

AGFRC ATHLON RUN SERIES ESC MANUAL

For Aircraft/ Helicopter

■ Thank you for purchasing Athlon Run series esc. The brushless system with high power can be very dangerous, we strongly suggest you read this manual carefully. Any claims arising from operating, failure or malfunctioning etc will be denied. We assume no liability for personal injury, property damage or consequential damages resulting from this product or our workmanship. We do not assume any liability arising from modification due to unauthorized product. We reserve the right to change without notice about product design, appearance, performance and operational requirements.

FEATURE

- Ultra-low impedance PCB(printed circuit board) and high power MOS drive tube with independent cooling fin for great current endurance.
- Power input with ultra low impedance and large volume capacitor to improve the power stability and protect the battery.
- Safety to power on. While power on, no matter how you operate the throttle stick, the motor do not start immediately to avoid personal injuries.
- Multiple protection: Input Voltage Abnormality Protection, Low Voltage Battery Protection, Overheat Protection, Throttle Signal Loss Protection etc., which extend effectively the ESC lifespan.
- Three start mode: regular start, soft start and super soft start, which compatible with fixed wing aircraft and helicopter.
- Programmable throttle curve suitable for all kinds of remote controllers. Smooth and exquisite speed regulation, perfect speed linear.
- Microprocessor power supply with independent stabilized voltage IC, superior anti-interference to reduce the possibility of out of control.
- The maximum rotation speed can up to 21000RPM (2 poles motor), 7000RPM (6 poles motor), 3500RPM (12 poles motor).

SPECIFICATION

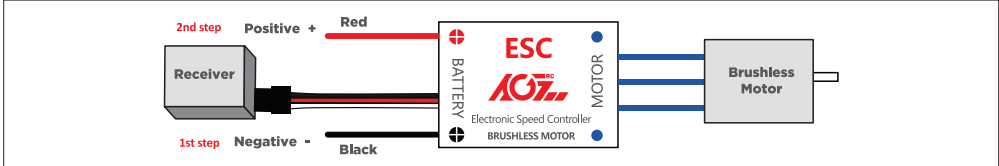
Item No.	Cont Current	Burst Current (10S)	BEC Type	BEC	Lipo Battery	Weight	Dimension
AR-7A	6A	10A	Linear	5V/1A	2S	5.5g	25*13*7mm
AR-13A	12A	18A	Linear	5V/2A	2-4S	13g	38*24*10mm
AR-20A	20A	25A	Linear	5V/2A	2-4S	23g	50*25*7mm
AR-30A	30A	40A	Linear	5V/2A	2-4S	24g	50*25*7mm
AR-40A	40A	60A	Switch	5V/3A	2-6S	35g	58*26*12mm
AR-60A	60A	80A	Switch	5V/5A	2-6S	66g	72*31*15mm

PRODUCT FUNCTIONS (BELOW BOLD FONT IS THE FACTORY DEFAULT)

- **Braking setting:** No / Yes
- **Battery type:** Lipo / NiMH
- **Low voltage battery protection:** Reduce the power gradually / Shutdown output immediately
Note: While in low voltage protection, pull the throttle stick to minimum to reboot the motor, but as in low voltage at the moment, so the power output is low.
- **Low voltage threshold value:** Low / Medium / High
 - While battery type set to Lipo battery, the esc will automatically recognize the lipo cells. The cut-off voltage of lipo cell in Low/ Medium/ High will be 2.85V/ 3.15V/ 3.3V respectively. For example: While using 3s lipo, set to Medium cut-off voltage, then low voltage threshold value will be 2.85X3=8.55V.
 - While battery type set to NiMH battery, the cut-off voltage in Low/ Medium/ High will be 0%/ 50%/ 65% of input voltage when power on. 0% means no low voltage protection. For example: Using 6s NiMH, full charge voltage is 1.44*6=8.64V, when set to Medium cut-off voltage, the threshold value will be 8.64*50%=4.3V.
- **Start Mode:** Normal / Soft / Super Soft Start, the motor rotation rate from static to maximum speed will be 300ms/ 1.5s/ 3s.
Normal Start suitable for fixed wing, Soft Start and Super Soft Start suitable for helicopter. The initial speeds of Soft Start and Super Soft Start are low, even pull the throttle stick to maximum immediately, the motor from static to full speed will be 1.5s and 3s.
Note: if finished the Start process, shut down the throttle, reboot within 3 seconds, then will switch to Normal Mode, in case slow response for crash during aerobatic flight.
- **Timing:** Low / Medium / High will be 3.75 °/ 15°/ 26.25°.
In general, low timing suitable for most of motors, but as the motor structure is different, please try different timing for the satisfied one. In order to increase the speed, you can set to High Timing. After change the Timing, please test on the ground before flight.

