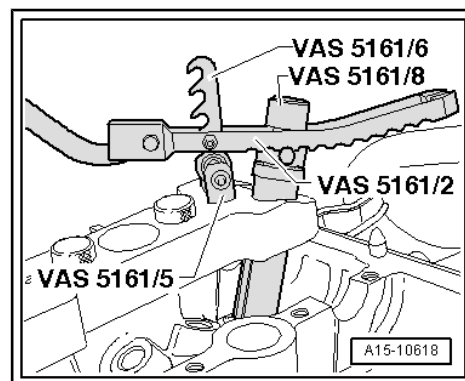


#### Exhaust side:

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

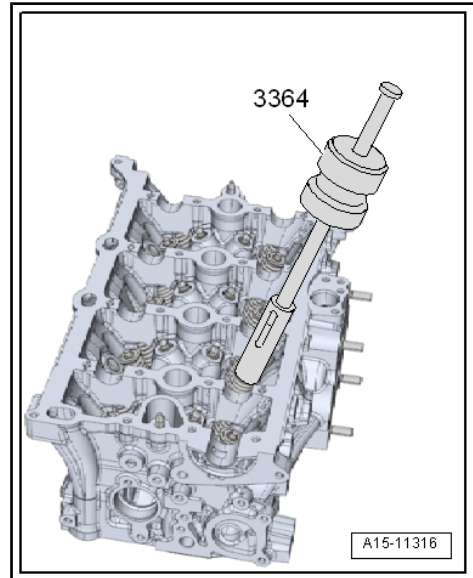
#### Both sides (continued):

- 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.





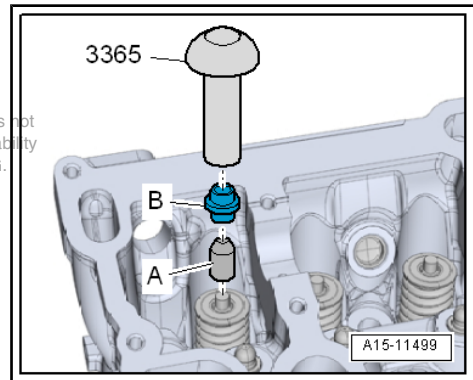
- Pull off valve stem oil seal with valve stem seal puller - 3364- .



**Caution**

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

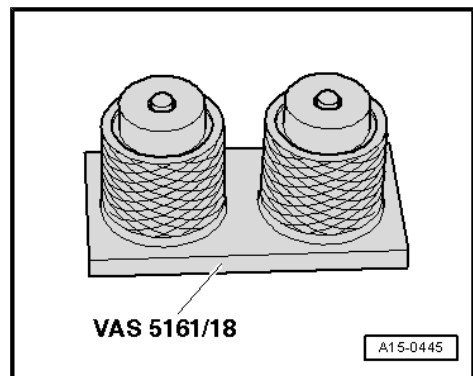
◆ **New valve stem oil seals -B- are supplied with plastic sleeve; fit plastic sleeve -A- onto valve stem.**



- 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:

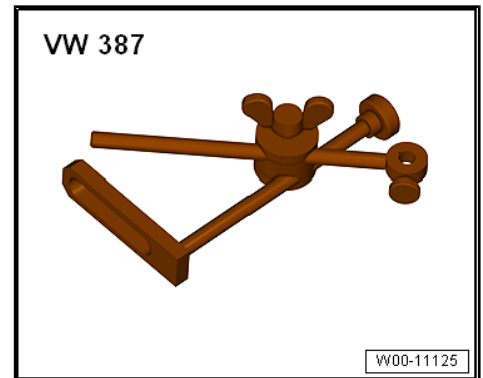
- Install camshafts ⇒ [page 195](#) .



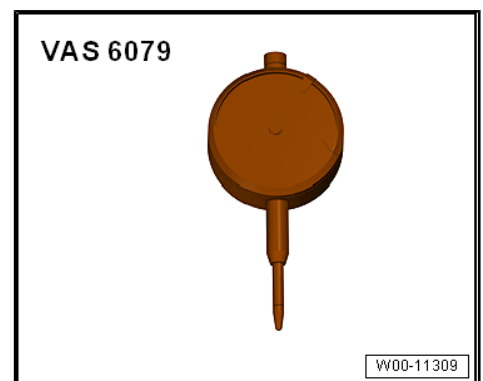
## 5.7 Checking valve guides

### Special tools and workshop equipment required

- ◆ Universal dial gauge bracket - VW 387-



- ◆ Dial gauge - VAS 6079-

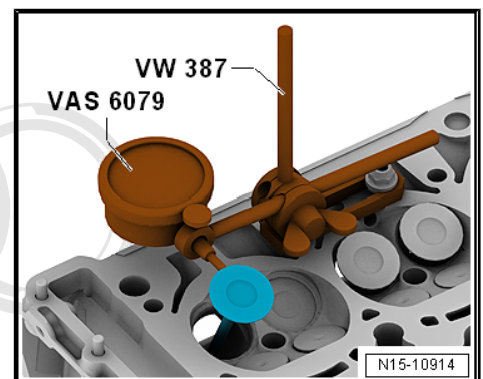


### Test sequence

- Insert valve into guide. End of valve stem must be flush with guide. Only insert inlet valve into inlet valve guide and exhaust valve into exhaust valve guide, as the stem diameters are different.
- Measure the amount of sideways play.

### Wear limit

Inlet valve guide	Exhaust valve guide
0.60 mm	0.60 mm



### Note

- ◆ *If the wear limit is exceeded, repeat the measurement with new valves. Renew cylinder head if wear limit is still exceeded.*
- ◆ *If the valve has to be renewed as part of a repair, use a new valve for the measurement.*



## 17 – Lubrication

### 1 Sump and oil pump

⇒ [“1.1 Exploded view - sump/oil pump”, page 218](#)

⇒ [“1.2 Removing and installing oil level and oil temperature sender G266”, page 222](#)

⇒ [“1.3 Removing and installing coarse oil separator, engine codes BYT, BPU”, page 222](#)

⇒ [“1.4 Removing and installing coarse oil separator, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA”, page 223](#)

⇒ [“1.5 Removing and installing sump \(bottom section\)”, page 223](#)

⇒ [“1.6 Removing and installing oil pump”, page 226](#)

⇒ [“1.7 Removing and installing sump \(top section\)”, page 228](#)

⇒ [“1.8 Removing and installing valve for oil pressure control N428, engine codes CDAA, CCZA”, page 233](#)



#### 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 engine oil cooler to prevent further damage occurring later.*

Check oil pressure ⇒ [page 236](#) .



#### Caution

*Risk of damage to catalytic converter.*

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

### 1.1 Exploded view - sump/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.

**1 - Oil level and oil temperature sender - G266-**

- Only fitted on some engine versions
- Removing and installing  
⇒ ["1.2 Removing and installing oil level and oil temperature sender G266", page 222](#)

**2 - Seal**

- Renew

**3 - Bolt**

- Renew
- Tightening sequence  
⇒ [page 220](#)

**4 - Sump (bottom section)**

- Removing and installing  
⇒ ["1.5 Removing and installing sump \(bottom section\)", page 223](#)

**5 - Bolt**

- 9 Nm

**6 - Baffle plate**

- Renew

**7 - Bolt**

- M6 - 9 Nm
- M8 - 20 Nm

**8 - Oil pump**

- Removing and installing  
⇒ ["1.6 Removing and installing oil pump", page 226](#)

**9 - Centring sleeve**

**10 - Chain tensioner**

**11 - Bolt**

- 9 Nm

**12 - Bolt**

- Engine codes CDAA, CCZA only
- 9 Nm

**13 - Valve for oil pressure control - N428-**

- Engine codes CDAA, CCZA only
- Removing and installing  
⇒ ["1.8 Removing and installing valve for oil pressure control N428, engine codes CDAA, CCZA", page 233](#)

**14 - O-ring**

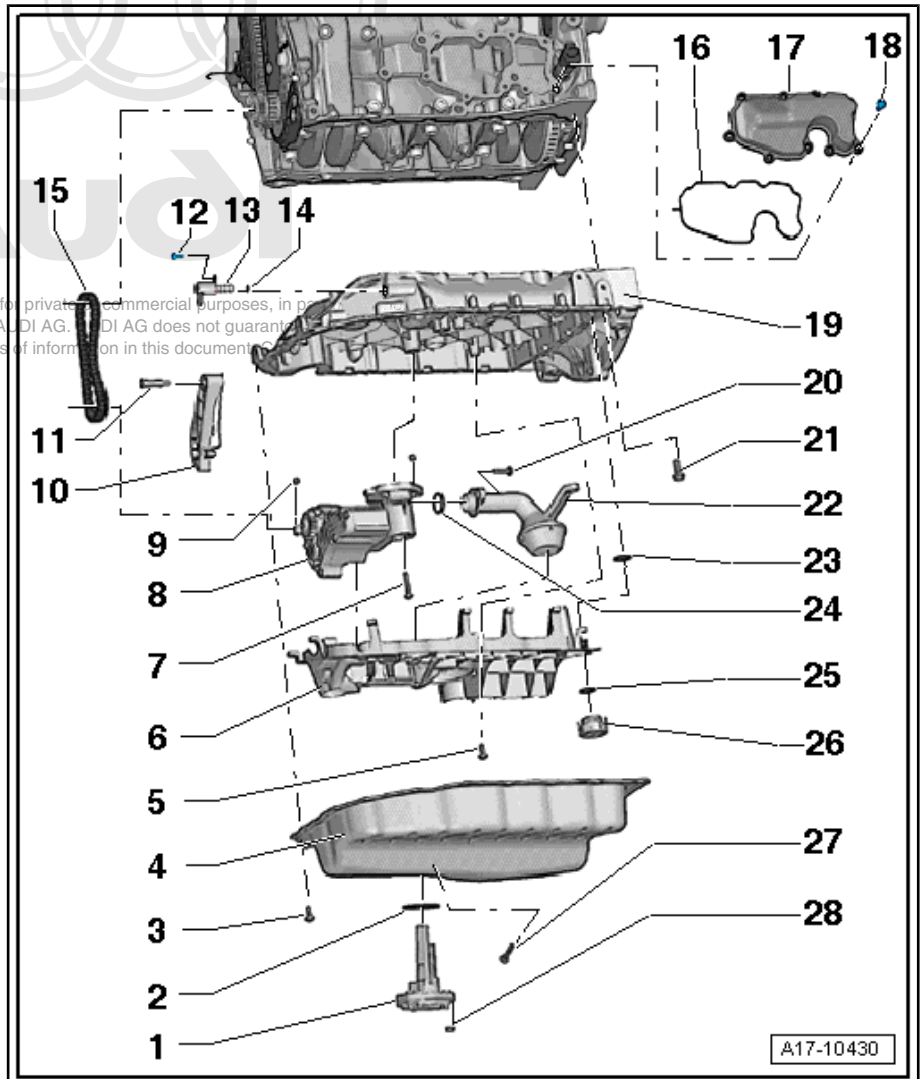
- Engine codes CDAA, CCZA only
- Renew

**15 - Drive chain for oil pump**

- Mark direction of rotation before removing

**16 - Gasket**

- Renew



A17-10430

## 17 - Coarse oil separator

- Removing and installing, engine codes BYT, BPU  
⇒ [“1.3 Removing and installing coarse oil separator, engine codes BYT, BPU”, page 222](#)
- Removing and installing, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA  
⇒ [“1.4 Removing and installing coarse oil separator, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA”, page 223](#)

## 18 - Bolt

- Tightening sequence - engine codes BYT, BPU ⇒ [page 221](#)
- Tightening sequence, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA ⇒ [page 221](#)

## 19 - Sump (top section)

- Removing and installing ⇒ [“1.7 Removing and installing sump \(top section\)”, page 228](#)

## 20 - Bolt

- 9 Nm

## 21 - Bolt

- Renew
- Tightening sequence ⇒ [page 221](#)

## 22 - Suction pipe

- Clean strainer if dirty

## 23 - O-ring

- Renew

## 24 - Seal

## 25 - O-ring

- Renew

## 26 - Non-return valve

## 27 - Oil drain plug

- Renew
- 30 Nm

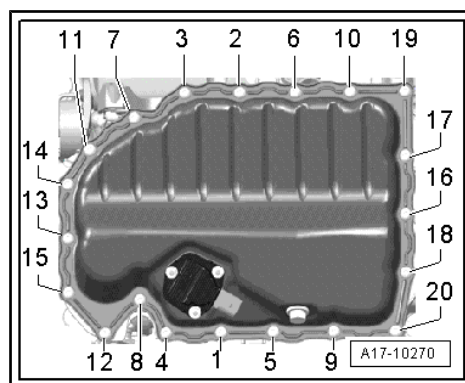
## 28 - Nut

- 9 Nm

## Tightening sequence for sump (bottom section)

– Tighten bolts in the sequence -1 to 20- in 3 stages as follows:

1. Tighten bolts hand tight.
2. Tighten bolts to 8 Nm.
3. Turn bolts 45° further.



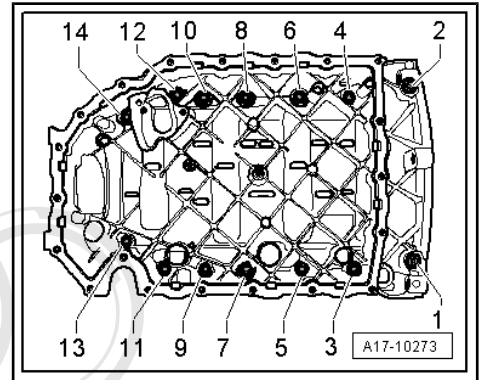
### Tightening sequence for sump (top section)

- Tighten bolts in the sequence -1 to 14- in 3 stages as follows:

 **Note**

*Some versions have only 13 bolts.*

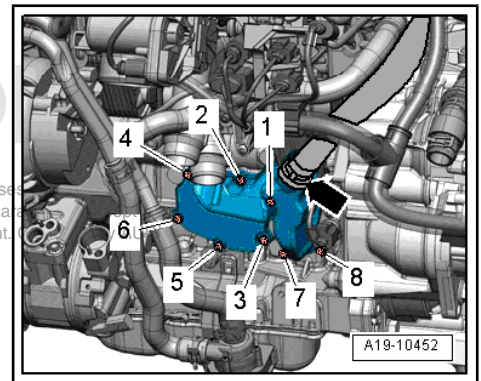
1. Tighten bolts hand tight.
2. Tighten bolts to 15 Nm.
3. Turn bolts 90° further.



### Tightening sequence for coarse oil separator, engine codes BYT, BPU

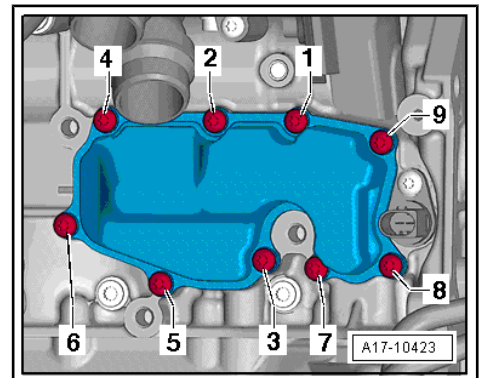
- Tighten bolts in the sequence -1 ... 8- to 9 Nm.

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



### Tightening sequence for coarse oil separator, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA

- Tighten bolts in the sequence -1 ... 9- to 9 Nm.



## 1.2 Removing and installing oil level and oil temperature sender - G266-

### Removing

- Engine oil drained ⇒ Maintenance ; Booklet 820
- Unplug electrical connector -3-.
- Remove nuts -1- and detach oil level and oil temperature sender - G266- -item 4-.

### Installing

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

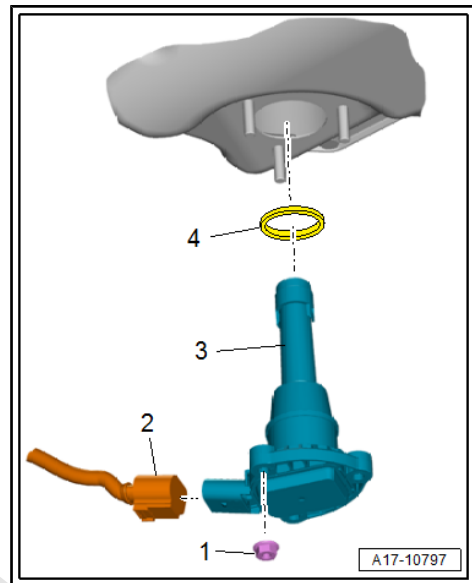
- Tightening torques  
⇒ ["1.1 Exploded view - sump/oil pump", page 218](#)



### Note

Renew seal -2-.

- Fill with engine oil and check oil level ⇒ Maintenance ; Booklet 820 .



## 1.3 Removing and installing coarse oil separator, engine codes BYT, BPU

### Removing

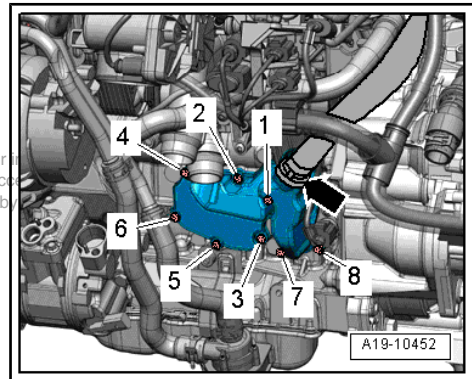
- Remove noise insulation ⇒ Rep. gr. 66 .
- Press release tabs, detach crankcase breather hose -arrow- and move clear to one side.
- Remove bolts -1 ... 8- and detach coarse oil separator.



**Caution** Protected by copyright. Copying for private or commercial purposes, in part or 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.

**Protect lubrication system against contamination.**

- ◆ Seal off opening with clean cloth.



### 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) ⇒ *Electronic parts catalogue* .
- Tightening sequence for coarse oil separator  
⇒ [Fig. "Tightening sequence for coarse oil separator, engine codes BYT, BPU", page 221](#)

## 1.4 Removing and installing coarse oil separator, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA

### Removing


- Remove noise insulation ⇒ Rep. gr. 66 .

### Cabriolet

- Remove noise insulation frame ⇒ Rep. gr. 50 .

### All vehicles:

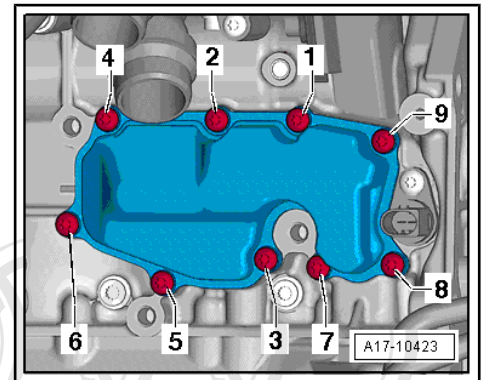
- Remove bolts -1 ... 9- and detach coarse oil separator.



**Caution**

*Protect lubrication system against contamination.*

- ◆ Seal off opening with clean cloth.



### Installing



**Note**

- ◆ Renew gaskets and seals.
- ◆ Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ *Electronic parts catalogue* .

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

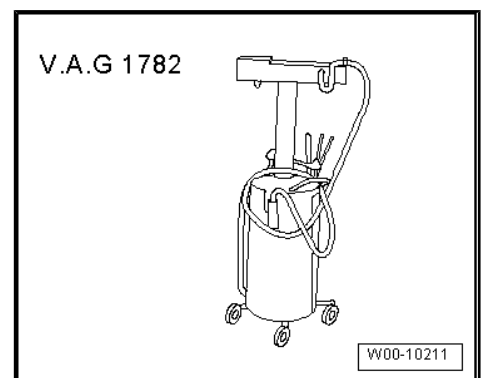
- Tightening sequence for coarse oil separator  
⇒ [Fig. "Tightening sequence for coarse oil separator, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA" page 221](#)

Copyright © Audi AG. All rights reserved. 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.

## 1.5 Removing and installing sump (bottom section)

### Special tools and workshop equipment required

- ◆ Used oil collection and extraction unit - V.A.G 1782-



- ◆ Electric drill with plastic brush
- ◆ Safety goggles
- ◆ Silicone sealant ⇒ *Electronic parts catalogue*

### Removing

- Remove noise insulation ⇒ Rep. gr. 66 .

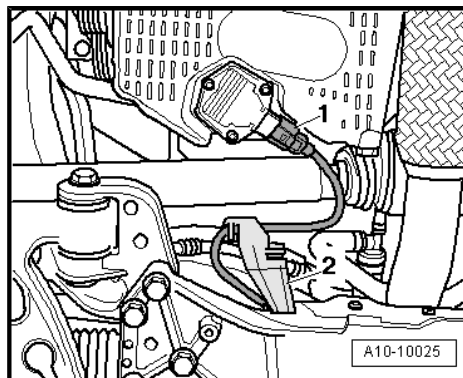


### Cabriolet

- Remove noise insulation frame ⇒ Rep. gr. 50 .

### All vehicles:

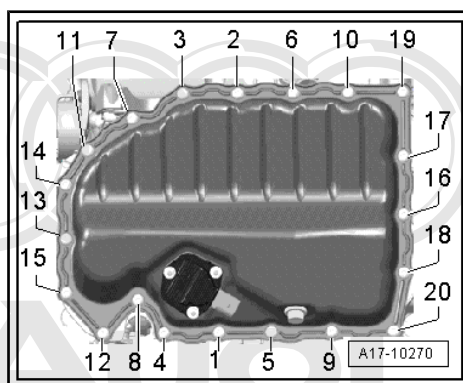
- Unplug electrical connector -1- for oil level and oil temperature sender - G266- .
- Remove oil drain plug and drain engine oil.



- Remove bolts -20 ... 1-.
- Take off sump: if necessary loosen it by striking lightly with a rubber hammer.

### Installing

- Tightening torques  
⇒ ["1.1 Exploded view - sump/oil pump", page 218](#)



**Caution**

*Protect lubrication system and bearings against contamination.*

- ◆ *Cover exposed parts of the engine.*

- ◆ Silicone sealant ⇒ Electronic parts catalogue

**Note**

- ◆ *Note the expiry date of the silicone sealant.*
- ◆ *The sump must be installed within 5 minutes after applying the silicone sealant.*
- Spray sealing surface with sealant remover and wait for it to take effect.
- Remove sealant remaining on sump (top section) with flat scraper.

**WARNING**

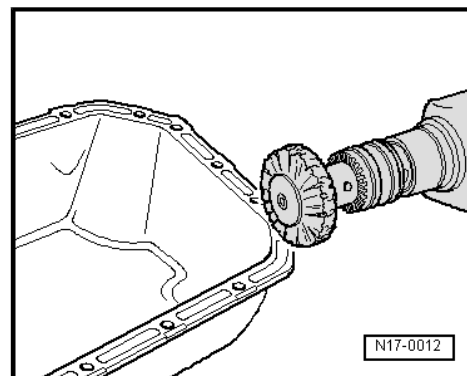
*Risk of eye injury.*

- ◆ *Put on safety goggles.*

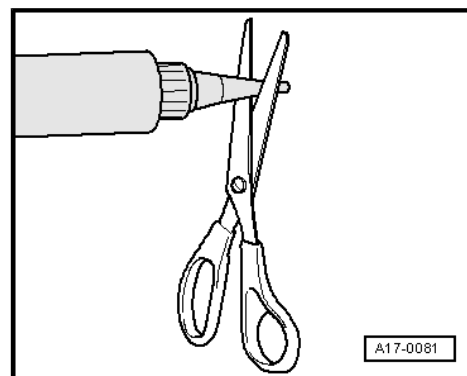
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- Remove sealant residue on sump (bottom section) using rotating plastic brush or similar.
- Clean sealing surfaces; they must be free of oil and grease.



- Cut off nozzle of tube at front marking (∅ of nozzle approx. 3 mm).



- Apply bead of silicone sealant onto clean sealing surface of sump (bottom section), as illustrated.

 **Caution**

***Make sure lubrication system is not clogged by excess sealant.***

◆ ***The bead of sealant must not be thicker than specified.***

- ◆ Thickness of sealant bead: 2 ... 3 mm

 **Note**

- ◆ *The sump must be installed within 5 minutes after applying the silicone sealant.*
- ◆ *The bead of sealant must not be thicker than specified, otherwise excess sealant can enter the sump and obstruct the strainer in the oil intake pipe.*

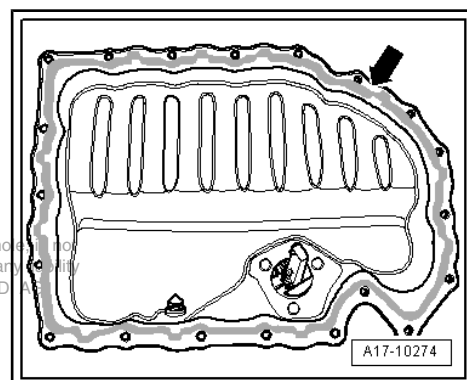
- Immediately fit sump (bottom section) and tighten bolts; tightening sequence ⇒ [page 220](#) .

 **Note**

*After fitting sump assembly, the sealant must dry for approx. 30 minutes. Then (and only then) fill the engine with engine oil.*

- Fill with engine oil and check oil level ⇒ Maintenance ; Booklet 808 .

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

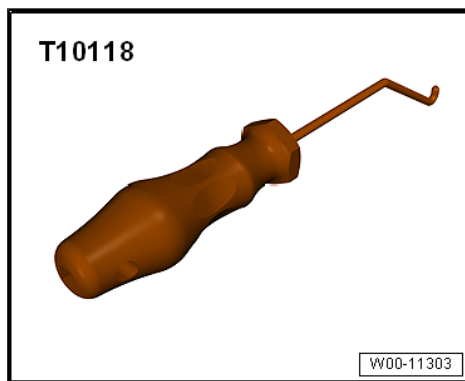




## 1.6 Removing and installing oil pump

### Special tools and workshop equipment required

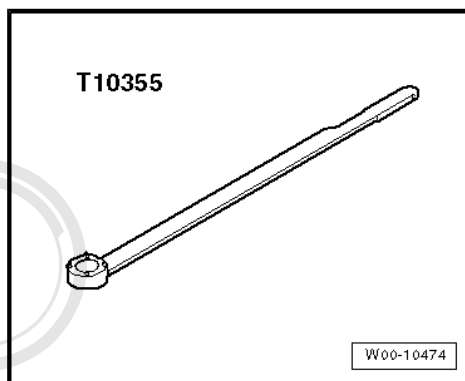
◆ Assembly tool - T10118-



◆ Locking tool - T40265-



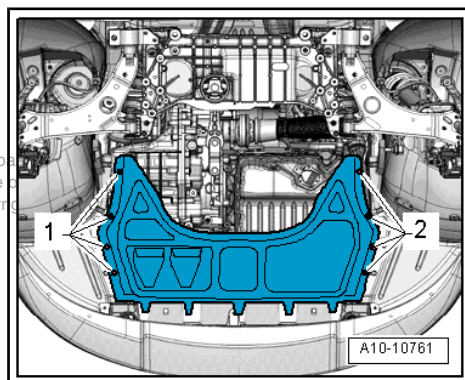
◆ Counterhold tool - T10355-



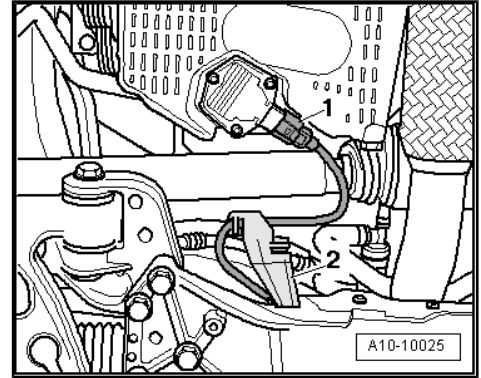
### Removing

– Release fasteners -1 and 2- and remove centre noise insulation.

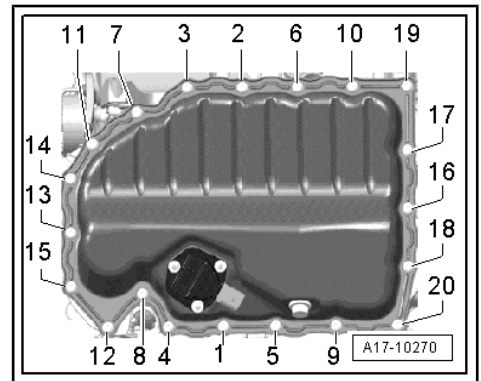
Protected by copyright. Copying for private or commercial purposes, in part or in full, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee the accuracy of the information with respect to the correctness of information in this document. Copyright © 2016 Audi AG



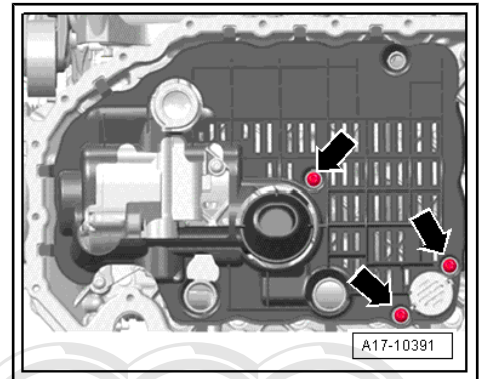
- Unplug electrical connector -1- for oil level and oil temperature sender - G266- .
- Drain off engine oil.



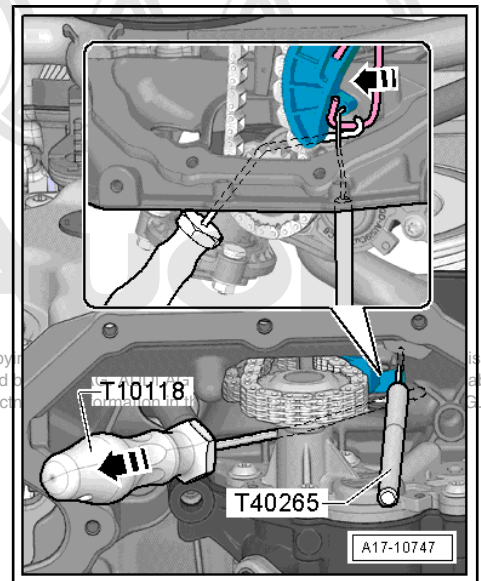
- Remove bolts -20 ... 1-.
- Take off sump: if necessary loosen it by striking lightly with a rubber hammer.



- Remove baffle plate -arrows-.



- Using assembly tool - T10118- , pull spring of chain tensioner in direction of -arrow- and secure with locking tool - T40265- .



Protected by copyright. Copying is not permitted unless authorised by Audi AG with respect to the correct use.

is not a liability of Audi AG.



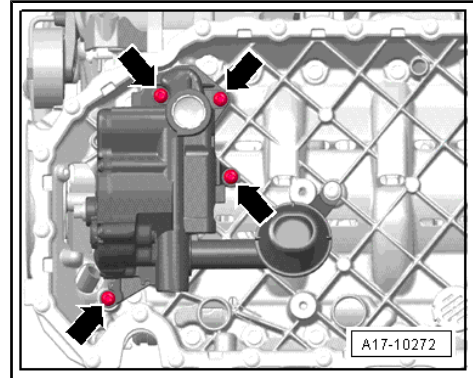
- Remove bolts -arrows- and detach oil pump.

### Installing

- Tightening torques  
=> "1.1 Exploded view - sump/oil pump", page 218

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

- Check that both centring sleeves are fitted in oil pump.
- Before installing oil pump, check strainer in oil intake pipe and oil passages in sump (top section) for dirt.
- Guide oil pump sprocket into drive chain and install oil pump.



### Caution

*Risk of irreparable damage to engine.*

- ◆ *The following step must be performed to ensure that spring of chain tensioner returns to installation position:*

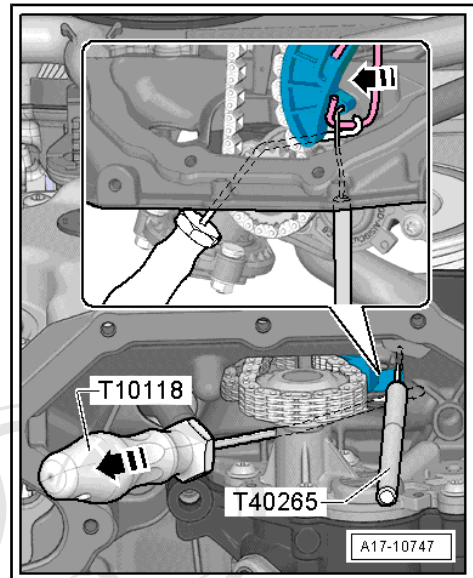
- Using assembly tool - T10118- , pull spring of chain tensioner in direction of -arrow- and remove locking tool - T40265- .
- Fit new baffle plate and secure in position.



### Note

*The plastic fins on the baffle plate are deformed permanently when tightening. The plastic fins make sure that the baffle plate rests on the contact surface without play and does not cause rattling noises. The baffle plate must therefore always be renewed.*

- Install sump (bottom section) => [page 223](#) .
- Fill with engine oil and check oil level => Maintenance ; Booklet 808 .



## 1.7 Removing and installing sump (top section)

### Special tools and workshop equipment required

- ◆ Assembly tool - T10118-

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.

### T10118



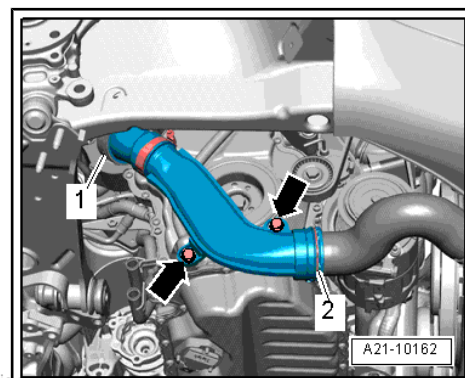
- ◆ Locking tool - T40265-



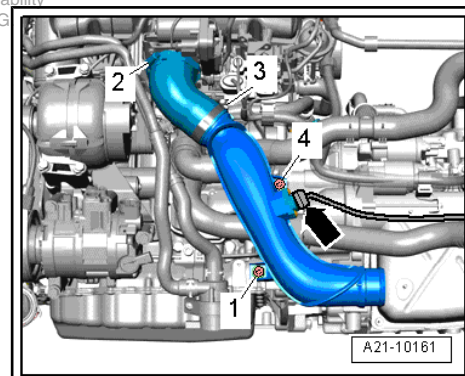
- ◆ Electric drill with plastic brush
- ◆ Safety goggles
- ◆ Silicone sealant → Electronic parts catalogue

### Removing

- Remove gearbox ⇒ Rep. gr. 34 .
- Remove sump (bottom section) ⇒ [page 223](#) .
- Remove oil pump ⇒ [page 226](#) .
- Remove sealing flange (gearbox end) ⇒ [page 65](#) .
- Remove front section of wheel housing liners (right-side) ⇒ Rep. gr. 66 .
- Remove bolts -arrows-.
- Remove air pipe (lift clips -1 and 2-).

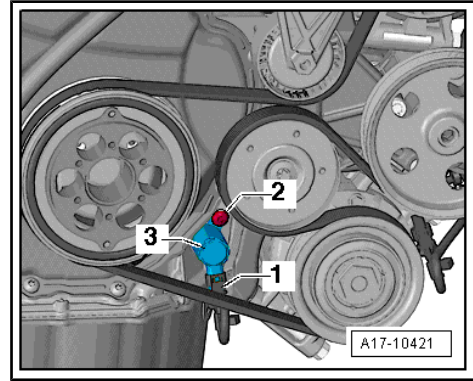


- Remove bolt -1-.
- Remove wire retainer next to continued coolant circulation pump - V51- from sump (top section).





- Unplug electrical connector -1- (not installed on all engine versions).

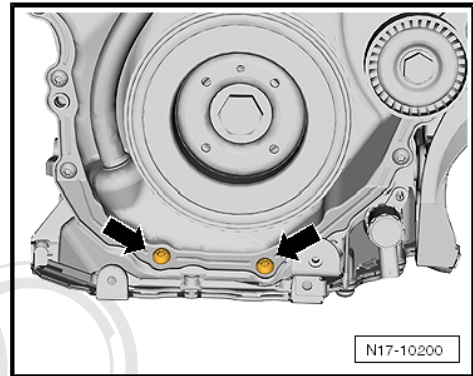


- Remove bolts -arrows-.



**DANGER!**

*Injury risk! The chain tensioner spring for oil pump drive jumps from sump (top section) to timing chain cover (bottom) when detaching sump (top section). Do not reach between sump (top section) and timing chain cover (bottom) when removing sump (top section).*



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 bolts -1 to 14- and lever off sump (top section).



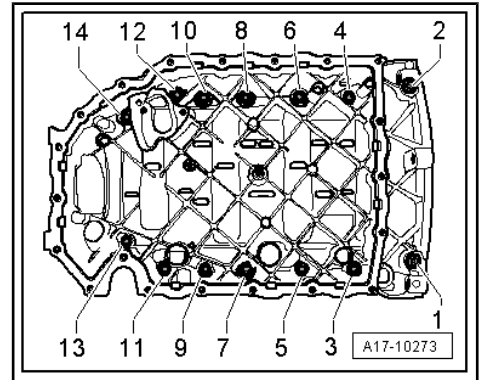
**Note**

*Some versions have only 13 bolts.*



**Caution**

**Lever off sump (top section) at gearbox end first. Take care timing chain cover is not bent when levering off.**



**Installing**

Tightening torques:

- => "1.1 Exploded view - sump/oil pump", page 218 .
- ◆ Silicone sealant => Electronic parts catalogue



**Note**

- ◆ *Note the expiry date of the silicone sealant.*
- ◆ *The sump (top section) must be installed within 5 minutes after applying silicone sealant.*
- ◆ *Renew the bolts tightened with specified tightening angle.*
- ◆ *Renew seals, gaskets and self-locking nuts.*

- Remove sealant remaining on cylinder block with flat scraper.



**WARNING**

**Risk of eye injury.**

- ◆ **Put on safety goggles.**

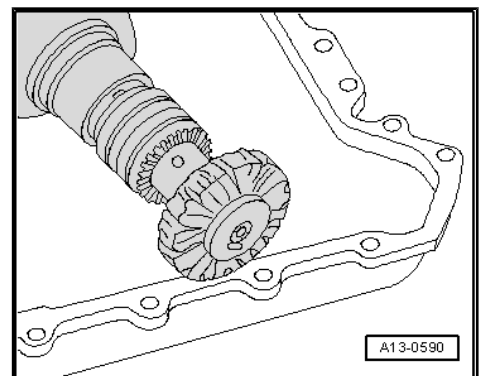
- Remove residual sealant at sump (top section) and timing chain cover (bottom) e.g. using a rotating plastic brush.



**Note**

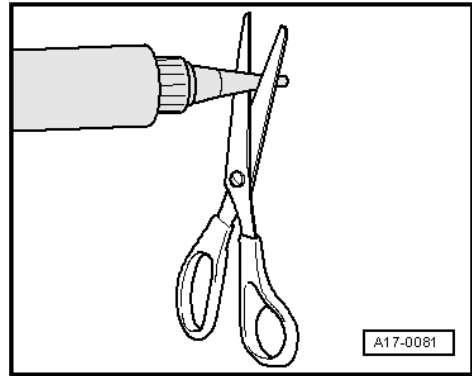
*Check if timing chain cover is deformed. For this purpose, first fit sump (top section) without sealant and determine gap between cover and sump (top section). If the cover is deformed and cannot be straightened, renew cover after installing sump (top section).*

- Clean sealing surfaces; they must be free of oil and grease.
- Check oil passages in sump (top section) and crankcase for contamination.





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

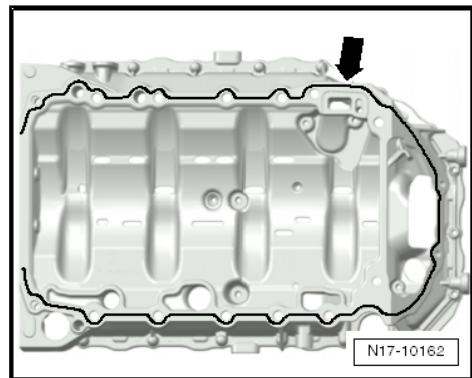


**Caution**

**Make sure lubrication system is not clogged by excess sealant.**

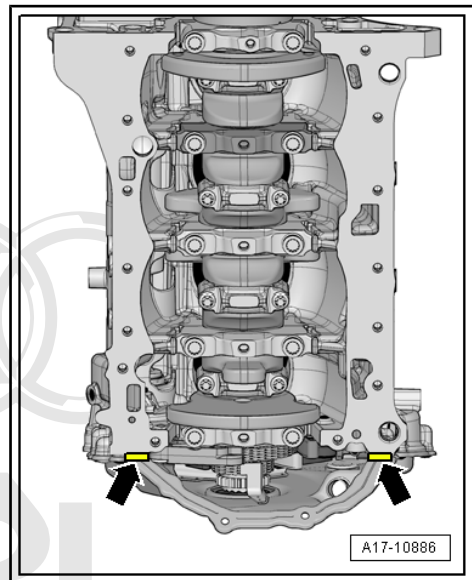
◆ **The bead of sealant must not be thicker than specified.**

- ◆ Thickness of sealant bead: 2 ... 3 mm.
- Apply silicone sealant onto clean sealing surface of sump (top section) as illustrated -arrow-.
- Apply silicone sealant between cylinder block and timing chain cover (bottom), as illustrated -arrows-.

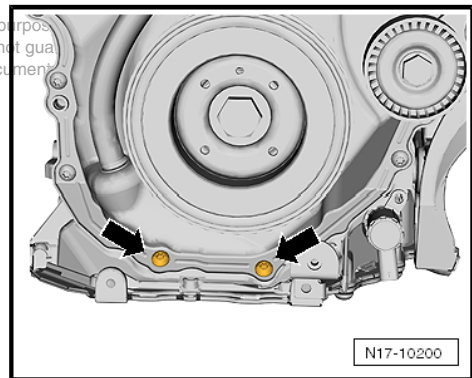


**Note**

- ◆ *The sump (top section) must be installed within 5 minutes after applying the silicone sealant.*
- ◆ *The bead of sealant must not be thicker than specified, otherwise excess sealant can enter the sump and obstruct the strainer in the oil intake pipe.*
- Sump (top section) and crankcase must be flush at gearbox end.
- Immediately fit sump (top section) and tighten bolts, tightening torque ⇒ [page 221](#) .



- Fit bolts -arrows-. Tightening torque ⇒ [Item 13 \(page 92\)](#)
- Install sealing flange (gearbox end) ⇒ [page 65](#)
- Install oil pump ⇒ [page 226](#) .
- Fit new baffle plate and secure in position.
- Install sump (bottom section) ⇒ [page 223](#) .
- Fill with engine oil and check oil level ⇒ Maintenance ; Booklet 808 .



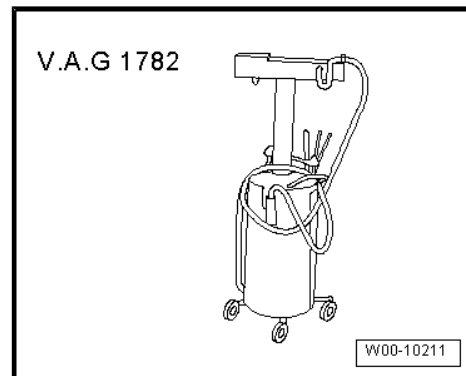
Further assembly is basically carried out in reverse order of dismantling.



## 1.8 Removing and installing valve for oil pressure control - N428- , engine codes CDAA, CCZA

### Special tools and workshop equipment required

- ◆ Used oil collection and extraction unit - V.A.G 1782-



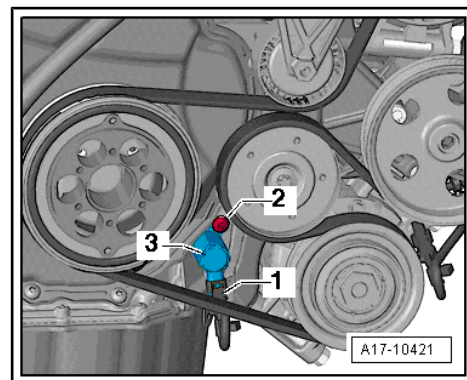
### Removing

- Remove noise insulation ⇒ Rep. gr. 66 .
- Position used oil collection and extraction unit - V.A.G 1782- below engine.
- Unplug electrical connector -1-.
- Remove bolt -2- and detach valve for oil pressure control - N428- -item 3-.

### Installing

- Tightening torque  
⇒ ["1.1 Exploded view - sump/oil pump", page 218](#)

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



### Note

Fit new O-ring.

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.

## 2 Oil filter, engine oil cooler and oil pressure switch - engine codes BYT, BPU, BZB, CAWB, CBFA, CCTA

⇒ "2.1 Exploded view - oil filter, engine oil cooler, oil pressure switch", page 234

⇒ "2.2 Removing and installing engine oil cooler", page 235

⇒ "2.3 Checking oil pressure and oil pressure switch", page 236

⇒ "2.4 Engine oil", page 237

⇒ "2.5 Checking oil level", page 237

### 2.1 Exploded view - oil filter, engine oil cooler, oil pressure switch

#### 1 - Bracket for ancillaries

- ❑ Removing and installing ⇒ page 54

#### 2 - Oil pressure switch - F1-

- ❑ 1.4 bar - black
- ❑ Checking ⇒ page 236
- ❑ 20 Nm

#### 3 - Gasket

- ❑ Renew

#### 4 - O-ring

- ❑ Not available as replacement part, supplied together with valve unit

#### 5 - O-ring

- ❑ Not available as replacement part, supplied together with valve unit

#### 6 - Valve unit

- ❑ With O-rings

#### 7 - Oil filter

- ❑ Removing and installing ⇒ Maintenance ; Booklet 808
- ❑ Remove and install with oil filter tool - 3417-

#### 8 - Bolt

- ❑ 23 Nm

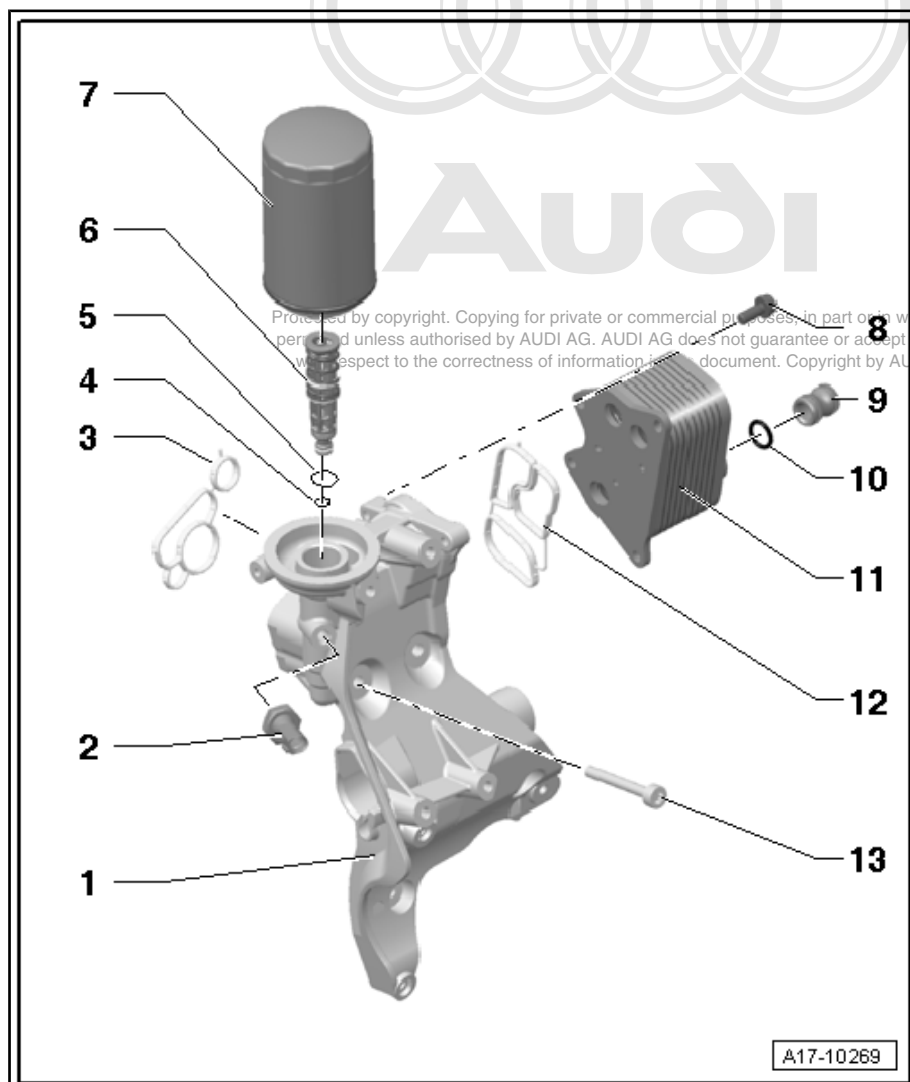
#### 9 - Connection

#### 10 - Seal

- ❑ Renew

#### 11 - Engine oil cooler

- ❑ See note ⇒ page 218
- ❑ Ensure clearance from surrounding components
- ❑ Connection diagram - coolant hoses ⇒ page 244



- ❑ Removing and installing ⇒ [page 235](#)

## 12 - Gasket

- ❑ Renew

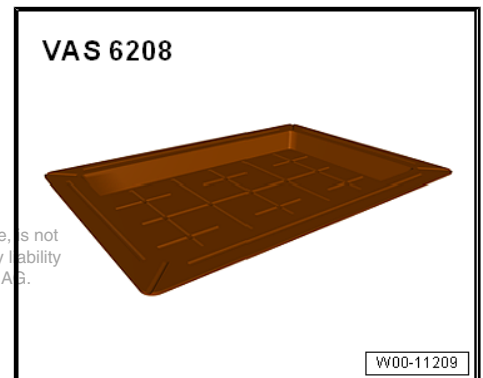
## 13 - Bolt

- ❑ Tightening sequence ⇒ [page 49](#)

## 2.2 Removing and installing engine 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.

### Removing



#### WARNING

*The cooling system is under pressure when the engine is hot. Hot steam/hot coolant can escape - risk of scalding.*

*Danger of scalding skin and other parts of the body.*

- *Put on protective gloves.*
- *Put on safety goggles.*
- *Release pressure (cover filler cap on coolant expansion tank with a cloth and open carefully).*

- Drain coolant ⇒ [page 247](#) .
- Remove bracket for ancillaries ⇒ [page 54](#) .
- Unscrew bolts -4 and 5- and remove engine oil cooler -3- together with seal -2-.

### Installing

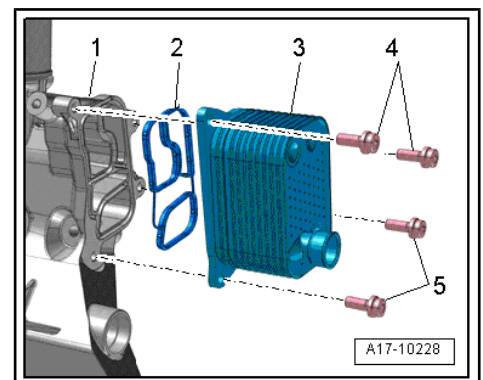
Installation is carried out in the reverse order; note the following:

- Tightening torques  
 ⇒ ["2.1 Exploded view - oil filter, engine oil cooler, oil pressure switch"](#), [page 234](#)



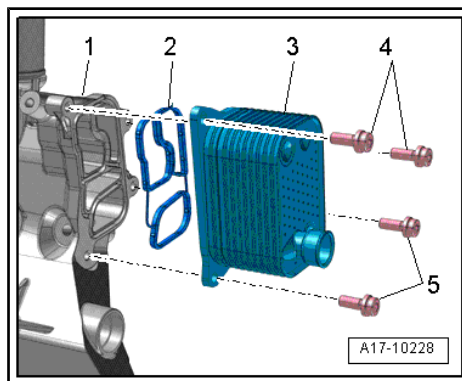
#### Note

- ◆ *Renew gaskets and seals.*
- ◆ *Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ [Electronic parts catalogue](#) .*





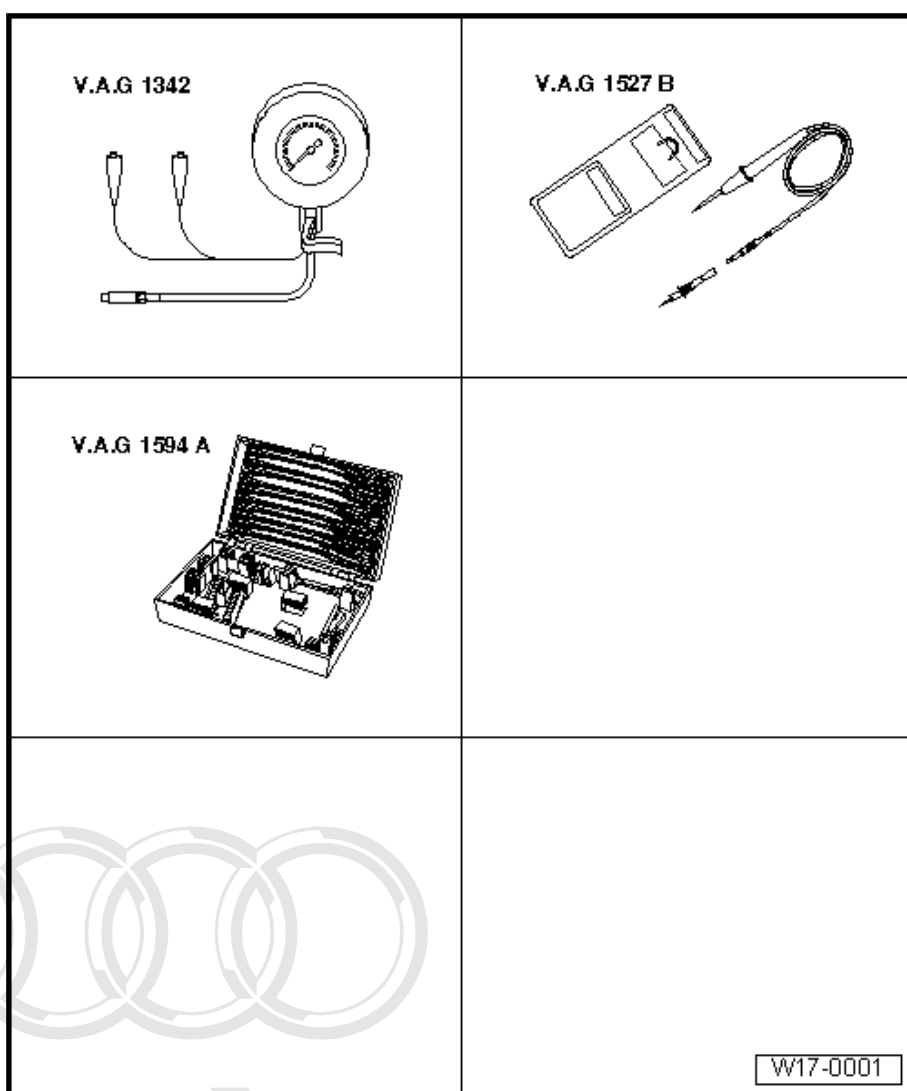
- Install engine oil cooler -3- with new seal -2-.
- Install bracket for ancillaries ⇒ [page 54](#) .
- Fill up with coolant ⇒ [page 248](#) .



### 2.3 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

- 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).

 **Note**

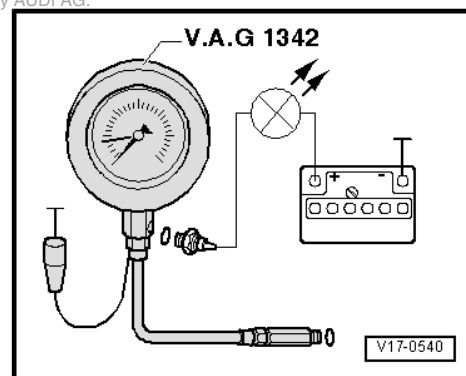
*Functional check and servicing the visual and acoustic oil pressure warning: Current flow diagrams ⇒ Vehicle diagnostic tester; "Function and component selection".*

### Test sequence

- Tightening torques  
⇒ ["2.1 Exploded view - oil filter, engine oil cooler, oil pressure switch", page 234](#)
- Remove oil pressure switch - F1- and screw it into tester.
- Screw tester into oil filter bracket in place of the oil pressure switch.
- Connect brown wire of tester to earth (-).
- Connect voltage tester - V.A.G 1527 B- with adapter leads from auxiliary measuring set - V.A.G 1594 C- to battery positive (+) and oil pressure switch - F1- . LED must not light up.
- If LED lights up, renew 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 - F1- . Increase engine speed further. At 2,000 rpm and an oil temperature of 80 °C the oil pressure should be between 2.0 ... 4.5 bar.



## 2.4 Engine oil

Viscosity grades and oil specifications ⇒ Maintenance ; Booklet 808 .

Oil capacities ⇒ Maintenance tables .

## 2.5 Checking oil level

- Check oil level ⇒ Maintenance ; Booklet 808 .

### 3 Oil filter, engine oil cooler and oil pressure switches - engine codes CDAA, CCZA

⇒ [“3.1 Exploded view - oil filter, engine oil cooler, oil pressure switches”, page 238](#)

⇒ [“3.2 Removing and installing engine oil cooler”, page 239](#)

⇒ [“3.3 Removing and installing oil pressure switch F22 ”, page 240](#)

⇒ [“3.4 Removing and installing oil pressure switch for reduced oil pressure F378 ”, page 241](#)

⇒ [“3.5 Checking oil pressure switch”, page 242](#)

⇒ [“3.6 Checking oil pressure”, page 242](#)

⇒ [“3.7 Engine oil”, page 243](#)

⇒ [“3.8 Checking oil level”, page 243](#)

#### 3.1 Exploded view - oil filter, engine oil cooler, oil pressure switches

##### 1 - Bracket for ancillaries

- Removing and installing ⇒ [page 54](#)

##### 2 - Oil pressure switch - F22-

- Blue insulation
- Removing and installing ⇒ [page 240](#)
- Checking ⇒ Vehicle diagnostic tester
- 20 Nm

##### 3 - Oil pressure switch for reduced oil pressure - F378-

- Brown insulation
- Removing and installing ⇒ [page 241](#)
- Checking ⇒ Vehicle diagnostic tester
- 20 Nm

##### 4 - Gasket

- Renew

##### 5 - O-ring

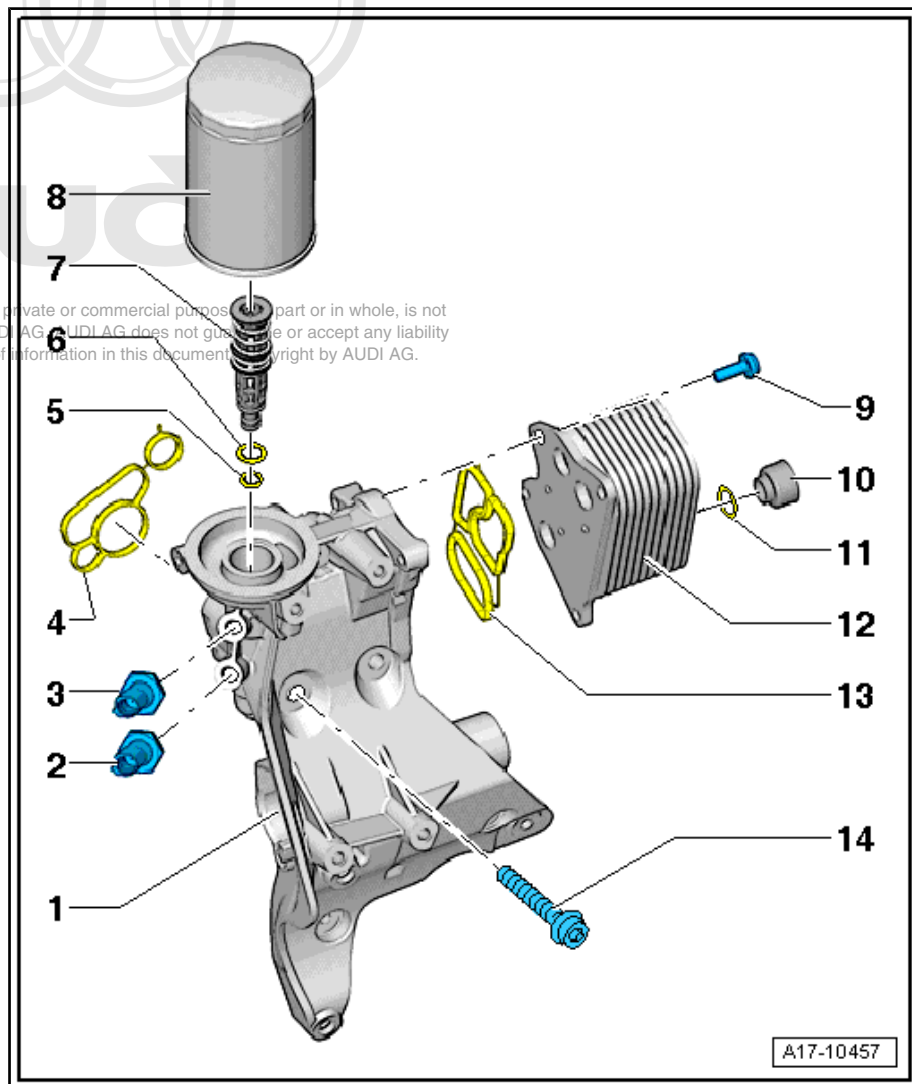
- Not available as replacement part, supplied together with valve unit

##### 6 - O-ring

- Not available as replacement part, supplied together with valve unit

##### 7 - Valve unit

- With O-rings



### 8 - Oil filter

- Removing and installing ⇒ Maintenance ; Booklet 808
- Remove and install with oil filter tool - 3417-

### 9 - Bolt

- 23 Nm

### 10 - Connection

### 11 - Seal

- Renew

### 12 - Engine oil cooler

- See note ⇒ [page 218](#)
- Ensure clearance from surrounding components
- Connection diagram - coolant hoses ⇒ [page 244](#)
- Removing and installing ⇒ [page 239](#)

### 13 - Gasket

- Renew

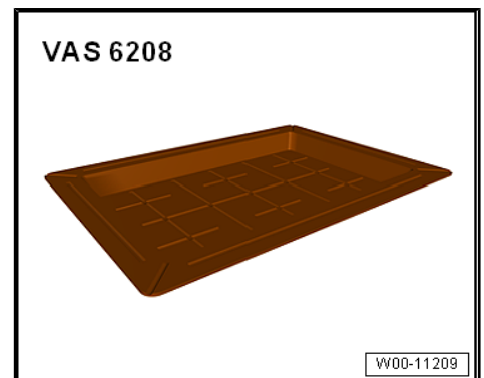
### 14 - Bolt

- Tightening sequence ⇒ [page 49](#)

## 3.2 Removing and installing engine oil cooler

### Special tools and workshop equipment required

- ◆ Drip tray for workshop hoist - VAS 6208-



### Removing

**⚠ WARNING**

*The cooling system is under pressure when the engine is hot. Hot steam/hot coolant can escape - risk of scalding.*

*Danger of scalding skin and other parts of the body.*

- *Put on protective gloves.*
- *Put on safety goggles.*
- *Release pressure (cover filler cap on coolant expansion tank with a cloth and open carefully).*

- Drain coolant ⇒ [page 247](#) .
- Remove bracket for ancillaries ⇒ [page 54](#) .



