Association piston – cylinder[1])

Group number		0	1	2
Standard dimension	Piston dia	85.970–85.982	85.980–85.992	85.990–86.002
	Cylinder dia	85.998–86.008	86.009–86.018	86.019–86.028
1st repair stage + 0.5	Piston dia	86.470–86.482	86.480–86.492	86.490–86.502
	Cylinder dia	86.498–86.508	86.509–86.518	86.519–86.528
2nd repair stage + 1.0	Piston dia	86.970–86.982	86.980–86.992	86.990–86.002
	Cylinder dia	86.998–86.008	87.009–87.018	87.019–87.028

[1]) The smallest measured cylinder dia and the largest measured piston dia are decisive for association.

Piston code number and piston distance

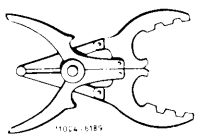
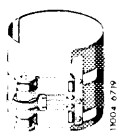
Engine		Compression ratio ϵ : 1		Piston code number	Distance between piston crown and cylinder crankcase parting surface
Normal compression					
110.921	110.983		Std	37, 40, 50, 60, 64, 69 80[1]), 83, 86[1]), 89	Standback 0.20 to 0.70
110.922	110.984				
110.923	110.985				
110.924	110.986	9.0 ± 0.2	+ 0.5	38, 41, 51, 67, 70, 84, 90	Standback 1.0 to 1.50
110.981	110.987	8.7 ± 0.2			
110.982			+ 1.0	39, 42, 52, 68, 71, 85, 91	
Low compression					
110.921	110.984		Std	28, 54, 72, 75	0.25 standout up to 0.15 standback
110.922	110.985				
110.923	110.991	8.0–0.4			
110.924			+ 0.5	29, 55, 73, 76	Standback 0.55 to 0.95
110.931	110.992		+ 1.0	30, 56, 74, 77	
110.932	110.993				

[1]) Installed in engine 110.984, 110.985, 110.986 and 110.987 as standard equipment. Not available as repair stages. Use only together with piston of same piston code number.

Test values		New (Installation tolerance)	Wear limit
Piston clearance		0.016 to 0.040	0.08
Difference in weight of pistons in one engine		4 g	10 g
Piston pin dia.		22.996 to 23.00	
Piston pin clearance	in conrod bushing	0.007 to 0.017	
	in piston	0.002 to 0.011	
Piston ring gap	groove 1	0.30 to 0.45	1.0
	groove 2	0.30 to 0.45	0.8
	groove 3	0.25 to 0.40	0.8
Piston ring clearance	groove 1	0.05 to 0.08	0.15
	groove 2	0.03 to 0.06	0.08
	groove 3	0.01 to 0.04	0.08

Tightening torque		
Connecting rod nuts	torque pressure	40–50 Nm
	torque angle	90–100°

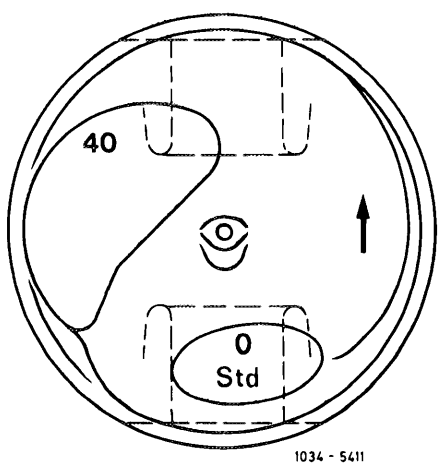
Special tools

Piston ring pliers		000 589 51 37 00
Piston ring compressor		000 589 04 14 00

Note

The piston version (std, + 0.5 or + 1.0), the group number (0, 1 or 2), the piston code (e.g. 40) and an arrow for forward direction are stamped in the piston crown.

The group number is also stamped in the crankcase mating surface.



The group number of pistons (e.g. 1) is the same as the group number of cylinder bores (production).