WIRING DIAGRAM

While the battery comes with banana plug, please connect the battery negative pole first instead of positive,



USAGE INSTRUCTION

Please make sure properly connection before use(do not connect the battery this moment). If everything is ok, please start the ESC as below.

- Keep the throttle stick in the lowest position, then switch on the transmitter.
- Connect the battery pack with ESC, ESC will start self-detect, warning tone of motor "123" means power supply is ok. The continuous short tone "beep" means lipo battery numbers, then motor with long tone "Beep-----" mean self-detect properly, and ready to fly.
 - * If without any response, please check the battery connection is properly or not.
 - * If the motor with "Beep~ Beep~" tone after power on in 2 seconds, "56712" special tone appear in 5 seconds, that means ESC enter program mode, at this moment, your remote control still do not finish setup, throttle channel reverse, please read the "Throttle Setting" as a reference.
 - * If the motor with "Beep~ Beep, Beep~ Beep~", Beep~ Beep~" tone (1s interval), that means battery pack voltage too low or too high, please check the battery pack voltage.

NORMAL START-UP PROCESS



Note: In order to make it work properly, when you use the ESC at first time or exchange to use with another transmitter, please reset the throttle curve.

THROTTLE SETTING

(Note: Please reset the throttle curve, while first time to use or use with another remote control)



WARNING TONE INSTRUCTION

- **Warning tone for abnormal voltage:** while power on the ESC, it will detect the power supply voltage automatically, if power supply voltage is out of normal range, ESC will warn like this: "Beep~ Beep~", Beep~ Beep~" (interval time between every two beeps is 1s). Warning tone will stop while power voltage is normal.
- **Warning tone for throttle signal loss:** while ESC does not detect throttle signal, it will warn like this: "Beep~", Beep~", Beep~" (interval time between every beep is 2s);
- **Warning tone for throttle value which is not returned to zero(throttle stick is not in lowest position):** If throttle stick is not in the lowest position, ESC will warn like this: "Beep~ Beep~ Beep~ Beep~ Beep~" (Single tone warn rapidly);
- **Warning tone for small throttle stroke:** If the setup throttle stroke range is narrow(while setting the ESC, throttle stroke should be not low than 50%), ESC will warn, that means the stroke setting is invalid, it need to re-set. Warning method like this: "Beep~ Beep~ Beep~ Beep~ Beep~" (single tone warn rapidly).

WARNING TONE INSTRUCTION

- **Start up protection:** While pull the throttle to start up, if the motor failed to start up within 2 seconds, ESC will cut-off the motor. Throttle stick need to be moved to the lowest position to start up again. (It may happen in following cases: bad contact between ESC and motor, some output cable break off, propeller or motor is blocked etc.)
- **Temperature protection:** While ESC operation temperature more than 110 °C, ESC will reduce output power for protection. But it will not shut up all output power, maximum reduced to 40% of full power to ensure the motor have power and avoid crash. While temperature drops, ESC will gradually recover the maximum power.
- **Throttle signal loss protection:** While detect throttle signal lost for 1 second, ESC start to reduce output power; if the signal still cannot recover, output power will be reduced to zero(power reduction will be 2 seconds). If throttle signal recover during power reduction, then throttle control will be recover immediately. It will benefit a lot like this: while throttle signal disappear instantly(within 1 second), ESC will cannot enable power failure protection; If control signal lost for a long time, then it will start to protect, but it will not shut off output immediately. It will be a process for gradually power reduction, users have enough time to rescue their drones. It is safe and practical.
- **Overload protection:** While overload increased, ESC will cut off power or re-start automatically. Overload increase rapidly mainly caused by block (such as propeller hit something).

