

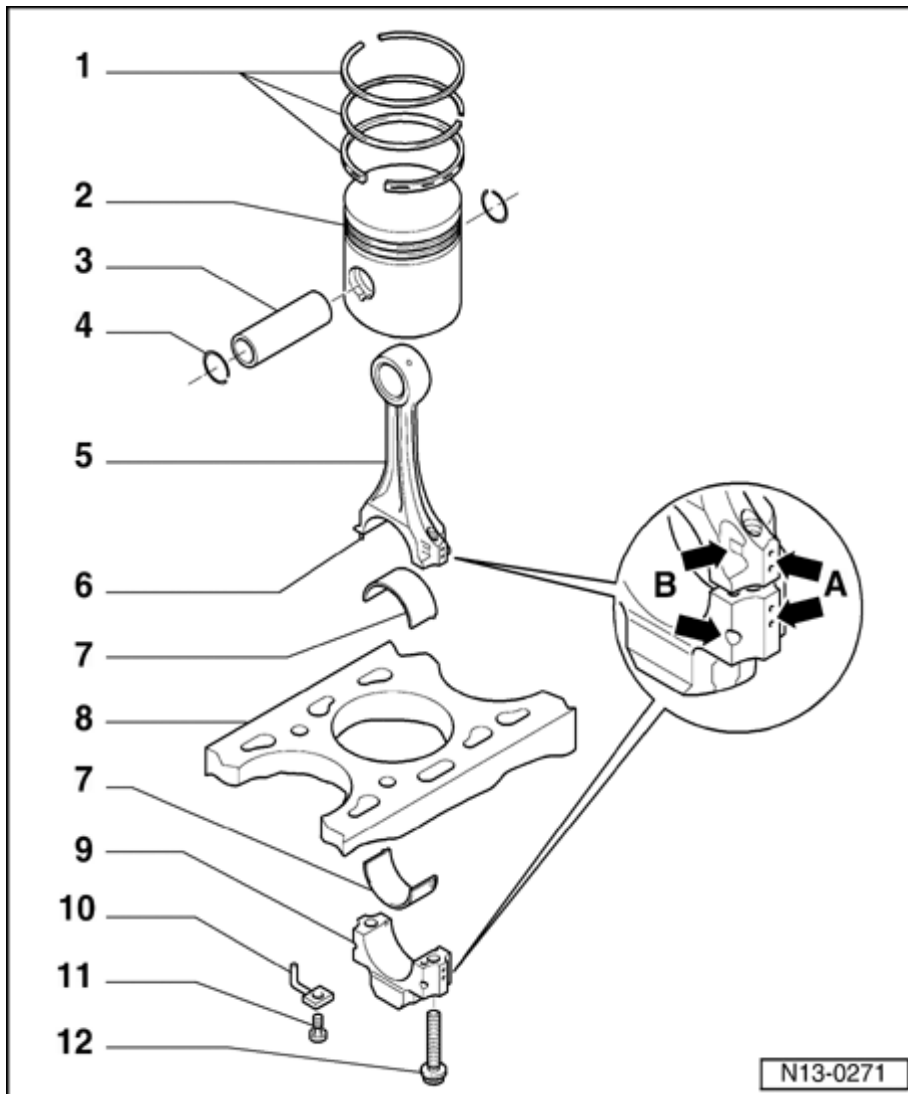
Pistons and connecting rods, disassembling and assembling

Note:

Support engine with VW 540 support before repairing.

