

Disassembly - Assembly

Pistons and connecting rods

Before disassembling, mark the connecting rod and the cap with the cylinder the connecting rod is fitted to.

•Changing connecting rod bushes

TRT 51 engines

Use the tool No. 5532 for a 41 mm pin.

Disassembly

- 1 - Fit on one of the ends of the connecting rod bush the extractor shaft (A). Turn the shaft (A) until the tapered parts of the shaft are parallel with the tapered parts of the bush (C).
- 2 - Opposite the extractor shaft (A), install the receiver plate (B).
- 3 - Using a hydraulic press, (c) press the bush from the connecting rod until the extractor shaft (A) falls into the receiving plate (B).

IMPORTANT: If the bush is badly worn out, the extractor shaft (A) can contact the inside diameter of the connecting rod bore. When extracting the bush, ensure you do not damage the connecting rod bore.

- 4 - Clean, inspect, and measure the inside diameter of the connecting rod pin bore.

Reassembly

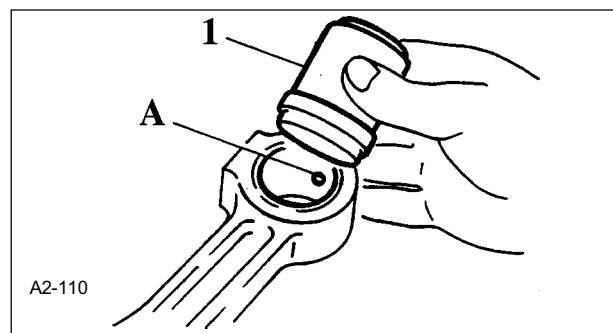
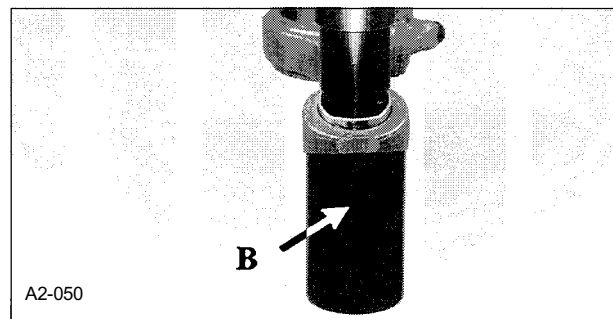
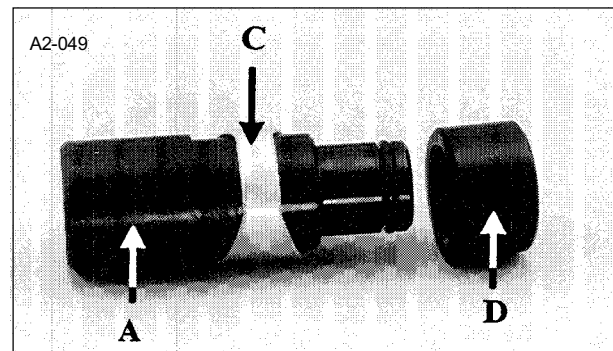
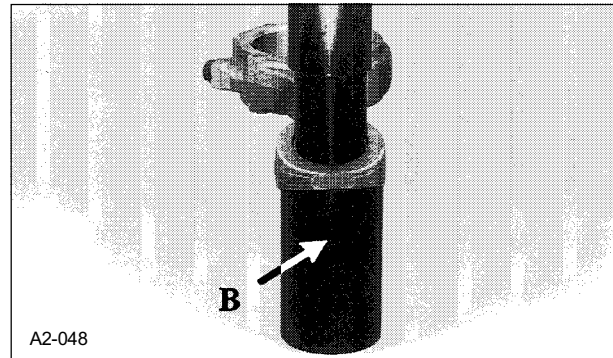
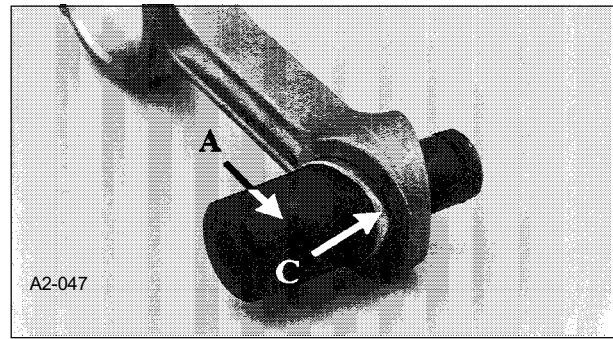
- 1 - First slide the bush (C) on the shaft (A), then the part (D). Apply grease on the outside diameters of the bushes (C) and (D), as well as in the connecting rod bore.
- 2 - Insert the shaft (A) into the connecting rod pin bore, ensuring that the pilot bush (D) is guided in the connecting rod bore, and that the taper of the bush (C) is aligned with the taper of the shaft (A).
- 3 - Install the receiving plate (B) on the other end of the connecting rod.
- 4 - Using a hydraulic press, push the bush into the connecting rod bore, until the rim is flush or just under the connecting rod face.

