

Repair Manual

VIN: **WAUHP84A3PN025789**

Sales Code: **4A2555**

Engine Code: **AAN**

License Plate Number:

Customer Number:

User Name: **bhderekd**

Model Year Code: **P**

Model Description: **AUDI S4 quattL4162GKAT5G**

Transmission Code: **CBD**

Final Drive Code: **AAT**

Customer Name Abbreviated:

Service Advisor Name:

Job Number: 67474974

Fastener Tightening Specifications

Components	Bolt Size	Nm
Viscous clutch bolt		20
Belt tensioner bolts		20
Hydraulic pump bracket bolts		20
Generator (GEN) bracket bolts		45
Vibration damper bolt with spanner With spanner -2079-:		350
Vibration damper bolt with spanner Without spanner -2079-:		450
Connecting rod nuts		30
Bearing cap bolt		65
Flywheel bolt		30 Nm + 1/4-turn (90°)
Camshaft sprocket bolt		65

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Crankshaft Radial Clearance, Checking

- Check radial clearance with Plastigage.



Note

It is possible to check radial clearance with engine installed.

Measuring range of Plastigage	Color	Type
0.025 - 0.076 mm (0.0010 - 0.0030 in.)	Green	PG-1
0.050 - 0.150 mm (0.0020 - 0.0060 in.)	Red	PR-1
0.100 - 0.230 mm (0.0040 - 0.0091 in.)	Blue	PB-1

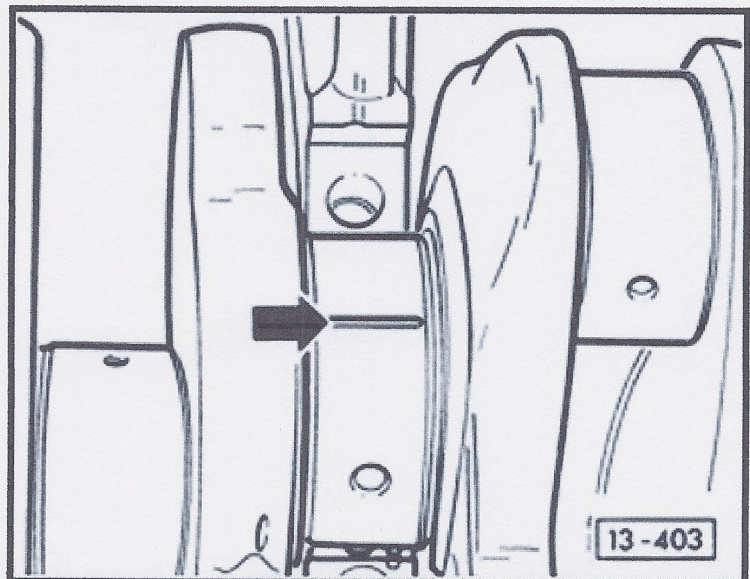
- Remove crankshaft bearing cap.
- Clean bearing shell and crankshaft journal.
- Place Plastigage strip corresponding to bearing width on journal or in bearing shell in axial direction (arrow).
- Install cap and shell and tighten to 65 Nm (48 ft lb).



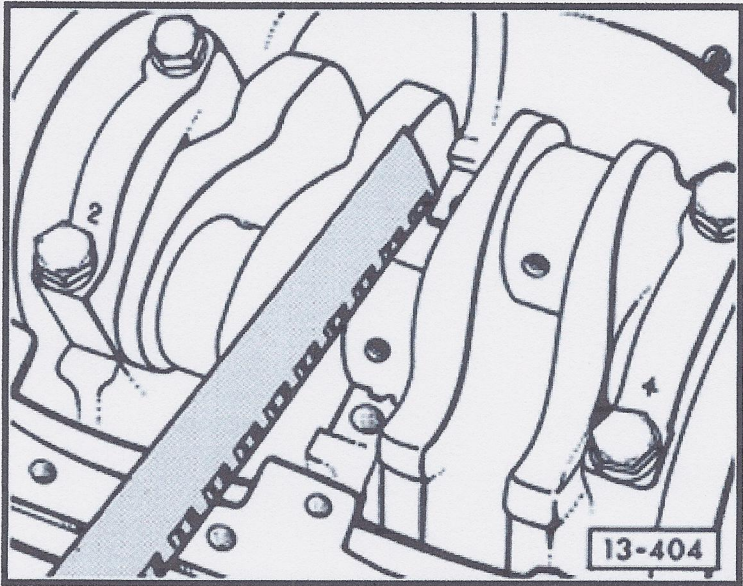
Note

Do not rotate crankshaft.

- Remove bearing cap again.



- Compare width of Plastigage strip with measuring scale.
- ♦ New: 0.018-0.058 mm (0.0007-0.0023 in.)
- ♦ Wear limit: 0.16 mm (0.0063 in.)



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Connecting Rod Radial Clearance, Checking

- Check radial clearance with Plastigage.



Note

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Measuring range of Plastigage	Color	Type
0.025 - 0.076 mm (0.0010 - 0.0030 in.)	Green	PG-1
0.050 - 0.150 mm (0.0020 - 0.0060 in.)	Red	PR-1
0.100 - 0.230 mm (0.0040 - 0.0091 in.)	Blue	PB-1

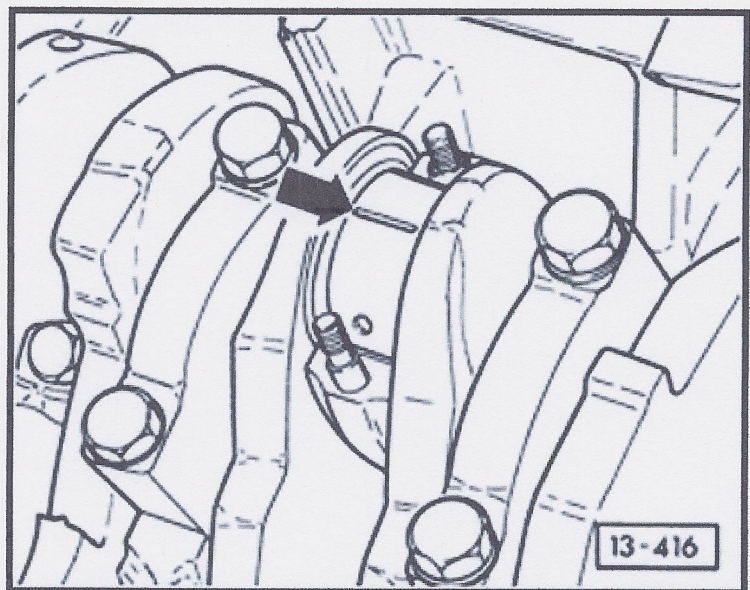
- Remove connecting rod bearing cap.
- Clean bearing shell and crank journal.
- Lay Plastigage strip corresponding to width of crankshaft journal in axial direction (arrow) on journal or in bearing shell.
- Install connecting rod bearing cap with bearing shell and tighten to 30 Nm (22 ft lb), but no further.



Note

Do not rotate crankshaft.

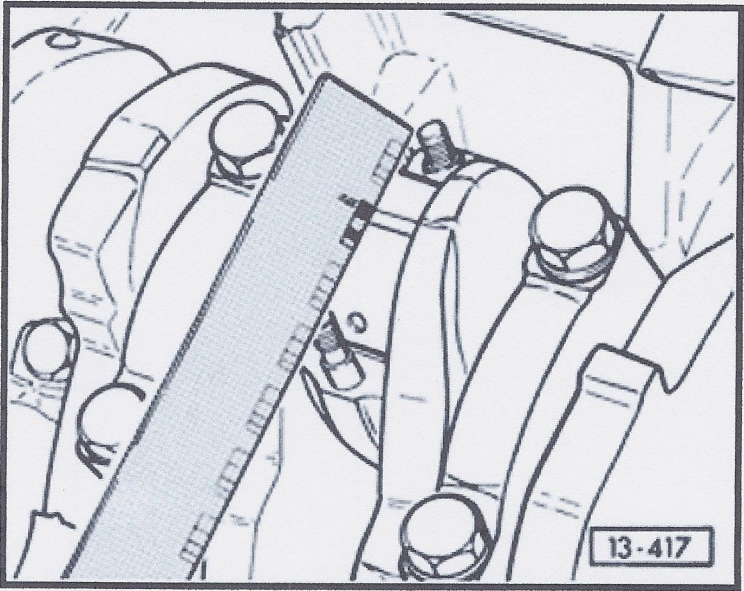
- Remove connecting rod bearing cap again.



- Compare width of Plastigage strip with measuring scale.

Connecting rod radial clearance:

- ♦ New: 0.010-0.050 mm (0.0004-0.0020 in.)
- ♦ Wear limit: 0.12 mm (0.0047 in.)



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Pistons and Connecting Rods

1 - Piston rings

- ☐ Offset gaps by 120°
- ☐ "TOP" marking points toward piston crown
→ [Anchor](#)
- ☐ Removing and installing → [Anchor](#)
- ☐ Checking side clearance → [Anchor](#)
- ☐ Checking ring gap
→ [Anchor](#)

2 - Piston

- ☐ Mark installation position and cylinder number → [Anchor](#)
- ☐ Checking → [Anchor](#)
- ☐ Removing and installing → [Anchor](#)
- ☐ Arrow on piston crown points toward pulley end
- ☐ Piston dimensions
→ [Anchor](#)

3 - Connecting rod

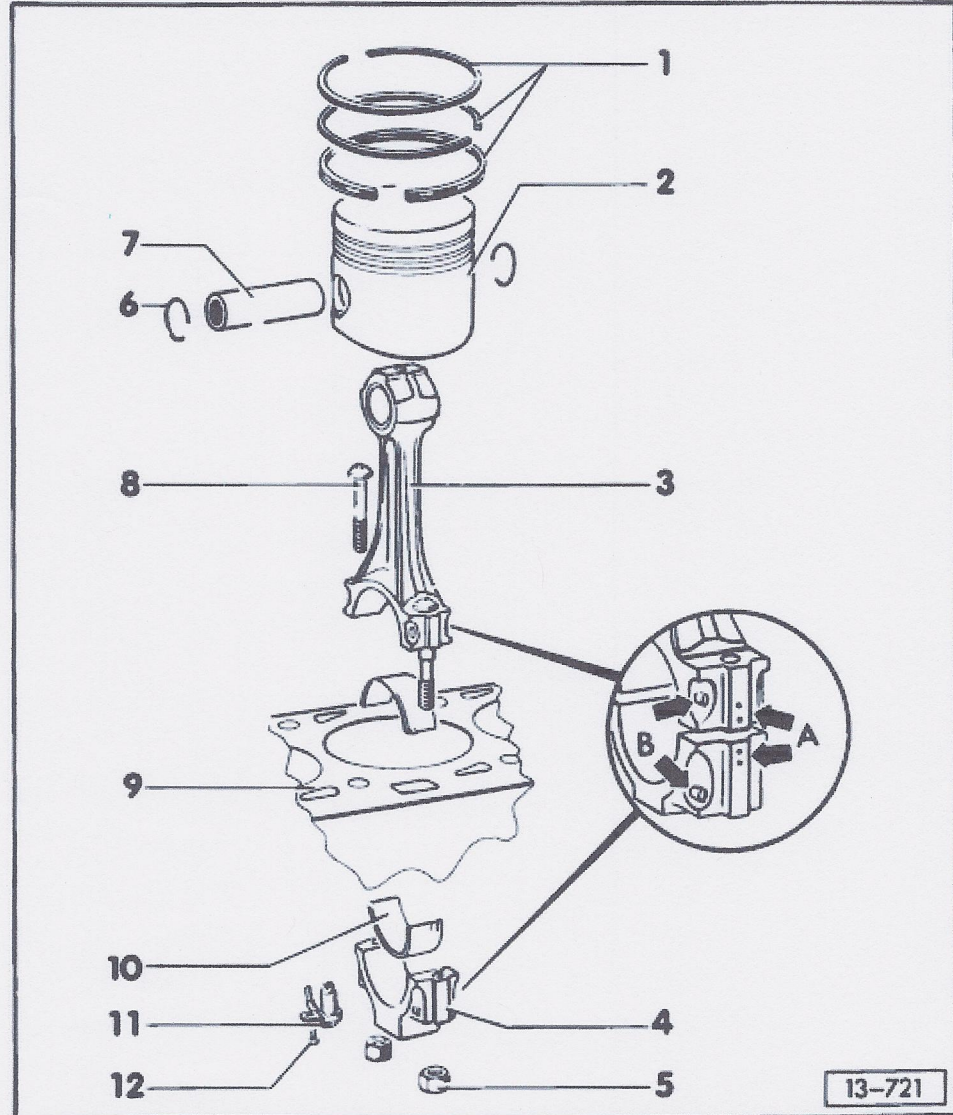
- ☐ Always replace as set
- ☐ Mark cylinder number -A- with punch
- ☐ Installation position: Markings -B- point toward pulley end

