

**Nick
Adams**

COMPETITION ELECTRICS

THE NUMBER OF DIFFERENT MOTORS AVAILABLE for 1/12th electric cars is still growing, although many are very similar but produced under different trade names. The IGARASHI motor is available, especially from the USA, in apparently hundreds of different variations, and it is very difficult to find out exactly what state of tune the motors possess, although the price is always clearly marked.

I have selected the MRP series of motors to illustrate a typical rational range of motors; whereas other traders such as PARMA produce many more variations the differences are not so easy to explain. I could have selected others, such as BO-LINK, JEROBEE, ASSOCIATED and TRINITY, but none of these offer such an easily identifiable range as MRP. This especially applies to ASSOCIATED which never carry any information on their labels except REEDY MODIFIED, which refers to the fact that Mike Reedy of Associated has tuned the motor and that alone should be sufficient to induce you into giving up your money.

TRINITY motors were being used by several Europeans at the recent modified meeting in Switzerland, but their availability in this country is limited to specialist suppliers.

The 550

The photograph shows the entire range of MRP motors from the 550 to the later 554. As discussed in an earlier article, the 550 is the standard class legal motor and is completely unmodified direct from the Japanese factory. It has 35 turns of 23 gauge wire and will have production tolerance balancing which normally means no drillings of the armature. The commutator will also be trued and the armature windings varnished.

The 551

The 551 motor at present is almost identical to the 550 except it has a fine degree of balancing carried out on the armature, which means balance drilling will be present. I believe this motor is as supplied by the Japanese factory, although it is possible that blueprints could be made up and assembled in the States under the 551 number. It is also



Modified end bells showing dots which indicate double and single winds

possible that the 551 represents a selected and 'broken-in' motor from the 550 batch. However, of all the 551 motors I have seen, they have always been 35 turn 23 gauge and I believe they are acceptable in the USA for standard-class racing. However, in this country, their price of £9.50 exceeds the £7.50 maximum which means they cannot be used (although I have my suspicions that some competitors change the labels with a 550 and therefore cannot be detected even on a motor strip-down).

The Associated Reedy Selected motor, which is in the same category as the 551, is, I am informed, having its price reduced to £7.50 and so will become legal.

One final point about the 551 motor is that some people believe it to be either 32 turns or 35 turns of the thicker, 22 gauge wire, but I have never seen one of these variations and cannot discover any evidence of their existence.

The 552

Moving now to the 552 motor, the photograph shows the old label design

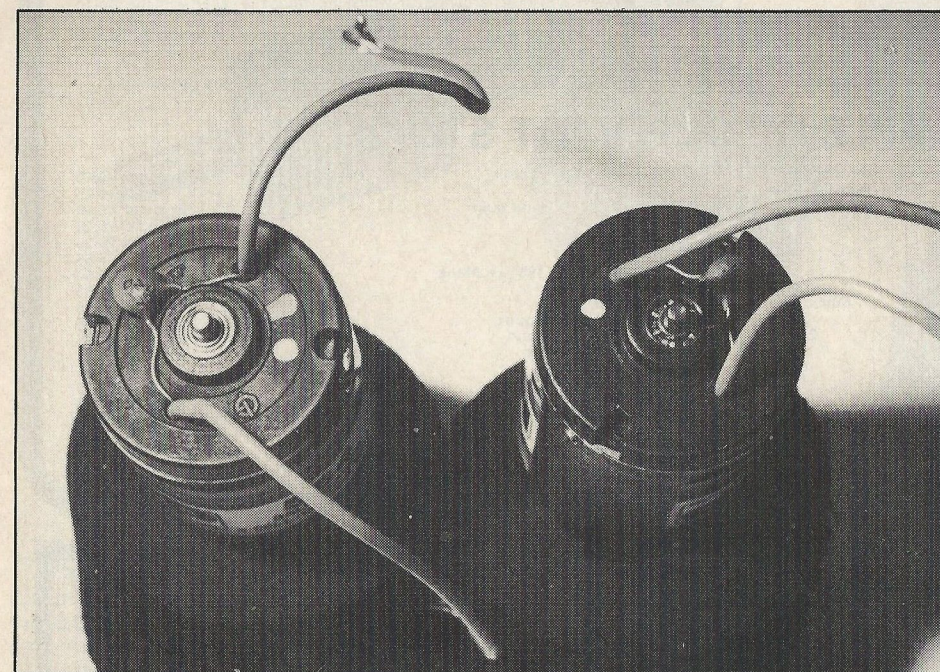
which has now been superseded by one of the new ones which proclaims, 'Factory Team Setup'. This motor is, in fact, a 32 turn of 23 gauge and once more is direct from the Japanese factory.

