

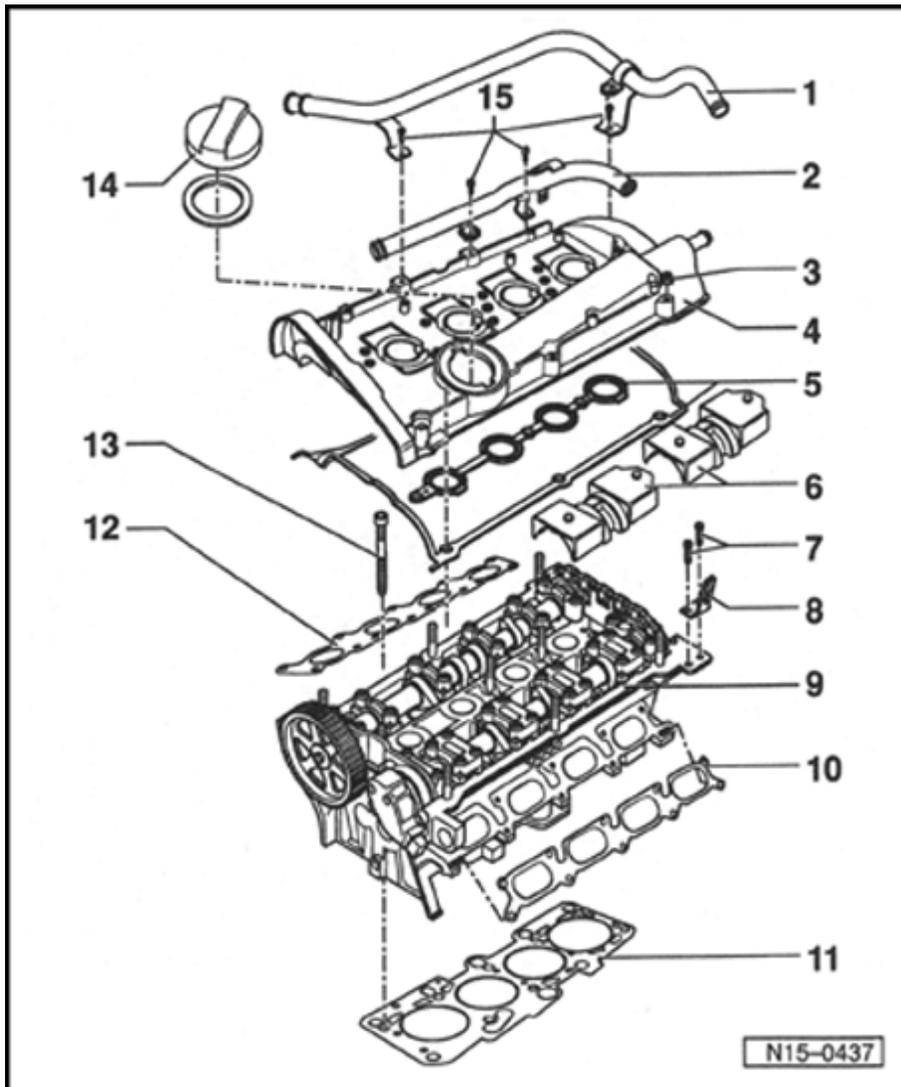
Cylinder head, removing and installing

From 08.00 a new tightening roller and tightening device for the toothed belt is being installed. tightening roller must be adjusted in order to tension toothed belt.

Checking compression pressure ⇒ [Page 15-20](#)

Notes:

- ◆ *When installing a replacement cylinder head with camshafts attached, grease contact surfaces between valve lifters and cam lubricating surfaces before attaching cylinder head cover.*
- ◆ *Do not remove plastic covers protecting exposed valves until immediately before installing cylinder head.*
- ◆ *When replacing cylinder head or cylinder head gasket, coolant must be replaced.*