4 - Connecting rod bearing cap

- ☐ Mark cylinder number -A- with punch
- ☐ Installation position: Markings -B- point toward pulley end

5 - 30 Nm (22 ft lb) + 1/4-turn (90°)

- ☐ Only replace when engine is completely dismantled
- ☐ Oil contact surfaces
- ☐ To measure radial clearance tighten to 30 Nm (22 ft lb), but no further



6 - Circlip

- ❑ Pry out → [Anchor](#)

7 - Piston pin

- ❑ Remove and install with drift -10-508-
- ❑ If difficult to remove, heat piston to approx. 60°C (140°F)

8 - Connecting rod bolt

- ❑ Only replace when engine is completely dismantled

9 - Cylinder block

- ❑ Checking cylinder bores → [Anchor](#)
- ❑ Piston and cylinder dimensions → [Anchor](#)

10 - Bearing shell

- ❑ Note installation position
- ❑ Do not interchange used bearing
- ❑ Observe marking (original dimensions/oversize)
- ❑ Retaining lugs must engage in recesses in bearing caps and connecting rod
- ❑ Measuring axial clearance → [Anchor](#)
- ❑ Checking radial clearance with Plastigage → [Chapter „Connecting Rod Radial Clearance, Checking“](#)

11 - Oil spray jet

- ❑ For cooling piston

12 - 10 Nm (7 ft lb)

- ❑ Install with locking compound D6

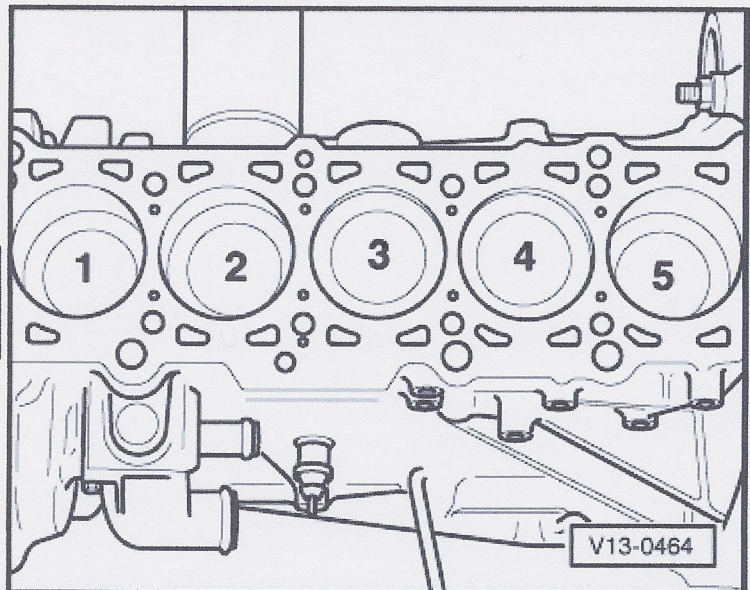
Marking piston installation position

- ◆ Arrow on piston crown points toward pulley end.
- Mark cylinder numbers 1 through 5.
- Clearly mark sequence on piston crown with waterproof felt pen.



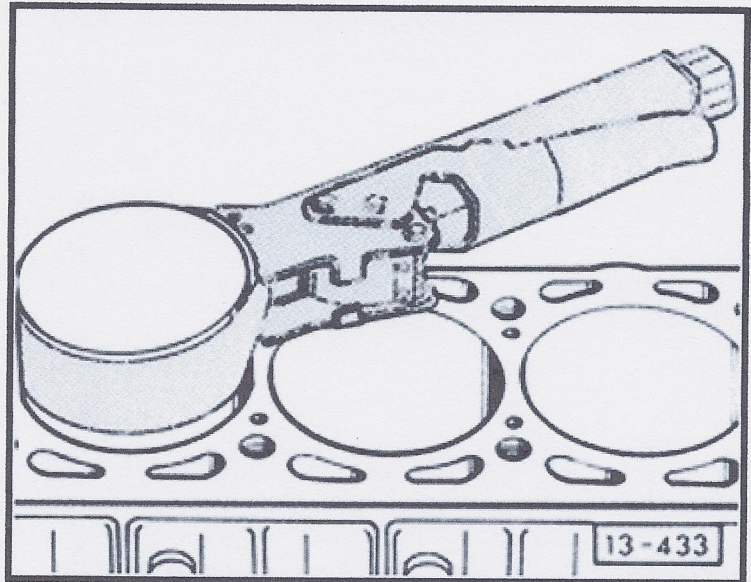
Caution

Do not use punch, as piston crown is coated.

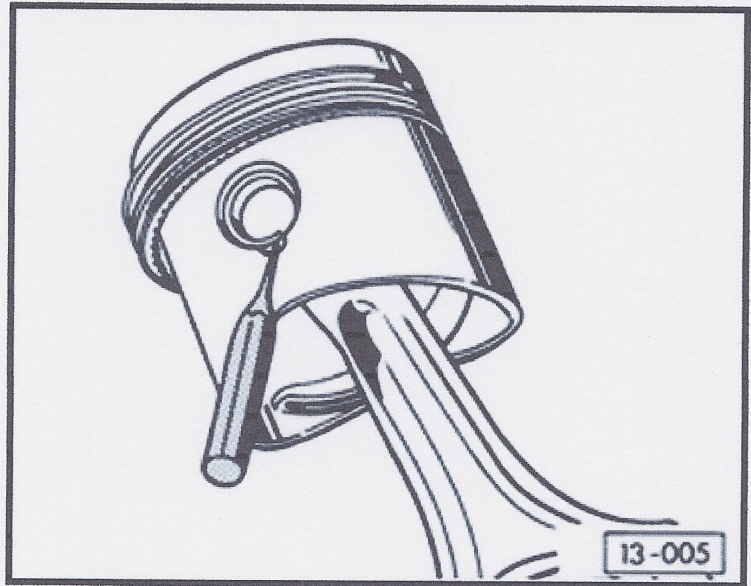


Removing and installing piston

- Install with piston ring compressor.

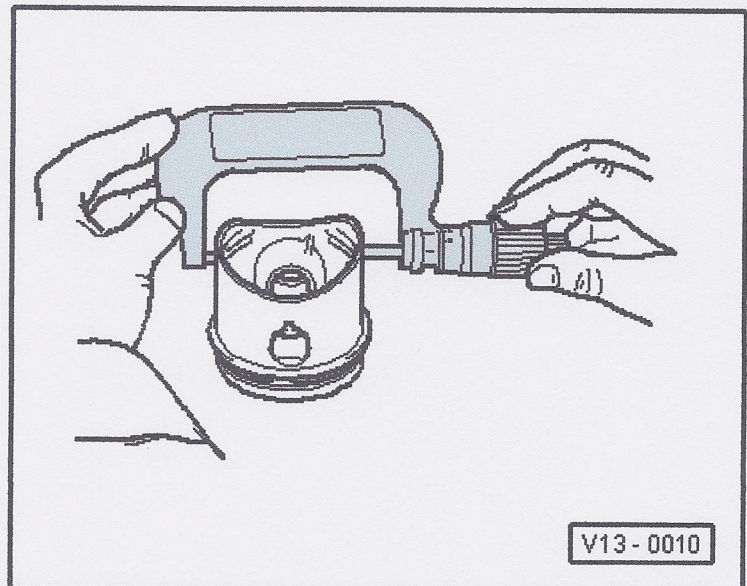


Prying out circlip



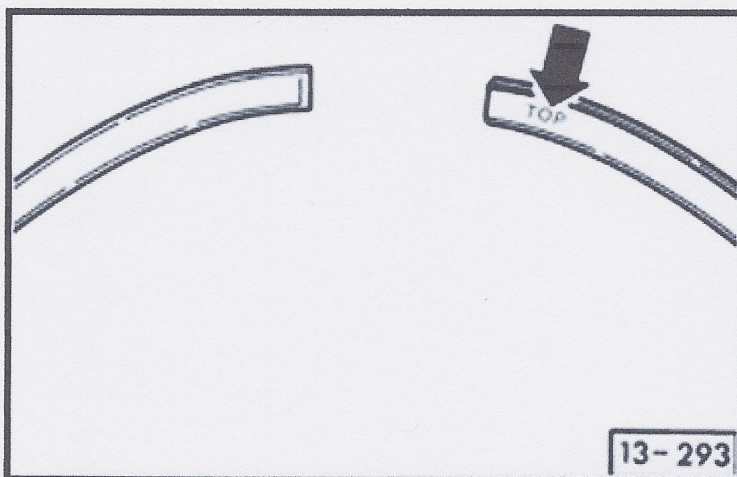
Checking piston

- Measure approx. 10 mm (0.39 in.) from bottom of skirt and 90° offset to piston pin axis.
- ♦ Maximum deviation from specified dimension: max. 0.04 mm (0.0016 in.)



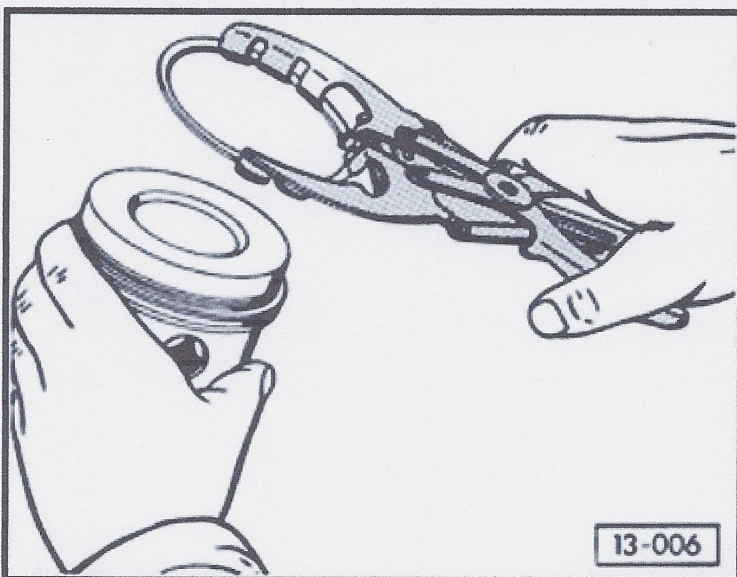
Installation position of piston rings

- "TOP" must face toward piston crown.
- Chamfer on plane ring must face toward piston crown.
- Step on stepped ring must face toward piston pin.



