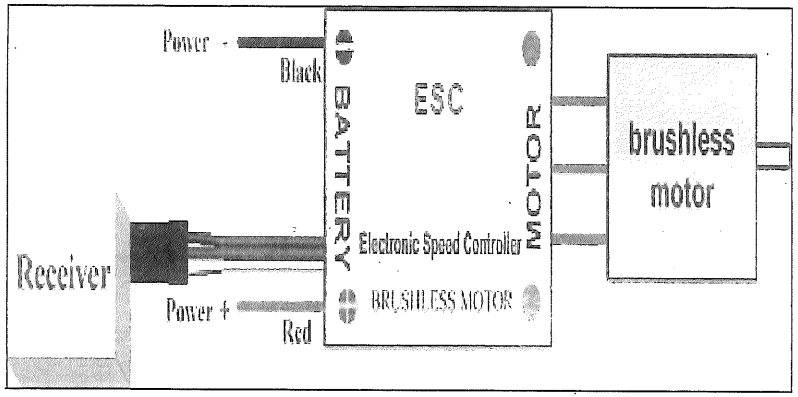
Brushless ESC Manual Instruction

Thanks so much for purchasing XP series speed controllers. Please read the instruction booklet carefully before flying to ensure to get optimal performance with least damage as possible and enjoy your flying.

Product Specification chart

Class	item NO.	Continuous current	Burst current (10S)	BEC mode	BEC output	Battery cell		Weight	Dimension L*W*H
						Li-ion Li-poly	NiMH NiCd		
10A	XP V2,10A	10A	12A	linear	5V/2A	2-3	5-9	10g	32*24*8
18A	XP V2,18A	18A	22A	linear	5V/2A	2-4	5-12	17g	40*24*8
22A	XP V2,220A	22A	25A	linear	5V/2A	2-4	5-12	21g	46*26*11
30A	XP V2,30A	30A	40A	linear	5V/2A	2-4	5-12	25g	46*26*11
40A	XP V2,14A	40A	45A	linear	5V/3A	2-4	5-12	32g	55*26*12.7

Wire diagram



Programmable Items:

1. **Brake Setting:** Enabled / Disabled, default is Disabled

2. **Battery Type:** Li-xx(Li-ion or Li-poly) / Ni-xx(NiMH or NiCd), default is Li-xx.

3. **Low Voltage Protection Mode**(Cut-Off Mode): Soft Cut-Off (Gradually reduce the output power) or Cut-Off (Immediately stop the output power). Default is Soft Cut-Off.

4. **Low Voltage Protection Threshold**(Cut-Off Threshold): Low / Medium / High, default is Medium.

1) **For lithium batteries,** the number of battery cells is calculated automatically. Low / medium / high cutoff voltage for each cell is: 2.6V/2.85V/3.1V. For example: For a 3 cells lithium pack, when "Medium" cutoff threshold is set, the cut-off voltage will be: 2.85*3=8.55V.

2) **For nickel batteries,** low / medium / high cutoff voltages are 0%/45%/60% of the startup voltage (i.e. the initial voltage of battery pack), and 0% means the low voltage cut-off function is disabled. For example: For a 10 cells NiMH battery, fully charged voltage is 1.44*6=8.64V, when "Medium" cut-off threshold is set, the cut-off voltage will be:8.64*50%=4.3V.

5. **Startup Mode:** Normal /Soft /Super-Soft, default is Normal.

Normal is preferred for fixed-wing aircraft. Soft or Super-soft are preferred for helicopters. The initial acceleration of the Soft and Super-Soft modes are slower in comparison, usually taking 1 second for Soft startup or 2 seconds for Super-Soft startup from initial throttle advance to full throttle. If the throttle is closed (throttle stick moved to bottom) and opened again (throttle stick moved to top) within 3 seconds of the initial startup, the restart-up will be temporarily changed to normal mode to get rid of the chances of a crash caused by slow throttle response. This special design is very suitable for aerobatic flight when quick throttle response is needed.

6. **Timing:** Low / Medium / High, default is Low.

Usually, low timing value can be used for most motors. We recommend the Low timing value for 2 poles motor and Medium timing value for motors with more than 6 poles to get a high efficiency. For higher speed, High timing value can be chosen.