PROGRAM ESC WITH TRANSMITTER

- There are 4 steps to program ESC with throttle stick
- ① Enter program mode
 - ② Select programmable value
 - ③ Select program items
 - ④ Exit program mode

① ENTER PROGRAM MODE

- 1) Switch on transmitter, move throttle stick to top position, connect the battery pack to ESC.
- 2) Wait for 2 seconds, the motor should emit special tone like "beep-beep~".
- 3) Wait for another 5 seconds, special tone like "56712" should be emitted, which means program mode is entered.



- ② SELECT PROGRAMMABLE ITEMS
- After entering program mode, you will hear 8 tones in a loop with the following sequence. If you move the throttle stick to bottom within 3 seconds after one kind of tones, this item will be selected.
- | | | |
|------------------------------|--------------------|------------------|
| 1) "beep" | brake | (1 short tone) |
| 2) "beep- beep-" | battery type | (2 short tone) |
| 3) "beep- beep- beep-" | cutoff mode | (3 short tone) |
| 4) "beep- beep- beep- beep-" | cutoff threshold | (4 short tone) |
| 5) "beep-----" | startup mode | (1 long tone) |
| 6) "beep----- beep-" | timing | (1 long 1 short) |
| 7) "beep----- beep-" | set all to default | (1 long 2 short) |
| 8) "beep----- beep-----" | exit | (2 long tone) |
- Note:** 1 long "beep-----" = 5 short "beep-"

③ SELECT OPTION (PROGRAMMABLE VALUE)

You will hear several tones in loop. Set the value matching to a tone by moving throttle stick to top when you hear the tone, then a special tone "56712" emits, means the value is set and saved. (Keeping the throttle stick at top, you will go back to Step 2 and you can select other items; or moving the stick to bottom within 2 seconds will exit program mode directly)

Items	Tones	"beep~" 1 short tone	"beep-beep~" 2 short tones	"beep-beep-beep~" 3 short tones
Brake	Off	On	/	/
Battery type	Lipo	NiMH	/	/
Cutoff mode	Soft-Cut	Cut-Off	/	/
Cutoff threshold	Low	Medium	High	/
Start mode	Normal	Soft	Super soft	/
Timing	Low	Medium	High	/



④ EXIT PROGRAM MODE

- There are 2 ways to exit program mode:
- 1) In step 3, after special tone "56712", please move throttle stick to the bottom position within 2 seconds.
 - 2) In step 2, after tone "beep-----beep-----" (That is: The item #8), move throttle stick to bottom within 3 seconds.

TROUBLE SHOOTING

Trouble	Possible Reason	Action
After power on, motor doesn't work, no sound is emitted	The connection between battery pack and ESC is not correct	Check the power connection. Replace the battery.
After power on, motor doesn't work, such an alert tone is emitted: "beep-beep, beep-beep, beep-beep~" (Every "beep-beep~" has a time interval of about 1 second)	Input voltage is abnormal, too high or too low.	Check the voltage of battery pack
After power on, motor doesn't work, such an alert tone is emitted: "beep, beep, beep~" (Every "beep~" has a time interval of about 2 seconds)	Throttle signal is abnormal.	Check the receiver / transmitter / flying controller Check the cable of throttle channel
After power on, motor doesn't work, such an alert tone is emitted: "beep, beep, beep~" (Every "beep~" has a time interval of about 0.25 second)	The throttle stick is not in the bottom (lowest) position	Move the throttle stick to bottom position
After power on, motor doesn't work, a special tone "56712" is emitted after 2 beep tone (beep-beep~)	The Direction of throttle channel is reversed, so the ESC enters the program mode	Set the direction of throttle channel correctly
The motor runs in the opposite direction	The connection between ESC and the motor need to be changed.	Swap any two wire connections between ESC and motor