TRT 50 - DRT 50 - DRT 51 engines

Use the tool No. 5505 for a 35 mm pin.

- 1 - Push the connecting rod bush out using the tool (1)
- 2 - Fit the new bush using the same tool.
- 3 - Bore the new bush in order to enable the insertion of the piston pin by pushing it with your thumb.

IMPORTANT: Check that the bush lubrication orifice (A) is aligned with the connecting rod's.



Disassembly - Assembly

• Checking the piston heads and skirts

Check that the pistons are not scratched and show no trace of seizing or overheating.

Measure the diameter of the piston at 19 mm from the bottom of the skirt, perpendicularly to the piston's pin. Compare the dimension measured with the initial dimension: 106.38 - 106.40 mm.

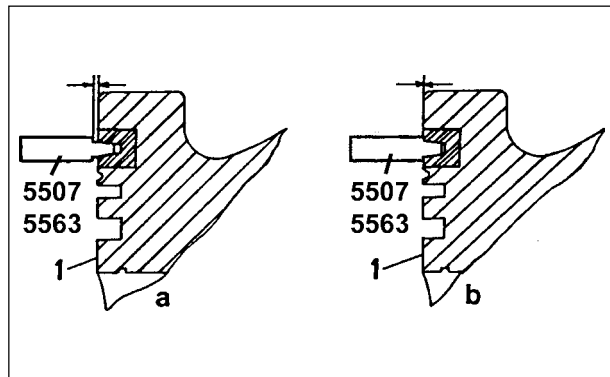
• Compression ring groove

Use gauge No.5507 (TRT 51) or 5563 (- DRT 50/51 - TRT 50) to check the state of wear of the compression ring groove.

1 - Piston

a - Piston can be used

b - Piston to be changed



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• Compression and oil ring grooves

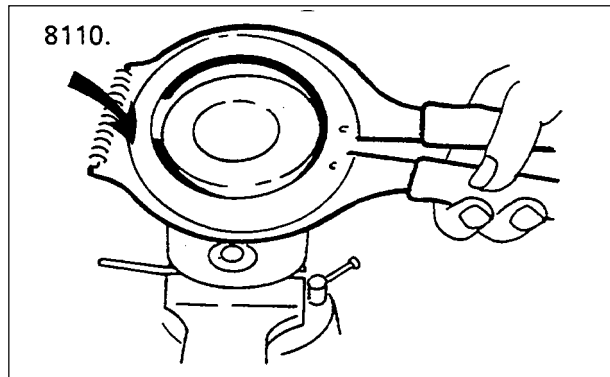
Use a new ring and a set of shims to determine the clearance, which should not exceed 0.20 mm.

If the clearance exceeds this dimension, change the piston.

• Fitting piston rings

Fit the piston rings using the ring extender No.8110. The "." stamped marks, one for the compression ring (No. 1) and two for the oil ring (No.2), must be directed towards the piston head.