1 - Line

- ◆ For crankcase ventilation

2 - Pressure line

- ◆ For combination valve

3 - 10 Nm

4 - Cylinder head cover

5 - Cylinder head cover gasket

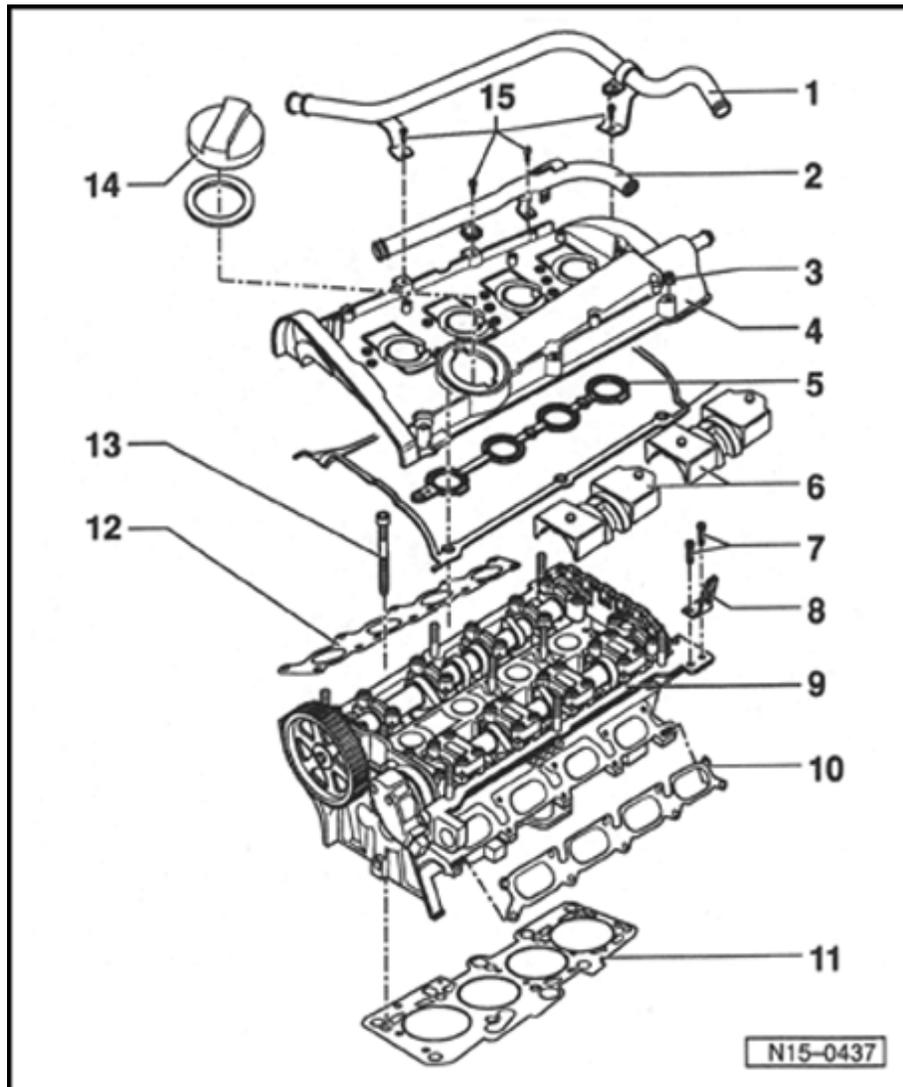
- ◆ Replace if damaged
- ◆ Before installing, coat sealing contact surfaces between bearing cap and cylinder head with D 454 300 A2 ⇒ [Page 15-31](#) , ⇒ Fig. ⇒ [4](#) and ⇒ [Page 15-31](#) Fig. ⇒ [5](#)

6 - Oil deflector

- ◆ Note position: above intake camshaft

7 - 25 Nm

8 - Lifting eye



9 - Cylinder head

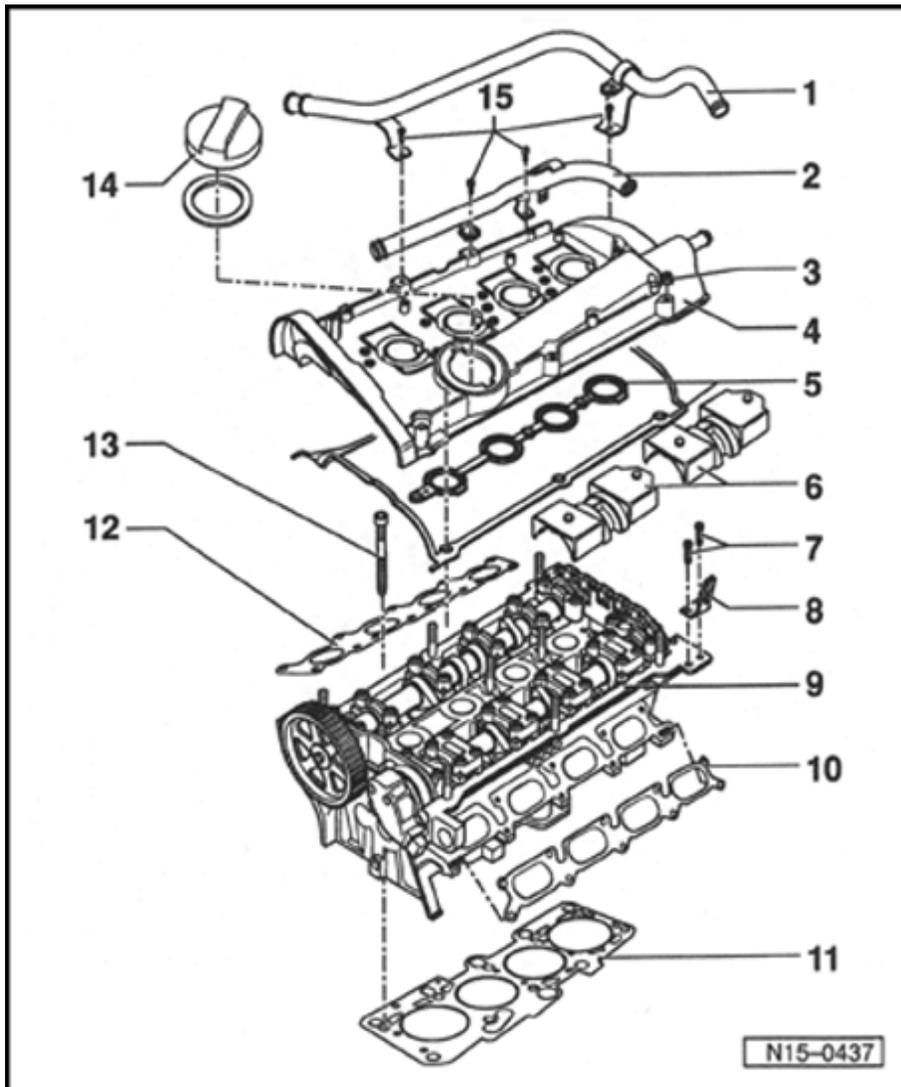
- ◆ Check for warpage ⇒ Fig. ⇒ [1](#)
- ◆ Reface sealing surface ⇒ [Page 15-29](#) , Fig. ⇒ [1](#)
- ◆ Removing and installing ⇒ [Page 15-14](#)
- ◆ After replacing, completely replace coolant

