

Himax Brushless Outrunner Motor

HC4220-770



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 HC4220-770 motor is made for medium size models weighing up to 4.5 Lb for 3D flight, up to 6Lb for aerobatic flight and up to 8 Lb for leisure flight.

Accessories (included):

- 1 - Prop Adapter
- 3 - Female 3.5mm connector
- 4 - Motor Mounting Screws
- 1 - Motor Mount Kit
- 4 - Hex Keys

Features:

High Efficiency - High Power - High Torque - Lightweight - Replacement for .40-.60 size engines

Specifications:

Weight: 200g, (7oz), Motor only
Max Power: 700W, (This is dependent on several factors)
Max RPM: 12,000 RPM
Diameter: 42mm, (1.7")
Length: mm, 50mm(1.9")
Shaft Diameter: 5.0mm (.2")
Mount Screw Thread: M3, 5 mm max depth on 25 mm (1.0") circle
Maximum Case Temperature: 65°C, (149°F)

Electrical Specifications:

HC4220-770 Kv = 770, Rm = .02, Io = 2.4@10V
Efficient Operating Current = 30-42A, 60A Max 15 seconds

Recommended Accesories:

50 to 60 Amp Brushless Speed Control
3-4S Lithium Polymer battery, capable of 40-60 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 wires of the motor 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. Reversing the shaft does not void the warranty. See our website under "Tips & Tricks". 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.

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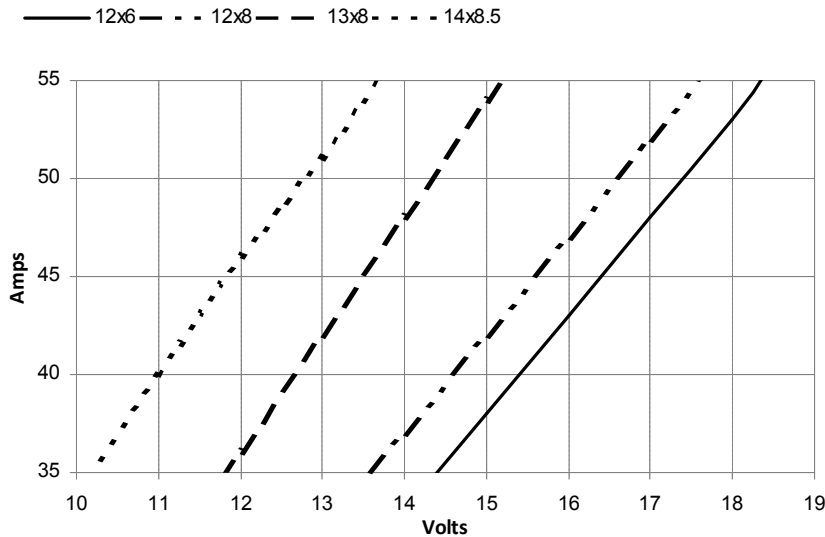
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MDI

HC4220 Current vs Voltage with Propeller



Removing or Reversing the Shaft:

1. First of all, never use a hammer or heavy object to pound or tap on the motor. Sharp impact will damage ball bearings and other components.
2. Use an allen wrench to remove the setscrews in the endbell and the wheel collar. The setscrews may be tight because thread locker is used to secure them.
3. Separate the stator assembly and rotor assembly. This may be tight because thread locker sometimes seeps between the shaft and ball bearing. Heating the rotor with an air-gun will help.
4. In order to maintain critical balance, the shaft fits tightly in the rotating endbell. Use an arbor press or drill press to exert steady pressure to push it out of the endbell. Before applying pressure, make sure the press and shaft are aligned. Avoid using a vise because it is difficult to maintain proper alignment with a vise.
5. There are flats on the shaft. Align the flats with the set screws, and tighten.
6. Put the rotor and stator assemblies back together and reinstall the wheel collar. If you wish to use thread locker, use only a removable type.

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 regularly 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 use balanced propellers to reduce loads on bearings, to reduce noise, and reduce stress on the airframe.

Reading the Chart

The graph represents the HC4220-770 operating range. Current ratings are noted on the front of this manual. The suggested props are not a recommendation for any 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, 3.5 volts per Lithium cell. As an example we are using a 3S lithium pack. $3 \times 3.6 = 10.8V$. Follow along the 10.8V line up the chart. If using a 15x8 prop this motor will draw approximately 47A. This would be acceptable for full throttle continuous flight. If a 16x8 prop were used, current would be about 58A. This would allow 15 second bursts of full throttle with enough power off time to allow the motor to cool.

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, 100W/Lb. Anything more than 150W/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 95% 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.

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.

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 to obtain a service form.

Service:

Himax motors in need of service should be sent to Maxx Products, 815 Oakwood Rd, Unit D, Lake Zurich, IL 60047. Please include a note explaining the problem. Return shipping for repair estimates must be prepaid.