- Unscrew bolts -4 and 5- and remove engine oil cooler -3- together with seal -2-.

### Installing

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

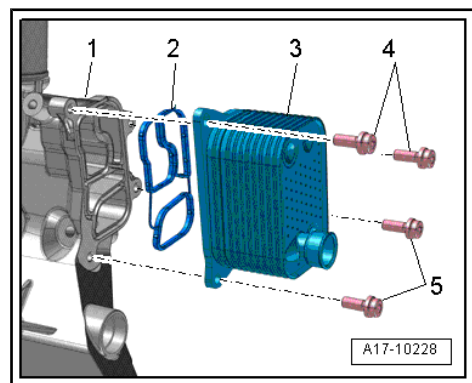
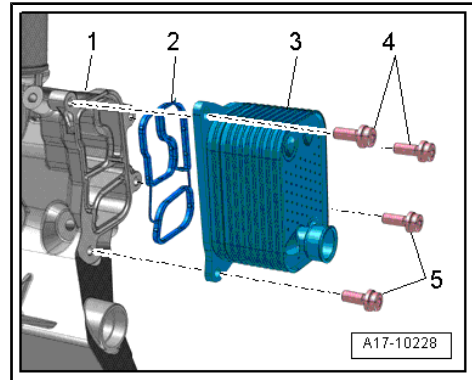
- Tightening torques  
⇒ ["3.1 Exploded view - oil filter, engine oil cooler, oil pressure switches", page 238](#)



### Note

- ◆ *Renew gaskets and seals.*
- ◆ *Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ [Electronic parts catalogue](#) .*

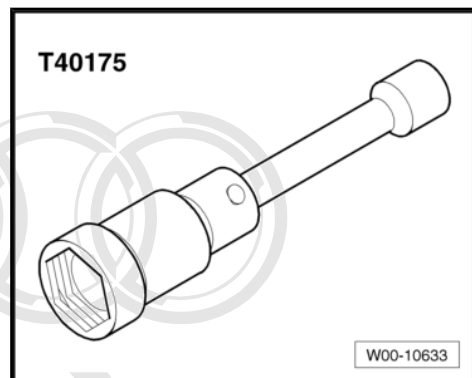
- Install engine oil cooler -3- with new seal -2-.
- Install bracket for ancillaries ⇒ [page 54](#) .
- Fill up with coolant ⇒ [page 248](#) .
- Fill with engine oil and check oil level ⇒ Maintenance ; Booklet 808 .



## 3.3 Removing and installing oil pressure switch - F22-

### Special tools and workshop equipment required

- ◆ Articulated wrench, 24 mm - T40175-



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

- Unplug electrical connector -4- on oil pressure switch - F22- .

### Note

*Place a cloth underneath bracket for ancillaries to catch any escaping oil.*

- Remove oil pressure switch - F22- -3-.

## Installing

- Tightening torques  
⇒ ["3.1 Exploded view - oil filter, engine oil cooler, oil pressure switches", page 238](#)

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

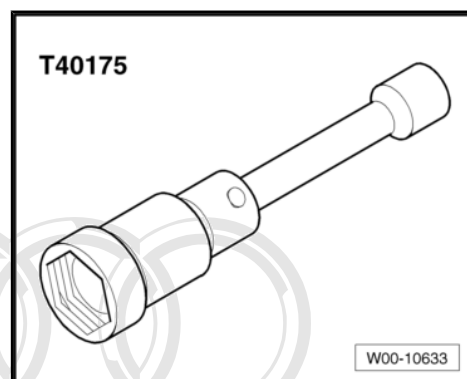
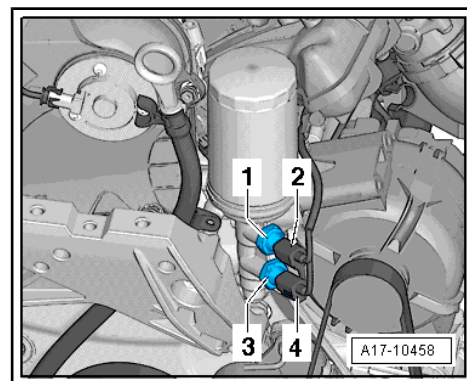
### Note

- ◆ *Renew seal.*
- ◆ *Fit the new oil pressure switch - F22- into the connection immediately to avoid loss of oil.*
- Check oil level ⇒ Maintenance ; Booklet 808 .

## 3.4 Removing and installing oil pressure switch for reduced oil pressure - F378-

### Special tools and workshop equipment required

- ◆ Articulated wrench, 24 mm - T40175-



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

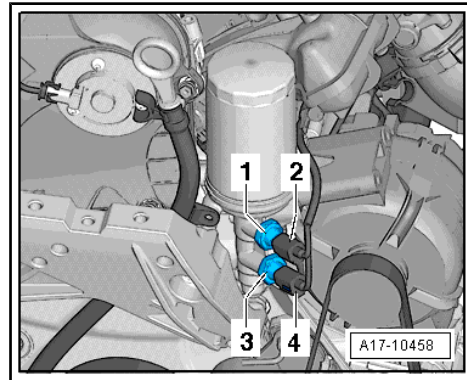
- Unplug electrical connector -2- at oil pressure switch for reduced oil pressure - F378- .



### Note

*Place a cloth underneath bracket for ancillaries to catch any escaping oil.*

- Unscrew oil pressure switch for reduced oil pressure - F378-1-.



## Installing

- Tightening torque  
⇒ ["3.1 Exploded view - oil filter, engine oil cooler, oil pressure switches", page 238](#)

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



### Note

- ◆ *Renew seal.*
- ◆ *Fit the new oil pressure switch for reduced oil pressure - F378- into the connection immediately to avoid loss of oil.*
- Check oil level ⇒ Maintenance ; Booklet 808 .

## 3.5 Checking oil pressure switch

- Check oil pressure switch ⇒ Vehicle diagnostic tester.

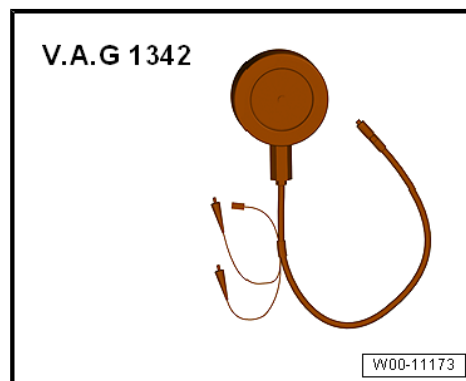
## 3.6 Checking oil pressure

### Special tools and workshop equipment required

- ◆ Oil pressure tester - V.A.G 1342-



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.



### Test requirements

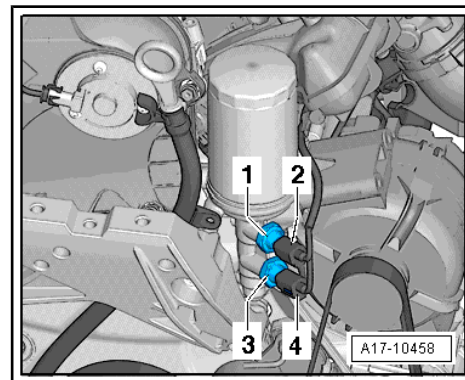
- Oil level OK, checking ⇒ Maintenance ; Booklet 808 .
- Engine oil temperature at least 80°C (radiator fan must have run once).

## Test sequence

### Note

*Place a cloth underneath bracket for ancillaries to catch any escaping oil.*

- Unplug electrical connector -2- at oil pressure switch for reduced oil pressure - F378- .
- Unscrew oil pressure switch for reduced oil pressure - F378- -1-.
- Screw oil pressure tester - V.A.G 1342- into oil filter bracket in place of oil pressure switch.
- Screw oil pressure switch for reduced oil pressure - F378- into oil pressure tester - V.A.G 1342- .
- Start engine.
- Oil pressure at idling speed: 1.2 ... 2.0 bar.
- Oil pressure at 2000 rpm: 1.6 ... 2.2 bar.
- Oil pressure at 3700 rpm: 3.0 ... 4.0 bar.



### Note

*During the running-in period, the oil pressure at 2000 rpm can be between 3.0 and 4.0 bar.*

## Assembling

- Tightening torques  
 ⇒ ["3.1 Exploded view - oil filter, engine oil cooler, oil pressure switches", page 238](#)
- Install oil pressure switch.

## 3.7 Engine oil

Refer to ⇒ Maintenance tables for engine oil capacity, oil specifications and viscosity grades.

## 3.8 Checking oil level

- Check oil level ⇒ [Maintenance: Booklet 808](#)



## 19 – Cooling

### 1 Parts of cooling system (on engine)

⇒ [“1.1 Connection diagram - coolant hoses”, page 244](#)

⇒ [“1.2 Draining and filling cooling system”, page 247](#)

⇒ [“1.3 Checking cooling system for leaks”, page 252](#)



#### WARNING

*The cooling system is under pressure when the engine is hot. Hot steam/hot coolant can escape - risk of scalding.*

*Danger of scalding skin and other parts of the body.*

- *Put on protective gloves.*
- *Put on safety goggles.*
- *Release pressure (cover filler cap on coolant expansion tank with a 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 installing spring-type clips.*
- ◆ *Renew gaskets and seals.*
- ◆ *The arrow markings on coolant pipes and on ends of hoses must align.*

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.

### 1.1 Connection diagram - coolant hoses

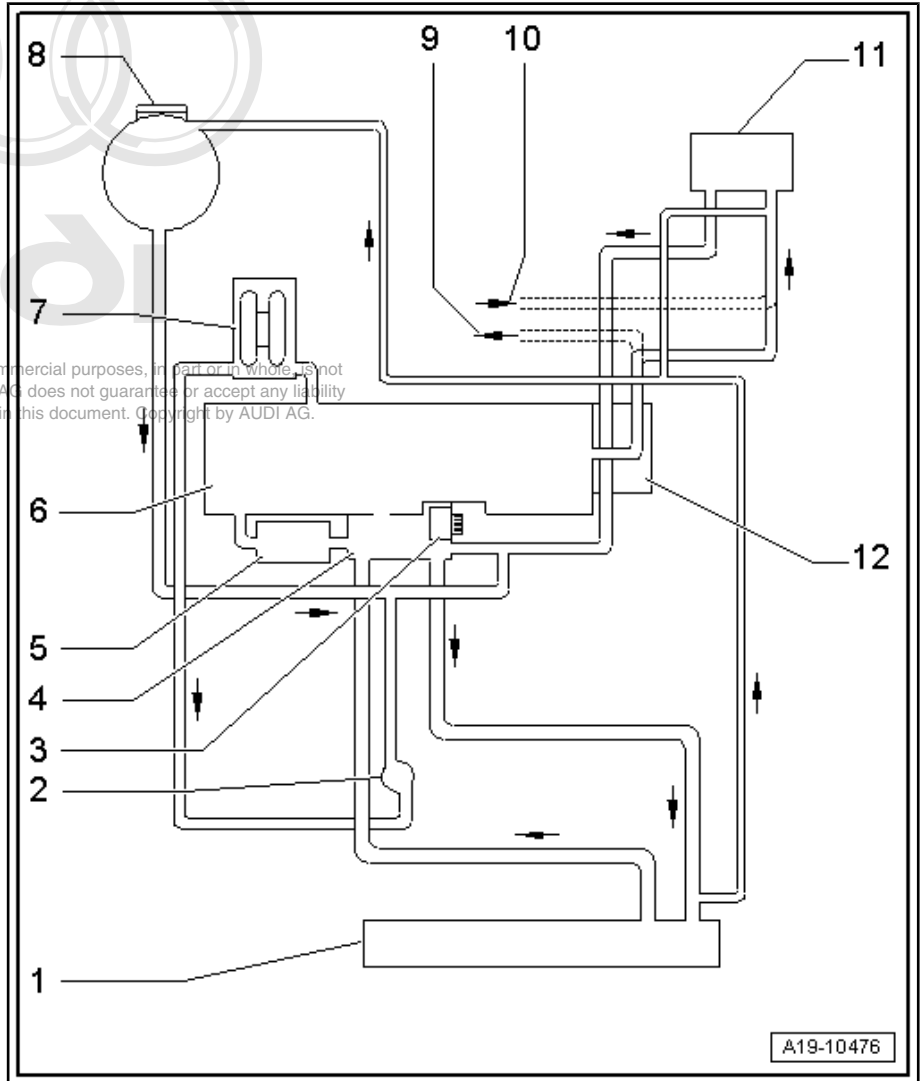
Vehicles with manual gearbox



#### Note

- ◆ *Incorporation of coolant circuit with auxiliary heater ⇒ Rep. gr. 82 .*
- ◆ *-Arrows- show direction of coolant flow.*

- 1 - Radiator
- 2 - Continued coolant circulation pump - V51-
- 3 - Coolant pump
- 4 - Thermostat
- 5 - Engine oil cooler
- 6 - Cylinder head and cylinder block
- 7 - Turbocharger
- 8 - Coolant expansion tank
  - With filler cap
  - Checking pressure relief valve in filler cap  
 ⇒ [page 252](#)
- 9 - To auxiliary heater
  - Incorporation of coolant circuit with auxiliary heater ⇒ Rep. gr. 82
- 10 - From auxiliary heater
  - Incorporation of coolant circuit with auxiliary heater ⇒ Rep. gr. 82
- 11 - Heat exchanger for heater
- 12 - Coolant connection



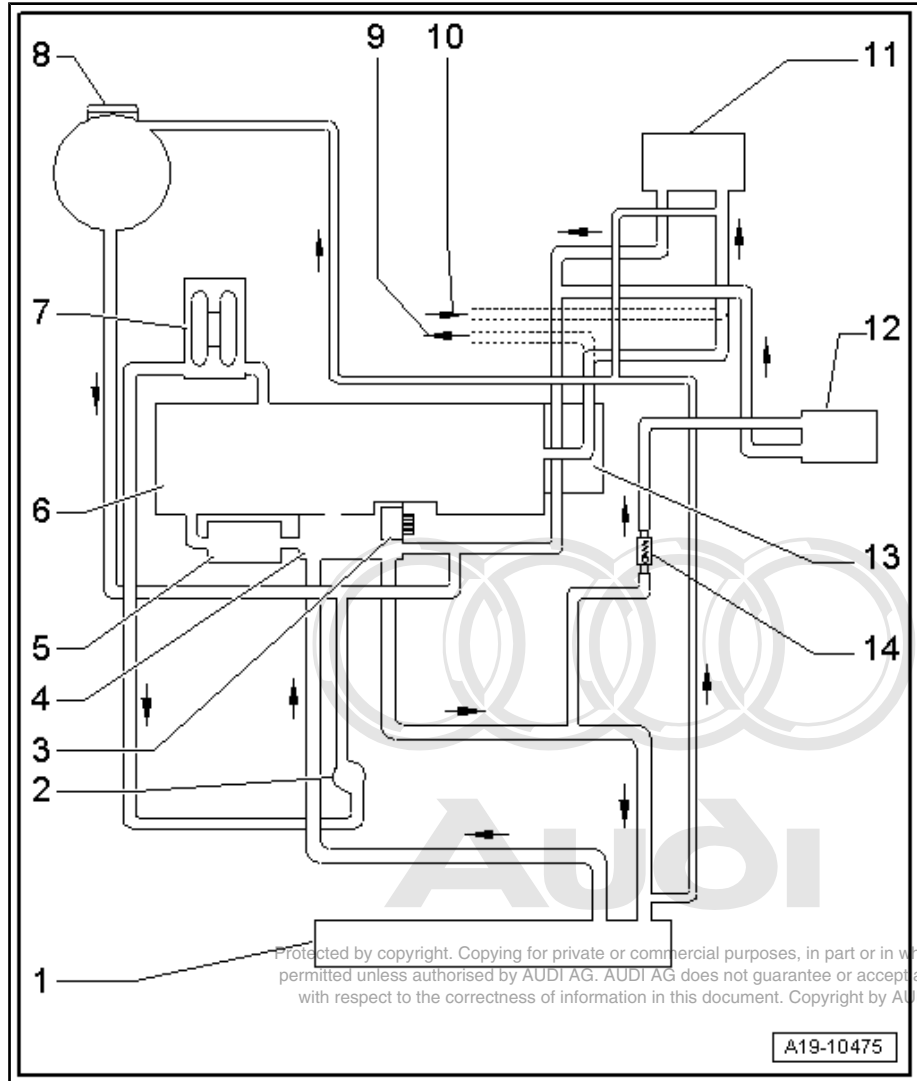
Vehicles with dual clutch gearbox

**i** Note

- ◆ Incorporation of coolant circuit with auxiliary heater ⇒ Rep. gr. 82
- ◆ -Arrows- show direction of coolant flow.



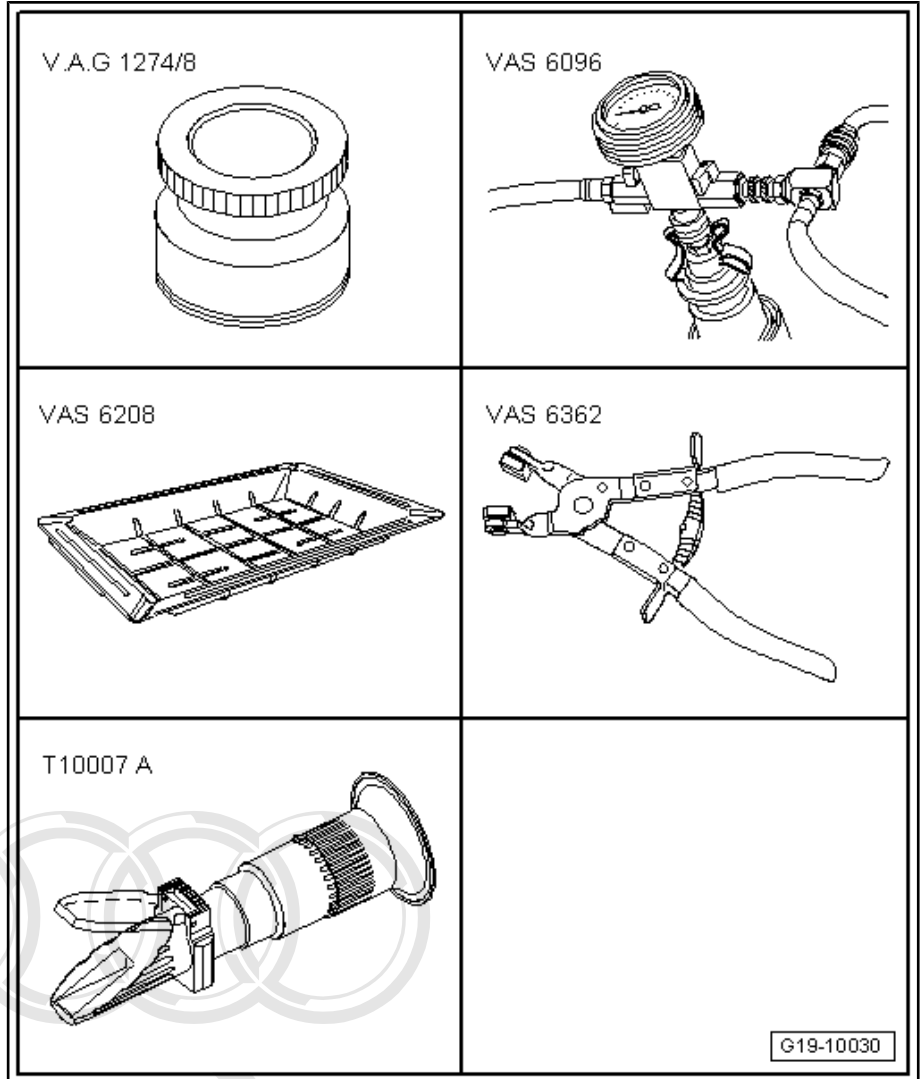
- 1 - Radiator
- 2 - Continued coolant circulation pump - V51-
- 3 - Coolant pump
- 4 - Thermostat
- 5 - Engine oil cooler
- 6 - Cylinder head and cylinder block
- 7 - Turbocharger
- 8 - Coolant expansion tank
  - With filler cap
  - Checking pressure relief valve in filler cap  
⇒ [page 252](#)
- 9 - To auxiliary heater
  - Incorporation of coolant circuit with auxiliary heater ⇒ Rep. gr. 82
- 10 - From auxiliary heater
  - Incorporation of coolant circuit with auxiliary heater ⇒ Rep. gr. 82
- 11 - Heat exchanger for heater
- 12 - Gear oil cooler
- 13 - Coolant connection
- 14 - Thermostat for gear oil cooler



## 1.2 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 A-



### Draining



#### WARNING

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.

**The cooling system is under pressure when the engine is hot.  
 Hot steam/hot coolant can escape - risk of scalding.**

**Danger of scalding skin and other parts of the body.**

- **Put on protective gloves.**
- **Put on safety goggles.**
- **Release pressure (cover filler cap on coolant expansion tank with a cloth and open carefully).**

- Open filler cap on coolant expansion tank.
- Remove noise insulation ⇒ Rep. gr. 66 .

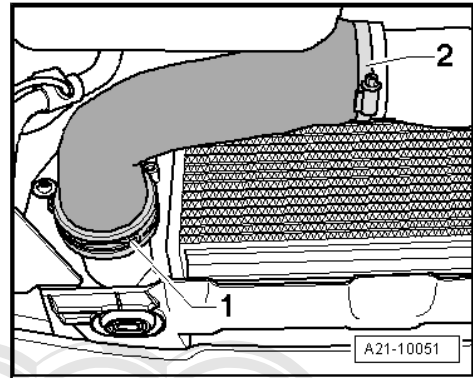
### Cabriolet

- Remove noise insulation frame ⇒ Rep. gr. 50 .



**All vehicles:**

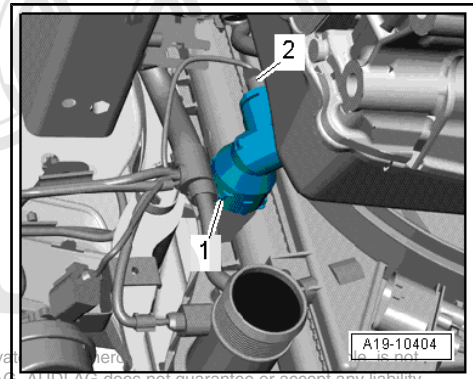
- Remove air pipe -item 1 and 2-



**Note**

*Collect drained coolant in a clean container for re-use or disposal.*

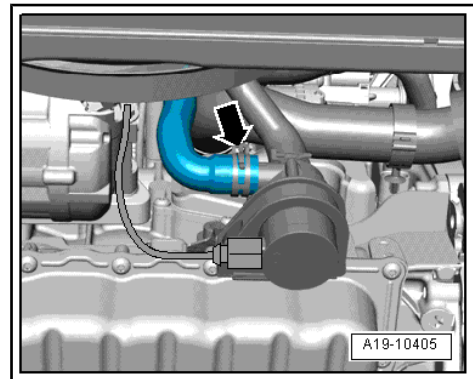
- Place drip tray for workshop hoist - VAS 6208- beneath engine.
- Disconnect coolant hose -1- from radiator (bottom) and drain off coolant.



**Note**

*-Item 2- can be disregarded.*

- Disconnect bottom coolant hose leading to continued coolant circulation pump - V51- -arrow- and drain off coolant.



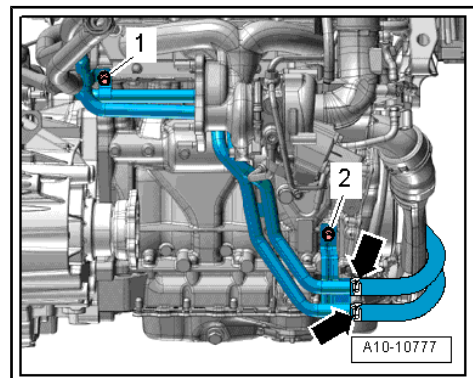
**Vehicles with auxiliary heater:**

- Disconnect coolant hoses -arrows- and drain off remaining coolant.



**Note**

*Disregard items marked -1 and 2-*

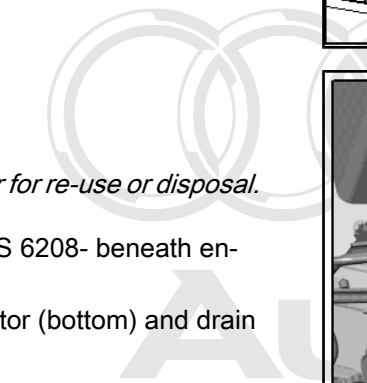


**Filling**



**Caution**

*To ensure optimal corrosion protection, only distilled water may be mixed with coolant additives.*

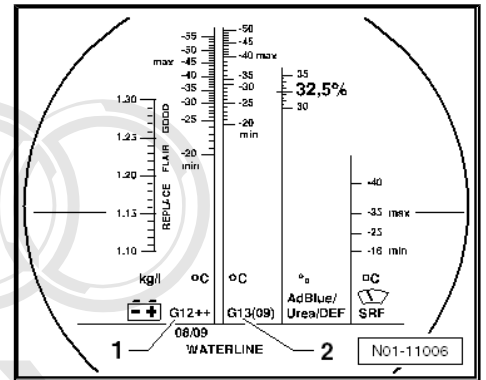


Protected by copyright. Copying for private use is permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



**Note**

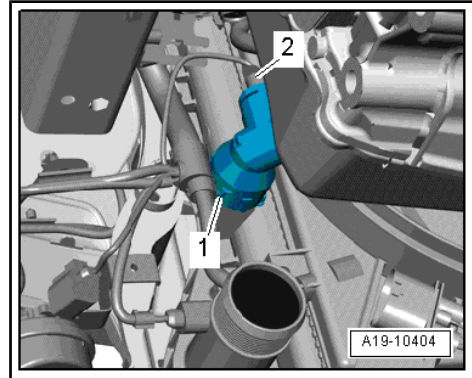
- ◆ *The effectiveness of the coolant is greatly influenced by the quality of the water with which it is mixed. Because water may contain different substances depending on the country or even the region, the water quality to be used for cooling systems has been specified. Distilled water meets all the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

**Recommended mixture ratio for coolant**

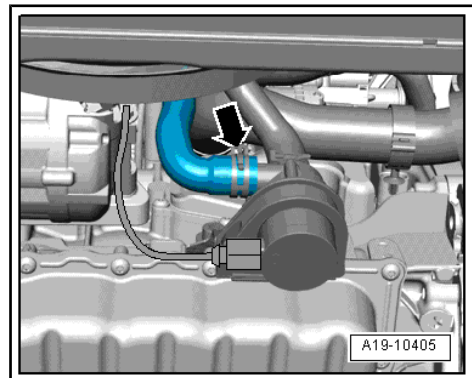
- Coolant (40 %) and distilled water (60 %) for frost protection to -25 °C
- Coolant (50 %) and distilled water (50 %) for frost protection to -36 °C
- Coolant ⇒ Electronic parts catalogue (ETKA)



- Connect bottom coolant hose -1- to radiator.



- Connect the coolant hose to the continued circulation coolant pump - V51- -arrow-.



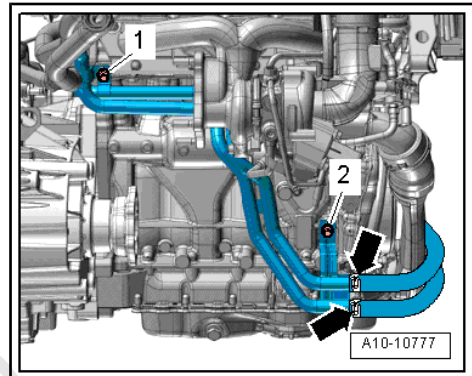
**Vehicles with auxiliary heater:**

- Connect coolant hoses -arrows-.



**Note**

*Disregard items marked -1 and 2-.*



**All vehicles:**

- Fill reservoir of cooling system charge unit - VAS 6096- with at least 10 litres of premixed coolant (according to recommended ratio) => [page 249](#) .
- Fit 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-.

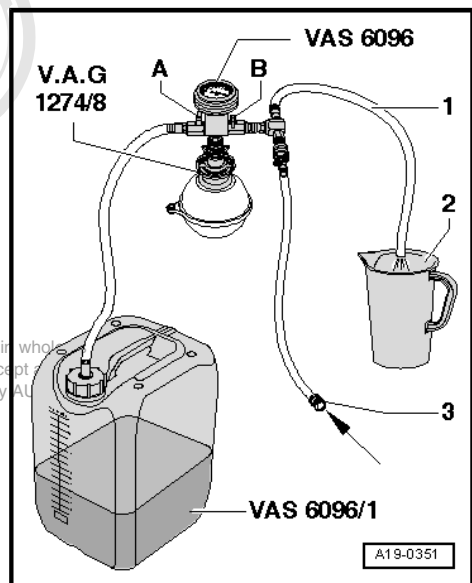


**Note**

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.

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

- Close both valves -A- and -B- (turn lever at right angles to direction of flow).
- Connect hose -3- to compressed air supply.
- Pressure: 7 ... 10 bar.



- Open valve -B- by setting lever in direction of flow.
- The suction jet pump generates a partial vacuum in the cooling system; the needle on the gauge should move into the green zone.
- Also briefly open valve -A- (turn lever in direction of flow) so that hose on reservoir of cooling system charge unit - VAS 6096- can fill with coolant.
- Close valve -A- again.

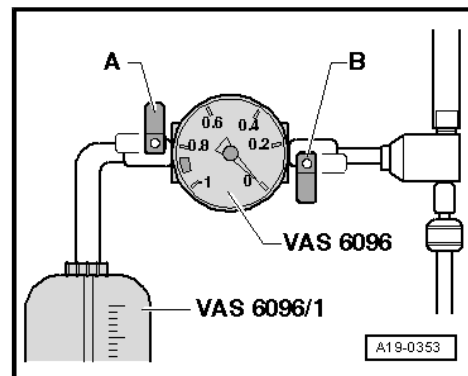
Protected by copyright. This document, in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the accuracy of the information.

- Leave valve -B- open for another 2 minutes.
- The suction jet pump continues to generate a partial vacuum in the cooling system; the needle on the gauge should remain in the green zone.
- Close valve -B-.
- The needle on the gauge should stop in the green zone. The vacuum level in the cooling system is then sufficient for subsequent filling.



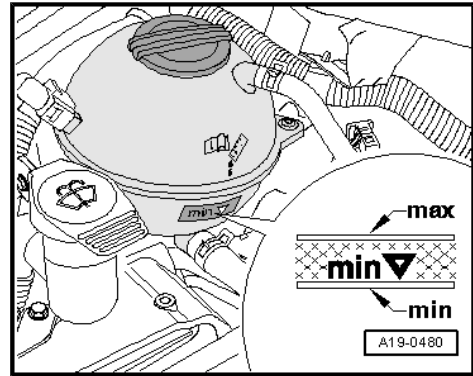
#### Note

- ◆ *If the needle does not reach the green zone, repeat the process.*
- ◆ *Check cooling system for leaks if the vacuum is not maintained.*
- Detach compressed air hose.
- Open valve -A-.
- The vacuum in the cooling system causes the coolant to be drawn out of the reservoir of the cooling system charge unit - VAS 6096- ; the cooling system is then filled.





- Check coolant level.
- Top up coolant to “max” mark.
- Start engine and run for 2 minutes (maximum) at approx. 1500 rpm.
- Top up coolant to overflow hole on expansion tank with engine running.
- Close filler cap on coolant expansion tank.
- Start engine and run at approx. 3000 rpm until radiator fan cuts in.



**WARNING**

***The cooling system is under pressure when the engine is hot. Hot steam/hot coolant can escape - risk of scalding.***

***Danger of scalding skin and other parts of the body.***

- ***Put on protective gloves.***
- ***Put on safety goggles.***
- ***Release pressure (cover filler cap on coolant expansion tank with a cloth and open carefully).***

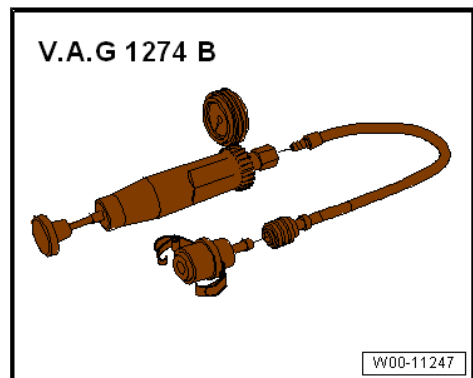
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not accept any liability for the content of this document. Copyright by AUDI AG.

- Check coolant level.
- When the engine is at normal operating temperature, coolant level must be at “max” mark, when engine is cold it must be between “min” and “max” marks.
- Top up with coolant again if necessary.
- Switch off engine.

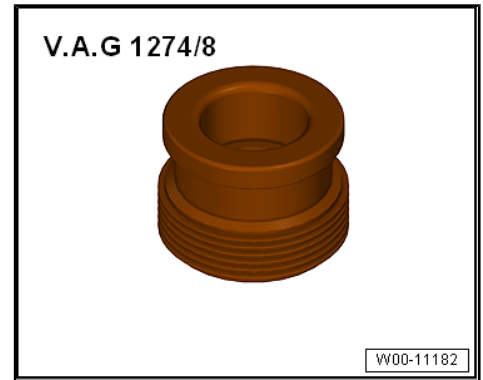
### 1.3 Checking cooling system for leaks

#### Special tools and workshop equipment required

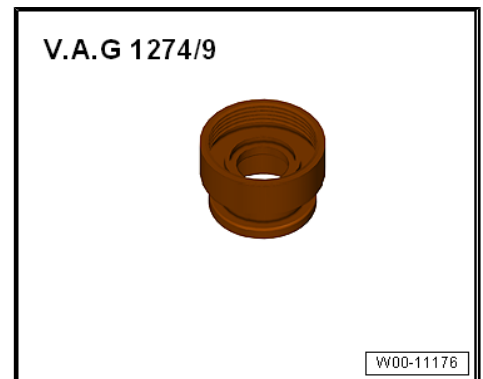
- ◆ Cooling system tester - V.A.G 1274 B-



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



- ◆ Adapter for cooling system tester - V.A.G 1274/9-



#### Procedure

- Engine must be warm.



#### WARNING

*The cooling system is under pressure when the engine is hot.  
Hot steam/hot coolant can escape - risk of scalding.*

*Danger of scalding skin and other parts of the body.*

- *Put on protective gloves.*
- *Put on safety goggles.*
- *Release pressure (cover filler cap on coolant expansion tank with a cloth and open carefully).*

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.



- Open filler cap on coolant expansion tank.
- Fit cooling system tester - V.A.G 1274 B- with adapter - V.A.G 1274/8- onto coolant expansion tank.
- Using hand pump on cooling system tester, build up a pressure of approx. 1.5 bar.
- The pressure should not drop more than 0.2 bar within 10 minutes.
- If the pressure drops more than 0.2 bar, locate leak and eliminate fault.



**Note**

*The drop in pressure of 0.2 bar within 10 minutes is caused by the decrease in coolant temperature. The colder the engine is, the less the pressure will fall. If necessary, check again when the engine is cold.*

**Checking pressure relief valve in filler cap**

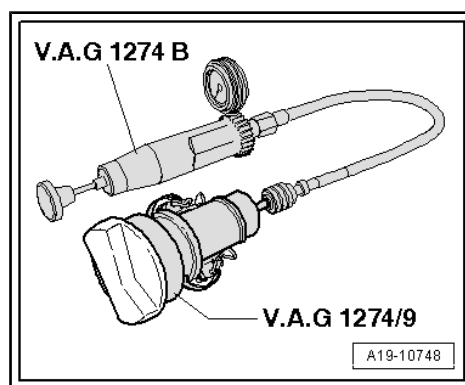
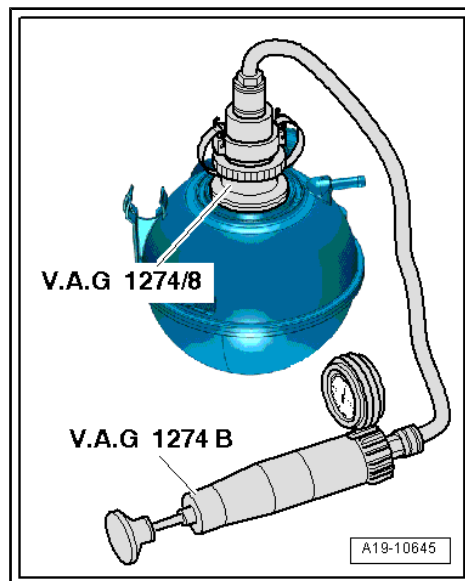
- Fit cooling system tester - V.A.G 1274 B- with adapter - V.A.G 1274/9- onto filler cap.
- Build up pressure with hand pump on cooling system tester.

**Blue filler cap**

- ◆ The pressure relief valve should open at a pressure of 1.4 ... 1.6 bar.

**Black filler cap**

- ◆ The pressure relief valve should open at a pressure of 1.6 ... 1.8 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.

## 2 Coolant pump/thermostat assembly

⇒ ["2.1 Exploded view - coolant pump/thermostat", page 255](#)

⇒ ["2.2 Exploded view - continued coolant circulation pump V51", page 257](#)

⇒ ["2.3 Removing and installing continued coolant circulation pump V51", page 257](#)

⇒ ["2.4 Removing and installing toothed belt for coolant pump", page 258](#)

⇒ ["2.5 Removing and installing coolant pump", page 261](#)

⇒ ["2.6 Removing and installing thermostat", page 263](#)

⇒ ["2.7 Checking thermostat", page 266](#)

⇒ ["2.8 Removing and installing coolant temperature sender G62", page 266](#)

### 2.1 Exploded view - coolant pump/thermostat

#### 1 - Bolt

- Tightening sequence  
⇒ [page 256](#)

#### 2 - O-rings

- Renew

#### 3 - Connection

#### 4 - Retaining clip

- Only on clip-on version
- Check that it is securely seated

#### 5 - Bolt

- 4 Nm
- Only on bolted version

#### 6 - Retaining plate

- Only on bolted version

#### 7 - Coolant temperature sender - G62-

- Removing and installing  
⇒ [page 266](#)

#### 8 - O-ring

- Renew

#### 9 - Coolant pump

- Removing and installing  
⇒ [page 261](#)
- New coolant pump: remove protective cap

#### 10 - Gasket

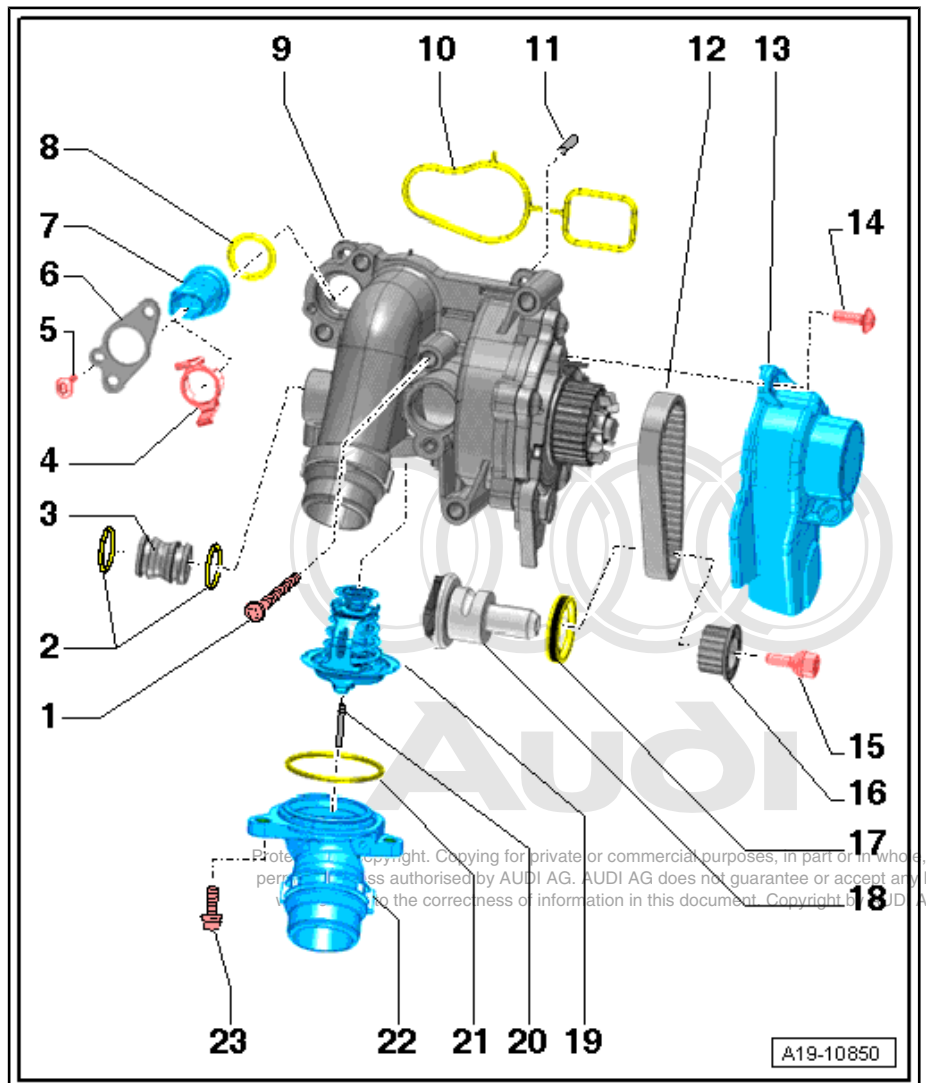
- Renew

#### 11 - Centring pin

- 2x

#### 12 - Toothed belt

- For coolant pump



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

A19-10850



- Removing and installing ⇒ [page 258](#)

### 13 - Toothed belt cover

### 14 - Bolt

- 9 Nm

### 15 - Bolt

- Left-hand thread
- Renew
- 10 Nm + turn 90° further

### 16 - Toothed belt drive sprocket

- Note installation position

### 17 - Oil seal

- Renewing ⇒ [page 83](#)

### 18 - Balance shaft

### 19 - Thermostat

- Removing and installing ⇒ [page 263](#)
- Checking ⇒ [page 266](#)

### 20 - Centring pin

### 21 - O-ring

- Renew

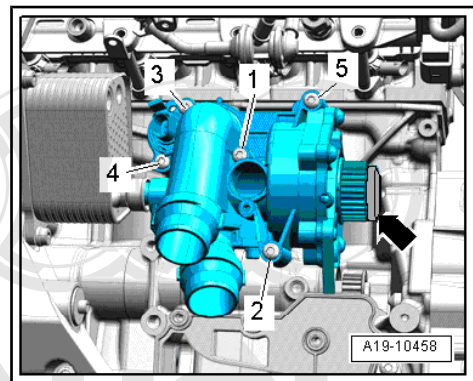
### 22 - Connection

### 23 - Bolt

- 9 Nm

### Coolant pump - tightening sequence

- Tighten bolts for coolant pump in the sequence -1 ... 5- to 9 Nm.

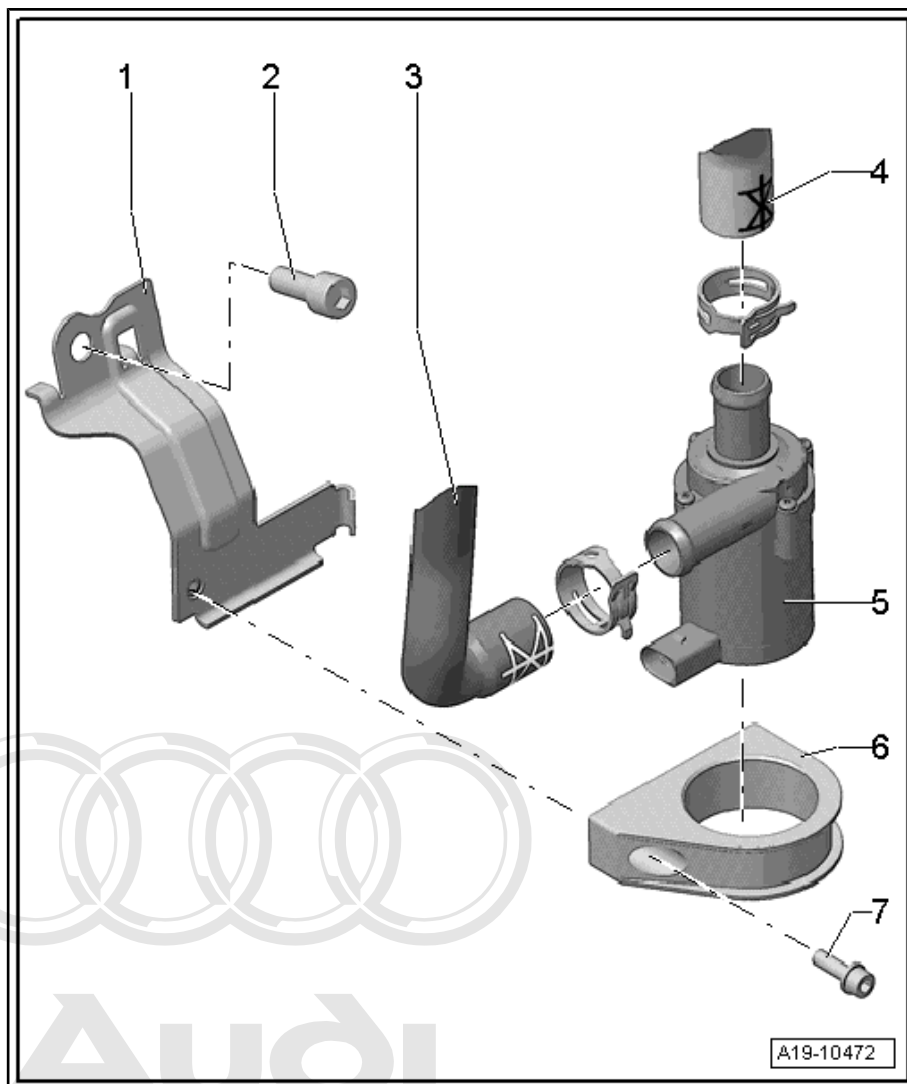


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



## 2.2 Exploded view - continued coolant circulation pump - V51-

- 1 - Bracket
- 2 - Bolt
  - 5 Nm
- 3 - Coolant hose
- 4 - Coolant hose
- 5 - Continued coolant circulation pump - V51-
- 6 - Bracket
- 7 - Bolt
  - 8 Nm

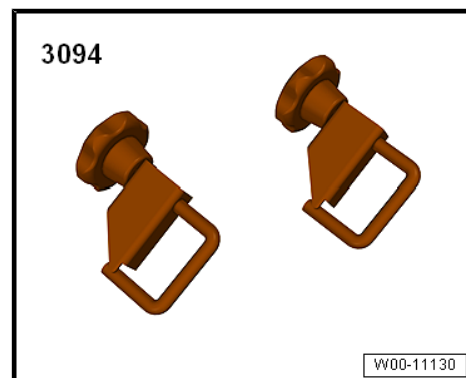


## 2.3 Removing and installing continued coolant circulation pump - V51-

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

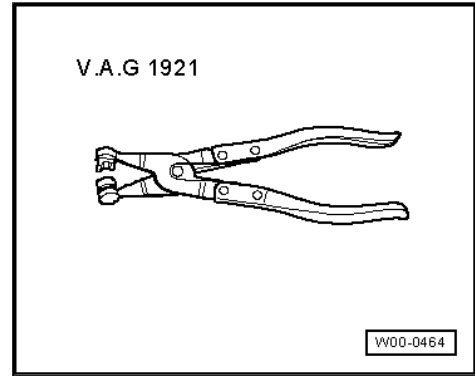
### Special tools and workshop equipment required

- ◆ Hose clamps, up to 25 mm - 3094-





- ◆ Hose clip pliers - V.A.G 1921-



### Removing



#### WARNING

*The cooling system is under pressure when the engine is hot. Hot steam/hot coolant can escape - risk of scalding.*

*Danger of scalding skin and other parts of the body.*

- Put on protective gloves.
- Put on safety goggles.
- Release pressure (cover filler cap on coolant expansion tank with a cloth and open carefully).

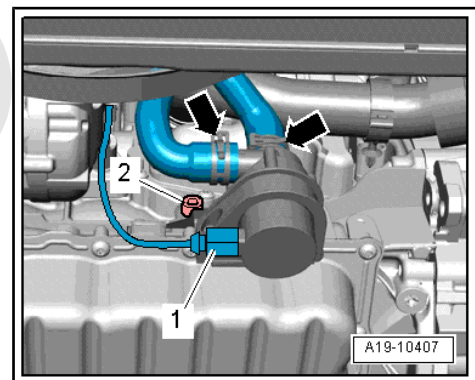
- Open filler cap on coolant expansion tank.
- Remove noise insulation => Rep. gr. 66 .

### Cabriolet

- Remove noise insulation frame => Rep. gr. 50 .

### All vehicles:

- Unplug electrical connector -1- for continued coolant circulation pump - V51- .
- Place drip tray for workshop hoist - VAS 6208- beneath engine.
- Clamp off coolant hoses -arrows- with hose clamps up to 25 mm - 3094- .
- Disconnect coolant hoses from continued coolant circulation pump - V51- .
- Remove bolt -2- and detach continued coolant circulation pump - V51- .



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.

### Installing

- Tightening torque  
=> ["2.2 Exploded view - continued coolant circulation pump V51"](#), [page 257](#)

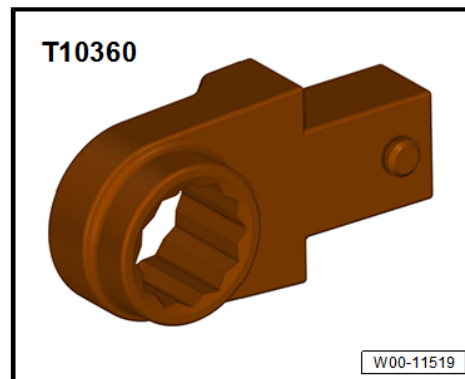
Installation is carried out in the reverse order; note the following:

- Fill up with coolant => [page 248](#) .

## 2.4 Removing and installing toothed belt for coolant pump

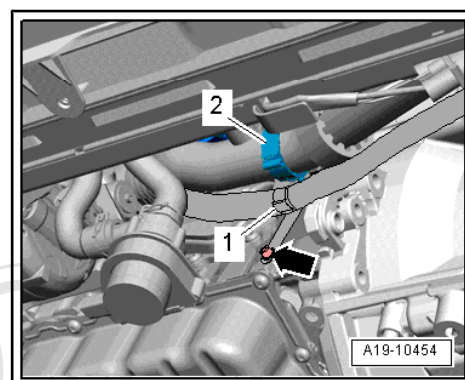
Special tools and workshop equipment required

- ◆ Tool insert - T10360-



### Removing

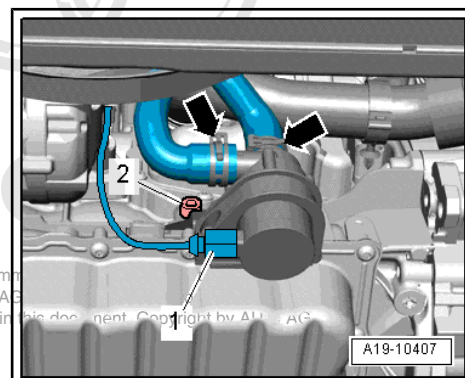
- Remove small coolant pipe => [page 273](#) .
- Move coolant hose -2- and electrical wiring harness -1- clear.
- Remove bolt -arrow- and remove bracket.



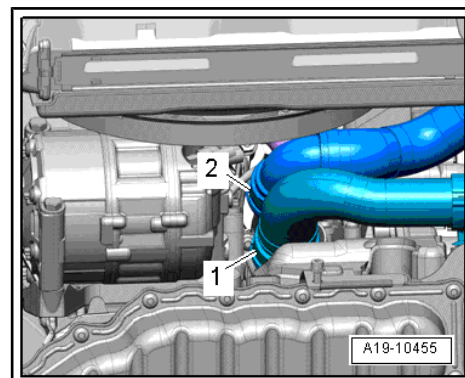
- Remove bolt -2- at bracket for continued coolant circulation pump - V51- .

 **Note**

*Disregard items marked -1 and arrows-.*



- Disconnect coolant hoses -1 and 2- and move clear to one side.

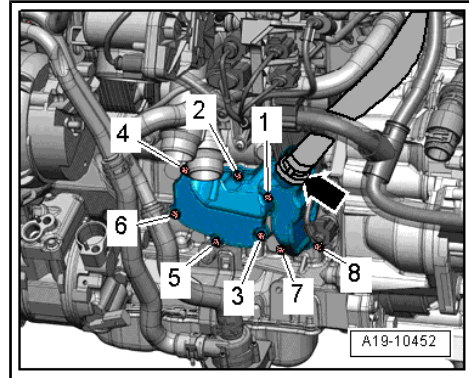


Protected by copyright. Copying for private or commercial use is not permitted unless authorised by AUDI AG. AUDI AG is not responsible with respect to the correctness of information in this document. Copyright by AUDI AG.



### Engine codes BYT, BPU

- Press release tabs, detach crankcase breather hose -arrow- and move clear to one side.
- Remove bolts -1 ... 8- and detach coarse oil separator.



### Engine codes BZB, CAWB, CBFA, CCTA, CDA, CCZA

- Remove bolts -1 ... 9- and detach coarse oil separator.

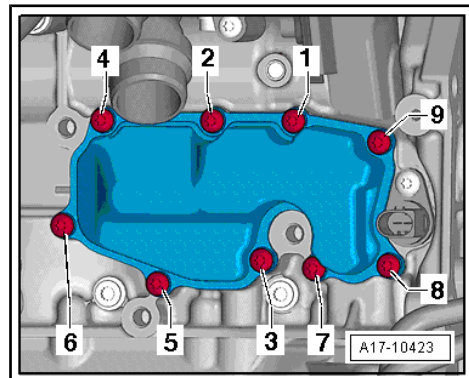
All vehicles:



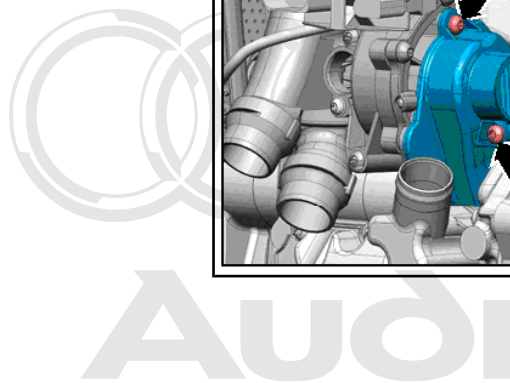
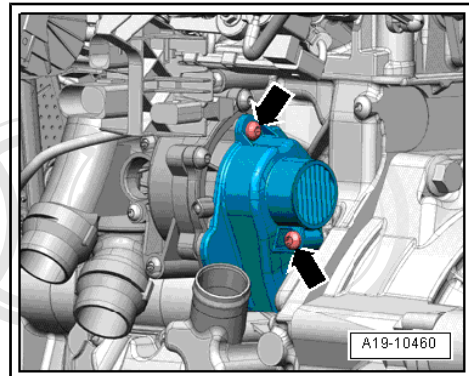
**Caution**

*Protect lubrication system against contamination.*


- ◆ Seal off opening with clean cloth.



- Remove bolts -arrows- and detach toothed belt cover.



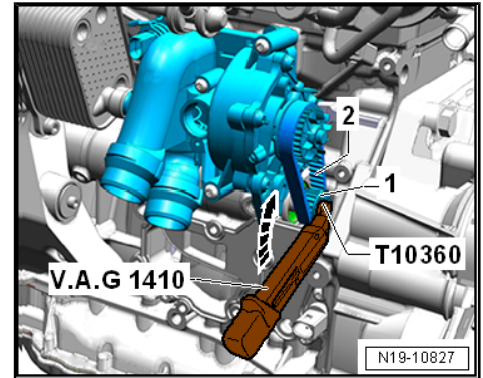
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

 **Caution**

*Risk of damage to thread.*

◆ *The drive sprocket bolt has a left-hand thread.*

- Use torque wrench - V.A.G 1410- and insert tool - T10360- to loosen bolt on coolant pump drive sprocket -1- in a clockwise direction (direction of -arrow-) and unscrew three turns (counterhold at vibration damper).
- Remove toothed belt -2-.



### Installing

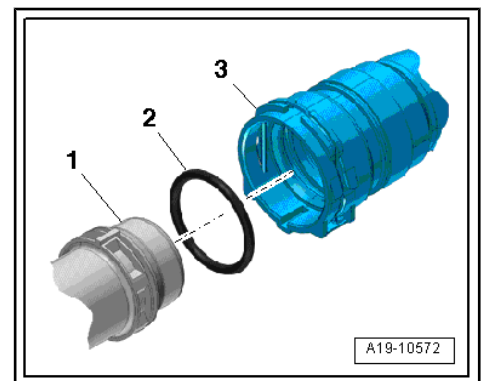
- Tightening torques  
⇒ ["2.1 Exploded view - coolant pump/thermostat", page 255](#)

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 without the prior written consent of Audi AG. Audi AG assumes no liability with respect to the correctness of information in this document. Copyright by AUDI AG.

### Note

- ◆ *Renew drive sprocket bolt.*
- ◆ *Renew gaskets and O-rings.*
- ◆ *Note installation position of toothed belt drive sprocket*  
⇒ [Item 16 \(page 256\)](#) .
- Install coarse oil separator: engine codes BYT, BPU  
⇒ [page 222](#) ; engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA ⇒ [page 223](#) .
- Install continued coolant circulation pump - V51-  
⇒ [page 257](#) .
- Install small coolant pipe ⇒ [page 273](#) .
- Connect coolant hose with plug-in connector ⇒ [page 277](#) .
- Fill up with coolant ⇒ [page 248](#) .



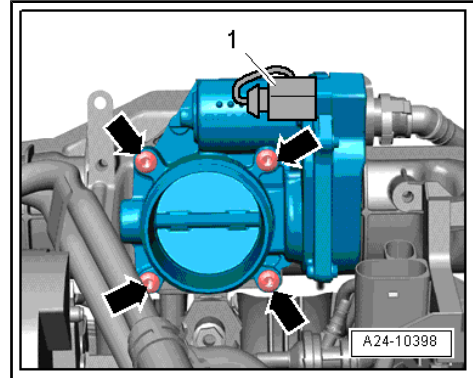
## 2.5 Removing and installing coolant pump

### Removing

- Remove small coolant pipe ⇒ [page 273](#) .
- Remove toothed belt for coolant pump ⇒ [page 258](#) .



- Unplug electrical connector -1- at throttle valve module - J338- .
- Unscrew bolts -arrows- and detach throttle valve module - J338- .

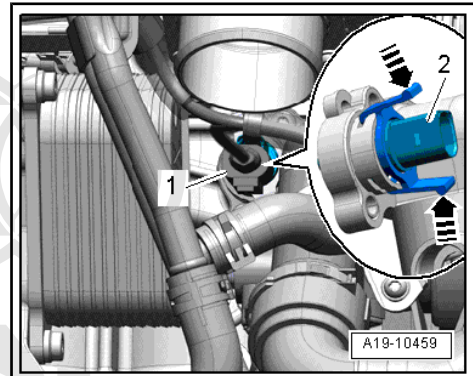


- Unplug electrical connector -1- at coolant temperature sender - G62- .



**Note**

Disregard items marked -2 and arrows-.



- Remove bolts -1 ... 5-.
- Detach coolant pump from centring pins and pull pump off engine oil cooler.



**Note**

Disregard -arrow-.

**Installing**

- Tightening torque  
⇒ ["2.1 Exploded view - coolant pump/thermostat", page 255](#)

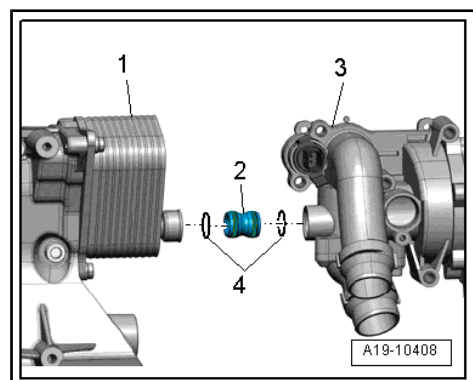
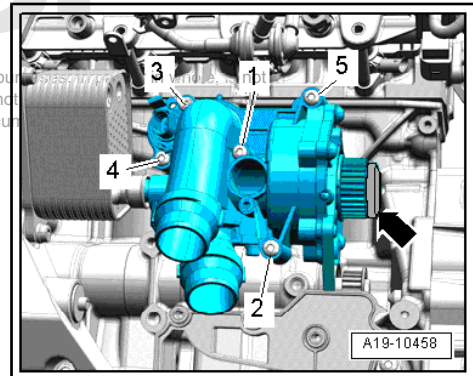
Installation is carried out in the reverse order; note the following:



**Note**

Renew gaskets and O-rings.

- Lubricate O-rings -4- with coolant, for coolant refer to ⇒ Electronic parts catalogue .
- Check whether the two centring pins are fitted in the cylinder block; install if necessary.
- Fit connecting piece -2- into engine oil cooler -1-.
- Push coolant pump -3- onto connecting piece and centring pins in cylinder block.

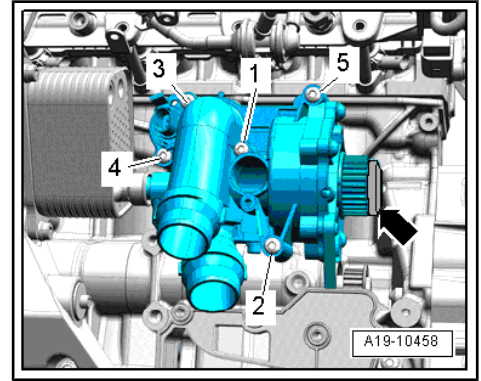


- Tighten bolts -1 ... 5-

 **Note**

*Detach protective cap -arrow- if a new coolant pump has been fitted.*

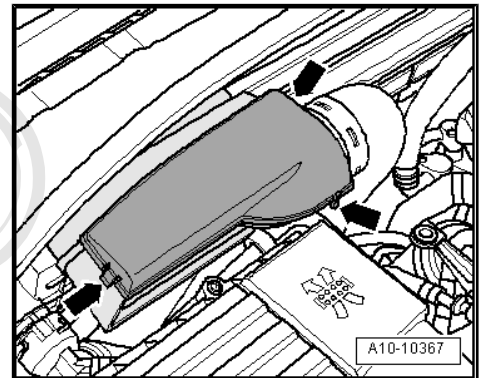
- Install toothed belt for coolant pump ⇒ [page 258](#) .
- Install coarse oil separator: engine codes BYT, BPU ⇒ [page 222](#) ; engine codes BZB, CAWB, CBFA, CCTA, CDA, CCZA ⇒ [page 223](#) .
- Install throttle valve module - J338- ⇒ [page 358](#) .
- Install small coolant pipe ⇒ [page 273](#) .
- Install continued coolant circulation pump - V51- ⇒ [page 257](#) .
- Connect coolant hose with plug-in connector ⇒ [page 277](#) .