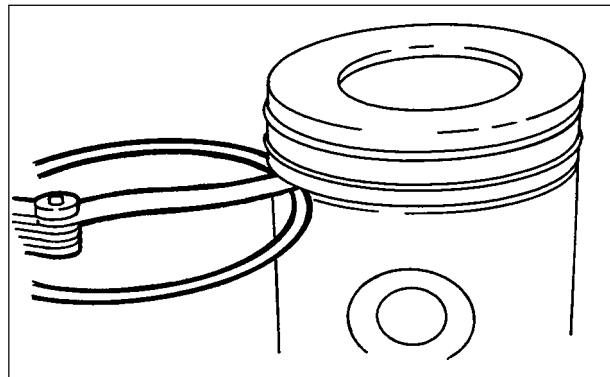
Note: The ring Nos.1 and 2 can also be identified using marks "Top", "T" or ".". During their installation, check that the rings are correctly positioned.



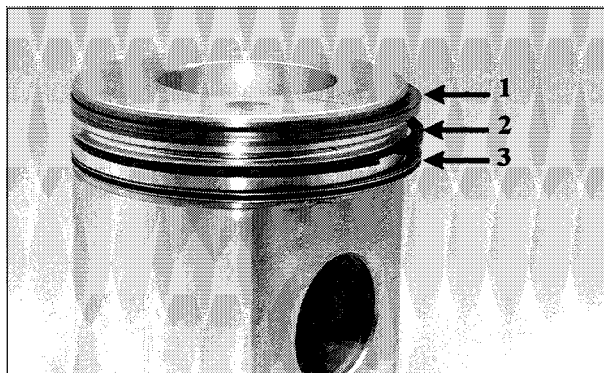
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• Fitting the oil ring

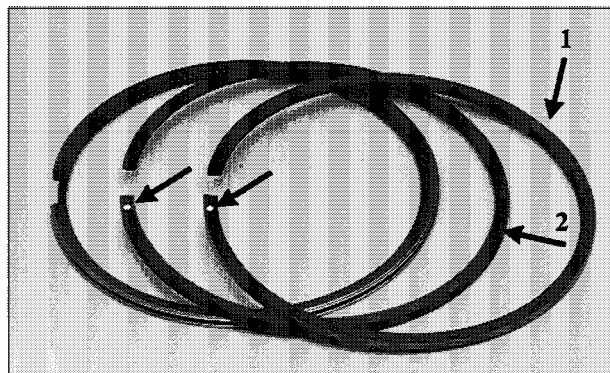
Fit the oil ring (3) in the lower groove, on the expander. Check that the opening of the oil ring is opposite the opening on the expander.



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Disassembly - Assembly

•Piston/connecting rods assembly

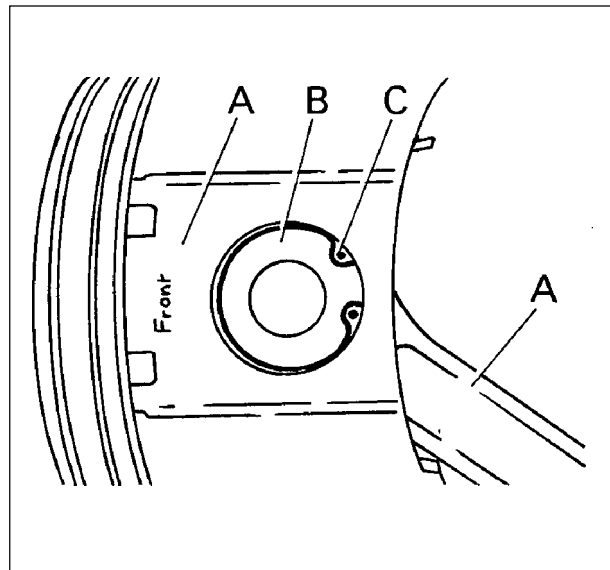
Note: Reassemble the pistons on the connecting rods they were removed from.

