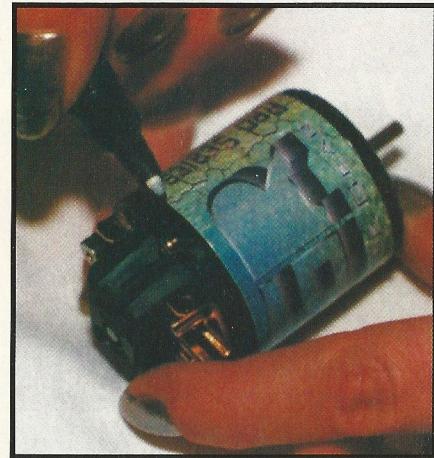


# Take Care of your



Always mark the can with some form of indelible marker before disassembly, so the end bell goes back in the same place.

Last month I covered some of the brief history of electric motors in R/C, basic theory and how to choose a motor for your class of racing. This month is all about motor care and if there is enough time I'll try to give a few hints and tips to make your motor go that bit quicker.

Firstly though, following in the steps of last month, some more help regarding gearing. I've done a bit of research (cheers Steve) into actu-

# Motors !!

Andy Griffiths's Electric Motors Guide Book Part 2

## Editorial note

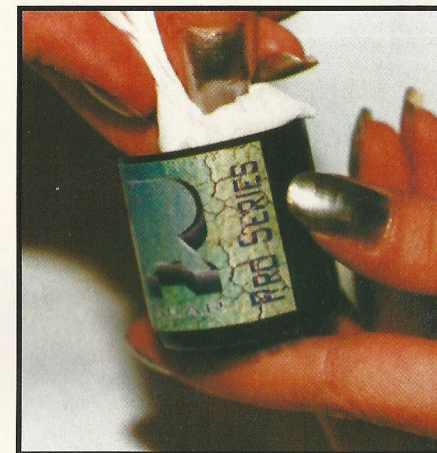
In Andy's last column there was a printing error in the example of how to work out your overall gearing. The overall gearbox ratio should be multiplied by the spur/pinion ratio..... not added. I'm sorry if this caused any major problems with overgearing.

No. of Turns	Cat 2000 EC	Yokomo YZ-10	Schumacher Fireblade	Losi XX	RC-10 B2	Scumacher SST	Losi XXT
11	16/22	16/84	17/89	17/84	19/81		
12	17/89	17/84	18/89	18/84	20/81		
13	19/95	18/86	19/89	19/84	21/81	22/83	17/88
						27/86	18/88



Remove the comm from the can very carefully, note the position of the spacer washers.

al pinion/spur combinations for various cars which may be more useful than just overall ratios.



Use a soft rag or kitchen roll to clean the inside of the can, don't spray directly into the can.

## Motor Care

- Cotton Buds
- Rag or Kitchen roll
- Motor Cleaner/Spray
- Comm Stick
- Screwdriver (small Phillips type)
- Brush Hood Alignment tool
- Patience

Every 1-2 races take the brushes out and look at them carefully, checking for any signs of discoloration. If they are ok they will be all be one bronze-ish colour. If they are a bluey burnt colour near the contact face, replace them immediately. This means that the brush has over heated and the natural lubricants within the brush will have dried out. The motor will still work but the brush will have hardened and without the lubricant, will soon wear away the commutator. You will also notice a drop in punch or 'sparkle'. If you find that you have to replace the brushes, and expect to every 6-8 runs in competition (more often with high silver or 'bad' brushes), it is best to give the commutator a skim at the same time. Frequent light skimming is much better than a heavy



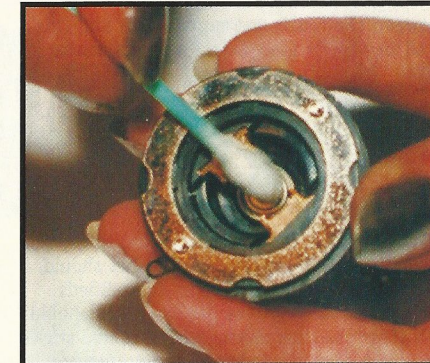
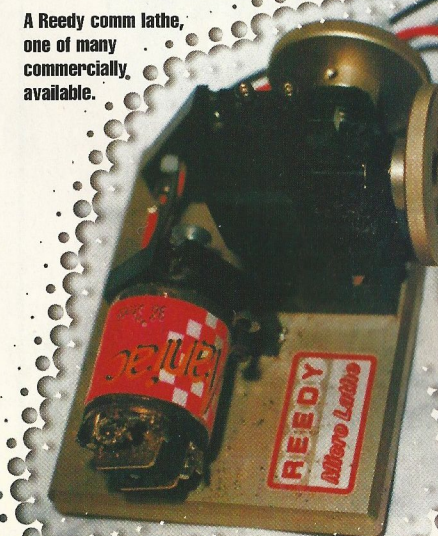
Again clean the com with a soft rag, spraying motor cleaner direct on to the winding can soften the epoxy.