A useful performance gain over the 35 turn motor is available for a small extra cost, especially as this same motor is available as the PARMA PORSCHE for £9. However, although it is not legal for standard class racing, it offers an excellent choice for club racing, where the smaller venue restrains the expensive modified motors.

Again, this motor is offered as a 32 turn 22 gauge by some outlets, but all my examples have been 23 gauge, although I have had some of 33 turns. The ASTRO RACING SPECIAL red label motor is also a 33 turn 23 gauge, but is very well balanced and always seems to be a little better than the others in this range, but it is rather hard to find in this country.

The 553 and 554

We now come to the top-of-the-range



Timing marks show degree of advance.

motors, the 553 and 554, which are modified motors in many ways. As you can see, the 554 is a 4-cell version which is popular class in the USA, but almost entirely shunned in the rest of the world. However, this motor can be run on six cells with spectacular results, especially if race duration is not a problem.

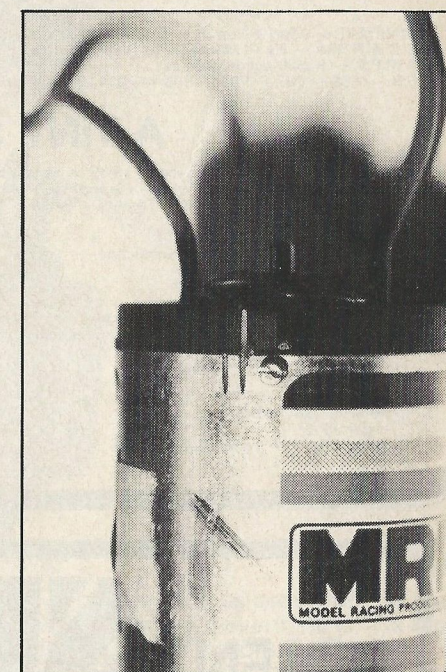
The 553 motor is the motor for 6-cell cars and it is available with several different winds of the armature. Unfortunately, like a lot of the other motors, in this category, it is very hard to find out exactly what state of tune the motor is in, although the price rarely strays from the £27 - £30 region.

Originally, the 553 was available with only two winds identified by colour dots on the end bell. A single orange dot meant a single wind of what looks like 29 turns of 22½ gauge, whereas a blue dot and a green dot meant a double wind, probably 29 turns of 25/26 gauge. Different colours are now turning up, but two dots means a double wind, and I am keeping a lookout for three dots or more!

Armatures are not available separately from MRP but others such as

PARMA and TRINITY have a large range available. Luckily the armatures come with labels proclaiming their wind characteristics, so if you want to do comparison tests you will need to buy the armatures and mark them before they get muddled up. The most popular single winds are 28 to 30 turns of 22, 22½ or 23 gauge and for double winds again 28 to 30 turns of 24/26, 25/25 or 25/26.