AGFRC 无刷马达电子调速器(ESC)说明书

空模用

■ 感谢您购买本产品！无刷动力系统功率强大，错误的使用可能造成人身伤害和设备损坏，请在使用设备前仔细阅读本说明书，并严格遵守规定的操作程序，我们不承担因使用本产品而引起的任何责任，包括但不限于对附带损失或间接损失的赔偿责任；同时，我们不承担因擅自对产品进行修改所引起的任何责任。

产品特点

- 采用超低阻抗 PCB(印刷线路板)和大功率 Mos 驱动管，并且在 Mos 管上加有独立的散热片，具有极强的耐电流能力。
- 电源输入端采用进口超低阻抗大容量电容，大大提升电源稳定性，同时对电池具有保护作用。
- 安全上电功能，接通电源时，无论油门摇杆处于任何位置均不会立即启动电机，避免造成人身伤害。
- 具备输入电压异常 / 电池低电压保护 / 过热保护 / 油门信号丢失保护等多重保护功能，有效延长电调使用寿命。
- 具有普通启动 / 柔和启动 / 超柔和启动三种启动模式，兼容固定翼飞机及直升机。
- 可设定油门行程，兼容市面上所有遥控器，具备平滑，细腻的调速手感，一流的调速线性。
- 微处理器采用独立的稳压 IC 供电，不从 BEC 输出取电，具有更好的抗干扰能力，大大降低失控的可能性。
- 最高转速可以达到 210000 RPM (2 级马达)，70000 RPM (6 级马达)，35000 RPM (12 级马达)。

AR 系列无刷电子调速器规格

型号	持续电流	瞬时电流	BEC 类型	BEC 输出	电池节数	重量	体积
AR-7A	6A	10A	线性	5V/1A	2S	5.5g	25*13*7mm
AR-13A	12A	18A	线性	5V/2A	2-4S	13g	38*24*10mm
AR-20A	20A	25A	线性	5V/2A	2-4S	23g	50*25*7mm
AR-30A	30A	40A	线性	5V/2A	2-4S	24g	50*25*7mm
AR-40A	40A	60A	开关	5V/3A	2-6S	35g	58*26*12mm
AR-60A	60A	80A	开关	5V/5A	2-6S	66g	72*31*15mm

产品功能说明

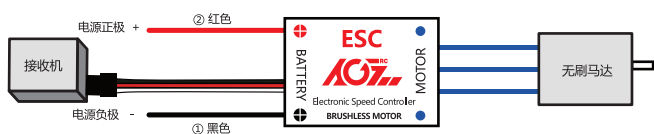
- **刹车设定:** 无刹车 / 有刹车，出厂默认为无刹车。
- **电池类型:** Li-xx (锂电池) / Ni-xx (镍氢或镍镉) 两大类电池，默认为 Li-xx (锂电池)。
- **低压保护模式:** 逐渐降低功率 / 立即关闭输出，默认为逐渐降低功率。
- **低压保护阈值:** 低 / 中 / 高，默认为中截止电压。
 - 1) 当设定使用的是 Li-xx 电池，则自动判断锂电池节数，低 / 中 / 高情况下每节电池的截止电压分别为：2.6V/2.85V/3.1V，例如：使用 3 节锂电池，设定为中截止电压，则低压保护阈值为：2.85X3=8.55V。
 - 2) 当设定使用的是 Ni-xx 电池，低 / 中 / 高情况下截止电压为开机时输入电压的 0%/50%/65%，0% 意味着不进行低压保护，例如：使用 6 节镍氢电池，充满电时电压为 1.44X6=8.64V，当设定为中截止电压时，则截止电压阈值为：8.64X50%=4.3V。
- **启动模式:** 普通 / 柔和 / 超柔和启动，默认为普通启动。

普通启动适用于固定翼，柔和启动 / 超柔和启动适用于直升机，柔和启动和超柔和启动的初始转速都比较低，从启动到全速启动需要 1 秒和 2 秒，但启动后若关闭油门，3 秒内再次启动时则均以普通模式启动，以免在做一些特技飞行动作时因反应过慢而导致掉机。
- **进角:** 低 / 中 / 高，默认为低进角。