1 - Piston ring

- ◆ Offset ring gaps 120°
- ◆ Remove and install using piston ring pliers
- ◆ "TOP" faces towards crown
- ◆ Ring gap, checking ⇒ Fig. ⇒ [1](#)
- ◆ Ring to groove clearance ⇒ Fig. ⇒ [2](#)



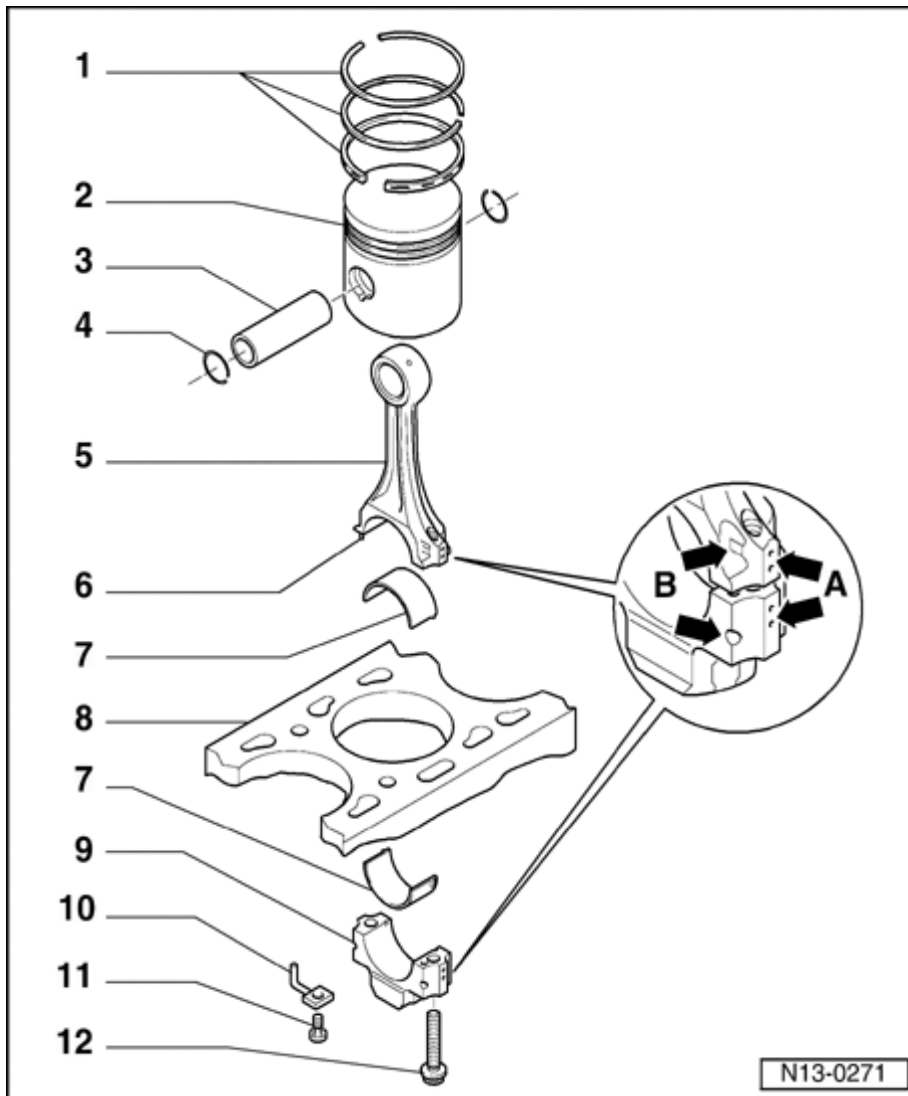
2 - Piston

- ◆ With combustion chamber
- ◆ Mark installation position and cylinder number ⇒ Fig. ⇒ [4](#)
- ◆ Arrow on piston crown points to pulley end
- ◆ Install using piston ring tool
- ◆ If piston skirt has cracks, replace piston
- ◆ Piston projection at TDC, checking ⇒ [Page 13-61](#)

3 - Piston pin

- ◆ If difficult to remove, heat piston to 60° C
- ◆ Remove and install using VW 222A

