

## Order List

### 1. Wheels

<http://store.kornylak.com/ProductDetails.asp?ProductCode=FXA314>



<http://store.kornylak.com/ProductDetails.asp?ProductCode=FXA315>



<http://store.kornylak.com/ProductDetails.asp?ProductCode=FXA317>



Price: \$ 7.48 for each

Total Price: \$ 22.44

The suitable one should be chosen according to the motor shaft in order to ease the coupling.

## MOTOR

### Brushless Motors

Some of the suitable motor that are candidates for our application.

Since they are running in high speeds we need to gear them down. It will also add some extra cost.

Also the ESC are costly and most of them does not support multiple run off motors.

The minimum price for a motor is about 20 dollars , and for the ESC is around 30 dollars. The minimum expected price for a motors + plus controller will be a least 90 dollars if we can run the 3 motors in a single Esc. Also there should be an extra cost to gear them down.

### 1-)Technical Specifications for **Hacker A10-12S**

Motor Type	Brushless, Outrunner
Weight	15g (0.53 oz)

Power	55 Watts
RPM/Volt (KV):	2900
Continuous Current	4A
Burst Current	6A
Recommended Propeller	APC 6x3
Recommended Lithium Polymer Battery	2 cell, 200mAh to 500mAh, (TP-350-2SPL2, TP-480-2SPL2)

Price: 33 euro

<http://www.rctoys.com/rc-toys-and-parts/HA-A10-12S/RC-PARTS-BRUSHLESS-MOTORS.html>

## 2) ADH50XL Micro Brushless outrunner 3000kv

Weight	: 7.3g
Kv:	3000rpm/v
Size:	13.9 x 22mm
Max current:	4A
Current:	10V/0.31A (No load)
Shaft:	1.5mm
Shaft length:	5mm
Prop:	4025

Test data;

Price: 16 euro

[http://www.hobbycity.com/hobbycity/store/uh\\_viewitem.asp?idproduct=10576](http://www.hobbycity.com/hobbycity/store/uh_viewitem.asp?idproduct=10576)

3)

Model #: Alpha 250 (63M11)

Kv:	2200Kv
Input Watts:	55W
Resistance:	.25 ohms
Idle Current:	.45A
Continuous Current:	7A
Max Burst Current:	8A
Cells Ni-Cd/Ni-MH:	6
Cells Li-Po:	2
Weight:	0.9 oz (25g)
Overall Diameter:	1.02 in (25.8mm)
Shaft Diameter:	0.11 in (3.0mm)
Overall Length:	.95 in (24.2mm)

Price: 7.9 euro

<http://www.hobbypartz.com/alpha-250--2200kv--brushless-motor-.html>

<http://www.raidentech.com/al2502oubrmo.html> ==> 20 \$ in that side.

4) Model #: Alpha 400 (63M16)

Kv:	740Kv
Input Watts:	100W
Resistance:	.26 ohms
Idle Current:	0.55A
Continuous Current:	7A
Max Burst Current:	10A
Cells Ni-Cd/Ni-MH:	6-10
Cells Li-Po:	2-3
Weight:	2.1 oz (60g)
Overall Diameter:	1.1 in (28mm)
Shaft Diameter:	1/8 in (3.175mm)
Overall Length:	1.22 in (31mm)

Price: 24.95 \$

<http://www.nitroplanes.com/al4007brmo.html>

5 ) Model #: Alpha 300 (63M12)

Kv:	1380Kv
Input Watts:	85W
Resistance:	.33 ohms
Idle Current:	.40A
Continuous Current:	7A
Max Burst Current:	9A
Cells Ni-Cd/Ni-MH:	6-10
Cells Li-Po:	2-3
Weight:	1.25 oz (35g)
Overall Diameter:	1.1 in (28mm)
Shaft Diameter:	1/8 in (3.17mm)
Overall Length:	.85 in (23mm)

Price: 19.95 \$

<http://www.xheli.com/al3001oubrmo.html>

## ESC s

### 1) Hacker X5 Brushless ESC Features

automatic timing ; adjustable timing ; adjustable frequency ; auto LiPo detection

selectable acceleration ; motor direction adjustment ; BEC ; low voltage cutoff

brake on/off ; soft start

X-5 Hacker Brushless ESC

Max Cells NiCad/NiMH:	5-10
Max Cells LiPo:	3
Continuous Operating Current:	5A
Peak/Burst Current:	7A
Max Servos:	3
Size:	22 x 23 x 7 mm (0.87 x 0.91 x 0.28 in)
Weight:	5g (0.18 oz)