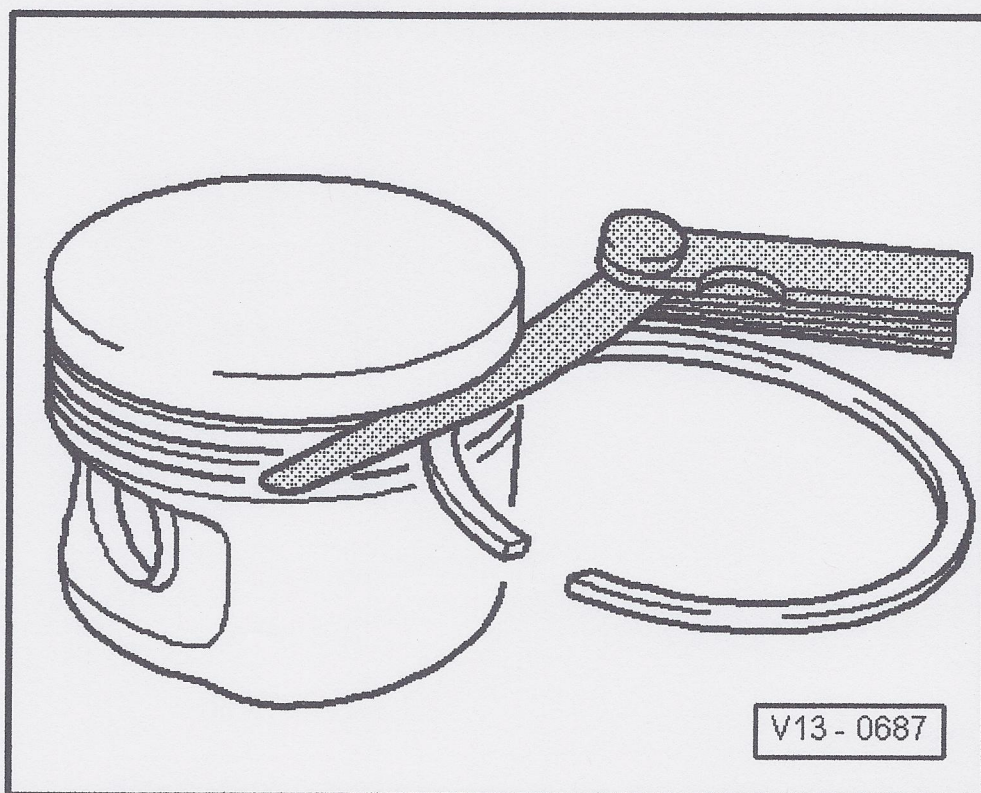
Removing and installing piston rings

- Remove and install with piston ring pliers.



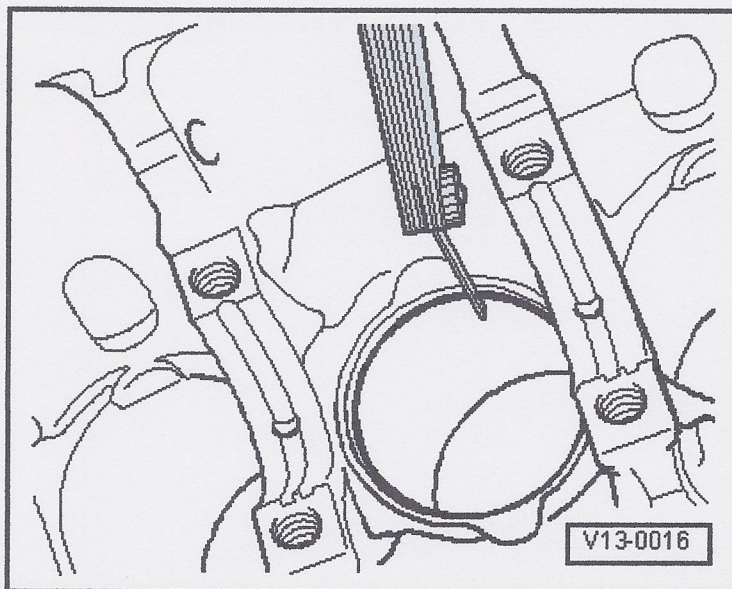
Checking piston ring side clearance in groove

- Clean ring groove before checking.
- ♦ New: 0.040-0.072 mm (0.0016-0.0028 in.)
- ♦ Wear limit: 0.1 mm (0.004 in.)



Checking piston ring gap

- Push ring squarely into lower end of cylinder until it is approx. 15 mm (0.59 in.) from cylinder edge.
- ♦ New: 0.15-0.35 mm (0.0059-0.0138 in.)
- ♦ Wear limit: 1.0 mm (0.039 in.)



Checking cylinder bores

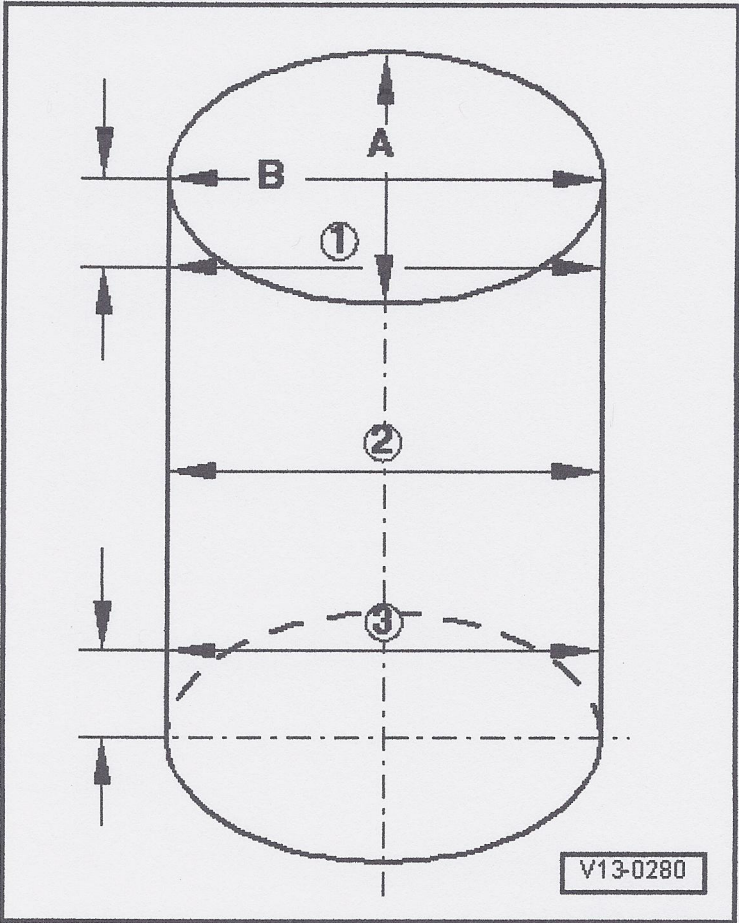
- Measure bores at 3 locations diagonally across engine -A- and longitudinally -B-.
- ♦ Use internal dial gauge, 50-100 mm
- ♦ Deviation from nominal dimension: max. 0.08 mm (0.0031 in.)

Piston and cylinder dimensions → [Anchor](#)



Note

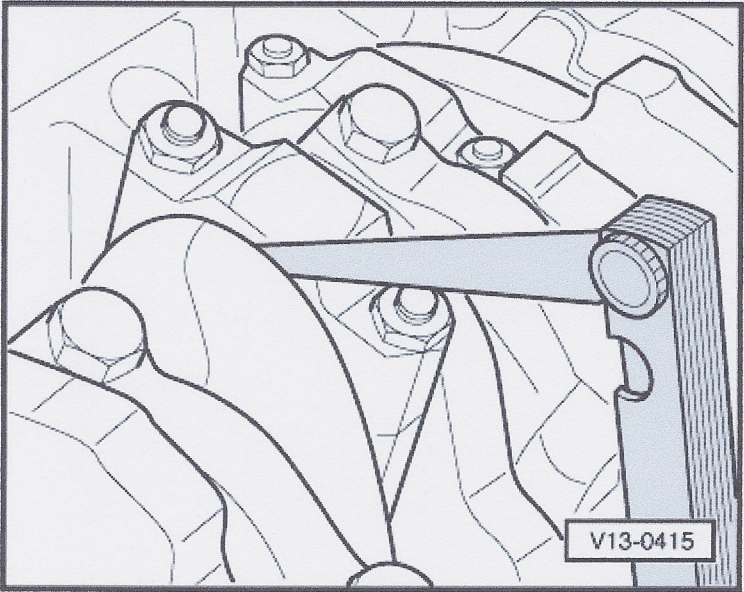
Cylinder bores must not be measured when cylinder block is mounted on repair stand with adapter -VW540- → Chapter „Engine, Securing to Assembly Stand“, as incorrect measurements are then possible.



Measuring connecting rod axial clearance

♦ Wear limit: 0.4 mm (0.016 in.)

Piston and Cylinder Dimensions



Honing dimension	Piston diameter	Cylinder bore diameter
Basic dimension	80.98 mm (3.1882 in.)	81.01 mm (3.1894 in.)
1st oversize	81.23 mm (3.1980 in.)	81.26 mm (3.1992 in.)
2nd oversize	81.48 mm	81.51 mm

	(3.2079 in.)	(3.2090 in.)
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Cylinder Block, Crankshaft and Flywheel

Note

- ♦ If metal shavings and abrasion in large quantities-caused by scoring damage such as piston, crankshaft or connecting rod bearing damage-are discovered in engine oil during engine repairs, crankcase and oil passages must be carefully cleaned in order to avoid further damage. Oil cooler must be checked for shavings and replaced if necessary → Chapter „Oil Filter, Oil Cooler and Turbocharger Oil Lines Overview“.
- ♦ Servicing clutch

→ Manual Transmission; Rep. Gr.30; Description and Operation.

- ♦ Always replace seals.

1 - Intake pipe gasket

- Always replace

2 - Securing plate

- Always replace

3 - 10 Nm (7 ft lb)

4 - Oil pick-up pipe

- Attach to oil pump first

5 - 10 Nm (7 ft lb)

