

# **Himax** Brushless Outrunner Motor HC6320-250



Himax Brushless motors are manufactured to high standards for the discerning modeler. Designed for lightweight, high efficiency, high torque, and durability Himax Outrunner motors are sure to make today's radio controlled models perform. Please read the entire operating manual to ensure correct functionality and best performance.

The HC6320-250 motor is made for large models weighing up to 10 Lb for 3D flight, up to 17 Lb oz for aerobatic flight and up to 22 Lb for leisurely flight.

#### **Accessories (included):**

- 2 - Prop Adapters
- 3 - Female 4mm connectors
- 1 - Motor Mount Kit
- 2 - Hex Keys

#### **Features:**

High Efficiency - High Power - High Torque - Lightweight - Replacement for 1.20 cubic inch glow or gas engines

#### **Specifications:**

Weight: 450g, (15.9oz), Motor only  
Max Power: 1700W, (This is dependent on several factors)  
Max RPM: 10,000 RPM  
Diameter: 63mm, (2.48")  
Length: mm, 51mm(2.01")  
Shaft Diameter: 8.0mm (.315")  
Maximum Case Temperature: 65°C, (149°F)

#### **Electrical Specifications:**

Kv = 250 rpm per volt  
Rm = .041 ohms  
Io = 1.3 amps at 20V  
Efficient Operating Current = 30-60A Continuous,  
80A Max 15 seconds

#### **Recommended Accessories:**

80 Amp Brushless Speed Control  
9-12S Lithium Polymer or 27 to 36 Cell NiCd or NiMH Battery,  
capable of 60-80 Amps

#### **Operation:**

1. Himax Brushless motors require brushless sensorless speed controls. Failure to use a brushless sensorless electronic speed control (ESC) can result in damage to the motor and/or ESC. A Castle Creations Phoenix series ESC is recommended for best performance. The standard setting for timing advance is recommended for best operation.
2. The three motor wires can be connected to the three output leads of the ESC in any order. Check the direction of rotation of the motor. If the motor spins in the wrong direction switching any **two** of the motor wires will reverse rotation. Be sure to insulate the wires to prevent shorting which may damage the ESC.
3. **Do not shorten the motor wires.** Shortening or cutting the motor wires voids the warranty and may cause motor failure. If the supplied connectors are not to be used, remove them by desoldering. **DO NOT CUT THE CONNECTORS OFF!**
4. Allow for proper cooling of the motor during operation. With extremely high capacity batteries, care must be taken to prevent excessive motor temperature. Overheating of the motor is not covered under warranty. Insufficient cooling can result in overheated motors, even when operated at moderate power levels.
5. Do not disassemble the motor. Disassembling the motor voids the warranty. If service is required please return the unit to Maxx Products for service.
6. Install the propeller after proper rotation has been determined. Consult the ESC operation manual for proper arming and use procedures. Be sure the prop is clear before starting the motor. Once the battery is plugged in stay clear of the prop, electric motors are capable of extremely high torque and can be very dangerous.
7. Verify the current draw. Excessive current draw will overheat and damage the motor. Overheating is not covered under warranty. The current must be within limits at full throttle. Verify the power consumption. Certain setups will run into the power limit before the current limit. Observe the current and power limits, which ever comes first. The 15-second max current rating is for 3D or limited motor run applications. Excessive use at high throttle settings when set up for the 15 second rating will overheat the motor. Allow for adequate cooling between bursts.