## 2.6 Removing and installing thermostat

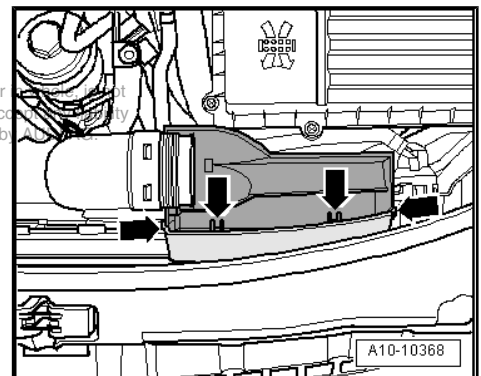
### Removing

- Drain coolant ⇒ [page 247](#) .
- Pull cover off air duct (release clips on sides) -arrows-



- Unclip air duct at the bottom by releasing clips -arrows-
- Detach air duct at bottom together with air hose.

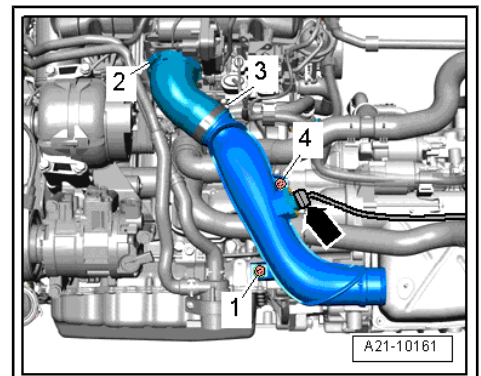
Protected by copyright. Copying for private or commercial purposes, in part or in full, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by Audi AG.



- Release hose clip -2-
- Remove bolt -4-
- Unplug electrical connector -arrow-
- Remove bolt -1- and take out air pipe downwards.

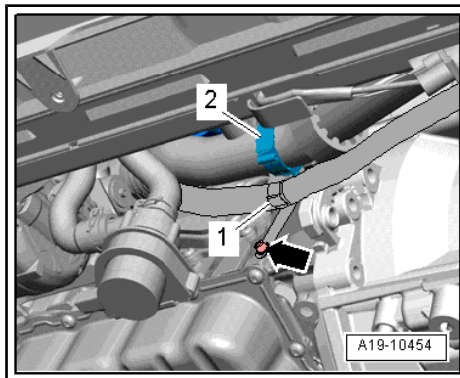
 **Note**

*-Item 3- can be disregarded.*





- Move coolant hose -2- and electrical wiring harness -1- clear.
- Remove bolt -arrow- and remove bracket.

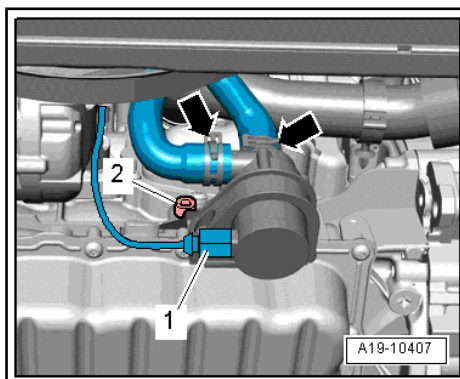


- Remove bolt -2- at bracket for continued coolant circulation pump - V51- .

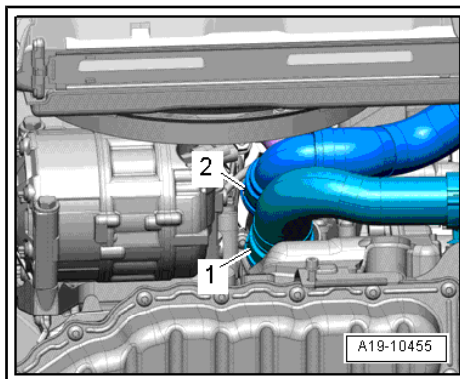


**Note**

- ◆ *The continued circulation coolant pump - V51- remains installed.*
- ◆ *Disregard items marked -1 and arrows-.*

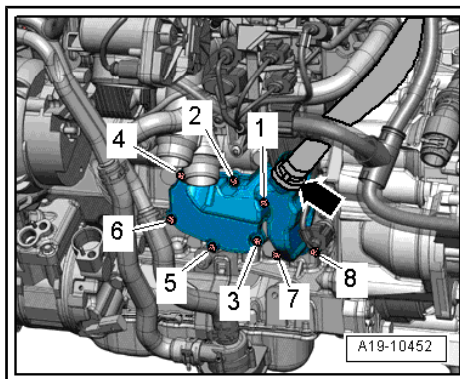


- Disconnect coolant hoses -1 and 2- and move clear to one side.



**Engine codes BYT, BPU**

- Press release tabs, detach crankcase breather hose -arrow- and move clear to one side.
- Remove bolts -1 ... 8- and detach coarse oil separator.



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.



Engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA

- Remove bolts -1 ... 9- and detach coarse oil separator.

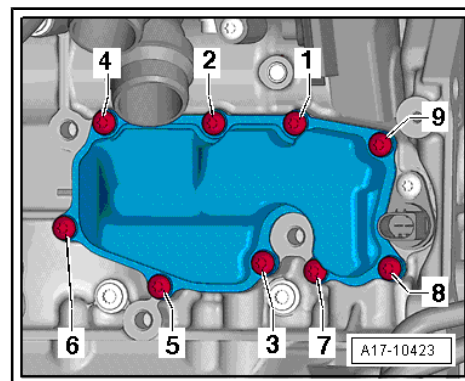
All vehicles:



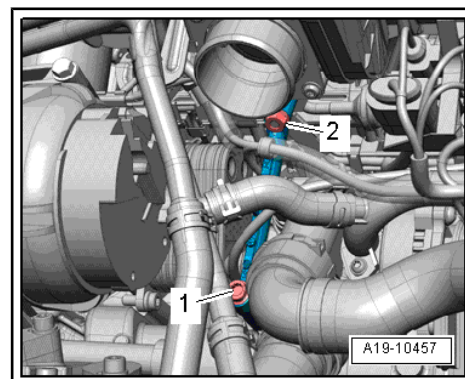
Caution

*Protect lubrication system against contamination.*

- ◆ Seal off opening with clean cloth.



- Loosen nut -2-, remove bolt -1- and swivel support for intake manifold slightly to right.



- Unscrew bolts -arrows- and remove connection.
- Detach thermostat.

Installing

- Tightening torques  
 ⇒ ["2.1 Exploded view - coolant pump/thermostat", page 255](#)

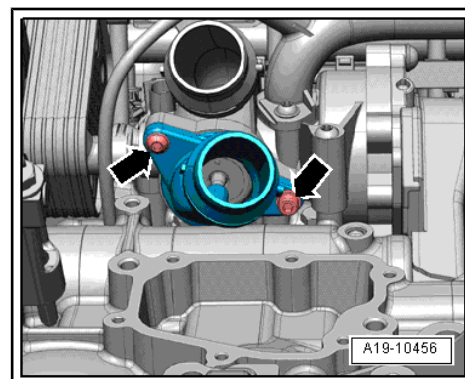
Installation is carried out in the reverse order; note the following:



Note

*Renew gaskets and O-rings.*

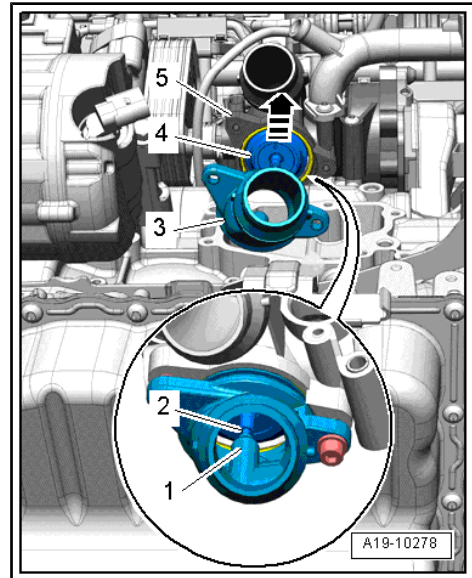
- Clean sealing surface for O-ring.
- Coat O-ring with coolant, coolant ⇒ Electronic parts catalogue .



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.



- Insert thermostat -4- in coolant pump housing -5- and swivel forwards slightly -arrow-.
- Fit connection -3- carefully (insert centring pin -2- in guide -1-).
- Install coarse oil separator: engine codes BYT, BPU ⇒ [page 222](#) ; engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA ⇒ [page 223](#) .
- Install support for intake manifold ⇒ [page 331](#) .
- Install continued coolant circulation pump - V51- ⇒ [page 257](#) .
- Install air pipes/hoses with plug-in connectors ⇒ [page 288](#) .
- Connect coolant hose with plug-in connector ⇒ [page 277](#) .
- Fill up with coolant ⇒ [page 248](#) .



## 2.7 Checking thermostat

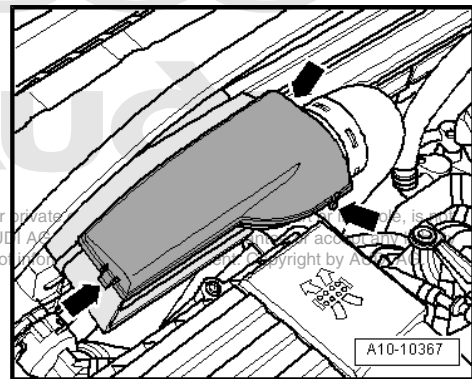
- Thermostat removed ⇒ [page 263](#)
- Heat thermostat in water bath.

Starts to open	Fully open	Opening travel
approx. 95°	approx. 105° <sup>1)</sup>	at least 8 mm
• <sup>1)</sup> Cannot be checked		

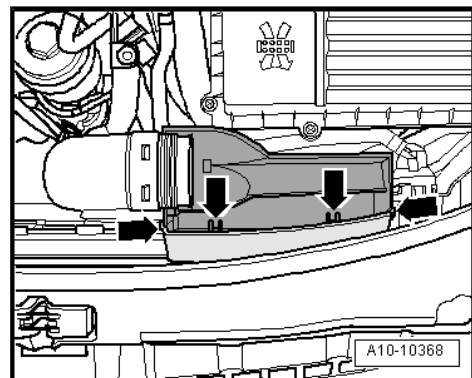
## 2.8 Removing and installing coolant temperature sender - G62-

### Removing

- Engine cold.
- Pull cover off air duct (release clips on sides) -arrows-.



- Unclip air duct at the bottom by releasing clips -arrows-.
- Detach air duct at bottom together with air hose.



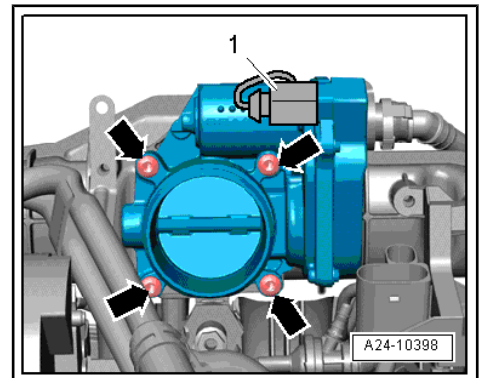
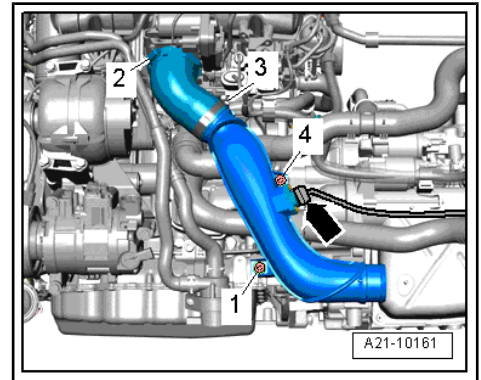
- Remove air hose -item 2 and 3-.

 **Note**

*Disregard items marked -1, 2 and 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.

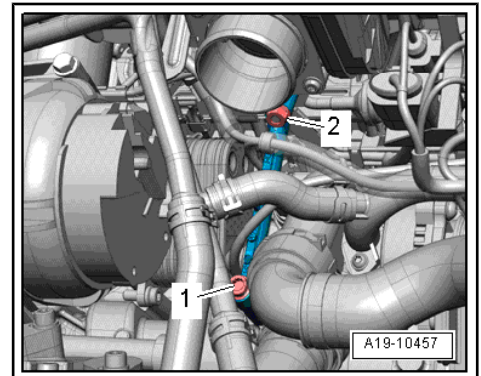
- Unplug electrical connector -1- at throttle valve module - J338- .
- Unscrew bolts -arrows- and detach throttle valve module - J338- .



- Remove support for intake manifold (remove nut -2- and bolt -1-).

 **Note**

*Depending on version, different coolant temperature senders - G62- can be fitted.*



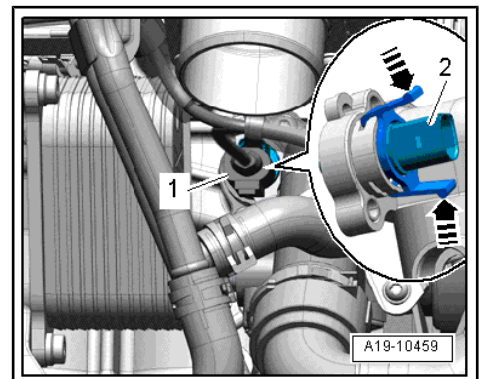
**Clip-on version**

- Unplug electrical connector -1- at coolant temperature sender - G62- .

 **Note**

*Place a cloth underneath to catch escaping coolant.*

- Detach retaining clip (press release tabs -arrows-).
- Detach coolant temperature sender - G62- -2-





### Bolted version

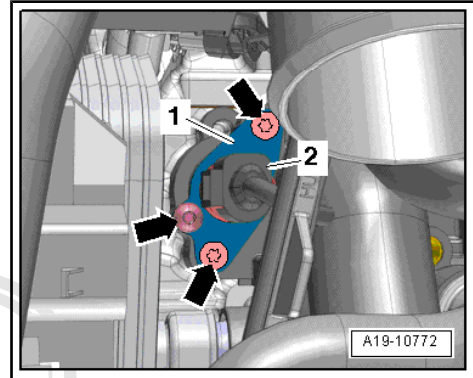
- Unplug electrical connector -2- at coolant temperature sender - G62- .



#### Note

*Place a cloth underneath to catch escaping coolant.*

- Unscrew bolts -arrows- and remove retaining plate -1-.
- Detach coolant temperature sender - G62- .



### Installing

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



#### Note

- ◆ *Fit new O-ring.*
- ◆ *Insert new coolant temperature sender - G62- immediately into connection to avoid loss of coolant.*

- Install support for intake manifold => [page 331](#) .
- Install throttle valve module - J338- => [page 358](#) .
- Check coolant level => [page 248](#) .

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted without the prior 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.

### 3 Coolant pipes

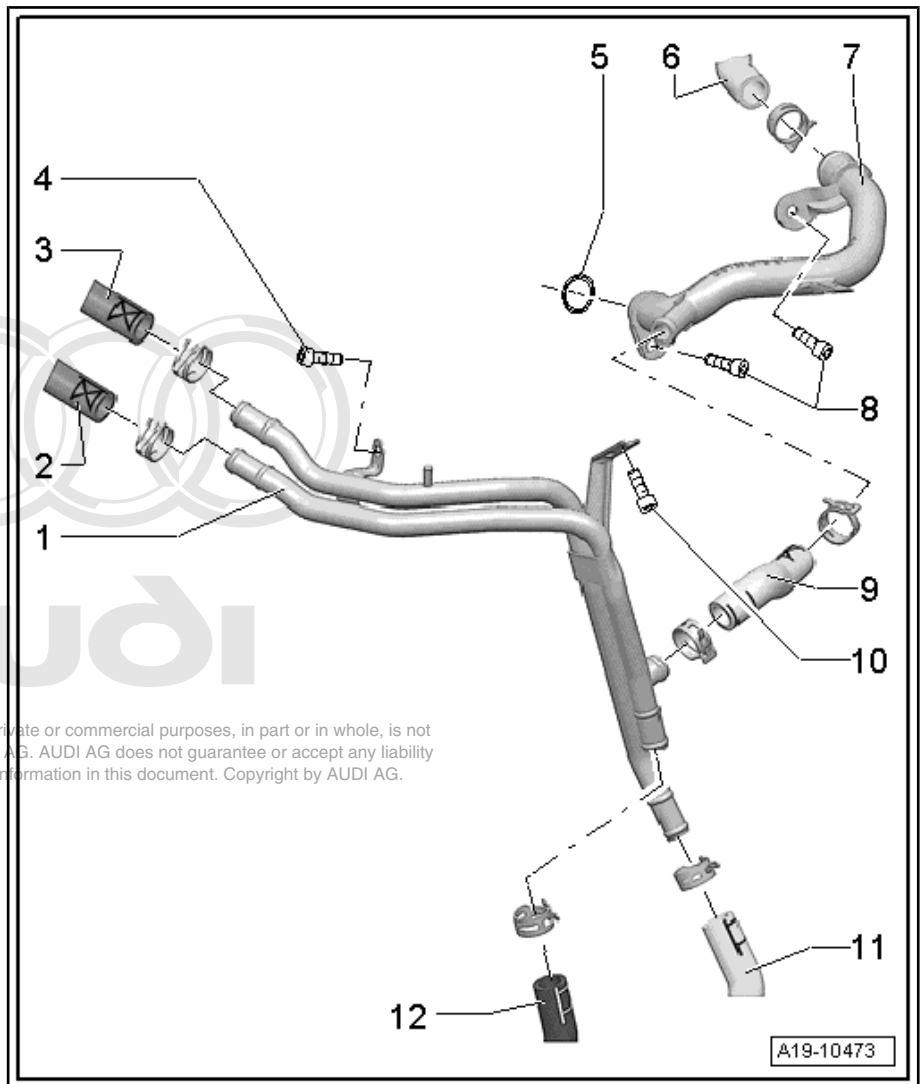
⇒ [“3.1 Exploded view - coolant pipes”, page 269](#)

⇒ [“3.2 Removing and installing coolant pipes \(front\)”, page 269](#)

⇒ [“3.3 Removing and installing small coolant pipe”, page 273](#)

#### 3.1 Exploded view - coolant pipes

- 1 - Coolant pipes (front)
  - Removing and installing  
⇒ [page 269](#)
- 2 - Coolant hose
  - From turbocharger
- 3 - Coolant hose
  - To coolant expansion tank
- 4 - Bolt
  - 5 Nm
- 5 - O-ring
  - Renew
- 6 - Coolant hose
  - To heat exchanger for heater
- 7 - Small coolant pipe
  - Removing and installing  
⇒ [page 273](#)
- 8 - Bolts
  - 9 Nm
- 9 - Coolant hose
- 10 - Bolt
  - 5 Nm
- 11 - Coolant hose
  - From continued coolant circulation pump - V51-
- 12 - Coolant hose
  - To continued coolant circulation pump - V51-

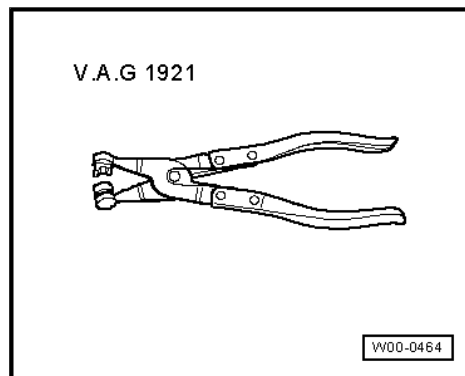


#### 3.2 Removing and installing coolant pipes (front)

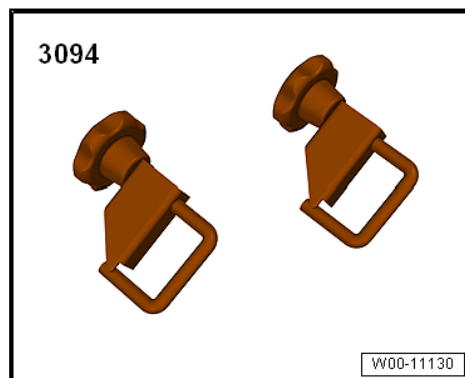
Special tools and workshop equipment required



- ◆ Hose clip pliers - V.A.G 1921-



- ◆ Drip tray for workshop hoist - VAS 6208-



### Removing



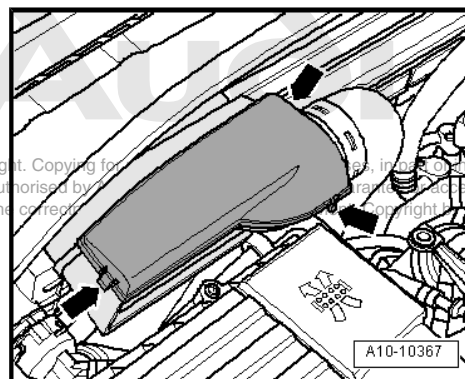
#### WARNING

*The cooling system is under pressure when the engine is hot.  
Hot steam/hot coolant can escape - risk of scalding.*

*Danger of scalding skin and other parts of the body.*

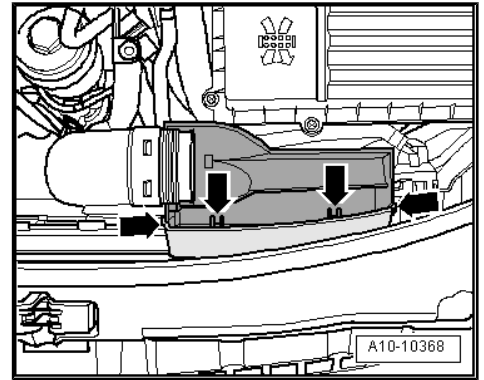
- *Put on protective gloves.*
- *Put on safety goggles.*
- *Release pressure (cover filler cap on coolant expansion tank with a cloth and open carefully).*

- Open filler cap on coolant expansion tank.
- Pull cover off air duct (release clips on sides) -arrows-.

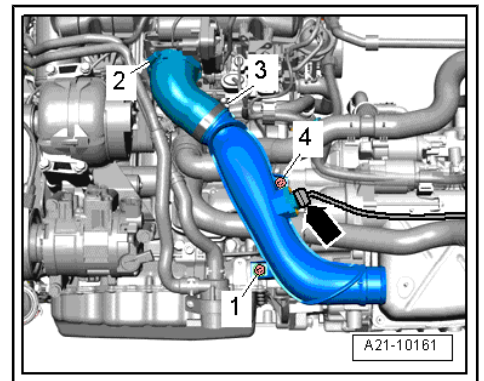


Protected by copyright. Copying for private use, in whole or in part, is not permitted unless authorised by Audi AG. Audi AG is not liable for any liability with respect to the correctness of the information. Copyright © Audi AG.

- Unclip air duct at the bottom by releasing clips -arrows-.
- Detach air duct at bottom together with air hose.



- Release hose clip -2-.
- Remove bolt -4-.
- Unplug electrical connector -arrow- and move wiring clear.



 **Note**

*Disregard items marked -1 and 3-.*

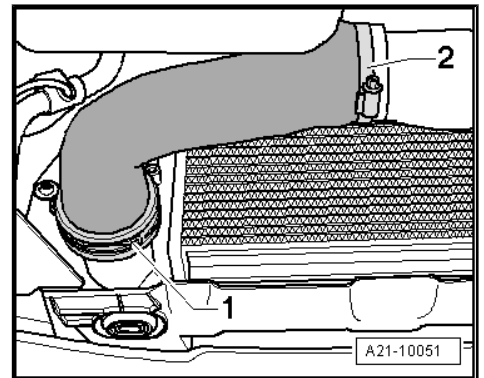
- Remove noise insulation ⇒ Rep. gr. 66 .

**Cabriolet**

- Remove noise insulation frame ⇒ Rep. gr. 50 .

**All vehicles:**

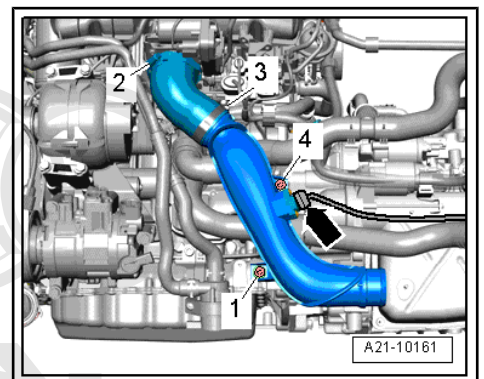
- Remove air pipe -item 1 and 2-.



- Remove bolt -1- and take out air pipe downwards.

 **Note**

*Disregard items marked -2, 3, 4 and arrow-.*



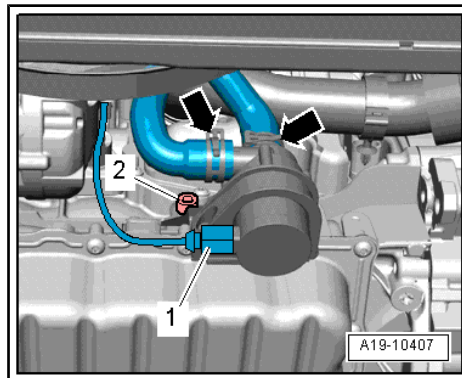


- Place drip tray for workshop hoist - VAS 6208- beneath engine.
- Disconnect coolant hoses from continued coolant circulation pump - V51- -arrows-.



**Note**

Disregard items marked -1 and 2-.



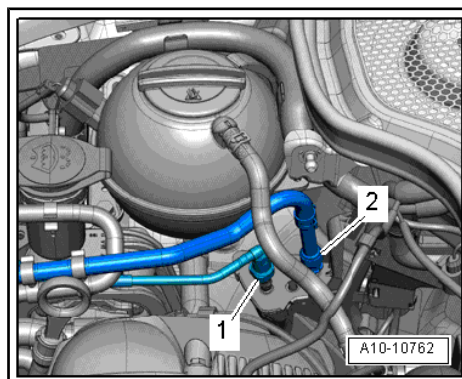
- Disconnect vacuum line -1- going to activated charcoal filter (press release tab).



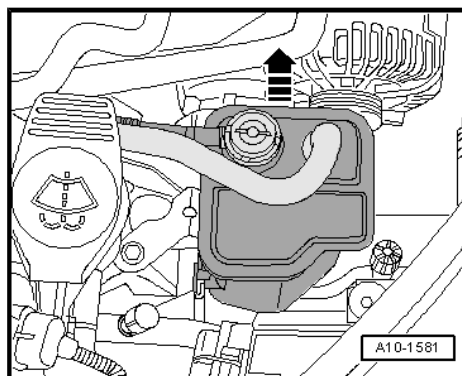
**Note**

-Item 2- can be disregarded.

- Detach vacuum line from coolant pipes (front).



- Pull activated charcoal filter with hoses attached upwards out of the bracket -arrow- and place to side.



- Unscrew bolts -1 and 2- and disconnect coolant pipes (front) from coolant hoses -arrows-.

**Installing**

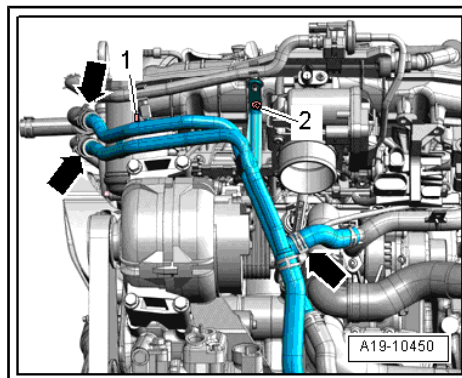
- Tightening torques  
⇒ ["3.1 Exploded view - coolant pipes"](#), page 269

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



**Note**

- ◆ **Renew gaskets and seals.** Information 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
- ◆ **Secure all hose connections with the correct type of hose clips (same as original equipment)** ⇒ *Electronic parts catalogue*.



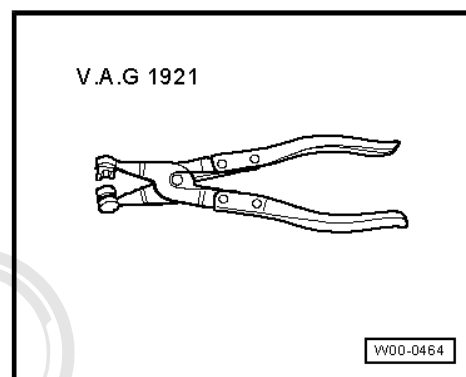
- Install air pipes/hoses with plug-in connectors ⇒ [page 288](#).
- Fill up with coolant ⇒ [page 248](#).



### 3.3 Removing and installing small coolant pipe

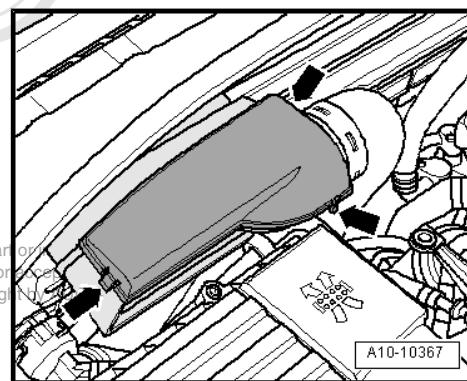
#### Special tools and workshop equipment required

- ◆ Hose clip pliers - V.A.G 1921-

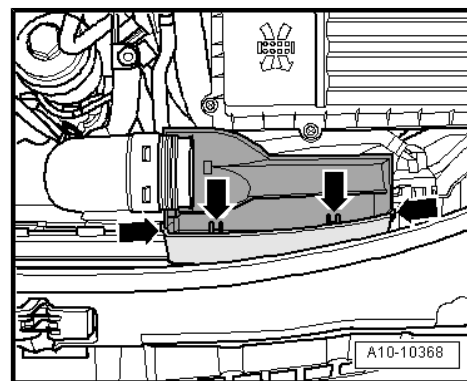


#### Removing

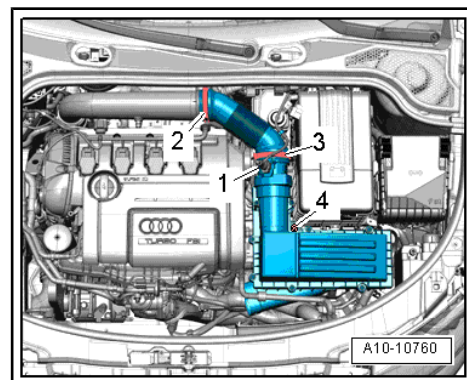
- Drain coolant → [page 247](#) .
- Pull cover off air duct (release clips on sides) -arrows-.



- Unclip air duct at the bottom by releasing clips -arrows-.
- Detach air duct at bottom together with air hose.



- Unplug electrical connector -1- at air mass meter - G70- .
- Detach air hose -2-.
- Unscrew bolt -4- and remove air cleaner housing.



#### Note

-Item 3- can be disregarded.



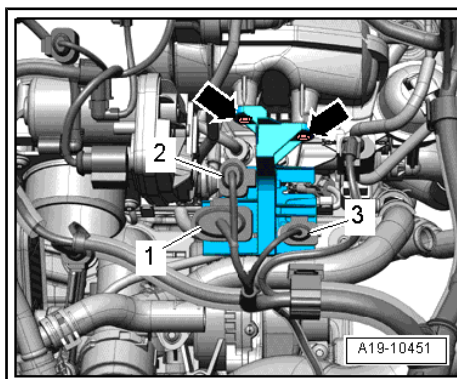
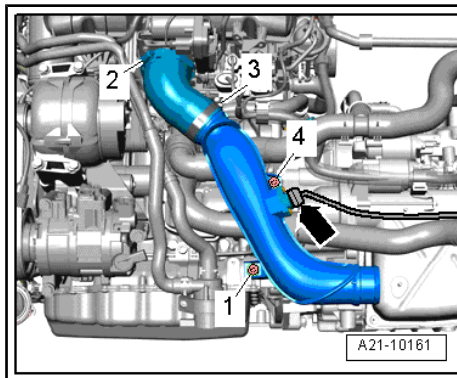
- Release hose clip -2-.
- Remove bolt -4-.
- Unplug electrical connector -arrow-.
- Remove bolt -1- and take out air pipe downwards.



**Note**

-Item 3- can be disregarded.

- Remove bolts -arrows- and detach electrical connectors -1 ... 3- from bracket.



**Engine codes BYT, BPU**

- Press release tabs, detach crankcase breather hose -arrow- and move clear to one side.

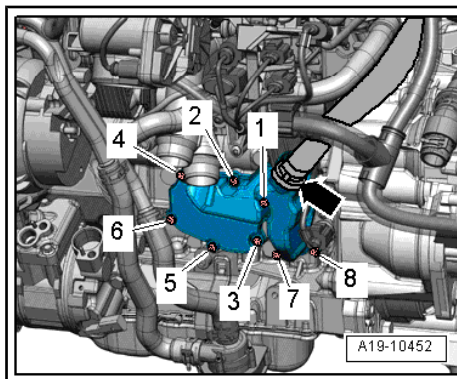


**Note**

Disregard bolts -1 ... 8-.

**All vehicles:**

- Move electrical wiring on small coolant pipe clear -arrow-.
- Remove bolts -2 and 3-.
- Detach small coolant pipe from coolant pump and coolant hoses -1 and 4-.



**Installing**

- Tightening torques [page 269](#)
- [3-1 Exploded view - coolant pipes](#), [page 269](#)

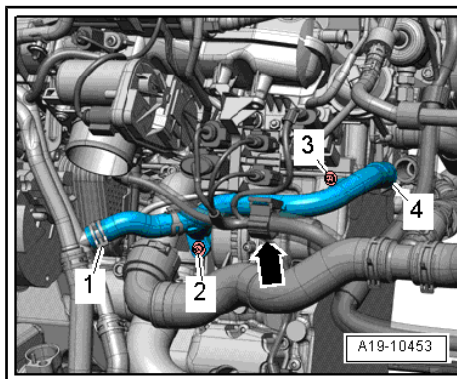
Installation is carried out in the reverse order; note the following:



**Note**

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

- Install air pipes/hoses with plug-in connectors ⇒ [page 288](#) .
- Fill up with coolant ⇒ [page 248](#) .



## 4 Radiator/radiator fans

⇒ [“4.1 Exploded view - radiator and radiator fans”, page 275](#)

⇒ [“4.2 Removing and installing radiator cowl”, page 277](#)

⇒ [“4.3 Removing and installing radiator fans”, page 279](#)

⇒ [“4.4 Removing and installing radiator”, page 279](#)



### WARNING

*The cooling system is under pressure when the engine is hot. Hot steam/hot coolant can escape - risk of scalding.*

*Danger of scalding skin and other parts of the body.*

- *Put on protective gloves.*
- *Put on safety goggles.*
- *Release pressure (cover filler cap on coolant expansion tank with a cloth and open carefully).*



### WARNING

*Risk of injury as the radiator fan(s) may start up automatically.*

- ◆ *Unplug electrical connectors before starting to work in the area of radiator cowl.*



### 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 installing spring-type clips.*
- ◆ *Renew gaskets and seals.*
- ◆ *If there are slight impressions on the fins, refer to ⇒ [“3.5 Installing radiators, condensers and charge air coolers”, page 6](#) .*
- ◆ *The arrow markings on coolant pipes and on ends of hoses must align.*

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

### 4.1 Exploded view - radiator and radiator fans

**1 - Radiator fan - V7-**

- Removing and installing ⇒ [page 279](#)

**2 - Nut**

- 10 Nm

**3 - Radiator cowl**

**4 - Coolant hose (bottom)**

- To connection for thermostat

**5 - Retaining clip**

**6 - Coolant temperature sender - G62-**

- Removing and installing ⇒ [page 266](#)

**7 - O-ring**

- Renew if damaged

**8 - Coolant hose (top)**

- From coolant pump

**9 - O-ring**

- Renew if damaged

**10 - Bolt**

- 5 Nm
- To charge air cooler

**11 - Radiator**

- Removing and installing ⇒ [page 279](#)

- If renewed, change coolant in entire system

- Note engine codes CBFA, CCTA with radiator identification sensor - G611-

⇒ [“4.5 Installing radiator identification sensor G611 , engine codes CBFA, CCTA”, page 281](#)

**12 - Nut**

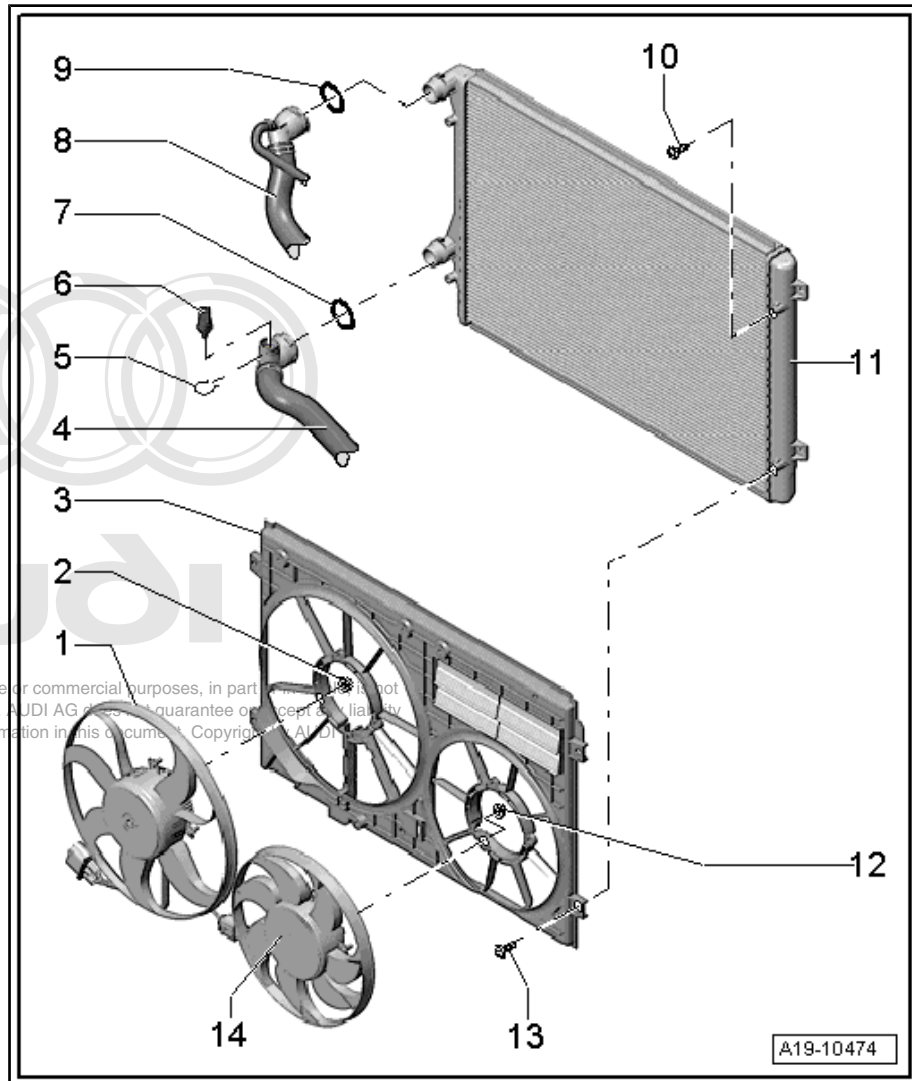
- 10 Nm

**13 - Bolt**

- 5 Nm
- To radiator

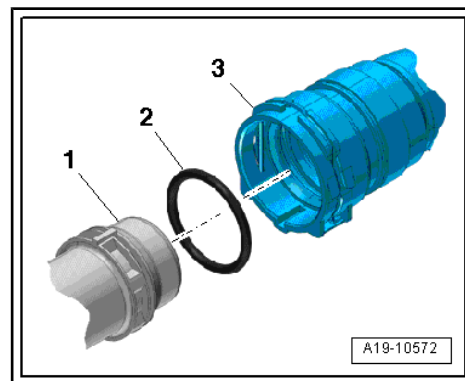
**14 - Radiator fan 2 - V177-**

- Removing and installing ⇒ [page 279](#)



### Connecting coolant hose with plug-in connector

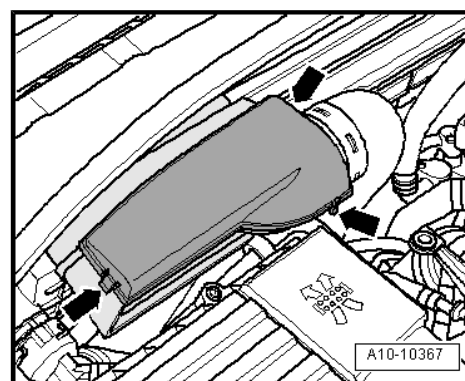
- Remove old O-ring -2- from coolant hose -3-.
- Lightly lubricate new O-ring with coolant and fit O-ring in coolant hose.
- Press coolant hose onto connection -1- until it engages audibly.
- Press coolant hose in again and then pull to check that plug-in connector is correctly engaged.



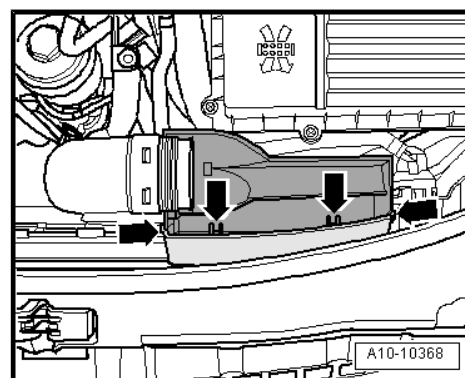
## 4.2 Removing and installing radiator cowl

### Removing

- Pull cover off air duct (release clips on sides) -arrows-.



- Unclip air duct at the bottom by releasing clips -arrows-.
- Detach air duct at bottom together with air hose.

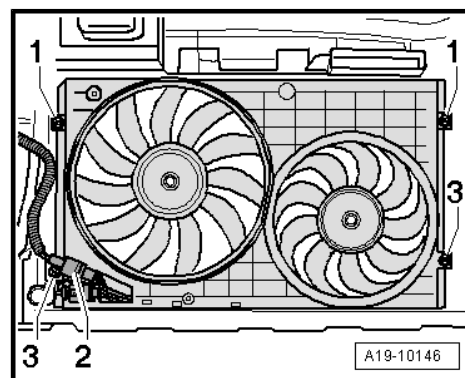


- Remove bolts -1- at top.

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 in respect to the correctness of information in this document. Copyright by AUDI AG.



Disregard items marked -2 and 3-.



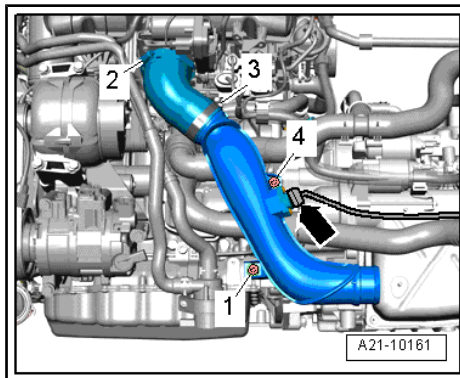


- Release hose clip -2-.
- Remove bolt -4-.
- Unplug electrical connector -arrow- and move wiring clear.

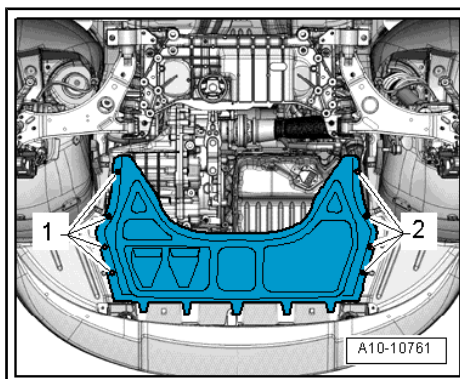


**Note**

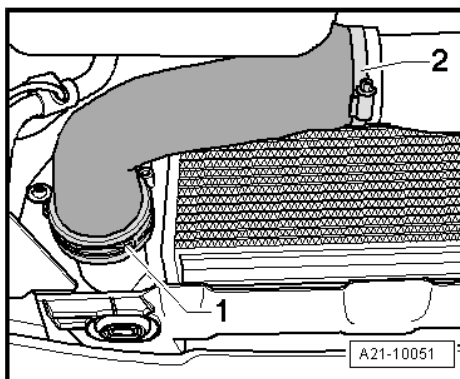
*Disregard items marked -1 and 3-.*



- Release fasteners -1 and 2- and remove centre noise insulation.



- Remove air hose -item 1 and 2-.

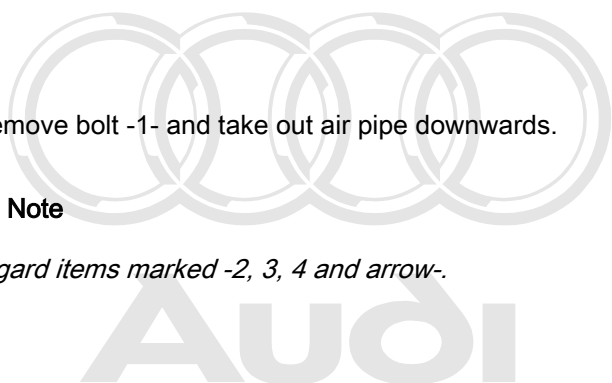
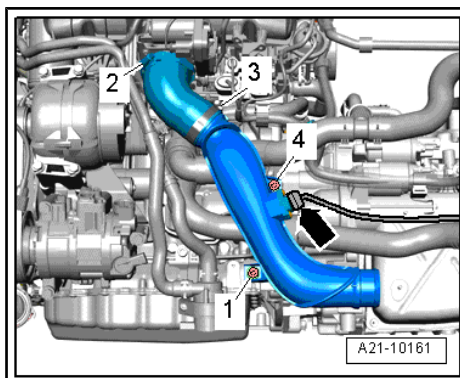


- Remove bolt -1- and take out air pipe downwards.



**Note**

*Disregard items marked -2, 3, 4 and 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.

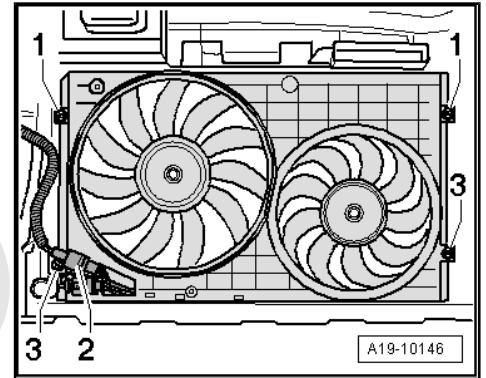
- Unplug electrical connector -2-.
- Remove bolts -3- and take out air cowl downwards.

#### Installing

- Tightening torque  
⇒ ["4.1 Exploded view - radiator and radiator fans", page 275](#)

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

- Install air pipes/hoses with plug-in connectors ⇒ [page 288](#) .



### 4.3 Removing and installing radiator fans

#### Removing

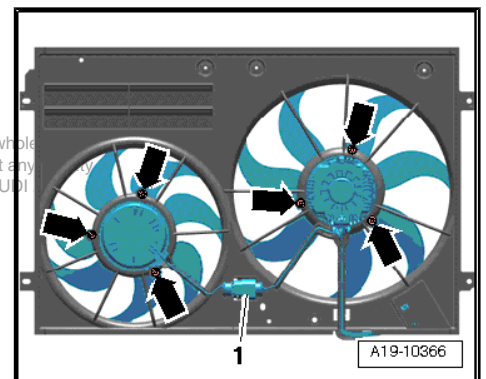
- Remove radiator cowl ⇒ [page 277](#) .
- Unplug electrical connector -1-.
- Move electrical wiring clear.
- Unscrew nuts -arrows- and remove radiator fans.

#### Installing

- Tightening torque  
⇒ ["4.1 Exploded view - radiator and radiator fans", page 275](#)

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

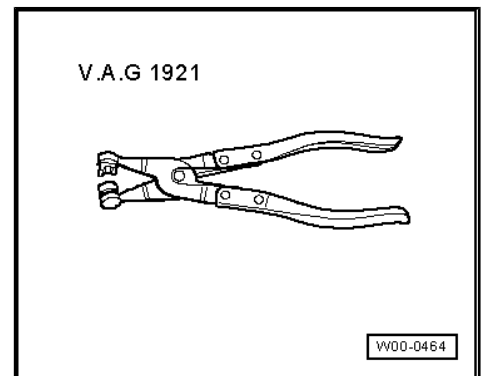
- Install radiator cowl ⇒ [page 277](#) .



### 4.4 Removing and installing radiator

#### Special tools and workshop equipment required

- ◆ Hose clip pliers - V.A.G 1921-



#### Removing



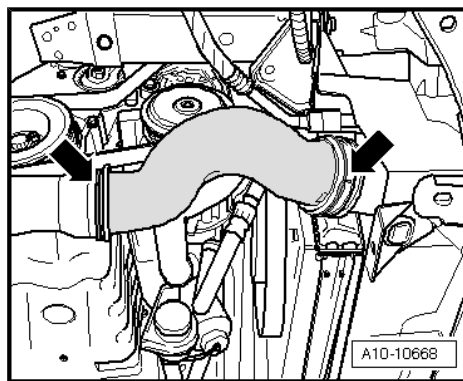
#### Note

*If there are slight impressions on the fins, refer to  
⇒ ["3.5 Installing radiators, condensers and charge air coolers",  
page 6](#) .*

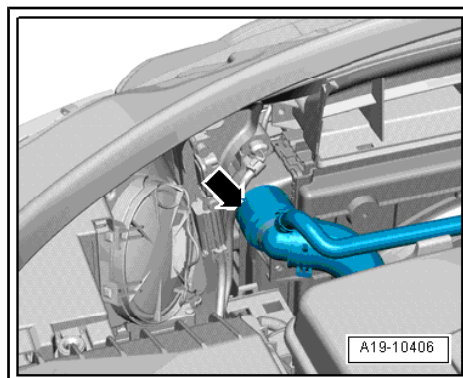
- Drain coolant ⇒ [page 247](#) .
- Remove radiator cowl ⇒ [page 277](#) .



- Remove air hose -arrows-.



- Detach top coolant hose from radiator -arrow-.
- Engine codes CBFA and CTTA: Unplug electrical connector for radiator identification sensor - G611- .



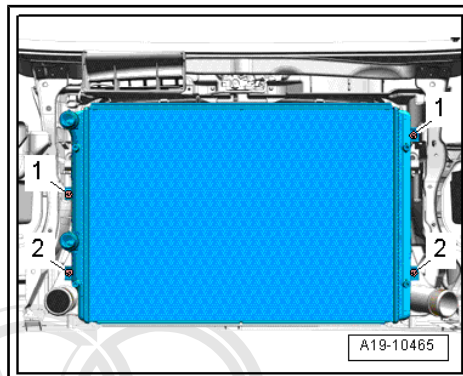
- Remove bolts -1 and 2- and take out radiator downwards.

**Installing**

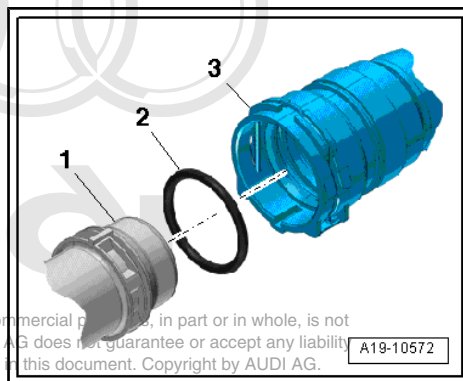
- Tightening torque  
⇒ ["4.1 Exploded view - radiator and radiator fans", page 275](#)

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

- Install air pipes/hoses with plug-in connectors ⇒ [page 288](#) .



- Connect coolant hose with plug-in connector ⇒ [page 277](#) .
- Install radiator cowl ⇒ [page 277](#) .
- Fill up with coolant ⇒ [page 248](#) .



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.



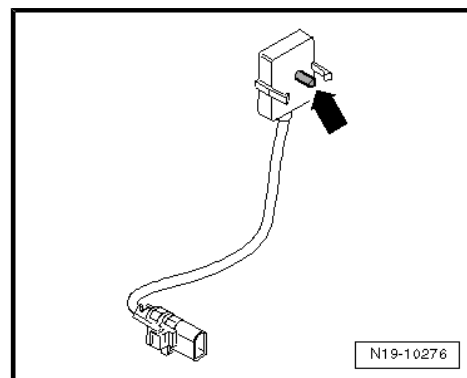
## 4.5 Installing radiator identification sensor - G611- , engine codes CBFA, CTTA

### Note

- ◆ *The radiator identification sensor - G611- can only be renewed together with the radiator.*
- ◆ *The installation position of the radiator identification sensor - G611- may vary (depending on version).*

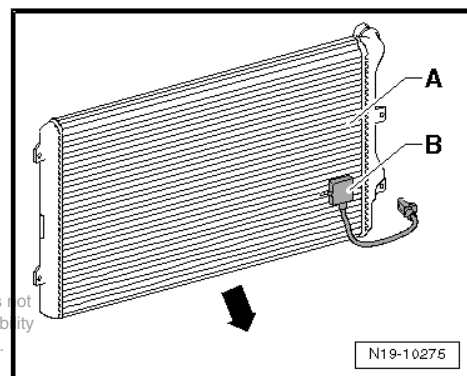
### Installing:

- Apply 2 grams of adhesive to cylindrical part of new sensor -arrow- ⇒ Electronic parts catalogue (ETKA) .
- Press new sensor into bracket on radiator until it engages.



### Installation position (bottom):

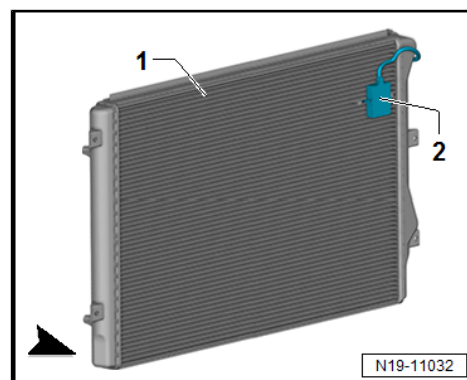
- Arrow- points in direction of travel
- A- Radiator
- B- Radiator identification sensor - G611-



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.

### Installation position (top):

- Arrow- points in direction of travel
- 1- Radiator
- 2- Radiator identification sensor - G611-





## 21 – Turbocharging/supercharging

### 1 Turbocharger

⇒ [“1.1 Exploded view - turbocharger”, page 282](#)

⇒ [“1.2 Fitting hose connections with plug-in connectors”, page 288](#)

⇒ [“1.3 Removing and installing turbocharger, engine codes BYT, BPU”, page 288](#)

⇒ [“1.4 Checking vacuum unit for turbocharger, engine codes BYT, BPU”, page 294](#)

⇒ [“1.5 Removing and installing turbocharger, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA”, page 296](#)

⇒ [“1.6 Checking vacuum unit for turbocharger, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA”, page 302](#)

⇒ [“1.7 Removing and installing vacuum unit for turbocharger \(1.8 ltr. engine only\)”, page 304](#)

⇒ [“1.8 Adjusting vacuum unit for turbocharger \(1.8 ltr. engine only\)”, page 304](#)



#### Note

- ◆ *Secure all hose connections with the correct type of hose clips (same as original equipment).*
- ◆ *Hose connections and charge air system hoses must be free of oil and grease prior to fitting. However (applies only to plug-in connectors), the seal and the sealing surface of plug-in connectors should be lubricated lightly with oil ⇒ [page 288](#).*
- ◆ *Charge air system must be free of leaks.*
- ◆ *Renew self-locking nuts.*
- ◆ *Hose clip pliers - VAS 6362- or hose clip pliers - V.A.G 1921- are recommended for use when installing spring-type clips.*
- ◆ *Fill turbocharger with engine oil at connection for oil supply line.*
- ◆ *After installing turbocharger, allow engine to idle for approx. 1 minute and do not rev up immediately to ensure turbocharger is supplied with oil.*
- ◆ *Observe rules for cleanliness ⇒ [page 5](#).*

### 1.1 Exploded view - turbocharger

Part I, engine codes BYT, BPU



Audi

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.

### 1 - Turbocharger

- Can only be renewed together with exhaust manifold and vacuum unit as one unit
- Removing and installing - engine codes BYT, BPU ⇒ [page 288](#) BZB, CAWB, CBFA, CCTA, CDAA, CCZA ⇒ [page 296](#)

### 2 - To activated charcoal filter

### 3 - Vacuum unit for turbocharger

- Checking ⇒ [page 294](#)
- Removing and installing ⇒ [page 304](#)
- Adjusting ⇒ [page 304](#)

### 4 - Seal

- Renew

### 5 - Nipple

### 6 - Banjo bolt

- 8 Nm

### 7 - Hose

### 8 - Hose

### 9 - Bolt

- 3 Nm

### 10 - Charge pressure control solenoid valve - N75-

### 11 - Hose

### 12 - Seal

- Renew

### 13 - Connection

### 14 - Securing clip

### 15 - Bolt

- 9 Nm

### 16 - Bolt

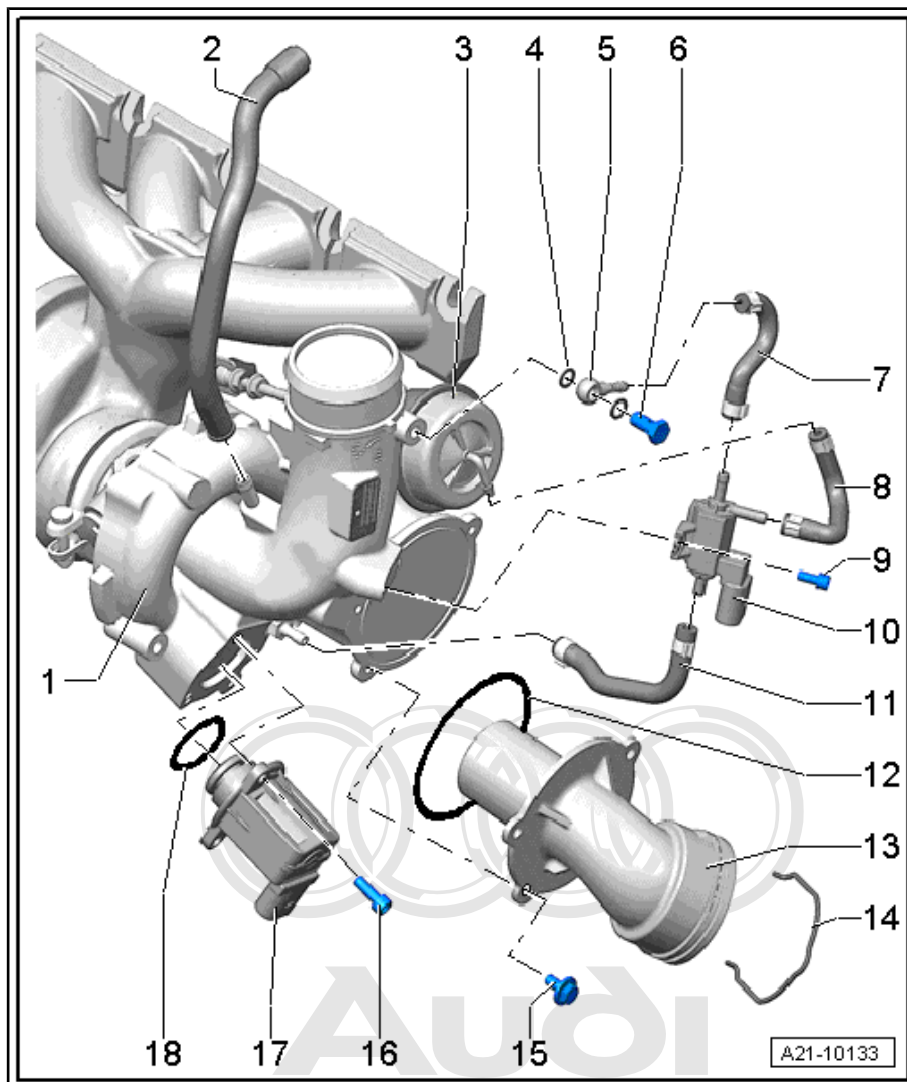
- 7 Nm

### 17 - Turbocharger air recirculation valve - N249-

- Note installation position ⇒ [page 284](#)

### 18 - Seal

- Renew



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.

