

TEXT: Dez Chand  
PICTURES: desawadigital.co.uk

# INTRO

A lot of so called performance benefits are all hype and no go. Over the summer of 2003 there has been a great deal of this type of hype from Switzerland, and all from the men at Orion/Peak Performance, why?? Seems they have designed a new motor... so it's time to put the new Revolution V series to the test. It claims "new standards in power output, Efficiency and longevity". Normally they are inversely proportional, but the V2 technology allegedly denies the rules of physics. So let's see for ourselves!

## THE THEORY!!!

The seven patents on this motor add up to a revolution in motor design, sorry!! Each individually, offers a small bonus, but as a complete package they work together to achieve the optimum motor characteristics possible.

O' ring mounted bearings in the end bell reduce vibration and brush bounce, hence arching and comm wear! A good start.

The V2 angled brush tunnels produce a greater footprint of brush on comm, which allows a reduced spring tension without suffering brush bounce, for increased efficiency through reduced drag.

Cylindrical brush springs, wound with unequal lengths to eliminate harmonic vibration, are made from heat resistant 'Inox' steel for supreme heat resistance and longevity. They are available in four different load ratings for fine-tuning your motor.

"TALK ABOUT A  
REVOLUTION,  
WELL YOU  
KNOW..."

(JOHN LENNON)

# ROCKET POWER

ORION V2 HARA EDITION  
MOTOR (12 X1) ON TEST



The signature feature of the new motor, the alloy end bell. The circular brush tubes can be clearly seen



The revolutionary brushes and springs

Circular brushes offer smoother brush overlap hence less arching; again reduced comm damage is a bonus, along with minimised electrical noise and interference; two compounds of brush are available now:

### Enduro & Sprint:

Enduro is supplied standard with the motors and does what it says, lasts well, and probably delivers more torque, or bottom end if you like.

Sprint is softer, and of a different compound; this produces more power, but at a price, i.e. increased brush wear. If you don't mind this, which kind of negates the motors advantage,

## TOP TEN FEATURES OF THE NEW DESIGN

1. Trick looking red LED, mounted in the end bell, illuminates to indicate correct anti-clockwise rotation direction, and a good solid light verifies correct operation of the triple internal capacitor and running condition for interference suppression. No vulnerable, messy, external capacitors!
2. Strategic, twisted vents to take air out of end bell with rotation in conjunction with the Ultra Flow can design to aid cooling
3. Circular brushes offer smoother brush overlap hence less arching. Reduced comm damage is a bonus along with minimised electrical noise and interference. The brush guide tubes end very close proximity to the commutator so the unsupported length of brush protruding is minimal, increasing brush stability
4. Cylindrical brush tunnel springs, wound with unequal lengths to eliminate harmonic vibration, made from heat resistant 'Inox' steel for high heat resistance and longevity. Available in four different load ratings for fine tuning your motor
5. Corkscrew commutator gives more overlap, which boosts top end performance
6. Huge CNC machined alloy end bell rapidly soaks heat away from the copper brush tunnels. It does this so well that you need a super soldering iron to attach motor wires and brush leads. Want a good excuse to upgrade your soldering iron?
7. Drilled and epoxy balanced armature
8. O' ring mounted bearings in end bell to reduce vibration and brush bounce hence arching and comm wear
9. Angled brush tunnels for greater footprint of brush on comm, and it allows reduced spring tension without suffering brush bounce for increased efficiency through reduced drag
10. Hand wound pyramid pattern for maximum field effect

then this will unlock all the possible power. (Note: use the hard spring on the negative brush for best results)

## HEAT REMOVAL

The brush tubes guide the brush very close to the commutator so the unsupported length of brush protruding is minimal, increasing brush stability, and reducing heat build up. With a skewed commutator comes more overlap, which boosts top end performance. The stack is pyramid pattern hand wound for maximum field effect, and the shape of the stack 'fill' needs to be balanced on each lobe of the commutator for a well-balanced armature. The less drilling and epoxy balancing, the better the lines of electrical flux will be.

A high speed modified needs to vent more heat quickly to avoid permanent damage to the magnets and brushes, so the V2 can design is equally as outstanding as the armature within.

The huge 'signature' CNC machined alloy end bell rapidly soaks heat away from the copper brush tunnels. It does this so well that you need a super soldering iron to attach motor wires and brush leads. Want a good excuse to upgrade your soldering iron? Strategic vortex vents take air out of end bell with the rotation of the armature; drawing fresh air in through the Ultra Flow can design to aid cooling.