The photograph of the two end bells shows the one and two dots previously mentioned, but also shows the two different ball races fitted in the motors. One is of open construction which more readily allows cleaning since even the shielded type seems to get the fine dust into it which can result in loss of performance. In the photograph, the silicone, flexible wire and small capacitor can also be seen, these both having been added by the tuner. The capacitor is normally a .05uf 10v. ceramic type and is supposed to help stop sparking and radio interference although I have never been able to notice any difference with or without them. The final point to notice is the lack of metal lugs in the two grooves,



Typical range of motors.

these being broken off to enable easy assembly and retiming.

The photograph to the side of the motor shows the timing marks and the screws necessary to hold the end bell in place.

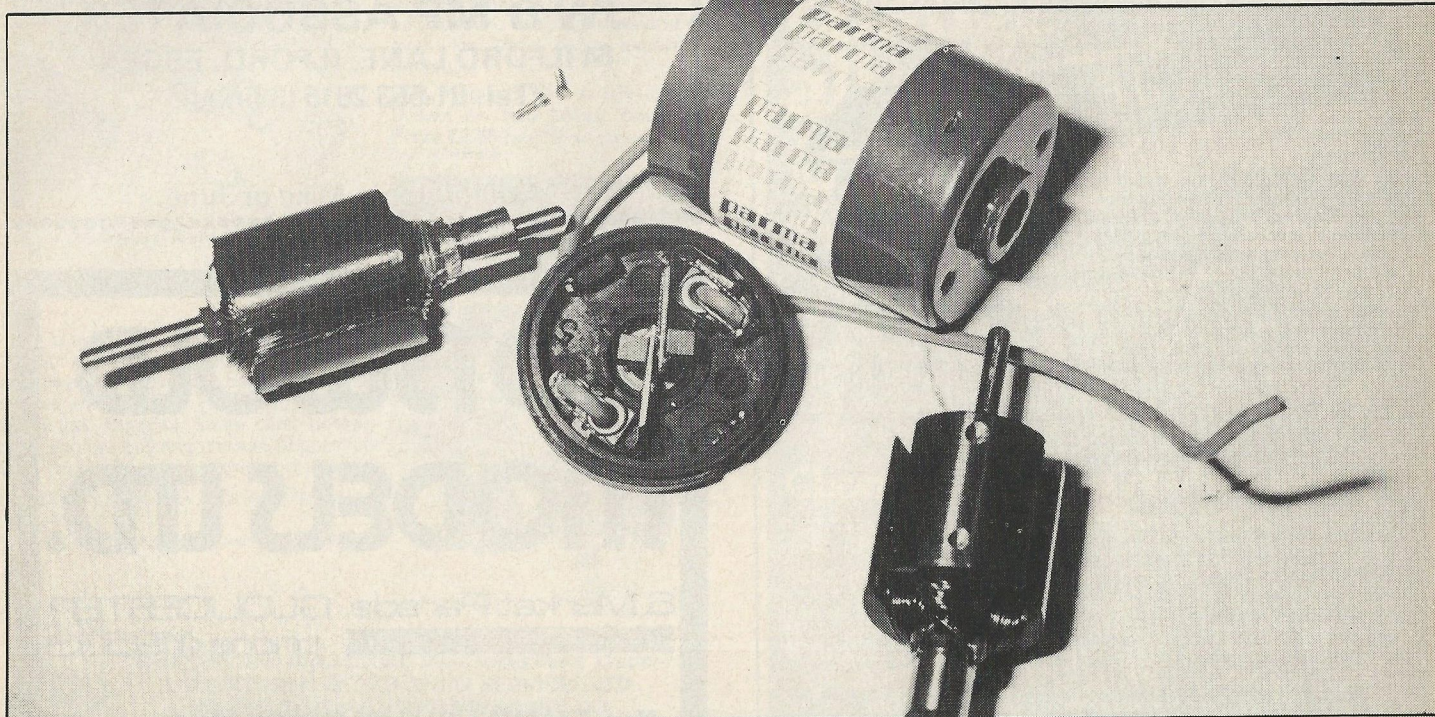
Notice the close fit of the end bell, which is essential to prevent rocking and subsequent brush and bearing misalignment. The timing mark furthest from the screw is the original nominal position and the setting as shown represents quite a small advance, whereas some motors are advanced two or three times as far.