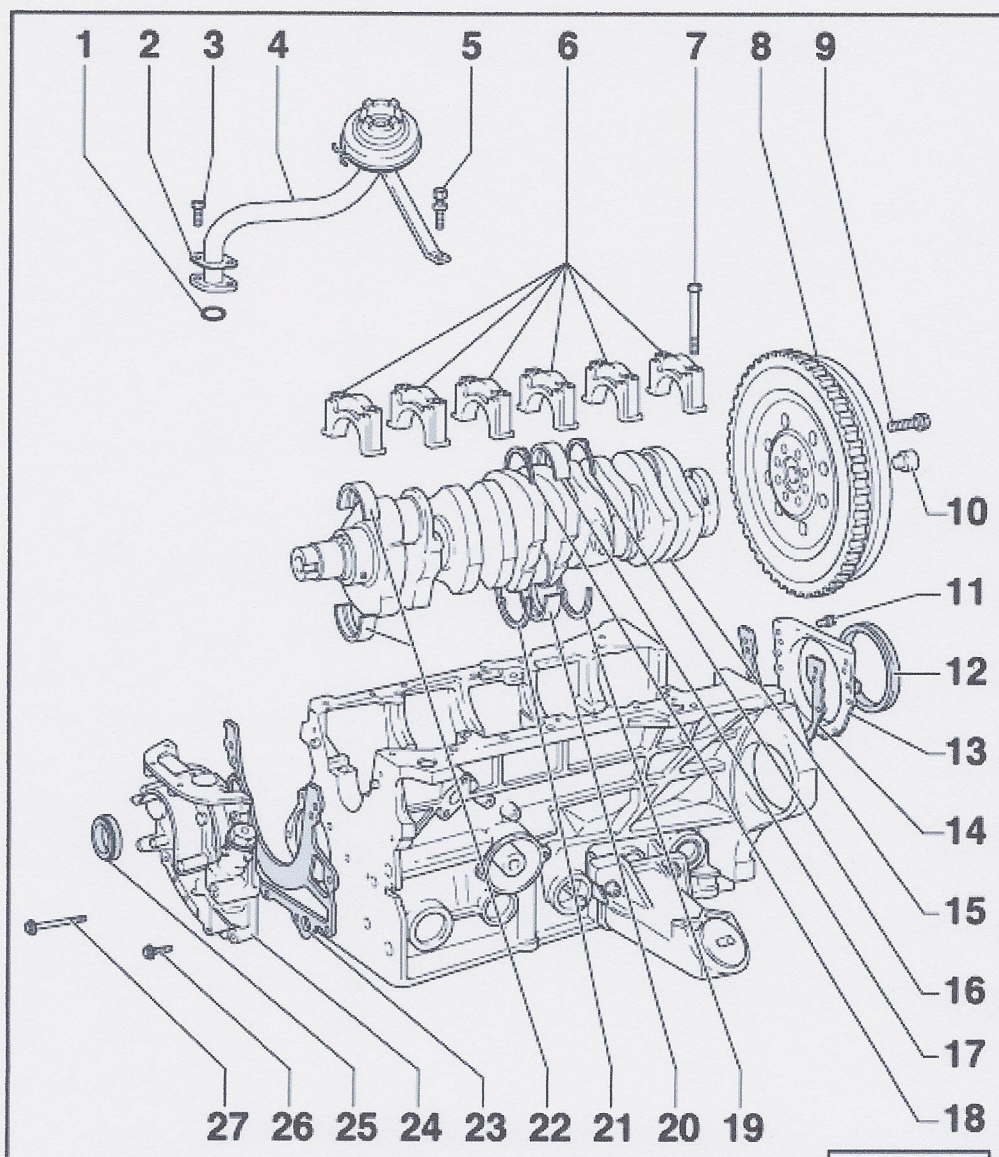
6 - Bearing cap

- Bearing cap 1: Belt pulley end
- Retaining lugs on bearing shells must align
- Watch bore offset

7 - 65 Nm (48 ft lb)

8 - Two-part flywheel

- Reduces rotational vibration in power train
- Removing and installing → Anchor
- With welded-on lugs for ignition firing point and firing angle
- Measure distance from lug to



Crankshaft Position
(CKP) sensor -G4-
and distance from
flywheel to Engine
Speed (RPM) sensor
-G28- → [Chapter](#)
„Crankshaft Position
Sensor and Engine
Speed Sensor,
Measuring“

- Tightening torque: 40 Nm (30 ft lb) + 1/2-turn (180°)

9 - 30 Nm (22 ft lb) + 1/4-turn (90°)

- Always replace

10 - Needle bearing

- Lubricate with MOS2 grease
- Driving out → [Anchor](#)
- Driving in → [Anchor](#)

11 - 10 Nm (7 ft lb)

12 - Oil Seal

- Pressing out → [Anchor](#)
- Pressing in → [Anchor](#)

13 - Sealing flange

14 - Gasket

- Always replace

15 - Crankshaft

- Measuring axial clearance → [Anchor](#)
- Check radial clearance with Plastigage → [Chapter „Crankshaft Radial Clearance, Checking“](#)
- Crankshaft dimensions → [Anchor](#)

16 - Thrust washer

- For cap
- Watch how secured

17 - Bearing shell 4

- With thrust washers
- For cap without oil groove

18 - Thrust washer

- For cap
- Watch how secured

19 - Thrust washer

- For cylinder block
- Without retaining lug

20 - Bearing shell 4

- With thrust washer
- For cylinder block with oil groove

21 - Thrust washer

- ❑ For cylinder block
- ❑ Without retaining lug

22 - Bearing shells 1, 2, 3, 5 and 6

- ❑ For cap without oil groove
- ❑ For cylinder block with oil groove
- ❑ Do not interchange worn bearing shells
- ❑ Retaining lug must engage in recess of cylinder block/bearing cap

23 - Oil pump gasket

24 - Oil pump

- ❑ Watch crankshaft drive when installing pump

25 - Oil seal

- ❑ Pulling out → [Anchor](#)
- ❑ Pressing in → [Anchor](#)

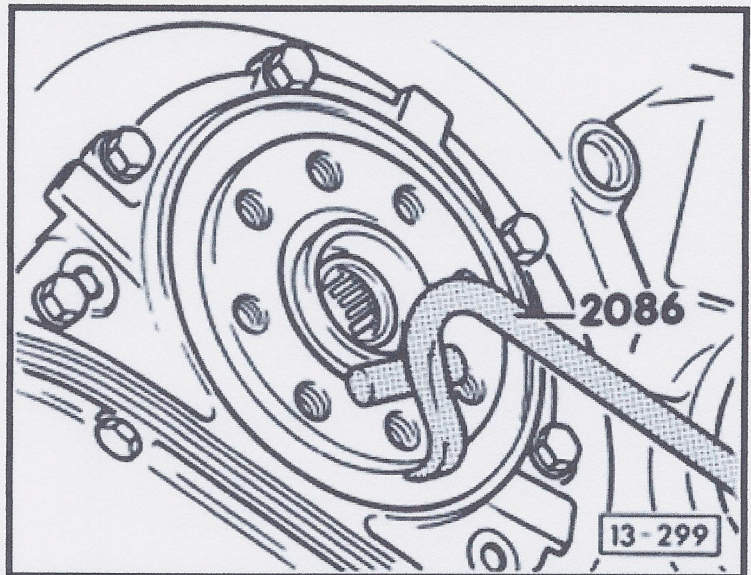
26 - 10 Nm (7 ft lb)

27 - 20 Nm (15 ft lb)

Pressing out oil seal for crankshaft (flywheel end)

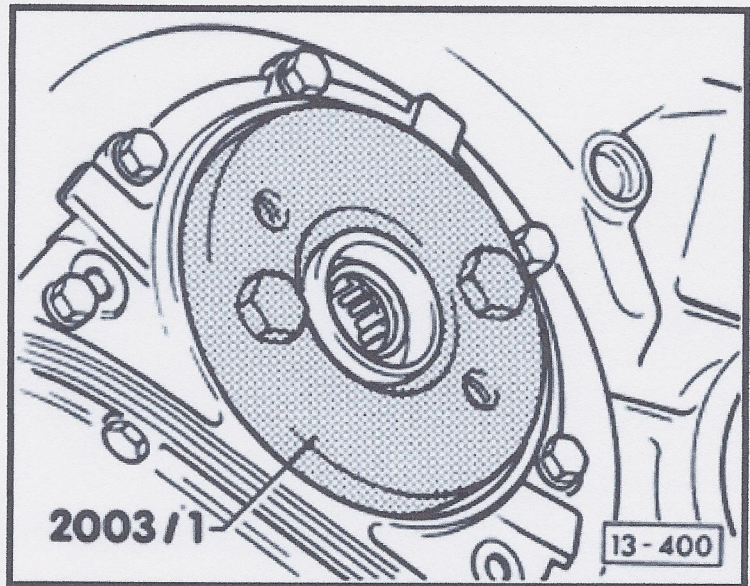
Removing and installing flywheel → [Anchor](#).

- Press out oil seal with puller hook -2086-.



Pressing in oil seal for crankshaft (flywheel end)

- Lightly oil sealing lip and outer edge of oil seal before installing.
- Press in oil seal with installing tool XXX/1 as far as possible.

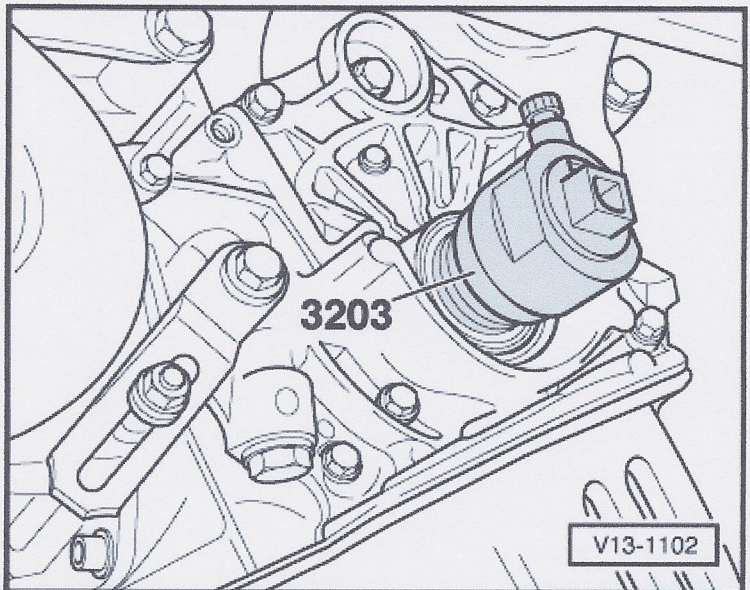


Pulling out crankshaft oil seal (pulley end)

Removing toothed belt → [Chapter „Toothed Belt“](#).

Removing vibration damper → [Anchor](#).

- Pull out oil seal with oil seal puller -3203-.

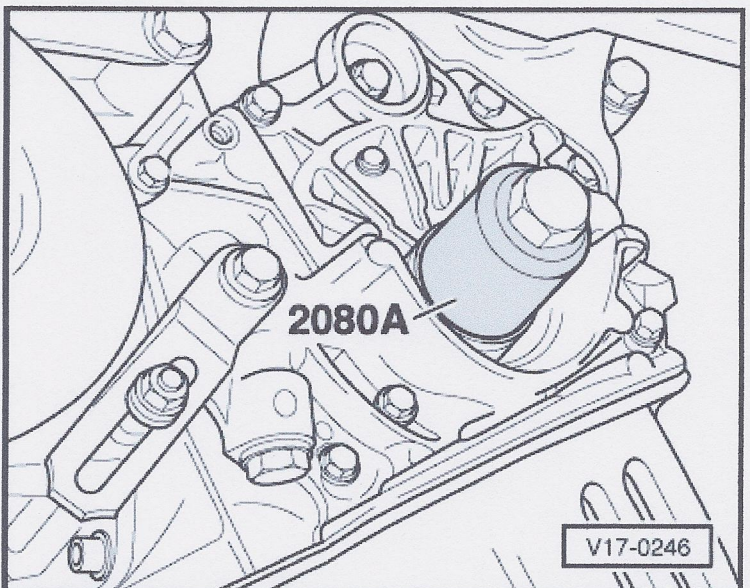


Pressing in crankshaft oil seal (pulley end)

- Lightly oil sealing lip and outer edge of oil seal before installing
- Install oil seal over installing sleeve from -2080A-.
- Press in oil seal flush with oil pump housing using installing sleeve -2080A- (use securing bolt of vibration damper).

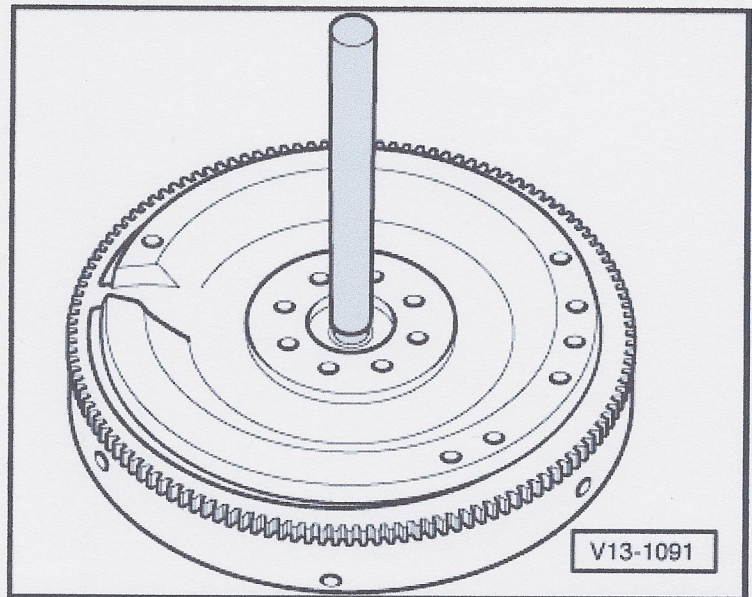
Note

If crankshaft shows signs of scoring, press oil seal in to stop.