- 1 - Lubricate the piston pin and bush with clean engine oil.
- 2 - Assemble the pistons and connecting rods, while checking that the marks "FRONT" (front) (A) on the side or the upper face of the piston and on the same side of the connecting rod are located on the same side.

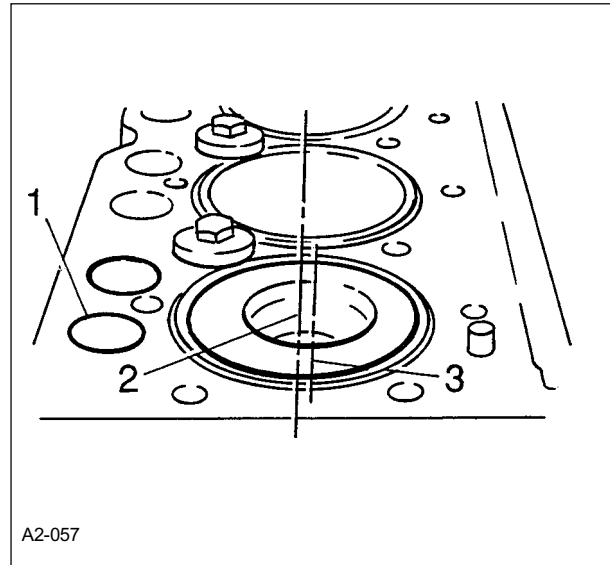
IMPORTANT: If the mark "FRONT" is not visible on the side or the upper face of the piston, fit the piston on its connecting rod while ensuring that the combustion chamber offset on the piston is located on the side opposite the camshaft. The long side of the connecting rod must be fitted on the camshaft side.

- 1 - Camshaft side
- 2 - Liner bore pin
- 3 - Combustion chamber offset

- 3 - Insert the piston pin (B) in the piston pin bore. Install new circlips (C) while directing the circlips cutting edge opposite the piston pin. Check that the circlips are properly pushed into the piston pin bore grooves.



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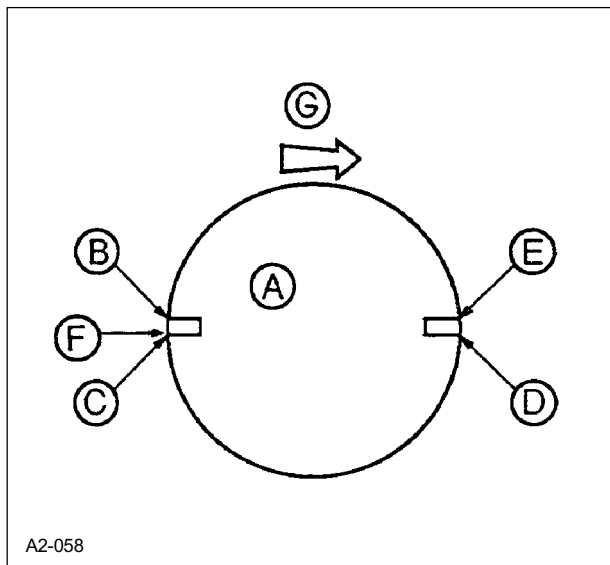


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• Ring spacing

The figure here shows where the ring openings must be located.

- A - Piston head
- B - Compression ring opening
- C - Oil ring opening
- D - Expander opening
- E - Compression ring opening
- F - Slit in the expander
- G - Engine front



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Disassembly - Assembly

• Inspecting the connecting rod and the cap

- 1 - Inspect the connecting rods and the caps to ensure that they are neither worn, nor damaged; search for chips and scratches in the connecting zone (A).

IMPORTANT: Do not scratch the connecting surfaces of the connecting rod and cap. This is absolutely vital on Précision Joint™ connecting rods to guarantee correct coupling. Never rub these surfaces (C) with a metallic brush nor any other tool. The contact surfaces must be preserved.

- 2 - Inspect the cap bolt holes (B) and the adjacent surfaces. In the presence of any defect, change the connecting rod and the cap.

