



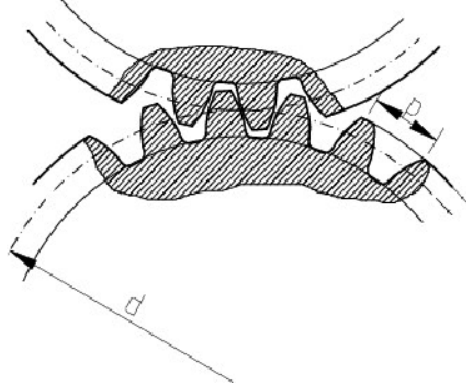
## Starters with different numbers of teeth

Within the framework of daily garage work, it may be that again and again starters with different numbers of teeth must be fitted.

Within the framework of product revisions, it may well be possible that starters with different numbers of teeth can be fitted to a vehicle.

In this context, what is decisive is not the pure number of teeth but the displacement of the centre of the armature to compensate for the difference on the ring gear.

The shifting of the armature shaft corresponds to half a *modulus* per tooth, where the modulus is always the ratio of the division  $p$  to the number  $\pi$  ( $\pi$ ), and therefore the diameter of the reference circle, or of the working diameter, results from the product of modulus and number of teeth. The gear and the mating gear must always have the same modulus.



If, for example, a starter with 11 teeth is to be replaced by a starter with 12, the armature shaft is moved 1.025 mm further from the ring gear at a modulus of 2.05.

The contact point of the circumference on the pinion and of the ring gear therefore remain identical despite the different number of teeth.

If, therefore, a starter with a different number of teeth is delivered, it can – provided that the vehicle was correctly assigned – be fitted easily.