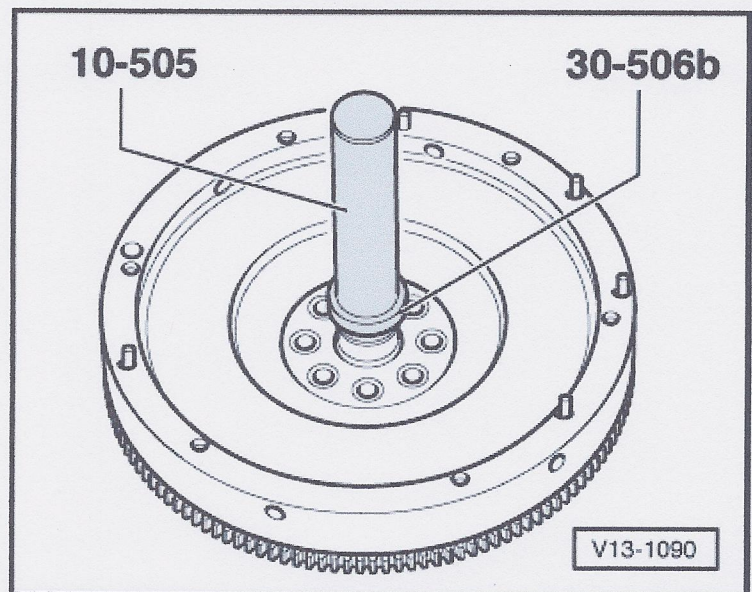
Driving out needle bearing

- Flywheel removed
- Drive out bearing with 20 mm dia. drift from backside of flywheel.



Driving in needle bearing

- Closed side of bearing points towards crankshaft.
- Oil outside of bearing housing.
- Drive in flush with flywheel (clutch side) with drift - VW295- and pressing tool -30-506b-.



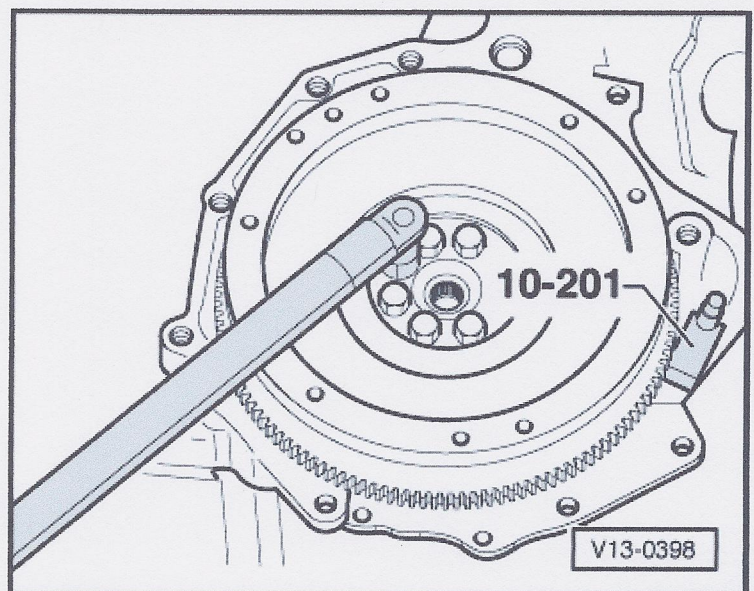
Flywheel, removing and installing

Removing

- Mark position of flywheel before removing.
- Switch around brace -10-201- when installing.

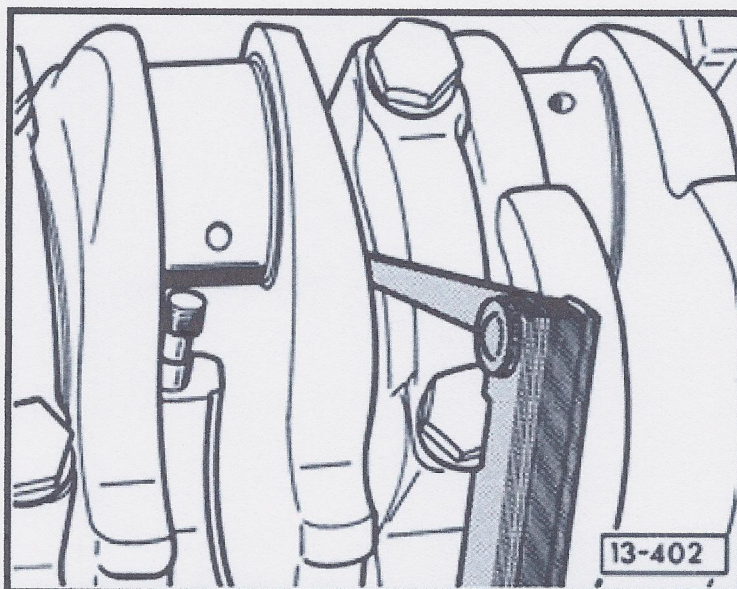
Installing

- ♦ Flywheel can only be fitted in one position - holes for securing bolts are offset
- ♦ Always replace bolts
- ♦ Use only bolts M10 x 1 x 43
- Position flywheel.
- ♦ Tightening torque: 40 Nm (30 ft lb) + 1/2-turn (180°)



Measuring crankshaft axial clearance

- Measure axial clearance at No. 4 bearing (thrust bearing).
- ♦ New: 0.07-0.23 mm (0.003-0.009 in.)
- ♦ Wear limit: 0.30 mm (0.012 in.)



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Valvetrain Overview



Note

Cylinder heads with cracks between valve seats or between valve seat inserts and spark plug threads may still be used without reducing service life, provided the cracks do not exceed max. 0.5 mm (0.020 in.) in width, or when no more than the first spark plug threads are cracked.

1 - Bearing cap

- ☐ Observe installation position and numbering → [Anchor](#)
- ☐ Installation sequence → [Chapter „Camshafts“](#)

2 - 15 Nm (11 ft lb)

3 - Oil seal

- ☐ Always replace → [Chapter „Camshaft Oil Seals“](#)

4 - Drive chain

5 - Outer valve spring

- ☐ Removing and installing -14-

6 - Inner valve spring

- ☐ Removing and installing -14-

7 - Lower valve-spring seat

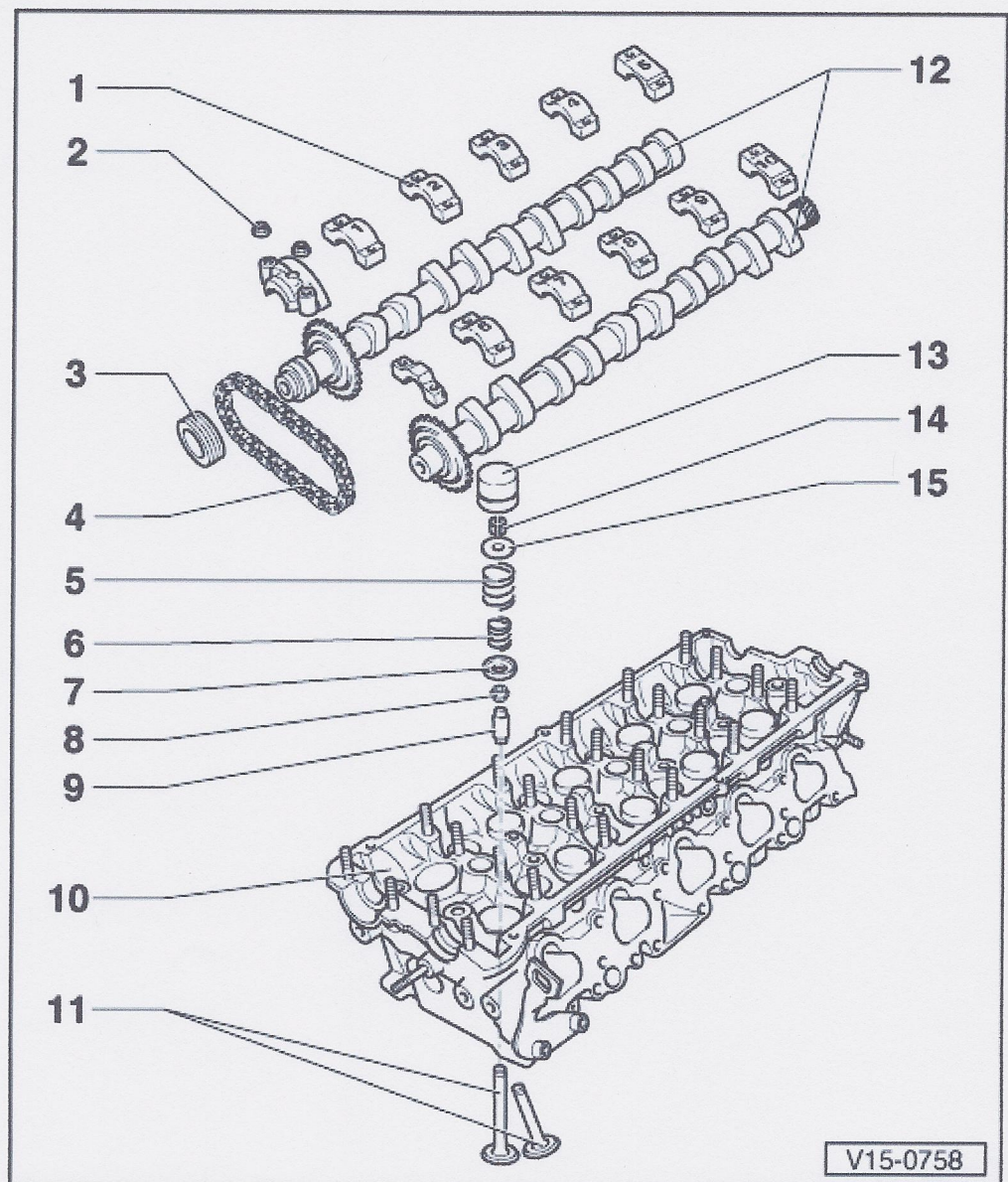
- ☐ Removing and installing -14-
- ☐ Can be removed after removing valve stem seal

8 - Valve stem seal

- ☐ Replacing with cylinder head installed → [Chapter „Valve Stem Oil Seals, Replacing“](#)

- ☐ Replacing with cylinder head removed → [Anchor](#)

9 - Valve guide



V15-0758

- ❑ Checking → [Anchor](#)
- ❑ Replacing → [Chapter „Valve Guides, Replacing“](#)

10 - Cylinder head

- ❑ Installing → [Chapter „Cylinder Head“](#)
- ❑ Checking for distortion, resurfacing dimension → [Anchor](#)
- ❑ Reconditioning valve seats → [Chapter „Valve Seats, Refacing“](#)

11 - Valves

- ❑ DO NOT reface by cutting or grinding
- ❑ Only lapping in is permitted
- ❑ Dimensions → [Anchor](#)
- ❑ Exhaust valves sodium-filled, follow instructions on scrapping → [Anchor](#)

12 - Camshafts

- ❑ Removing and Installing → [Chapter „Camshafts“](#)
- ❑ After installing camshafts, do not start engine for approx. 30 minutes (valves strike pistons), then turn crankshaft 2 rotations
- ❑ Checking axial clearance (valve lifters removed) → [Anchor](#)
- ❑ Check radial clearance with Plastigage (lifters removed)