一般情况下，低进角可以适应较多的马达，但是因为马达结构差异很大，请试用各个进角以获得满意的驱动效果。为提高转速，可以将进角设为高进角，改变进角设置后，建议先在地面进行测试，然后再飞行。

接线示意图

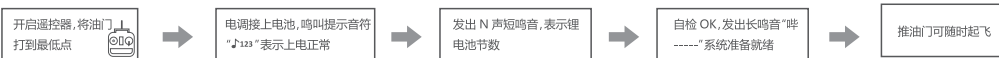
- 当电池上使用香蕉插头时，请先将①接通电池负极，再将②接通电池正极。第一步：电池负极 → 第二步：电池正极



正常开机使用说明

在使用无刷电子调速器之前请您仔细检查各个连接是否正确，可靠（此时请勿连接电池），经检查一切正常后，请按以下顺序启动无刷电子调速器。

- 将遥控器油门杆推至最低位置，接通遥控器电源；
- 将电池组接上无刷电子调速器，调速器开始自检，电机发出“123”上电提示音后，接着发出 n 声短促的“哔”鸣音表示锂电池节数，然后电机发出一声“哔-----”长鸣音表示自检正常，系统准备就绪，等待您推动油门启动电机。
 - * 若无任何反应，请检查电池是否完好，电池线是否可靠。
 - * 若上电后 2 秒电机发出“哔- 哔-”的鸣音，5 秒后又发出“56712”特殊提示音，表示电调进入编程设定模式，这说明遥控器未设置好，油门通道反向，请参考遥控器说明书正确设置油门通道的“正 / 反”向。
 - * 若上电后电机发出“哔- 哔- 哔- 哔- 哔- 哔-”的鸣音（间隔 1 秒），表示电池组电压过低或过高，请检查电池组电压。



特别强调

首次使用您的无刷电子调速器，为了让电调适应您的遥控器油门行程，在首次使用本电调或更换其他遥控器使用时，均应重新设定油门行程，以获得最佳的飞行线性。

油门行程设定说明



注意！ 当第一次使用或电调搭配其他遥控器使用时，均应重新设定油门行程，其他时候则不用

警告音说明

- **电压不正常警告音:** 电调开机时，会对电源电压进行检测，当电源电压不在正常范围内时，电调会作如下警告：“哔- 哔-，哔- 哔-，哔- 哔-”（每两声之间的间隔时间为 1 秒），直到电源电压正常为止；
- **油门信号丢失警告音:** 当电调未检测到油门信号时，电调会作如下警告：“哔~，哔~，哔~”（每声之间的间隔为 2 秒）；
- **油门未归零(油门摇杆未置于最低位置)警告音:** 当油门杆打到最低时，电调会作如下提示：“哔- 哔- 哔- 哔- 哔-”（很急促的单音鸣叫）；
- **油门行程过小警告音:** 当所设定油门行程过小时（电调设计时，要求油门行程不得小于三倍油门），电调会做警告，表明本次行程设定无效，需重新设定，警告方式为：“哔- 哔- 哔- 哔- 哔-”（很急促的单音鸣叫）；

保护功能说明

- **启动保护:** 当推油门启动后，如在两秒内未能正常启动电机，电调将会关闭电机，油门需再次置于最低点后，才可以重新启动。（出现这种情况的原因可能有：电调和电机电线连接不良或有个别输出线断开，螺旋桨被其他物体阻挡，减速齿卡死等）
- **温度保护:** 当电调工作温度超过 110 °C 时，电调会降低输出功率进行保护，但不会将输出功率全部关闭，最多只降到全功率的 40%，以保证电机仍有动力，避免掉机，温度下降后，电调逐渐恢复最大动力。
- **油门信号丢失保护:** 当检测到油门遥控信号丢失 1 秒后，电调开始降低输出功率，如果信号始终无法恢复，则一直降到零输出（降功率过程为 2 秒），如果在降功率的过程中油门遥控信号重新恢复，则立即恢复油门控制，这样的好处是：在油门信号瞬间丢失的情况下（小于 1 秒），电调并不会进行断电保护；如果遥控信号确实长时间丢失，则进行保护，但不是立即关闭输出，而是有一个逐步降低输出功率的过程，给玩家留有一定的时间救机，兼顾安全性和实用性。
- **过负荷保护:** 当负载突然变得很大时，电调会切断动力，或自动重启，出现负载急剧增大的原因通常是螺旋桨打到其他物体而堵转。