IMPORTANT: Never swap connecting rods and caps.

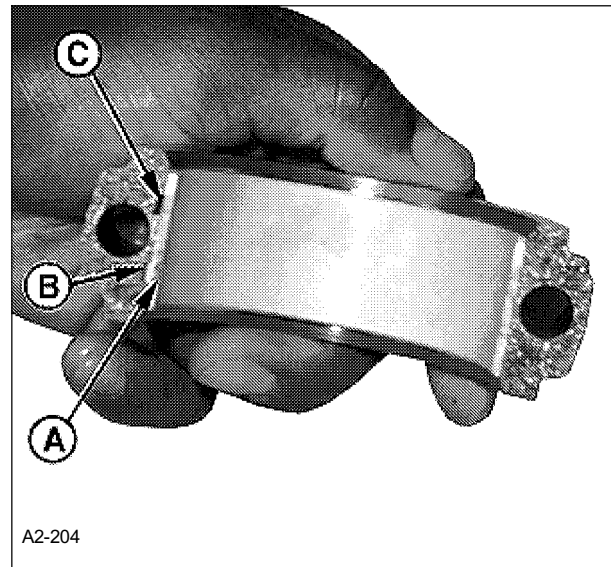
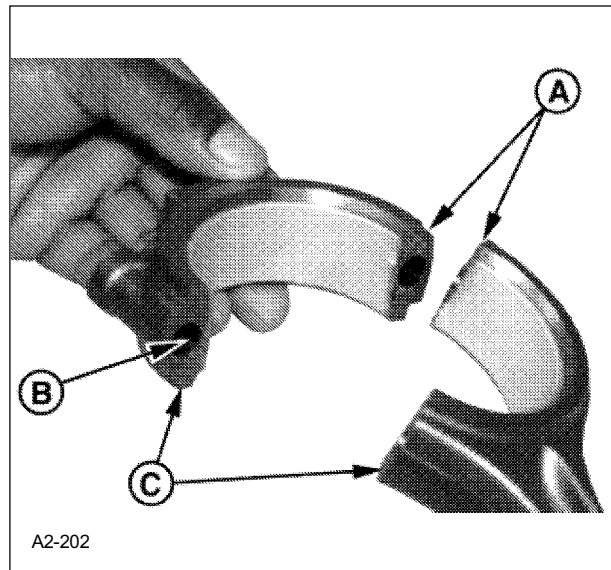
- A - Coupling zone
- B - Cap holes
- C - Précision Joint™ surfaces

• Fitting the bearing in the cap

Note: Because of their manufacturing process, the Précision Joint™ connecting rod and caps both comprise a notch, whereas the carried over bearing has a single pin. Only one notch on the cap is used for the bearing's pin.

- 1 - Fit the carried over bearing in the connecting rod cap with the pin (A) in the notch (B).
- 2 - Apply clean engine oil to the carried over bearing. Fit the cap on the connecting rod with the pins on the same side.

- A - Pin
- B - Notch
- C - Additional notch (not used)



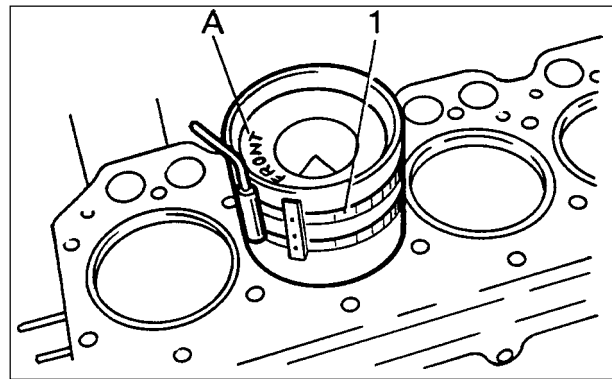
Disassembly - Assembly

• Reassembling pistons and connecting rods

Note: the pistons must be reassembled in the liners they were extracted from.