4 - Circlip

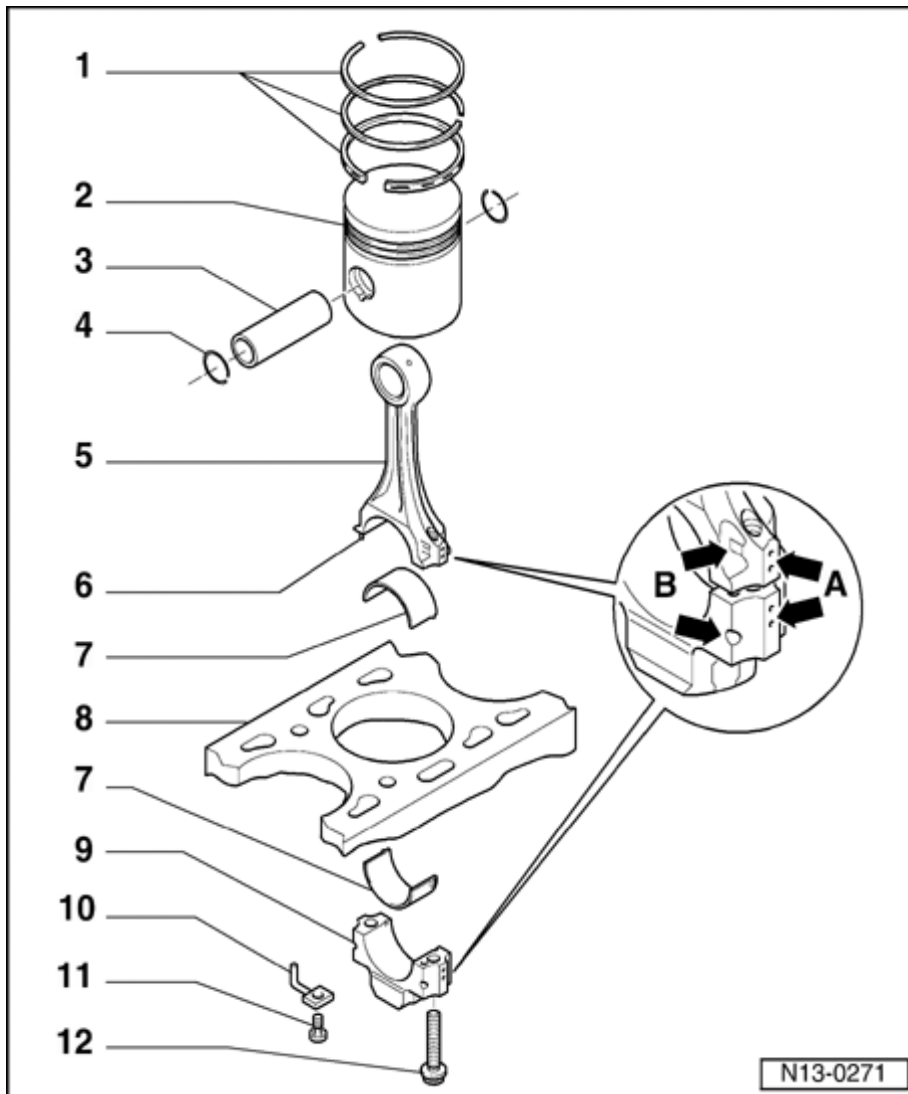


5 - Connecting rod

- ◆ Only replace as a set
- ◆ Mark cylinder number at -A-
- ◆ Installed position: Marking -B- faces pulley end