13 - Hydraulic valve lifter

- ❑ After installing bucket tappets, do not start engine for approx. 30 minutes (valves strike pistons), then turn crankshaft 2 rotations
- ❑ Oil bearing surfaces
- ❑ Do not interchange (mark)
- ❑ When removing, set aside tappet with contact surface facing downward
- ❑ Checking → [Chapter „Hydraulic Valve Lifters, Checking“](#)

14 - Valve keepers

- ❑ Removing and installing with cylinder head installed, with valve fitting tool -2036- and valve lever -VW541/1-. Valve stem oil seals, replacing, → [Chapter „Valve Stem Oil Seals, Replacing“](#)
- ❑ Removing and installing with cylinder head removed. Valve stem oil seals, replacing, → [Anchor](#)

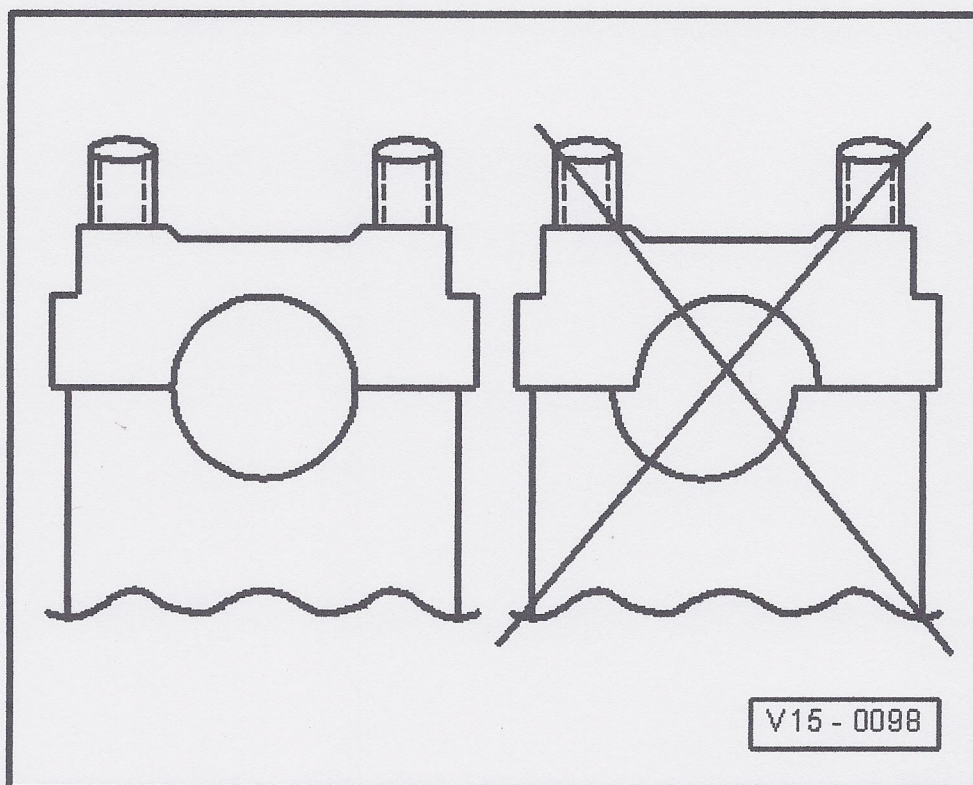
15 - Upper valve-spring seat

- ❑ Removing and installing -14-

Installation position of camshaft bearing cap

- Recesses at corners of bearing caps must point toward intake side of cylinder head (arrow).
- Install bearing caps according to numbering - 1- through -10- on caps as shown in diagram.
- Watch offset. Before installing camshaft, temporarily install bearing caps and determine

installation position.

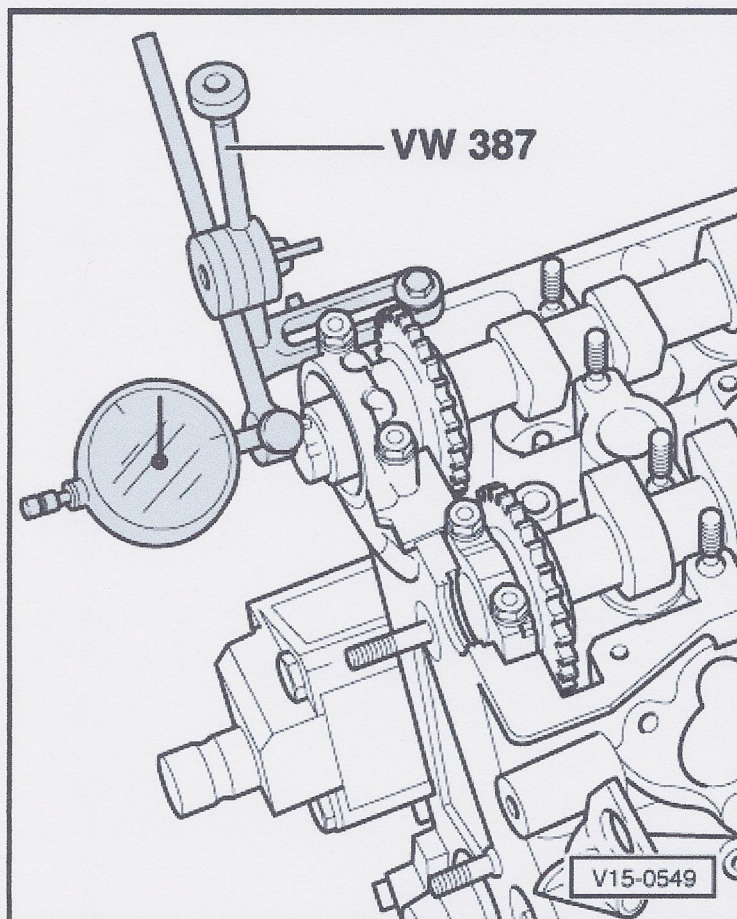


Checking camshaft axial play

- Valve lifters removed
- Camshaft installed with first and last bearing caps only
- Timing chain removed
- Screw universal measuring gauge bracket -VW387- onto face of cylinder head and mount gauge.

Axial play:

- ♦ Wear limit: 0.2 mm (0.008 in.)

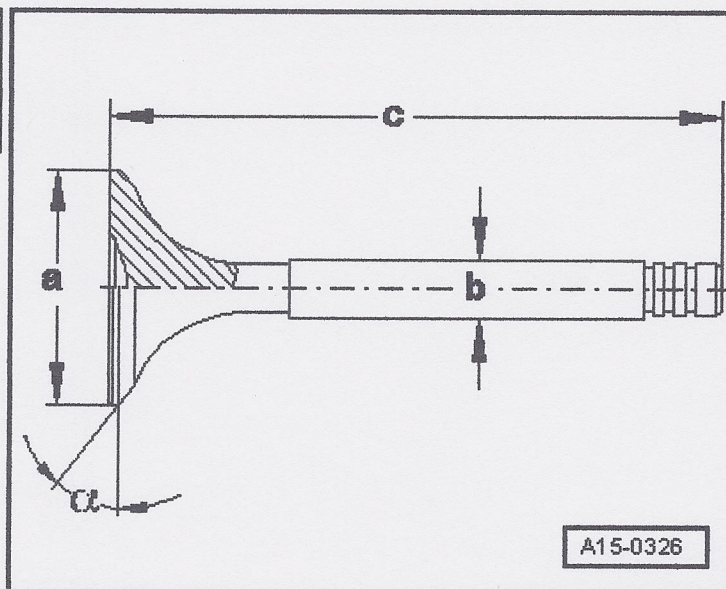


Valve dimensions



Caution

Valves must not be refaced by cutting or grinding. Only lapping is permitted.



A15-0326

Dimension		Intake valve	Exhaust valve
diameter -a-	mm (in.)	32.00 (1.2598)	28.00 (1.1024)
diameter -b-	mm (in.)	6.97 (0.2744)	6.94 (0.2732)
length -c-	mm (in.)	95.50 (3.7598)	98.20 (3.8661)
seat angle -α-		45°	45°



WARNING

WARNING!

Worn sodium-filled exhaust valves cannot simply be scrapped. Using a hack saw, valves should be cut in two across the middle of the stem. During this operation, valves must not come into contact with water. Throw maximum of ten valves prepared in this way into bucket of water and step back quickly to avoid any danger from ensuing chemical reaction, during which sodium will burn. Parts treated in this way can then be disposed of with other scrap.

Checking valve guide

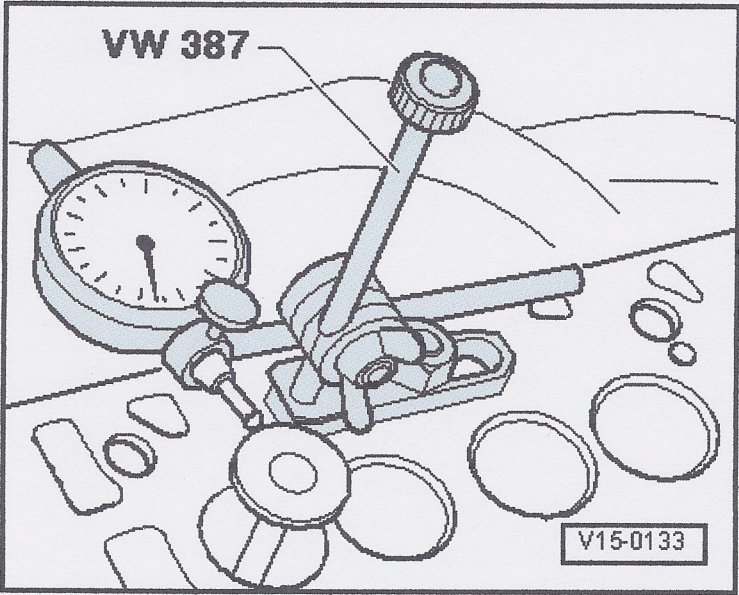
- Screw universal measuring gauge bracket -VW387- onto sealing surface of cylinder head and insert gauge.
- Insert new valve into guide. Valve stem end must seal with guide.



Note

Due to differing stem diameters, only insert inlet valve into inlet guide and exhaust valve into exhaust guide.

Valve rock (wear limit):



- | | | |
|------------------------|--------|-------------|
| ◆ Intake valve guide: | 1.0 mm | (0.039 in.) |
| ◆ Exhaust valve guide: | 1.3 mm | (0.051 in.) |

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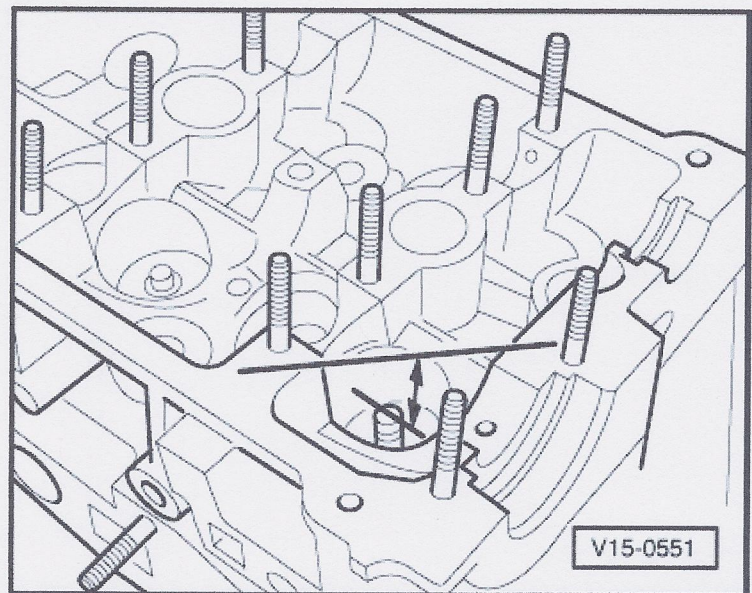
Valve Seats, Refacing**Note**

- ♦ When servicing an engine with leaky valves, it is not sufficient to recondition or replace valve seats and valves. It is also necessary to check valve guide wear (→ [Anchor](#)). This is particularly important when checking an engine with high mileage.
- ♦ Only reface valve seats enough to produce perfect contact surface. Before refacing begins, calculate maximum permissible refacing dimension.
- ♦ If this dimension is exceeded, correct function of the hydraulic valve lifter can no longer be guaranteed and the cylinder head must be replaced.