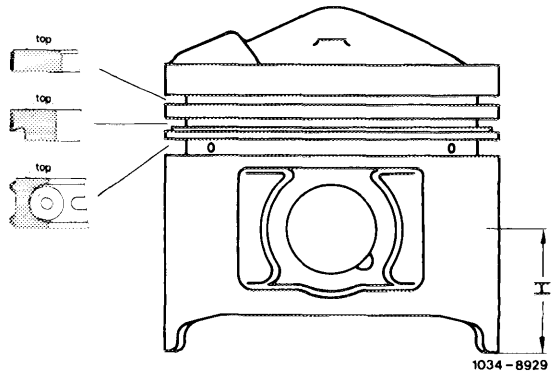
This will guarantee the specified piston clearance.

When repairing, the cylinder bores should be honed according to the sizes of the existing pistons plus the piston clearance.

Pistons and piston pins are matched.

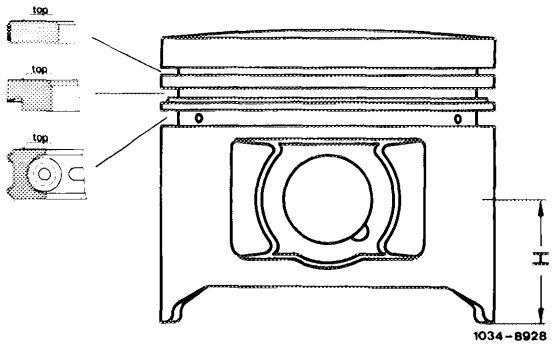
The measuring point for nominal diameter of pistons is offset by 90° in relation to piston pin axis at level H.

On used pistons the measured value does not necessarily correspond with nominal diameter of a new piston, since piston in range of measuring point and at shaft tab may "recede" already after a short operating period, that is, the nominal diameter may become smaller by up to 0.070 mm.



Piston normal compression
dimension H = 32 mm

If used pistons are used again, make sure that the oil drain bores in 3rd piston ring groove are cleaned.



Piston low compression and
USA version
dimension H = 32 mm

Removal

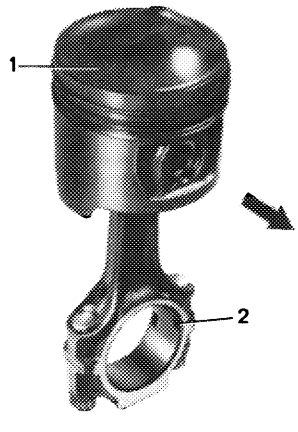
1 Take out connecting rod with piston from above.

2 Remove piston pin circlips and press out piston pin.

3 Repair and square connecting rod (03–313).

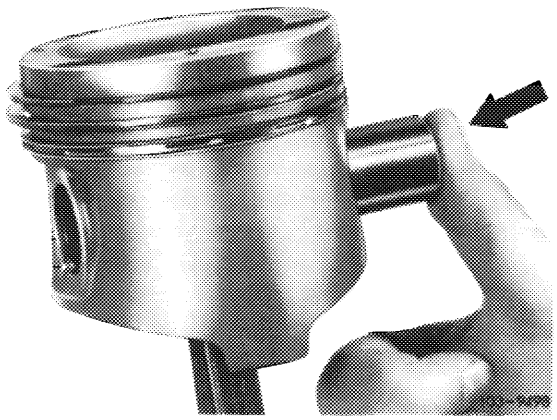
Installation

4 Place piston on connecting rod that arrow (1) faces in forward direction and circlip grooves (2) in connecting rod face to left side of engine (intake manifold).



Attention!
Don't heat piston.