skim every month! This can be done using a portable comm lathe such as those made by Twister etc. or by professional rebuild specialists like MG Model Products. If the brushes do not need to be replaced, simply clean the comm quickly with a good quality comm stick such as those made by Edge Racing Products and remove any dirt or deposits from the surface of the brush face with a cotton bud and re-assemble. Don't spray the brushes with motor cleaner as some of the more 'potent' varieties can dry out the brush lubricant and damage the brush. It is probably best to clear the brush hoods with a cotton bud before replacing the brushes so as to remove any dirt that could jam the brush, causing the motor to stop.

Every meeting the motor should be stripped down completely.

- Mark the can and endbell so that you can see clearly how to re-assemble the motor without altering the timing.
- Remove the springs and place them somewhere safe.
- Slide the brushes out of the brush hoods.

A Reedy comm lathe, one of many commercially available.



Clean out the end bell with a cotton bud soaked in motor cleaner.



Always re-oil the motor bearings after a re-build, don't add too much.

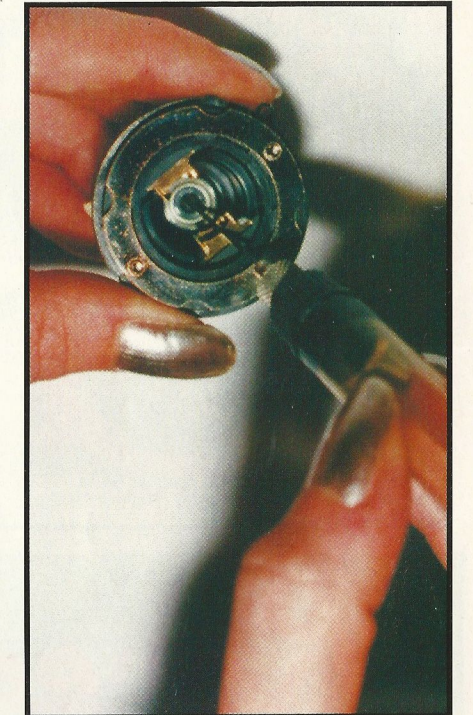
- Loosen the two main screws that secure the endbell on the can. carefully rotate the endbell until you feel it come loose and then remove it. It should not be necessary to completely remove the screws but if the endbell will not rotate freely you may have to remove them.
- Remove the armature from inside the can, being careful not to lose any of the washers/spacers. There will probably be some on both the top and bottom end of the armature.
- Put them to one side, remembering exactly where they came from.
- Spray some motor cleaner onto some tissue or rag and wipe around inside the can until all the carbon is removed.
- It is best not to spray directly into the can or endbell as this can force dirt into the bearings.
- With the endbell, spray motor cleaner onto a cotton bud and wipe around until clean. Again, don't spray directly into the endbell.
- Add a small drop of bearing oil (good stuff from HML or try Mobil 1) to each bearing, wiping off any excess with a cotton bud. Spin the armature in each bearing to check to see if it's running smoothly. If the bearing is notchy then you will have to flush the bearing

out thoroughly with motor spray. This must be done until the bearing feels smooth and then re-oil. If it is still notchy the bearing may need to be replaced. Motor bearings can be damaged quite easily due to the dirt associated with Off-road racing, and a bad bearing will dramatically effect the performance of the motor.

- Clean the armature with a motor spray soaked cloth. Don't spray directly onto the windings as some cleaners can soften the epoxy varnish. As described before, the commutator should be skimmed if possible.

- Re-assemble the motor, being sure to put all the spacers back in the right place and to align the endbell and can correctly.

It is very important that the armature is correctly spaced in the can to optimise the effect



of the magnetic field and the positioning of the brushes. You can check this by doing the following:-

- Assemble the motor with only the large fibre washer in place. Don't tighten the screws but hold the endbell on tightly by hand to save time.
- Spin the armature in the can, holding them motor horizontally. The armature will naturally come to a rest in the correct position. If you then push and pull the shaft and spin the armature again you will be able to feel where and how many spacers should be in the motor.