Part I, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA



**1 - Turbocharger**

- Can only be renewed together with exhaust manifold and vacuum unit as one unit
- Removing and installing ⇒ [page 288](#)

**2 - To activated charcoal filter**

**3 - Vacuum unit for turbocharger**

- Checking ⇒ [page 302](#)
- Removing and installing ⇒ [page 304](#)
- Adjusting ⇒ [page 304](#)

**4 - Hose**

**5 - Hose**

**6 - Bolt**

- 3 Nm

**7 - Charge pressure control solenoid valve - N75-**

**8 - Hose**

**9 - Connection**

**10 - Securing clip**

**11 - Bolt**

- 9 Nm

**12 - Seal**

- Renew

**13 - Turbocharger air recirculation valve - N249-**

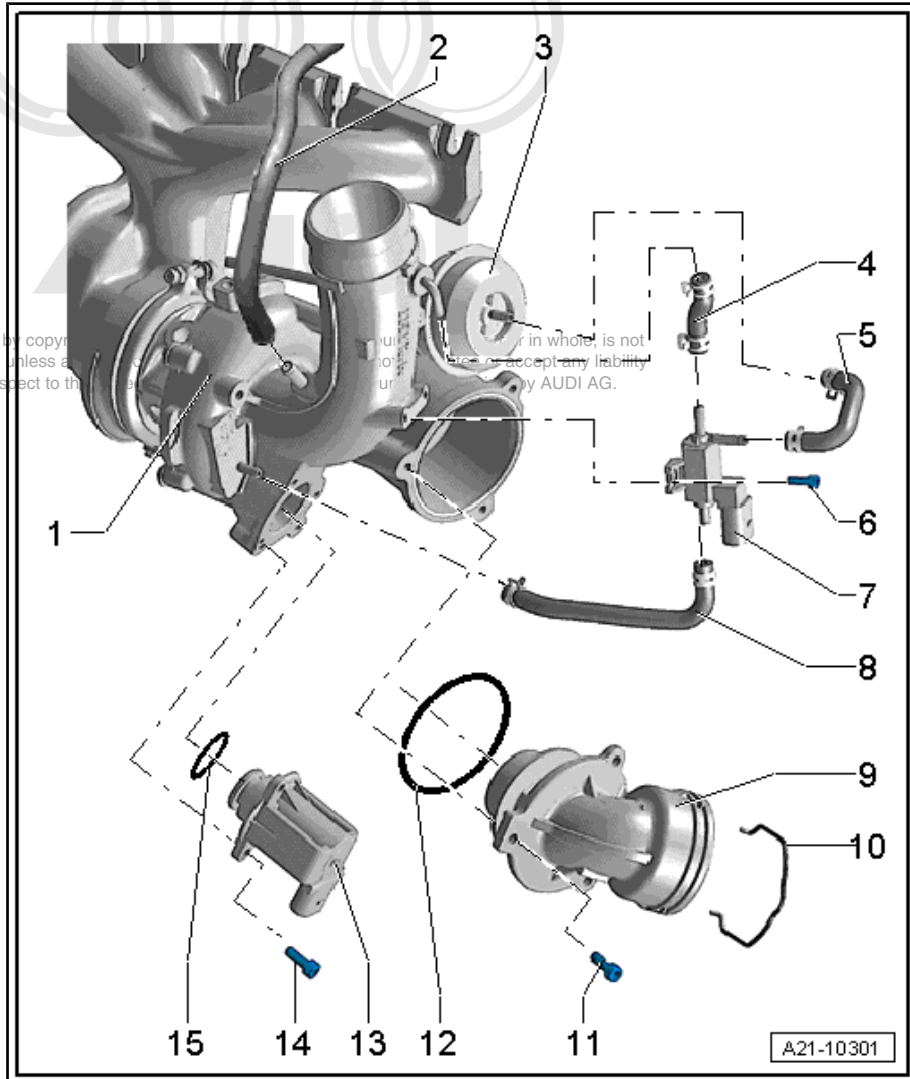
- Note installation position ⇒ [page 284](#)

**14 - Bolt**

- 7 Nm

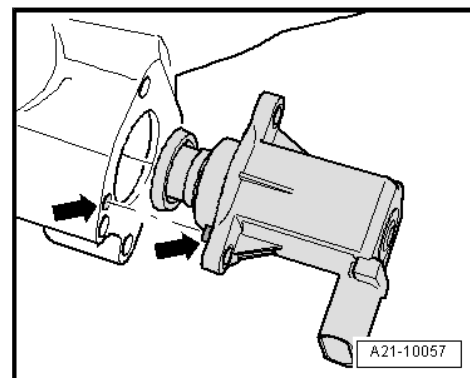
**15 - Seal**

- Renew



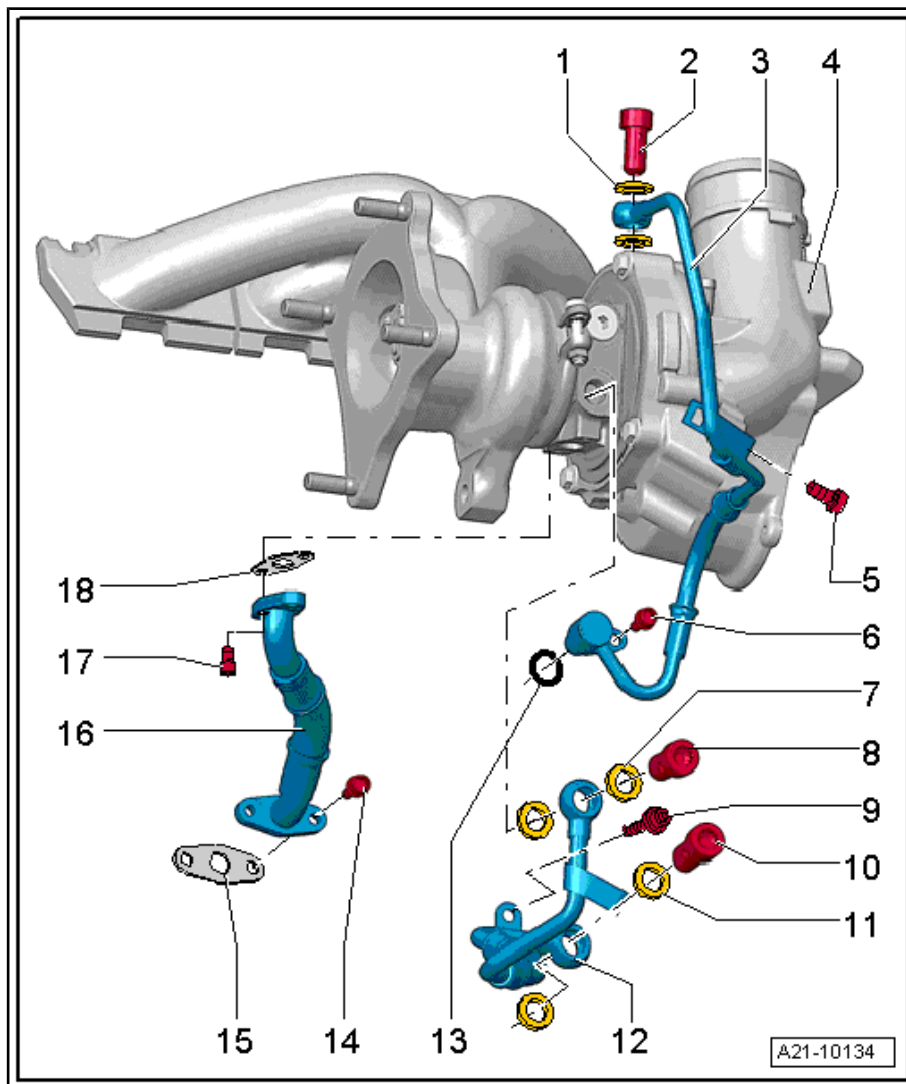
**Fitting location of turbocharger air recirculation valve - N249-**

- Note installation position -arrows-



**Part II**

- 1 - Seal**  
 Renew
- 2 - Bolt**  
 30 Nm
- 3 - Oil supply line**
- 4 - Turbocharger**  
 Can only be renewed together with exhaust manifold and vacuum unit as one unit  
 Removing and installing  
 => [page 288](#)
- 5 - Bolt**  
 9 Nm
- 6 - Bolt**  
 9 Nm
- 7 - Seal**  
 Renew
- 8 - Bolt**  
 35 Nm
- 9 - Bolt**  
 9 Nm
- 10 - Bolt**  
 35 Nm
- 11 - Seal**  
 Renew
- 12 - Coolant supply line**
- 13 - O-ring**  
 Renew
- 14 - Bolt**  
 9 Nm
- 15 - Gasket**  
 Renew
- 16 - Oil return line**
- 17 - Bolt**  
 9 Nm
- 18 - Gasket**  
 Renew



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.

**Part III**

**1 - Gasket**

- Renew

**2 - Nut**

- Renew
- Tightening sequence  
⇒ [page 287](#)
- Lubricate exhaust manifold studs with high-temperature paste. For high-temperature paste refer to ⇒ Electronic parts catalogue

**3 - Bolt**

- 35 Nm

**4 - Seal**

- Renew

**5 - Coolant return line****6 - Bolt**

- 9 Nm

**7 - Turbocharger**

- Can only be renewed together with exhaust manifold and vacuum unit as one unit
- Removing and installing  
⇒ [page 288](#)

**8 - Bracket****9 - Bolt**

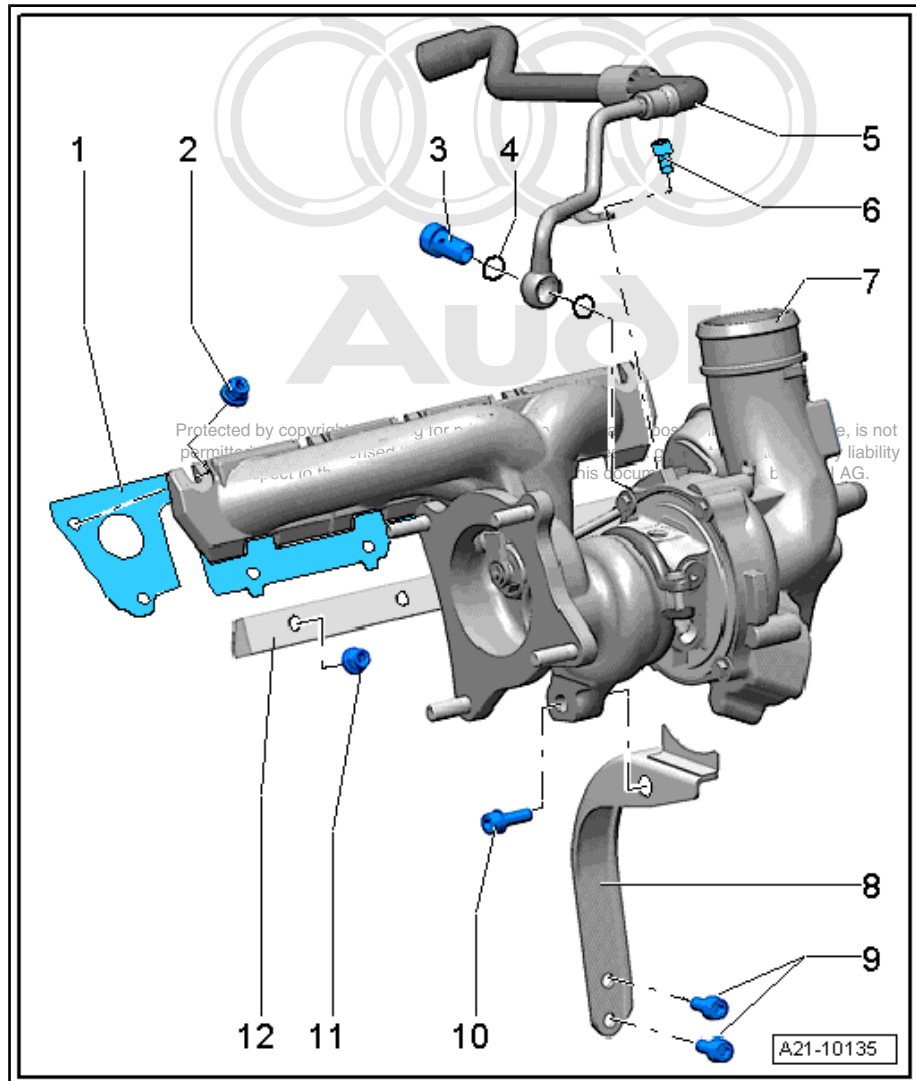
- 30 Nm
- Coat with high-temperature paste; for high-temperature paste refer to ⇒ Electronic parts catalogue

**10 - Bolt**

- 30 Nm
- Coat with high-temperature paste; for high-temperature paste refer to ⇒ Electronic parts catalogue

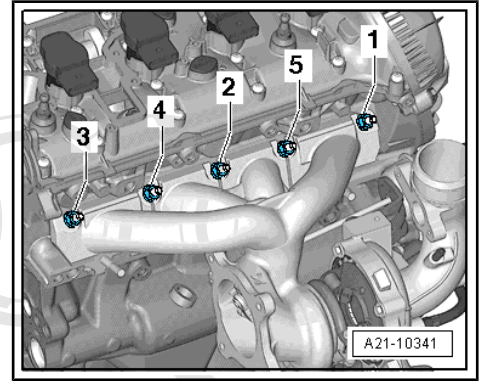
**11 - Nut**

- Do not open when removing turbocharger
- Renew
- 30 Nm
- Lubricate exhaust manifold studs with high-temperature paste. For high-temperature paste refer to ⇒ Electronic parts catalogue

**12 - Fastening strip**

### Turbocharger - tightening sequence

- Tighten nuts -1 to 5- in four stages as follows:
- 1. Tighten nuts to 5 Nm.
- 2. Tighten nuts to 12 Nm.
- 3. Tighten nuts to 16 Nm.
- 4. Tighten nuts to 25 Nm.



### Part IV

#### 1 - Turbocharger

- Can only be renewed together with exhaust manifold and vacuum unit as one unit
- Removing and installing ⇒ [page 288](#)

#### 2 - Vacuum unit for turbocharger

- Checking, engine codes BYT, BPU ⇒ [page 294](#); engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA ⇒ [page 302](#)
- Removing and installing ⇒ [page 304](#)
- Adjusting ⇒ [page 304](#)

#### 3 - Bolt

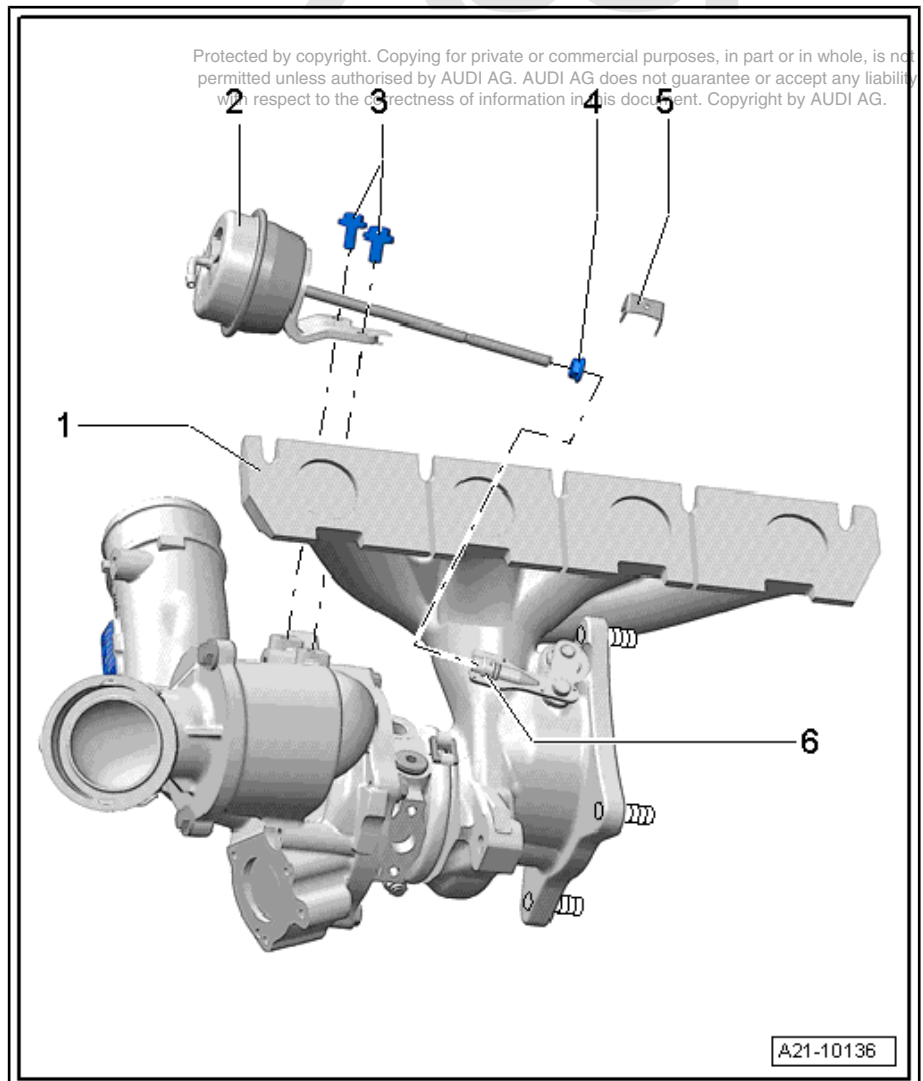
- 10 Nm

#### 4 - Nut

- 9 Nm
- Secure with sealant paint; for sealant paint refer to ⇒ Electronic parts catalogue

#### 5 - Retaining clip

#### 6 - Knurled nut



### Further tightening torques

Component	Nm
Air pipe (right-side) to sump	10
Air pipe to bracket	10

## 1.2 Fitting hose connections with plug-in connectors



### Caution

*Make sure the retaining clip is not in the locked position when fitting air pipes/hoses with plug-in connectors; otherwise the seal can be damaged and will not seal off properly.*

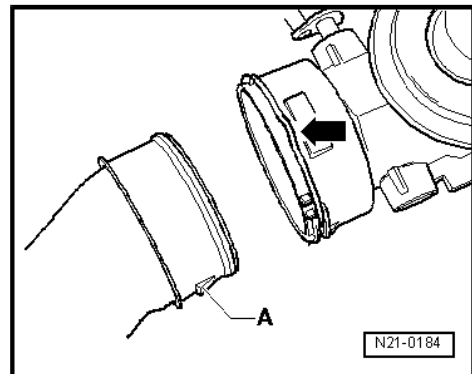
◆ *Note assembly instructions.*

### Removing

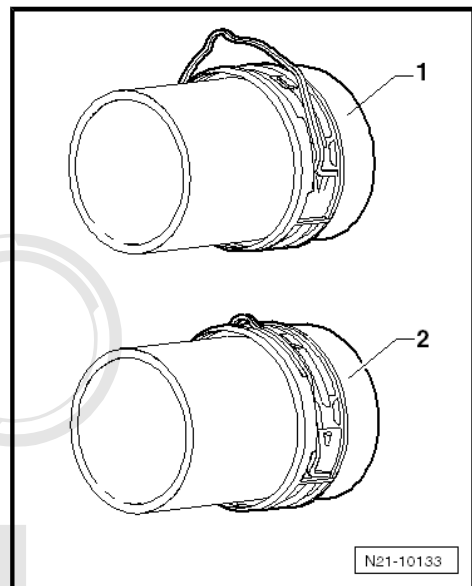
- Release plug-in connector by pulling out retaining clip -arrow-. Disconnect air pipes/hoses (do not use tools of any kind).

### Installing

- Position seal in groove on air hose if seal is being renewed.
- Make sure the seal is correctly seated in the groove all round and that it is not twisted.
- Lubricate sealing surface and seal.



- Release retaining clip (position -1-).
- Push air pipe/hose into plug-in connector as far as stop.
- Move retaining clip to locked position -2- and press air pipe/hose down again.
- Then pull air pipe/hose to check that it is fitted correctly and that plug-in connector is locked.



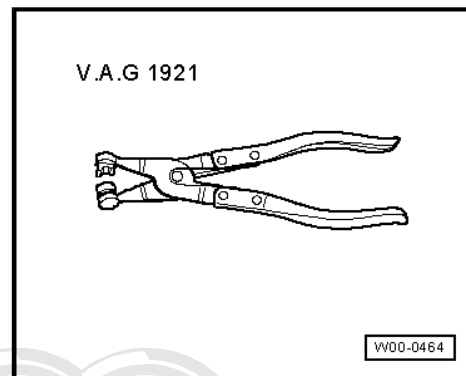
## 1.3 Removing and installing turbocharger, engine codes BYT, BPU

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted without the prior 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.

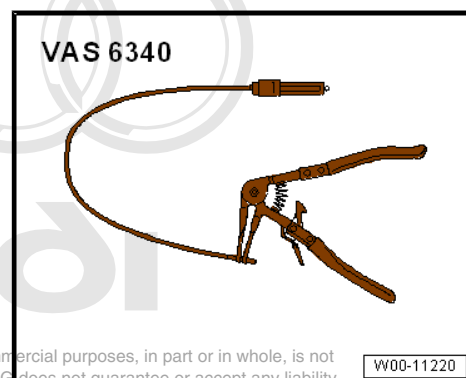
### Special tools and workshop equipment required



- ◆ Hose clip pliers - V.A.G 1921-

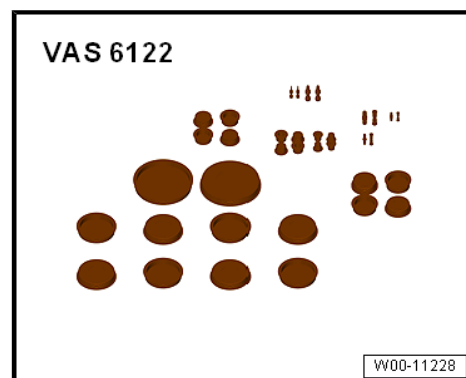


- ◆ Hose clip pliers - VAS 6340-



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.

- ◆ Engine bung set - VAS 6122-



## Removing



### Caution

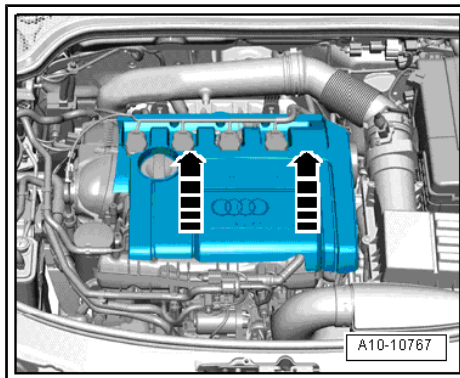
*If the turbocharger has suffered mechanical damage (e.g. damaged compressor wheel), it is not sufficient merely to fit a new turbocharger. The following work must be performed in order to avoid further damage:*

- ◆ *Check the air cleaner housing, air filter element and intake hoses for dirt and foreign particles.*
- ◆ *Check the entire charge air system (including the charge air cooler) for foreign matter.*

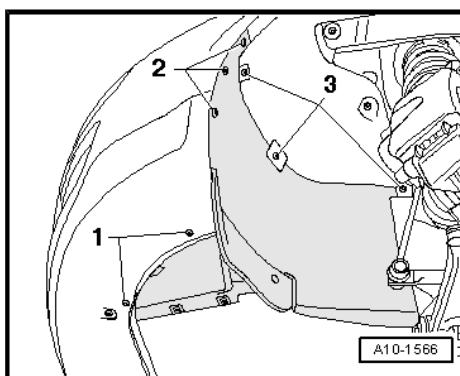
*If foreign matter is found in the charge air system, clean all relevant ducts and hoses and renew the charge air cooler if necessary.*



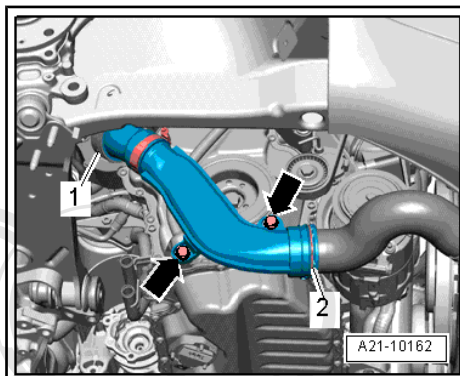
- Remove engine cover panel -arrows-.
- Drain coolant ⇒ [page 247](#) .
- Remove front exhaust pipe with catalytic converter ⇒ [page 383](#) .



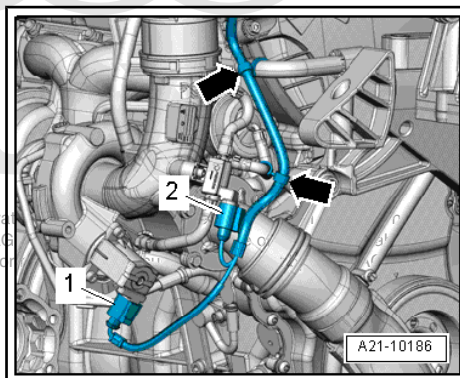
- Release fasteners -1, 2, 3- and remove noise insulation (right-side).



- Remove bolts -arrows-.
- Remove air pipe (lift clips -items 1 and 2-).



- Unplug electrical connectors -1 and 2- and move wiring clear -arrows-.



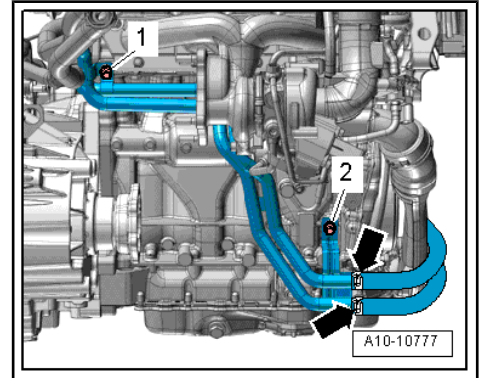
Protected by copyright. Copying for private use is permitted unless authorised by AUDI AG with respect to the correctness of information.

**Vehicles with auxiliary heater:**

- Unscrew bolts -1 and 2- and move coolant pipes to the left.

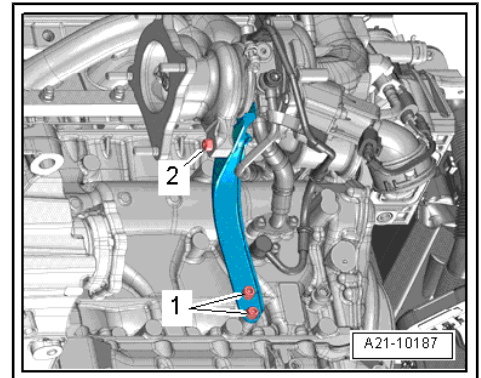
**i** Note

*Disregard -arrows-.*



**All vehicles:**

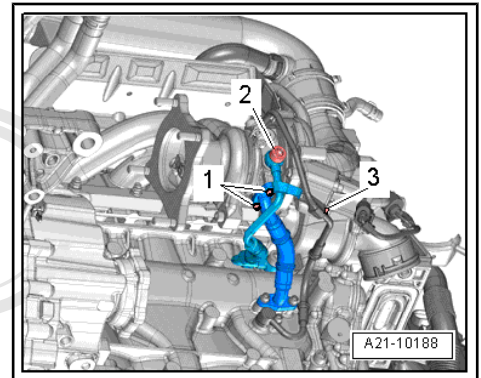
- Remove bolts -1 and 2- and detach support for turbocharger.



- Remove banjo bolt -2- and move coolant pipe clear to one side.
- Remove bolts -1- on oil return line.
- Remove bolt -3- on oil supply line.

**i** Note

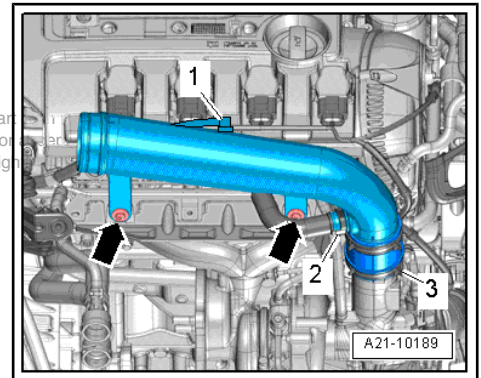
*For illustration purposes, the installation position is shown with the engine removed.*



- Press release tabs, detach air hose -2- and swivel to side.
- Remove bolts -arrows- for air pipe.

**Rest-of-world vehicles:**

- Press release tabs and detach crankcase breather hose -1- from air pipe.
- Release hose clip -3- and detach air pipe.



**USA models:**

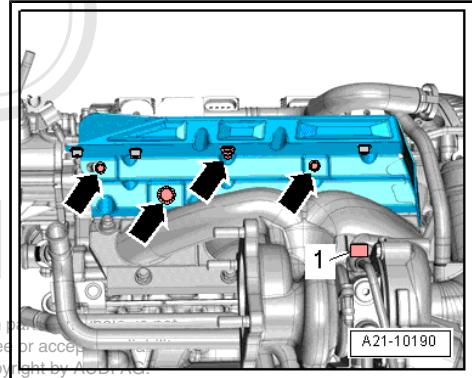
**⚠ Caution**  
***Risk of violating emission legislation applying to USA models.***  
 ♦ ***Do NOT open hose connection -1-.***

- Release hose clip -3- and move air pipe with crankcase breather hose -1- clear to one side (hose remains connected).



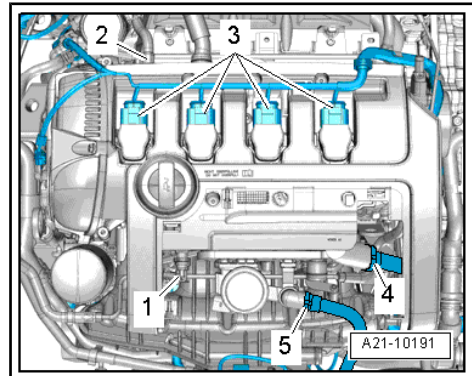
**All vehicles:**

- Remove heat shield -arrows-.
- Remove oil supply line from turbocharger -1-.

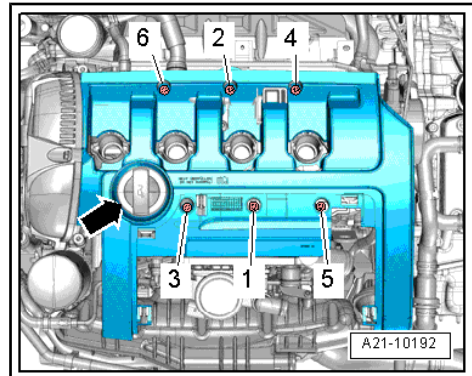


Protected by copyright. Copying for private or commercial purposes, in part or in full, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by Audi AG.

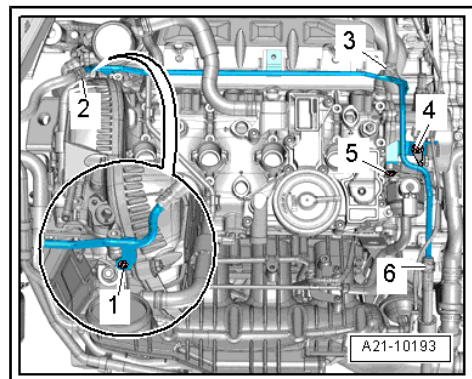
- Detach air hoses -1, 2, 4, 5-.
- Remove ignition coils -3- ⇒ [page 392](#) .



- Remove filler cap -arrow-.
- Remove bolts -1 ... 6- and detach oil separator from cylinder head cover.
- Move vacuum line clear.
- Fit filler cap.



- Remove bolts -1 and 5-.
- Disconnect coolant hose -3-.
- Move coolant bleeder line and earth wire -4- to the front (hoses -2 and 6- remain connected).

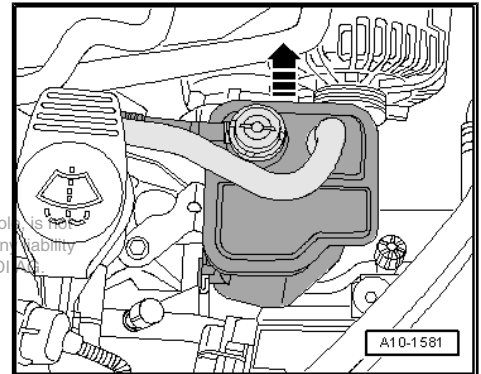
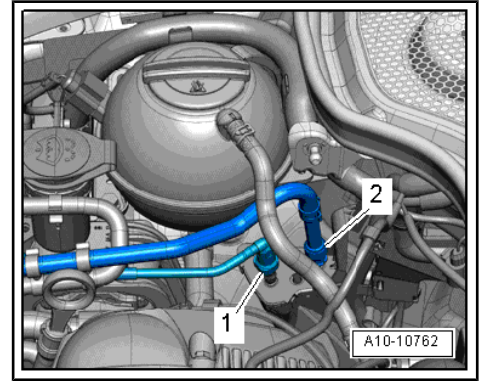


- Disconnect vacuum line -1- going to activated charcoal filter (press release tab).

 **Note**

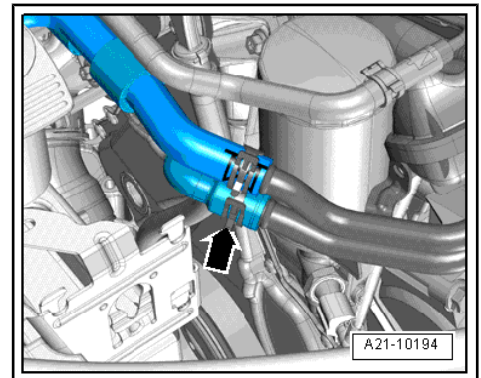
*-Item 2- can be disregarded.*

- Detach vacuum line from coolant pipes (front).
- Pull activated charcoal filter with hoses attached upwards out of the bracket -arrow- and place to side.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is prohibited without the prior 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.

- Disconnect coolant hose -arrow- and move clear.





- Remove nuts -arrows-.
- Lift out turbocharger with exhaust manifold.

### Installing

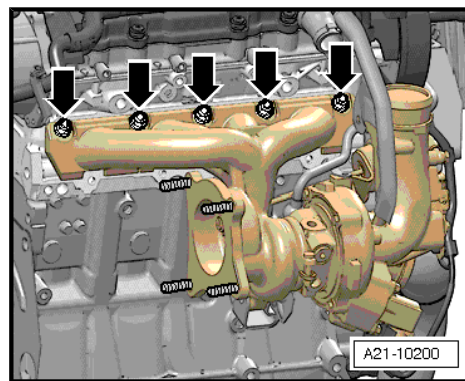
- Tightening torques  
⇒ ["1.1 Exploded view - turbocharger", page 282](#)

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



### Note

- ◆ *Renew seals, gaskets, O-rings and self-locking nuts.*
- ◆ *Fill turbocharger with engine oil at connection for oil supply line.*
- ◆ *Hose connections and charge air system hoses must be free of oil and grease prior to fitting.*
- ◆ *Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ [Electronic parts catalogue](#) .*
- Install turbocharger with exhaust manifold, tightening sequence ⇒ [page 287](#) .
- Install coolant pipes (front) ⇒ [page 269](#) .
- Install front exhaust pipe with catalytic converter ⇒ [page 383](#) .
- Align the exhaust system so it is free of stress ⇒ [page 385](#) .
- Install ignition coils ⇒ [page 392](#) .
- Install oil separator ⇒ [page 126](#) .
- Install air pipes/hoses with plug-in connectors ⇒ [page 288](#) .
- Fill up with coolant ⇒ [page 248](#) .
- Check oil level ⇒ Maintenance ; Booklet 808 .



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.



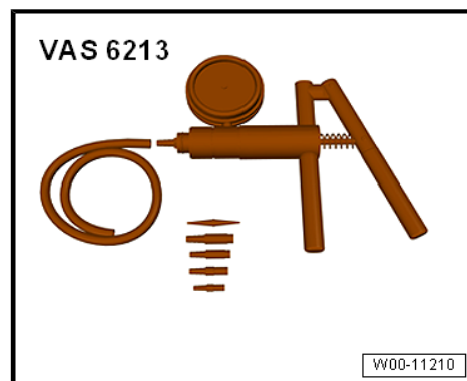
### Note

*After installing turbocharger, allow engine to idle for approx. 1 minute and do not rev up immediately to ensure turbocharger is supplied with oil.*

## 1.4 Checking vacuum unit for turbocharger, engine codes BYT, BPU

Special tools and workshop equipment required

- ◆ Hand vacuum pump - VAS 6213-

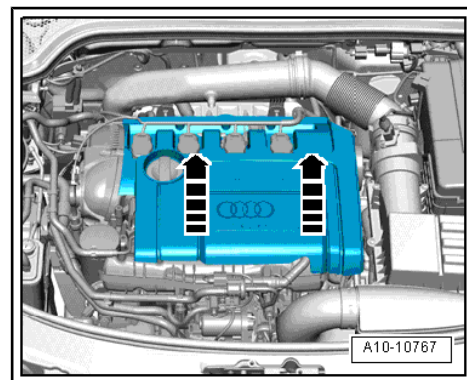


#### Test condition:

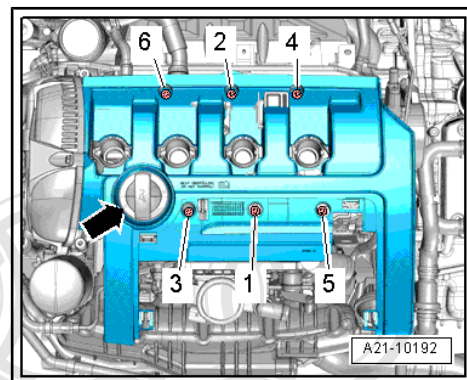
- ◆ Hose from turbocharger via charge pressure control solenoid valve - N75- to vacuum unit must not be blocked.
- ◆ Charge pressure control solenoid valve - N75- OK.

#### Procedure:

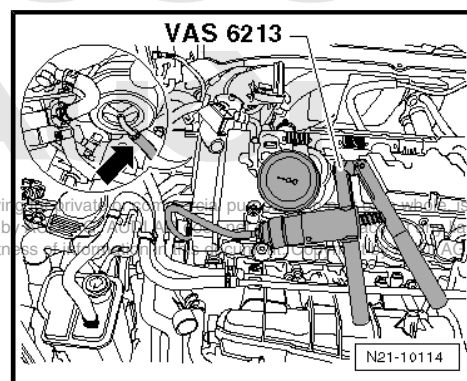
- Remove engine cover panel -arrows-.
- Remove ignition coils => [page 392](#) .



- Remove filler cap -arrow-.
- Remove bolts -1 ... 6- and detach oil separator from cylinder head cover.
- Move vacuum line clear.
- Fit filler cap.



- Connect hand vacuum pump - VAS 6213- to vacuum unit -arrow-.



Protected by copyright. Copying or reproduction in any form is not permitted unless authorised by Audi AG. The copyright holder assumes no responsibility with respect to the correctness of the information.



- Move adjuster ring -1- on hand vacuum pump - VAS 6213- to position -B- to select "pressure".



**Caution**

*The pressure must not exceed 750 mbar. The vacuum unit could be damaged if the pressure is exceeded.*

- Operate hand vacuum pump - VAS 6213- repeatedly and observe linkage.

The linkage -A- should start to move at a pressure of approx. 300 mbar and be at its limit stop at a pressure of approx. 700 mbar.

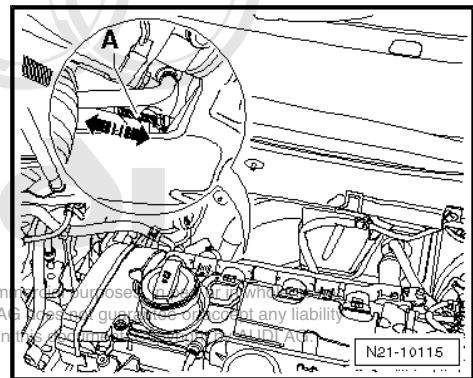
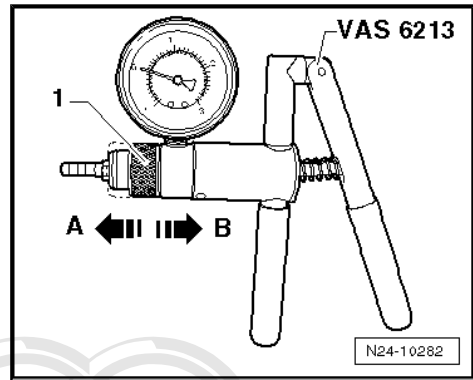
The linkage should travel approx. 10 mm.



**Note**

*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 - VAS 6213- and connecting hoses for leaks. If no fault is found: renew vacuum unit => page 304 .*

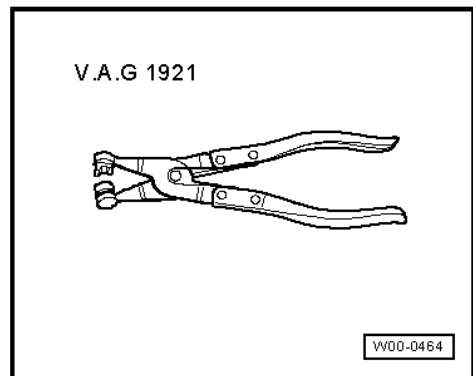
Protected by copyright. Copying for private or commercial purposes without the express written permission of Audi AG is prohibited. Audi AG assumes no liability for the content of this document with respect to the correctness of information in it.



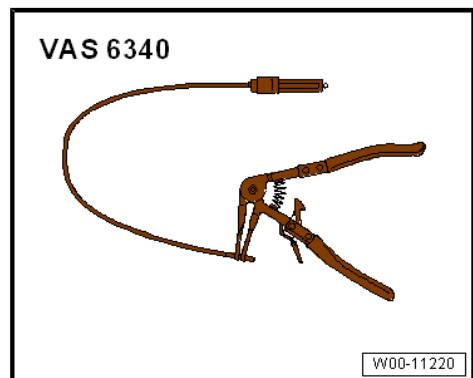
## 1.5 Removing and installing turbocharger, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA

### Special tools and workshop equipment required

- ◆ Hose clip pliers - V.A.G 1921-

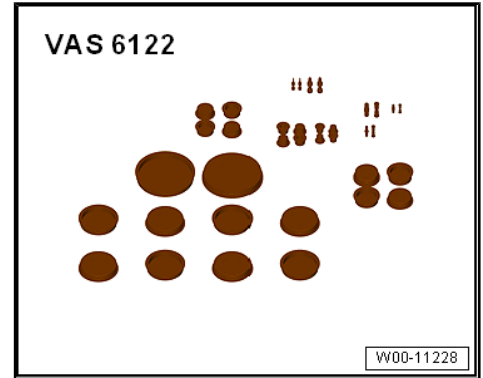


- ◆ Hose clip pliers - VAS 6340-





◆ Engine bung set - VAS 6122-



**Caution**

*If the turbocharger has suffered mechanical damage (e.g. damaged compressor wheel), it is not sufficient merely to fit a new turbocharger. The following work must be performed in order to avoid further damage:*

- ◆ *Check the air cleaner housing, air filter element and intake hoses for dirt and foreign particles.*
- ◆ *Check the entire charge air system (including the charge air cooler) for foreign matter.*

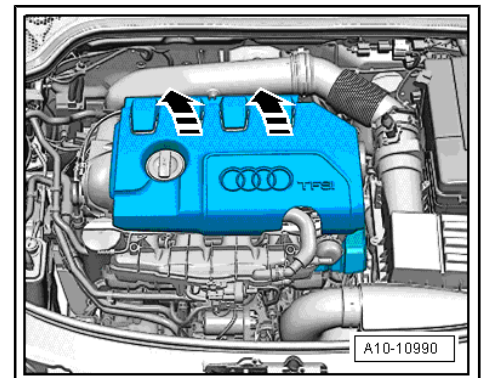
*If foreign matter is found in the charge air system, clean all relevant ducts and hoses and renew the charge air cooler if necessary.*

Removing

**Note**

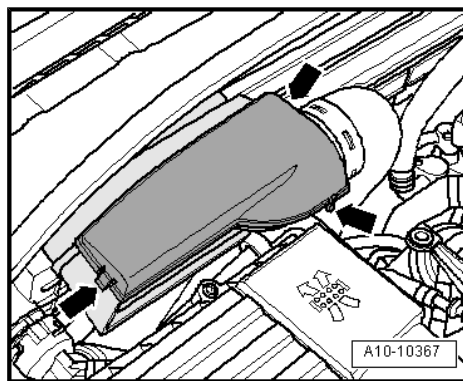
*Fit cable ties in the original positions when installing.*

- Remove engine cover panel -arrows-.

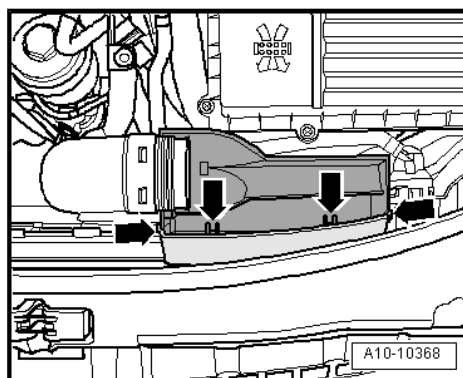




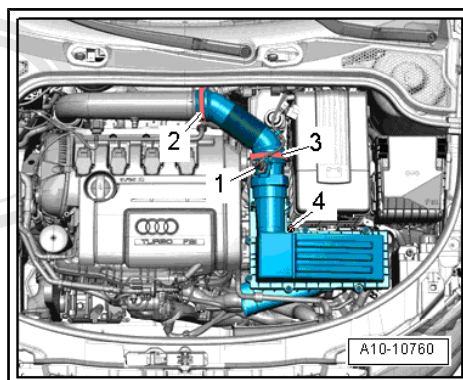
- Pull cover off air duct (release clips on sides) -arrows-.



- Unclip air duct at the bottom by releasing clips -arrows-.
- Detach air duct at bottom together with air hose.



- Unplug electrical connector -1- at air mass meter - G70- .
- Detach air hose -2-.
- Unscrew bolt -4- and remove air cleaner housing.



**Note**

-Item 3- can be disregarded.

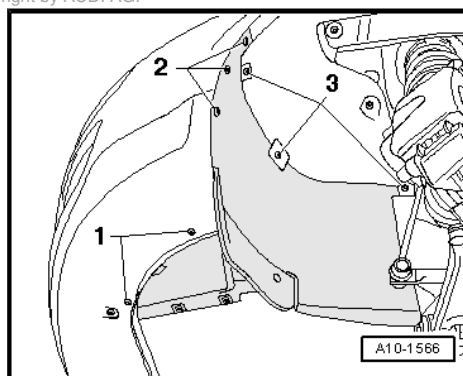
- Remove front exhaust pipe with catalytic converter ⇒ [page 383](#) .
- Remove front right wheel.
- Remove noise insulation ⇒ [Rep. gr. 66](#) .
- Release fasteners -1, 2, 3- and remove noise insulation (right-side).

**Cabriolet**

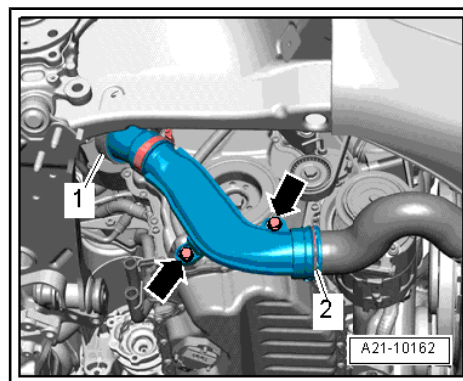
- Remove noise insulation frame ⇒ [Rep. gr. 50](#) .

**All vehicles:**

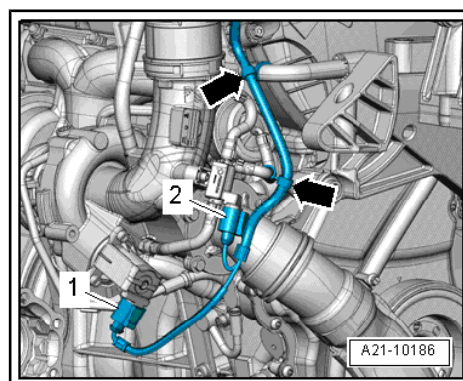
- Drain coolant ⇒ [page 247](#) .



- Remove bolts -arrows-.
- Remove air pipe (lift clips -items 1 and 2-).



- Unplug electrical connectors -1 and 2- and move wiring clear -arrows-.

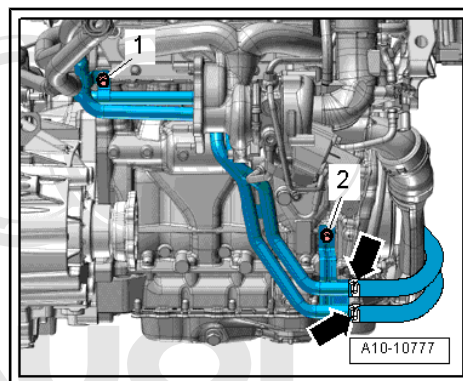


**Vehicles with auxiliary heater:**

- Unscrew bolts -1 and 2- and move coolant pipes to the left.

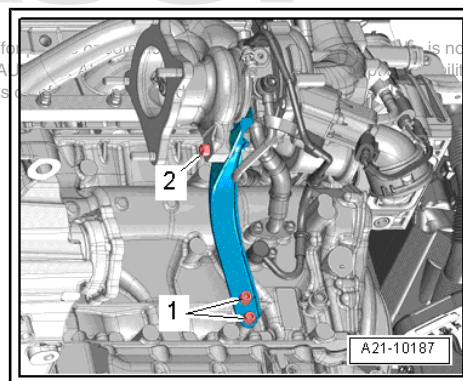


*Disregard -arrows-.*



**All vehicles:**

- Remove bolts -1 and 2- and detach support for turbocharger



Protected by copyright. Copying for private use is not permitted. All rights reserved. Used by Audi AG. Audi AG is not responsible for the correctness of the information.



- Remove banjo bolt -2- and move coolant pipe clear to one side.
- Remove bolts -1- on oil return line.
- Remove bolt -3- on oil supply line.



**Note**

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

- Press release tabs, detach air hose -2- and swivel to side.
- Remove bolts -arrows- for air pipe.

**Rest-of-world vehicles:**

- Press release tabs and detach crankcase breather hose -1- from air pipe.
- Release hose clip -3- and detach air pipe.

**USA models:**



**Caution**

**Risk of violating emission legislation applying to USA models.**

- ◆ **Do NOT open hose connection -1-.**

- Release hose clip -3- and move air pipe with crankcase breather hose -1- clear to one side (hose remains connected).

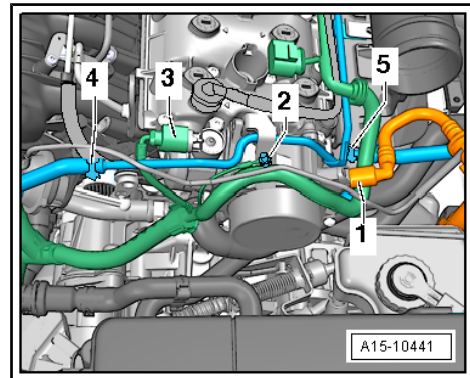
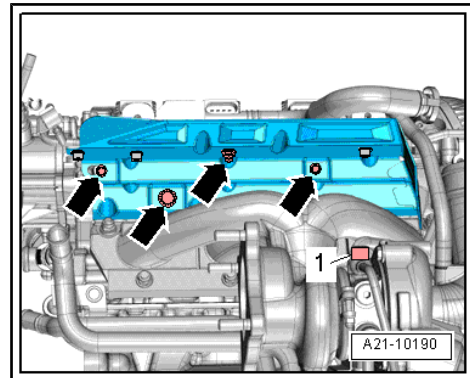
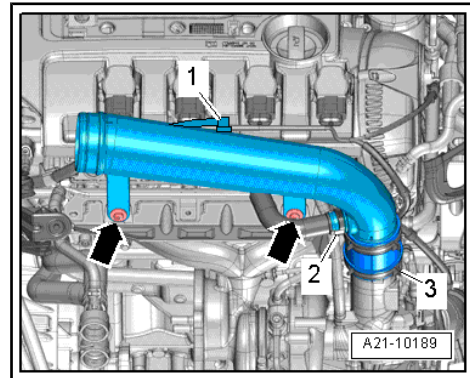
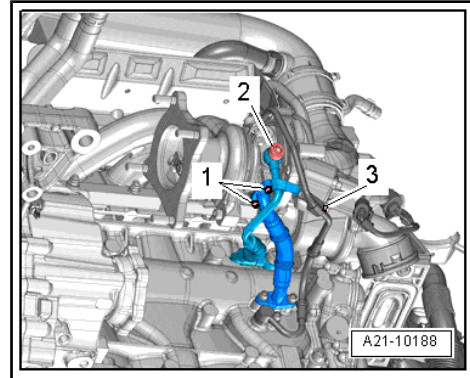
**All vehicles:**

- Remove oil supply line from turbocharger -1-.

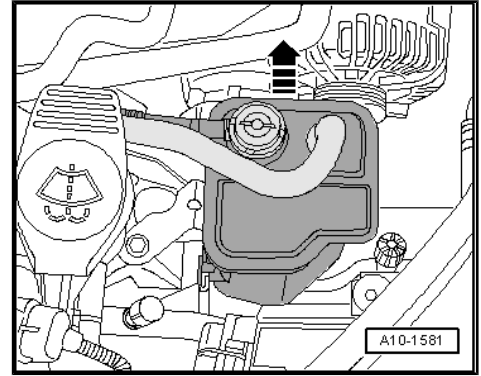


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

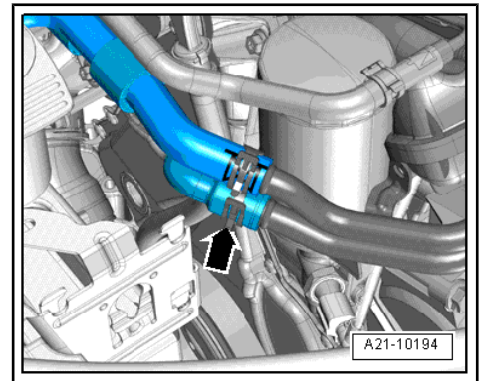
- Disconnect coolant hoses -4 and 5-.
- Unscrew earth wire -2-.



- Pull activated charcoal filter with hoses attached upwards out of the bracket -arrow- and place to side.



- Disconnect coolant hose -arrow- and move 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 nuts -arrows-.
- Lift out turbocharger with exhaust manifold.

### Installing

- Tightening torques  
⇒ "1.1 Exploded view - turbocharger", page 282

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



### Note

- ◆ Renew seals, gaskets, O-rings and self-locking nuts.
- ◆ Fill turbocharger with engine oil at connection for oil supply line.
- ◆ Hose connections and charge air system hoses must be free of oil and grease prior to fitting.
- ◆ Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ Electronic parts catalogue .

- Install turbocharger with exhaust manifold, tightening sequence ⇒ page 287 .

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 coolant pipes (front) ⇒ page 269 .

- Install front exhaust pipe with catalytic converter ⇒ page 383 .

- Align the exhaust system so it is free of stress ⇒ page 385 .

- Install air pipes/hoses with plug-in connectors ⇒ page 288 .

- Fill up with coolant ⇒ page 248 .

- Check oil level ⇒ Maintenance ; Booklet 808 .



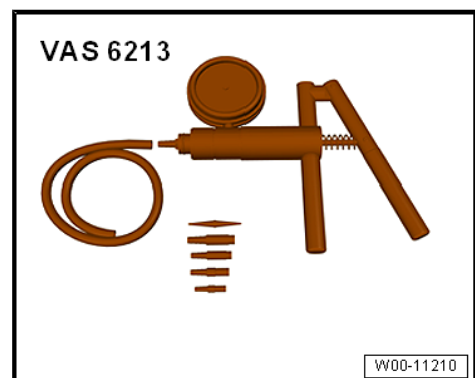
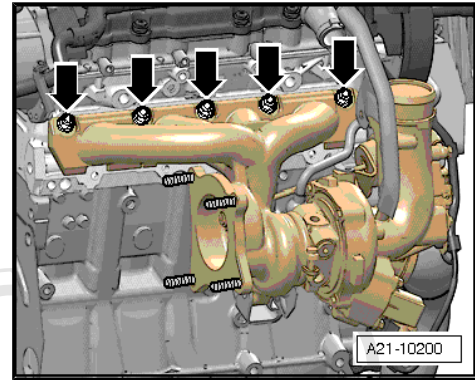
### Note

After installing turbocharger, allow engine to idle for approx. 1 minute and do not rev up immediately to ensure turbocharger is supplied with oil.

## 1.6 Checking vacuum unit for turbocharger, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA

### Special tools and workshop equipment required

- ◆ Hand vacuum pump - VAS 6213-

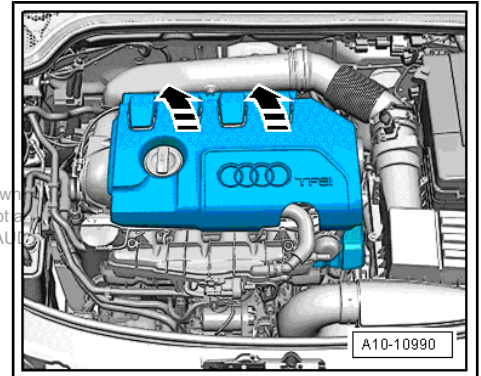


**Test condition:**

- ◆ Hose from turbocharger via charge pressure control solenoid valve - N75- to vacuum unit must not be blocked.
- ◆ Charge pressure control solenoid valve - N75- OK.

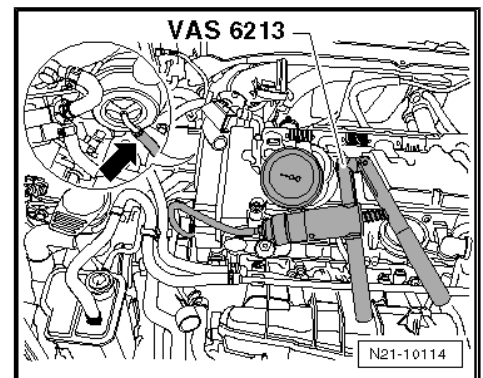
**Procedure:**

- Remove 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.

- Connect hand vacuum pump - VAS 6213- to vacuum unit -arrow-.



- Move adjuster ring -1- on hand vacuum pump - VAS 6213- to position -B- to select "pressure".

**Caution**

*The pressure must not exceed 750 mbar. The vacuum unit could be damaged if the pressure is exceeded.*

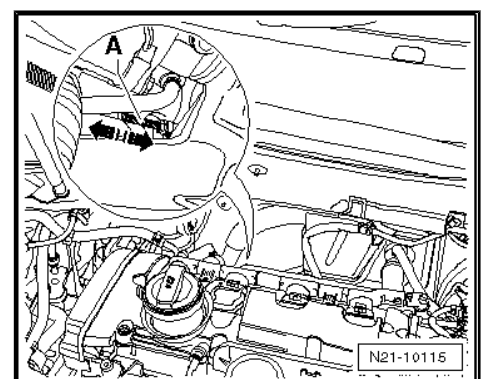
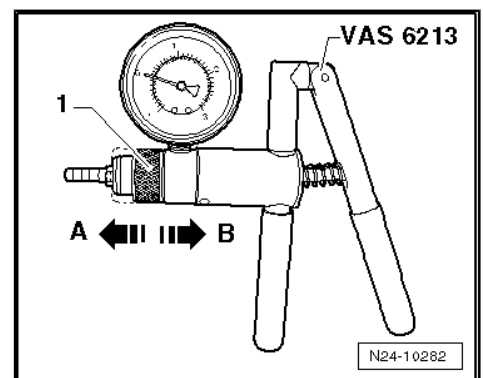
- Operate hand vacuum pump - VAS 6213- repeatedly and observe linkage.

The linkage -A- should start to move at a pressure of approx. 300 mbar and be at its limit stop at a pressure of approx. 700 mbar.

The linkage should travel approx. 10 mm.

**Note**

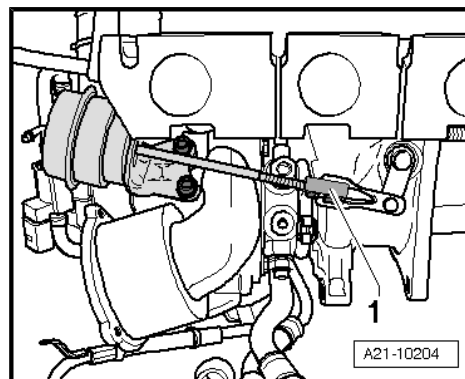
*If it is not possible to build up pressure with hand vacuum pump - VAS 6213- or if the pressure drops again immediately, check hand vacuum pump - VAS 6213- and connecting hoses for leaks. If no fault is found: renew vacuum unit ⇒ [page 304](#) .*



## 1.7 Removing and installing vacuum unit for turbocharger (1.8 ltr. engine only)

### Removing

- Remove turbocharger  
⇒ [“1.5 Removing and installing turbocharger, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA”, page 296](#) .
- Detach locking plate -1- on turbocharger linkage.

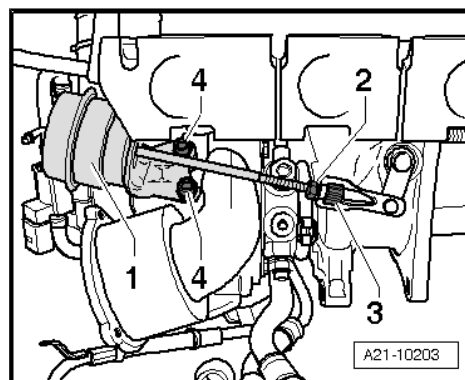


- Loosen lock nut -2-.
- Detach linkage from turbocharger -3-.
- Remove bolts -4- and take out vacuum unit -1-.

### Installing

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

- Tightening torques  
⇒ [“1.1 Exploded view - turbocharger”, page 282](#)
- Adjust vacuum unit for turbocharger ⇒ [page 304](#) .
- Install turbocharger  
⇒ [“1.3 Removing and installing turbocharger, engine codes BYT, BPU”, page 288](#)  
⇒ [“1.5 Removing and installing turbocharger, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA”, page 296](#) .