Price : 30 \$

<http://www.rctoys.com/rc-products/HA-X-5-PRO.html>

## 2) GWS Brushless 25A 2-4S 2A BEC, Speed Controller.

Weight: 18g

BEC: 2A

Price : 28 \$

[http://www.hobbycity.com/hobbycity/store/uh\\_viewItem.asp?idProduct=4172](http://www.hobbycity.com/hobbycity/store/uh_viewItem.asp?idProduct=4172)

## 3) Dualsky 18A/25A Brushless Motor ESC V2

Max Output 18A, 25A surges

Weight with Wires 0.67 oz (19g)

1.85x1.02x0.27in

High rate (10 KHz) switching (PWM)

Up to 12 NiCd, Ni-MH cells (7.2-14.4V) or four Li-poly cells (7.2-14.8V) with three micro servos.

Supported highest motor speed: 210000 RPM(2 poles), 70000 RPM(6 poles), 35000 RPM(12 poles)

Smooth and accurate speed control, excellent throttle linearity

Extreme low resistance, super current endurance

XMotor™ optimized timing advance.

High rate (8 KHz) switching (PWM)

Cutoff can be programmed for motor stop or reduced power

Brake/No Brake operation. Stop folding props cold or let fixed props freewheel

Full protection features: Low-voltage cutoff protection / over-heat protection / throttle signal lost protection

3 startup modes: Normal / Soft / Super-Soft startup, can be used for both fixed-wing aircraft or helicopter models

Throttle range can be configured, fully compatible with all market available transmitters

Microprocessor and BEC(Battery Elimination Circuit) use separate voltage regulator IC , with good anti-jamming capability

Programming card coming!

Price: 29 \$

<http://2dogrc.com/dualsky-18a25a-brushless-motor-p-1890.html>

#### 4) Castle Creations Phoenix 10 Specifications:

Cells w/BEC:	5-10
Cells w/o BEC:	5-16
Continuous:	10 amps
Surge:	15 amps
Switching Rate:	12,500 Hz
Resistance:	0.013 Ohms
Brake:	Yes
Reversible:	Yes - change any two wires
Low Voltage Cut-off:	Programmable
Size:	0.73 x 0.8 x 0.16 in.
Weight (with wires):	0.21 oz. (6g)
Connector type:	Universal

Price : 50 \$

<http://www.rctoys.com/rc-toys-and-parts/CC-PH10/RC-PARTS-SPEED-CONTROLLERS-CASTLE-CREATIONS.html>

## Battery

I focused on Li-po batteries that are available in robot-italy and jonathan. Around 2000 mA would be enough for 2 hours with current around 1 ampere.

It would be wise to control the capacity after finalizing the decision for the robot.

The price for the battery is around 25 euro with the weight around 120 grams.

The chargers for LiPos are around 20 euro.

1) Li-Batt eco 2/1-2000 - 7,2V 2000mA

Technical Specifications:

Nominal Voltage	7,2V
Elements	2
Power mA	2000
C factor (discharge)	12
Discharge Power	max 24A
Dimensions	110 x 36 x 19 mm
Weight	125gr
Power Connector	Multiplex M6
Equalizer Connector	MPX/TP/FP

Price : 29 euro

[http://www.robot-italy.com/product\\_info.php?cPath=4\\_5&products\\_id=885](http://www.robot-italy.com/product_info.php?cPath=4_5&products_id=885)

Charger

This is a Polymer Lithium Ion battery charger based on the MAX1555 IC.



This is a Polymer Lithium Ion battery charger based on the MAX1555 IC. This charger uses either USB bus power (MAX1555 internally limits this to 100mA) or 2.1mm center positive wall-wart power (MAX1555 internally limits this to 300mA). Current is automatically shut off when charging is complete. Cheap, easy to use, and flexible, this board serves as a great demo board for the MAX1555. This charger is a 'must have' for quick and clean charging of Lithium Polymer chemistry batteries.