Maximum Permissible Refacing Dimension, Calculating

The maximum permissible refacing dimension is the difference between the actual distance measured at the cylinder head (arrow) and the specified minimum dimension.

Minimum dimension:



At intake valve: 36.0 mm (1.417 in.)

At exhaust valve: 36.3 mm (1.429 in.)

Distance at Cylinder Head, Measuring

- Insert valve into valve guide and press firmly against valve seat.
- Measure distance between valve stem end and upper edge of cylinder head.

Example:

Measured distance	37.0 mm
- Minimum dimension (specified)	36.3 mm
= Max. permissible reworking dimension	0.7 mm

Refacing intake valve seat

a - Seat diameter - 31.2 mm (1.228 in.)

b - Not given

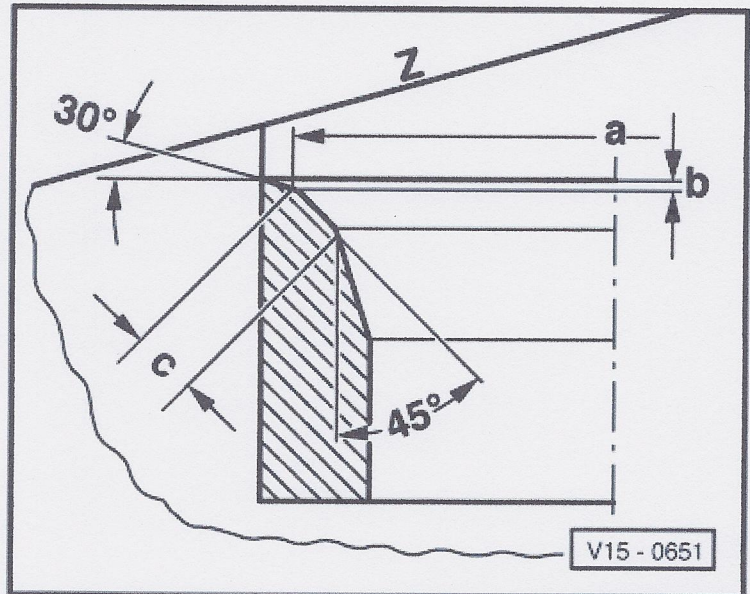
c - Seat width - 1.5-1.8 mm (0.059-0.071 in.)

If necessary, rework valve seat with 75° resealing tool.

Z - Lower edge of cylinder head

30 - ° - Upper correction angle

45 - ° - Valve seat angle



Refacing exhaust valve seat

a - Seat diameter - 27.6 mm (1.087 in.)

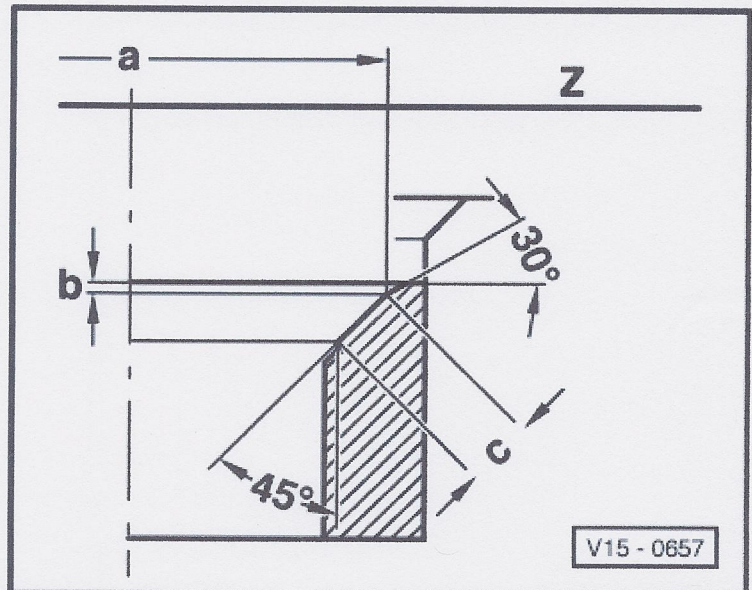
b - Not given

c - Seat width - approx. 1.8 mm (0.071 in.)

Z - Lower edge of cylinder head

30 - ° - Upper correction angle

45 - ° - Valve seat angle



Repair Manual

VIN: **WAUHP84A3PN025789**

Sales Code: **4A2555**

Engine Code: **AAN**

License Plate Number:

Customer Number:

User Name: **bhderekd**

Job Number: 67474974

Model Year Code: **P**

Model Description: **AUDI S4 quattL4162GKAT5G**

Transmission Code: **CBD**

Final Drive Code: **AAT**

Customer Name Abbreviated:

Service Advisor Name:

Camshafts

Removing

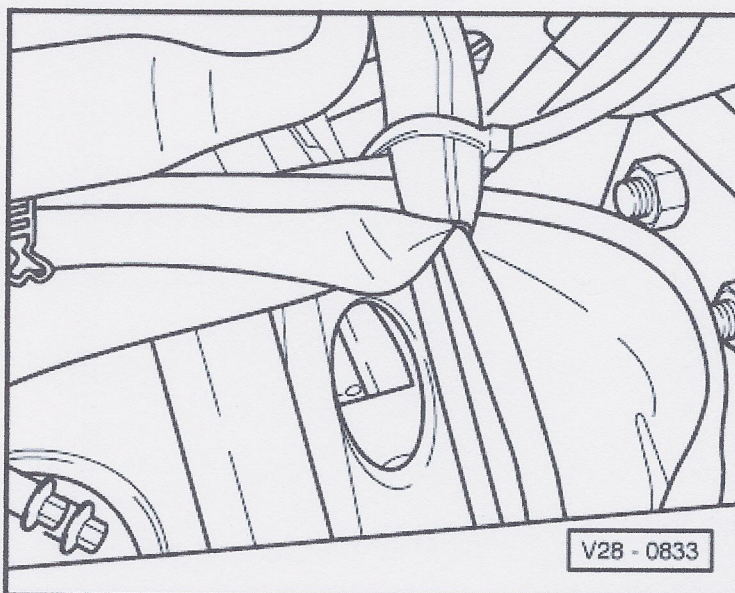
- Remove upper toothed-belt guard.



Note

Instead of "0", notch can also be made on flywheel as TDC marking.

- Rotate crankshaft until No. 1 cylinder is at TDC. TDC marking must be located under edge in inspection hole ...

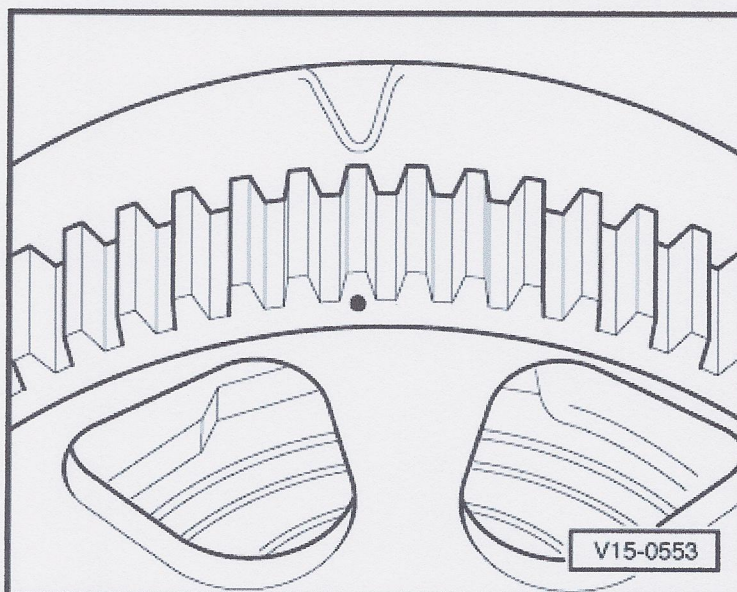


- ... and markings on camshaft and cylinder head cover must align.
- If markings on camshaft are 1/2-turn offset, turn crankshaft one additional rotation.



Note

Hex flange (32 mm) is provided on hydraulic pump for turning engine by hand.



- Loosen tensioner bolts -1-, -2- and -3-.

- Remove camshaft sprocket.
- Remove cylinder head cover.

Exhaust Camshaft

- Remove bearing cap in front of chain, as well as caps -2- and -4-.
- Remove bearing cap -1-, -3- and -5- alternately in diagonal sequence.

Intake Camshaft

- Remove bearing cap in front of chain, as well as -7- and -9-.
- Remove bearing caps -6-, -8- and -10- alternately in diagonal sequence.

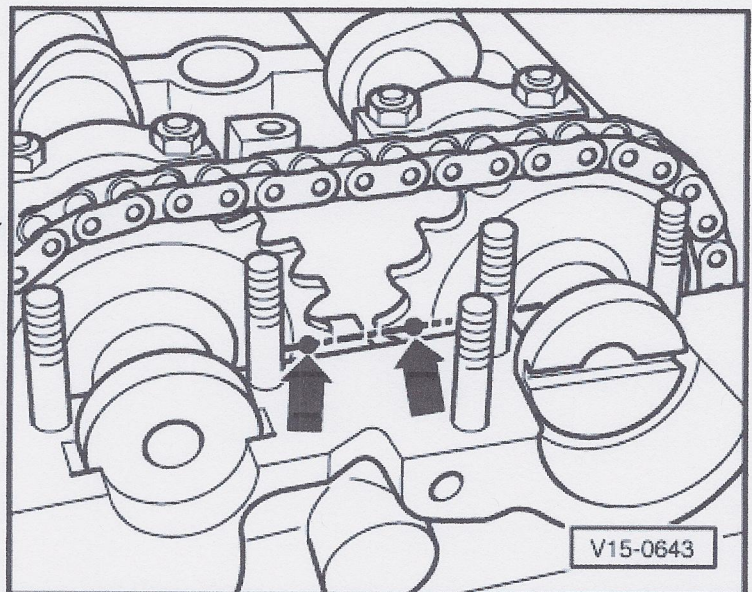
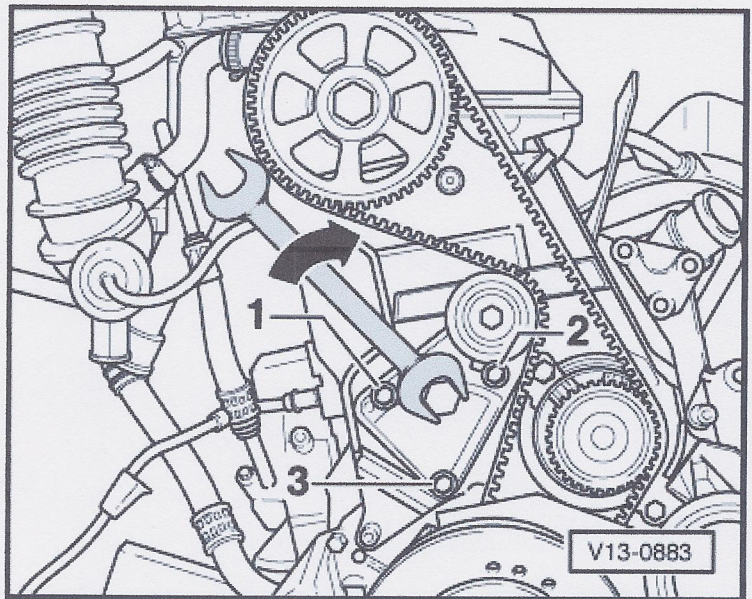
Installing

- Oil all running surfaces.
- Install camshafts with chain so that markings on chain sprockets align (arrows).

