

CYCLON Mini Heli From Electronic Model - Instructions

Congratulations, you have just acquired a Brushless motor from Electronic Model. This motor is intended only for powering helicopters. This motor is not for use in a boat, in a car or a plane. The motor is best powered by sub-c cells 500 to 2000 mAh capacity or good quality Li-Po's. Using 10 cells at a power consumption of 15 amps, this motor can fly with ease models up to 800 gms with a rotor diameter of 50 cm to 70 cm. The main technical features of this motor were studied and calculated in order to optimise the output during the flight phase and not to look good on a bench test. The range Heli Cyclon motors use the NFS Principle (Noro Fabrice System). This process allows the motor to attain considerable power for very low weight. Your Cyclon Motor possesses a record power to weight ratio, as it can develop 160 W continuous and more than 200 W in peak power a weight of only 50 grms.

Characteristics of motor using timing of 4-15 °

Power with 10 cells : 160 W continuous , 200 W peak (30 seconds)

Efficiency : 81 % at 11 ,5 V – 44A. , Timing 4 °

Current : 15 A Continuous , 20 A peak (30 seconds).

Wiring Resistance : 0, 055hm /Phase , 0,113 Ohm au total.

KV = 2835 Revs/ Min / Volt I_o = 0,9 A (6v)

Dimensions : Diameter 26 mm , Length 32 mm (without shaft) , Weight : 50 gr

Controller

Like all brushless sensorless motors (without sensors), this motor needs to be used with an adequate controller. The utilisation of a maladjusted controller can greatly lower the performance of your motor at the same time overheat it, creating irreparable damage. The output is directly bound to the compatibility of the whole Motor/Controller/Battery combination. Being given the important number of available controllers on the market, It is difficult of prepare an exhaustive list, more so as many have a variety of programming options, which can make them compatible or not compatible. In all events, we advise you to use a controller of variable timing. Attention, it doesn't mean to say that these motors could be controlled by all the controllers with variable timing!!

The timing is only one of the numerous features of a controller! It is important that the controller is also designed to control a Multi pole motor.

The timing to use is from 4 to 15°

Battery

Choice of battery for propulsion is just as important as the other components in the chain of propulsion. Never forget that the batteries constitute the reservoir of your motor. The capacity of the battery plays on its structure and its internal resistance as a check on the output. On these grounds, always use batteries designed for high output. E.g.: A battery of 1800 mAh with low output of LR type is unusable. Preference therefore is for cells of RC type 1200, RC 1600, GP 2200 or all other cells having a low internal resistance. Attention do not use cells designed, for example, to supply low currents for the use in transmitters or receivers. You will be able to also use some Lipo cells, In this last case, you will insure that your cells could discharge at least 15 amps continuous.

Installation

Your CYCLON motor has M2.5 threaded holes for fixing a mount to the stationary part of the motor. It is recommended that you use these as your method for mounting the motor. It is important that the length of the screws is such that they do not pass further than 2 mm in to the interior of motor. It is greatly advised against fixing your motor by a system of a clamp or collar around the stationary cover of the motor.

Your CYCLON motor can be easily disassembled for exchange of the shaft or in order to change the exit end of the shaft. If you want to disassemble your motor in order to switch the shaft around or for any other reason, it is essential to replace the hexagonal screw that keeps the end bell in place on the shaft, on every re-assembly. On re-assembly this screw must be new and very tight because the forces passing through this fixing are very high on this part. A bad assembly could cause the destruction of the motor! We recommend you also regularly check that this fixing is very tight. Attention, the bell of this motor could reach of very high speeds of active rotation until 40000 towers/ minutes.

It is indispensable to take all precautions in order to protect the health of motor and the security of the user.

Never run this motor unconnected to the rotors.

The motor must be connected to the controller by the 3 wires. We recommend you solder the wires of the motor to the wires of the controller. In case you would wish to use connectors, it is indispensable that they are of quality, of PK 4 mm or PP 3.5 mm types. It is indispensable to have a length of flexible wire between the motor and the controller. Never join the cables of motor directly on to the controller, use some flexible wire.

If no flexible wire is used there is a high possibility that the stiff motor wires will fracture due to the vibration with the possibility of damage to controller and motor.

The motor needs ventilation. The apertures in the motor are there for this reason, to assure correct cooling. Thus if the motor is enclosed you need to make sure you have apertures to feed the motor with an airflow, it is as important to have an exit for the air as well, this should be at least 1.5 times the area of the inlet. It is very important of taking care of this point because the air circulation can vary in the cockpit of a helicopter.

Transmission connection

The choice of the ratio of reduction is important. It is this which is going to determine the speed of rotation of your rotor and load on the motor.

This must be adapted to the helicopter, to the motor, to the number of cells and your style of flight.

It is very important when selecting the best combination of gearing. The lowest gearing that produces the optimum rotor head speed is best. The motor must therefore turn as quickly possible and the gear ratio be the highest possible.

Never choose a combination of reduction that will would push your rotor to 3000 Revs at full power, then use the throttle to come down to 2000 Revs at the rotor. This abuse will have for consequence of overheating your motor and your controller causing their destruction. In any event this set-up combination will produce mediocre performance from your helicopter (and only for a short time before you destroy your motor and controller).

It is therefore preferable to power with the throttle from 85 to 95% while stationary, and throttle up to the maximum in transition to flight. If in this case you see that the speed of rotor rotation is too high, you must decrease the number of teeth and not the percentage of throttle on your radio. If your rotor doesn't turn enough quickly, you must of course use a pinion with more teeth.

Your Cyclon Mini Heli motor turns to 2850 revs per volt with no load. The mid load speed is in the region of 2600 revs per volt.

In order to calculate your reduction ratio you must know what speed of rotation the rotor needs to run at.

Some helicopters require 1800 Revs only, some other need 2500 or 2000 revs in order to fly correctly.

Below therefore is the formula in order to calculate the ratio of reduction:

$$\frac{(\text{Number of NiMh cells used} \times 1.1 \text{ V or Li-po} \times 3.7) \times \text{Revs of motor under load (2600 revs per volt)}}{\text{Speed or rotor wanted}} = \text{Reduction ratio to use}$$

An example for The ZOOM 400: 3 (Lipo cells) x 3.7 x 2600/ 2200 revolutions of rotor= 13,1.

The Zoom 400 uses a crown of 133 teeth, you can therefore divide this by the reduction ratio 133/ 13,1= 10.15. Use 10 teeth for a rotor speed of about 2200 Revs. 11 teeth will give about 2400 Revs and a 9 teeth about 2000 Revs.

This Mini Motor for heli's is compatible with many machines of mini helicopter of variable pitch, the list is not exhaustive:

Zoom 400, Carboon 2 CP, Trex 450, Tiny 2 CP, Emingburd CP, MS Hornet 1 and 2; etc.

For utilisation on the Mini heli's of fixed pitch, like the Carboon, the GWS and other PicoLo, we recommend the Mini Cyclon 3.

GOOD FLYING!