10 - Seal for intake line

- ◆ Always replace

11 - Cylinder head gasket

- ◆ Always replace
- ◆ Metal gasket
- ◆ After replacing, replace coolant
- ◆ Note position: Identification: Part number must be visible from intake side.



12 - Seal for exhaust manifold

- ◆ Always replace
- ◆ Note installed position

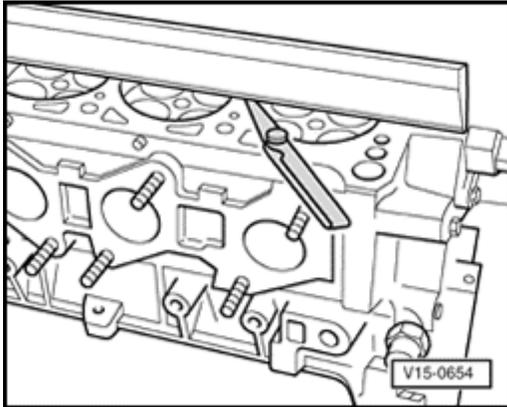
13 - Cylinder head bolt

- ◆ Always replace
- ◆ Sequence for loosening and tightening ⇒ [Page 15-14](#) , cylinder head, removing and installing

14 - Cap

- ◆ Replace seal if damaged

15 - 10 Nm

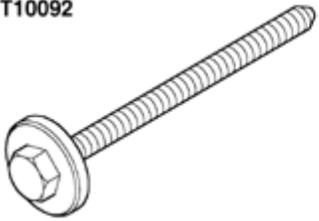
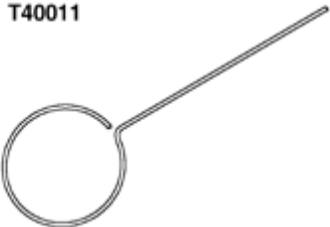
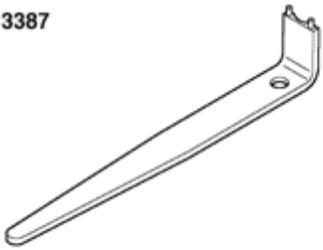
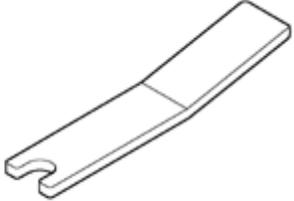


A

Fig. 1 Check cylinder head for warpage

Cylinder head warpage must not exceed: 0.1 mm



<p>V.A.G 1331</p> 	<p>V.A.G 1332</p> 
<p>T10092</p> 	<p>T40011</p> 
<p>3387</p> 	<p>T10008</p>  <p style="text-align: right;">W15-0156</p>

Toothed belt, removing, installing and tightening

Special tools and equipment

- ◆ VAG 1331 Torque wrench (5 to 50 Nm)
- ◆ VAG 1332 Torque wrench (40 to 200 Nm)

Tightening roller up to 07.00 (not adjustable)

- ◆ T10092 Tightening bolt
- ◆ T40011 Pin

Tightening roller from 08.00 (must be adjusted)

- ◆ 3387 Pin wrench
- ◆ T10008 Locking plate

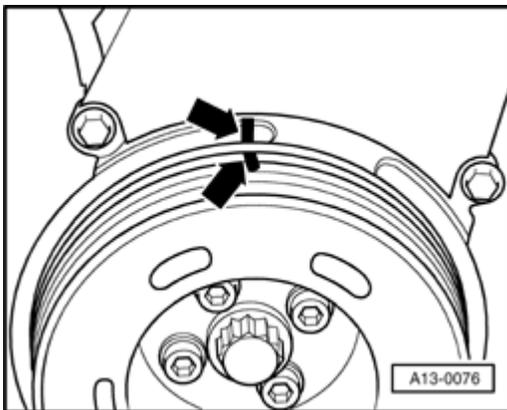


Removing

- Bring lock carrier into service position:

⇒ [Repair Manual, Body Exterior, Repair Group 50; Body, front; Lock carrier service position](#)

- Remove ribbed belt ⇒ [Page 13-14](#) .
- Remove tightening element for ribbed belt.
- Remove toothed belt guard upper.
- Mark direction of rotation of toothed belt.
- Adjust camshaft to TDC cylinder 1.