## 1.8 Adjusting vacuum unit for turbocharger (1.8 ltr. engine only)

Turbocharger removed

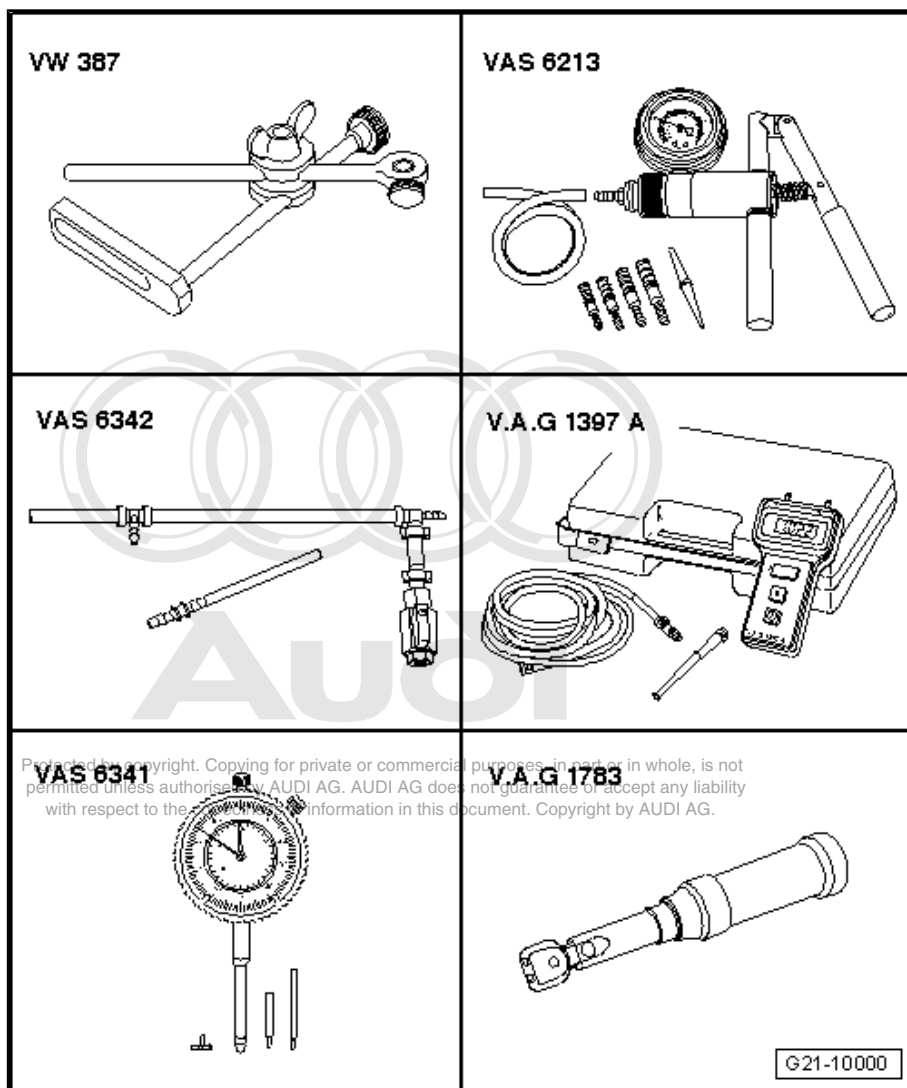


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

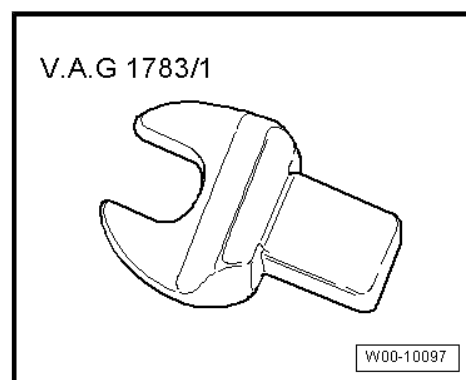


**Special tools and workshop equipment required**

- ◆ Universal dial gauge bracket - VW 387-
- ◆ Hand vacuum pump - VAS 6213-
- ◆ Pressure control valve - VAS 6342-
- ◆ Turbocharger tester - V.A.G 1397A-
- ◆ Dial gauge set, 4-part - VAS 6341-
- ◆ Torque wrench - V.A.G 1783-



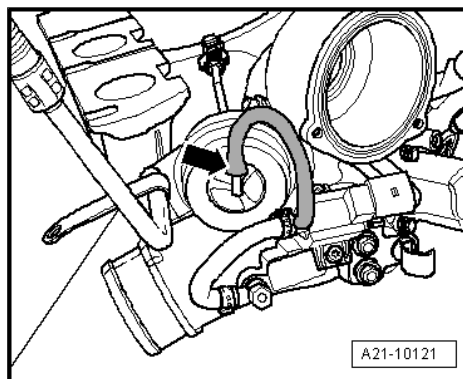
- ◆ Open-end spanner insert AF 10 - V.A.G 1783/1-

**Adjusting**

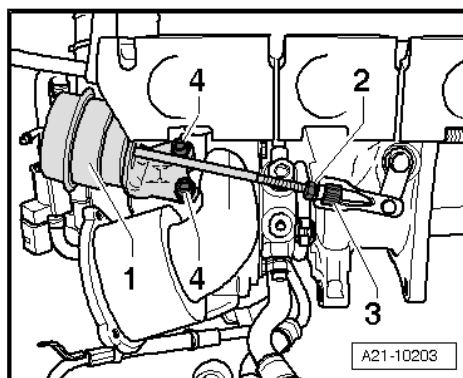
- Tightening torques ⇒ [page 287](#)



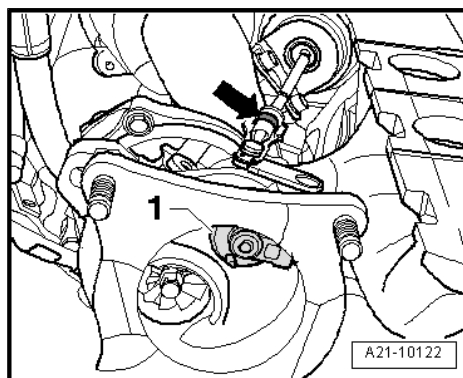
- Disconnect hose -arrow- at vacuum unit on turbocharger.
- Release clip above linkage on turbocharger.



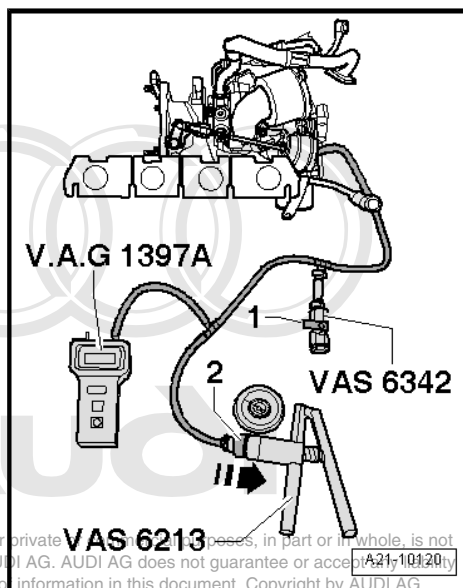
- Loosen lock nut -2-.



- Pre-adjust bypass flap -1- at knurled nut -arrow- so that bypass flap can still just be turned by hand.
- Hand-tighten lock nut.

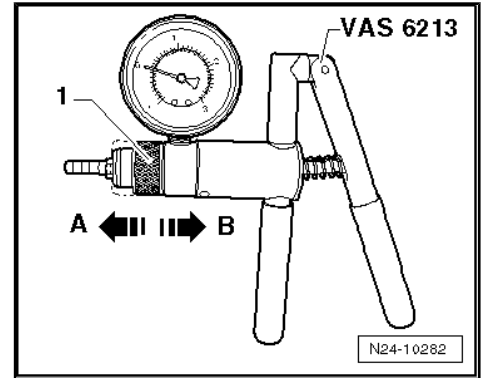


- Connect hand vacuum pump - VAS 6213- and pressure control valve - VAS 6342- to vacuum unit and connection II of turbocharger tester - V.A.G 1397A- , as shown in illustration.
- Close pressure control valve - VAS 6342- at lever -1-.



Protected by copyright. Copying for private use, 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.

- Move adjuster ring -1- on hand vacuum pump - VAS 6213- to position -B- to select "pressure".
- Switch on turbocharger tester - V.A.G 1397A- and set sliding switch to position II.



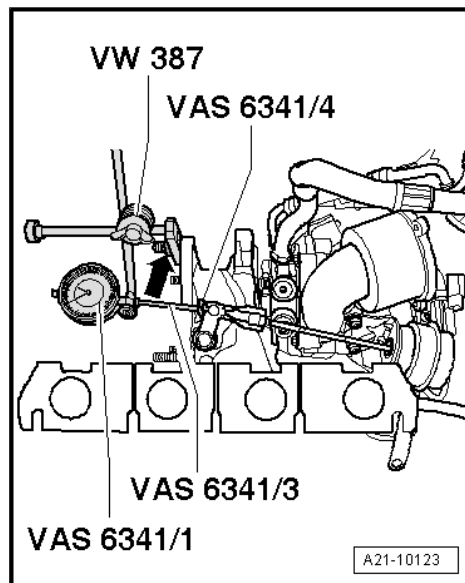
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Secure universal dial gauge bracket - VW 387- to turbocharger -arrow-.

**Note**

*The dial gauge values (mm) listed here include the 1 mm preload that is initially set on the gauge.*

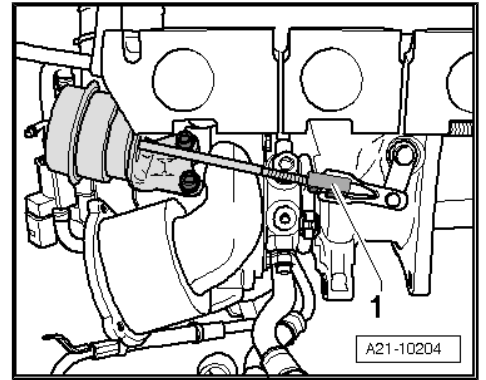
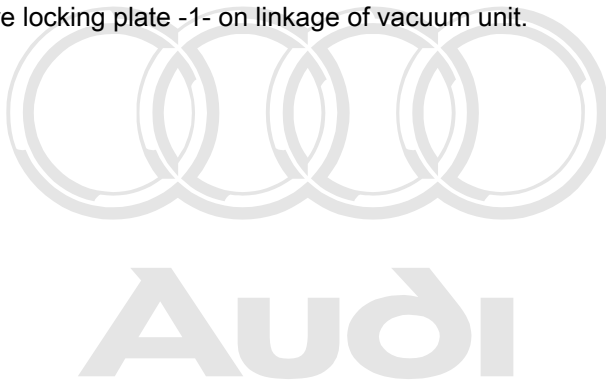
- Attach dial gauge - VAS 6341/1- with extension, 30 mm - VAS 6341/3- and flat probe - VAS 6341/4- to universal dial gauge bracket - VW 387- .
- With pressure at 0 bar, set dial gauge - VAS 6341/1- to 1 mm preload.
- Set scale of dial gauge - VAS 6341/1- to 0.
- Make sure that dial gauge can move freely.
- Operate hand vacuum pump - VAS 6213- until turbocharger tester - V.A.G 1397A- indicates 460 +/- 5 mbar.
- The dial gauge should now indicate a value between 4.1 mm and 4.3 mm. If not, turn knurled nut until this value is indicated.
- Hand-tighten lock nut.
- Repeat measurement.
- Vent system via pressure control valve - VAS 6342- so that pressure reading drops to 0 mbar.
- Set dial gauge - VAS 6341/1- to 0.

**Note**

*The following measurements must be performed in continuous sequence. Do not allow the pressure to drop to 0 between measurements.*

- Operate hand vacuum pump - VAS 6213- until turbocharger tester - V.A.G 1397A- indicates 460 +/- 5 mbar.
- Read off and note value indicated on dial gauge - VAS 6341/1- .
- Operate hand vacuum pump - VAS 6213- until turbocharger tester - V.A.G 1397A- indicates 650 to 700 mbar.
- Vent system via pressure control valve - VAS 6342- so that pressure reading drops to 460 +/- 5 mbar.
- Read off and note value indicated on dial gauge - VAS 6341/1- .
- Add values 1 and 2 together and divide by 2.
- The result (mean value) should be 5 +/- 0.25 mm.
- If the result (mean value) is not 5 +/- 0.25 mm: Correct the setting accordingly, tighten the lock nut hand-tight and repeat the measurement.
- If the result (mean value) is 5 +/- 0.25 mm: Tighten the lock nut and secure with sealing paint. Sealing paint ⇒ Electronic parts catalogue .

- Secure locking plate -1- on linkage of vacuum unit.



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 Charge air system

⇒ [“2.1 Diagram of turbocharger system, engine codes BYT, BPU”, page 310](#)

⇒ [“2.2 Diagram of turbocharger system, engine codes BZB, CAWB, CBFA, CCTA, CDA, CCZA”, page 311](#)

⇒ [“2.3 Exploded view - charge air cooling”, page 312](#)

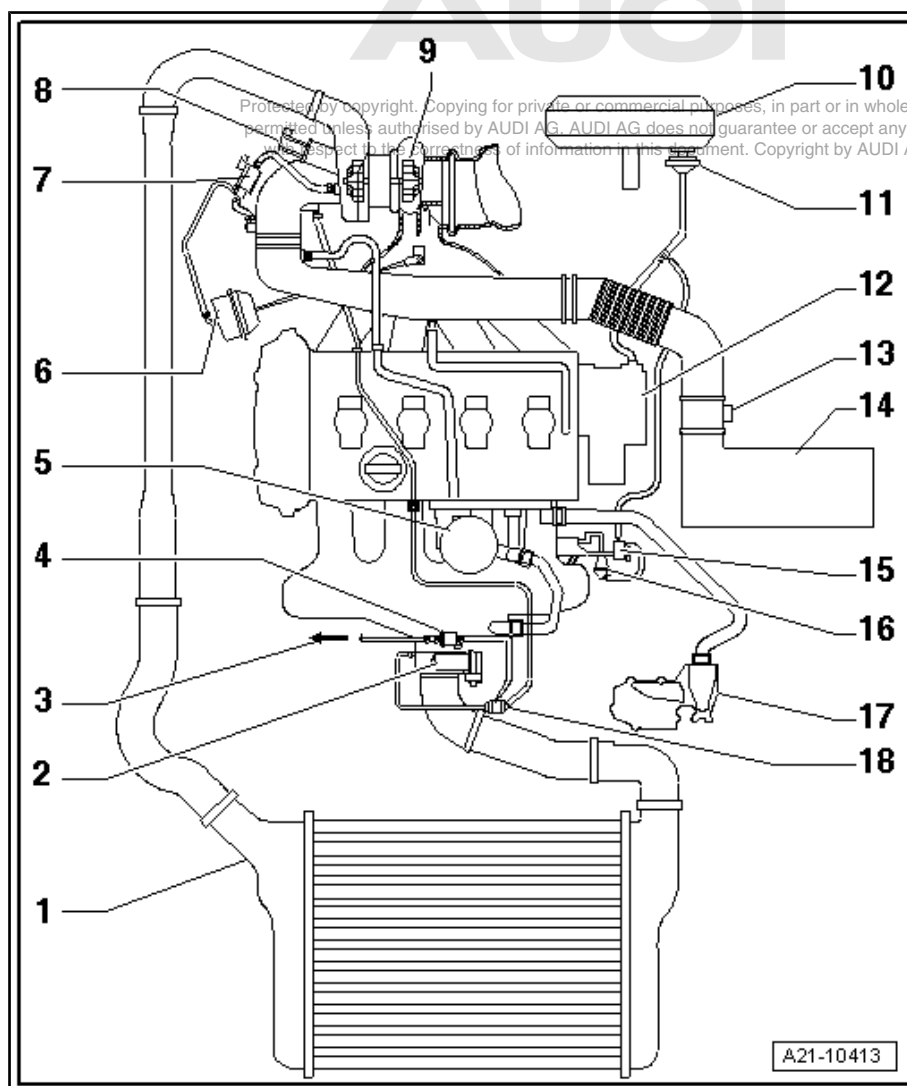
⇒ [“2.4 Removing and installing charge pressure sender G31”, page 313](#)

⇒ [“2.5 Checking charge air system for leaks”, page 313](#)

⇒ [“2.6 Removing and installing charge air cooler”, page 315](#)

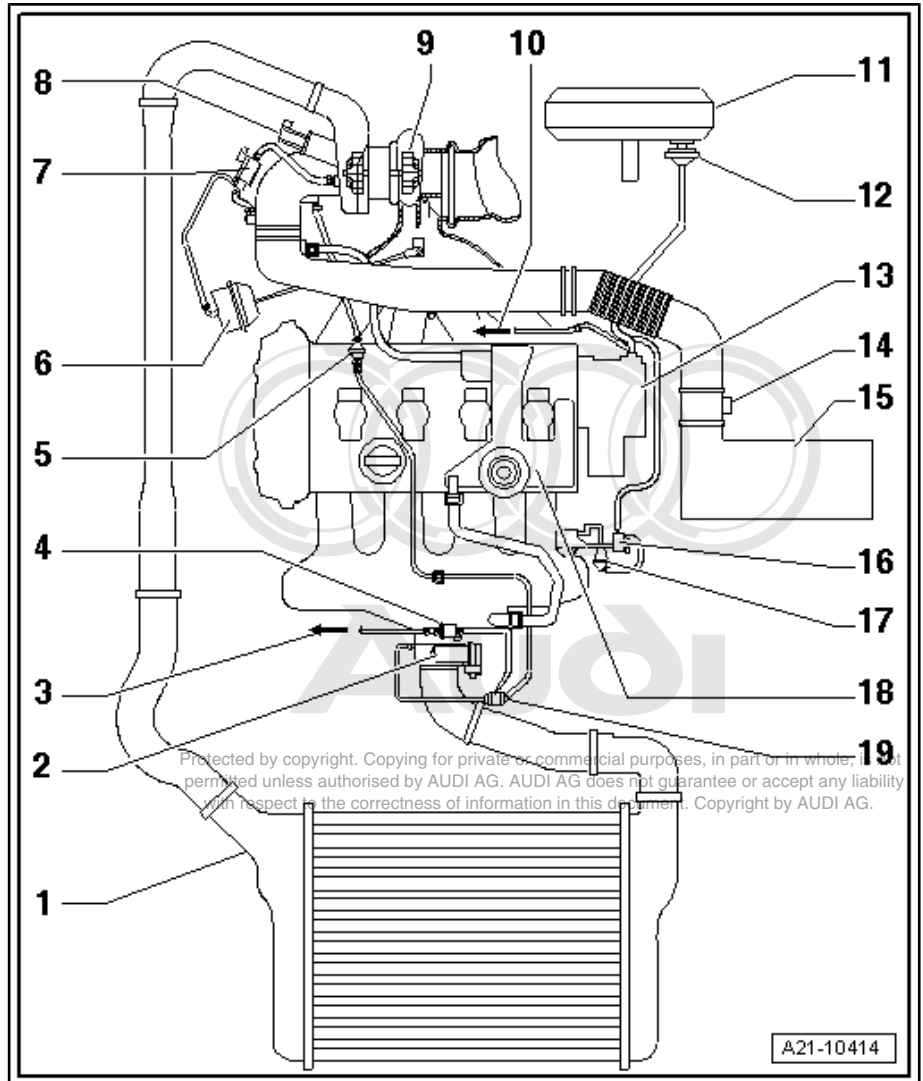
### 2.1 Diagram of turbocharger system, engine codes BYT, BPU

- 1 - Charge air cooler
- 2 - Throttle valve module - J338-
- 3 - To activated charcoal filter
- 4 - Activated charcoal filter solenoid valve 1 - N80-
- 5 - Pressure control valve
- 6 - Vacuum unit for charge pressure control
- 7 - Charge pressure control solenoid valve - N75-
- 8 - Turbocharger air recirculation valve - N249-
- 9 - Turbocharger
- 10 - Brake servo
- 11 - Non-return valve
- 12 - Vacuum pump
- 13 - Air mass meter - G70-
- 14 - Air cleaner
- 15 - Variable intake manifold change-over valve - N156-
- 16 - Vacuum unit for intake manifold change-over
- 17 - Coarse oil separator
- 18 - Non-return valve



## 2.2 Diagram of turbocharger system, engine codes BZB, CAWB, CBFA, CCTA, CDA, CCZA

- 1 - Charge air cooler
- 2 - Throttle valve module - J338-
- 3 - To activated charcoal filter
- 4 - Activated charcoal filter solenoid valve 1 - N80-
- 5 - Non-return valve
- 6 - Vacuum unit for charge pressure control
- 7 - Charge pressure control solenoid valve - N75-
- 8 - Turbocharger air recirculation valve - N249-
- 9 - Turbocharger
- 10 - To fuel system diagnostic pump - V144-
  - Only engine codes CCTA, CBFA
- 11 - Brake servo
- 12 - Non-return valve
- 13 - Vacuum pump
- 14 - Air mass meter - G70-
- 15 - Air cleaner
- 16 - Variable intake manifold change-over valve - N156-
- 17 - Vacuum unit for intake manifold change-over
- 18 - Crankcase breather
- 19 - Non-return valve





## 2.3 Exploded view - charge air cooling



### Note

- ◆ *Hose connections and air pipes and hoses must be free of oil and grease before assembly.*
- ◆ *Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ [Electronic parts catalogue](#) .*
- ◆ *To ensure that the charge air hoses can be properly secured at their connections, spray rust remover onto the worm thread of used hose clips **before installing**.*
- ◆ *If there are slight impressions on the fins, refer to ["3.5 Installing radiators, condensers and charge air coolers"](#), page 6 .*

#### 1 - Bolt

- 5 Nm

#### 2 - Mounting

- For charge air cooler

#### 3 - Charge air cooler

#### 4 - Charge air pipe

- Fitting hose connections with plug-in connectors ⇒ [page 288](#)

#### 5 - Bolt

- 10 Nm

#### 6 - Charge air hose

- Fitting hose connections with plug-in connectors ⇒ [page 288](#)

#### 7 - Hose clip

#### 8 - Charge air hose

- To throttle valve module - J338-

#### 9 - Hose clip

#### 10 - Bolt

- 10 Nm

#### 11 - Charge air pipe

#### 12 - Hose clip

#### 13 - Charge air hose

- Fitting hose connections with plug-in connectors ⇒ [page 288](#)

#### 14 - Seal

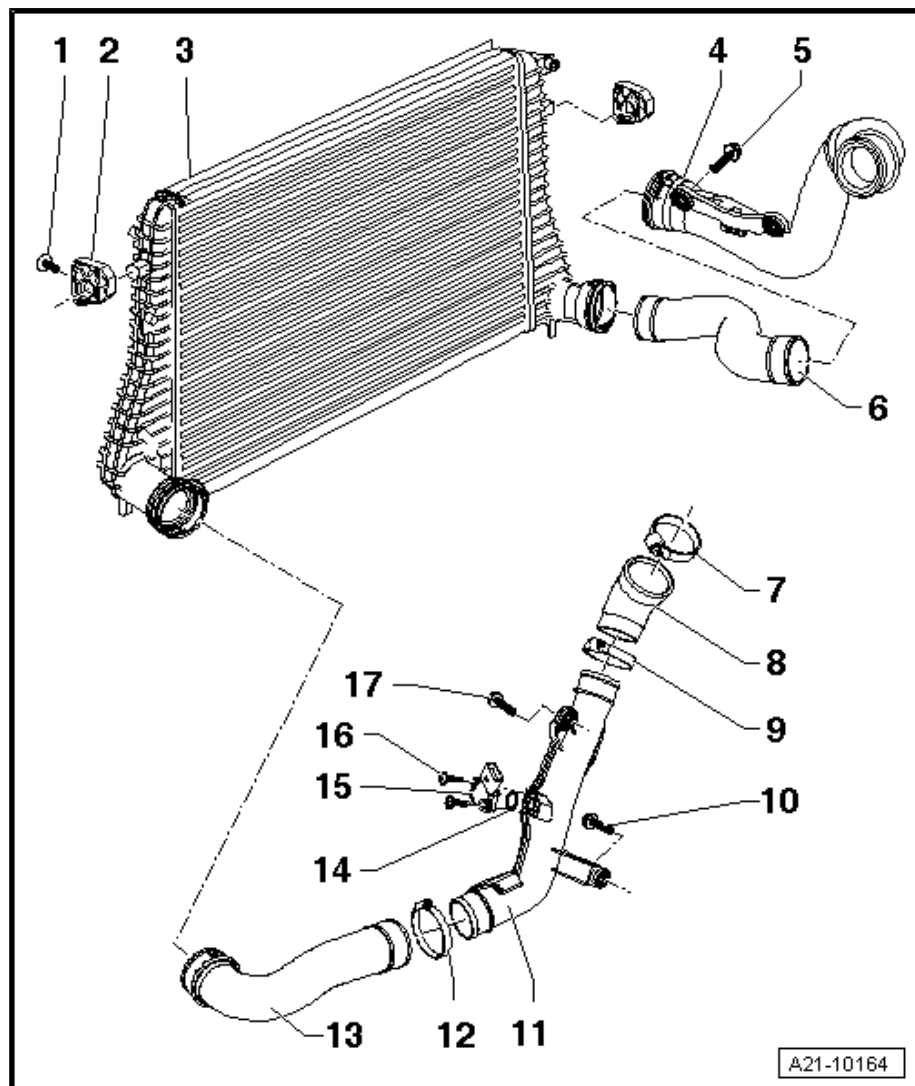
- Renew

#### 15 - Charge pressure sender - G31-

- Removing and installing ⇒ [page 313](#)

#### 16 - Bolt

- 5 Nm





## 17 - Bolts

- 10 Nm

## 2.4 Removing and installing charge pressure sender - G31-

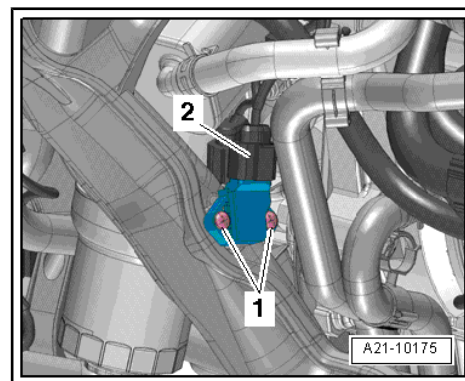
### Removing

- Unplug electrical connector -2-.
- Unscrew bolts -1- and remove charge pressure sender - G31- .

### Installing

- Tightening torque  
 ⇒ ["2.3 Exploded view - charge air cooling", page 312](#)

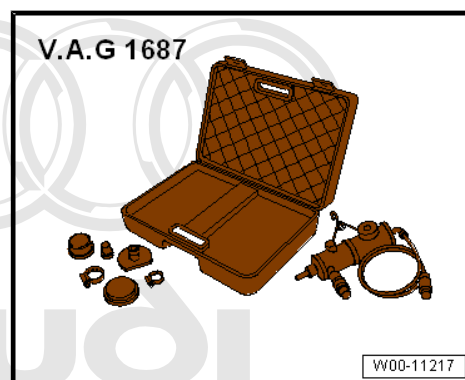
Install in reverse sequence.



## 2.5 Checking charge air system for leaks

### Special tools and workshop equipment required

- ◆ Charge air system tester - V.A.G 1687-



- ◆ Adapter - V.A.G 1687/5-

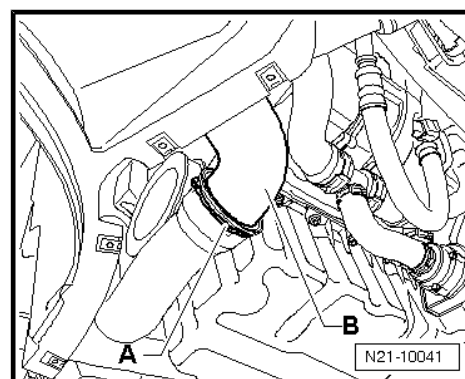
- Remove noise insulation ⇒ Rep. gr. 66 .

### Cabriolet

- Remove noise insulation frame ⇒ Rep. gr. 50 .

### All vehicles:

- Release retaining clip -A- and disconnect hose -B- from charge air pipe.

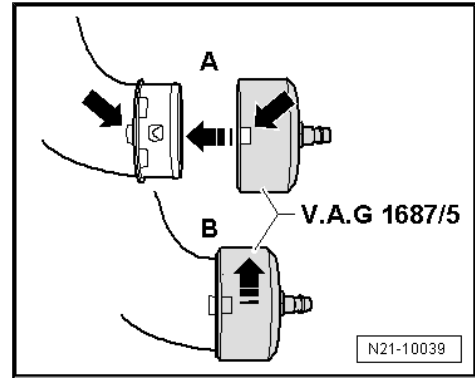


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- Fit adapter - V.A.G 1687/5- onto charge air hose -A- and turn by approx. 90° -B-.

Prepare charge air system tester - V.A.G 1687- as follows:

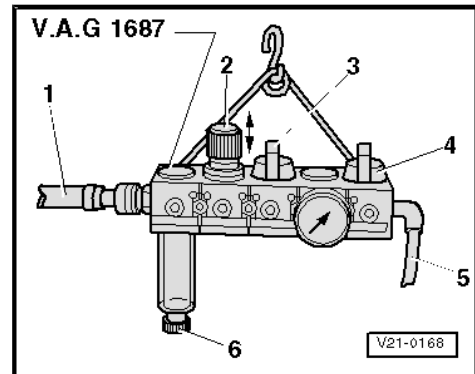


- Unscrew pressure control valve -2- completely and close valves -3- and -4-.

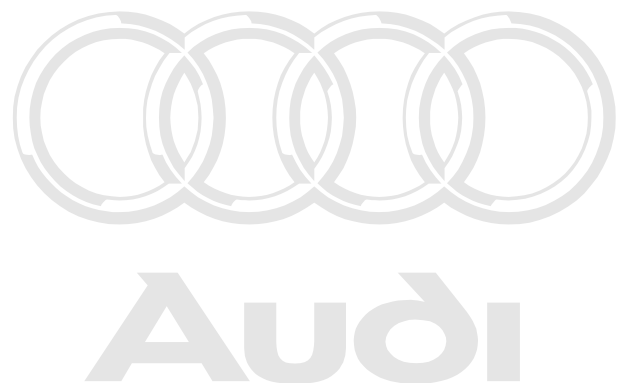
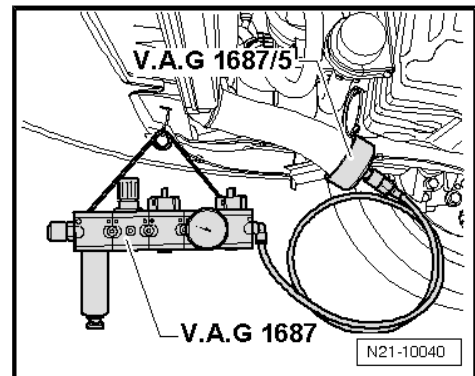


**Note**

*Make sure knob is pulled out before turning pressure control valve -2-.*



- Connect charge air system tester - V.A.G 1687- as shown in illustration.



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.

- Connect pressure hose -1- (compressed air supply line) to charge air system tester - V.A.G 1687- .

**i Note**

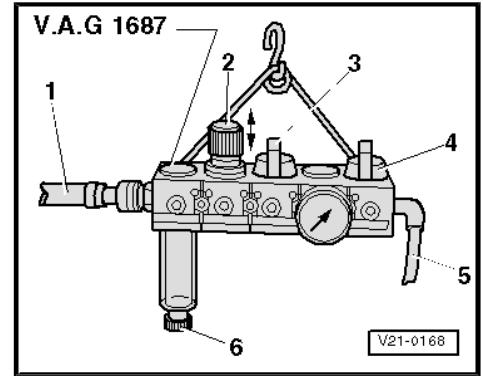
*If sight glass contains water, loosen drain plug and drain water -6-.*

- Open valve -3-.
- Adjust pressure to 0.5 bar via pressure control valve -2-.



**Caution**

***The pressure must not exceed 0.5 bar. If the pressure is set too high this can damage the engine.***



- Open valve -4- and wait until test system is pressurised. If necessary, adjust pressure to 0.5 bar again.
- Check charge air system for audible leaks or leaks that can be felt with the hand; apply commercially available leak detecting spray or use ultrasonic tester - V.A.G 1842- .

**i Note**

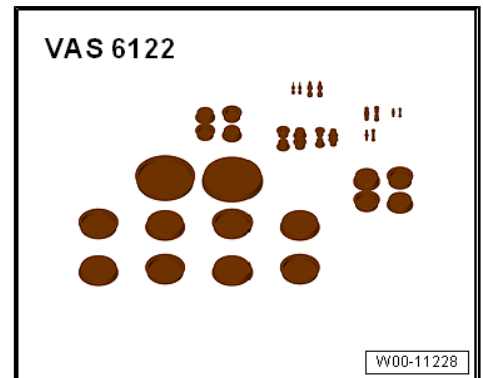
- ◆ *Fitting hose connections with plug-in connectors => page 288 .*
- ◆ *A small amount of air escapes through the valves and enters the engine. Therefore it is not possible to perform a pressure retention test.*
- ◆ *Operation of ultrasonic tester - V.A.G 1842- => Operating instructions .*
- ◆ *Release pressure by detaching coupling from adapter - V.A.G 1687/5- before removing adapter.*
- ◆ *Hose connections and charge air system hoses must be free of oil and grease prior to fitting.*

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 the correctness of information in this document. Copyright by AUDI AG.

## 2.6 Removing and installing charge air cooler

### Special tools and workshop equipment required

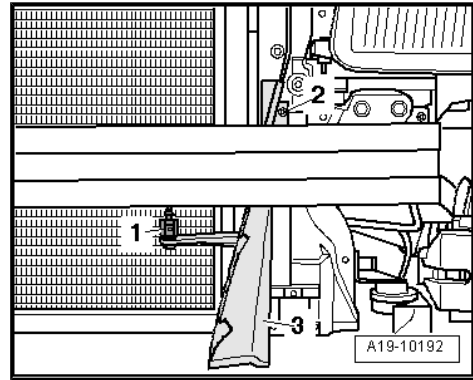
- ◆ Engine bung set - VAS 6122-





### Removing

- Remove radiator ⇒ [page 279](#) .
- Remove bumper cover (front) ⇒ Rep. gr. 63 .
- Unplug electrical connector -1- at ambient temperature sensor - G17- .
- Remove bolts -2- at air ducts (left and right) on charge air cooler.
- Disengage air ducts -3- (push them slightly upwards to do so).
- Swivel air ducts to left side of vehicle and guide out air ducts at rear of bumper.



### WARNING

*Risk of injury caused by refrigerant.*

- ◆ *The air conditioner refrigerant circuit must not be opened.*

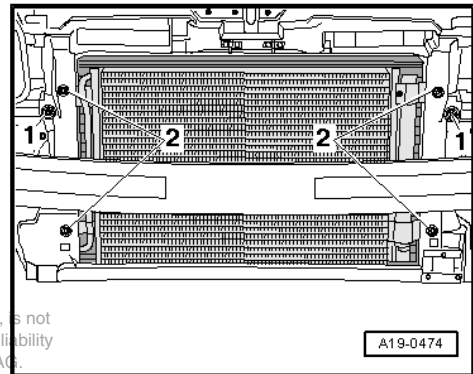


### Caution

*Danger of damage to refrigerant lines and hoses.*

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

- Remove bolt on retaining clip for refrigerant line in vicinity of longitudinal member.
- Remove bolts -2- securing condenser.
- Remove bolts -1- securing charge air cooler.
- Swivel charge air cooler slightly 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.

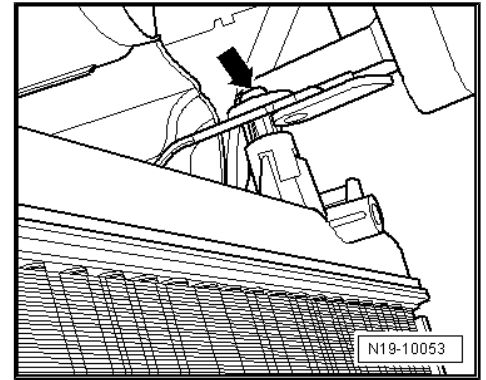
- Remove bolt at bracket for refrigerant line (bottom right) at charge air cooler.
- Swivel condenser forward into opening in lock carrier.
- Detach charge air cooler upwards from lock carrier and remove by guiding it out diagonally from below.

### Installing

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

 **Note**

*If there are slight impressions on the fins, refer to  
 ⇒ ["3.5 Installing radiators, condensers and charge air coolers"](#),  
[page 6](#).*



 **Note**

- ◆ *Renew seal.*
- ◆ *Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ [Electronic parts catalogue](#).*
- Install radiator ⇒ [page 279](#).
- Install bumper cover (front) ⇒ Rep. gr. 63.
- Install air pipes/hoses with plug-in connectors ⇒ [page 288](#).
- Fill up with coolant ⇒ [page 248](#).



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.



## 24 – Mixture preparation - injection

### 1 Injection system

⇒ [“1.1 Technical data”, page 318](#)

⇒ [“1.2 Overview of fitting locations - injection system”, page 318](#)

⇒ [“1.3 Removing and installing engine cover panel”, page 325](#)

⇒ [“1.4 Removing and installing cover with oil separator - engine code BYT”, page 325](#)

#### 1.1 Technical data

Engine data		1.8 ltr./2.0 ltr. turbo FSI engine
Idling speed (cannot be adjusted; is regulated by idling speed stabilisation)		640 ... 800 rpm
Maximum rpm governed by deactivation of fuel injectors		6500 rpm
Fuel pressure	Initial fuel pressure up to high-pressure pump (generated by electric fuel pump in fuel tank)	3 to 7 bar
	Pressure in high-pressure fuel circuit (generated by mechanical single-plunger pump)	approx. 40 bar at idling speed approx. 150 bar in certain parts of operating range.

#### 1.2 Overview of fitting locations - injection system

##### Overview of fitting locations - engine compartment

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted. All rights reserved 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 - Engine control unit - J623-**

- Removing and installing  
⇒ [page 376](#)

**2 - Lambda probe - G39-**

- For position of Lambda probes, refer to exploded view  
⇒ ["7.1 Exploded view - Lambda probe"](#),  
[page 363](#)
- Removing and installing  
⇒ [page 367](#)

**3 - Lambda probe after catalytic converter - G130- and Lambda probe 3 after catalytic converter - G287-**

- For position of Lambda probes, refer to exploded view  
⇒ ["7.1 Exploded view - Lambda probe"](#),  
[page 363](#)
- Removing and installing  
⇒ [page 367](#)

**4 - Accelerator position sender - G79- and accelerator position sender 2 - G185-**

- Fitting location  
⇒ [page 323](#)
- Exploded view ⇒ Fuel supply system, petrol engines; Rep. gr. 20

**5 - Brake light switch - F- / brake pedal switch - F47-**

- Fitting location  
⇒ [page 323](#)
- Removing and installing ⇒ Rep. gr. 45

**6 - Clutch position sender - G476-**

- Only fitted on vehicles with manual gearbox
- Fitting location ⇒ [page 323](#)
- Removing and installing ⇒ Rep. gr. 30

**7 - Secondary air pump motor - V101-**

- Only on engines with code letters CBFA
- Fitting location ⇒ [page 324](#)
- Exploded view ⇒ [page 388](#)

**8 - Radiator outlet coolant temperature sender - G83-**

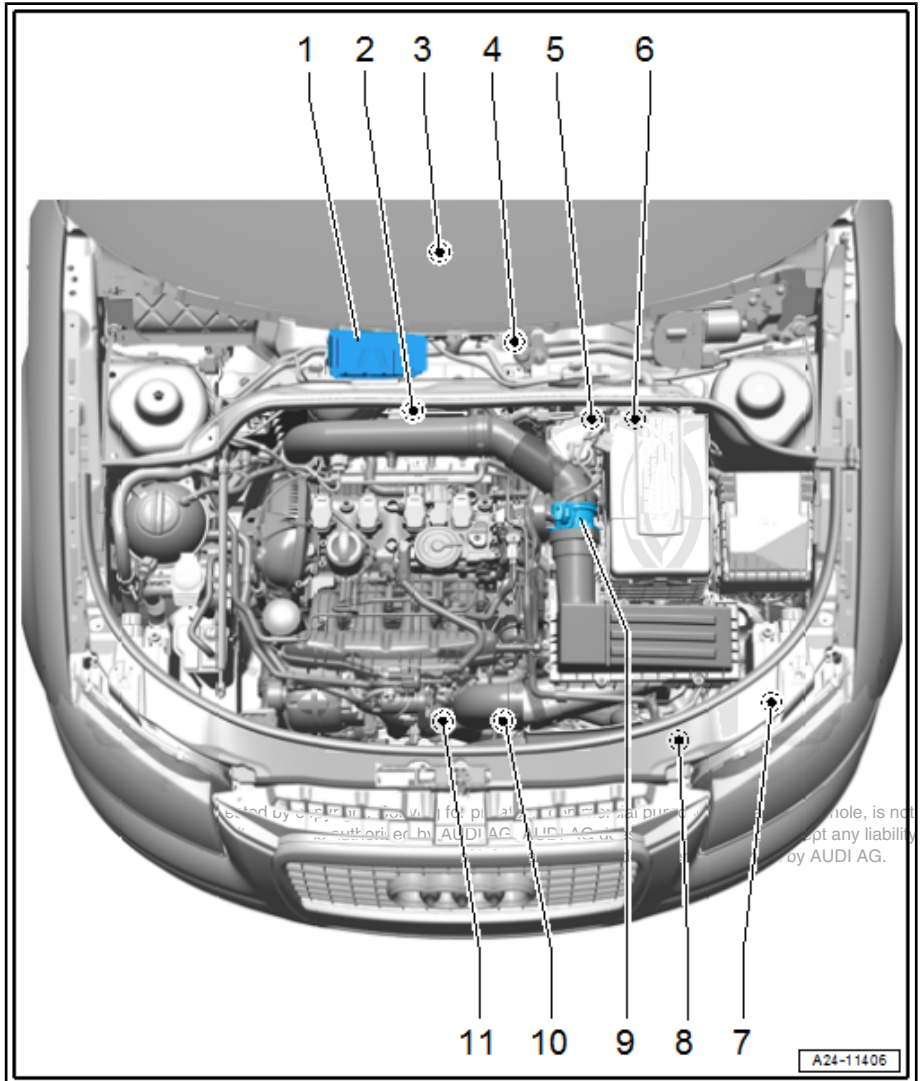
- Fitting location ⇒ [page 324](#)

**9 - Air mass meter - G70-**

- Also with intake air temperature sender 2 - G299- on engines with code letters CDAA
- Exploded view ⇒ [page 327](#)

**10 - Charge pressure sender - G31-**

- Fitting location ⇒ [page 324](#)
- Exploded view ⇒ [page 312](#)





### 11 - Continued coolant circulation pump - V51-

- Fitting location ⇒ [page 324](#)
- Exploded view ⇒ [page 257](#)

### Overview of fitting locations - engine (view from left side)

#### 1 - Valve for oil pressure control - N428-

- Only on engines with code letters CDAA, CCTA, CCZA
- Exploded view ⇒ ["1.1 Exploded view - sump/oil pump", page 218](#)

#### 2 - Coolant temperature sender - G62-

- Exploded view ⇒ ["2.1 Exploded view - coolant pump/thermostat", page 255](#)

#### 3 - Oil pressure switch - F1- / oil pressure switch - F22-

- Oil pressure switch - F1- only on engines with code letters BPU, BYT, BZB, CAWB, CBFA
- Oil pressure switch - F22- only on engines with code letters CDAA, CCTA, CCZA
- Exploded view ⇒ ["2.1 Exploded view - oil filter, engine oil cooler, oil pressure switch", page 234](#)

#### 4 - Oil pressure switch for reduced oil pressure - F378-

- Only on engines with code letters CDAA, CCTA, CCZA

- Exploded view ⇒ ["2.1 Exploded view - oil filter, engine oil cooler, oil pressure switch", page 234](#)

#### 5 - Intake manifold flap potentiometer - G336-

- Exploded view ⇒ ["3.1 Exploded view - intake manifold", page 331](#)

#### 6 - Fuel pressure sender - G247-

- Exploded view ⇒ ["3.2 Exploded view - fuel rail", page 333](#)

#### 7 - Intake air temperature sender - G42-

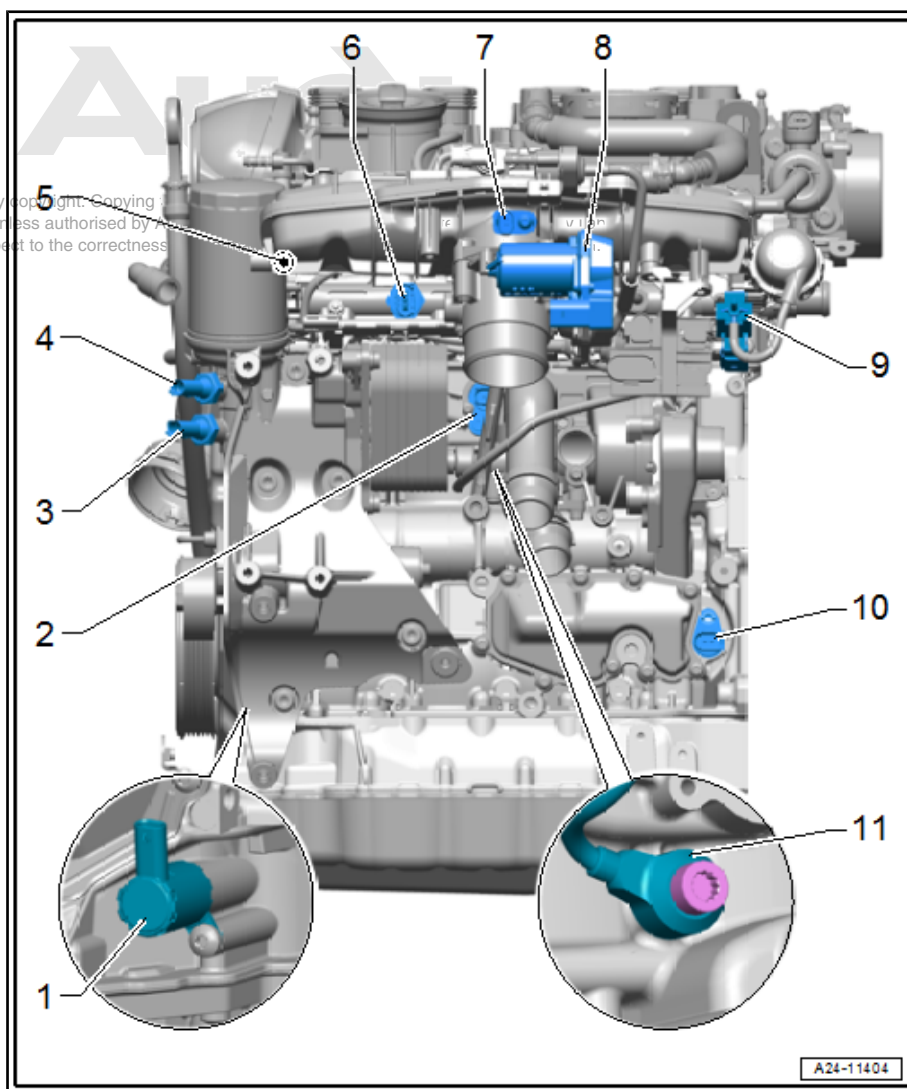
- Exploded view ⇒ ["3.1 Exploded view - intake manifold", page 331](#)

#### 8 - Throttle valve module - J338-

- Including throttle valve drive (electric throttle operation) - G186- , angle sender for throttle valve drive - G187- and angle sender 2 for throttle valve drive - G188-
- Exploded view ⇒ ["3.1 Exploded view - intake manifold", page 331](#)

#### 9 - Intake manifold flap valve - N316-

- Exploded view ⇒ ["3.1 Exploded view - intake manifold", page 331](#)





### 10 - Engine speed sender - G28-

- ❑ Exploded view ⇒ ["1.2 Exploded view - ignition system", page 391](#)

### 11 - Knock sensor 1 - G61-

- ❑ Knock sensor 2 - G66- (not installed in all vehicles)
- ❑ Exploded view ⇒ ["1.2 Exploded view - ignition system", page 391](#)

### Overview of fitting locations - engine (view from right side)

#### 1 - Charge pressure control solenoid valve - N75-

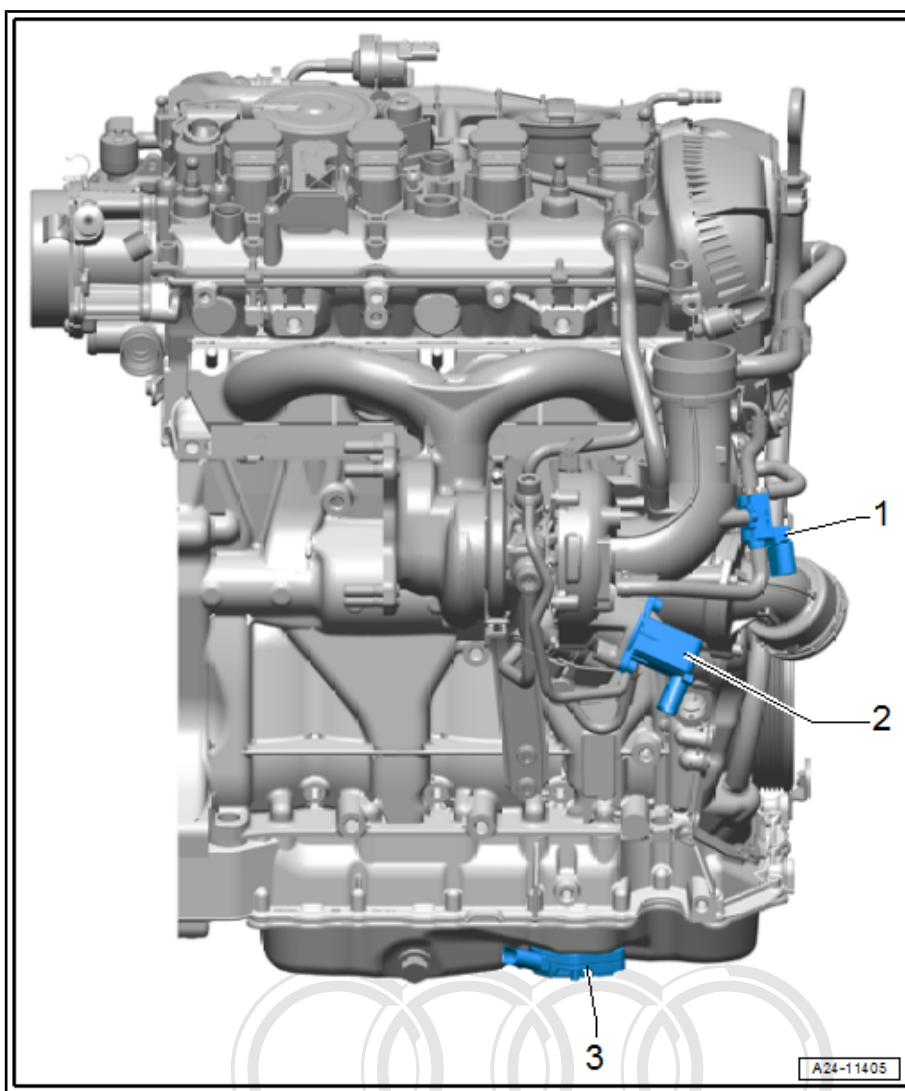
- ❑ Exploded view ⇒ ["1.1 Exploded view - turbocharger", page 282](#)

#### 2 - Turbocharger air recirculation valve - N249-

- ❑ Exploded view ⇒ ["1.1 Exploded view - turbocharger", page 282](#)

#### 3 - Oil level and oil temperature sender - G266-

- ❑ Exploded view ⇒ ["1.1 Exploded view - sump/oil pump", page 218](#)



### Overview of fitting locations - engine (view from above)



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 - Camshaft control valve 1 - N205-**

- ❑ Exploded view  
⇒ [“1.1 Exploded view - timing chain cover, camshaft control valve 1 N205”, page 91](#)

**2 - Ignition coil 1 with output stage - N70-**

- ❑ Exploded view  
⇒ [“1.2 Exploded view - ignition system”, page 391](#)

**3 - Ignition coil 2 with output stage - N127-**

- ❑ Exploded view  
⇒ [“1.2 Exploded view - ignition system”, page 391](#)

**4 - Ignition coil 3 with output stage - N291-**

- ❑ Exploded view  
⇒ [“1.2 Exploded view - ignition system”, page 391](#)

**5 - Ignition coil 4 with output stage - N292-**

- ❑ Exploded view  
⇒ [“1.2 Exploded view - ignition system”, page 391](#)

**6 - Fuel metering valve - N290- or fuel pressure regulating valve - N276-**

- ❑ Fuel metering valve - N290- or fuel pressure regulating valve - N276- may be fitted, depending on version
- ❑ Integrated in high-pressure pump

**7 - Injector, cylinder 4 - N33-**

- ❑ In fuel rail
- ❑ Exploded view ⇒ [“3.2 Exploded view - fuel rail”, page 333](#)

**8 - Injector, cylinder 3 - N32-**

- ❑ In fuel rail
- ❑ Exploded view ⇒ [“3.2 Exploded view - fuel rail”, page 333](#)

**9 - Activated charcoal filter solenoid valve 1 - N80-****10 - Hall sender - G40-**

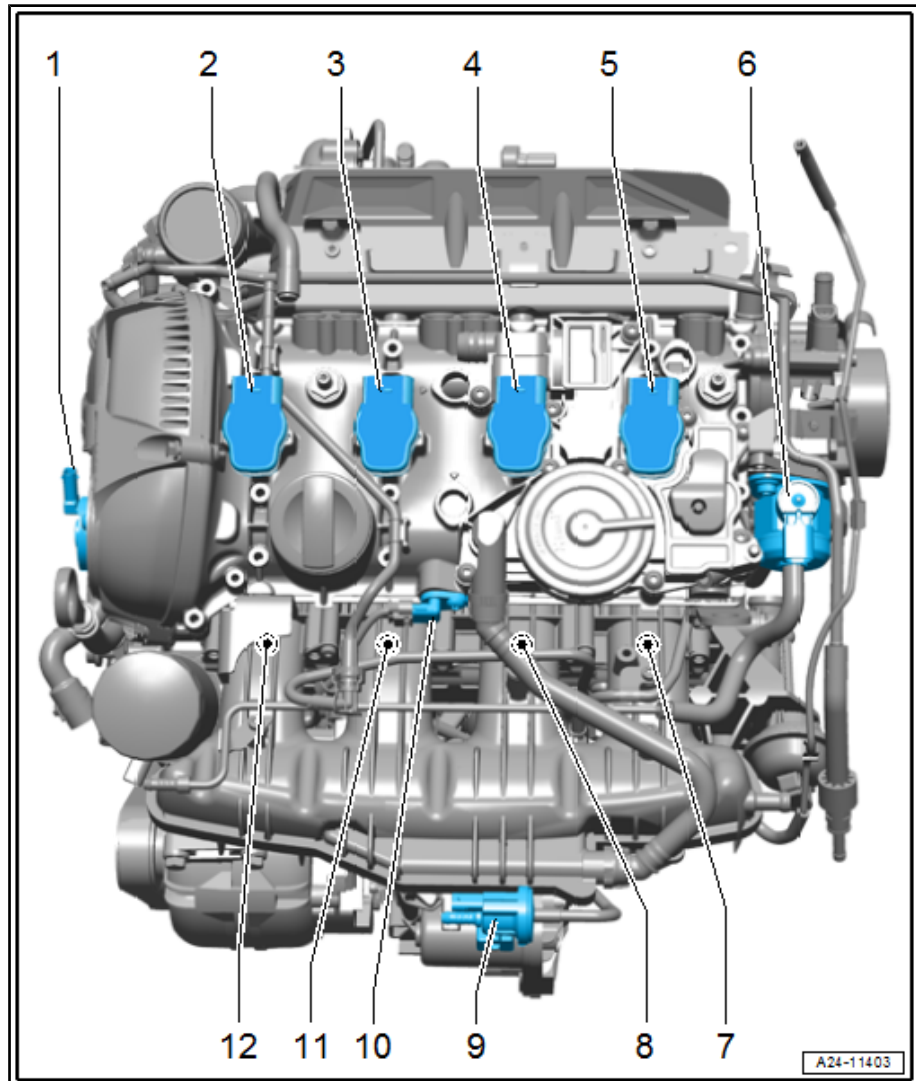
- ❑ Exploded view ⇒ [“1.2 Exploded view - ignition system”, page 391](#)

**11 - Injector, cylinder 2 - N31-**

- ❑ In fuel rail
- ❑ Exploded view ⇒ [“3.2 Exploded view - fuel rail”, page 333](#)

**12 - Injector, cylinder 1 - N30-**

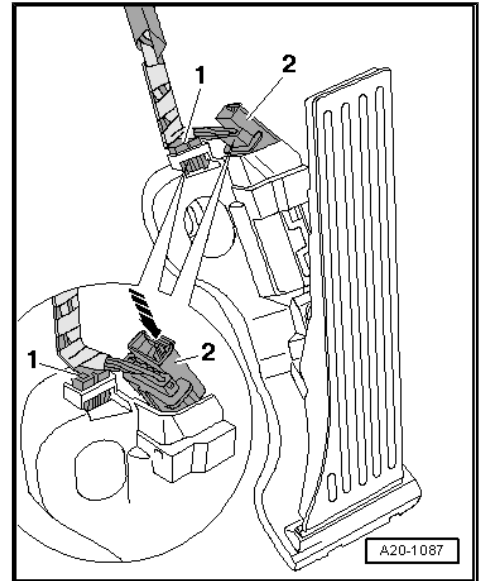
- ❑ In fuel rail
- ❑ Exploded view ⇒ [“3.2 Exploded view - fuel rail”, page 333](#)



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

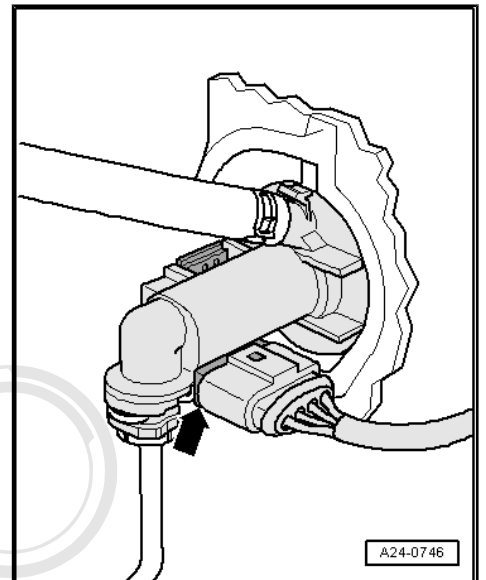
2 - Electrical connector for accelerator pedal module

Removing and installing ⇒ Fuel supply system, petrol engines;  
Rep. gr. 20



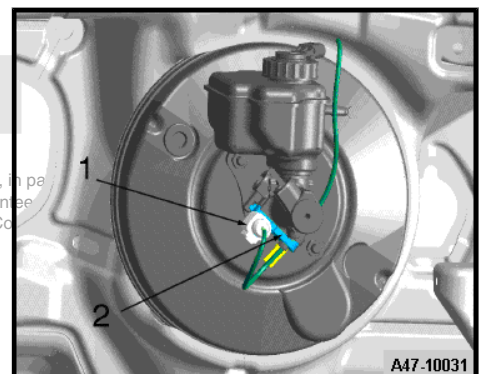
**Clutch position sender - G476-**

Removing and installing, see Power transmission, clutch ⇒ Rep.  
gr. 30



**Brake light switch - F- and brake pedal switch - F63-**

Removing and installing ⇒ Rep. gr. 45

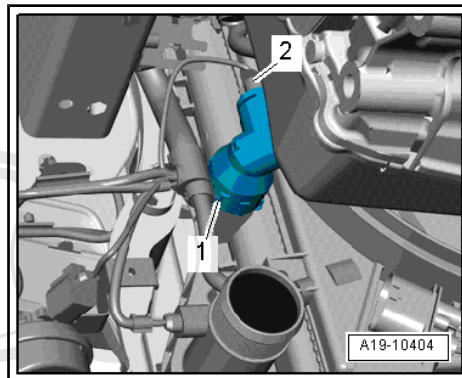


Protected by copyright. Copying for private or commercial purposes, in part or in full, is permitted unless authorised by AUDI AG. AUDI AG does not guarantee the accuracy of information in this document. Copyright © 2016 Audi AG



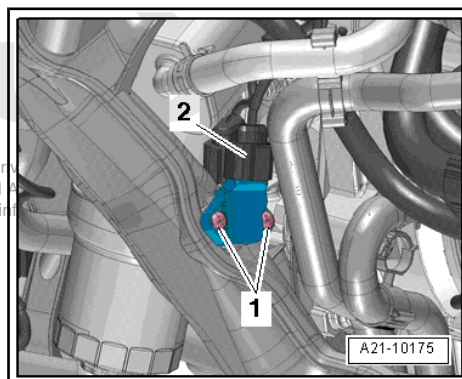
**Fitting location of radiator outlet coolant temperature sender - G83-**

- ◆ -Item 1- on radiator (bottom left)



**Fitting location of charge pressure sender - G31-**

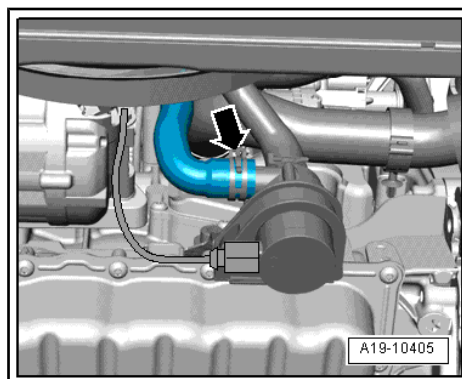
- ◆ At air pipe (front) on engine



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

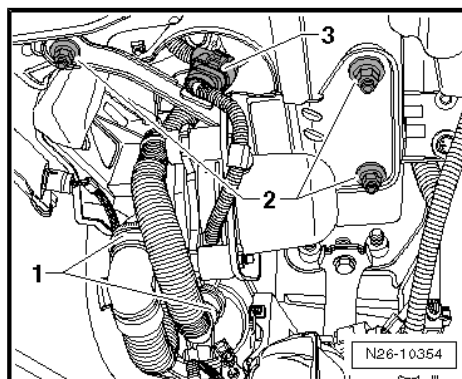
**Fitting location of continued coolant circulation pump - V51-**

- ◆ At front of engine (bottom)



**Fitting location of secondary air pump motor - V101-**

- ◆ In wheel housing (front left)
- 3 - Electrical connector for secondary air pump motor - V101-



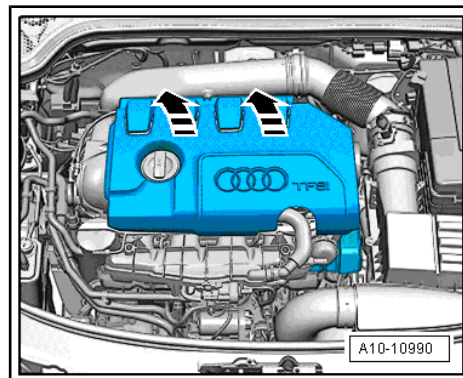
### 1.3 Removing and installing engine cover panel

#### Removing

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

#### Installing

- Carefully press engine cover panel back into mountings.
- To avoid damage, do not strike the engine cover panel with your fist or with any kind of tool.

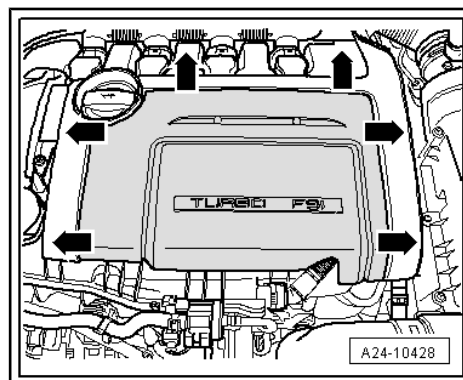


### 1.4 Removing and installing cover with oil separator - engine code BYT

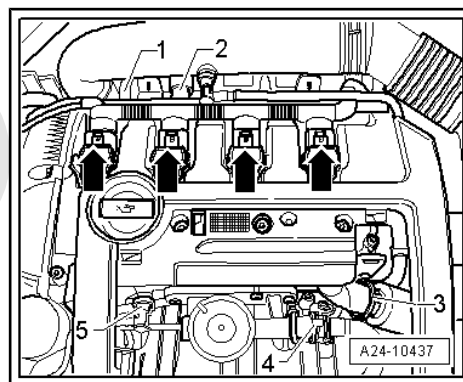
Oil separator is fitted in cover only on vehicles with engine code BYT.

#### Removing

- Pull off top engine cover panel carefully. Do not jerk the cover panel away, and do not try to pull on one side only.



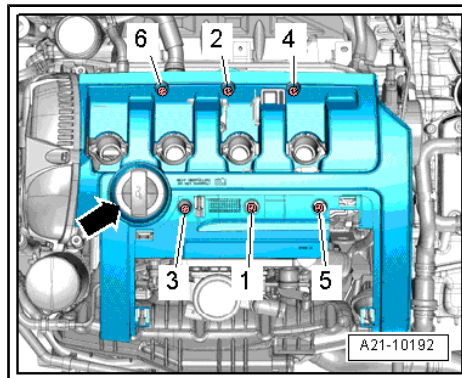
- Carefully disconnect hose -1-.
- Disconnect vacuum hoses -2-, -3-, -4- and -5-.
- Remove ignition coils -arrows- → [page 392](#) .
- Remove cap.