The idea is to space the armature so that it lies in its natural position. There are other points to take into account though that can control where you put the washers:

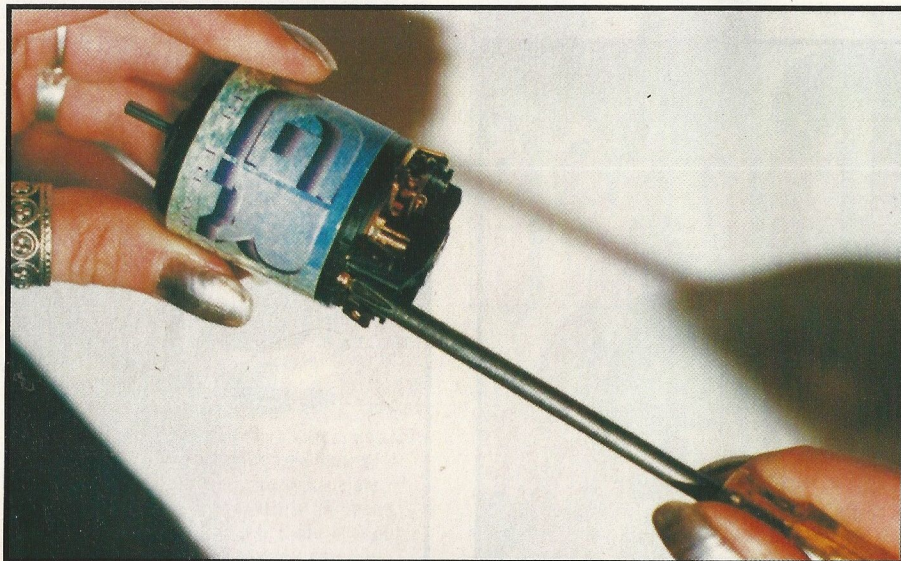
- Make sure that the windings do not rub on the bottom of the can.
- Make sure that the whole of the brush face is able to contact the commutator. Sometimes the magnets are bonded too low in the can (common problem with old style Epic Cans) pulling the armature out of view of the brush hoods. In this case more washers must be placed at the bottom end of the can.
- Make sure that there is approx 1/2 mm of end float when the endbell screws are fully tightened. Tip: very carefully, with the motor assembled and screws tightened, lightly tap



the armature shaft at both ends. This seats the bearings, improving alignment and optimizing the end float .

It is also important that the brush hoods are correctly aligned. This can be done using one of the tools available from either Trinity or S+K. With the endbell off the can, loosen the screws that anchor the brush hoods to the endbell and make sure that the brush hoods are free to move. Push the tool through both brush hoods and tighten the screws with the tool still in place. Remove the tool and there you have it - perfectly aligned brush hoods. This will improve the contact

**Aligning the brush hoods is very important.**



between the brush and commutator and this is all important for maximum performance.

## Stock/Standard motors

Cleaning these is some what easier to explain as you can't take them apart. Brushes should be dealt with in the same way as modifieds and cleaned and checked regularly. You should also clean the commutator with a comm. stick after each race if possible. If you use any additives ( I will explain about these at a later

date ) then you should clean any residue away from the commutator with a cotton bud after each race before adding any more. Clean the bushings with a cotton bud to remove any dirt or oil and add a single drop of fresh oil.

Each meeting flush the motor out thoroughly with motor cleaner. This can be done with the motor running on a low voltage say a 3 cell pack. Do not spray the motor with it in the car as I will not be held responsible for any violent explosions! If you spray the motor until the cleaner no longer flushes out carbon then it should be pretty clean. Leave the motor to dry and lightly oil the bushings,

Stock motors are notoriously difficult to keep in good condition but following the above should help prolong the life a little.

I'm afraid that's it for the moment as I'm rather pushed for time. Next month I'll try to give a few hints and tips to make your motor go quicker. If there's anything you would like me to explain or cover next month then please e-mail me at [teamagr@dial.pipex.com](mailto:teamagr@dial.pipex.com) and I'll try to fit it in. If you don't understand any of the terminology you should have read last month! **RRCI**

## Useful places

- **MG Model Products:** for rebuilds
- **Apex Models:** for S+K brush hood alignment tool
- **Trinity Stockists:** Trinity hood alignment tool, Comm sticks.
- **HML:** for lubricants and Edge comm sticks
- **Boots:** for cotton buds