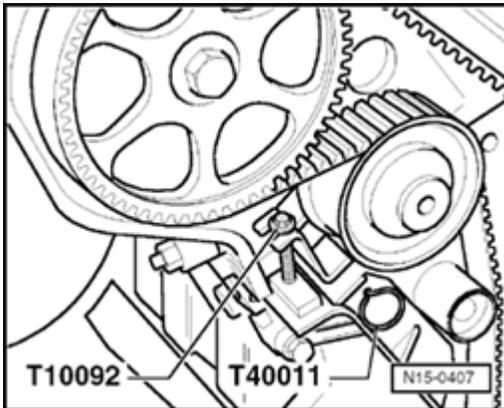




- Remove harmonic balancer/belt pulley.
- Remove lower and center toothed belt guard.



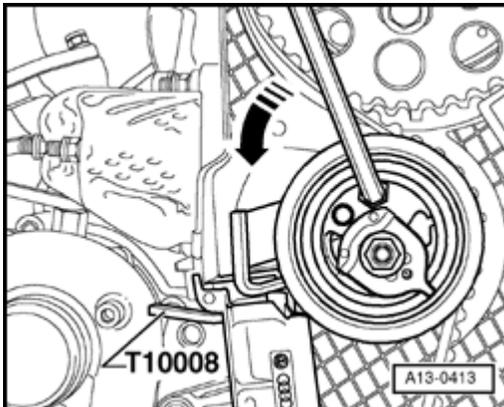
Tightening roller up to 07.00 (not adjustable)



A

- Thread T10092 tightening bolt into tightening device for toothed belt.
- If necessary, align pressure piston before tightening, using needle nose pliers or thin wire (hole in pressure piston and hole in housing must overlap).
- Tighten pressure piston only far enough so that the pressure piston can be secured using T40001 pin.

Tightening roller from 08.00 (must be adjusted)

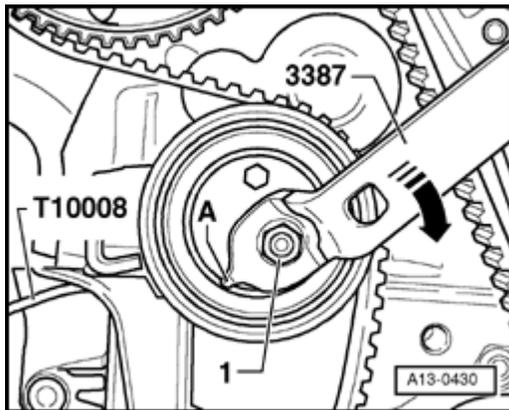


A

- Insert an hex wrench into hex socket up to stop and press tightening roller in counterclockwise direction (in direction of arrow) with uniform non-excessive force until the tightening device of the toothed belt can be aligned using T10008 locking plate.

Note:

Toothed belt tightening device is an oil damper device and can only be compressed slowly and with equal force. Excessive force during compression can damage tightening roller.



A

- To loosen toothed belt, loosen nut -1- of tightening roller and turn pin wrench in direction of arrow using 3387 pin wrench.

Note:

Impact tab -A- of pin wrench must not be bent.

Continuation for all

- Remove toothed belt.
- Then turn crankshaft back slightly.

Installing

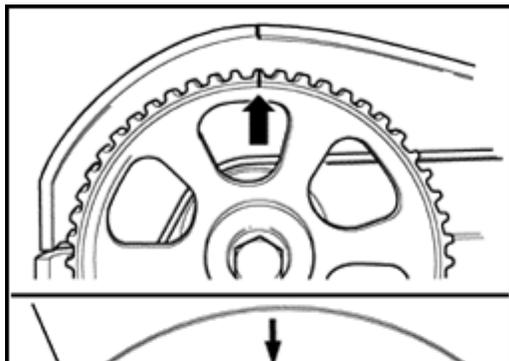
Requirement

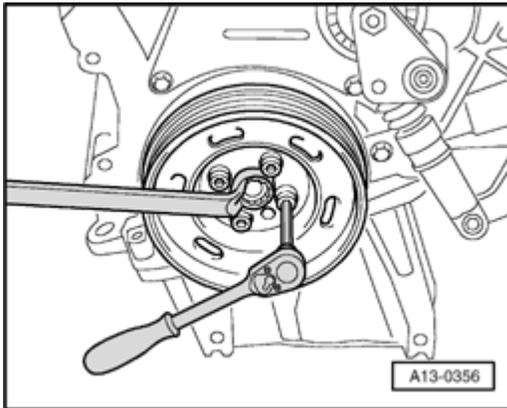
- Pistons must not be positioned in TDC.