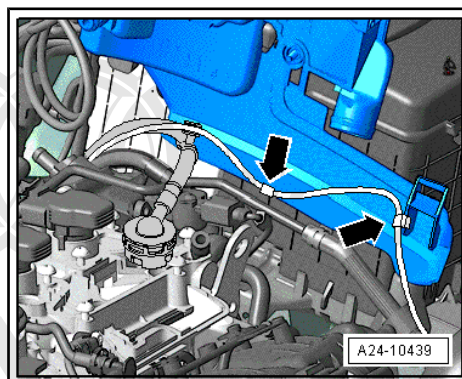
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- Remove 6 bolts -arrows-.

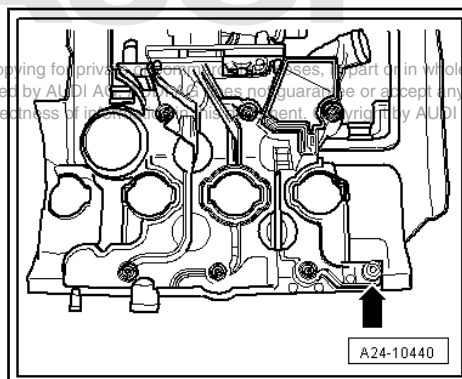


- Lift up cover towards the right and pull vacuum line out of two clips -arrows-.



### Installing

- Pay attention to O-ring -arrow-; renew O-ring if **damaged**.
- ◆ Tightening torque for bolts: 11 Nm
- The remaining installation steps are carried out in the reverse sequence.



copyright. Copying for private use is permitted. All other uses, 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 Air cleaner

⇒ [“2.1 Exploded view - air cleaner”, page 327](#)

⇒ [“2.2 Removing and installing air filter element”, page 328](#)

⇒ [“2.3 Removing and installing air cleaner housing”, page 329](#)

### 2.1 Exploded view - air cleaner

#### 1 - Spring-type clip

#### 2 - Air hose

- To turbocharger
- Check air intake hose for dirt and leaves

#### 3 - Air mass meter - G70-

- 2 Nm
- Removing and installing ⇒ [page 351](#)

#### 4 - Bolts

- For air cleaner (top section)

#### 5 - Bolts

- For air cleaner (top section)
- 2 Nm

#### 6 - Air cleaner (top section)

- Clean any salt residue, leaves and dirt out of air cleaner (top section)

#### 7 - Filter element

- Always use genuine part for air filter element
- Removing and installing ⇒ [page 328](#)
- Observe change intervals ⇒ Maintenance ; Booklet 808

#### 8 - Bolt

- For air cleaner (bottom section)
- 8 Nm

#### 9 - Snow screen

- Not installed in all vehicles

#### 10 - Air cleaner (bottom section)

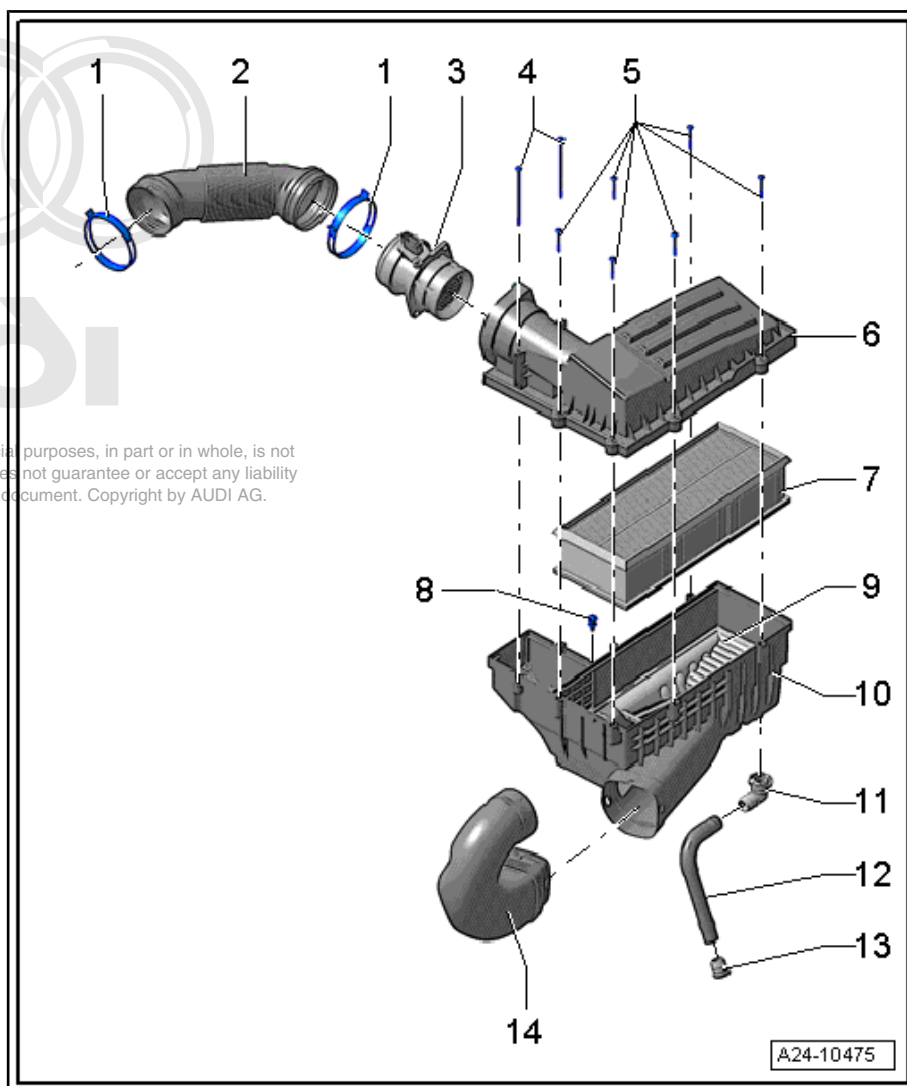
- Clean any salt residue, leaves and dirt out of air cleaner (bottom section)

#### 11 - Connection for water drain hose

- Clean connection

#### 12 - Water drain hose

- Clean water drain hose



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.



### 13 - Flutter valve

- Clean and re-install

### 14 - Intake air duct

- To lock carrier
- Clean any leaves and dirt out of intake air duct

## 2.2 Removing and installing air filter element

### Removing

- Unscrew bolts -arrows- from air cleaner (top section).



#### Note

*Disregard items 1 to 3.*

- Lift up air cleaner (top section) and take out air filter element.

### Installing



#### Note

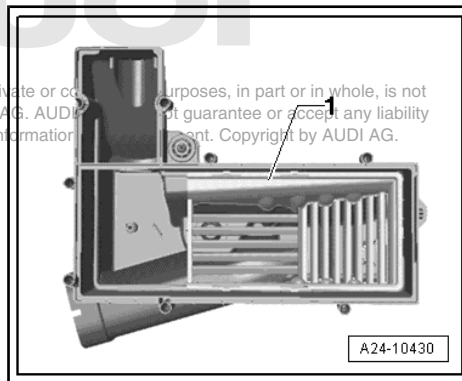
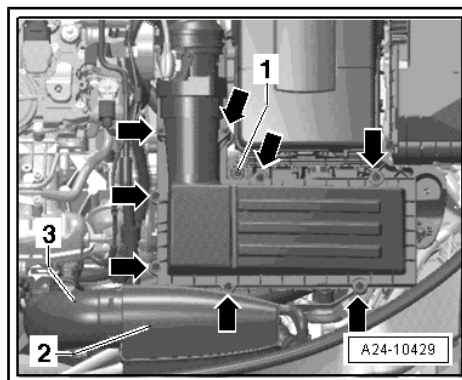
- ◆ *Always use genuine air filter elements (same as original equipment).*
- ◆ *Hose connections and charge air system hoses must be free of oil and grease prior to fitting. Do not use any lubricants containing silicone when assembling.*
- ◆ *Both sections of the air cleaner housing must be clean.*
- ◆ *Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ Parts catalogue .*
- ◆ *To prevent malfunctions, cover all critical parts of the engine air intake tract (air mass meter, intake pipes, etc.) with a clean cloth when blowing out the air cleaner housing with compressed air.*
- ◆ *Please observe requirements for disposal.*

- Check air mass meter and intake hose (engine intake side) for salt residue, dirt and leaves.
- Check air intake hose from air duct for dirt.
- Remove snow screen -1- and clean it.



#### Note

*The snow screen is not installed in all vehicles.*



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 contained herein. Copyright by AUDI AG.



- Clean water drain -arrow- and air cleaner (bottom section).
- When installing the air filter element, check that it is properly centred in the retainer in the air cleaner (bottom section).
- Carefully fit air cleaner (top section) on air cleaner (bottom section) without applying any force. Make sure the top section of the air cleaner is fitted straight on the air filter element (note position of sealing lip on air filter element).

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

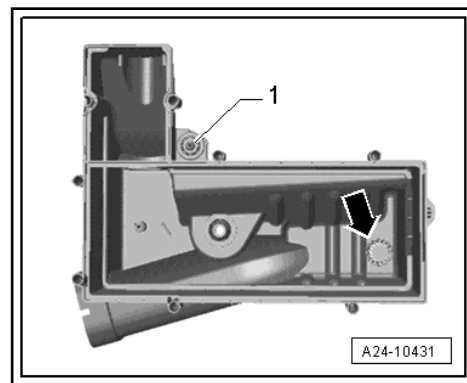
#### Tightening torques

- ◆ ⇒ ["2.1 Exploded view - air cleaner", page 327](#)

## 2.3 Removing and installing air cleaner housing

### Removing

- Unscrew bolts -arrows- from air cleaner (top section).
- Lift up air cleaner (top section) and take out air filter element.
- Remove air duct leading from lock carrier to air cleaner housing -2 and 3-.
- Slacken bolt -1-.
- Carefully lift air cleaner (bottom section).



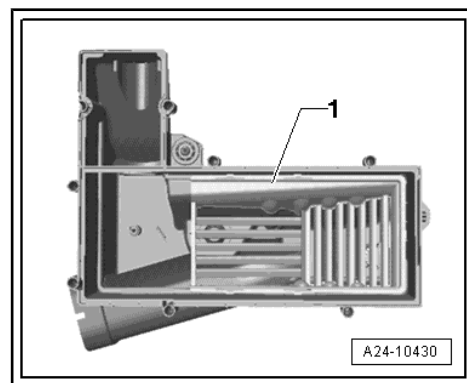
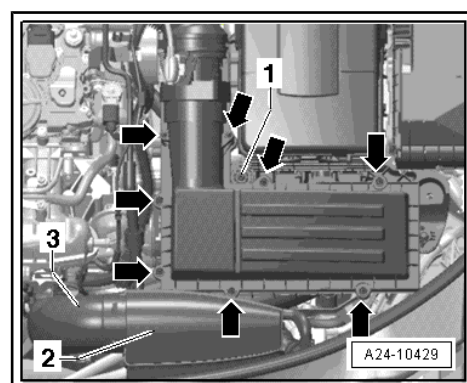
### Installing

- Remove and clean snow screen -1-.

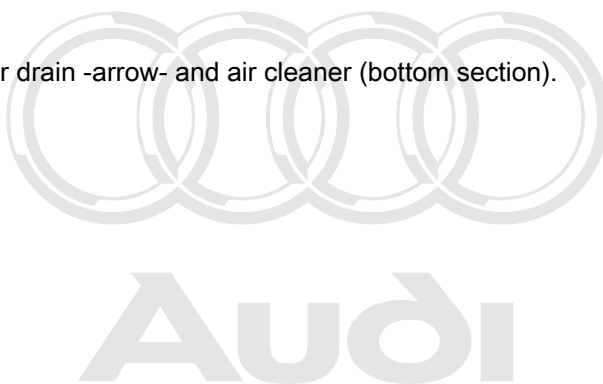
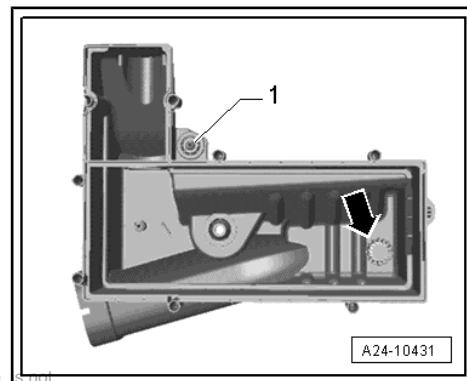


#### Note

*The snow screen is not installed in all vehicles.*



- Clean water drain -arrow- and air cleaner (bottom section).



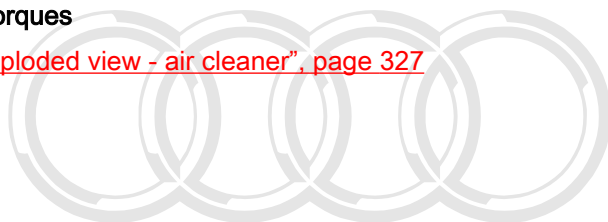
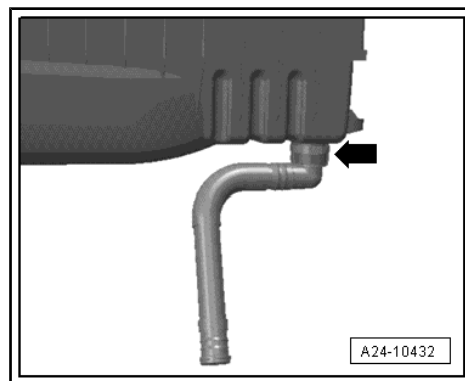


- Disconnect water drain hose -arrow- from air cleaner (bottom section) and clean any dirt or leaves out of connection and hose.
- When installing the air filter element, check that it is properly centred in the retainer in the air cleaner (bottom section).
- Carefully fit air cleaner (top section) on air cleaner (bottom section) without applying any force. Make sure the top section of the air cleaner is fitted straight on the air filter element (note position of sealing lip on air filter element).

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

#### Tightening torques

- ◆ ⇒ ["2.1 Exploded view - air cleaner", page 327](#)



# 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.

### 3 Intake manifold

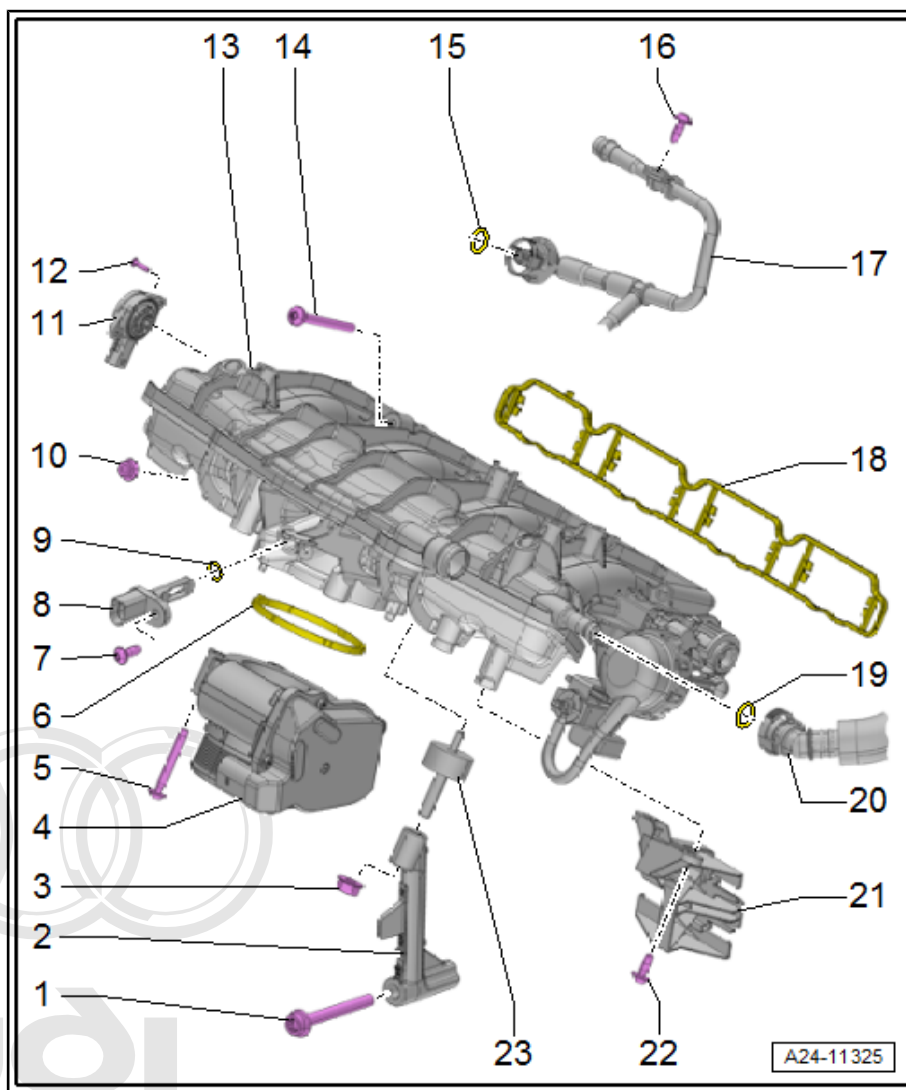
⇒ "3.1 Exploded view - intake manifold", page 331

⇒ "3.2 Exploded view - fuel rail", page 333

⇒ "3.3 Removing and installing intake manifold with fuel rail", page 334

#### 3.1 Exploded view - intake manifold

- 1 - Bolt
  - 20 Nm
- 2 - Support for intake manifold
- 3 - Nut
  - 10 Nm
- 4 - Throttle valve module - J338-
  - Including throttle valve drive for electric throttle - G186- , throttle valve drive angle sender 1 for electric throttle - G187- and throttle valve drive angle sender 2 for electric throttle - G188-
  - Removing and installing ⇒ page 358
  - Cleaning ⇒ page 359
  - After renewing, perform "Adaption" for engine control unit - J623- / throttle valve module - J338- in ⇒ Vehicle diagnostic tester, Guided Functions
- 5 - Bolt
  - 7 Nm
- 6 - Seal
  - Renew
- 7 - Bolt
  - 5 Nm
- 8 - Intake air temperature sender - G42-
- 9 - O-ring
  - Renew
- 10 - Nut
  - Pre-tightening torque: 3 Nm
  - Final tightening torque: 10 Nm
- 11 - Intake manifold flap potentiometer - G336-
  - After renewing, perform "Adaption" for engine control unit - J623- / intake manifold flap potentiometer - G336- using ⇒ Vehicle diagnostic tester, Guided Functions
- 12 - Bolt
  - Thread-forming



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted without express authorisation 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.



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

### 13 - Intake manifold

- Removing and installing ⇒ [page 334](#)
- After installing, perform "Adaption" for engine control unit - J623- / intake manifold flap potentiometer - G336- in ⇒ Vehicle diagnostic tester, Guided Functions

### 14 - Bolt

- Pre-tightening torque: 3 Nm
- Final tightening torque: 10 Nm

### 15 - O-ring

- Renew

### 16 - Bolt

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

### 17 - Vacuum hose

### 18 - Gasket

- Renew

### 19 - O-ring

- Renew

### 20 - Hose

- For crankcase breather

### 21 - Retainer

- For electrical connectors

### 22 - Bolt

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

### 23 - Bonded rubber bush

- 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.

## 3.2 Exploded view - fuel rail

### 1 - High-pressure pipe

- Connections must not be damaged
- Do not alter shape
- Lubricate thread of union nut with clean engine oil
- Tighten union nut to 27 Nm

### 2 - Fuel rail

- Connections must not be damaged
- Removing and installing ⇒ [page 334](#)

### 3 - Fuel pressure sender - G247-

- Checking ⇒ [page 351](#)
- Removing and installing ⇒ [page 354](#)
- Lubricate threads lightly with clean engine oil
- 27 Nm

### 4 - Bolt

- 5 Nm

### 5 - Support ring

- Make sure it is correctly seated
- Via this support ring, the fuel rail exerts the force which holds the injector in the cylinder head

### 6 - O-ring

- Renew
- Lubricate lightly with clean engine oil

### 7 - Spacer ring

- Renew if damaged

### 8 - Injector

- Different versions; for allocation refer to ⇒ Electronic parts catalogue
- Ensure correct installation position.
- Removing and installing ⇒ [page 344](#)

### 9 - Sealing element

### 10 - Retainer

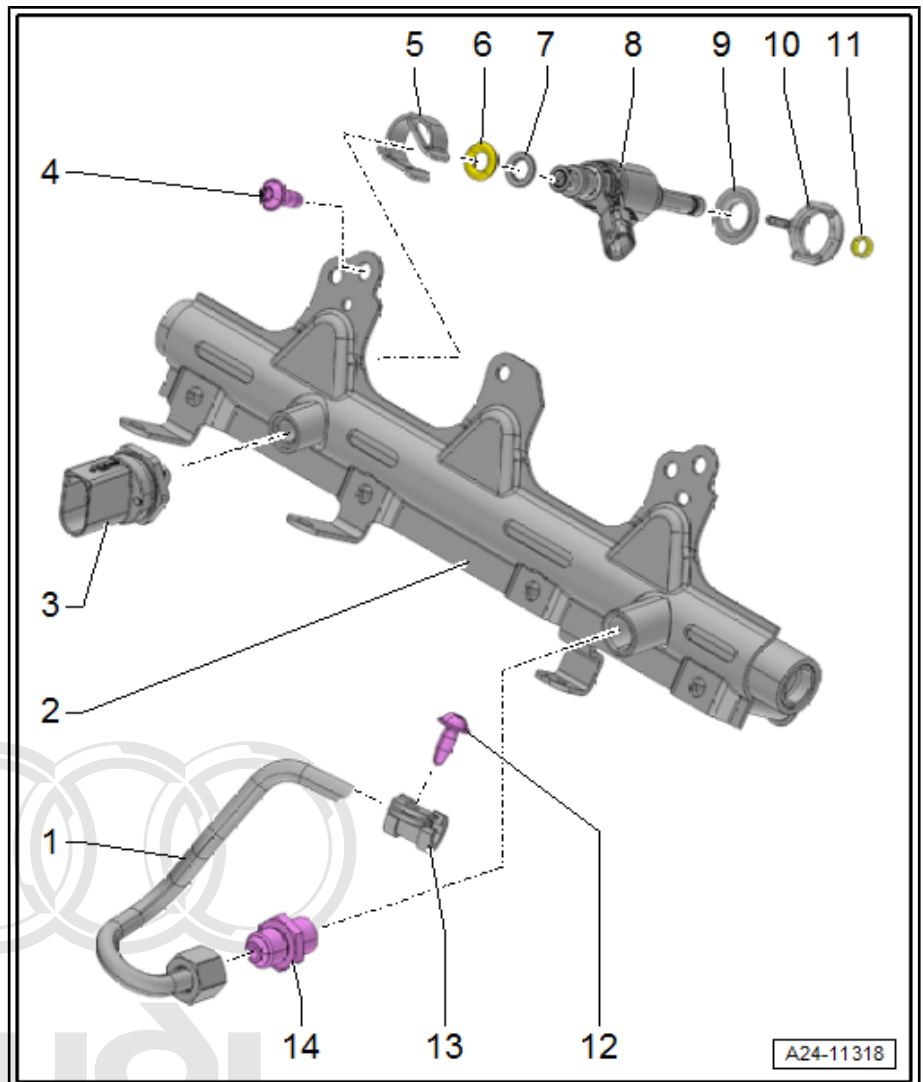
- For sealing element

### 11 - Combustion chamber ring seal

- Renewing ⇒ ["5.1 Removing and installing injectors", page 344](#)

### 12 - Bolt

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





### 13 - Retaining clamp

- For high-pressure pipe

### 14 - Connecting piece

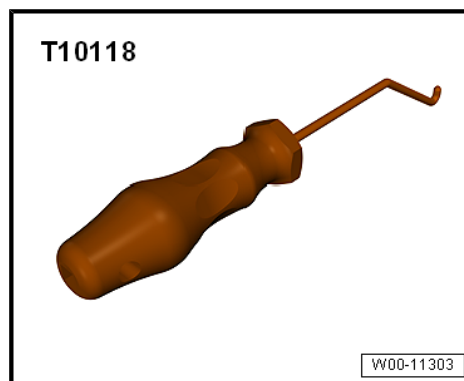
- For high-pressure pipe
- Counterhold when loosening union nut
- Renew after removing
- 40 Nm

## 3.3 Removing and installing intake manifold with fuel rail

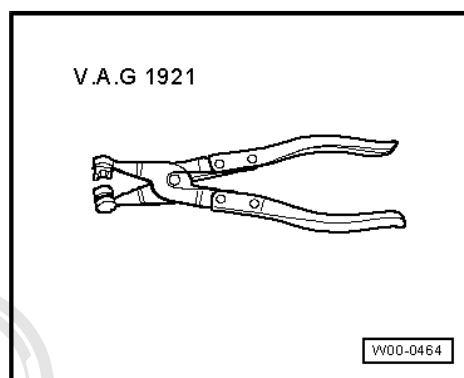
After the fuel rail has been removed or renewed, intake manifold flap potentiometer - G336- must be adapted to engine control unit - J623- . Use vehicle diagnostic tester to do so.

### Special tools and workshop equipment required

- ◆ Assembly tool - T10118-



- ◆ Hose clip pliers - V.A.G 1921-



- ◆ Socket - T10347-

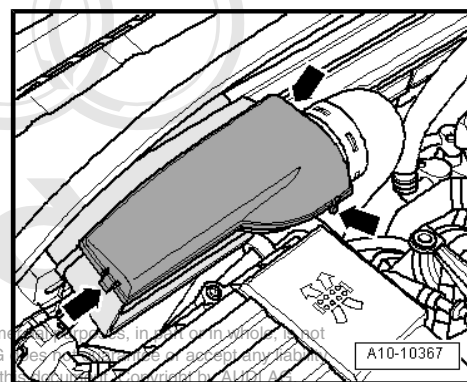


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

## Removing

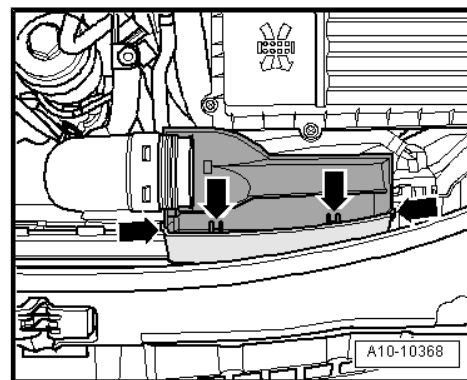
### Note

- ◆ *The combustion chamber ring seal (teflon) and the O-ring must be renewed.*
- ◆ *Exploded view - intake manifold ⇒ [page 331](#)*
- ◆ *Exploded view - fuel rail ⇒ [page 333](#)*
- Disconnect negative terminal from battery.
- Remove engine cover panel ⇒ [page 325](#) .
- Remove cover with oil separator (engine code letters BYT only) ⇒ [page 325](#) .
- Clean joint between intake manifold and cylinder head.
- Pull cover off air duct (release clips on sides) -arrows-.
- Unclip air duct at the bottom by releasing clips -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 accept any liability with respect to the correctness of information in this manual.

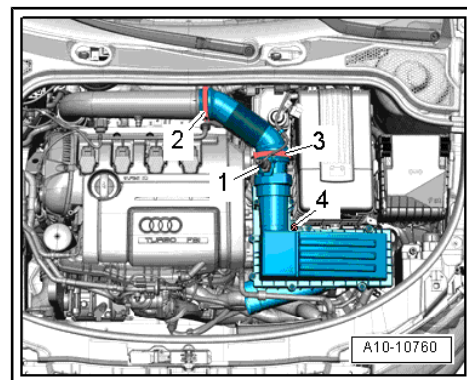
- Detach air duct at bottom together with air hose.



- Unplug electrical connector -1- at air mass meter - G70- .
- Release hose clip -2-.
- Unscrew bolt -4- and remove air cleaner housing with air intake hose.

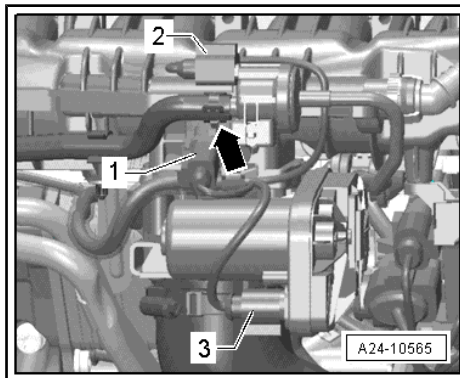
### Note

*-Item 3- can be disregarded.*

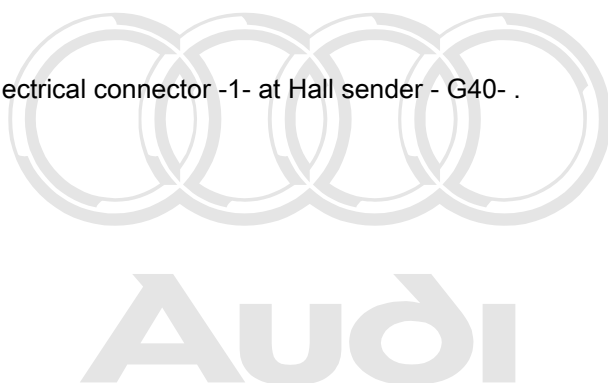
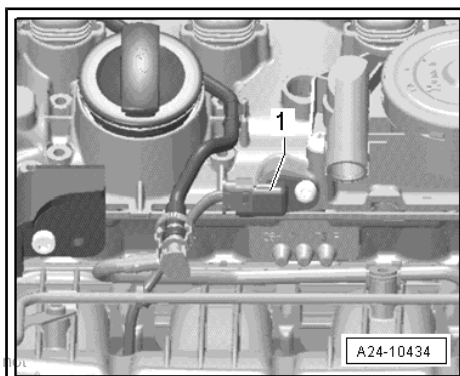




- Disconnect vacuum line -arrow- leading to activated charcoal filter.
- Unplug following electrical connectors:
  - 1 - Intake air temperature sender - G42-
  - 2 - Activated charcoal filter solenoid valve 1 - N80-
  - 3 - Throttle valve module - J338-

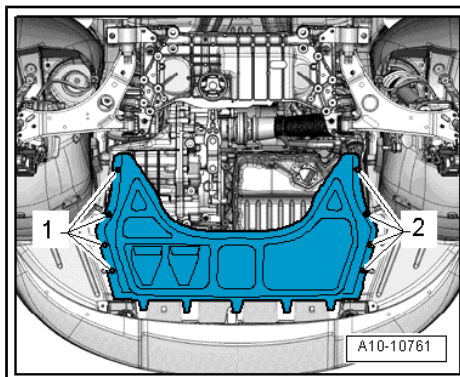


- Unplug electrical connector -1- at Hall sender - G40- .

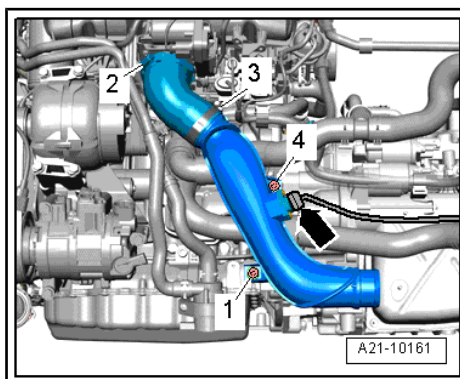


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Release fasteners -1- and -2- and remove noise insulation.



- Release hose clips -2- on air pipe.
- Unplug electrical connector -arrow-.
- Unscrew bolts -1- and -4- and detach air hose from throttle valve module - J338- downwards.
- Pull out air hose.





- Disconnect vacuum line -1- at position marked -2- and remove crankcase breather hose -3-.

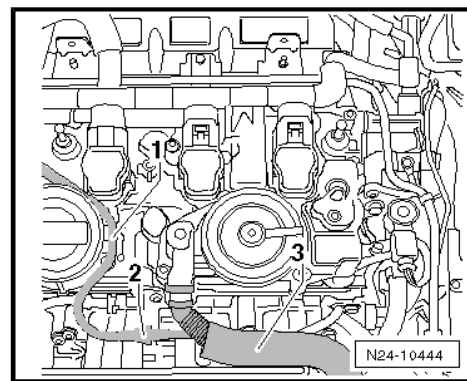


**WARNING**

*The fuel system is pressurised.*

*Risk of injury as fuel may spray out.*

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



- Disconnect fuel supply hose -2- by pressing release ring.



**Note**

- ◆ *The fuel system must not be under pressure.*
- ◆ *Use a clean cloth to catch escaping fuel.*

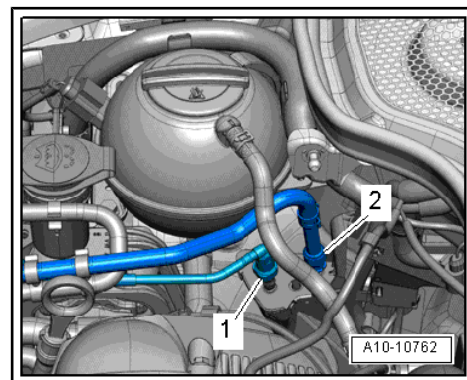


**WARNING**

*The fuel system is pressurised.*

*Risk of injury as fuel may spray out.*

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

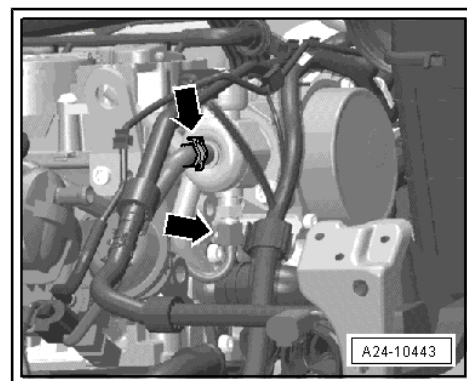


- Unfasten spring-type clip -top arrow- and disconnect fuel supply hose from high-pressure pump.
- Unscrew union nut for high-pressure fuel pipe -bottom arrow- at high-pressure pump.



**Note**

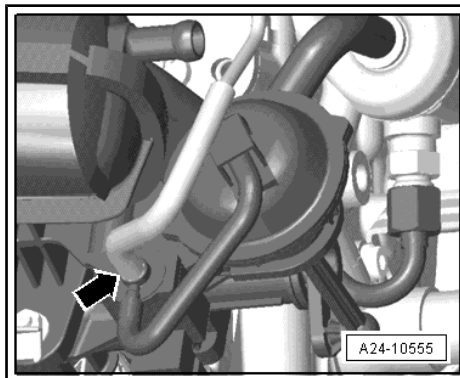
*Seal off open connections with clean caps. It is essential to ensure that no dirt enters the fuel system.*



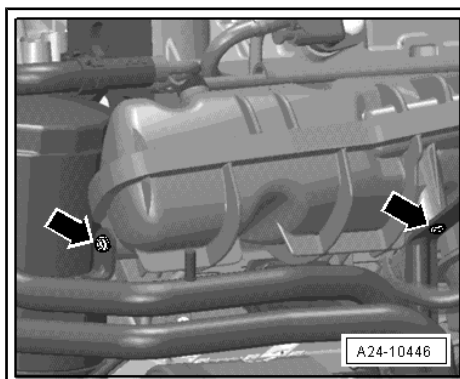
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



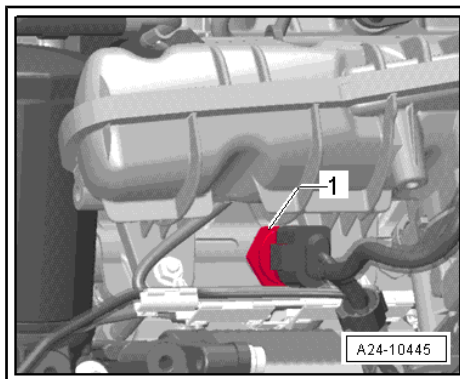
- Disconnect vacuum line -arrow- from intake manifold flap valve - N316- .



- Unscrew bolts -arrows- for coolant line from intake manifold.



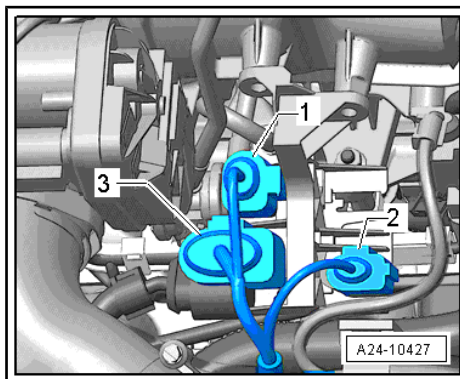
- Unplug electrical connector from fuel pressure sender - G247-  
-1-.



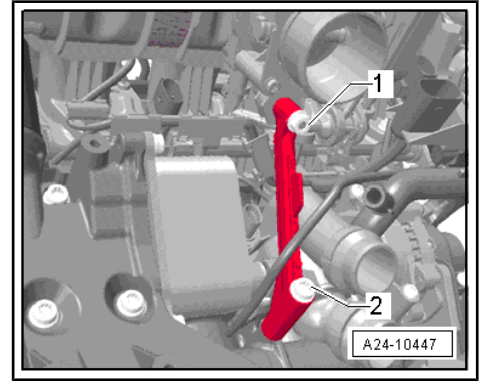
Audi

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.

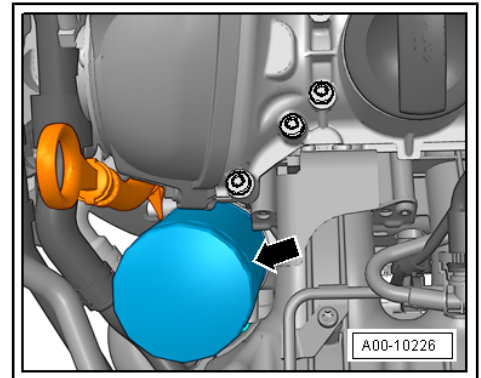
- Unplug electrical connectors -1-and -3- and detach them from retainer towards one side.



- Loosen securing nut -1- slightly and remove bolt -2-.



- Use Hazet strap wrench - 2171-1- or oil filter tool - 3417- to slacken oil filter and then remove it.

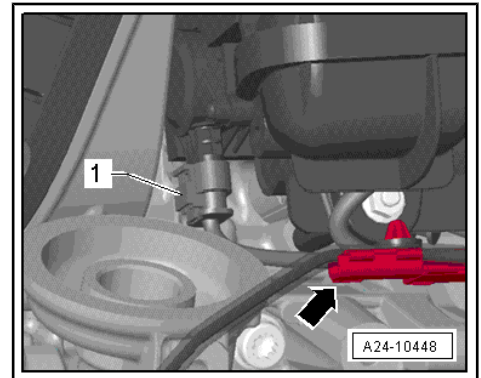


- Open cable retainer -arrow- and move wiring clear.
- Remove bolts from intake manifold using socket - T10347- .

**i** Note

*To remove the bolts that cannot be accessed if you do not have socket - T10347- , the throttle valve module - J338- must be removed.*

- Carefully pull intake manifold and fuel rail slightly away from cylinder head.



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 intake manifold flap potentiometer - G336- and detach intake manifold.

**Note**

- ◆ *The injectors can remain in the fuel rail.*
- ◆ *Block off intake ports with a clean cloth.*

- Disconnect intake manifold from fuel rail ⇒ [page 340](#)

**Installing****Note**

*Make sure that injectors are installed correctly.*

- Fit intake manifold onto studs (left and right) on cylinder head.
- The remaining installation steps are carried out in the reverse sequence.

**Tightening torques**

- ◆ ⇒ [“3.1 Exploded view - intake manifold”, page 331](#)
- ◆ ⇒ [“3.2 Exploded view - fuel rail”, page 333](#)

### 3.3.1 Detaching fuel rail from intake manifold

After the fuel rail has been removed or renewed, intake manifold flap potentiometer - G336- must be adapted to engine control unit - J623- . Use vehicle diagnostic tester to do so.

**Note**

*Intake manifold must be removed; removing intake manifold ⇒ [page 334](#) .*

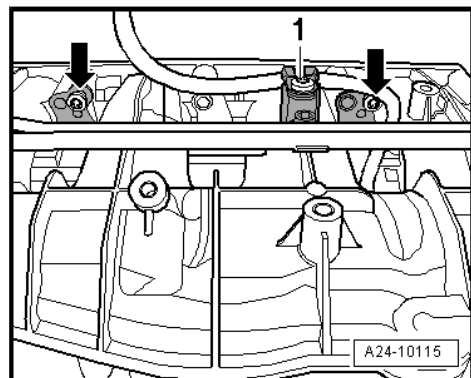
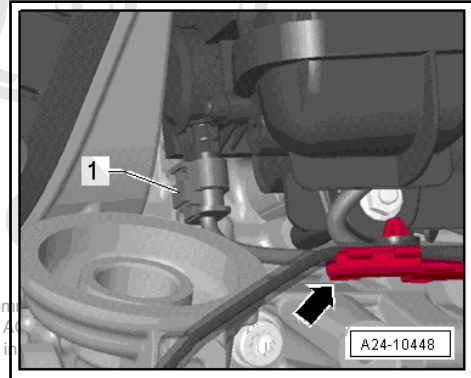
- Release hose clip -1-.
- Remove hoses from activated charcoal filter.
- Disconnect fuel line at fuel rail.
- Unscrew two bolts -arrows- on fuel rail.
- Detach fuel rail from intake manifold.

**Installing**

- Always renew both connecting pieces for fuel supply line.
- Connect and tighten fuel line.
- Plug electrical connector back in.
- Install intake manifold ⇒ [page 334](#) .
- The remaining installation steps are carried out in the reverse sequence.

**Tightening torques**

- ◆ ⇒ [“3.1 Exploded view - intake manifold”, page 331](#)
- ◆ ⇒ [“3.2 Exploded view - fuel rail”, page 333](#)



## 4 High-pressure pump

⇒ [“4.1 Exploded view - high-pressure pump”, page 341](#)

⇒ [“4.2 Removing and installing high-pressure pump”, page 342](#)

### 4.1 Exploded view - high-pressure pump

#### 1 - High-pressure pipe

- Do not alter shape
- Install so that parts are free of tension
- Lubricate thread of union nut with clean engine oil
- Tighten union nut to 27 Nm

#### 2 - Connecting piece

- For high-pressure pipe
- Counterhold when loosening union nut
- Must always be renewed once loosened
- 40 Nm

#### 3 - Fuel supply hose

- From fuel tank

#### 4 - High-pressure pump

- Depending on version, with fuel metering valve - N290- or fuel pressure regulating valve - N276- (do not loosen)
- Observe rules for cleanliness when installing  
⇒ [page 5](#)
- Removing and installing  
⇒ [page 342](#)
- Take care not to tilt when installing

#### 5 - O-ring

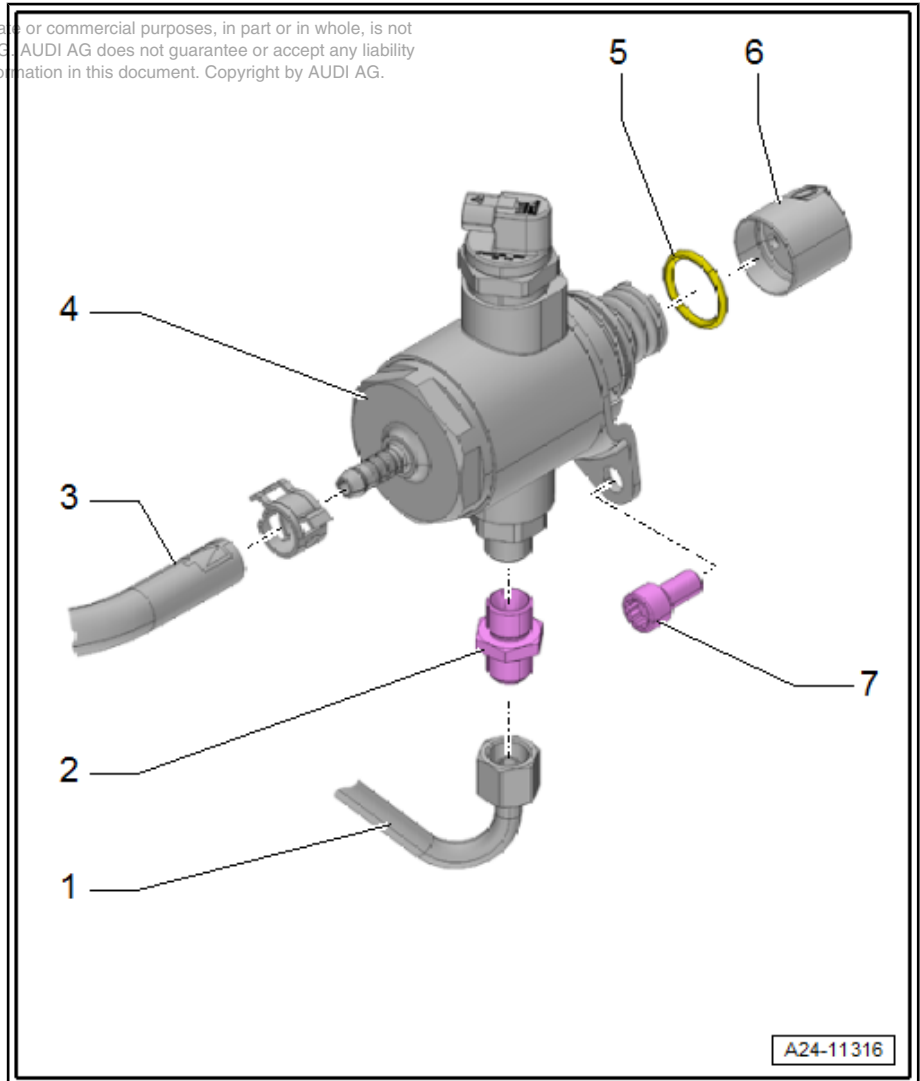
- Renew after removing
- Lubricate lightly with engine oil

#### 6 - Roller tappet

- May remain lodged in vacuum pump when high-pressure pump is removed

#### 7 - Bolt

- M6; renew
- Tightening torque and sequence ⇒ [page 342](#)

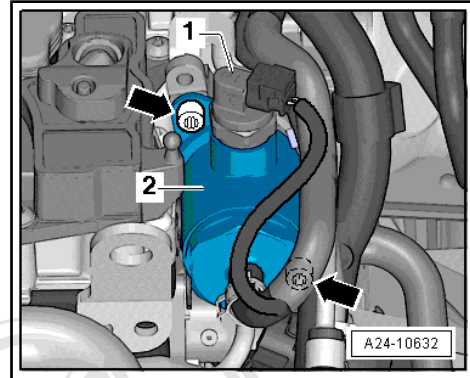


### High-pressure pump - tightening torque and sequence

To prevent flange of high-pressure pump from being deformed during installation, fit high-pressure pump as follows:

- Tighten bolts in stages as follows:

Stage	Bolts	Tightening torque
1.	-arrows-	Screw in by hand until contact is made
2.	-arrows-	Tighten one turn alternately until flange of high-pressure pump makes contact with vacuum pump
3.	-arrows-	M6 bolt: 8 Nm + 90°; renew bolts after removal M8 bolt: 20 Nm



## 4.2 Removing and installing high-pressure pump

### Removing



#### Note

- ◆ *The high-pressure pump must only be removed when the engine is cold.*
  - ◆ *When installing the high-pressure fuel pump, it is essential to ensure that no dirt enters the fuel system.*
  - ◆ *Use a cloth to catch escaping fuel.*
  - ◆ *The O-ring must always be renewed.*
  - ◆ *Always ensure that the high-pressure fuel pipes are free of tension when tightening the connections.*
- Remove engine cover panel ⇒ [page 328](#) .
  - Remove cover with oil separator (engine code letters BYT only) ⇒ [page 325](#) .
  - Unplug electrical connector -2-.

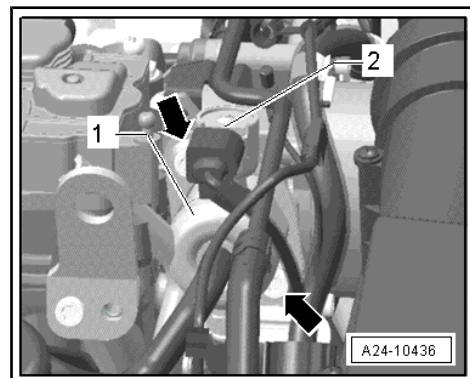


#### WARNING

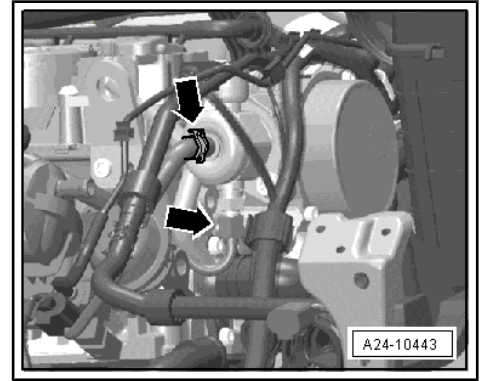
*The fuel system is pressurised.*

*Risk of injury as fuel may spray out.*

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



- Disconnect both fuel lines -arrows-.



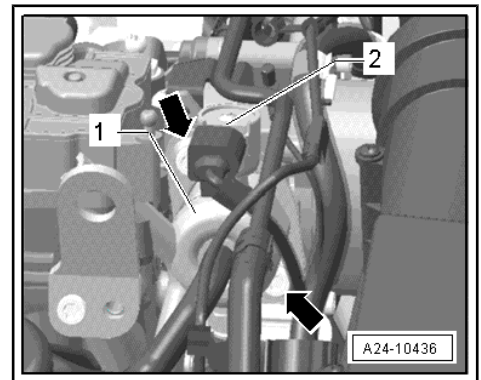
- Remove the two bolts -arrows-.
- Carefully pull out high-pressure pump. It is possible that the roller tappet may remain lodged in the vacuum pump.

### Installing

- Fit roller tappet in vacuum pump (check roller tappet for damage first).

### **i** Note

- ◆ *Renew O-ring.*
- ◆ *Always ensure that the high-pressure fuel pipes are free of tension when tightening the connections.*
- ◆ *The roller tappet must be positioned at the lowest point when installing the high-pressure pump.*
- ◆ *When installing a used high-pressure pump, the connecting piece for the fuel supply line (high-pressure section of the system) must be renewed.*



- Turn crankshaft until roller tappet is positioned at lowest point.
- Fit high-pressure pump in vacuum pump.
- Tighten bolts in stages ⇒ [page 342](#) .

### **i** Note

*The high-pressure pump can be damaged if it is tightened too much on one side (keep it straight).*

- Tighten union nut on fuel supply line hand-tight and align line so that it is free of stress.

### **i** Note

*Check fuel system for leaks.*

### Tightening torques

- ◆ ⇒ [“4.1 Exploded view - high-pressure pump”, page 341](#)
- ◆ ⇒ [Fig. ““High-pressure pump - tightening torque and sequence””, page 342](#)
- ◆ ⇒ [“3.1 Exploded view - intake manifold”, page 331](#)

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.

## 5 Injectors

⇒ "5.1 Removing and installing injectors", page 344

⇒ "5.2 Cleaning injectors", page 349

### 5.1 Removing and installing injectors

#### Special tools and workshop equipment required

- ◆ Tool kit with puller - T10133-



#### Note

*Special tool T10133/2 (puller) has been modified and now has the designation puller T10133/2 A . If you have not yet received the new tool you can make the modification yourself.*

#### Modifying special tool T10133/2 (puller) to make it equivalent to puller - T10133/2A-

#### Special tools and workshop equipment required

- ◆ Round file, approx. 6 mm
- File out a semi-circular recess as shown in the illustration. The recess allows the tool to be pushed further onto the injector so the contact surface is increased.



- For identification purposes, mark the modified tool with the letter "A" after the tool number.

### Removing

- Remove engine cover panel ⇒ [page 328](#) .
- Remove cover with oil separator (engine code letters BYT only) ⇒ [page 325](#) .
- Remove intake manifold and fuel rail ⇒ [page 334](#) .

 **Note**

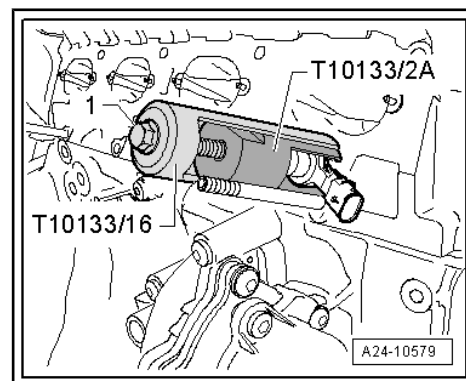
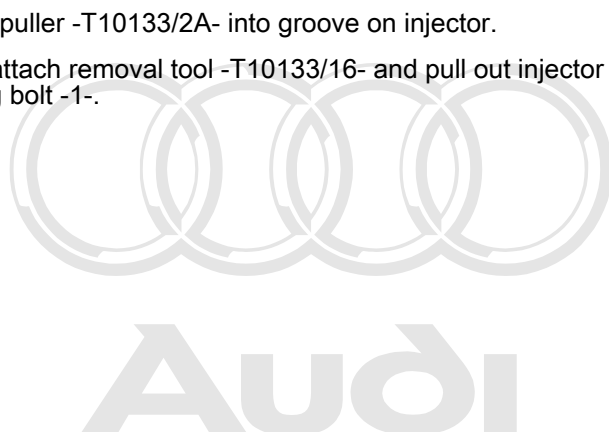
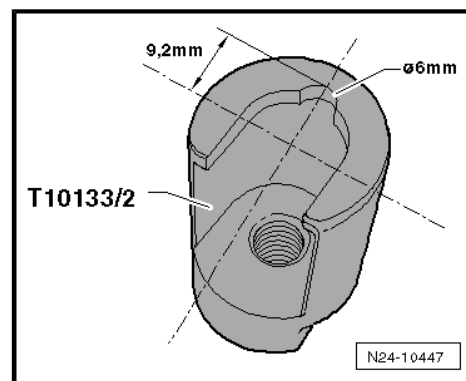
*Carefully pull out any injectors that remain lodged in the fuel rail.*

- Remove the injectors if they remain lodged in the cylinder head.

 **Note**

*Injectors must only be installed when the engine is cold.*

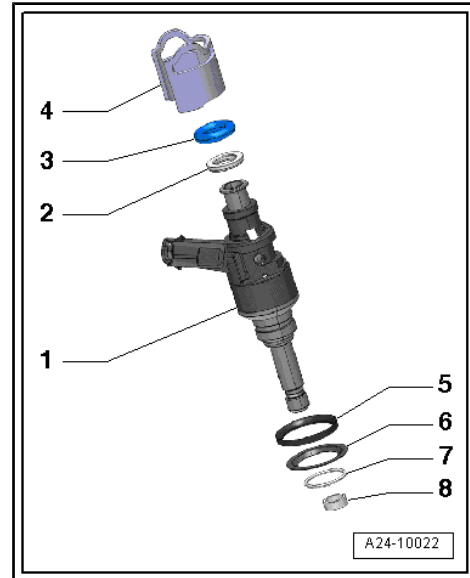
- Cover open inlet ports with a clean cloth.
- Unplug electrical connector on injector that is to be removed and pull off support ring.
- Guide puller -T10133/2A- into groove on injector.
- Then attach removal tool -T10133/16- and pull out injector by turning bolt -1-.



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.

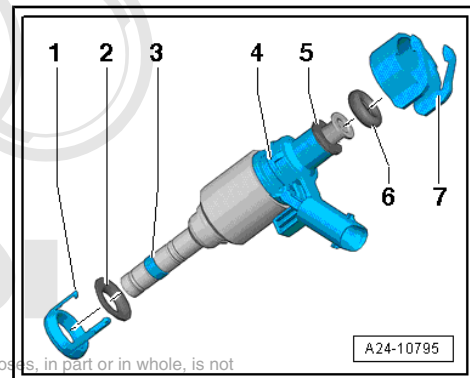
**Injector (old version)**

- 1 - Injector
- 2 - Spacer ring - renew
- 3 - O-ring - renew (apply thin coating of clean engine oil prior to installation)
- 4 - Support ring - renew (via this support ring, fuel rail exerts force which secures injector in cylinder head)
- 5 - Intermediate ring/retaining ring (top) - note installation position; renew if visibly damaged or worn (no longer available; replaced with an intermediate ring - see next illustration ⇒ [page 346](#) )
- 6 - Intermediate ring/retaining ring (bottom) - note installation position; renew if visibly damaged or worn (no longer available; replaced with an intermediate ring - see next illustration ⇒ [page 346](#) )
- 7 - Circlip - do not stretch (no longer available; replaced with a retaining ring - see next illustration ⇒ [page 346](#) )
- 8 - Combustion chamber ring seal (teflon ring seal) - renew; when fitting, do not grease ring or use any other lubricant. Carefully remove old combustion chamber ring seal. To do so, cut open combustion chamber ring seal using knife or prise open with small screwdriver and then pull off forwards. Take care not to damage groove on injector. Injector must be renewed if groove is damaged.



**Injector (new version)**

- 1 - Retaining ring - renew (combined as a unit with intermediate ring -2-)
- 2 - Intermediate ring - renew (combined as a unit with retaining ring -1-)
- 3 - Combustion chamber ring seal (teflon ring seal) - renew; when fitting, do not grease ring or use any other lubricant
- 4 - Injector
- 5 - Spacer ring - renew
- 6 - O-ring - renew (apply thin coating of clean engine oil prior to installation)
- 7 - Support ring - renew (via this support ring, fuel rail exerts force which secures injector in cylinder head)



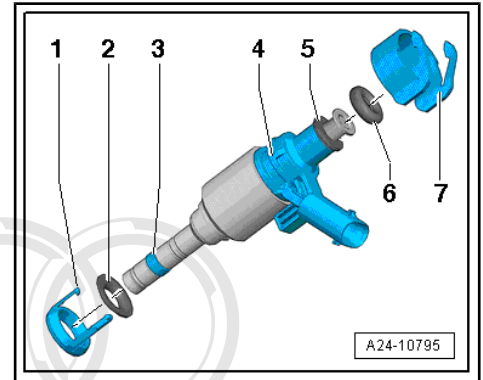
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

### Dismantling injector

- Pull O-ring -6- and spacer ring -5- off injector -4-.
- Unclip sealing element -1-.
- Carefully remove old combustion chamber ring seal -3-. To do so, cut open combustion chamber ring seal using knife or prise open with small screwdriver and then pull off forwards.

#### Note

Take care not to damage groove on injector. Injector must be renewed if groove is damaged.



### Installing

#### Note

- ◆ Renew sealing element, combustion chamber ring seal and O-ring.

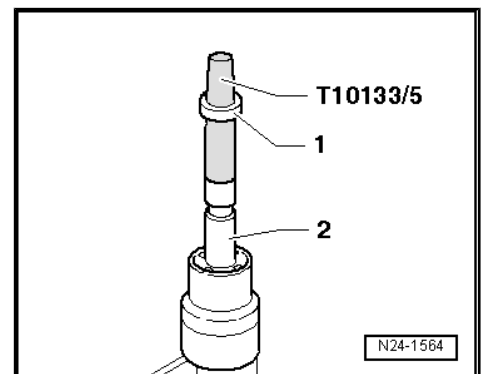
- ◆ Renew spacer ring if damaged.

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.

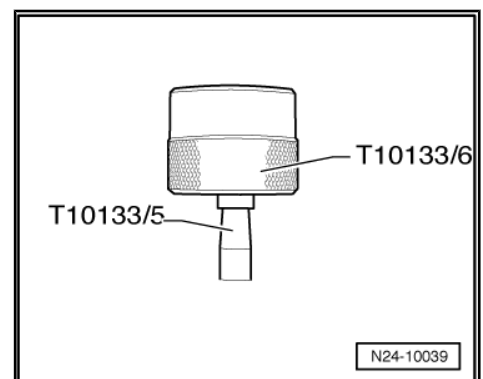
- ◆ Lubricate O-rings of injectors lightly with clean engine oil.

- Before new combustion chamber ring seal is fitted, any combustion residue must be removed from ring groove and injector stem using a clean cloth.

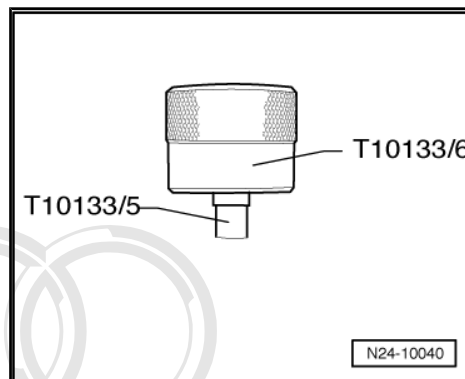
- Fit assembly cone -T10133/5- with new combustion chamber ring seal -1- onto injector -2-.



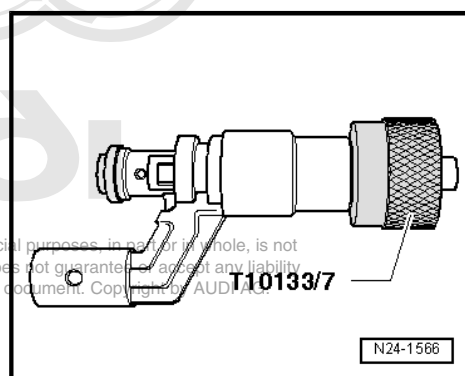
- Using assembly sleeve -T10133/6-, push combustion chamber ring seal onto assembly cone -T10133/5- as far as it will go.



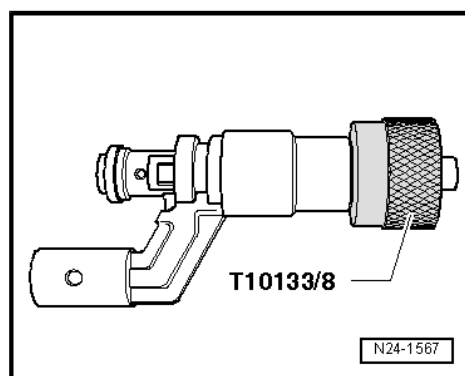
- Turn assembly sleeve - T10133/6- upside down and push combustion chamber ring seal to end of assembly cone - T10133/5- .
- Remove assembly cone - T10133/5- and push combustion chamber ring seal into sealing ring groove using assembly sleeve - T10133/6- .



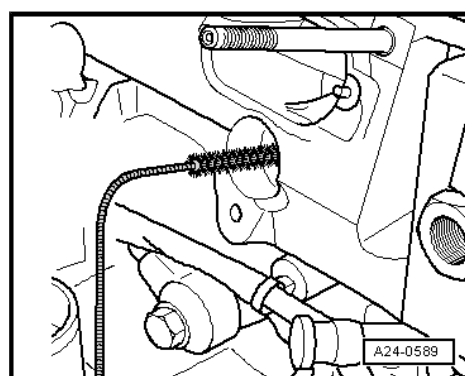
- Push calibration sleeve -T10133/7- onto injector as far as it will go and simultaneously turn it slightly (approx. 180°).
- Pull calibration sleeve -T10133/7- off again by turning it in the opposite direction.



