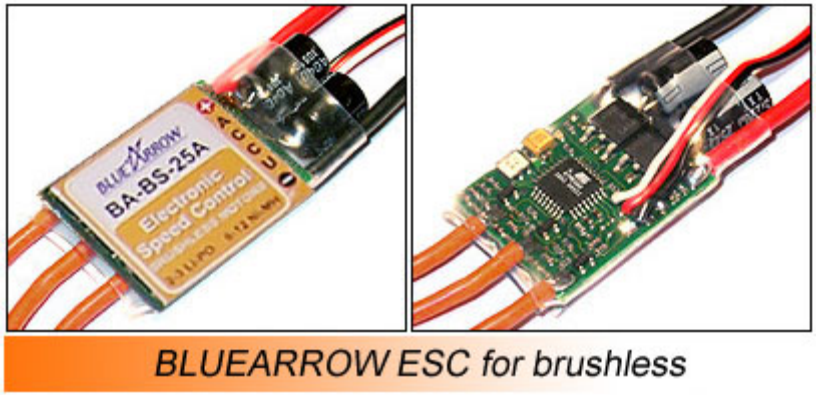
BLUEARROW User Guide of Brushless Electronic Speed Controller



MODEL	CURRENT	SURGE	BEC	SIZE	WEIGHT(WITH WIRES)

AS-5A	5amp	8amp	1amp	22.5*21*4(mm) 0.88*0.82*0.16 (in)	7g 0.25oz
AS-10A	10amp	15amp	1amp	22.5*21*4(mm) 0.88*0.82*0.16 (in)	8g/12g 0.28oz/0.42oz
AS-18A	18amp	25amp	1amp	27*24*5(mm) 1.06*0.94*0.2 (in)	17g 0.6oz
AS-25A	25amp	35amp	1amp	30*24*6.5(mm) 1.18*0.94*0.25 (in)	18g 0.63oz
AS-36A	36amp	45amp	1amp	43*24*6.5(mm) 1.69*0.94*0.25 (in)	22g 0.75oz

Attention:

To avoid Brushless ESC's starting reversely when you use ESC for the first time, we design a new and advantage software to ensure that the motor will never start reversely.

Within the first 2 or 3 seconds the motor have a bit jittering. Some users may think that it is difficult to start; in fact it is a normal situation and the motor will run forward smoothly soon. So when the motor starts with jittering, don't pull throttle up with a rush. You can try pulling the throttle up lightly again.

After startup, BlueArrow ESC has a stable and good speed. The throttle can be pulled up smoothly.

BlueArrow ESC has powerful direct-drive ability. It is suitable for grade 130 or 29OS brushless motor to drive 1047 propeller directly and have a smooth and reliable startup and running.

Safety and operating instructions

Building and operating R/C model aircraft requires careful and safe handling. Incorrect assembly and careless use can result in significant property damage and/or personal injuries. BlueArrow ESC is developed exclusively for R/C model applications. Don't use it in any man-carrying aircraft or any other man-carrying machine. BlueArrow ESC is designed for exclusive operating with batteries (NiCd, Ni-MH or Li-Poly batteries). Never use the unit by connecting to any other incity power

supply; you should use Li-Poly battery as it requires otherwise it will result in serious consequences.

Operating R/C electronic models should be done as operating steps require, such as don’t supply power before finishing checking, keep your body and any other objects away from the path of a propeller or other spin motor parts, check R/C distance and range before flying and some other conditions of clearing the sky.

BlueArrow ESC is a kind of accurate electronic product. It is forbidden to use it under the condition of moisture, high temperature, dust, and high voltage. It should be kept in proper environment.

Check the BlueArrow unit completely after any model crash. Never go on using it before completely checking. Don't disconnect the battery from the BlueArrow ESC when the brushless motor is still running. This will result in large surge current, which can cause device destruction. If we use brushless motor when the voltage and load are over as it requires, the current of BlueArrow ESC will be over its loading current. Then it will result in short circuit, expanding, burning, exploring and other bad consequences.

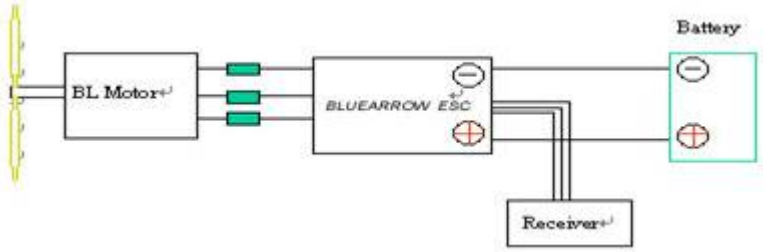
Actual current and load of brushless motor will be different from it marks because of battery's type, battery's capacity, driver's form, propeller's size and others. So it is not right to test actual current only using multimeter and AC/DC forcipiform meter. It needs special instrument. So only after testing by special persons you can use BlowArrow ESC which is suitable for your brushless aircraft system.

