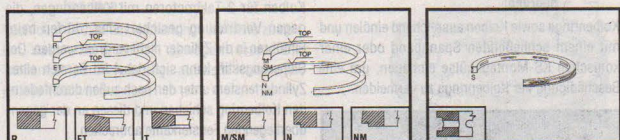


Ring types

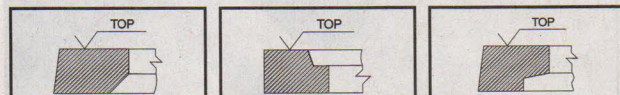


R Rectangular
ET Half keystone ring
T Keystone ring 6° / 15°
M/SM Taper faced ring
N Napier ring
NM Taper faced Napier ring
S Slotted oil control ring



DSF Double-bevelled
SLF Multi-piece steel-rail oil control ring
UF U-Flex oil ring

Ring codes



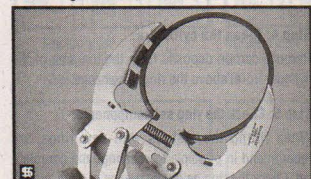
IFU Inside bevel bottom side
IW Inside step
IWU Inside step bottom side

CB INSTALLATION OF RINGS PAGE 10

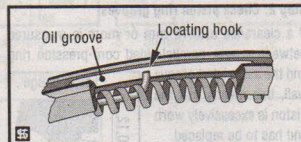
Step 6: Installation of the piston rings

Insert piston rings in the associated piston ring groove using the right assembly tool!
 Avoid excessive opening of the piston rings on fitting as this would cause permanent deformation and would impair the performance of the piston rings. Piston rings marked "TOP" have to be fitted with a

gap. Some spiral expanders pass through a teflon tube, which is located opposite the spring ends and therefore directly beneath the ring gap. In the case of spiral-expander rings with locating hook, take care that the locating hook engages correctly in the oil groove.



particular side up. The mark "TOP" should point towards the piston crown so that the scraping effect is directed to the skirt lower end. If the rings are not fitted accurately, there is danger of oil being pumped from the crankcase to the combustion chamber and the function of the ring set would no longer be ensured. When fitting rings with spiral expander the spring ends should always be positioned opposite the ring



Special: Installation of steel rail oil control rings

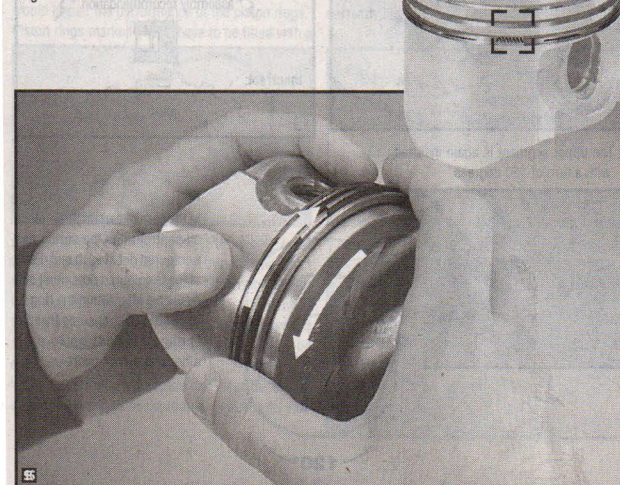
1. The expander spring is fitted into the groove.



CB INSTALLATION OF RINGS PAGE 12

Step 7: Function test/Turning the piston rings:

After fitting the piston rings, make sure that they can be freely moved.
 Position the ring gaps with 120° offset to the next ring.



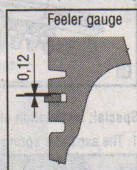
Step 1: Clean pistons:

First clean the pistons thoroughly and remove all carbon deposits from the ring grooves. Use a twist drill and tap wrench to remove the carbon deposit from the oil drain holes. Replace cracked or deformed and worn pistons.

Grease clearance (mm)	Piston usage
0.05 - 0.10	Piston can be re-used without restrictions
0.11 - 0.12	More caution necessary
> 0.12	Fitting of new pistons essential

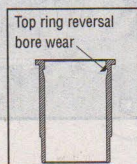
Step 2: Check piston ring grooves:

If a clearance of 0.12 mm or more is measured between a new, parallel-sided compression ring and the associated groove wall, this means that the piston is excessively worn and has to be replaced.



Step 3: Check the cylinder wear:

If the cylinder wear exceeds 0.1 mm for SI engines and 0.15 mm for diesel engines, the cylinder also has to be exchanged (top ring reversal bore wear)



Step 4: Clean the cylinders:

Remove carbon deposits from the top area of the cylinder bore, above the ring travel zone.

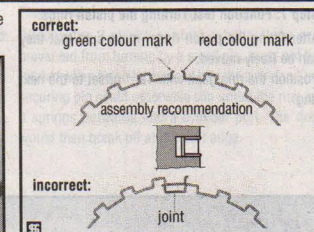
Step 5: Check the ring set components:

When fitting the pistons with new rings, we recommend in principle to exchange the complete set. Check the ring height by means of a measuring gauge. It is recommended to compare with our Catalogue data.

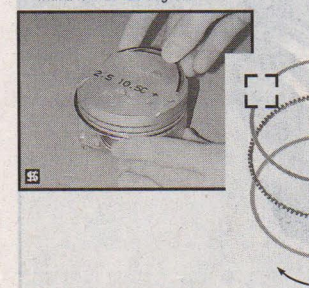
The diameter may be checked by means of a measuring ring or of a reworked cylinder, the ring gap on the basis of subjective assessment or using a feeler gauge. When verifying the ring diameter in worn cylinders /cylinder liners, it should be remembered that the ring gap may have larger values.

CB INSTALLATION OF RINGS PAGE 11

2. The lower segment is inserted with a 120 degree turn.



3. The upper segment is again inserted with a turn of 120 degrees.



Hint!

In the case of certain three-piece oil control rings the spring has a coloured dot at each end. Each of these coloured dots must still be visible after fitting the ring to the piston. This ensures that the spring ends butt up to each other and do not overlap.

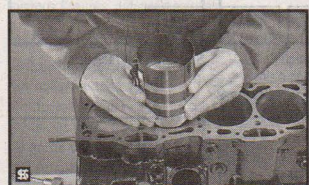
CB INSTALLATION OF RINGS PAGE 13

Step 8: Fitting the piston into the cylinder bore:

Oil the piston rings and the piston appropriately and use a ring compressor or a conical KS assembly sleeve in order to prevent damage to the piston rings.

Please note!

Pistons for 2-stroke engines whose rings are prevented from turning by a small pin, must not be rotated when being introduced into the cylinder. The securing pin could otherwise slip under the ring as it springs outwards into a cylinder port. The ring would then break off at the port edge.



Attention!

Chromium-plated piston rings must not be fitted to chromium-plated cylinder liners.