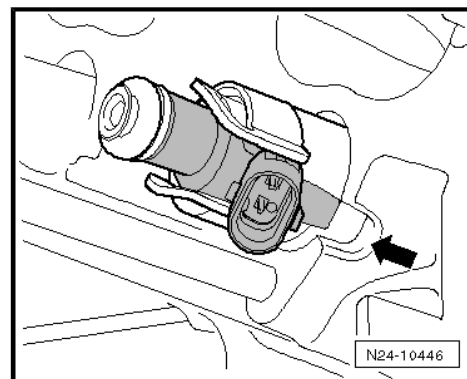
- Push calibration sleeve -T10133/8- onto injector as far as it will go and simultaneously turn it slightly (approx. 180°).
- Pull calibration sleeve -T10133/8- off again by turning it in the opposite direction.
- Fully assemble injector using parts from repair kit.

**Note**

- ◆ *The combustion chamber ring seal on the injector must not be oiled or greased.*
  - ◆ *Make sure that there is no cleaning fluid or oil in the holes in the cylinder head when installing the injectors.*
- Before installing injectors, thoroughly clean apertures for injectors in cylinder head using supplied nylon brush - T10133/4- .



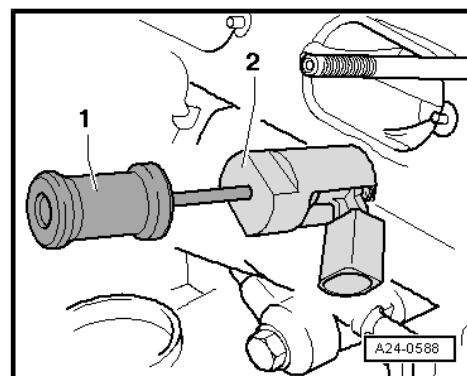
- Press injector by hand as far as it will go into aperture in cylinder head (aperture must be free of oil and grease). Ensure that the injector is properly seated -arrow- in the cylinder head.



 **Note**

*If the injector cannot be pushed in by hand, use puller - T10133/2A- -2- with striker - T10133/3- to insert the injector.*

- Fit support ring onto injector.
- Lightly lubricate O-rings for injectors with clean engine oil.
- Position fuel rail on injectors and press into place evenly.
- Install intake manifold and fuel rail ⇒ [page 334](#) .
- Install cover with oil separator (engine code letters BYT only) ⇒ [page 325](#) .



## 5.2 Cleaning injectors

 **Note**

*The following procedure applies to FSI engines.*

### Special tools and workshop equipment required

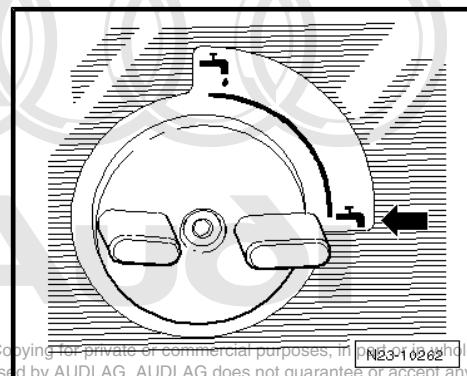
- ◆ Ultrasonic cleaning unit - VAS 6418-
- ◆ Mounting plate for injection modules - VAS 6418/1-
- ◆ Cleaning fluid - VAS 6418/2-

### Cleaning

- Close drain tap -arrow- on ultrasonic cleaning unit - VAS 6418- (located on right side of housing).
- Fill ultrasonic unit with 2,120 ml of water which has been allowed to settle for a few minutes and cleaning fluid - VAS 6418/2- .

### Mixture ratio for cleaning fluid

- 2,100 ml of tap water which has been allowed to settle for a few minutes and 20 ml of cleaning fluid - VAS 6418/2-
- Remove FSI injectors ⇒ [page 344](#) .



Protected by copyright. Copying for private or commercial purposes, in whole or in part, 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.

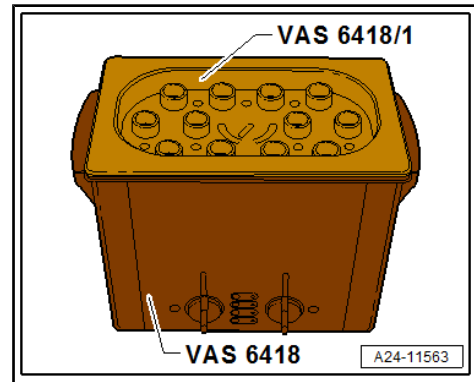


- Place mounting plate for injection modules - VAS 6418/1- on top of cleaning unit.

**WARNING**

*It is important to read the safety notes in the operating instructions before switching on the ultrasonic cleaning unit - VAS 6418-.*

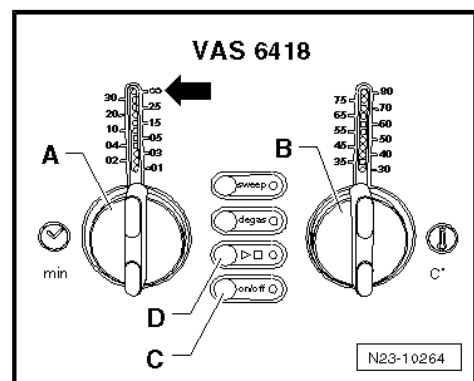
*The ideal fluid level is approx. 1-4 mm above the base of the mounting plate. The ultrasonic cleaning unit - VAS 6418- can be damaged if the fluid level is too low.*



- Insert FSI injectors all the way into guides of mounting plate for injection modules - VAS 6418/1- .
- Switch on cleaning unit by pressing **[on/off]** button -C-.
- Select a cleaning time of 30 minutes with rotary control -A-.
- Set rotary control -B- to a temperature of 50°C.
- Press **[▶]** button -D- to start cleaning procedure.

**Note**

- ◆ *The temperature-controlled cleaning process is now started. While the fluid is being heated, the ultrasound is activated at intervals in order to circulate the cleaning solution. The ultrasound is activated continuously when the preselected temperature is reached.*
  - ◆ *The actual cleaning process commences when the temperature reaches at least 50 °C and must last for at least 30 minutes.*
- Install injectors with new combustion chamber seal  
⇒ [page 344](#) .



# 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.

## 6 Senders and sensors

⇒ [“6.1 Removing and installing air mass meter G70”, page 351](#)

⇒ [“6.2 Checking fuel pressure sender G247”, page 351](#)

⇒ [“6.3 Removing and installing fuel pressure sender G247”, page 354](#)

⇒ [“6.4 Checking fuel pressure and residual pressure \(up to high-pressure pump\)”, page 356](#)

⇒ [“6.5 Removing and installing throttle valve module J338”, page 358](#)

⇒ [“6.6 Cleaning throttle valve module J338”, page 359](#)

⇒ [“6.7 Checking intake manifold change-over function”, page 359](#)

⇒ [“6.8 Checking dual non-return valve”, page 361](#)

### 6.1 Removing and installing air mass meter - G70-

#### Removing

- Unplug electrical connector -1- at air mass meter - G70- .
- Unscrew both bolts from air mass meter - G70- and carefully pull air mass meter - G70- out of guide on air cleaner housing.

#### Installing

To ensure the correct function of the air mass meter - G70- , it is important to observe the following notes and instructions.



#### Note

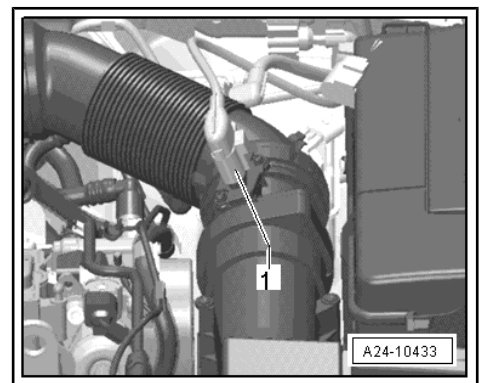
- ◆ *If the air filter element is very dirty or wet, dirt particles or water can reach the air mass meter - G70- and falsify the detected air mass values. This will cause a loss of power, as the calculated injection quantities will be too low.*
- ◆ *Always use genuine air filter elements (same as original equipment).*
- ◆ *Use a silicone-free lubricant when installing the intake hose.*
- ◆ *Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ Parts catalogue .*
- Check air mass meter and intake hose (engine intake side) for salt residue, dirt and leaves.
- Check intake duct as far as air filter element for dirt. If necessary, clean salt residue, dirt and leaves out of air cleaner housing (top and bottom sections); wash out or use a vacuum cleaner as required. Removing and installing air cleaner ⇒ [page 328](#) .

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

### 6.2 Checking fuel pressure sender - G247-

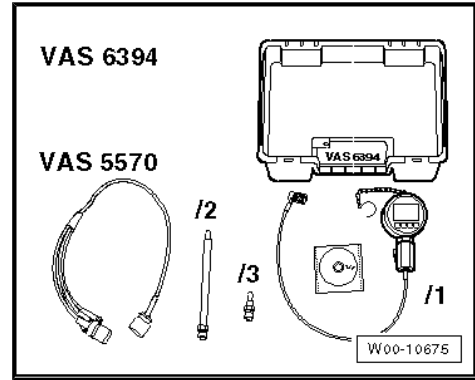
#### Special tools and workshop equipment required

- ◆ Test instrument adapter - VAS 5570-






◆ Pressure sensor tester - VAS 6394-



- ◆ Adapter - VAS 6394/2-
- ◆ Torque wrench - V.A.G 1331-
- ◆ Vehicle diagnostic tester

**Procedure**

- Remove engine cover panel => [page 325](#) .

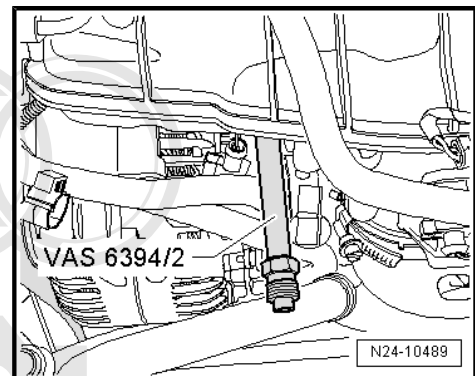
 **WARNING**

*The fuel system is pressurised.*

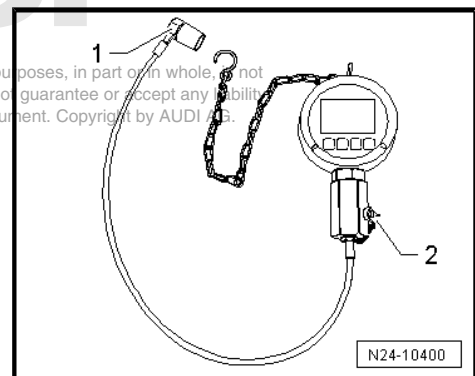
*Risk of injury as fuel may spray out.*

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

- Remove fuel pressure sender - G247- => [page 354](#) .
- Screw in adapter - G247- in place of fuel pressure sender - VAS 6294/2- and tighten adapter with the same torque as that specified for fuel pressure sender - G247- .



- Unscrew plug -2- on pressure sensor tester - VAS 6394/1- and screw in the removed fuel pressure sender - G247- . Tighten to torque normally specified for fuel pressure sender
- Connect pressure line of pressure sensor tester - VAS 6394/1- to adapter - VAS 6394/2- .





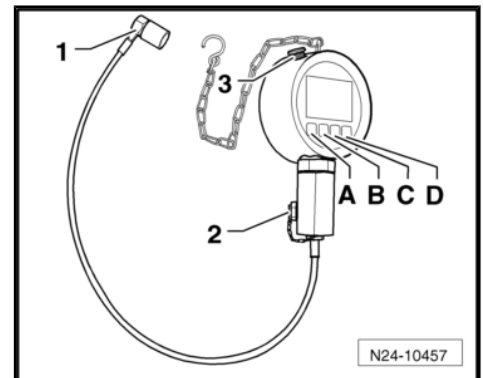
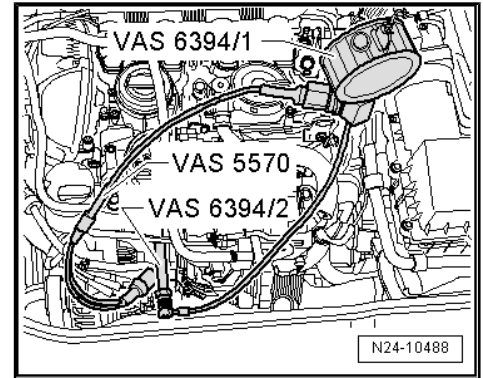
- Use test instrument adapter - VAS 5570- to make electrical connection between vehicle and fuel pressure sender - G247- .
- Connect a vehicle diagnostic tester.
- Switch on ignition.
- Select "Engine electronics" in vehicle self-diagnosis.
- Then select function read "Measured values".
- Select measured value block 140.

Display zone 3 shows the actual pressure value being transmitted to the engine control unit by the fuel pressure sender - G247- .

- Switch on pressure sensor tester - VAS 6394/1- by pressing button -A- once briefly.

 **Note**

*You can press and hold button -A- for 2 seconds to switch on the illumination for 20 seconds.*

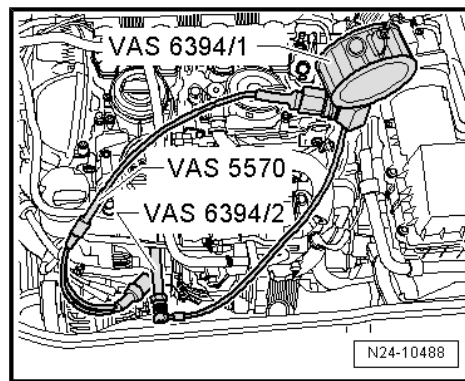


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



Pressure sensor tester - VAS 6394/1- should indicate 0 bar. If this is not the case, press button -C- once briefly to zero the tester.

- Start the engine.
- Compare the pressure indicated by pressure gauge - VAS 6394/1- with the actual pressure value on the vehicle diagnostic tester.
- The pressure readings must not deviate by more than 5 bar.
- If the deviation is more than 5 bar, test a new fuel pressure sender - G247- .



**WARNING**

*The fuel system is pressurised.*

*Risk of injury as fuel may spray out.*

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

- Screw a new fuel pressure sender - G247- into the pressure gauge - VAS 6394/1- .
- Repeat the test with the new fuel pressure sender - G247- and compare the two pressure values.

**If the two values still do not agree:**

- Check electrical connection between fuel pressure sender - G247- and engine control unit. Refer to ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

**If the values agree:**

- Install the new fuel pressure sender - G247- ⇒ [page 354](#) .

### 6.3 Removing and installing fuel pressure sender - G247-

If the fuel pressure sender - G247- fails, the fuel metering valve - N290- or fuel pressure regulating valve - N276- is switched off, the electric fuel pump is activated fully and the engine is operated with the fuel pressure which remains. This will reduce engine torque considerably.

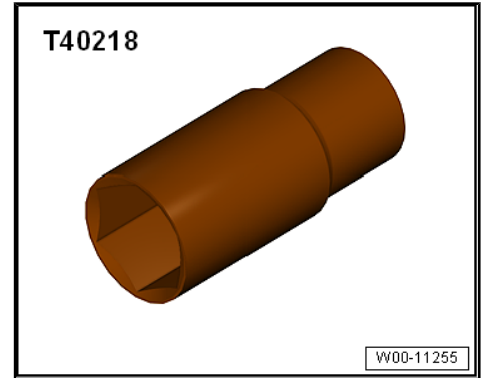
**Special tools and workshop equipment required**

- ◆ Assembly tool - T10118-



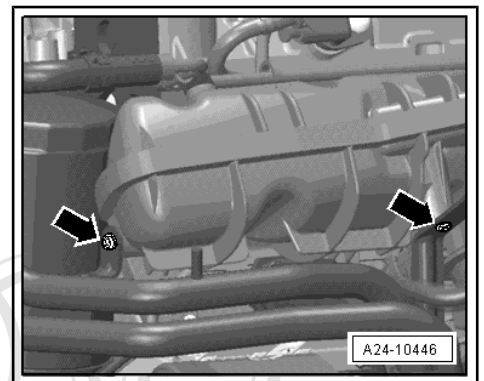
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- ◆ Bit (27 mm) - T40218- or commercially available socket (27 mm)



### Removing

- Remove engine cover panel ⇒ [page 325](#) .
- Detach coolant pipe from intake manifold -arrows-.



- Release connector on fuel pressure sender - G247- using assembly tool - T10118- .



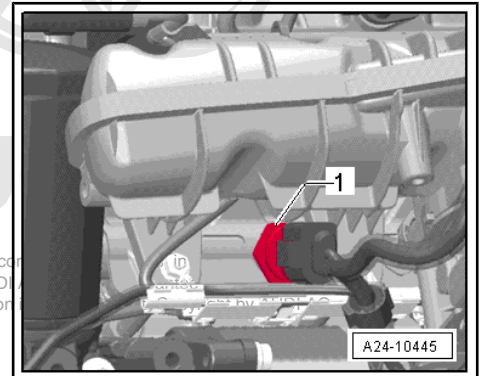
### WARNING

*The fuel system is pressurised.*

*Risk of injury as fuel may spray out.*

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

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



- Unscrew fuel pressure sender - G247- using bit, 27mm - T40218- .

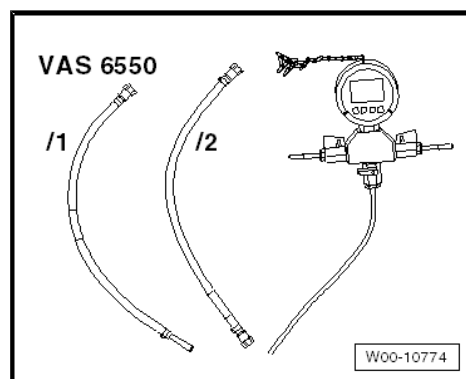
### Installing

- Install in reverse sequence.
- Make sure that connecting piece is tightened to specified torque before installing fuel pressure sender - G247- .
- Tightening torque for connecting piece: exploded view - fuel rail ⇒ [page 333](#)
- Tightening torque for fuel pressure sender - G247- : exploded view - fuel rail ⇒ [page 333](#)

## 6.4 Checking fuel pressure and residual pressure (up to high-pressure pump)

### Special tools and workshop equipment required

- ◆ Pressure tester - VAS 6550- with adapters - VAS 6550/1- and -VAS 6550/2-



- ◆ Fuel-resistant measuring container

### Test conditions

- Battery voltage at least 12.5 V
- Fuel filter OK.
- Fuel tank at least  $\frac{1}{4}$  full.
- Fuel pump control unit - J538- OK (check)
- Ignition switched off.

### Test sequence



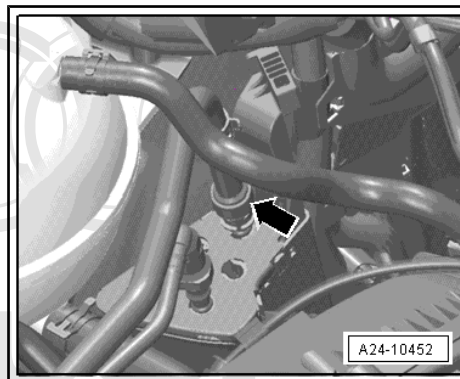
#### WARNING

*The fuel system is pressurised.*

*Risk of injury as fuel may spray out.*

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

- Lift release tab and disconnect fuel supply line -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.

- Connect pressure tester - VAS 6550- with adapters - VAS 6550/1- and -VAS 6550/2- to fuel supply line.
- Make sure that drain tap (centre hose) is closed and cut-off valves (left and right) are open.
- Switch on ignition.
- Fuel pump will run for approx. 5 seconds and build up fuel pressure.
- Read fuel pressure off pressure tester - VAS 6550- .
- Specification: 4.0 ... 7.0 bar.

If specification is not obtained:

- Check delivery rate of fuel pump ⇒ Fuel supply system, petrol engines; Rep. gr. 20 .

#### Checking residual pressure

- Check system for leaks and check residual pressure by watching the drop in pressure on the pressure tester - VAS 6550- .
- After 10 minutes pressure should still be at least 3 bar.

If the residual pressure drops below 3 bar:

- ◆ Check union between pressure tester - VAS 6550- and fuel supply line for leaks.
- ◆ Check pressure tester - VAS 6550- for leaks.
- ◆ Check fuel lines and their connections for leaks.
- ◆ Renew fuel filter with integrated fuel pressure regulator ⇒ Fuel supply system, petrol engines; Rep. gr. 20 . Then repeat the test.
- ◆ If fuel filter is OK, **renew fuel pump** ⇒ Fuel supply system, petrol engines; Rep. gr. 20 .

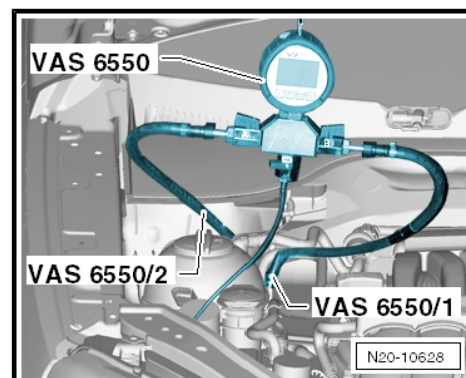
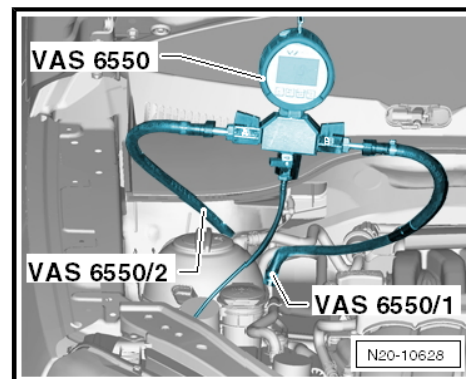
Assembly is carried out in the reverse order; note the following:

- The ignition must be switched off.



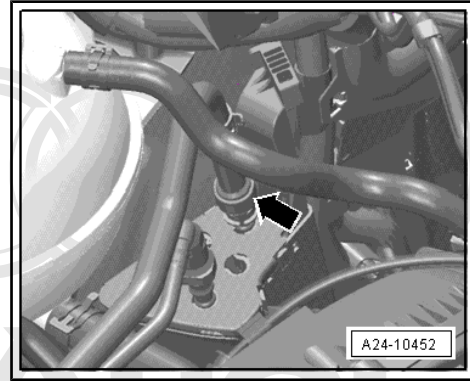
#### Note

*Before removing the pressure tester, release the fuel pressure by opening the drain tap (centre hose). Hold end of hose into a measuring container.*





- Re-attach fuel supply line -arrow- (make sure that all parts are clean and that there are no leaks).

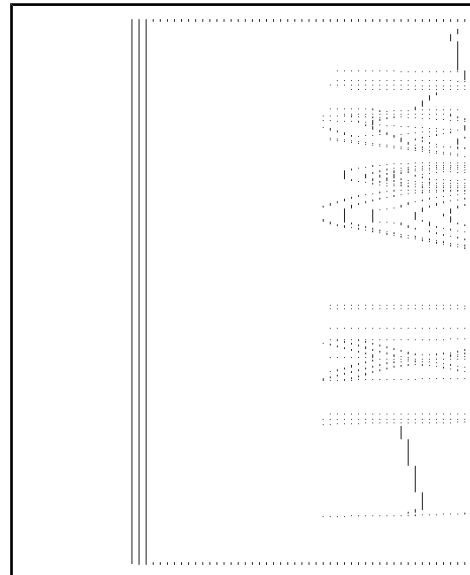


## 6.5 Removing and installing throttle valve module - J338-

### Removing

- Remove engine cover panel ⇒ [page 325](#) .
- Remove noise insulation.
- Unscrew bolts and clips -arrows- and remove charge air pipe and hose from below.
- Unplug electrical connector -1- from throttle valve module - J338- .

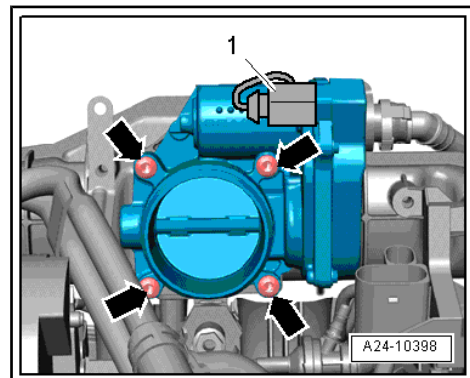
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- Remove the four bolts -arrows- from throttle valve module - J338- and detach throttle valve module - J338- .

### Installing

- Install in reverse sequence.
- Clean sealing surface for seal.
- Renew seal.
- Tightening torques: exploded view - intake manifold ⇒ [page 331](#)
- After throttle valve module - J338- has been renewed, it must be re-adapted to engine control unit - J623- .



## 6.6 Cleaning throttle valve module - J338-

### Note

- ◆ *The throttle valve module must be adapted if a new engine control unit - J623- is installed.*
- ◆ *Take care not to scratch the throttle valve housing when cleaning it.*
- Remove throttle valve module - J338- ⇒ [page 358](#) .
- Open throttle valve by hand and block it in the open position with a suitable object (e.g. plastic or wooden wedge) -arrow-.

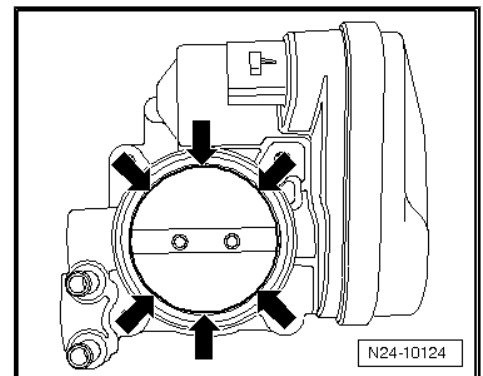
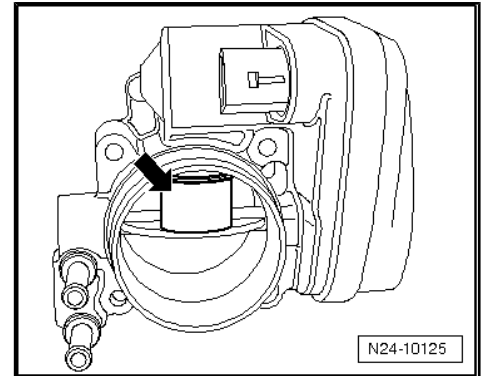


### WARNING

**Acetone is highly flammable. Please observe all accident prevention regulations and safety precautions when handling flammable liquids. Do not use compressed air when cleaning the throttle valve. Wear safety goggles and protective clothing to avoid possible injury and skin contact.**

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.

- Clean throttle valve housing thoroughly, especially around the points -arrows- where the throttle valve closes, using commercially available acetone and a small brush.
- Wipe out throttle valve housing with a lint-free cloth.
- Allow acetone to evaporate completely and re-install throttle valve module after cleaning.
- Erase learnt values and adapt engine control unit - J623- to throttle valve module using ⇒ Vehicle diagnostic tester.

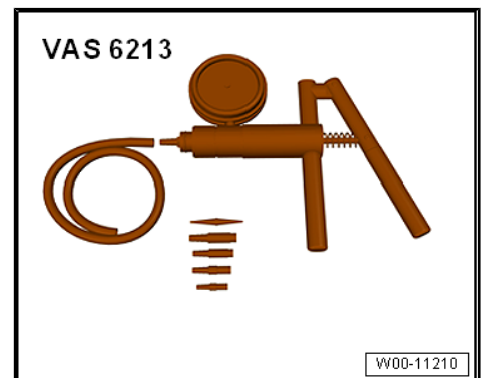


## 6.7 Checking intake manifold change-over function

Only perform this test if there is a loss of engine torque (poor flexibility or lack of pulling power).

### Special tools and workshop equipment required

- ◆ Hand vacuum pump - VAS 6213-





**Test condition**

- ◆ Intake manifold flap valve - N316- has been checked with a vehicle diagnostic tester.

Perform the following steps if the intake manifold flap valve - N316- is OK.

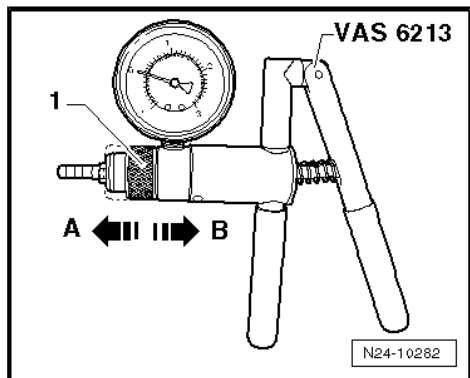
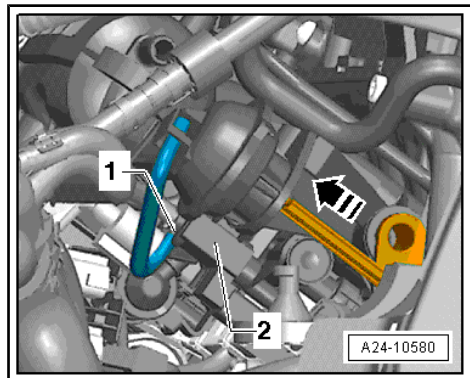
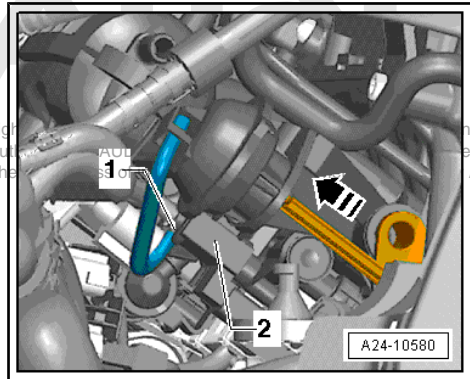
- Carefully pull off engine cover panel.
- Start engine and run at idling speed.
- Have a second mechanic rev up engine quickly (short burst of throttle) and observe vacuum unit for intake manifold change-over.
- The vacuum unit should pick up -arrow-.

If the change-over does not operate as described:

- Check vacuum system for leaks.
- Check that change-over mechanism moves freely by operating linkage manually.
- Check proper connection of vacuum lines.
- Check vacuum hoses for porosity.

- Disconnect vacuum hose -1- leading to vacuum unit for intake manifold flap valve - N316- at intake manifold flap valve - N316- -2-.

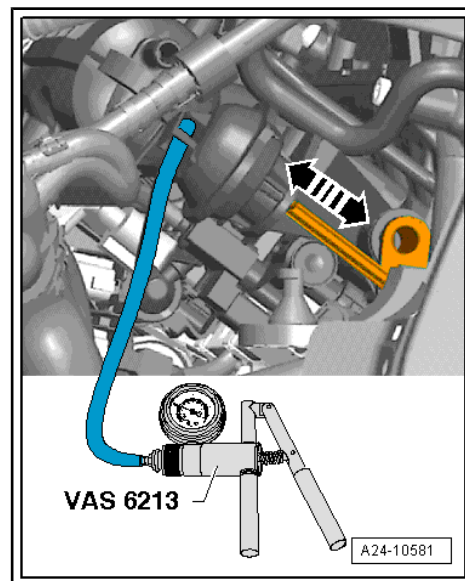
- Move adjuster ring -1- on hand vacuum pump - VAS 6213- to position -A- to select "vacuum".



Protected by copyright. All rights reserved. Audi AG. In whole, is not liable for any liability.



- Connect hand vacuum pump - VAS 6213- to vacuum unit for intake manifold flap valve - N316- .
  - Operate the hand vacuum pump - VAS 6213- several times.
- The vacuum unit should move -arrows-.
- If vacuum unit does not move, renew vacuum unit.



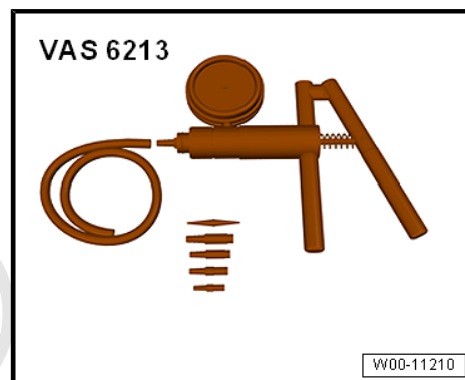
## 6.8 Checking dual non-return valve

Special tools and workshop equipment required

- ◆ Auxiliary measuring set - V.A.G 1594C-



- ◆ Hand vacuum pump - VAS 6213-



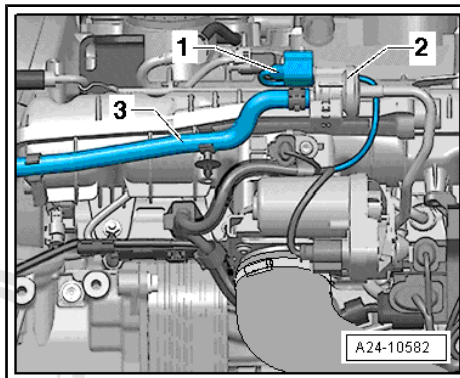
### Test condition

- Activated charcoal filter solenoid valve 1 - N80- has been checked with a vehicle diagnostic tester and is OK.
- Carefully pull off engine cover panel.

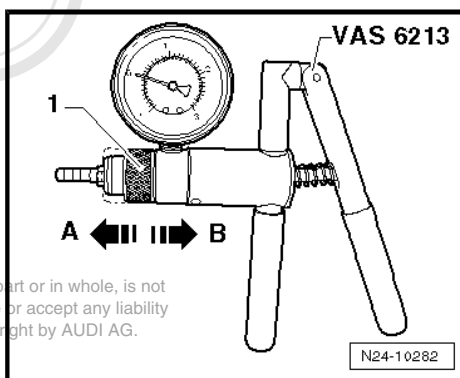
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- Unplug connector -1- and detach breather hose -3- from activated charcoal filter solenoid valve 1 - N80- -2-.



- Move adjuster ring -1- on hand vacuum pump - VAS 6213- to position -A- to select "vacuum".



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.

- Connect hand vacuum pump - VAS 6213- to activated charcoal filter solenoid valve 1 - N80- .
- Connect contacts of activated charcoal filter solenoid valve 1 - N80- -1- to battery using test leads. This will open activated charcoal filter solenoid valve 1 - N80- .

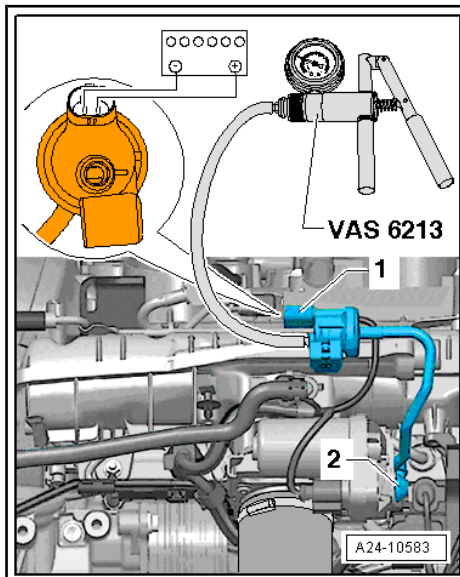
Then immediately operate hand vacuum pump - VAS 6213- several times.

- Vacuum should build up.
- Again disconnect battery to cut off current supply.

If vacuum does not build up:

- Renew dual non-return valve -1-.

Dual non-return valve, activated charcoal filter solenoid valve 1 - N80- and plastic hoses are combined as one unit and can only be renewed together.



## 7 Lambda probes

⇒ [“7.1 Exploded view - Lambda probe”, page 363](#)

⇒ [“7.2 Removing and installing Lambda probe”, page 367](#)

### 7.1 Exploded view - Lambda probe

⇒ [“7.1.1 Exploded view - Lambda probe, CCTA/CCZA/CDAA/CDTA”, page 363](#)

⇒ [“7.1.2 Exploded view - Lambda probe, BPU/BYT/BZB/CAWB”, page 365](#)

⇒ [“7.1.3 Exploded view - Lambda probe, CBFA”, page 366](#)

#### 7.1.1 Exploded view - Lambda probe, CCTA/CCZA/CDAA/CDTA



##### Note

- ◆ *Threads of new Lambda probes are already coated with assembly paste; the paste must not get into the slots on the probe body.*
- ◆ *In the case of a used Lambda probe grease only the thread with high-temperature paste. The paste must not get into the slots on the Lambda probe body. High-temperature paste ⇒ Parts catalogue*
- ◆ *When installing, the Lambda probe wire must always be reattached at the same locations to prevent it from coming into contact with the exhaust pipe.*



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.



### 1 - Lambda probe - G39- and Lambda probe heater - Z19-

- ❑ Removing and installing on vehicles with engine codes CCTA/CCZA/CDAA/CDTA  
⇒ [“7.2.2 Removing and installing Lambda probe G39 and Lambda probe heater Z19 before catalytic converter - CCTA/CCZA/CDAA/CDTA”, page 368](#)

- ❑ 55 Nm

### 2 - Electrical connector

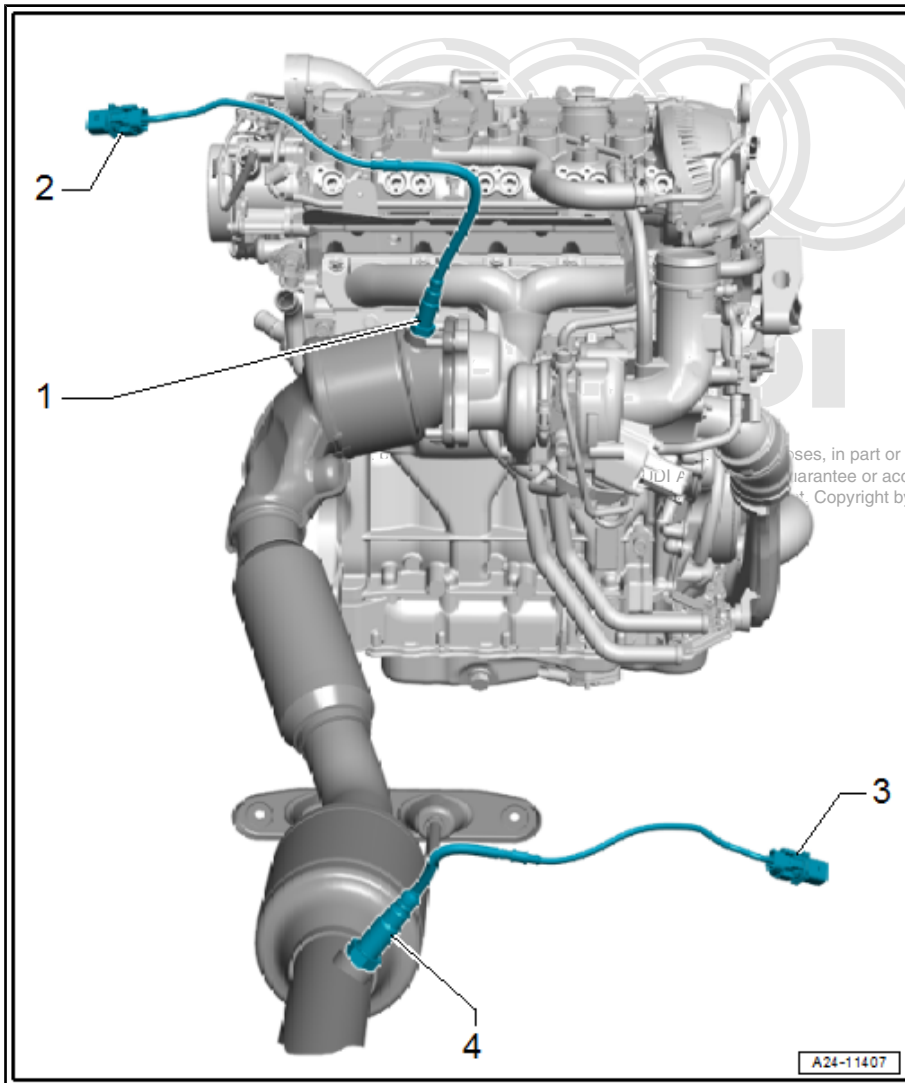
- ❑ For Lambda probe - G39- and Lambda probe heater - Z19-
- ❑ Illustration shows installation position on plenum chamber partition panel (left-side) on vehicles with engine codes CCTA/CCZA/CDAA/CDTA

### 3 - Electrical connector

- ❑ For Lambda probe after catalytic converter - G130- and Lambda probe heater 1 after catalytic converter - Z29-
- ❑ Installation position: underneath underbody cover (right-side)

### 4 - Lambda probe after catalytic converter - G130- and Lambda probe heater 1 after catalytic converter - Z29-

- ❑ Only on vehicles with engine codes CCTA/CCZA/CDAA/CDTA
- ❑ Removing and installing ⇒ [page 370](#)
- ❑ 55 Nm



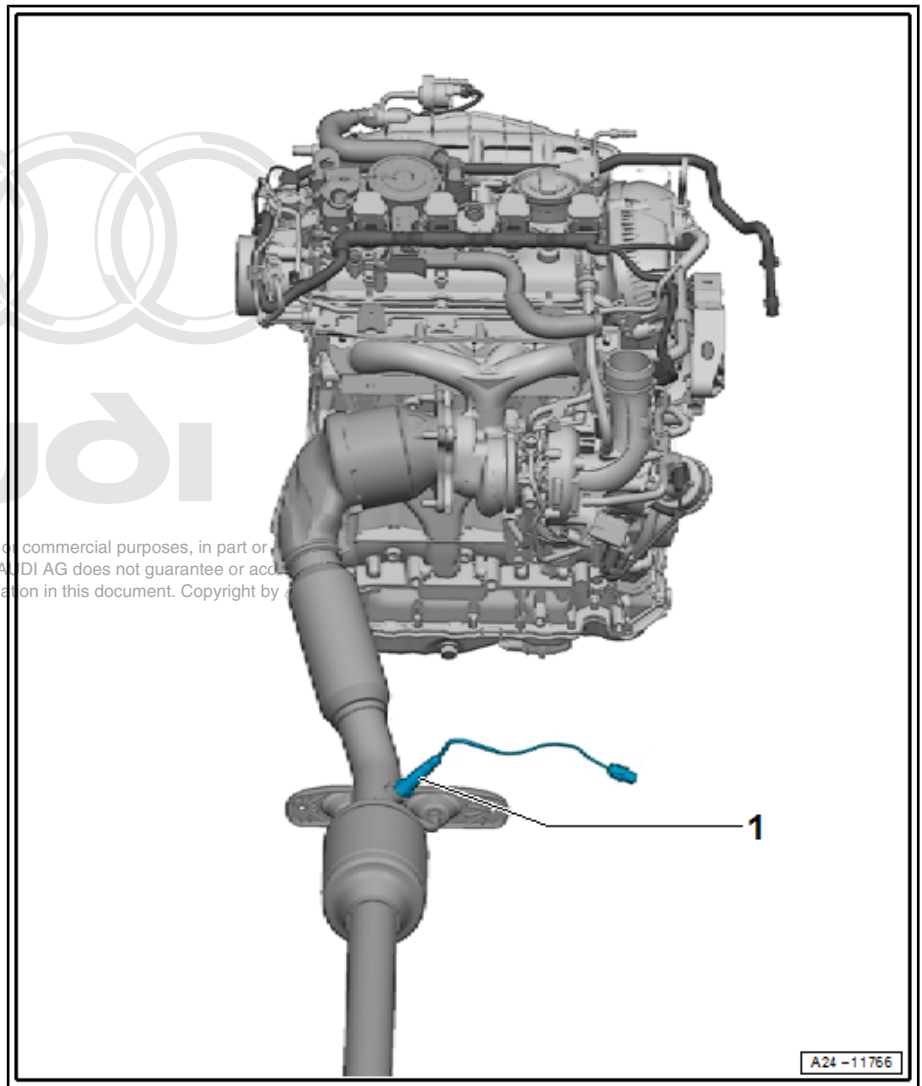
## 7.1.2 Exploded view - Lambda probe, BPU/BYT/BZB/CAWB

### Note

- ◆ *Threads of new Lambda probes are already coated with assembly paste; the paste must not get into the slots on the probe body.*
- ◆ *In the case of a used Lambda probe grease only the thread with high-temperature paste. The paste must not get into the slots on the Lambda probe body. High-temperature paste ⇒ Parts catalogue*
- ◆ *When installing, the Lambda probe wire must always be reattached at the same locations to prevent it from coming into contact with the exhaust pipe.*

### 1 - Lambda probe - G39- and Lambda probe heater - Z19-

- Removing and installing on vehicles with engine codes BPU/BYT/BZB/CAWB ⇒ [page 367](#)
- 55 Nm



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.

A24 - 11766

### 7.1.3 Exploded view - Lambda probe, CBFA



#### Note

- ◆ *Threads of new Lambda probes are already coated with assembly paste; the paste must not get into the slots on the probe body.*
- ◆ *In the case of a used Lambda probe grease only the thread with high-temperature paste. The paste must not get into the slots on the Lambda probe body. High-temperature paste ⇒ Parts catalogue*
- ◆ *When installing, the Lambda probe wire must always be reattached at the same locations to prevent it from coming into contact with the exhaust pipe.*

#### 1 - Lambda probe - G39- and Lambda probe heater - Z19-

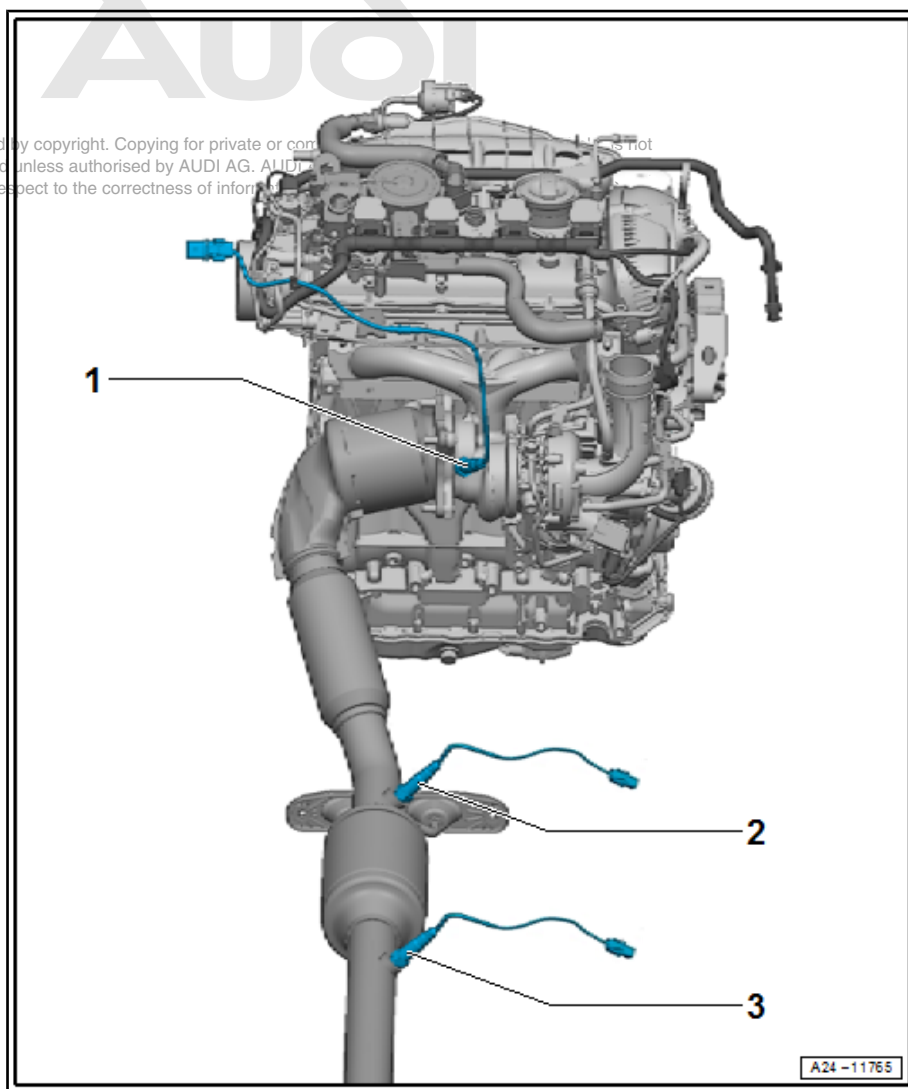
- ❑ Removing and installing ⇒ [“7.2.3 Removing and installing Lambda probe G39 and Lambda probe heater Z19 before catalytic converter - CBFA”, page 369](#)
- ❑ 55 Nm

#### 2 - Lambda probe after catalytic converter - G130- and Lambda probe heater 1 after catalytic converter - Z29-

- ❑ Removing and installing ⇒ [“7.2.5 Removing and installing Lambda probe after catalytic converter G130 and Lambda probe 1 heater after catalytic converter Z29 - CBFA”, page 371](#)
- ❑ 55 Nm

#### 3 - Lambda probe 3 after catalytic converter - G287- and Lambda probe heater 3 after catalytic converter - Z64-

- ❑ Removing and installing ⇒ [“7.2.6 Removing and installing Lambda probe 3 after catalytic converter G287 and Lambda probe 3 heater after catalytic converter Z64 - CBFA”, page 372](#)
- ❑ 55 Nm



## 7.2 Removing and installing Lambda probe

⇒ [“7.2.1 Removing and installing Lambda probe G39 and Lambda probe heater Z19 before catalytic converter - BPU/BYT/BZB/CAWB”, page 367](#)

⇒ [“7.2.2 Removing and installing Lambda probe G39 and Lambda probe heater Z19 before catalytic converter - CCTA/CCZA/CDAA/CDTA”, page 368](#)

⇒ [“7.2.3 Removing and installing Lambda probe G39 and Lambda probe heater Z19 before catalytic converter - CBFA”, page 369](#)

⇒ [“7.2.4 Removing and installing Lambda probe after catalytic converter G130 and Lambda probe 1 heater after catalytic converter Z29 - CCTA/CCZA/CDAA/CDTA”, page 370](#)

⇒ [“7.2.5 Removing and installing Lambda probe after catalytic converter G130 and Lambda probe 1 heater after catalytic converter Z29 - CBFA”, page 371](#)

⇒ [“7.2.6 Removing and installing Lambda probe 3 after catalytic converter G287 and Lambda probe 3 heater after catalytic converter Z64 - CBFA”, page 372](#)

### 7.2.1 Removing and installing Lambda probe - G39- and Lambda probe heater - Z19- before catalytic converter - BPU/BYT/ BZB/CAWB

#### Special tools and workshop equipment required

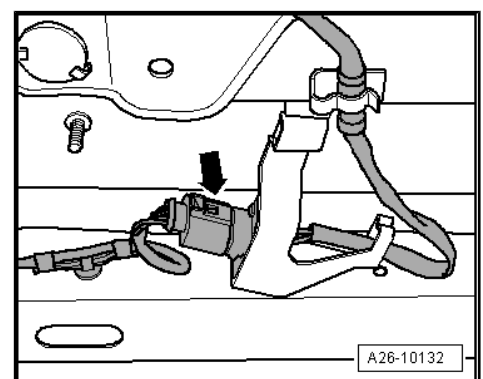
- ◆ Lambda probe open ring spanner set - 3337-

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 (right-side) from underbody.
- Unplug electrical connector -arrow- for Lambda probe - G39- and Lambda probe heater - Z19- .





- Unscrew Lambda probe - G39- -arrow- using tool from Lambda probe open ring spanner set - 3337- .

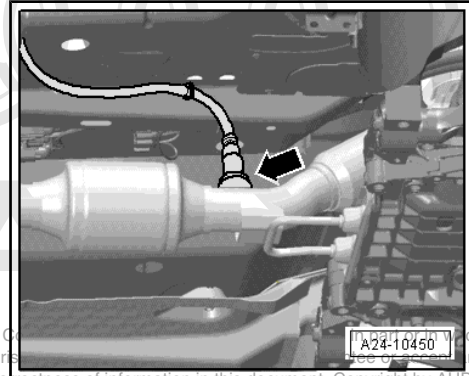
### Installing

When installing, note the following:



#### Note

- ◆ *Threads of new Lambda probes are already coated with assembly paste; the paste must not get into the slots on the probe body.*
  - ◆ *In the case of a used Lambda probe grease only the thread with high-temperature paste. The paste must not get into the slots on the Lambda probe body. High-temperature paste → Parts catalogue*
  - ◆ *When installing, the Lambda probe wire must always be reattached at the same locations to prevent it from coming into contact with the exhaust pipe.*
- Tightening torque: exploded view - Lambda probe → [page 363](#)

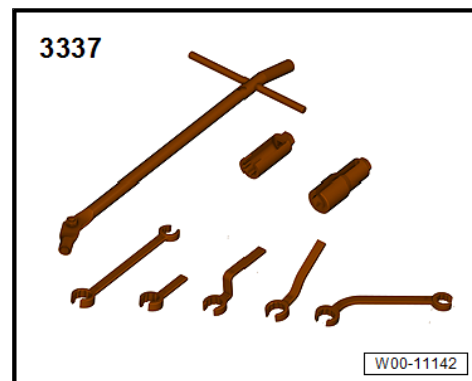


Protected by copyright. Copying, distribution, or reproduction in any form is not permitted unless authorized in writing by the copyright holder. All rights reserved. Copyright by Audi AG.

## 7.2.2 Removing and installing Lambda probe - G39- and Lambda probe heater - Z19- before catalytic converter - CCTA/CCZA/CDAA/CDTA

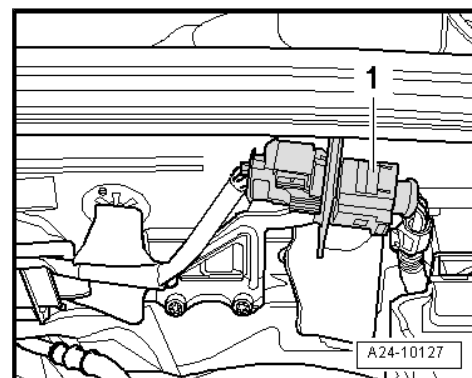
### Special tools and workshop equipment required

- ◆ Lambda probe open ring spanner set - 3337-



### Removing

- Remove cover (right-side) from underbody.
- Unplug electrical connector -1- for Lambda probe - G39- and Lambda probe heater - Z19- .





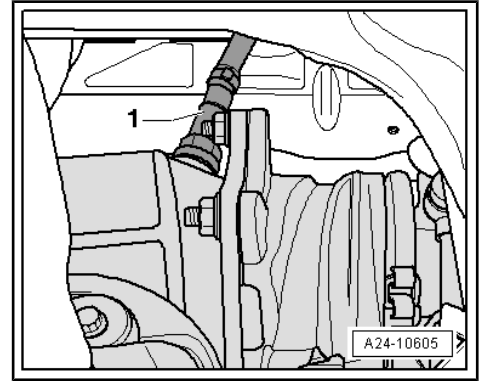
- Unscrew Lambda probe - G39- -1- using tool from Lambda probe open ring spanner set - 3337- .

### Installing

When installing, note the following:

#### Note

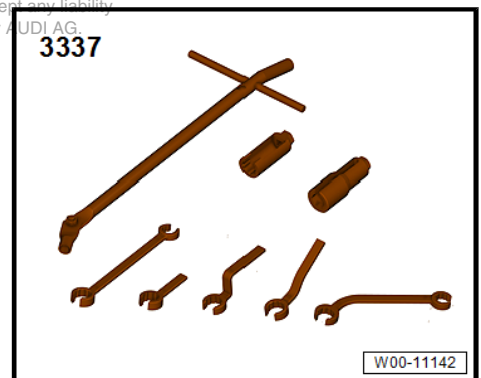
- ◆ *Threads of new Lambda probes are already coated with assembly paste; the paste must not get into the slots on the probe body.*
- ◆ *In the case of a used Lambda probe grease only the thread with high-temperature paste. The paste must not get into the slots on the Lambda probe body. High-temperature paste => Parts catalogue*
- ◆ *When installing, the Lambda probe wire must always be reattached at the same locations to prevent it from coming into contact with the exhaust pipe.*
- Tightening torque: exploded view - Lambda probe => [page 363](#)



## 7.2.3 Removing and installing Lambda probe - G39- and Lambda probe heater - Z19- before catalytic converter - CBFA

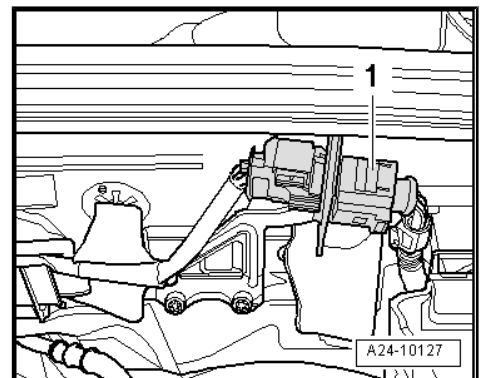
### Special tools and workshop equipment required

- ◆ Lambda probe open ring spanner set - 3337-



### Removing

- Remove cover (right-side) from underbody.
- Unplug electrical connector -1- for Lambda probe - G39- and Lambda probe heater - Z19- .





- Unscrew Lambda probe - G39- -1- using tool from Lambda probe open ring spanner set - 3337- .

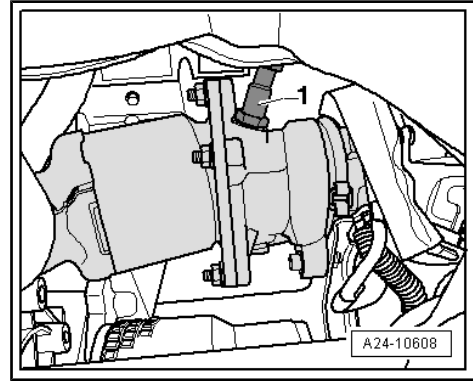
### Installing

When installing, note the following:



#### Note

- ◆ *Threads of new Lambda probes are already coated with assembly paste; the paste must not get into the slots on the probe body.*
  - ◆ *In the case of a used Lambda probe grease only the thread with high-temperature paste. The paste must not get into the slots on the Lambda probe body. High-temperature paste → Parts catalogue*
  - ◆ *When installing, the Lambda probe wire must always be reattached at the same locations to prevent it from coming into contact with the exhaust pipe.*
- Tightening torque: exploded view - Lambda probe  
⇒ ["7.1.3 Exploded view - Lambda probe, CBFA", page 366](#)



## 7.2.4 Removing and installing Lambda probe after catalytic converter - G130- and Lambda probe 1 heater after catalytic converter - Z29- - CCTA/CCZA/CDA/CDTA

### Special tools and workshop equipment required

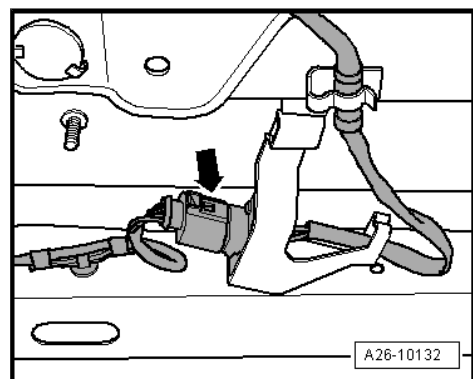
- ◆ Lambda probe open ring spanner set - 3337-



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.

### Removing

- Remove cover (right-side) from underbody.
- Unplug electrical connector -arrow- for Lambda probe after catalytic converter - G130- and Lambda probe 1 heater after catalytic converter - Z29- .



- Unscrew Lambda probe after catalytic converter - G130- -1- using tool from Lambda probe open ring spanner set - 3337- (arrow indicates direction of travel).

### Installing

When installing, note the following:

#### Note

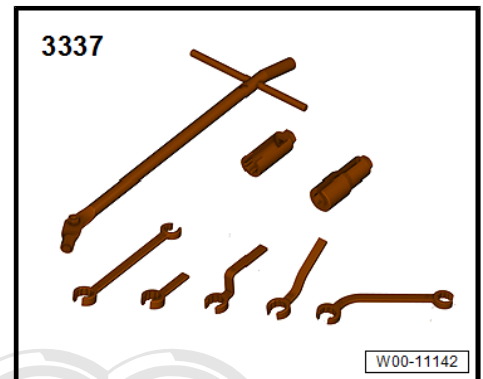
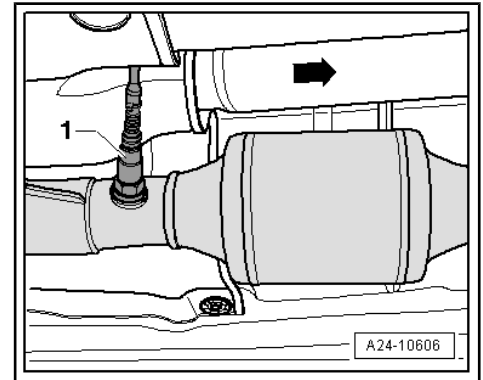
- ◆ *Threads of new Lambda probes are already coated with assembly paste; the paste must not get into the slots on the probe body.*
- ◆ *In the case of a used Lambda probe grease only the thread with high-temperature paste. The paste must not get into the slots on the Lambda probe body. High-temperature paste → Parts catalogue*
- ◆ *When installing, the Lambda probe wire must always be reattached at the same locations to prevent it from coming into contact with the exhaust pipe.*

- Tightening torque: exploded view - Lambda probe  
 ⇒ [page 363](#)

## 7.2.5 Removing and installing Lambda probe after catalytic converter - G130- and Lambda probe 1 heater after catalytic converter - Z29- - CBFA

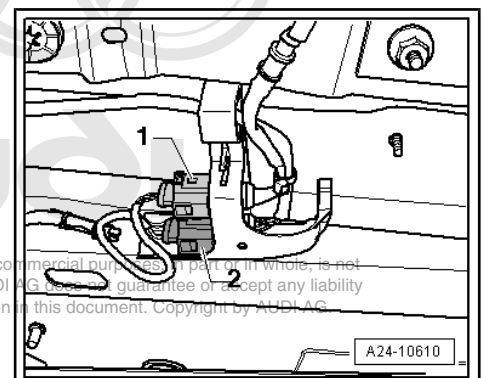
### Special tools and workshop equipment required

- ◆ Lambda probe open ring spanner set - 3337-



### Removing

- Remove cover (right-side) from underbody.
- Unplug electrical connector -2- for Lambda probe after catalytic converter - G130- and Lambda probe 1 heater after catalytic converter - Z29- .



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 accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG

- Unscrew Lambda probe after catalytic converter - G130- -2- using tool from Lambda probe open ring spanner set - 3337- (arrow indicates direction of travel).