- 1 - Smear the pistons and rings with clean engine oil. Fit the pistons into the liners using the ring compressor No. 8111 (1).

Note: Check for each piston that the mark "FRONT" (A) on the upper face of the piston is turned towards the front of the cylinder block.



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- 2 - Push the piston into the liner until the upper ring is fully inside it.

• Assembling the cap onto the connecting rod

- 1 - Smear the half-bearings with clean engine oil, then assemble the cap onto the connecting rod with the pins (A) on the same side. The notch (C) is not used.

IMPORTANT: Ensure that the cap is correctly aligned on the connecting rod with the junction surfaces perfectly coupled.



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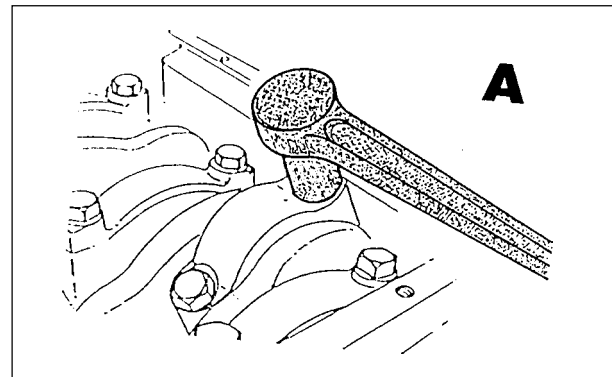
- 2 - Dip the connecting rod bolts in clean engine oil and fit them.

IMPORTANT: Never use the connecting rod bolts more than once for the final assembly of the engine. When connecting rod bolts have been tightened at final torque, do not reuse them.

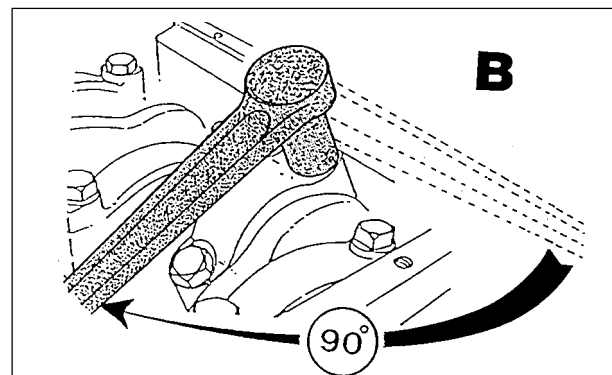
- 3 - Tighten the bolts alternatively at 5.8 daN.m, then turn each bolt at a 90-100 degree angle.

• Tightening method

- 1 - Position the wrench in parallel the engine axis (A).
- 2 - Tighten the bolt until the wrench is perpendicular to the engine axis (B).