6 - Dowel

- ◆ Dowel must seat securely in connecting rod, not in bearing cap

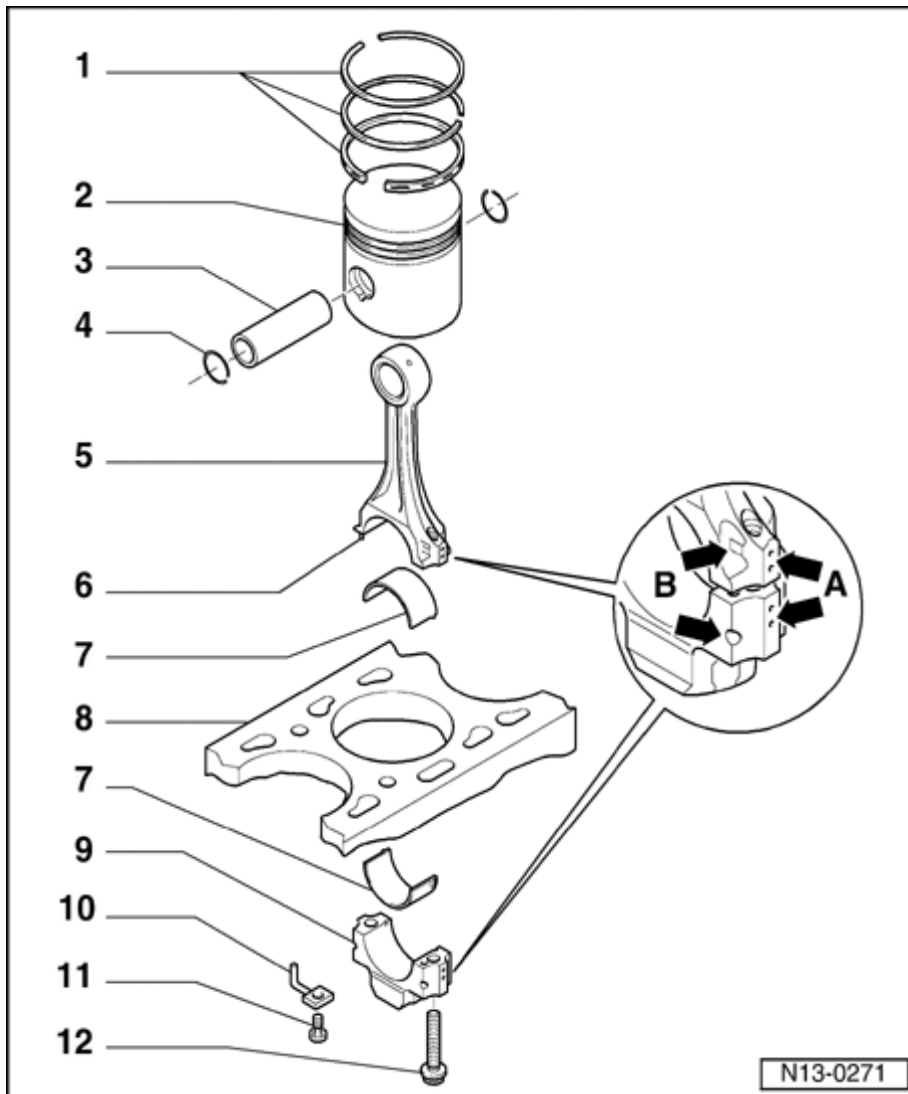


7 - Bearing shell

- ◆ Note version: upper bearing shell (toward piston) in wear-resistant material. Identification: black line on running surface close to separation edge.
- ◆ Note installed position
- ◆ Do not interchange used bearing shells
- ◆ Axial clearance: wear limit: 0.37 mm
- ◆ Check radial clearance with Plastigage: Wear limit: 0.08 mm. Do not rotate crankshaft while checking.

8 - Cylinder block

- ◆ Checking cylinder bores ⇒ Fig. ⇒ [3](#)
- ◆ Piston and cylinder dimensions ⇒ [Page 13-63](#)



