



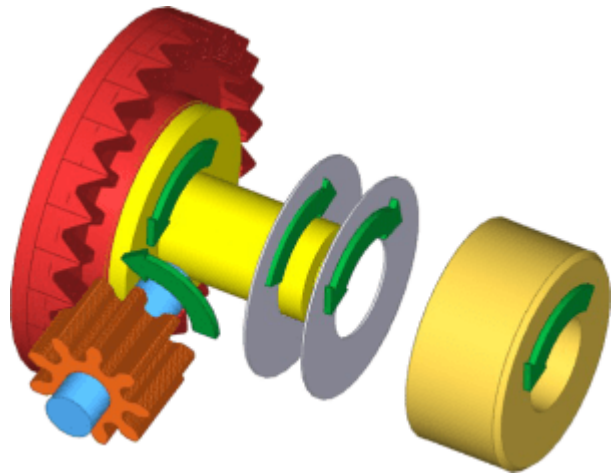
## The history and how-to of the M Crowns

After much development work, we are rolling out a completely new type of crown: the “M” type crown.

### What's in a name?

“That which we call a rose, by any other name would smell as sweet.”

We decided to call it 'M' because we found ourselves completely short of fantasy. It is not easy to give a name to a new product: some say 'found the name, made the company', but as our products are sold to competent racers, they must above all work well, and we didn't find a proper name. We could have baptized it soberly "Disassemblable crown in which the friction on the outer shoulder has been drastically reduced", but we immediately realized that the packaging in which we would sell them would not have been big enough to contain such a long name. So, to make it short, "M". "M" like "Mr. Bean". Or Marmot, or many other things that start with the M, like Mom, Metro, and Maserati cars.



So, jokes apart: M is the synthetic abbreviation of "modular divisible crown created with the aim of reducing as much as possible the friction that is created between the drive shaft and the outer shoulder of the centering groove: we managed to reduce it almost to zero". Linguistic synthesis achieved.

### A sore throat

It is a known fact: in order to maintain the coupling between the crown and the pinion, the part of the shaft opposite the crown teeth rests on the outer shoulder of the crowns' “throat” or groove. On that side of the crown the two parts, shaft and groove, rotate in the opposite direction, in contact through a very small surface, geometrically reduced to a line. The only thing that avoids the destruction of the shoulder is the oil film that is interposed between the parts, in addition to the strength of the bronze or hardened and Teflon

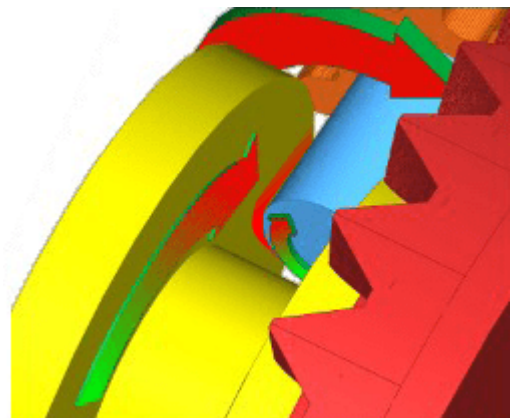


Figure 1: The arrows show the mutual rotation.

coated aluminium. If the axle starts grinding the shoulder of the crown, an unrecoverable degenerative phenomenon also takes place.

Despite this shortcoming, our system has worked well for twenty years, as we've relied on exact manufacturing, and specific metals and surface treatments. However, like all things that could be improved, we sat down at the drawing board, redesigned it, and applied for a patent, given the curious tendency of our pieces to reproduce themselves, especially at our competitors' hands.

It must be understood that the M crowns do not replace the traditional monolithic crowns: the latter are in fact very simple to assemble, less expensive, and have proven their quality over the years. They are within everyone's reach, while the new type requires a little patience in assembly.

On the other hand, the new ones offer a measurable performance improvement ("also sprach the stopwatch"), and the possibility of using pinions with a diameter of 5.5 and 6mm, replacing only the ferrule.

## Assembly how-to and caveats

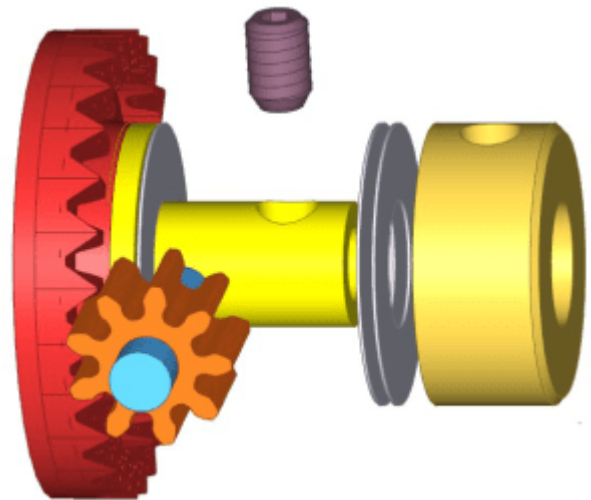
The new M crowns are composed by four basic pieces:

1. the gear side: the teeth are exactly the same as the usual Slot.it crowns, with a new insert. The insert has a non threaded hole.
2. the lock ring: this is the part that keeps the shaft in place. We have made two types: one is for the 5.5 mm pinion, one for the 6mm pinion.
3. the steel washers: they work as a bearing, free to rotate independently from each other and from the mutual movement of the crown and the shaft, nicely floating on a layer of oil.
4. the grub screws: the humble screw locks everything in the right place.