Special Note

Some high KV out-runner motors have very special construction, the space between each magnet is very large, and many ESCs can't drive these motors. After much testing, our ESCs have proven to work very well with these types of motors. Therefore, we have provided some suggestions as follows:

Programmable / Motor	Timing	Startup mode
Generic in-runner motor	Low	Usually,aircraft use "Normal" startup mode and helicopter use"super-soft" startup mode
Generic out-runner motor	Low or Medium	
Align 420LF (Made in TAIWAN, out-runner)	High (MUST)	
450TH (Made in TAIWAN)	Low	Soft(MUST)

Begin To Use Your New ESC

Please start the ESC in the following sequences:

1. Move the throttle stick to the bottom position and then switch on the transmitter.

2. Connect the battery pack to the ESC, the ESC begins the self-test process, a special tone " 123" is emitted, which means the voltage of the battery pack is in normal range, and then N "beep" tones will be emitted, means the number of lithium battery cells.Finally a long "beep——" tone will be emitted, which means self-test is OK, the aircraft/

Normal startup procedure:

Move throttle stick to bottom and then swi tch on transmitter.	Connect battery pack to ESC, special tone like "123" means power supply is OK	Several "beep-" tones should be emitted, presenting the number of lithium battery cells	When self-test is finished, a long "beep—-"tone should be emitted	Move throttle stick upwards to go flying

"VERY IMPORTANT !" Because different transmitter has different throttle range, we strongly suggest you using the "Throttle Range Setting Function" to calibrate throttle range. Please read the instruction on page 4-----"Throttle Range Setting".

Throttle range setting: (Throttle range should be reset whenever a new transmitter is being used)

Swi tch on transmitter, move throttle stick to top	Connect battery pack to ESC, motor should emit several "beep-" tones, presenting the number of battery cells	wait for about 2 seconds. "Beep-Beep-" tone should be emitted means throttle range highest point has been correctly confirmed	Move throttle stick to the bottom, and wait for 1 second	A long "Beep-" tone should be emitted, means throttle range lowest point has been correctly confirmed	Move throttle stick upwards to go flying

Alert Tone

1. Input voltage is abnormal: The ESC begins to check the voltage when the battery pack is connected, if the voltage is not in the acceptable range, such an alert tone will be emitted: "beep-beep-, beep-beep-,beep-beep-" (Every "beep-beep-" has a time interval of about 1 second.)

2. Throttle signal is abnormal: When the ESC can't detect the normal throttle signal, such an alert tone will be emitted: "beep-, beep-, beep-". (Every "beep-" has a time interval of about 2 seconds)

3. Throttle stick is not in the bottom position: When the throttle stick is not in bottom (lowest) position, a very rapid alert tone will be emitted: "beep-, beep-, beep-". (Every "beep-" has a time interval of about 0.25 second.)

Protection Function

1. Abnormal start up protection: If the motor fails to start within 2 seconds of throttle application, the ESC will cut-off the output power. In this case, the throttle stick MUST be moved to the bottom again to restart the motor. (Such a situation happens in the following cases: The connection between ESC and motor is not reliable, the propeller or the motor is blocked, the gearbox is damaged, etc.)

2. Over-heat protection: When the temperature of the ESC is over 110 Celsius degrees, the ESC will reduce the output power.

3. Throttle signal loss protection: The ESC will reduce the output power if throttle signal is lost for 1 second, further loss for 2 seconds will cause its output to be cut-off completely.

Program the ESC with your transmitter (4 Steps):

1. Enter program mode
2. Select programmable items
3. Set item's value (Programmable value)
4. Exit program mode

1. Enter program mode

1) Switch on transmitter, move throttle stick to top , 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-beep-" set all to default (1 long 2 short)
8. "beep----beep----" exit (2 long tone)

Note: 1 long "beep-----" = 5 short "beep-"

3. Set item value (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 "1515" 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; 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	Li-ion / Li-poly	NiMH / NiCd	
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 "1515", please move throttle stick to the bottom position within 2 seconds.
2. In step 2, after tone "beep—beep----"(ie. The item #8), move throttle stick to bottom within 3 seconds.

IMPORTANT: The throttle range of your HURC ESC should be set the first time you use it. The throttle range can be set as follows:

1. Connect the ESC to a motor and receiver. DO NOT connect a battery yet.
2. Turn on your transmitter. Move the throttle stick to the full power position.
3. Connect the ESC to a battery. You will hear an ascending musical tone and then immediately 2, 3 or 4 beeps (indicating the number of battery cells), then a two second pause, then 2 beeps. Immediately after the two beeps, move the throttle stick to the off position.
4. You should hear one long beep, and then your HURC ESC is ready to use.