9 - Connecting rod bearing cap

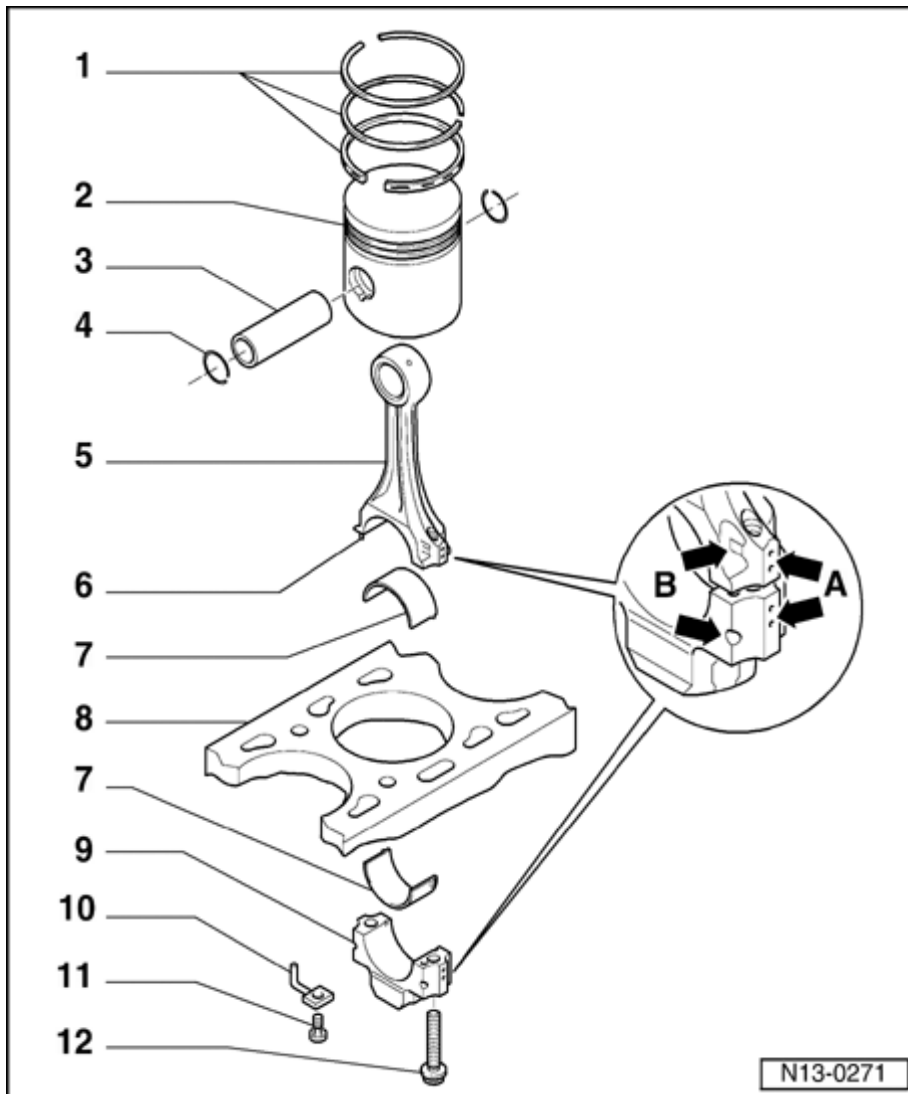
- ◆ Mark cylinder number at -A-
- ◆ Note installed position
- ◆ Installed position: Marking -B- faces pulley end

10 - Oil spray jet

- ◆ For piston cooling

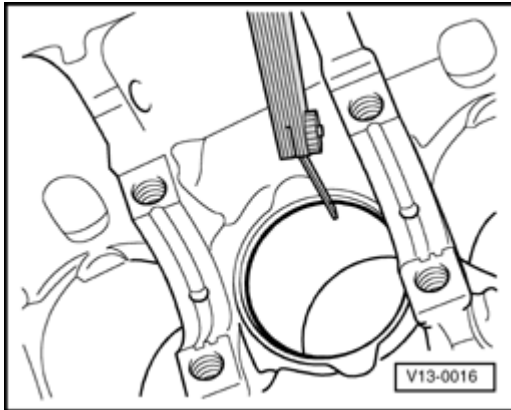
11 - 25 Nm (18 ft lb)

- ◆ Install without sealant



12 - Connecting rod bolt

- ◆ 30 Nm (22 ft lb) + additional 1/4 turn (90°)
- ◆ Always replace
- ◆ Oil the threads and contact surfaces
- ◆ Use old bolts to measure radial clearance
- ◆ Torque angle can be measured with Hazet 6690 torque angle meter or equivalent.