REV: 4/6/06

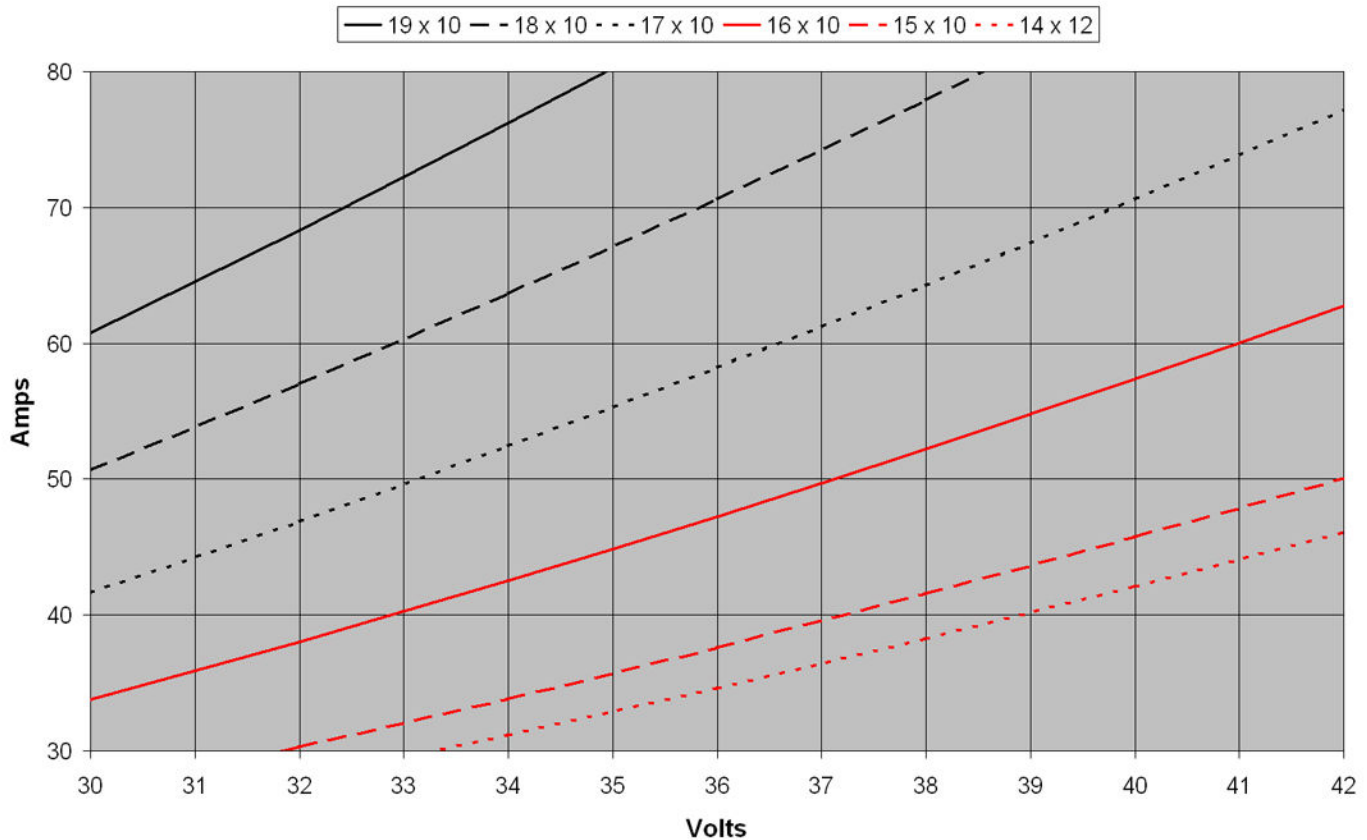
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## HC6320-250 Current vs. Voltage with Propeller



### Reading the Chart

The graph represents the HC6320-250 operating range. Current ratings are noted on the front of this manual. The suggested props are not a recommendation for a specific airframe or flying style. The graph does give a range of props to work with and an idea of the current draw. The chart assumes APC Electric series propellers. First, approximate the operating voltage, 1- 1.1 volts per NiXx cell or 3.3 volts per Lithium cell. As an example we are using a 10S lithium pack.  $10 \times 3.3 = 33V$ . Follow along the 33V line up the chart. If using an 18x10 prop this motor will draw approximately 60A. This would be acceptable for full throttle continuous flight if adequate cooling is provided. If the 18x10 prop were used at 38-39V, current would be about 80A. This would allow 15 second bursts of full throttle with enough power off time to allow the motor to cool. For propellers in this size range it can be assumed that adding two inches to the pitch equals one inch in diameter. This means that in the example above at 33V the 18x10 drew ~60A, a 17x12 would have similar draw. Battery voltage under load varies greatly. The user must measure current to prevent damage to the motor or ESC.

### Propeller selection:

Use the chart to start with propeller selection. It is a starting point and we recommend testing several props on the model to find the best performing prop. **Verify current draw when testing props.** A 3D model will use a prop very different than a model intended to fly very fast. Generally, 3D models will use a prop that has a pitch to diameter ratio (P/D) of 0.5 or less, like 10x5 or 12x5. Most sport models will use a prop with a P/D or 0.6-0.8. Models that are designed to fly at high speed or have other special requirements will use props in the 1.0 P/D range. The highest static thrust will be available from the 0.5 P/D props, but they have limited top speed. Highest speeds can be attained with 1.0 P/D props, however low speed thrust and acceleration is limited.

### Choosing a power system:

Power system can be chosen based on the type of flying expected of the model and all up weight of the aircraft. Sedate flying from a hand launch requires 35 watts per pound (W/Lb). Taking off the ground needs approximately 50W/Lb. Aerobatics and good climb performance, 75W/Lb. Anything more than 75W/Lb will result in excellent performance. Based on the weight of the model and the flying desired, the power require can be calculated. Select the voltage of the battery being used. It is best to use a loaded voltage of about 90% of nominal. Now, calculate the current required. From the chart, pick a motor at the voltage you intend to use and find the prop that pull the required current.

### Maintenance:

Brushless motors are almost maintenance free, so minimal care is required for long life. Keep the motor clean free of dust and dirt, especially the bearings. Dirty bearings wear quickly. Lubricate the bearings occasionally with light oil. Do not immerse the motor in water, or solvents. Do not bend the wires excessively and secure wires to prevent breakage due to fatigue from vibration. Always used balanced propellers to reduce loads on bearings, to reduce noise, and reduce stress on the airframe.

### Warranty:

Himax motors have a two year limited warranty to the original owner, excluding gearboxes. All motors are guaranteed to be free from manufacturing defects within two years of date of purchase. Not covered under warranty is crash damage, customer abuse, improper use, or overheating. Warranty claims should be handled directly with Maxx Products, 815 Oakwood Rd, Unit D, Lake Zurich, IL 60047. Be sure to include contact information and a description of the problem including which ESC, battery, and prop was being used. If possible visit [www.maxxprod.com](http://www.maxxprod.com) to obtain a service form.