



## So – Which brushless motor is best for your car?

Here we try to answer the question for you and explain some of the numbers on the motors.

As our example, we will use this motor. This is a product sold on RCScrapyard.com. It is a Brushless Motor and is described as 3650-3100KV



3650-3500KV

So let's Break that down, into sections we can actually understand.

### **3650**

**36** = The width (diameter) in mm of the motor casing

**50** = The length in mm of the motor casing

Those numbers help you to determine if the brushless motor will fit into your car. If you are converting from a Brushed motor, usually a 540 Motor, then a 3650 brushless motor will be a perfect sized replacement.

## **3500KV**

**KV** = turns per volt of power. So K=x000 turns per V volt of power.

Lets make it easier – 3500K = 3500 turns per volt per minute.

Assuming this motor runs on a 7.4V Battery, we can do the following calculation which will give us the maximum amount of RPM assuming the motor is not under load (ie not in the car)

$$3500 \times 7.4 = 25,900 \text{ rpm}$$

So a maximum speed of 25,900 RPM indicates a good all round brushless motor which would be ideal for converting a brushed car, truck or buggy into a quicker accelerating vehicle but with a fast and manageable top speed.

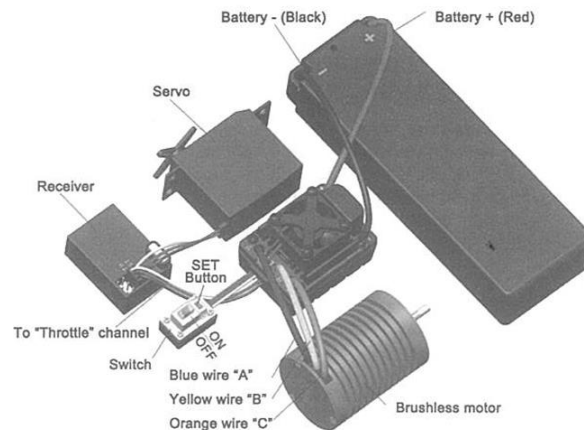
Something that is not often mentioned as part of these numbers is the current draw the motor is likely to use. These are normally provided as two ratings, Continuous and Burst. The Continuous rating is the current likely to be drawn as the car is running, ie it's up to speed and in full motion, whereas the Burst, is a much bigger current draw usually seen when a motor is put under hard acceleration or from a standing start. This normally only lasts a few second, but can be much longer depending on many factors, including user skills and terrain. The 3650-3500KV motor above has a rating of 55/340. So that's 55 Amps continuous and 340 Amps burst. Thus is important when choosing the right ESC to go with your motor. We will cover that topic later.

As a rule of thumb, Motors with a higher KV rating will have a faster top speed, but will be slower on acceleration, whereas motors with a lower KV rating will be very fast on acceleration, but have a slower top speed.

In my opinion the 3500KV motor is an excellent replacement for a brushed motor, providing close to double the acceleration speed and top speed of the equivalent brushed motor, when used in most vehicles. If you have a road going car, you may want to consider a 5000KV for additional speed, but using s 5000KV motor in a truck may make it sluggish on acceleration, especially when coming out of corners, but ultimately the choice is down to the user. That said, if you want to play around with motor KV ratings, for speed or acceleration, you will need to make sure your ESC is rated correctly, and your battery is up to the challenge! This is explained in a separate article referenced below.

As a final note – It is not possible to directly replace a brushed motor with a brushless motor as the control electronics are entirely different. For example a brushed motor has two wires, whereas a brushless motor has three. You will also need an ESC (electronic Speed Controller) which is specific to the type of motor (brushed or brushless) you are running.

Below is a schematic of how the Brushless Motor and ESC is connected together.



If you would like to know more about Brushless ESC's and how to match an ESC to a Brushless motor, please see my other article called "**Which ESC is best for your car**" This explains the different current ratings, why they matter, and how to choose the right one to go with your motor.

Complete Brushed to Brushless conversion kits are available on [RCScrapyard.com](http://RCScrapyard.com), along with separate components including Batteries and Chargers.

[RCScrapyard.com](http://RCScrapyard.com)

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