A

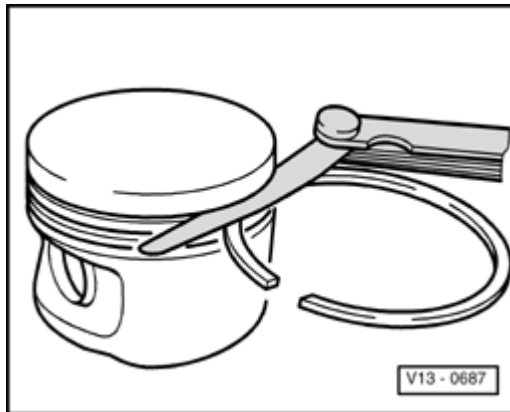
Fig. 1 Piston ring gap, checking

Special tools

◆ Feeler gauge

- Squarely insert ring into top of cylinder and push it down to approx. 15 mm from lower edge of cylinder.

Piston ring	New	Wear limit
Dimensions in mm		
1st compression ring	0.20 to 0.40	1.0
2nd compression ring	0.20 to 0.40	1.0
Oil scraper ring	0.25 to 0.50	1.0



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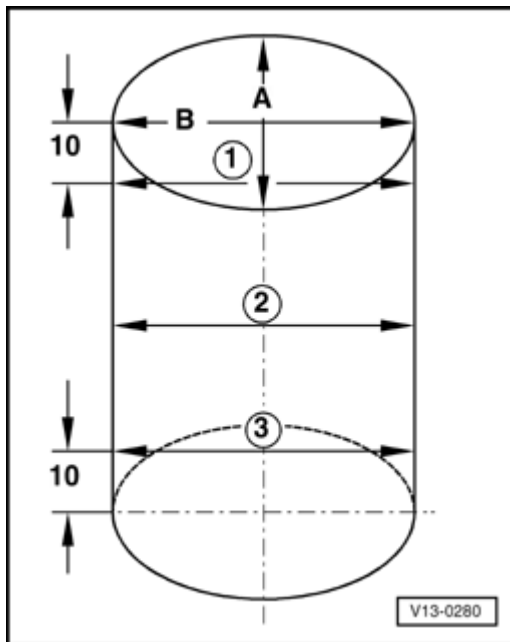
Fig. 2 Ring to groove clearance, checking

Special tools

◆ Feeler gauge

- Clean groove before checking.

Piston ring	New	Wear limit
Dimensions in mm		
1st compression ring	0.06 to 0.09	0.25
2nd compression ring	0.05 to 0.08	0.25
Oil scraper ring	0.03 to 0.06	0.15



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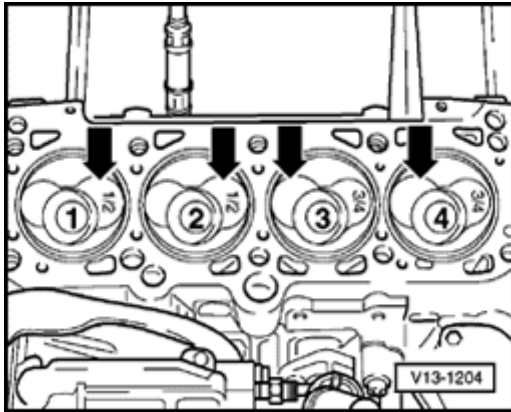
Fig. 3 Cylinder bores, checking

Special tools

- ◆ Internal dial gauge 50 to 100 mm
- Take measurements at 3 positions in both lateral -A- and longitudinal -B- directions, as illustrated.
- Deviation from nominal dimension: 0.10 mm maximum

Note:

Do NOT measure the cylinder bores when the block is mounted on a repair stand using the VW 540 adaptor bracket. Bending stresses resulting from the mass overhang will make incorrect measurements likely.



A

Fig. 4 Piston installation position and piston/cylinder allocation

Piston in cylinders 1 and 2:

Larger intake valve chamber points toward flywheel (arrows)

Piston in cylinders 3 and 4:

Larger intake valve chamber points toward belt pulley side (arrows).

Note:

New piston/cylinder allocations are shown by a colored mark on the piston crown.