Work sequence

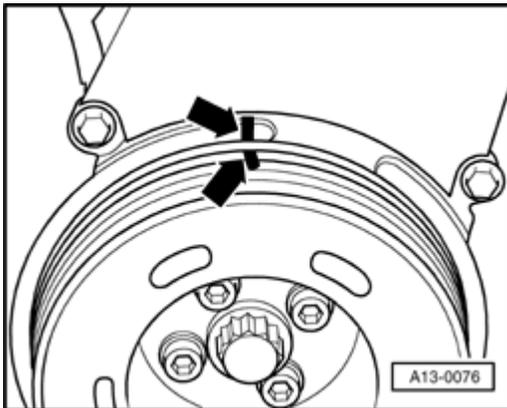
A

- Align mark on camshaft gear and mark at cylinder head cover.
- Install toothed belt on crankshaft gear (note direction of rotation)
- Install toothed belt guard, lower.





- A**
- Install harmonic balancer/belt pulley using new bolts.
Tightening torque: 10 Nm + $\frac{1}{4}$ turn (90°) additional



- A**
- Adjust crankshaft to TDC cylinder 1.
 - Install toothed belt in the order coolant pump, tightening roller, camshaft gear.
 - Tighten toothed belt ⇒ [Page 15-11](#)



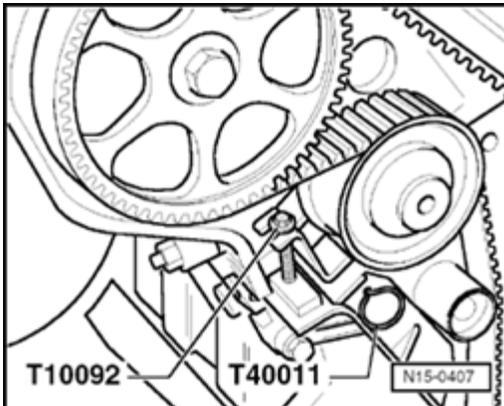
Tightening toothed belt

Requirements

- Engine must not be more than hand-warm.
- Engine is at TDC cylinder 1.

Work sequence

Tightening roller up to 07.00 (not adjustable)



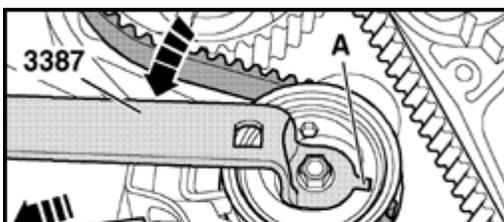
A

- Tighten toothed belt by pulling out T40001 pin and unbolting T10092 tightening bolt.

Tightening roller from 08.00 (must be adjusted)

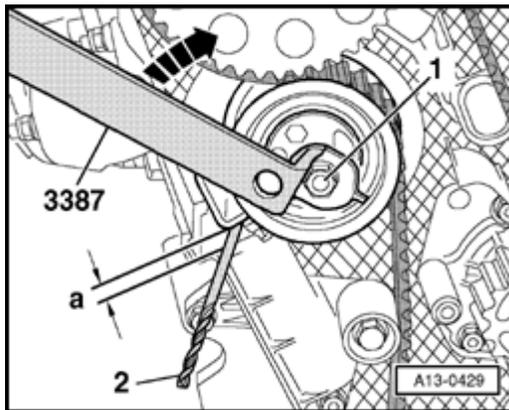
Note:

If the toothed belt tightening device is completely extended, it must be pressed back in installed position with the tightening roller. This procedure can take up to 5 minutes. Excessive force during compression can damage tightening roller.



A

- Turn pin wrench counterclockwise (tab -A- of pin wrench must not be bent) using 3387 pin wrench until T10008 locking plate can be removed without tension.



A

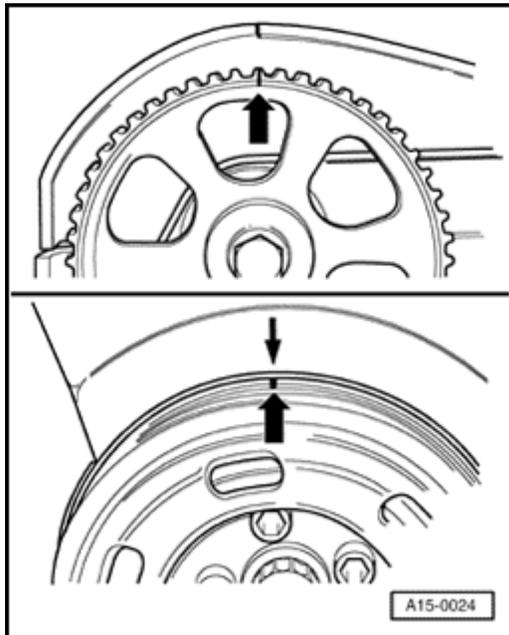
- Turn pin wrench to the right in clockwise direction (direction of arrow) until a drill bit -2- with dimension -a- can be pulled through tightening lever and housing of tightening device.

Specified value dimension -a-: 8 mm.