Note

- ♦ When installing the camshafts, the Camshaft Position (CMP) sensor housing must be removed.
- ♦ For installing CMP sensor housing and CMP sensor basic setting

→ Fuel Injection and Ignition; Rep. Gr.28; Removal and Installation



- ♦ When installing bearing caps, recesses on corners of caps must point toward intake side of cylinder head (arrow).

Intake Camshaft

- Tighten bearing caps -6-, -8- and -10- alternately in diagonal sequence.
- ♦ Tightening torque: 15 Nm (11 ft lb)
- Install remaining bearing caps.
- ♦ Tightening torque: 15 Nm (11 ft lb)

Exhaust Camshaft

- Tighten bearing caps -1-, -3- and -5- alternately in diagonal sequence.
- ♦ Tightening torque: 15 Nm (11 ft lb)

- Install remaining bearing caps.
- ◆ Tightening torque: 15 Nm (11 ft lb)
- Replace camshaft oil seals → [Chapter „Camshaft Oil Seals“](#).
- Install camshaft sprocket and tighten.
- ◆ Tightening torque: 65 Nm (48 ft lb)
- Install toothed belt → [Anchor](#).



Caution

After installing new or reinstalling old lifters, and after installing camshafts, the engine must not be started for approx. 30 minutes. Otherwise the valves strike the pistons. After this period, carefully turn crankshaft two rotations by hand in order to ensure that no valves strike pistons.

Repair Manual

VIN: **WAUHP84A3PN025789**

Sales Code: **4A2555**

Engine Code: **AAN**

License Plate Number:

Customer Number:

User Name: **bhderekd**

Model Year Code: **P**

Model Description: **AUDI S4 quattL4162GKAT5G**

Transmission Code: **CBD**

Final Drive Code: **AAT**

Customer Name Abbreviated:

Service Advisor Name:

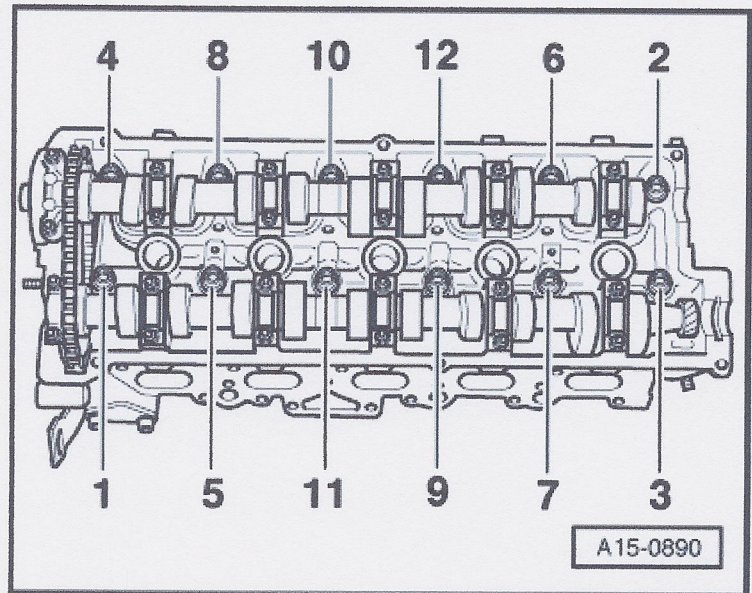
Job Number: **67474974**

Cylinder Head

Note

- ♦ Always replace cylinder head bolts.
- ♦ There must be no oil or coolant in the blind cylinder head bolt holes in the cylinder block.
- Before installing cylinder head, set crankshaft and camshaft in cylinder head to Top Dead Center (TDC) for cylinder 1.
- Fit cylinder head gasket over centering pins: "OBEN" or part number must face cylinder head (watch hole pattern).
- Install cylinder head and cylinder head bolts; tighten by hand.
- Tighten cylinder head bolts in total of three stages - for sequence, ⇒ diagram.

Tightening torques (engine cold):



- | | | |
|--------------|--|------------|
| ♦ Stage I: | 40 Nm | (30 ft lb) |
| ♦ Stage II: | 60 Nm | (44 ft lb) |
| ♦ Stage III: | 1/2 turn (180°) further with rigid spanner without stopping
(2 x 90° is also permissible) | |

Note

- ♦ Loosen cylinder head bolts in reverse order.
- ♦ Additional retightening of bolts is not required.

Repair Manual

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Engine Code: **AAN**

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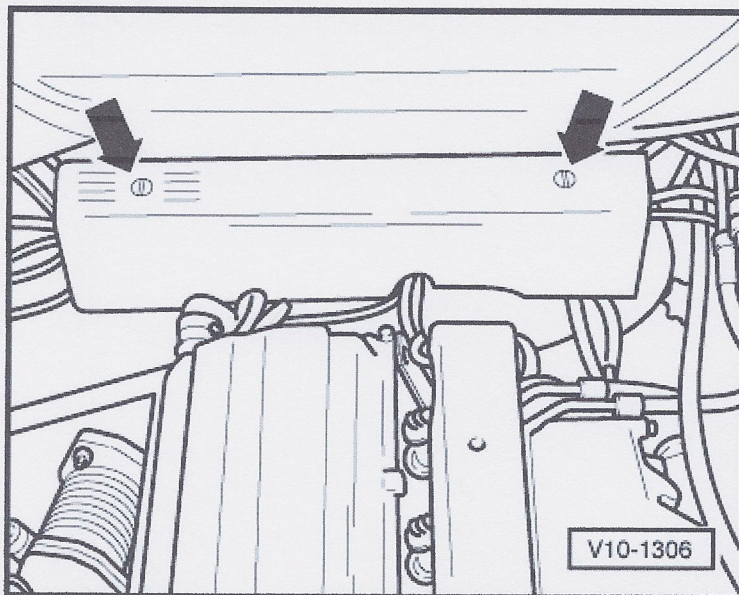
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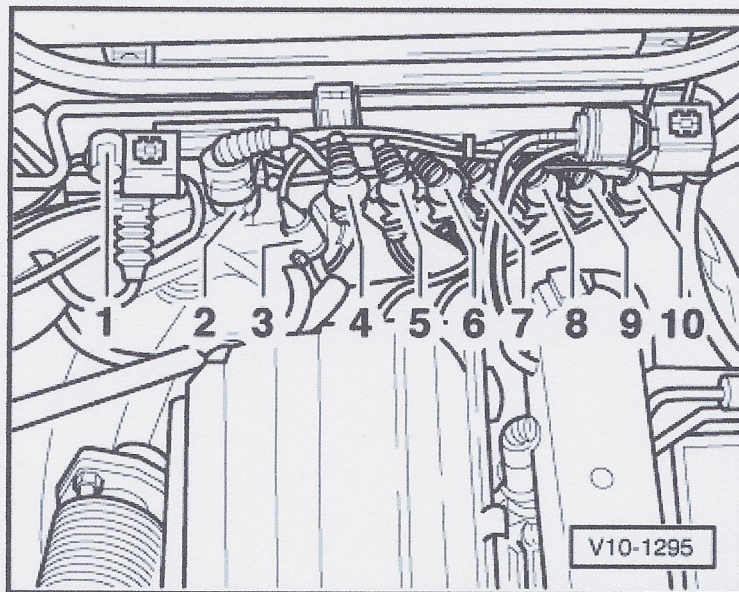
Compression Pressure, Checking

- Engine warm-coolant temperature gauge at approx. 80°C (176°F).

- Turn quick fasteners (arrows) on connector cover on rear engine compartment bulkhead 90° to left and remove cover.



- Mark and separate connectors -5- and -6- (to ignition coils).
- Remove cover with coils on cylinder head cover.
- Unscrew all spark plugs with spark plug wrench - 3122A-.
- Check compression pressure with compression pressure recorder -VAG1381- and adapter - VAG1381/1-.
- Throttle valve fully open
- Operate starter until no further pressure increase is indicated by tester.



Compression Pressures

Specified value:	9.0-13.0 bar (131-189 psi)
Wear limit:	7.0 bar (102 psi)
Maximum permissible pressure difference between individual cylinders:	3.0 bar (44 psi)

6 - Cylinder head bolts

- ☐ Always replace
- ☐ Follow installation instructions and sequence when loosening and tightening → [Chapter „Cylinder Head“](#)

7 - Heat shield

8 - 65 Nm (48 ft lb)

9 - 10 Nm (7 ft lb)

- ☐ Tighten diagonally

10 - Gasket

- ☐ Flanged surface must face exhaust manifold

11 - 25 Nm (18 ft lb)

- ☐ Always replace

12 - Exhaust manifold

- ☐ With turbocharger

13 - 10 Nm (7 ft lb)

14 - Spring with bracket

15 - 10 Nm (7 ft lb)

16 - Cover

- ☐ With ignition coils

17 - Gasket

- ☐ Only replace if damaged
- ☐ Insert in groove in cover

18 - Not applicable

19 - 10 Nm (7 ft lb)

20 - 10 Nm (7 ft lb)

21 - Bracket

- ☐ For vacuum hoses

22 - Cylinder head cover

23 - Gasket for cylinder head cover

- ☐ Only replace if damaged
- ☐ Insert in groove on cylinder head cover

24 - Plugs

- ☐ Only replace if damaged

25 - Intake manifold

- ☐ Use Allen socket -VAG1669- to remove and install

26 - Bolt

- For oil dipstick guide tube
- 10 Nm (7 ft lb)

27 - Gasket

- Always replace

28 - O-ring

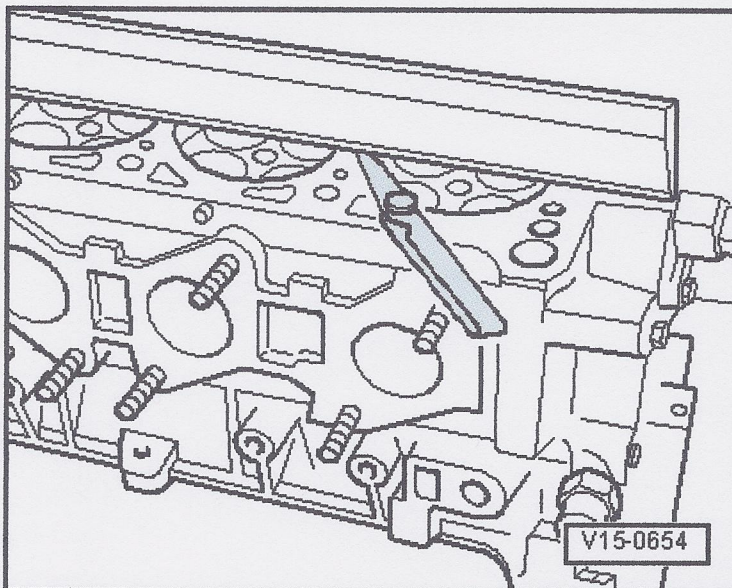
- Always replace

29 - Coolant pipe

30 - 10 Nm (7 ft lb)

Checking cylinder head for distortion

- Measure with feeler gauge at several locations.
- ♦ Distortion: max. 0.1 mm (0.004 in.)



Resurfacing cylinder head

Resurfacing of the cylinder head (grinding flat) is permissible up to minimum dimension -a- (measured through bolt hole).

- ♦ Dimension -a- (minimum) = 118.1 mm (4.650 in.)