Price 18 euro

[http://www.robot-italy.com/product\\_info.php?cPath=4\\_16&products\\_id=775](http://www.robot-italy.com/product_info.php?cPath=4_16&products_id=775)

2) J.tronik - Li-POWER 2100 mA 2S1P 7,4V 25C

N. celle	2 x 3,7V 2100 mA
Dimensioni	16x34x95 mm
Peso	110 g
Cavetto bilanciatore	Tipo ROBBE
Spina	NO
Scarica continua	25C (52,5 Ampere)
Scarica picco	30C (63 Ampere)

Price 27 euro

<http://www.jonathan.it/shop/master.asp?prn=prod&pid=356325&ref=356325&descref=Li-POWER%202100%20mA%202S1P%207,4V%2025C&cat=Batterie&scat1=Pacchi+LiPo&scat2=2+celle>

3) J.tronik - Li-POWER 2100 mA 2S1P 7,4V 20C

N. celle	2 x 3,7V 2100 mA
Dimensioni	16x34x95 mm
Peso	120 g
Cavetto bilanciatore	Tipo ROBBE
Spina	NO
Scarica continua	20C (42 Ampere)
Scarica picco	25C (52,5 Ampere)

Price 20 euro

<http://www.jonathan.it/shop/master.asp?prn=prod&pid=355927&ref=355927&descref=Li-POWER%202100%20mA%202S1P%207,4V%2020C&cat=Batterie&scat1=Pacchi+LiPo&scat2=2+celle>

4) Hacker TopFuel - 2100 mA 2S1P 7,4V 30C

N. celle	2 x 3,7V 2100 mA
Dimensioni	106x35x17 mm

Peso	126 g
Cavetto bilanciatore	Tipo FlightPower MPX TOPfuel
Spina	NO
Scarica continua	30C (63 Ampere)
Scarica picco	50C (75 Ampere)

Price 25 euro

<http://www.jonathan.it/shop/master.asp?prn=prod&pid=356335&ref=356335&descref=2100%20mA%202S1P%207,4V%2030C&cat=Batterie&scat1=Pacchi+LiPo&scat2=2+celle>

5) Extreme Power - 2200 mA 2S1P 7,4V 20C

N. celle	2 x 3,7V 2200 mA
Dimensioni	100x34x17 mm
Peso	g
Cavetto bilanciatore	Tipo ROBBE
Spina	NO
Scarica continua	20C (44 Ampere)
Scarica picco	40C (88 Ampere)

Price 30 euro

<http://www.jonathan.it/shop/master.asp?prn=prod&pid=356319&ref=356319&descref=2200%20mA%202S1P%207,4V%2020C&cat=Batterie&scat1=Pacchi+LiPo&scat2=2+celle>

Chargers

1) Robbe - POWER PEAK LIPOLY 300

Alimentazione	11...15 V DC
Dimensioni	100x65x23 mm
Corrente di carica	0,3...3A
N. celle Lipo	1-3

Price 24 euro

<http://www.jonathan.it/shop/master.asp?prn=prod&pid=446591&ref=446591&descref=POWER%20PEAK%20LIPOLY%20300&cat=Caricabatterie&scat1=12V&scat2=Lipo>

2) Graupner - Caricabatterie Li-Po 1-4 celle

Alimentazione	11-15 V DC
N. celle Lipo	1-4
Corrente di carica	0-3000 mA
Settaggi	Automatico

Price 20 euro

<http://www.jonathan.it/shop/master.asp?prn=prod&pid=355775&ref=355775&desc=Caricabatterie%20Li-Po%201-4%20celle&cat=Caricabatterie&scat1=12V&scat2=Lipo>

## NiMH Batteries

1 )

Product	6.0V 2000mAh NiMH Battery
Make	made of 5x AA NiMH 2000mah cells
Connector	with universal radio connector, solid welding with 22AWG silicone wire
Fit Models	RC airplane: Hitec, Futaba and JR etc Walking robot
Feature	Rapidly charge up and long cycle life
Weight	5Oz ( 140 gram )
Dimensions	72mm (Long); 50mm (Height); 15mm (Thickness)

Price : 8 dollar

<http://www.all-battery.com/6v2000mahnimhsidebysiderxreceiverbatterypackwhiteconnector11106.aspx>

2 )

6 Volt AA 2200 mAh NiMH Battery Pack + Charger

Size:	5 AA Cells
Capacity:	2200 mAh
Chemistry:	Nickel Metal Hydride (NiMH)
Voltage:	6V
Connector:	Hitech
Dimensions:	50x15x75 mm

Package Includes: 6 Volt Charger

. Price: 30 dollar

[http://www.megabatteries.com/item\\_details.asp?id=13676&cat\\_id=55](http://www.megabatteries.com/item_details.asp?id=13676&cat_id=55)