5 Press in piston pin coated with engine oil **by hand.**

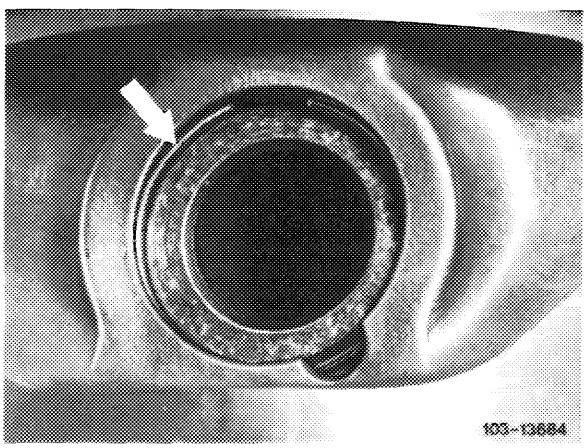


6 Insert piston pin circlips in grooves.

When installing used pistons, check piston ring gaps and clearances.

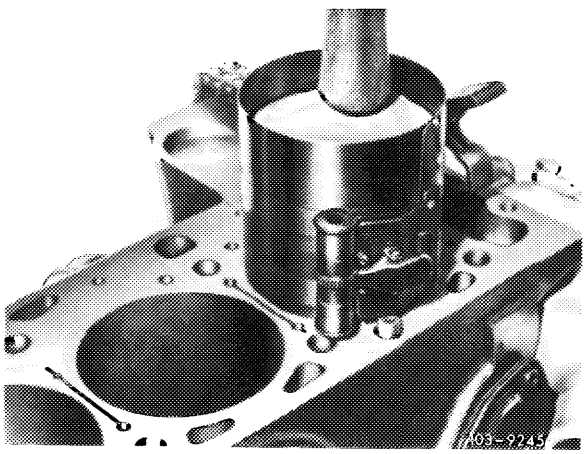
Check piston rings for easy movement.

7 Lubricate cleaned cylinder bores, conrod bearing journals, conrod bearing shells and the pistons.



8 Distribute gaps of piston rings around piston circumference evenly.

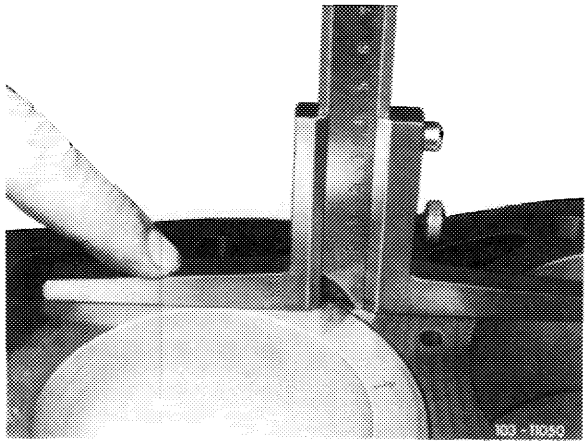
9 Install piston ring compressor and guide in piston with arrow facing forward.



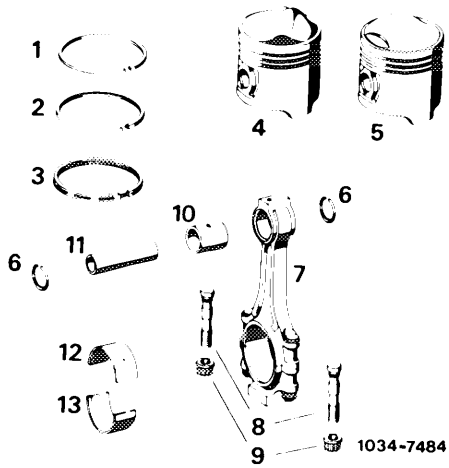
10 Place connecting rod bearing caps with code numbers facing each other on connecting rod and tighten connecting nuts to 40–50 Nm initial torque and to 90–100° angle of rotation torque.

11 Turn crankshaft and check clearance between piston pin boss and connecting rod.

12 Measure distance between piston crown and crankcase mating surface when piston is positioned at TDC (see chart).



Pistons and connecting rods



1 Plain compression ring
2 Oil scraper ring
3 Bevelled compression ring with hose lined spring
4 Piston
5 Piston, USA and low compression
6 Circlip
7 Connecting rod with conrod cap
8 Conrod bolt
9 Nut
10 Conrod bushing
11 Conrod pin
12 Conrod bearing upper half with oil bore
13 Conrod bearing lower half