Although BlueArrow units are equipped with extensive protection devices, it can only protect when operating in a "normal" range. So you should use it carefully as its strict safety and operating instructions require.

Features of BlueArrow ESC(The BlueArrow ESC has many powerful features)

- High rate (10 KHz) switching (PWM)
- Large voltage range: input voltage 4.8v-17.9v,six to twelve Ni-MH cells or two to four Li-poly cells to supply power.
- No limit of highest rotating speed: support all kinds of brushless motors' highest speed.
- Repeating menu's setting, operating easily.
- BEC function: provide 1A power to receivers and servos under standard conditions (up to ten Ni-MH cells or three Li-poly cells)
- Safe "power on" arming program ensures motor will not accidentally turn on no matter where the position of throttle stick is.
- Automatic positive rotating as function: rotating direction of brushless motor will not occur accidental or abnormal reverse when brushless motor starts up.
- Directions of motor can be changed by programming and you can avoid changing connectors on the spot.
- Low-voltage protection - the value of low-voltage cutoff can be set as 4.8v, 5.6v, 6v.7.2v, 8.4v, 9v, 11.2v, 12v.
- Cutoff can be programmed for motor stop or reduced power.
- Dynamic braking ensures prompt prop folding.
- Electronic timing advance can be set between the range of 4°～10°、10°～20°、20°～30°to satisfy number of poles of different magnets.
- Full power indication: LED on ESC board will flash when it reaches full power.
- Auto shut down in 4sec after when signal is lost.
- Over temperature protection: automatic cut when reaching 155℃.
- Over voltage protection: refuse startup over 18V.
- Powerful direct-drive ability.

Wiring your BlueArrow ESC



Motor, Battery and Receiver wiring diagram

Key to illustration:

Receiver cable, 3-pin

- (ground) ……black or brown

+ (positive)……red

P (signal)……white or orange

Battery connection ground (-)……black

Battery connection positive(+)……red

Motor connection a……red or yellow

Motor connection b……red or yellow

Motor connection c……red or yellow

IMPORTANT NOTE:

1.You must be sure that the polarity is correct when connecting the speed controller. Incorrect polarity could permanently damage the controller.

2.We recommend that you use plugs to connect ESC with battery and motor. You should deal with

insulation. If short circuit occurs where ESC meets motor's three joints, ESC will be damaged permanently.

3.Please make sure that the working current of battery and motor will be within ESC's largest range of working current. Excessive current will permanently damage the controller.

4.If you want to reverse the motor rotation, simply swap any two wires connections to the motor or do it by programming.

Using your BlueArrow brushless ESC for the first time

Before you use BlueArrow ESC every time, please check all connectors (battery connect cannot be connected) to see if there is any not reliable connecting, short circuit. If you find anything abnormal, please correct it at once. After you check everything is normal, you can do as follows.

1.Turn on your transmitter, and set the throttle stick to lowest position.

- Connect the main power battery to the speed controller, you should hear a "beep", and see the LED "flash" once. Then ESC has been electrified.
- If there is not any reaction, check battery connector to ESC and see if there is power in battery.
- If LED "flash" continuously, it means that the voltage is too high. Please change battery pack within ESC's allowed voltage range.
- The soundness of motor is related to motor's structure and battery's voltage. Please hear carefully.

3.Waiting for two seconds, you will hear a "beep" or double "beep", at the same time, the LED will "flash" once or twice. It means that ESC has get signal of transmitter and is waiting for you to pull the throttle up and start up the motor.

1) You will hear a "beep ", One "beep" and one "flash" means no brake, double "beep" and two "flashes" means braking is enabled.

2) If there is no reaction after two seconds, please check that if throttle stick is at the lowest position; move down the throttle slightly; check that if the receiver's connection to channel of throttle is correct and reliable; check that if there is power in battery of transmitter; check that if it is normal to receive and send out R/C signals.

4. Pull the throttle up and ESC will start the motor, then you can fly your model after motor begins to run normally.

Note:

If the BEC cutoff occurs when you are flying, you must put the throttle to the lowest position, and then you can restart the motor and use low throttle, land your model as soon as you can.