- ◆ *Piston for cylinder 1 and 2: marked 1/2*
- ◆ *Piston for cylinder 3 and 4: marked 3/4*

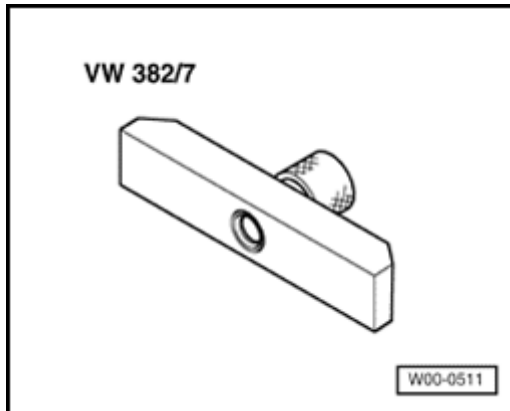


Piston projection at TDC, checking

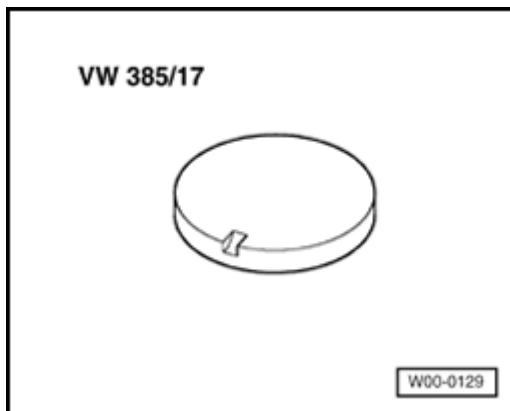
Special tools

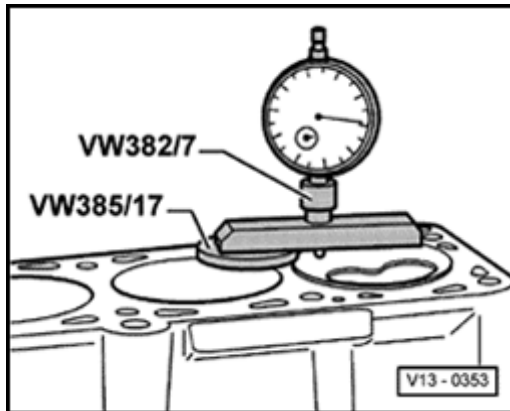


- ◆ VW 382/7 measuring bridge



- ◆ VW 385/17 magnetic plate
- ◆ Dial indicator



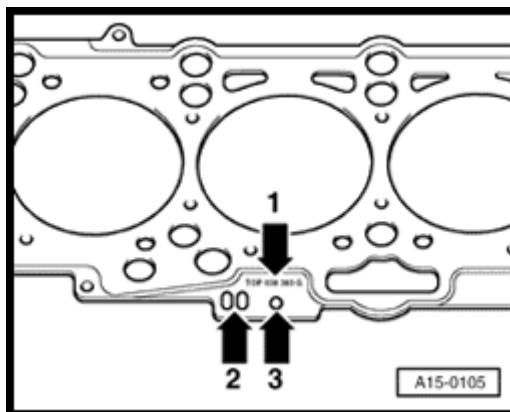


- A** Piston projection at TDC must be measured when installing new pistons or a short block. Depending on piston projection, install the corresponding cylinder head gasket using the following table:

Note:

To measure the piston position at TDC, turn crankshaft clockwise.

Piston projection	Identification: holes/notches
0.91 mm to 1.00 mm	1
1.01 mm to 1.10 mm	2
1.11 mm to 1.20 mm	3



A **Cylinder head gasket, identification**

- ◆ Part No. = arrow 1
- ◆ Production control code = arrow 2 (disregard)
- ◆ Holes = arrow 3

Note:

If the measurements of piston projections are different, use the largest measurement to select the proper gasket.



Piston and cylinder dimensions

Honing dimension		Piston diameter	Cylinder bore diameter
Basic dim.	mm	79.47	79.51
1st oversize	mm	79.72	79.76
2nd oversize	mm	79.97	80.01