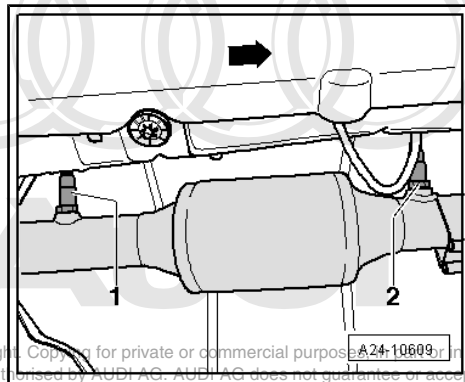
**Installing**

When installing, note the following:



**Note**

- ◆ *Threads of new Lambda probes are already coated with assembly paste; the paste must not get into the slots on the probe body.*
  - ◆ *In the case of a used Lambda probe grease only the thread with high-temperature paste. The paste must not get into the slots on the Lambda probe body. High-temperature paste → Parts catalogue*
  - ◆ *When installing, the Lambda probe wire must always be reattached at the same locations to prevent it from coming into contact with the exhaust pipe.*
- Tightening torque: exploded view - Lambda probe  
⇒ ["7.1.3 Exploded view - Lambda probe, CBFA", page 366](#)

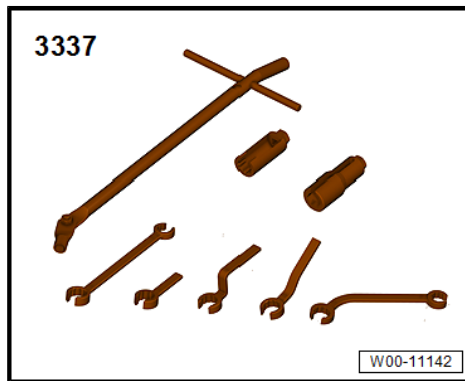


Protected by copyright. Copying for private or commercial purposes in whole, is not permitted unless authorized by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

**7.2.6 Removing and installing Lambda probe 3 after catalytic converter - G287- and Lambda probe 3 heater after catalytic converter - Z64- - CBFA**

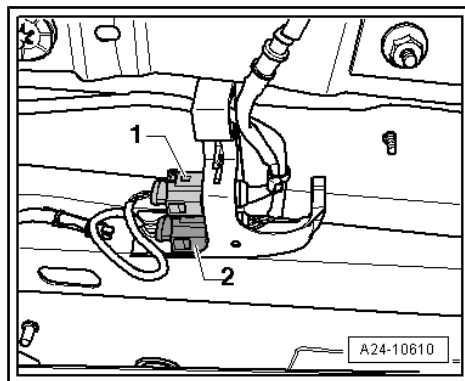
**Special tools and workshop equipment required**

- ◆ Lambda probe open ring spanner set - 3337-



**Removing**

- Remove cover (right-side) from underbody.
- Unplug electrical connector -1- for Lambda probe 3 after catalytic converter - G287- and Lambda probe heater 3 after catalytic converter - Z64- .



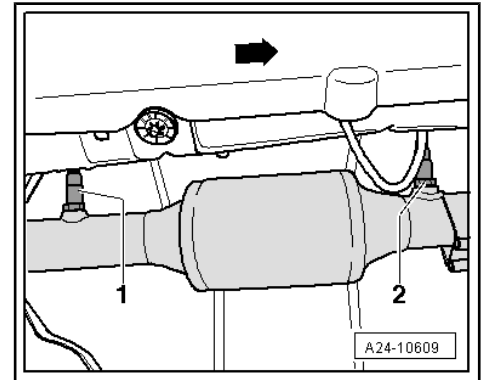
- Unscrew Lambda probe 3 after catalytic converter - G287-1- using tool from Lambda probe open ring spanner set - 3337- (arrow indicates direction of travel).

### Installing

When installing, note the following:

#### Note

- Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted.
- ◆ **Threads of new Lambda probes are already coated with assembly paste; the paste must not get into the slots on the probe body.**
  - ◆ *In the case of a used Lambda probe grease only the thread with high-temperature paste. The paste must not get into the slots on the Lambda probe body. High-temperature paste ⇒ Parts catalogue*
  - ◆ *When installing, the Lambda probe wire must always be reattached at the same locations to prevent it from coming into contact with the exhaust pipe.*
  - Tightening torque: exploded view - Lambda probe  
⇒ ["7.1.3 Exploded view - Lambda probe, CBFA", page 366](#)





## 8 Engine control unit

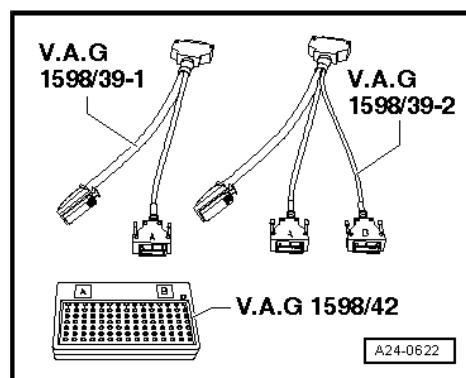
⇒ ["8.1 Wiring and component check with test box V.A.G 1598/42", page 374](#)

⇒ ["8.2 Renewing engine control unit J623", page 376](#)

### 8.1 Wiring and component check with test box - V.A.G 1598/42-

#### Special tools and workshop equipment required

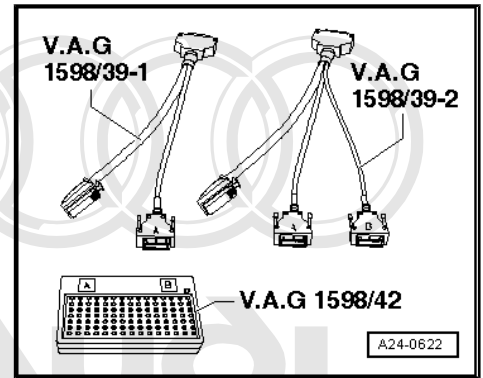
- ◆ Adapter cable - V.A.G 1598/39-1-
- ◆ Adapter cable - V.A.G 1598/39-2-
- ◆ Test box - V.A.G 1598/42-



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.

**i Note**

- ◆ *The test box has 105 sockets. The connecting cable can be disconnected from the test box. This means that only the cable (and not the test box) has to be purchased for future engine control units with different types of connectors.*
- ◆ *The smaller of the two connectors on the engine control unit has the contacts 1 to 60. The larger of the two connectors has the contacts 1 to 94.*
- ◆ *To carry out tests on the 60-pin wiring harness connector, the adapter cable - V.A.G 1598/39-1- is connected to connector -A- on the test box. For components connected to 60-pin wiring harness connector ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.*
- ◆ *To carry out tests on the 94-pin wiring harness connector, the adapter cable - V.A.G 1598/39-2- must be connected to connectors -A- and -B- on the test box. For components connected to 94-pin wiring harness connector ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.*
- ◆ *The test box - V.A.G 1598/42- is designed so it can be connected both to the wiring harness for the engine control unit and to the engine control unit itself at the same time.*
- ◆ *The advantage of this is that the electronic engine control system remains fully functional when the test box is connected (for example, for measuring signals when the engine is running).*
- ◆ *The relevant test procedure will state whether it is necessary to also connect the engine control unit to the test box.*
- ◆ *Always use auxiliary measuring set - V.A.G 1527 B- to connect test equipment (e.g. voltage tester - V.A.G 1526 C-, hand-held multimeter - V.A.G 1594 C- etc.).*



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 the correctness of information in this document. Copyright by AUDI AG.



**WARNING**

***To prevent irreparable damage to the electronic components, select appropriate measuring range before connecting the measuring cables and observe the test requirements.***

The engine control unit has to be removed before multi-pin connectors can be unplugged from engine control unit ⇒ [page 376](#) .

- Connect test box - V.A.G 1598/42- to wiring harness connector. The earth clip on the test box must be connected to the negative battery terminal. The instructions for performing the individual tests indicate whether or not the engine control unit itself also needs to be connected to the test box.
- Carry out test as described in appropriate repair procedures.

**Installing engine control unit**

Installation is performed in the reverse sequence.

- It is important that the protective housing is re-fitted on the engine control unit (if fitted previously).
- Clean threaded holes for shear bolts to remove any residue from locking fluid. This can be done using a thread tap.
- Always use new shear bolts.

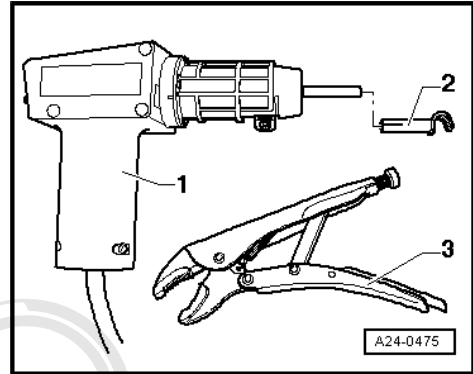


The procedure required after connecting the new engine control unit is described in the Guided Fault Finding or Guided Functions.

## 8.2 Renewing engine control unit - J623-

### Special tools and workshop equipment required

- ◆ Hot air blower - VAS 1978/14A- -item 1- with nozzle attachment -2- from wiring harness repair set - VAS 1978 B-

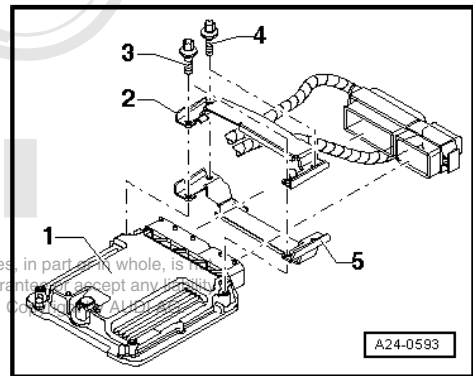


- ◆ Small, commercially available mole grips -3-



### Note

- ◆ *Not every engine control unit is bolted to a protective housing. Whether a protective housing is fitted depends on the engine/gearbox combination.*
- ◆ *The engine control unit -1- is bolted to a protective casing -2 and 5-. To make it more difficult to unscrew the shear bolts -4- for locking plate -2-, their threads have been coated with locking fluid.*
- ◆ *The metal housing has to be removed before the connectors can be unplugged from the engine control unit (e.g. to connect the test box or renew the engine control unit).*



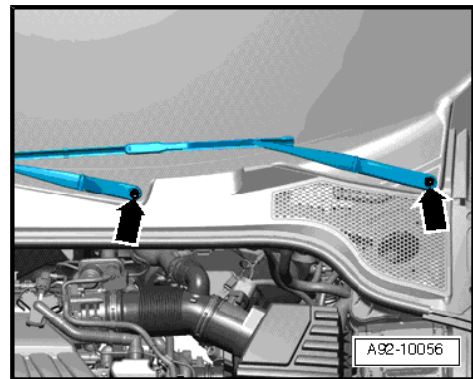
### Removing

- When renewing engine control unit, select diagnosis object "Replace engine control unit" in "Guided Functions".
- Switch off ignition and remove ignition key.
- Lever off caps on windscreen wiper arms with a screwdriver.
- Loosen hexagon nuts -arrows- several turns.
- Loosen wiper arms from wiper shafts by tilting them slightly.
- Completely remove hexagon nuts and detach wiper arms from wiper shafts.



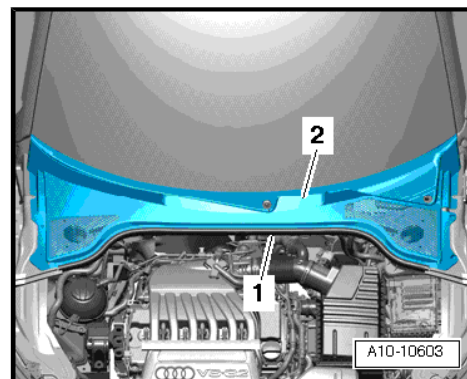
### Note

*Use puller (commercially available) to remove wiper arms if necessary.*





- Pull off rubber seal -1- and remove plenum chamber cover -2-.



- Release clip -arrow- and remove engine control unit - J623- .

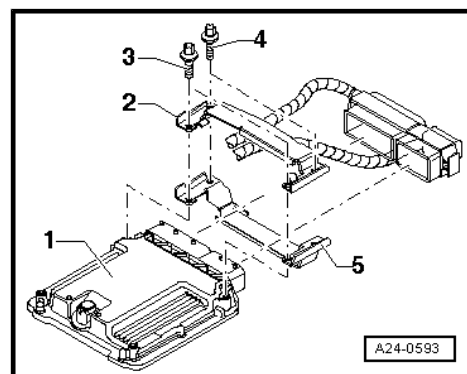
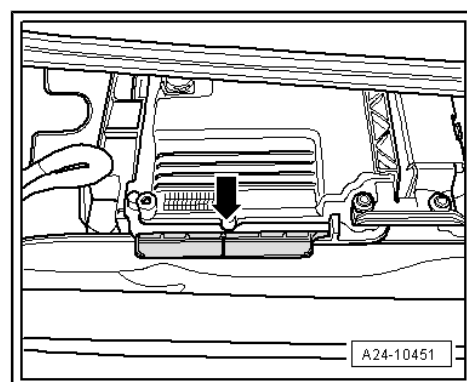


*Cover painted surfaces with a cloth to prevent scratching.*

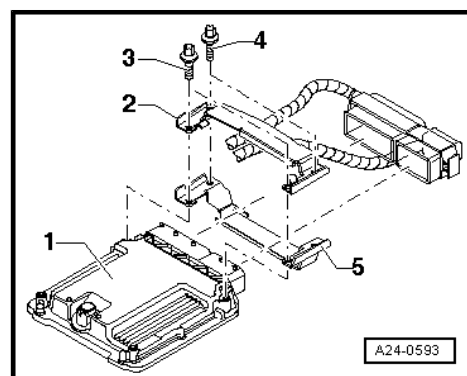
# Audi

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

To help prevent unauthorised access to the connectors on the engine control unit, the control unit is secured by means of shear bolts to a locking plate and a protective casing.

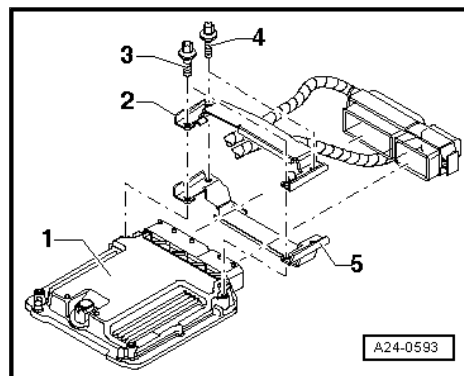


The threads of the two shear bolts -4- which are not screwed into the engine control unit are secured with locking fluid. To unscrew these two bolts, the threads must therefore be heated with the hot air blower.





The threads of the two shear bolts -3- which are screwed into the engine control unit are not secured with locking fluid. Do not apply heat to the threads in the control unit housing; this is not necessary and would cause overheating of the control unit.

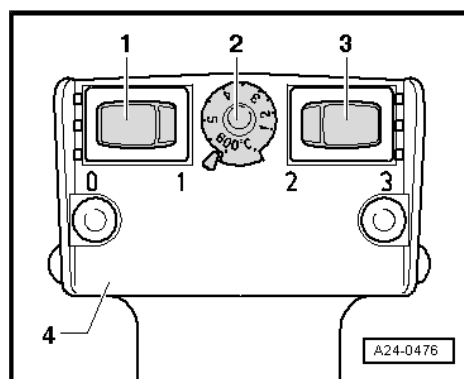


Select settings on hot air blower as shown in illustration, i.e. set temperature potentiometer -2- to maximum heat output and two-stage air flow switch -3- to position 3.



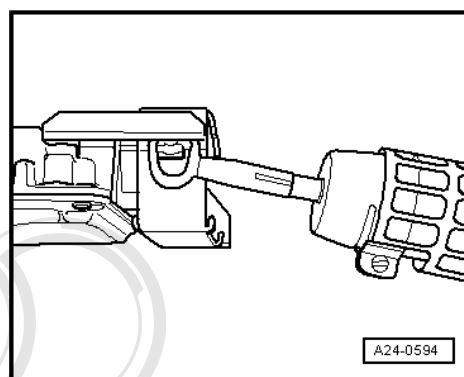
**WARNING**

*Heating the thread of the locking plate also heats up the shear bolts and parts of the metal housing. Take care to avoid burns. It is also important to ensure that only the thread is heated and none of the surrounding components. These should be covered.*



Apply heat to the threads of the shear bolts on the connector side as shown in the illustration.

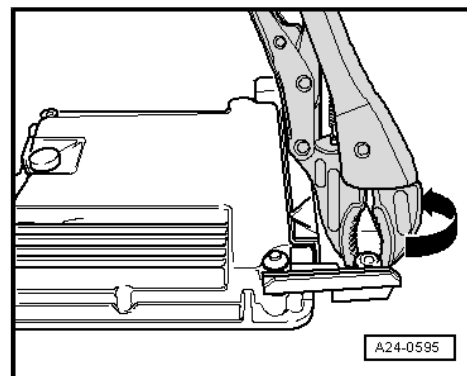
Switch on the hot air blower and heat the bolt for approximately 20 ... 30 seconds.



**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.

- Unscrew shear bolts using suitable vice-grip pliers (see arrow in illustration).
- The two shear bolts screwed into the engine control unit do not need to be heated. They should be removed without being heated.
- Detach protective casing from connectors.
- Unscrew both securing bolts from engine control unit - J623- .
- Release connectors on engine control unit - J623- and unplug connectors.
- Take out old engine control unit - J623- and connect new engine control unit - J623- .



#### Installing engine control unit:

Installation is performed in the reverse sequence.

- It is important that the protective housing is re-fitted on the engine control unit (if fitted previously).
- Clean threaded holes for shear bolts to remove any residue from locking fluid. This can be done using a thread tap.
- Always use new shear bolts.
- ◆ Tightening torque for bolts securing lid of electronics box: 3.5 Nm.

#### After installing a new engine control unit, the following operation must be performed:

- Activate engine control unit via a vehicle diagnostic tester in "Guided Functions" mode, "Replace engine control unit".

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 Components of exhaust system

- ⇒ [“1.1 Exploded view - silencers”, page 380](#)
- ⇒ [“1.2 Separating centre and rear silencers”, page 382](#)
- ⇒ [“1.3 Removing and installing front exhaust pipe with catalytic converter”, page 383](#)
- ⇒ [“1.4 Aligning exhaust system”, page 385](#)
- ⇒ [“1.5 Checking exhaust system for leaks”, page 386](#)

#### Note

The exhaust manifold and the turbocharger are combined as one unit; removing and installing ⇒ [page 282](#)

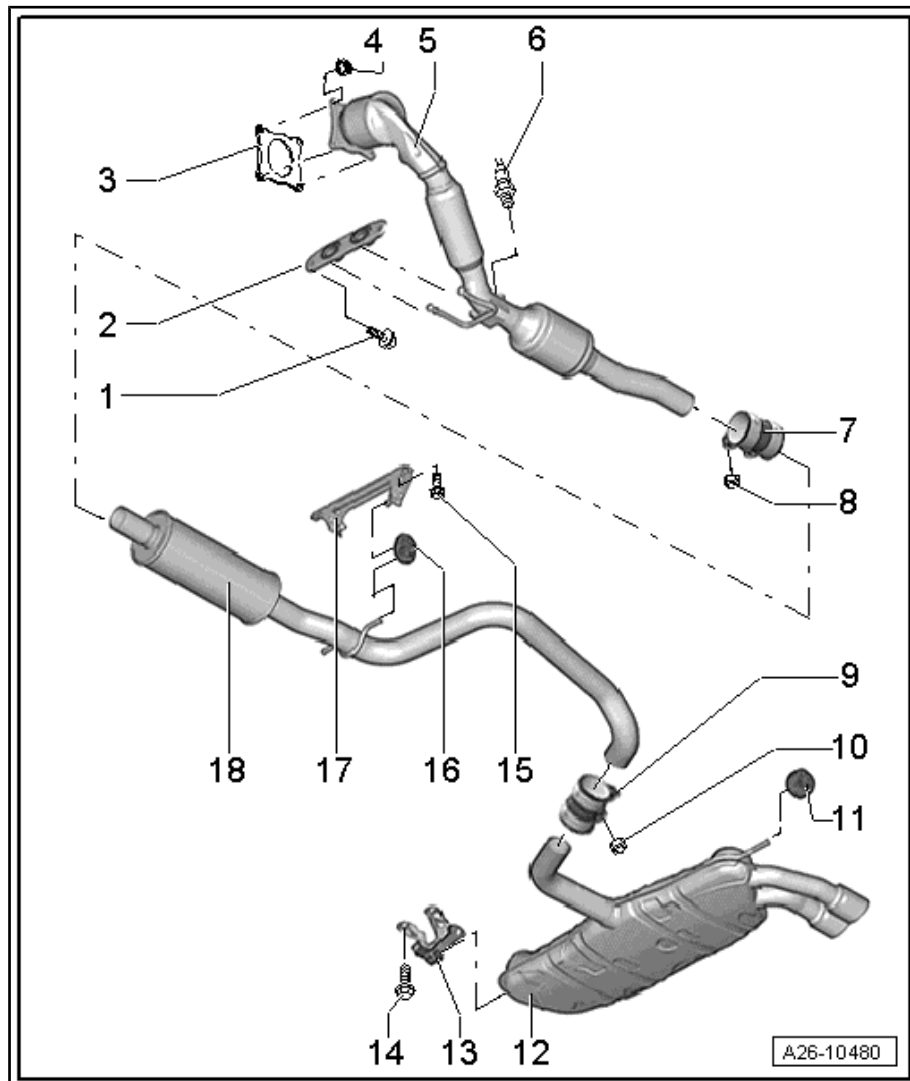
This document is intended for private use only. It is not to be reproduced, stored in a retrieval system, or transmitted, in part or in whole, is not permitted without the prior written permission of Audi AG. Audi AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by Audi AG.

### 1.1 Exploded view - silencers

- 1 - Bolt
  - 23 Nm
- 2 - Mounting
  - Renew if damaged
- 3 - Gasket
  - Renew
- 4 - Nut
  - 40 Nm
  - Renew
  - Coat studs of turbo-charger with high-temperature paste
  - High-temperature paste ⇒ Electronic parts catalogue
- 5 - Front exhaust pipe with catalytic converters

**Caution**  
 Risk of 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.

- Protect catalytic converter from damage by knocks and impact
- Removing and installing ⇒ [page 383](#)
- Align exhaust system so it is free of stress ⇒ [page 385](#)



## 6 - Lambda probe

- Exploded view ⇒ [“7.1 Exploded view - Lambda probe”, page 363](#)

## 7 - Clamp (front)

- Before tightening, align exhaust system so it is free of stress ⇒ [page 385](#)
- Installation position ⇒ [page 381](#)
- Tighten bolt connections evenly.

## 8 - Nut

- 25 Nm

## 9 - Clamp (rear)

- Before tightening, align exhaust system so it is free of stress ⇒ [page 385](#)
- Installation position ⇒ [page 382](#)
- Tighten bolt connections evenly.

## 10 - Nut

- 25 Nm

## 11 - Rubber mounting

- Renew if damaged

## 12 - Rear silencer

- Combined in one unit with centre silencer as original equipment. Can be renewed individually for repair purposes
- Cutting point ⇒ [page 382](#)
- Align exhaust system so it is free of stress ⇒ [page 385](#)

## 13 - Mounting

- Renew if damaged

## 14 - Bolt

- 23 Nm

## 15 - Bolt

- 23 Nm

## 16 - Rubber mounting

- Renew if damaged

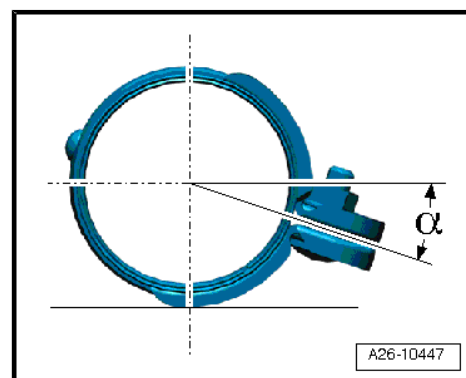
## 17 - Bracket for exhaust system

## 18 - Centre silencer

- Combined in one unit with rear silencer as original equipment. Can be renewed individually for repair purposes
- Cutting point ⇒ [page 382](#)
- Align exhaust system so it is free of stress ⇒ [page 385](#)

### Installation position of front clamp

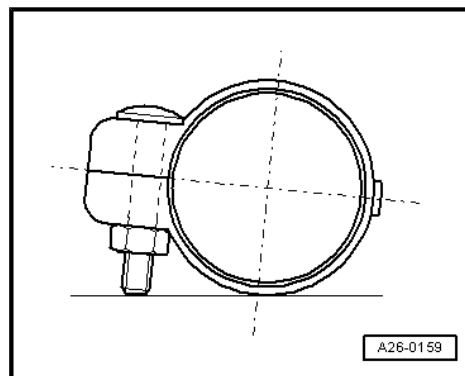
- Fit the clamp at the angle shown.
- Bolted connections face to right.
- Nuts face upwards.
- $\alpha$  = approx. 20°





### Installation position of rear clamp

- Install clamp so that ends of bolts do not protrude beyond bottom of clamp.
- Bolted connections face downwards.

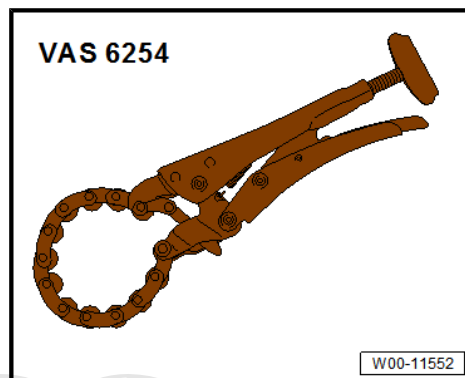


## 1.2 Separating centre and rear silencers

- ◆ 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.

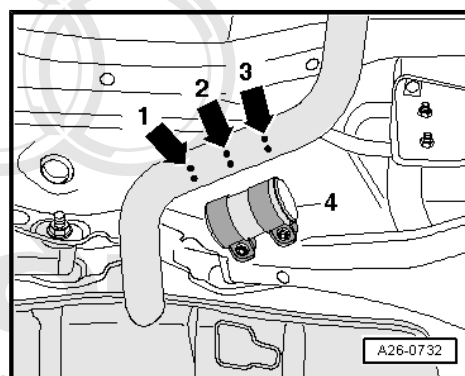
### Special tools and workshop equipment required

- ◆ Chain pipe cutter - VAS 6254-



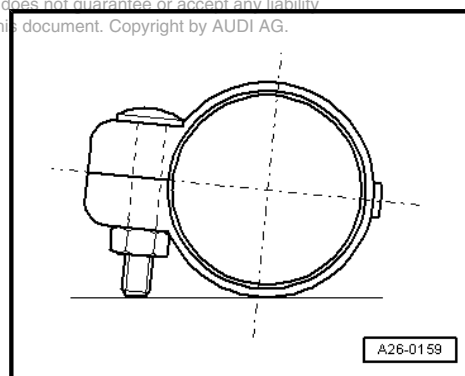
### Procedure

- Cut through exhaust pipe at right angles at the position marked -arrow 2- using chain pipe cutter - VAS 6254-.
- Position clamp -4- at side marks when installing -arrow 1- and -arrow 3-.



Protected by copyright. Copying for private or commercial use without the written permission of Audi AG is prohibited. Audi AG does not guarantee or accept any liability for the content of this document. Copyright by Audi AG.

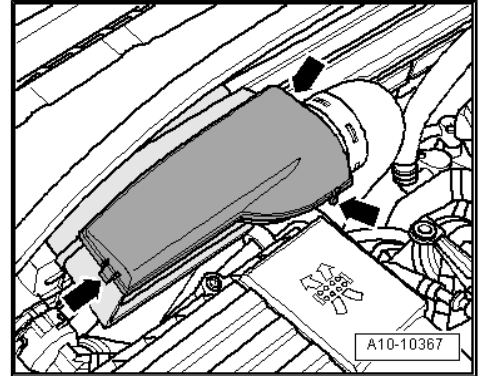
- Install clamp so that ends of bolts do not protrude beyond bottom of clamp.
- Bolted connections face downwards.
- Align the exhaust system so it is free of stress => [page 385](#).



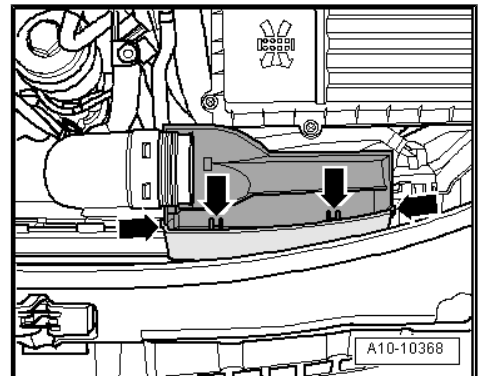
### 1.3 Removing and installing front exhaust pipe with catalytic converter

#### Removing

- Pull cover off air duct (release clips on sides) -arrows-.



- Unclip air duct at the bottom by releasing clips -arrows-.
- Detach air duct at bottom together with air hose.

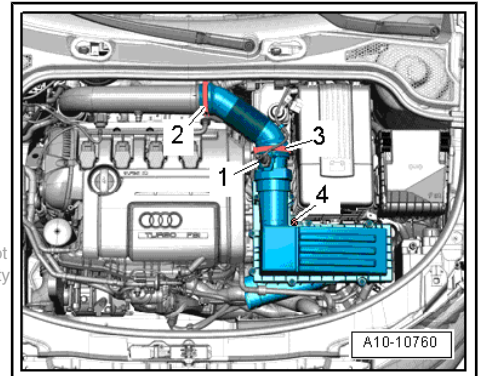


- Unplug electrical connector -1- at air mass meter - G70-.
- Detach air hose -2-.
- Unscrew bolt -4- and remove air cleaner housing.

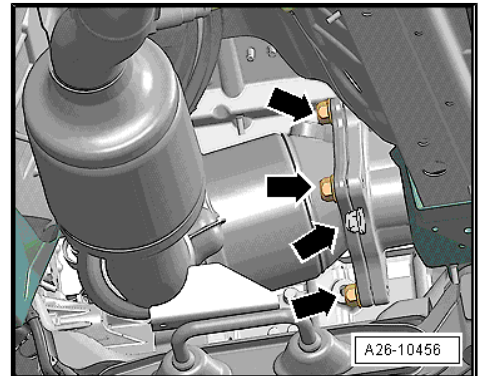


#### Note

*-Item 3- can be disregarded.* This document is not permitted to be reproduced, stored in a retrieval system, or used 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.

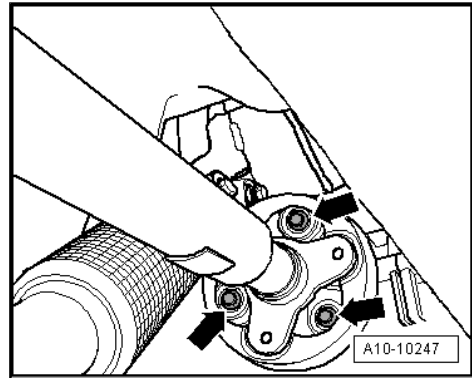


- Remove nuts (accessible from above) -arrows- securing front exhaust pipe to turbocharger.



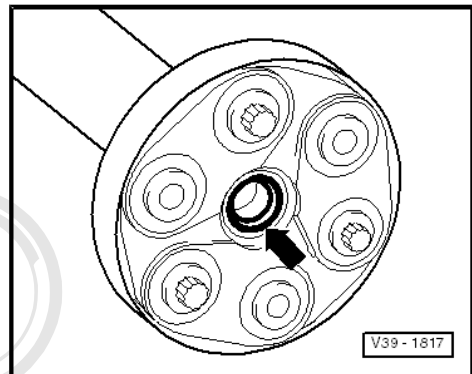
**Four-wheel drive:**

- Mark position of flexible coupling and flange for bevel box in relation to each other for re-installation.
- Remove bolts -arrows- for flexible coupling for propshaft at bevel box (counterhold using a suitable lever at triangular flange).

**Caution**

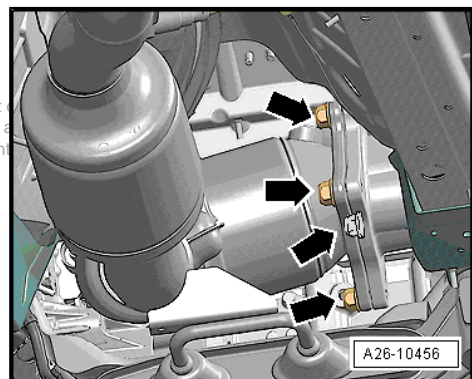
*Make sure not to damage the oil seal -arrow- in the propshaft flange.*

- ◆ *Push the propshaft horizontally to the rear and towards the right side of vehicle as far as possible.*

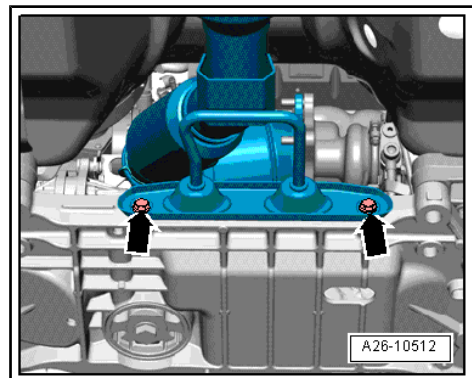
**Continued for all vehicles:**

- Unscrew nuts (accessible from below) securing front exhaust pipe to turbocharger.
- Detach connector for Lambda probe ⇒ [page 367](#) and move clear.
- Unscrew remaining securing nuts -arrows- of front exhaust pipe/turbocharger from underneath.

Protected by copyright. Copying for private or commercial purposes, in part 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




- Unbolt bracket for exhaust system -arrows-.



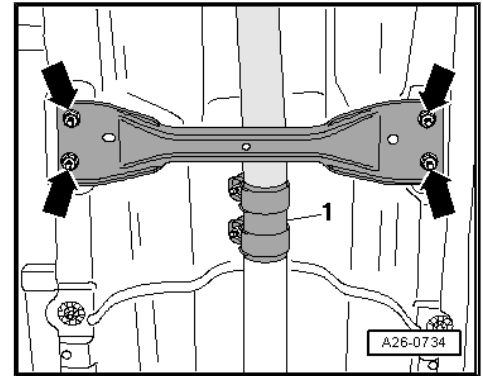


- Remove front cross member for underbody -arrows-.

 **Caution**

*Avoid damage to flexible joints.*

◆ *Do not bend flexible joints in front exhaust pipe more than 10°.*



- Loosen clamp -1- and push to rear.
- Detach catalytic converter with front exhaust pipe.

### Installing

- Tightening torques  
 ⇒ "1.1 Exploded view - silencers", page 380

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

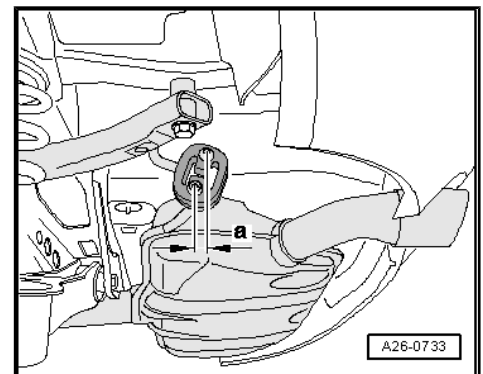
### Note

*Renew gaskets and self-locking nuts.*

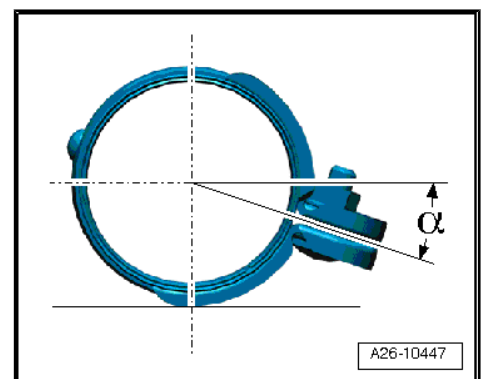
- Align the exhaust system so it is free of stress ⇒ [page 385](#) .

## 1.4 Aligning exhaust system

- The exhaust system must be aligned when it is cool.
- Tightening torques  
 ⇒ "1.1 Exploded view - silencers", page 380
- Loosen bolts on front clamp ⇒ [Item 7 \(page 381\)](#) .
- Push exhaust system towards front of vehicle -arrow- so that mounting for rear silencer is preloaded by -a- = 15 ... 17 mm.



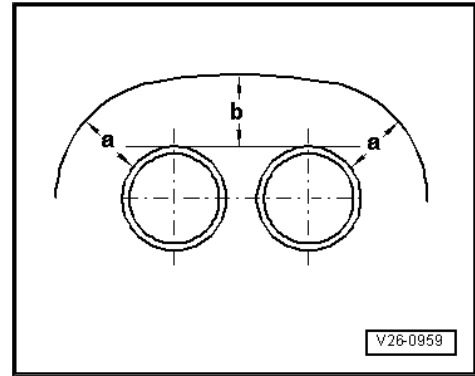
- Position the clamp at the angle shown.
- Bolted connections face to right.
- Nuts face upwards.
- $\alpha$  = approx. 20°
- Tighten bolt connections on clamp evenly.





### Aligning tailpipes:

- 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 21 mm
- If necessary, unfasten rear silencer mounting to align tailpipes.



## 1.5 Checking exhaust system for leaks

- Start engine and run at idling speed.
- Plug the tailpipes (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.

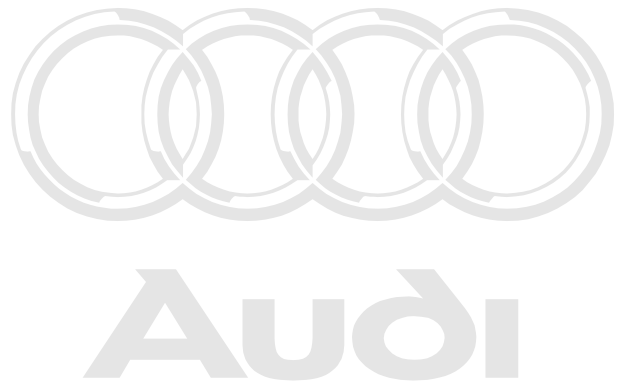


# Audi

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.

## 2 Exhaust manifold

The exhaust manifold and the turbocharger are combined as one unit; removing and installing ⇒ [page 282](#) .



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 Secondary air system - engine code CBFA

⇒ ["3.1 Exploded view - secondary air system", page 388](#)

⇒ ["3.2 Removing and installing secondary air pump motor V101", page 388](#)

⇒ ["3.3 Removing and installing combination valve for secondary air system", page 389](#)

#### 3.1 Exploded view - secondary air system

**1 - Gasket**

- Renew

**2 - Combination valve for secondary air system**

- Removing and installing  
⇒ [page 389](#)

**3 - Bolt**

- 9 Nm

**4 - Sender 1 for secondary air pressure - G609-**

**5 - Seal**

- Renew

**6 - To air cleaner**

**7 - Secondary air lines**

**8 - Locating aid for drain line from air cleaner**

**9 - Nut**

- 9 Nm

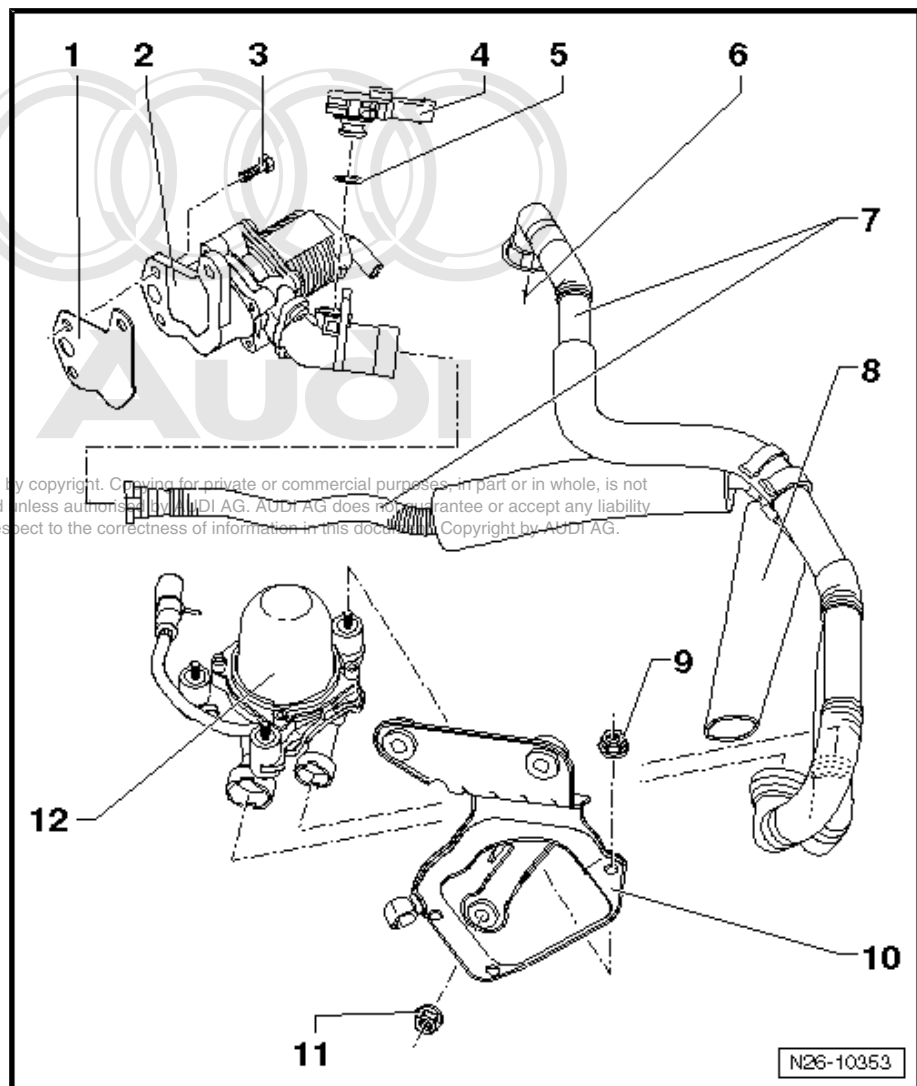
**10 - Bracket for secondary air pump motor - V101-**

**11 - Nut**

- 25 Nm

**12 - Secondary air pump motor - V101-**

- Removing and installing  
⇒ [page 388](#)



#### 3.2 Removing and installing secondary air pump motor - V101-

**Removing:**

- Remove noise insulation ⇒ Rep. gr. 66 .
- Remove front left wheel housing liner ⇒ Rep. gr. 66 .

**Cabriolet**

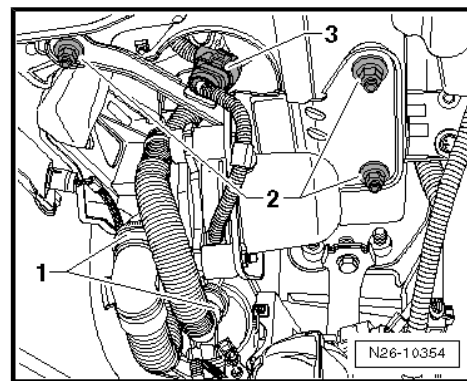
- Remove noise insulation frame ⇒ Rep. gr. 50 .

**All vehicles:**

- Detach connecting lines -1-, loosen bolts -2-, unplug electrical connector -3- and take out secondary air pump motor - V101- .

**Installing:**


Install in reverse sequence.



### 3.3 Removing and installing combination valve for secondary air system

**Removing:**

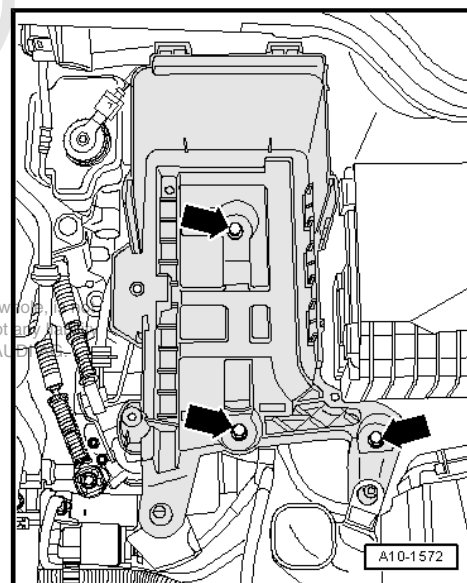
- Remove air cleaner housing => [page 329](#) .

 **Caution**

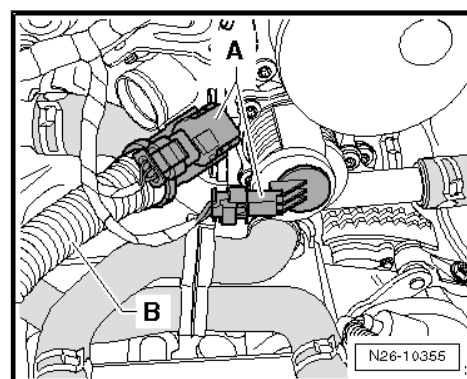
*To prevent irreparable damage to the electronic components when disconnecting the battery:*

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

- Remove battery => Electrical system; Rep. gr. 27 .
- Remove battery tray -arrows-.



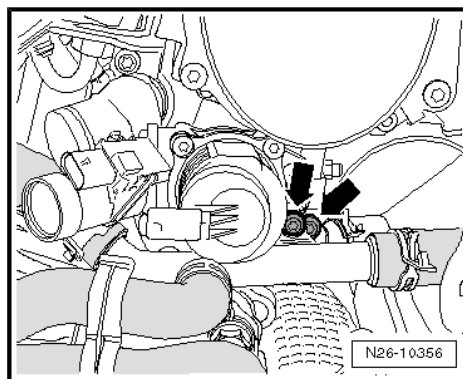
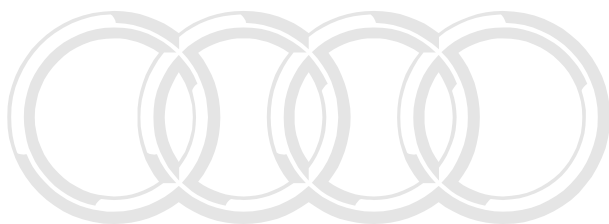
- Disconnect electrical connector -A- and hose -B- from combination valve for secondary air system.



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.



- Remove bolts -arrows- and detach coolant pipe.



- Remove bolts -arrows- and detach combination valve for secondary air system.

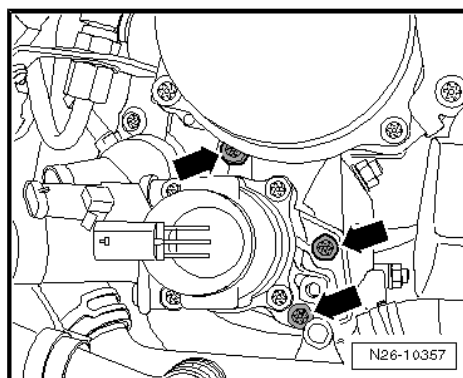
**Installing:**

- Tightening torques

⇒ ["3.3 Exploded view - cylinder head, engine codes BZB, CAWB, CBFA, CCTA, CDAA, CCZA" page 148](#)

... in part or in whole, is not liable or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

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



**Note**

*Renew gaskets and self-locking nuts.*

- Install battery ⇒ Electrical system; Rep. gr. 27 .
- Install air cleaner housing ⇒ [page 329](#) .

## 28 – Ignition system

### 1 Servicing ignition system

⇒ [“1.1 Test data”, page 391](#)

⇒ [“1.2 Exploded view - ignition system”, page 391](#)

⇒ [“1.3 Removing and installing ignition coils with output stages”, page 392](#)

⇒ [“1.4 Removing knock sensor 1 G61”, page 394](#)

#### 1.1 Test data

Engine data	1.8 ltr./2.0 ltr. turbo FSI engine
Idling speed Cannot be adjusted; is regulated by idling speed stabilisation	640 ... 800 rpm
Engine speed limiter (deactivates injectors/closes throttle valve)	approx. 6,500 rpm
Ignition timing is determined by the control unit. Ignition timing cannot be adjusted.	
Ignition system	Multi-coil ignition system with 4 ignition coils (integrated output stages) connected directly to spark plugs via spark plug connectors; use puller - T40039 - to remove ignition coils.
Firing order	1-3-4-2

#### 1.2 Exploded view - ignition system



# 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.



**1 - Bolt**

- The tightening torque influences the function of the knock sensor
- 20 Nm

**2 - Knock sensor 1 - G61- / knock sensor 2 - G66-**

- Contacts gold-plated
- Removing and installing ⇒ [page 394](#)

**3 - Bolt**

- 9 Nm

**4 - Hall sender - G40-**

- Removing and installing ⇒ [page 396](#)

**5 - O-ring**

- Renew

**6 - Ignition coil with output stage**

- ◆ Ignition coil 1 with output stage - N70-
- ◆ Ignition coil 2 with output stage - N127-
- ◆ Ignition coil 3 with output stage - N291-
- ◆ Ignition coil 4 with output stage - N292-
- Removing and installing ⇒ [page 392](#)

**7 - Spark plug**

- Removing and installing, tightening torque ⇒ Maintenance ; Booklet 808

**8 - O-ring**

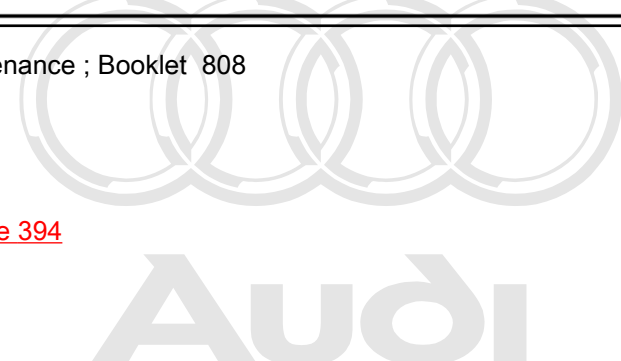
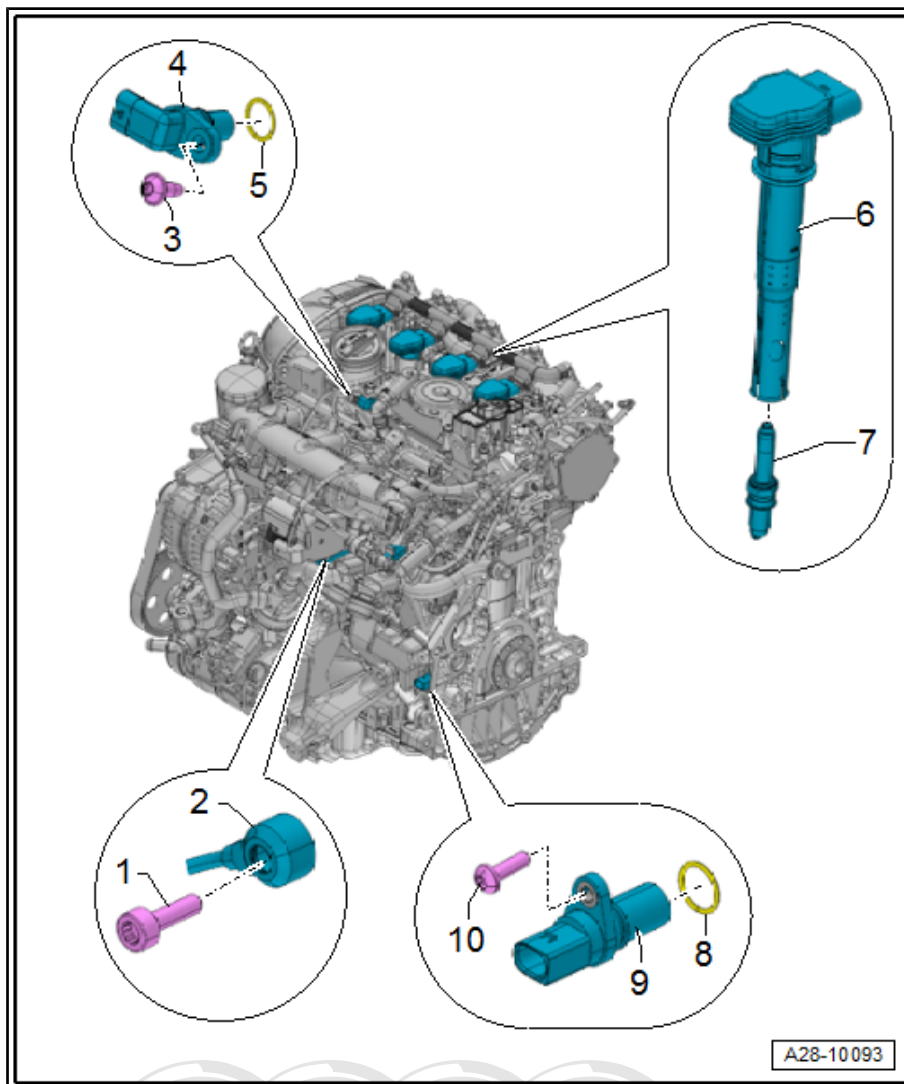
- Renew

**9 - Engine speed sender - G28-**

- Removing and installing ⇒ [page 394](#)

**10 - Bolt**

- 4.5 Nm



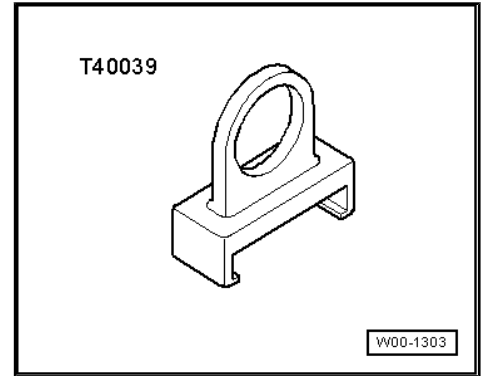
### 1.3 Removing and installing ignition coils with output stages

Reproduction, copying, distribution, or use 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.

#### Special tools and workshop equipment required



◆ Puller - T40039-



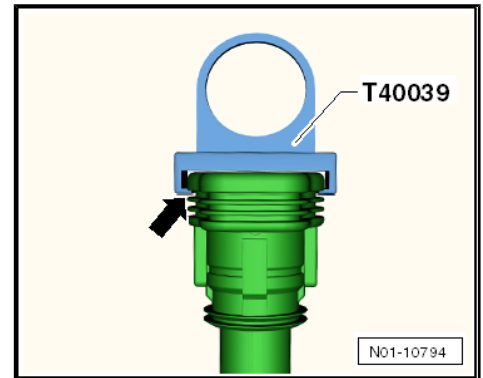
**Removing**

- Remove engine cover panel ⇒ [page 328](#).
- Remove cover with oil separator (engine code letters BYT only) ⇒ [page 325](#).

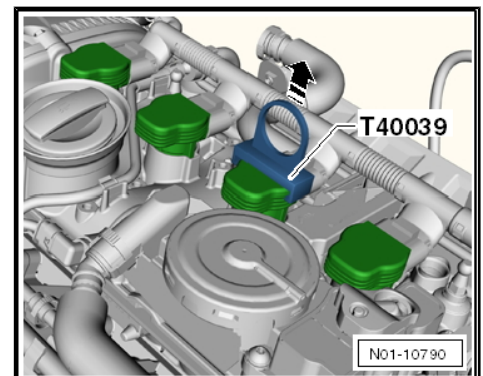
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



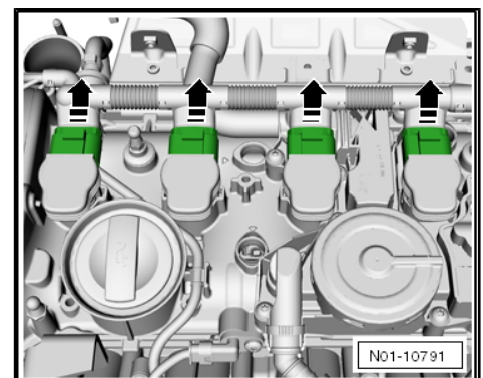
- ◆ *To remove ignition coils, fit puller - T40039- onto upper (thick) rib -arrow- of ignition coil with output stage.*
- ◆ *The lower ribs can be damaged if they are used.*



- Using puller - T40039- , pull all ignition coils approx. 30 mm out of spark plug holes.



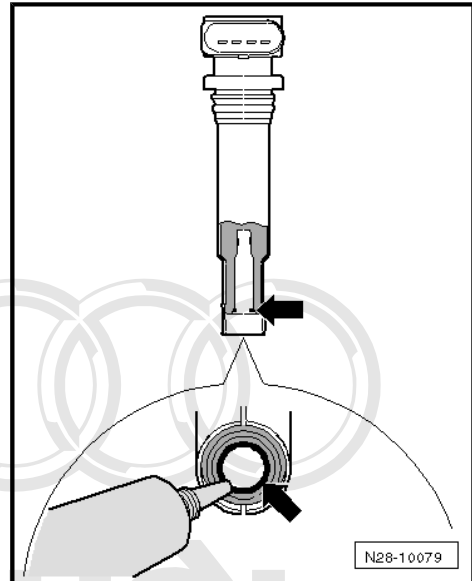
- Release connectors and unplug all connectors from the ignition coils at the same time.



**Installing:**

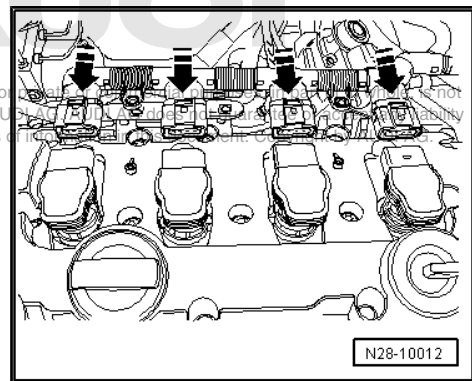
- Apply a thin bead of silicone paste all around end of sealing hose of ignition coil with output stage -arrow-.

Silicone paste ⇒ Electronic parts catalogue (ETKA) .



- Fit all ignition coils loosely into spark plug holes.
- Align ignition coils with electrical connectors and plug all connectors simultaneously onto coils.
- Press ignition coils onto spark plugs by hand with uniform pressure (do not use any tools).

Protected by copyright. Copying for private use is permitted unless authorised by Audi AG. The correctness of the information is not guaranteed.



## 1.4 Removing knock sensor 1 - G61-

**Removing**

- Unplug electrical connector -2- at knock sensor 1 - G61- .
- Remove coolant pump with thermostat ⇒ [page 261](#) .

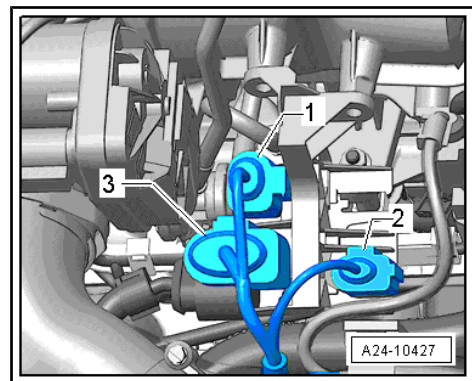
**Note**

*Knock sensor 1 - G61- is located below the intake manifold and behind the coolant pump.*

- Remove knock sensor 1 - G61- -2-.

**Installing**

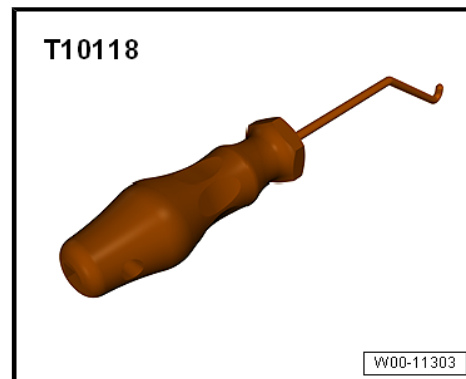
- Install in reverse sequence.
- Tightening torque: refer to exploded view of ignition system ⇒ [page 391](#) .



## 1.5 Removing and installing engine speed sender - G28-

Special tools and workshop equipment required

- ◆ Assembly tool - T10118-



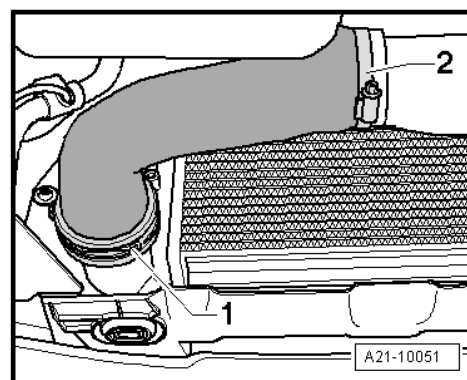
### Removing

- Remove noise insulation ⇒ Rep. gr. 66 .
- Release hose clip -2- and detach air hose.



#### Note

Disregard -item 1-.

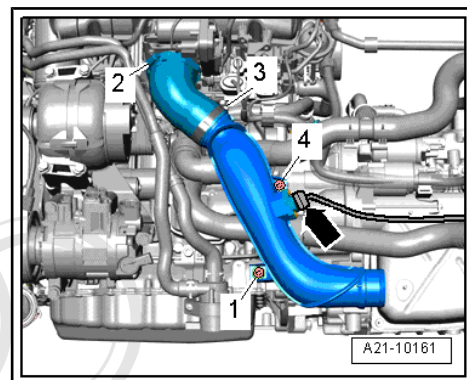


- Release hose clip -2-.
- Remove bolt -4-.
- Unplug electrical connector -arrow-.
- Remove bolt -1- and take out air pipe downwards.



#### Note

Disregard -item 3-.



- Unplug electrical connector at engine speed sender - G28- -2- using assembly tool - T10118- .



#### Note

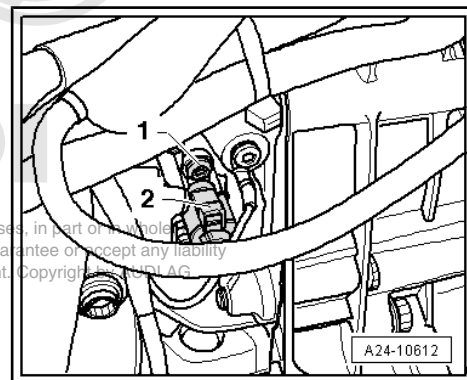
To release electrical connector without assembly tool - T10118- , press connector on engine speed sender in with a screwdriver and at the same time lift release tab with a thin wire hook.

- Remove securing bolt -1-.

### Installing

Install in reverse sequence.

- Tightening torque: refer to exploded view of ignition system ⇒ [page 391](#) .





## 1.6 Removing and installing Hall sender - G40-

### Removing

- Remove engine cover panel ⇒ [page 325](#) .
- Unplug electrical connector -1-.
- Unscrew bolt -2- and detach Hall sender - G40- .

### Installing

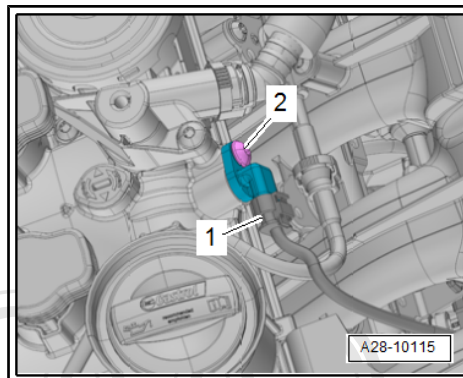
Installation is carried out in the reverse order; note the following:



#### Note

*Renew O-ring.*

- Tightening torque: refer to exploded view of ignition system ⇒ [page 391](#) .



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.