Motor cutoff will occur when conditions occur as follows:

1)The battery's voltage drops to low cutoff protection voltage you set, and the protection method is set as closed.

2)The ESC temperature rises to 155℃.

3)Loss of Transmitter signal.

You can adopt some methods as follows to avoid them.

1) Use battery which has been charged fully to fly; Set low cutoff protection voltage correctly; Set protection method of low voltage as reducing power.(At present it is factory default setting.) If you find power begins to reduce when flying, please land your model.

- Don't pack anything outside of ESC. Install ESC in a aeration cooling position.
- Fly your model where remote device can control it. Pay attention to the voltage of remote device's battery. If the voltage reduces quickly, land your model.

BlueArrow Programming Features

To enter programming mode, follow the steps below:

1. Turn on the power of transmitter and set the throttle stick to highest position.

2. Connect the battery to the speed controller, you should hear a short "beep", and see the LED "flash" once. Then ESC has been electrified.

3.After waiting for 5 seconds, you will hear four short "beeps" and six long "beeps", repeated. That means it have entered programming mode. As the long "beeps" occur, move your transmitter stick to the lowest position to select an option as in the table below show.

BlueArrow ESC "beep"	Operation	Setting	Responses of BlueArrow ESC
Four short "beeps"			
First long "beep"	Put stick to the lowest position	Cutoff voltage	One "beep"
Second long "beep"	Put stick to the lowest position	Brake Type	Two "beeps"
Third long "beep"	Put stick to the lowest position	Timing Advance	Three "beeps"
Fourth long "beep"	Put stick to the lowest position	Cutoff Type	Four "beep"
Fifth long "beep"	Put stick to the lowest position	Change rotation	Five "beeps"
Sixth long "beep"	Put stick to the lowest position	Leave programming mode	Wait 2 seconds for one or two "beeps"

Attention:

1) If there is no reaction after five seconds, please check:

2) If the throttle stick is at the highest position;

3) Pull the throttle up slightly;

4) If the receiver's connection is connected to channel of transmitter correctly and reliably;

5) If there is power in transmitter's battery;

6) If the transmitter sends out and receives signals normally.

Programming BlueArrow ESC :

1. Programming Setting 1 -Cutoff Voltage Choice

	Voltage Setting	Battery	
1	4.8V cutoff voltage	6 cell Ni-MH packs	
2	5.6V cutoff voltage	7 cell Ni-MH or 2 cell Li-poly packs(per cell 2.8v)	Factory default settings
3	6.0V cutoff voltage	8 cell Ni-MH or 2 cell Li-poly packs(per cell 3v)	
4	7.2V cutoff voltage	9 cell Ni-MH	
5	8.4V cutoff voltage	10 cell Ni-MH or 3 cell Li-poly packs(per cell 2.8v)	
6	9.0V cutoff voltage	12 cell Ni-MH or 3 cell Li-poly packs(per cell 3v)	
7	11.2V cutoff voltage	4 cell Li-poly packs (per cell 2.8v)	
8	12V cutoff voltage	4 cell Li-poly packs (per cell 3v)	

After you enter Cutoff Voltage Choice mode, you will hear one short "beeps" and eight long "beeps", repeated. As the long "beeps" occur, move your transmitter stick to the highest position to select an option.

Do as follows:

BlueArrow ESC"beep"	Operation	Setting	Responses of BlueArrow ESC

one short "beep"			
First long "beep"	Put stick to the top position	4.8V cutoff voltage	One "beep"
Second long "beep"	Put stick to the top position	5.6V cutoff voltage	Two "beeps"
Third long "beep"	Put stick to the top position	6.0V cutoff voltage	Three "beeps"
Fourth long "beep"	Put stick to the top position	7.2V cutoff voltage	Four "beeps"
Fifth long "beep"	Put stick to the top position	8.4V cutoff voltage	Five "beeps"
Sixth long "beep"	Put stick to the top position	9.0V cutoff voltage	Six "beeps"
Seventh long "beep"	Put stick to the top position	11.2V cutoff voltage	Seven "beeps"
Eighth long "beep"	Put stick to the top position	12V cutoff voltage	Eight "beeps"

When you select one cutoff voltage, BlueArrow ESC will give corresponding response. Then BlueArrow ESC will return to repeated function selection that is four short “beeps” and six long “beeps”. Waiting for you to move your transmitter stick to the lowest position and enter BlueArrow ESC’s other setting modes.

