

Fitting Pistons and Rings into Cylinders

Job No.

03-15

The pistons of the engine Model OM 636 were changed several times. Presently, only forged pistons are installed, optionally supplied by the firm Mahle and the firm Nüral. Cast Nüral pistons can optionally also be installed in the engines of the type 636.914 and 917 (see table below). On both brands the width of the 1st compression ring was changed from 2.5 mm to 2 mm and the oil scraper ring (IV) was furnished with a Goetze snug-fit ring to obtain better sealing (see Figure 03-15/7).

The forged pistons, compared to the cast pistons, have as a characteristic feature the solid design shape between the piston pin bosses and the piston crown (see Figure 03-15/4). In the cast pistons, however, the upper part of the piston pin bosses has been relieved (see Figure 03-15/3).

The following table lists the piston designs which are serially installed in the engines of the different types of the OM 636 and in case of repair, at present. All former piston designs should no longer be installed.

Piston		for cylinder diameter	installed in the engines of the type	
Design and Brand	Part No.			
forged Mahle, compression rings 2.5 mm wide	636 030 15 17	73.50 mm	636.915	
forged Mahle, compression rings 2.0 mm wide	636 030 47 17	75.00 mm	636.914 636.917	
cast Nüral, compression rings 2.0 mm wide	or 636 030 57 17			
forged Nüral, compression rings 2.0 mm wide	or 636 030 68 17			
forged Mahle, compression rings 2.0 mm wide	optional 636 030 47 17	75.00 mm	636.916	636.932
forged Nüral, compression rings 2.0 mm wide	or 636 030 68 17		636.918	636.933
			636.919	636.934
			636.930	636.936
			636.931	

The installation of new or used pistons or new compression rings into worn cylinders rarely brings about good results. In these cases, a higher oil consumption must be taken into account.

If the wear exceeds 0.05 mm or the out-of-round exceeds 0.03 mm, bore the cylinder bores to the following repair size (see Job No. 01-0 and 01-27).

During measuring, the crankcase and the pistons should have the same temperature.

The piston play is 0.06 mm for Mahle and Nüral pistons.

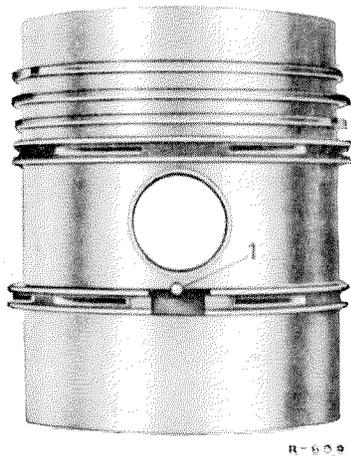
The pistons are therefore available in three dimension steps 0.01 mm apart for each overhaul stage.

The piston dimension is punched on the piston crown. The piston must be selected according to the dimension of the cylinder bore, so that the running clearance of 0.06 mm is ensured.

If, in case of repair, the pistons are only available in one size of the determined repair stage, then the cylinder running surfaces must be honed according to the available pistons.

Available pistons (Mahle and Nüral)

(see Job No. 03-0, Page 03-0/4).



- I. Compression ring chromium-plated
- II. Compression ring
- III. Compression ring
- IV. Oil scraper ring with Goetze snug-fit ring
- V. Slotted ring

Figure 03-15/1

Piston for OM 636

1 Securing pin against turning of the slotted ring

The pistons for the OM 621 have no slotted ring V and instead of the slotted oil control ring IV with Goetze expander, they are fitted with a hose-shaped expander ring.

Each piston is slightly tapered. The largest diameter is near the bottom of the piston skirt. The cross section at this point is not circular but elliptical, meaning the measurement A is smaller than the measurement B (Figure 03-15/2).

The diameter of the piston is measured in direction B at the bottom end of the skirt; this dimension corresponds to the measurement punched on the piston crown.

When selecting the pistons make sure that the difference in weight between the individual pistons installed in a certain engine is not more than 4 g. Check the correct sequence of the piston rings (see Figure 03-15/1). The oil scraper ring with Goetze snug-fit ring (IV) for OM 636 should never be mistaken for the slotted ring (V). The slotted ring (V) is guarded against turning in the groove by a securing pin; for this purpose the gap ends have two cut-outs (see Figure 03-15/1). When installing the slotted ring (V) make sure that the gap ends are on either side of the securing pin.

When installing the oil scraper ring (IV) the snug-fit ring must be mounted in such a way

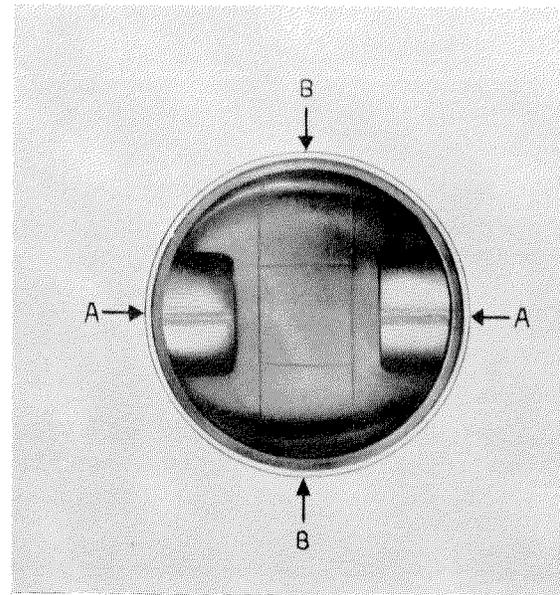


Figure 03-15/2

that the gap of the snug-fit ring will be located exactly opposite to the gap of the oil scraper ring (see Figure 03-15/7).