On top of all this, a trick looking red LED, mounted inside the end bell with the capacitors, illuminates to indicate correct anti clockwise rotation direction - no more excuses for a car that takes off backwards at the sound of the buzzer! Now was that really John Robson... anybody want to buy a video. It also serves as a status indicator; a good solid light verifies correct operation of the triple internal capacitors and a good commutator running condition for interference suppression.

Note the cooling slot cut in the endbell, and the shape of the cut outs on the can, this is designed to get as much airflow, and thus cooling though the can and past the brushes, all seems to work!!







This circuit board is for the capacitors and the various status LED's, also you can just see the insulators for the brush tubes



Here you can clearly see just how thick the end-bell is, and thus how good a heatsink it will be

Hand wound, this is how the comm looked after the first runs, and the brushes are only just bedded in



## RUNNING CHECK

Pulling the motor out for a brush check and dyno run revealed a healthy specimen, amazing! No time for mercy now, so I installed it straight into a touring car (HPi Pro 4) for some carpet racing, where high-speed straights and short stop-start corners are the norm. We were looking at high current drains, reduced airflow and a relatively heavy vehicle, compared to using it in say a 1:12th or other light-weight car.

With four runs throughout the meeting, we were getting progressively faster as I learnt a new circuit. This time we were in race mode, so were doing a more regular five minutes plus a lap. We were coming off the track with plenty of capacity remaining in the 3300 mAh cells to have run for eight minutes - very comfortable and plenty quick enough.

By the end of the night the tyres were indeed tired; the shell was full of rubber dust, the body battered in various 'racing incidents', but how was the motor? It still felt plenty powerful with no noticeable drop off after the equivalent of three race days' usage!

Between the two test cars this would have stressed the best of the current performance motors to the outer limits, so let's pull it out the V2 and see what it looks like, then record some dyno figures. Without even a quick look at the brushes, it was put to work on the dyno - flying right up to its 44,600 rpm ceiling. The dogs all down our street howled as it hit the high notes, yowch! No wonder it was tearing lumps out of the truck tyres! Look at those curves!

### 1 STRAIGHT FROM THE BOX:

Power: 199.2 watts  
Peak Efficiency: 76%  
RPM: 44,354

### 2 AFTER FIRST RUN:

Power: 216.1 watts  
Peak Efficiency: 70.8%  
RPM: 45,283

### 3 AFTER 25 MINUTES RACING

(new brushes fitted at start)  
Power: 200.1 watts  
Peak Efficiency: 72.1%  
RPM: 43,626

### 4 AFTER 50 MINUTES RUNNING:

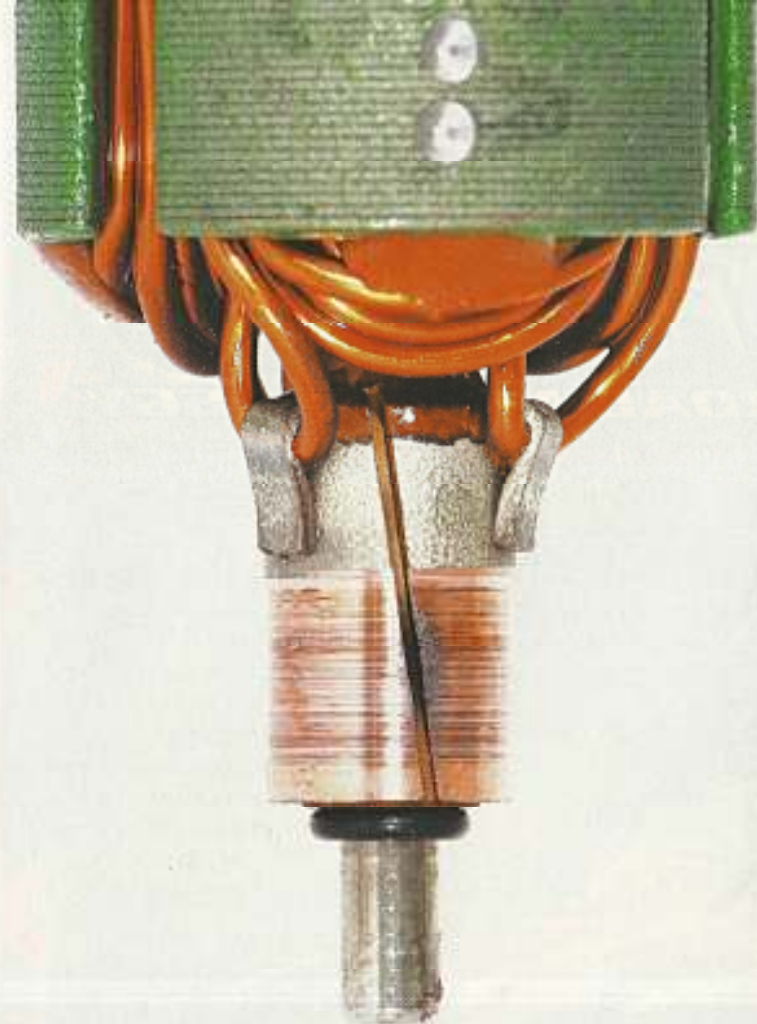
Power: 196.8 watts  
Peak Efficiency: 72.0%  
RPM: 44,358