2. Programming Setting 2 -Brake Type Choice

	Setting	Battery	
1	No brake		Factory Default setting
2	Brake	Motor will be stopped rotating rapidly	

After you enter Brake Type Choice mode, you will hear two short "beeps" and two long"beeps", repeated. As the long "beeps" occur, move your transmitter stick to the highestposition to select an option. Do as follows:

BlueArrow ESC "beep"	Operation	Setting	Responses of BlueArrow ESC
two short "beeps"			
First long "beep"	Put stick to the top position	No brake	One "beep"
Second long "beep"	Put stick to the top position	Brake	Two "beeps"

3. Programming Setting 3 -Electronic timing advance Choice

	Electronic timing advance	Recommended for use with:	
1	4 ° ~10 °	12 or more pole motor(such asout runner motor)	
2	10° ~20°	6 or 8 pole motor	Factory Default setting
3	20 ° ~30 °	2 or 4 pole motor	

After you enter Electronic timing advance Choice mode, you will hear three short "beeps" and three long "beeps", repeated. As the long "beeps" occur, move your transmitter stick to the highest position to select an option. Do as follows:

BlueArrow ESC "beep"	Operation	Setting	Responses of BlueArrow ESC
three short "beeps"			
First long "beep"	Put stickto the top position	4 ° ~10 °	One "beep"
Second long "beep"	Put stickto the top position	10° ~20°	Two "beeps"
Third long "beep"	Put stickto the top position	20 ° ~30 °	Three "beeps"

When you select Electronic timing advance, BlueArrow ESC will give corresponding response. Then BlueArrow ESC will return to repeated function selection, that is four short “beeps” and six long “beeps”. Waiting for you to move your transmitter stick to the lowest position and enter BlueArrow ESC’s other setting modes.

4. **Programming Setting 4 - Cutoff Type Choice**

	Setting	
1	Cut off	
2	Reduce power	Factory Default setting

After you enter Cutoff Type Choice mode, you will hear four short "beeps" and two long "beeps", repeated. As the long "beeps" occur, move your transmitter stick to the highest position to select an option. Do as follows:

BlueArrowESC "beep"	Operation	Setting	Responses of BlueArrow ESC
four short "beeps"			
First long "beep"	Put stickto the top position	Cut off	One "beep"
Second long "beep"	Put stickto the top position	Reduce power	Two "beeps"

When you select Cutoff Type, BlueArrow ESC will give corresponding response. Then BlueArrow ESC will return to repeated function selection that is four short “beeps” and six long “beeps”. Waiting for you to move your transmitter stick to the lowest position and enter BlueArrow ESC’s other setting modes.

5. Programming Setting 5 - Change the rotation of the motor Choice

After you enter Change the rotation of the motor Choice mode, you will hear five short "beeps" and two long "beeps", repeated. As the long "beeps" occur, move your transmitter stick to the highest position to select an option. Do as follows:

BlueArrowESC "beep"	Operation	Setting	Responses of BlueArrow ESC
five short "beeps"			
First long "beep"		Factory Default setting	
Second long "beep"	Put stickto the top position	Change rotation	Two "beeps"

6. Programming Setting 6 - Leave programming mode

The sixth long "beeps" occur when entering initialization setting repeated state, move your transmitter stick to the lowest position and then you can leave programming mode.

ESC will enter the normal using state, wait two seconds and you will hear one ”beeps”(set as no brake) or two “beeps”(set as brake), it means that all setting of ESC has been finished, only wait for you to pull the throttle up to start the motor.

Troubleshooting

ESC directly enters programming mode after turning on the power of transmitter.

It is because that ESC is connected to the channel of receiver. Transmitter sets the channel direction of throttle. Your direction is contrary to standard direction, that is the stick is at high position equal to common defining low position. You only need to reset your channel direction of throttle and restart.

Limitation of liability

BlueArrow has the right to change its products, including appearance, specification and other using requirements without notice.

BlueArrow doesn’t guarantee, declare or promise that its products are suitable for any special purpose.

Technical data in technical instructions is just testing result of the time. We don’t affirm the result legally. BlueArrow doesn’t assume any responsibility because of the third party’s products. BLUEARROW assumes no liability for personal injury, property damage or consequential damages resulting from our product or our workmanship.

BlueArrow’s electronic product’s specifications will change for different application. All specifications should be checked by client’s technologists according to different purpose of every application and then used.

Special Function: on-line testing

BlueArrow ESC can be set parameters on computer through PC connector. And we also can test Brushless motor on line by using BlueArrow ESC Config software. (You can look at our website http://www.bluearrow-rc.com/ to get more information and details.)