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Disassembly - Assembly

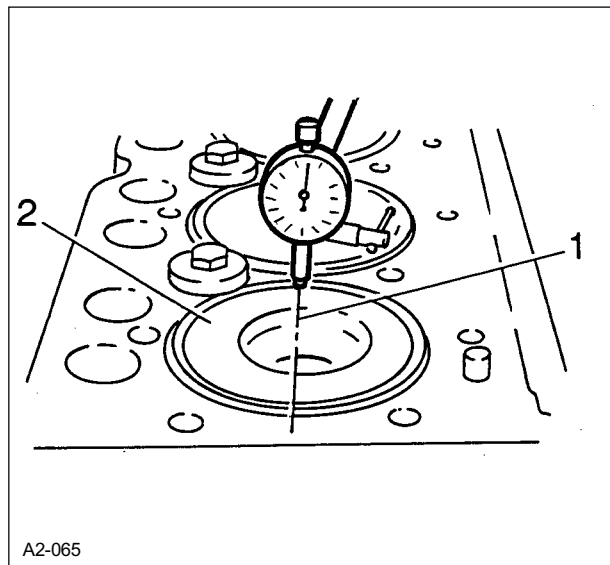
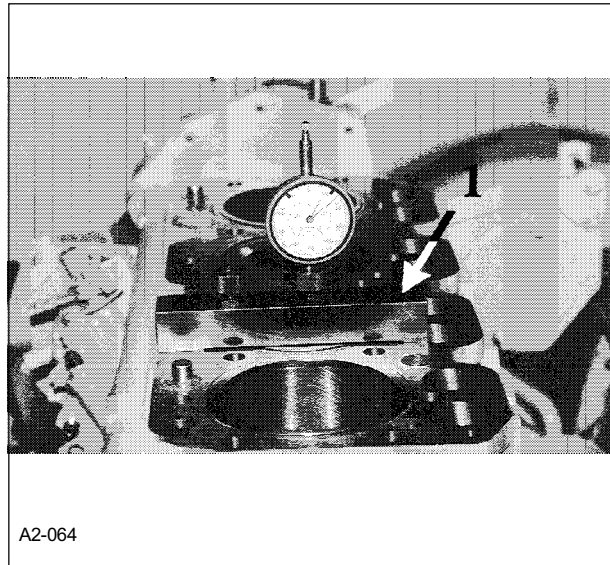
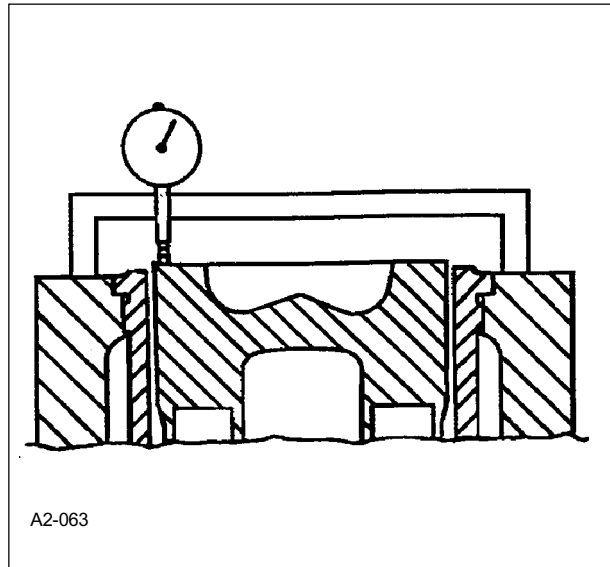
• Measuring piston overlap

Use the checking tool No.8180 (1).

- 1 - Calibrate the checking tool.
 - Fit the calibration rule on the base.
 - Calibrate the comparator to zero.
 - Remove the rule.
- 2 - Implementing the control tool
 - Position the checking tool on the cylinder to check.
- 3 - Measuring the piston overlap
 - Bring the piston to the top dead centre using the comparator and the engine displacement tool.
 - Read directly the piston overlap value in respect of the gasket face of the engine block.
 - Move the apparatus on the longitudinal axis of the engine, and record a second value.
 - Calculate the average over the 2 values.
- 4 - If the gauge No.8180 is used, the piston overlap must not exceed 0.20 mm.

Note: If the gauge No.8180 is not available, use a comparator. In this case, the piston overlap must not exceed 0.35 mm.

- 5 - If the overlap exceeds the dimensions specified, check all the parts involved to determine its cause.
 - 1 - Liner bore pin
 - 2 - Piston at TDC





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Disassembly - Assembly

Crankshaft, bearings, and flywheel

• Fitting bearing bushes

1 - Install the bearing bushes. Check that the bearing bush tags (A) are engaged in the slots (B) in the cylinder block and the bearing seats. Also check that the bearing bush lubrication holes (C) are aligned with the oil passages in the block (D). During assembly, apply a thick layer of clean engine oil:

- on all cylinder block bearings,
- on both sides of the bearings,
- on the outside diameter of the journals.

2 - Fit the thrust bearing (E) in the rear bearing (F) of the cylinder block after dipping them in clean engine oil.

- A - Tags in the bearing bush
- B - Slot in the block
- C - Lubrication holes in the bearing bush
- D - Oil passages in the block
- E - Rear thrust bearing bush.