使用遥控器编程设定说明

使用遥控器油门杆行程设定参数分为四个步骤：

- ① 进入编程模式；
- ② 选择设定项下的参数值；
- ③ 选择设定项；
- ④ 保存退出。

① 进入编程模式

- 1) 开启遥控器，将油门打到最高，电调接上电池
- 2) 等待 2 秒，马达鸣叫“哔哔”提示音
- 3) 再等待 5 秒，马达鸣叫“56712”特殊提示音，表示 已经进入编程模式。



② 选择设定项

进入编程设定后，会听到 8 种鸣叫音，按如下顺序循环鸣叫，在鸣叫某个提示音后，三秒内将油门打到最低则进入该设定项。

1) “哔”	刹车	(1 短音)
2) “哔哔”	电池类型	(2 短音)
3) “哔哔哔”	低压保护模式	(3 短音)
4) “哔哔哔哔”	低压保护阈值	(4 短音)
5) “哔-----”	启动模式	(1 长音)
6) “哔-----”	进角	(1 长 1 短)
7) “哔----- 哔哔”	恢复出厂默认	(1 长 2 短)
8) “哔----- 哔-----”	退出	(2 长音)

注：一长音“哔-----”相当于 5 声短音“哔”，所以在“选择设定项”中，一长一短的“哔----- 哔”表示第 6 项，以此类推。

③ 选择参数值

马达会循环鸣叫，在鸣叫某个提示音后将油门杆打到最高点，则选择该提示音所对应的设定值，接着鸣叫特殊提示音“56712”，表示该参数值已被保存。（此时如果不想再设定其它选项，则在 2 秒内将油门杆打到最低，即可快速退出编程设定模式；如果还要设定其它选项，则继续等待，退回第二步，再选择其它设定项）

设定项	提示音	“哔” 1 声	“哔哔” 2 声	“哔哔哔” 3 声
刹车	无刹车	有刹车	/	/
电池类型	锂电池	镍氢电池	/	/
低压保护方式	逐渐降低功率	立即关闭动力	/	/
低压保护阈值	低	中	高	/
启动模式	普通启动	柔和启动	超柔和启动	/
进角	低	中	高	/



④ 退出设定

有如下两种方式退出设定。

- 1) 在第三步骤，选择设定项时，鸣叫特殊提示音“56712”后，2 秒内将油门杆打到最低点，则退出设定。
- 2) 在第二步骤，选择设定项时，当电机鸣叫出“哔----- 哔-----”（即第 8 个设定项）两长音后，3 秒内将油门打到最低点，则退出设定。

故障快速处理

故障现象	可能原因	解决方法
上电后电机无法启动，无任何声音	电源接头接触不良	重新插好接头或者更换插头
上电后电机无法启动，发出“哔哔、哔哔、哔哔”警告音（每组声音之间的间隔为 1 秒）	电池组电压不正常	检查电池组电压
上电后电机无法启动，发出“哔哔、哔哔、哔哔”警告音（每组声音之间的间隔为 2 秒）	接收机油门通道无油门信号输出	检查发射机接收机的配合是否正常，油门控制通道接线是否插紧
上电后电机无法启动，发出“哔哔哔哔哔”急促单音	油门未归零或油门行程设置过小	将油门杆置于最低位置，重新设置油门行程
上电后电机无法启动，发出“哔哔”提示音，然后发出“56712”特殊提示音	油门通道“正 / 反”向错误	参考有空气说明书，调整油门通道的“正 / 反”向设置
电机反转	电调输出线和电机线连接的线序错误	将三根输出线中的任意两根对调