- Hold tightening roller in this position and tighten securing nut of tightening roller as follows:

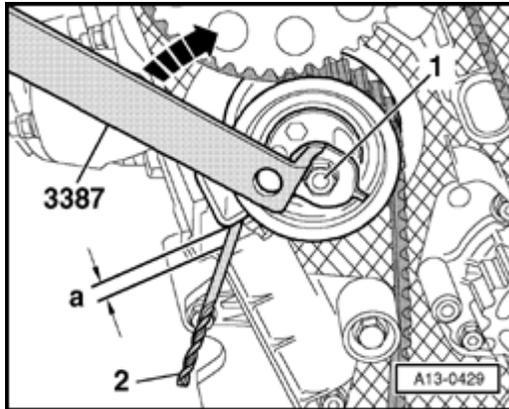
Specified value: 27 Nm

Continuation for all



A

- Turn crankshaft two rotations and check whether the camshaft and crankshaft marks align with their reference points.



Tightening roller from 08.00 (must be adjusted)

A

- Check dimension -a- using a drill bit -2- between tightening lever and housing of tightening device.

Specified value: 6...10 mm

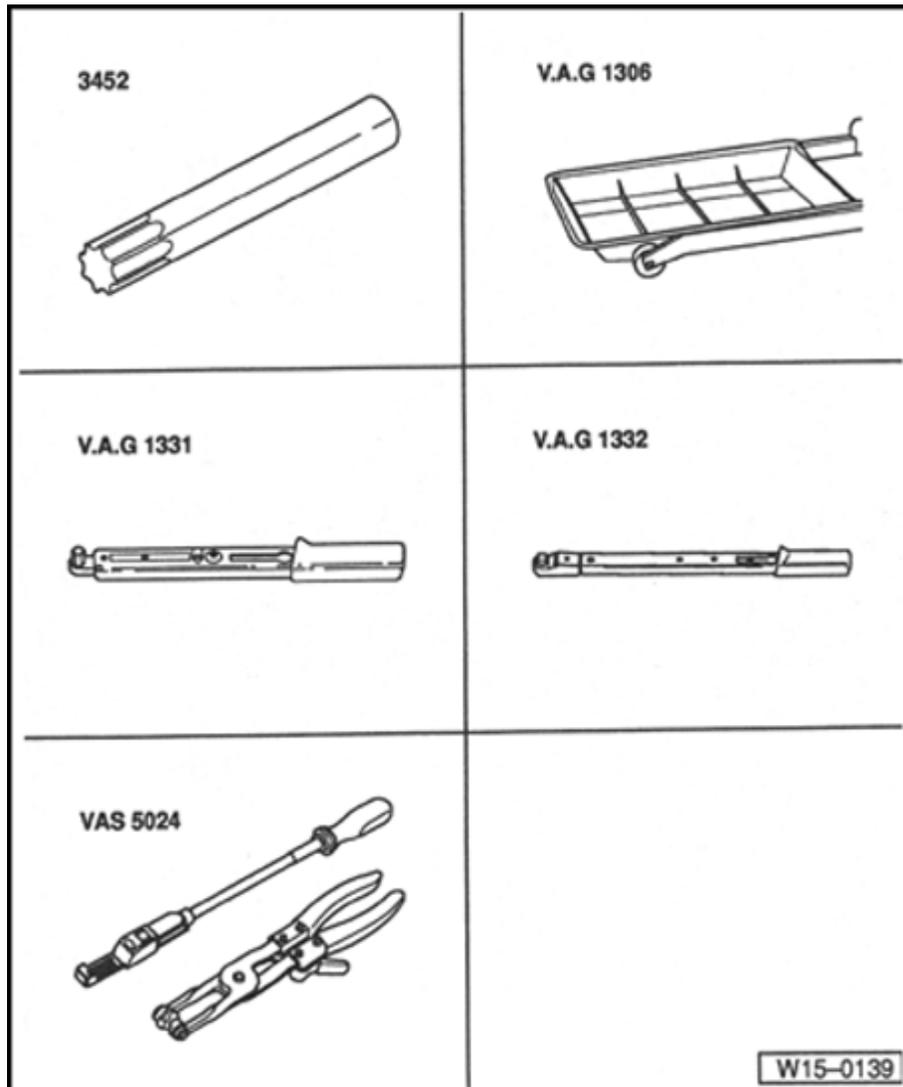
If dimension -a- is not being reached

- Repeat procedure ⇒ [Page 15-11](#) , Tighten toothed belt.

If dimension -a- is being reached

Continuation for all

- Toothed belt guard, install center and upper part.
- Install tightening device for ribbed belt.
Tightening torque: 25 Nm
- Install ribbed belt ⇒ [Page 13-14](#) .



Cylinder head, removing and installing

Special tools and equipment

- ◆ 3452 polydrive key
- ◆ VAG 1306 drip tray
- ◆ VAG 1331 torque wrench (5 to 50 Nm)
- ◆ VAG 1332 torque wrench (40 to 200 Nm)
- ◆ VAS 5024 assembly tool for spring-type clamps



Requirements

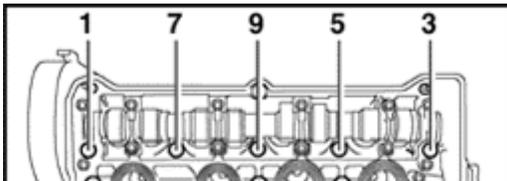
- Engine must not be hotter than lukewarm.
- Pistons must not be at Top Dead Center (TDC).