Also observe this, when assembling the hose-shaped expander of the hose-shaped expander ring on the OM 621.

During the mounting of the piston rings make sure that the designation "top" or "F" of the compression ring (I) and the designation GOE F of the oil scraper ring (IV) with snug-fit ring faces towards the top (see Figure 03-15/7).

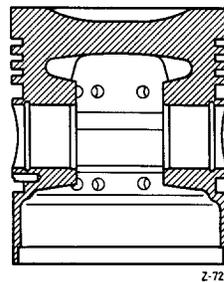


Figure 03-15/3
Cast piston OM 636

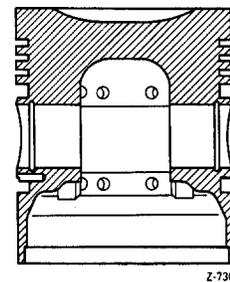


Figure 03-15/4
Forged piston OM 636

Normally, it is not necessary to check the piston ring gap and groove clearance, because the piston with rings and piston pin is supplied as one unit ready for assembly. In exceptional cases, in which the piston rings are supplied separately for fitting, the vertical clearance and the gap clearance can be checked against the values listed in the table Page 03-0/4 and 03-0/5.

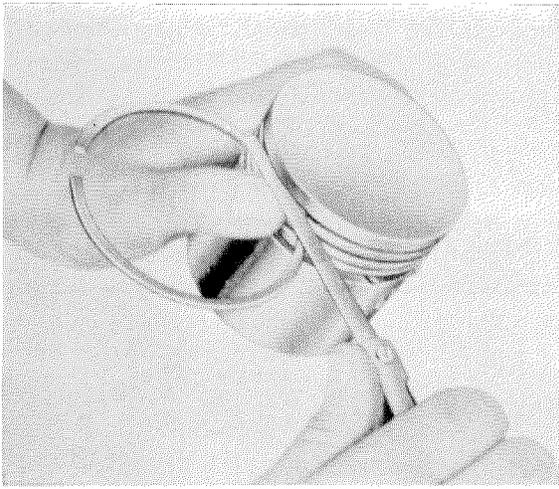


Figure 03-15/5

The vertical clearance of the piston rings in the annular groove is measured with a feeler gauge (see Figure 03-15/5).

In order to measure the gap clearance of the piston rings put the ring into the cylinder bore approx. 40 to 50 mm below the upper contact

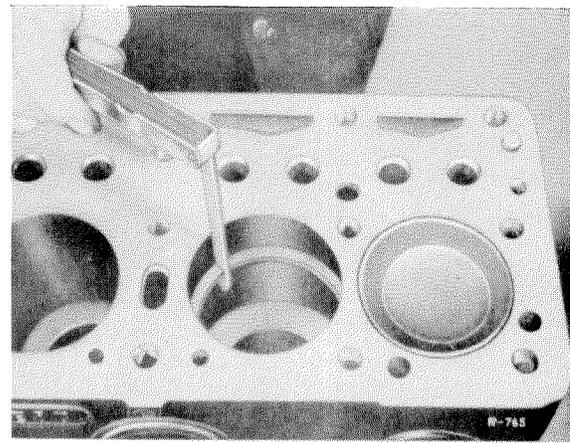


Figure 03-15/6

surface of the crankcase. Make sure that the rings are seated exactly vertical to the running surface during the measuring operation (see Figure 03-15/6).

After fitting and mounting of the rings check the skirt end of the piston. The edge must be sharp and undamaged. Carefully machine the edge if necessary.

Subsequent Installation of an Oil Scraper Ring with Goetze Snug-Fit Ring to reduce Oil Consumption OM 636

Oil scraper rings with Goethe snug-fit rings can be installed in engines which have a high oil consumption in spite of the perfect condition of cylinder bores, pistons and piston rings (see Figure 03-15/7).

The engines of all types of the Model OM 636 are now serially equipped with oil scraper rings with Goetze snug-fit rings.

The installation of oil scraper rings with Goetze snug-fit rings will only have an effect on the oil consumption **if the out-of-round tolerance of the cylinder bores is not higher than 0.015 mm.**

New rings will not adapt themselves to cylinder bores being out of true. In such cases the cylinder bores should be honed if possible, if not, they must be bored to the next overhaul stage.

Under certain conditions a decrease of oil consumption cannot be observed immediately after the installation of the new oil scraper rings, but only after a certain running-in period during which the ring has adapted itself to the cylinder bore.

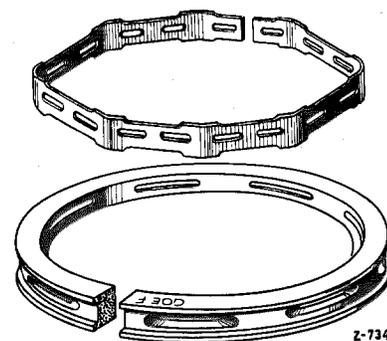


Figure 03-15/7

Oil scraper ring with Goetze snug-fit ring

The rings must be fitted before the installation of the piston. The specified vertical clearance and gap clearance must be adhered to (see Piston Ring Clearances, Page 03-0/4). The oil scraper rings with Goetze snug-fit rings can be ordered from our Spare Parts Division for all overhaul stages by naming the respective Part Number.

Overhaul stage	Diameter of Cylinder Bore in mm	Part Number
Standard size	75.00	001 037 22 18
I	75.50	001 037 23 18
II	76.00	001 037 24 18
III	76.50	001 037 25 18
IV	77.00	001 037 26 18