The view of the motor parts shows clearly the shunted brushes, as discussed in an earlier article. The Parma 'can' is in fact one sold specifically with zapped magnets.

Continuing the analysis of a modified motor, the ceramic magnets held within the steel can hold the key to motor performance, since without excellent strength magnets, the motor will never respond to the effort of tuning all the other parts.

The rules do not allow the magnets to be changed for better and more expensive types such as

COMPETITION ELECTRICS (cont'd)



Modified motor parts, illustrating shunted brushes, zapped can, shingle and double wound armatures

Cobalt-Samarium, but their strength can be increased by a process commonly known as 'zapping'. This can be done with or without the motor assembled, and results in an increase in magnetic strength. However, the magnets will tend to lose their magnetism with time and especially if heated and knocked around, such as during an arduous race. Cooling fins and attachments are being used a lot in the USA, but strangely, these are banned in this country for standard class. Zapping of magnets is also not allowed in standard class, although it is not possible to feel the commutation difference between an excellent standard motor and a re-zapped, poor example.

Tuners will improve the magnetic properties of the motor further by removing the internal metal securing clips and fixing the magnets in place. Holes drilled in the space between the magnets changes the flux density and the characteristics of the motor and these holes normally two of $\frac{1}{4}$ in. diameter, also allow cooling by creating a fan effect with the armature. TRINITY motors have the holes, but a few others have been seen from PARMA. The SAGAMI motor has aluminium end bells at both ends and this results in a very unusual, no commutation feel.

In the photograph, the two modified armatures can be seen to be extremely neatly wound, which is essential for smooth operation. The tags holding the

wire to the commutator are normally soldered, with high-melting-point solder, for excellent contact, although some tuners weld these contacts. Binding of the wire behind the tags and then epoxy-coating all ensure that the windings and contacts never move.

One can only admire the careful work which goes into making a modified motor, but it still remains rather a mystery to a lot of racers why their £30 motor does not go any better than an off-the-shelf, cheap Mabuchi. The answer normally is the result of many

other things, such as gear ratio, nicads, weight of car etc. Nevertheless, it is true that sometimes motors just will not perform, and there is still a lot to learn about getting the maximum out of your motor.

At the time of writing, two important events have just taken place; these being the start of the modified outdoor meetings in Battersea Park, London, and the European Championship for Standard Class in Milan, Italy.

As far as I can determine, the results and motors were as follows:

RESULTS — MILAN — STANDARD CLASS. — DURATION — 8 mins.

Place	Name	Country	Laps	Time	Motor
1st	Neal Francis	GB	28	8.01.4	MRP 550
2	Bill Maisey	GB	28	8.11.9	PARMA RENAULT
3	Masnala	I	27	8.10.0	ASSOCIATED
4	Constantini	I	27	8.12.0	ASSOCIATED
5	George Land	GB	27	8.16.0	MRP 550
6	Daneu	I	26	8.05.5	ASSOCIATED
7	De Marchi	I	25	8.05.5	ASSOCIATED
8	Tony Wells	GB	-	-	MRP 550

RESULTS — BATTERSEA PARK — MODIFIED CLASS — DURATION — 6 mins.

1	Bill Maisey	23	5.58	IGARASHI, 33-turn
2	Steve Durrant	22	5.47	PARMA FERRARI
3	John Chamberlain	22	5.50	MRP 553 Orange
4	Neal Francis	22	5.53	Mabuchi Red end
5	Phil Greeno	21	5.54	MRP 554 red
6	Chris Sheldrake	21	5.59	PARMA FERRARI
7	Dave Tonge	21	6.00	PARMA VETTE 5
8	Geoff Peters	20	5.49	MRP 553 Orange.