Procedure

- First determine whether an anti-theft coded radio is installed. If so, determine the correct radio anti-theft code and record.
- Switch ignition off and disconnect Battery Ground (GND) strap.
- Drain engine coolant ⇒ [Page 19-16](#) .
- Disconnect fuel supply line and return line at connection point at fuel rail. Fuel system is under pressure. Therefore place rags around the connection before disconnecting hoses.
- Seal off lines so that no dirt will get into fuel system.



- Unbolt catalytic converter from turbocharger.
- Disconnect all necessary connections:
 - ◆ Cooling system
 - ◆ Crankcase breather valve
 - ◆ Secondary air system
 - ◆ Exhaust turbocharger/regulation
 - ◆ Fuel injection and ignition system
- Remove upper portion of toothed belt guard.
- Loosen tensioner and lift toothed belt from camshaft gear.
- Remove cylinder head cover.

**A**

- Loosen and unbolt cylinder head bolts in specified sequence using 3452 polydrive key.
- Carefully remove cylinder head.

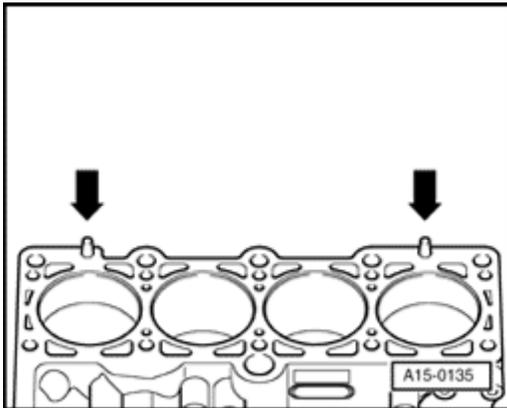


Installing

Notes:

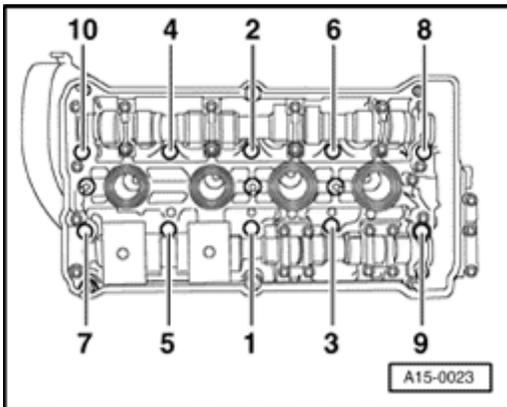
- ◆ *Pocket holes in engine block for cylinder head bolts must be free of oil and coolant.*
- ◆ *Do not remove new cylinder head gasket from package until immediately before installing.*
- ◆ *Handle new gasket extremely carefully. Damage will cause leaking.*
- Stuff clean cloths into cylinders so that no dirt or abrasive powder can get between cylinder wall and piston.
- Do not allow dirt or abrasive powder to get into coolant either.
- Carefully clean sealing surfaces of cylinder head and cylinder block. Avoid introducing scratches or scoring (do not use sandpaper with grit below 100).
- Thoroughly remove all sanding and grinding residue and remove cloths.

- Set piston of 1. Cylinder in TDC position and slightly turn crankshaft backward.



A

- Position new cylinder head gasket.
- ◆ Pay close attention to pilot pins in cylinder block (arrows).
- ◆ Pay close attention to cylinder head seal; replacement part number must be legible.
- Install cylinder head.
- Insert new cylinder head bolts and hand-tighten.



A

- Tighten cylinder head bolts in specified sequence as follows:
- Tighten all bolts to 40 Nm.
- Then tighten all bolts to 60 Nm.
- Then turn all bolts $\frac{1}{4}$ rotation (90°) using a rigid wrench.
- Then turn all bolts an additional $\frac{1}{4}$ rotation (90°) turn.



The rest of the installation follows the reverse of the removal procedures.

How to install toothed belt and adjust valve timing ⇒ [Page 15-6](#)