The crown, like the 'standard' monolithic ones, is co-injected on a hub, through which the rear axle runs. The first washer (optional) must be installed between the motor shaft and the gear side of the crown. Two washers must be interposed between the ferrule and the motor shaft. The ferrule itself is threaded, and the fixing grub screw locks the ferrule on the axle, going through the hole made on the hub, which is kept in place by the grub as well.

During assembly, a few fundamental points must be respected:

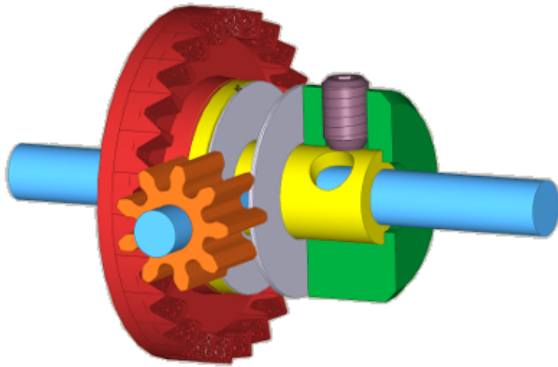
1. it is mandatory to use both external washers: they are not only necessary to reduce the friction and wearout, but the calibrated thickness maintains the proper coupling between the pinion and crown's teeth.
2. the grub screw **MUST** go all the way through to the shaft. In other words, make sure that the grub screw is inserted through the hole on the sleeve on the crown side.
3. the washer on the gear side is optional.
4. ferrule, washers and the groove on the crown must be oiled, preferably (hey! it is really a good



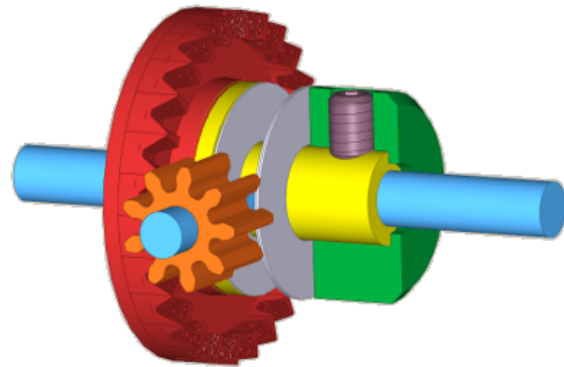
product!) with Slot.it Performance Oil SP40.

The crowns, and here is the other novelty, can be mounted with two different ferrules: the one in non-anodized aluminum must be used for the 5.5mm pinions, the orange anodized one is for 6mm ones.

The crowns are available with code GMXXo and GMXXi, where XX represents the number of teeth, o = offset, i = inline



*WRONG assembly: the grub screw is not inside the hole of the crown's insert*



*CORRECT assembly: the grub screw is completely inside the hole of the crown's insert*



## Some commonly asked questions:

Q: are the existing crowns going to be discontinued?

A: the existing crowns will not be discontinued at all. The traditional units are a time tested design, still the best of their breed.

Q: what are the advantages of the M crowns on the existing ones?

A: there are several, but mainly the new crowns are performance oriented. Our testing indicates a performance gain of 1% to 2% all other things being equal - which mean one extra lap at the end of a 100 lap stint. Besides, they can be used with 6mm pinion, therefore extending the range of ratios available to the racer.

Q: where does this performance increase come from?

A: as described by the pictures, the rubbing of the axle against the shoulder of the groove creates friction which, over time, may grind and wear the groove. We have inserted two steel rectified washers that work as thrust bearing, floating on the oil film which separates them, and the ferrule.

Q: Are the teeth any different?

A: the teeth are exactly the same as we couldn't find a way to make to improve what we already make.

Q: are there any disadvantages to the M crowns?

A: price is one, as they are more made by more parts, and the other point to keep in mind is that assembly requires good eyesight to make sure that no washers go amiss and the grub screw is properly inserted all the way to the axle.

Q: are those two washers really both needed?

A: Yes, absolutely. Running these crowns with one washer only, or, even worst, no washers, will quickly lead to the destruction of the gear teeth.

Q: there's an optional internal washer as well.

A: when torque is applied, the natural reaction of the pinion and crowns is to try to separate themselves. However, when the car is turning to the left, the centrifugal force acting on the car's mass presses the car's weight, or actually part of it, against the crown. This extra optional washer is used to relief pressure between the pinion and the crown, in this circumstance.