## RACER'S CHOICE

The motor in question will be the racer's choice: a hand wound super-modified 12 single, the Hara version no less, with skewed comm (which is BRCA/EFRA touring car legal). There are a huge range of winds and special editions, from both Orion and Peak Performance brand (who are the same company), that cover every class and type of racing, but the test motor is likely to be one of the best-sellers. Once run in as per the instructions (4 cell pack run for 15 minutes under zero load), we ran it on the RRCi Robitronic

dyno and recorded the power characteristics, and then it was off for a thrash test - err, I mean evaluation track test. I installed it in a 1:10th truck and touring car, just to see how it would compare, I took a squint through various websites to get a starting gear ratio for the truck. I went for a 19-tooth pinion, which appeared over geared once I hit the street, real torture for the motor! I gave it one run like this and ran it on the dyno to see if I'd harmed it. The results showed I'd just completed the running in: a smooth power curve and more efficiency meant the brushes



A picture is worth a 1000... after nearly 50 minutes running this is how the comm looked, a small amount of burning is present, but nothing very major

were well and truly bedded. Dropping a couple of teeth brought the truck to life - suddenly the motor was pulling within its optimum rev range and I had a fight on my hands. Trying to keep a 2 WD truck in a straight line with a rocket ship motor isn't easy. I proceeded to trash it round the local Astraturf racetrack at Brandon. Again, high loads, short infield turns and a good long straight made gearing choice difficult. It's one of those layouts where punch is a premium, paid with high current draw. Being a non-race day, I could stay on track for as long as the batteries would last. I spared the V2 nothing by simply swapping to another pack of 3300 mAh cells and going straight out again. Torture! After 50 minutes run time, the tyres were going bald and the test was finally halted when I broke the truck by getting a huge jump wrong! Oops!

And this is how the brushes looked, still in very good condition, and no signs of damage

## QUICK SPEC

CLASS: S40 Electric Motor  
TYPE: Ready To Race  
MANUFACTURER: Orion/Peak Performance  
PRICE: To BRCA Electric Board maximum

## WHAT YOU GET

S40 Electric Motor, Top Can, CNC Machined Alloy End Bell, Twin Ballraces, Angled Brush Tubes, 'INOX' Coil Brush Springs, Circular Brushes, Surface Mount Capacitors, LED Status light

## CONTACT DETAILS

Mirage RCE, Units 1-3, Queens Drive, Swadlincote, Derbyshire, DE11 0EG  
Tel: 01283 226570  
www.teamorion.com  
www.miragerce.com

## NOTE:

Over a long period of running/racing (100 minutes running or 4 race meetings) the motor lost less than 6% of its total performance taken from its best power curve. Other than one set of brushes there was no other motor maintenance other than cleaning out the dust from the can. This is pretty staggering, just think how often you service your current motor just to keep it on top line.

RRCi

## VERDICT

In conclusion, I found a high performance motor that needed gearing lower than any comparable spec motor wind due to its very high-speed capabilities. Design enhancements improved the longevity of its major components, by managing the heat flow out of the can to improve the efficiency and power available throughout a race day. Reduced maintenance requirements and stretched servicing intervals means the V2 design leaves you time to concentrate on your handling and set up while it delivers all the power you need to get through a full race meeting, or two or three! Well done Orion/Peak!!