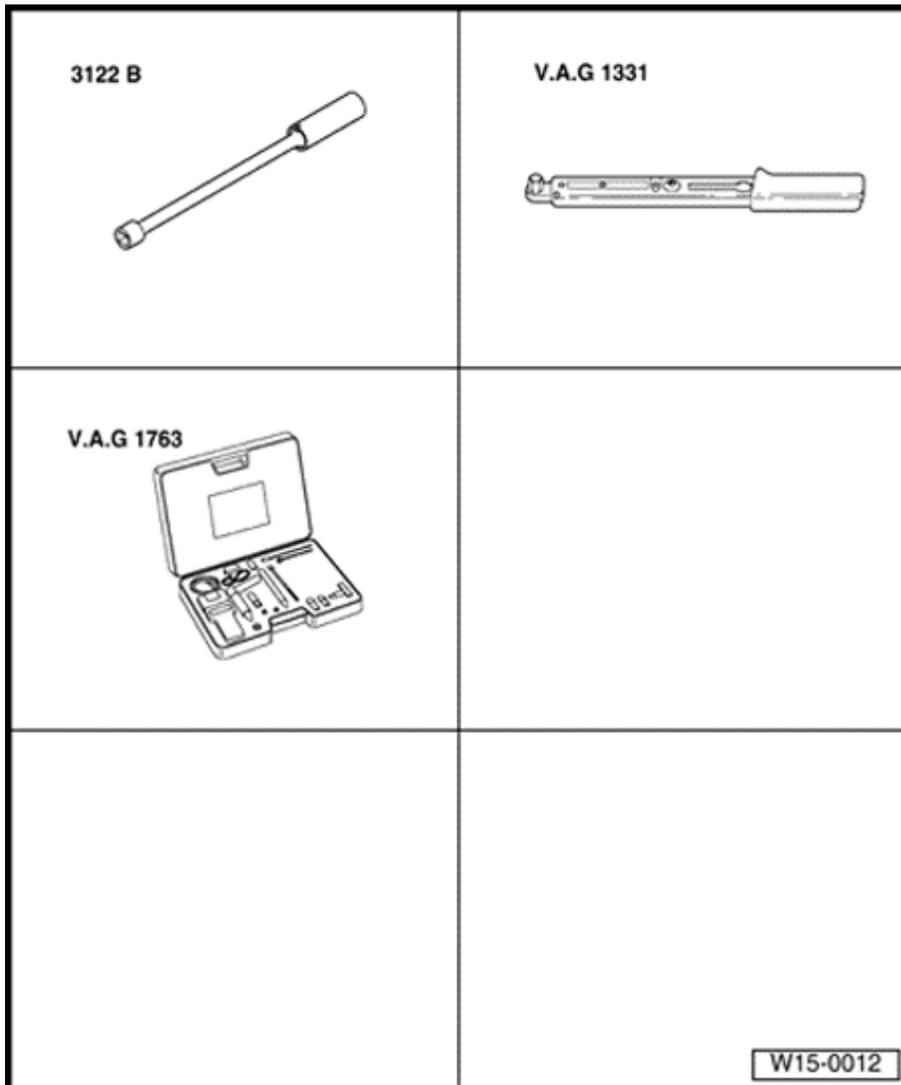
How to fill up new coolant ⇒ [Page 19-16](#) .

- Perform work step "Procedure to follow after interruption of voltage supply".

⇒ [Repair Manual, 1.8 Liter 4-Cyl. 5V Turbo Fuel Injection & Ignition, Engine Code\(s\): ATW, AUG, AWM, Repair Group 24; Engine Control Module, Procedure to follow after interruption of voltage supply](#)

- Perform road test and check DTC memory:

⇒ [Repair Manual, 1.8 Liter 4-Cyl. 5V Turbo Fuel Injection & Ignition, Engine Code\(s\): ATW, AUG, AWM, Repair Group 01, DTC memory; Engine Control Module \(ECM\) DTC memory, checking and erasing](#)



Compression pressure, checking

Special tools and equipment

- ◆ 3122B Spark plug removal tool
- ◆ VAG 1331 Torque wrench (5 to 50 Nm)
- ◆ VAG 1763 Compression tester



Test requirements

- Engine oil temperature must be at least 30 °C.
- Voltage supply OK

Procedure

A

- Remove fuse 32 from fuse holder.

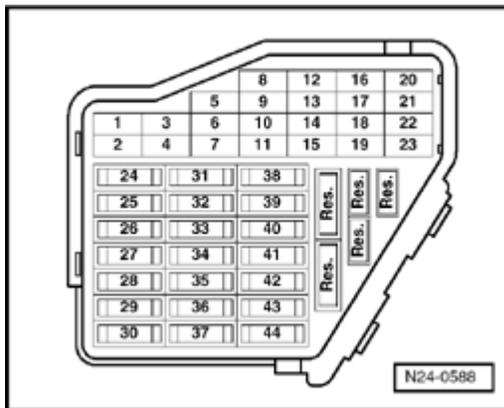
Note:

By removing fuse 32, voltage supply to the fuel injectors is interrupted.

- Disconnect connectors for ignition coils.
- Remove ignition coils.

⇒ [Repair Manual, 1.8 Liter 4-Cyl. 5V Turbo Fuel Injection & Ignition, Engine Code\(s\): ATW, AUG, AWM, Repair Group 28; Ignition, servicing; Parts of ignition system, removing and installing](#)

- Remove spark plugs using 3122B spark plug removal tool.
- Have a second technician depress accelerator pedal completely.
- Test engine compression using VAG 1381 or VAG 1763 compression tester.



**Note:**

Using VAG 1381 or VAG 1763 compression tester ⇒ operating instructions.

- Have a second technician operate the starter.
- Activate starter until no further pressure increases are indicated by VAG 1381 or VAG 1763 compression tester.

Compression values:

New: 10 to 14 bar positive pressure, Wear limit: 7.0 bar positive pressure

Tolerated deviation between cylinders: max. 3 bar

- Install spark plugs and ignition coils.
- Check DTC memory:

⇒ [Repair Manual, 1.8 Liter 4-Cyl. 5V Turbo Fuel Injection & Ignition, Engine Code\(s\): ATW, AUG, AWM, Repair Group 01, DTC memory; DTC memory, checking and erasing](#)