SWORDFISH X

BRUSHLESS ESC INSTRUCTIONS

Thanks for purchasing **SwordfishX** brushless speed controllers manufactured by HIFEI Technology Co., Ltd. **SwordfishX** series ESC are specifically developed to supply stable and strong power for R/C model boats beyond your expected.

Safety

⚠ Please always keep in safe when use ESC

⚠ Strongly recommend to calibrate the throttle range of transmitter when you first use controller or when using a new /different transmitter or receiver

⚠ Before begin the running, turn on the transmitter **BEFORE** powering on the receiver.
When finish the running, power off the receiver **BEFORE** turning off the transmitter.

⚠ Please **DO NOT** run Swordfish ESC without water flow.

⚠ Swordfish ESC is water-resistant, and thus cannot be soaked in water, which may cause ESC failure or be burned.

⚠ Never disconnect the battery pack while the brushless motor is running, as this could cause damage to the speed controller and/or motor. And such damage would not covered under manufacturer's WARRANTY.

⚠ It is suggest to add additional capacitor bank (such as HIFEI capacitor-bank 63V) in the flowing two situations:
A: When run Swordfish X HV ESC with high KV motor with 10s or more lipos.
B: When run Swordfish X HV ESC at max current for a long time.

⚠ Swordfish ESC is preset with default parameters in factory, which can be assembled for running directly. In order to get optimum power performance and well compatible to work with brushless motor, it is suggested to program ESC parameters before first run.

Features

• 32-bit Microprocessor with up to 80Mhz frequency.
• Aluminum PCB process makes the heat dissipation efficient
• High Power Ultra-Low Internal Resistance 263-7 MOSFETS
• Telemetry Real Data By Wireless WIFI.
• ESC is with built-in data logging, Pro is without data logging.
• ESC is water-proof to prevent spill water , and aluminum water-cooler pipe is pre-mounted.
• Full protection soft, include signal lose protection (in 100ms), temperature protection, motor block protection.
• ESC has Auto detect Lipo cells feature. Forward running mode is developed for competitions.
• ESC is fully programmable by Hifei software on computer, or by Hifei Wifi dongle
• ESC firmware is upgradeable by Hifei software on computer when a new version firmware becomes available.

Specifications

ESC	Voltage	Current / Max	BEC	Size (mm)	Weight
SwordfishX 200A-8S	2-8 Lipos	200/ 280	4A,6V	110X55X28	240g

Install your ESC

Please solder good quality connectors to ESC's motor wires and power wires before connect ESC to motor and battery. When connect power wires to battery, it is IMPORTANT to correctly connect positive to positive, and negative to negative. Swap any two motor wires' connecting can change the rotation direction.
In order to prevent and reduce any signal disturbance generated by ESC hardware, please install the ESC far away from receiver.
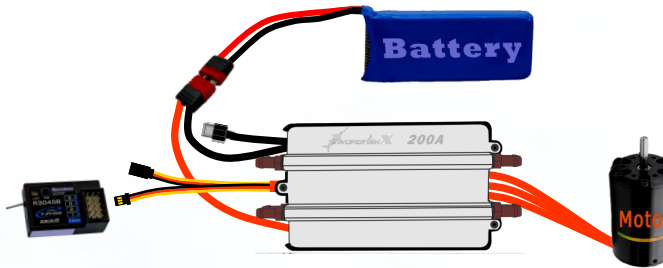
Step ①: Connect ESC to brushless motor;
Step ②: Connect receiver to the throttle channel of receiver;
Step ③: Connect receiver to ESC's receiver cable;
Step ④: Connect negative(-) cable of ESC to the negative of battery;
Step ⑤: Then connect positive **(+)** cable of ESC to the positive of battery.
Step ⑥: Switch on the ESC, after two beeps ♪ ♪ ,it is ready to run.

Calibrate throttle of TX

Note: In the following 3 situations, it is required to calibrate the throttle range of transmitter.
-When it is the first time to use a new speed controller.
-When change a new TX or RX, or a set of new radio system.
*-When upgrade the ESC into a new version of firmware.*

Board Transmitter

1st: Connect ESC to motor, plug receiver lead of ESC to throttle channel of RX.

2nd: Push joystick of transmitter to max throttle position, power on TX.

3rd: Power on receiver, connect ESC to battery. Motor emits three beeps in drop tones.

4th: In the following, motor will emit four long beeps in flat tones.

After any one beep of the four long beeps, pull joystick to zero immediately.

5th: Then motor emits two beeps in up tones.

Calibrating is completed, it's ready to go.

Note:SwordfishX ESC can not run in reverse. If throttle range were calibrated from reverse to neutral, the calibrating range will be invalid.

Program the ESC

SwordfishX ESC supports to be more easily programmed the parameters by Hifei programming devices, such as 'Hifei Wifi dongle' and 'Hifei USB Adoptor'(connection to PC).

Connect Wifi Dongle to SwordfishX
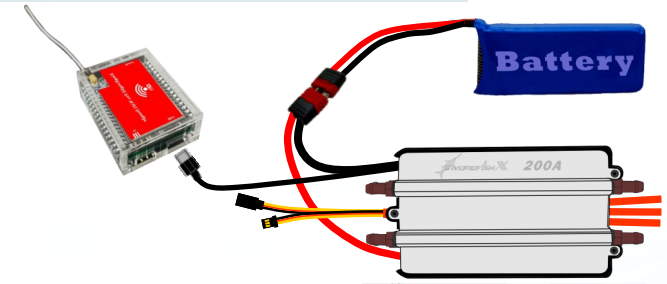
Hardware Request
• Keep the length of USB cable no more than 500mm
• Compatible to any kind of smart mobile phone ,PAD or PC with iOS/Android/Windows Operation System
• Support all kind of browsers such as: Chrome, IE, Safia, Firefox, etc.

Connecting the WiFi Dongle
• Connecting the cable to ESC and WiFi dongle (Figure 1)
• Power on the ESC (the red LED of dongle will light a while and then black out) , waiting more than 20 seconds till the green led on dongle start to blink.
• Option **SwordfishX** in the WLAN list of your smart terminal
• Open your browser and input the default IP address & password as following:
IP address   192.168.1.16:2015
Password   12345678
• Entered into the Home Page

Please read Wifi Dongle user manuals for more information

Connect ESC to PC
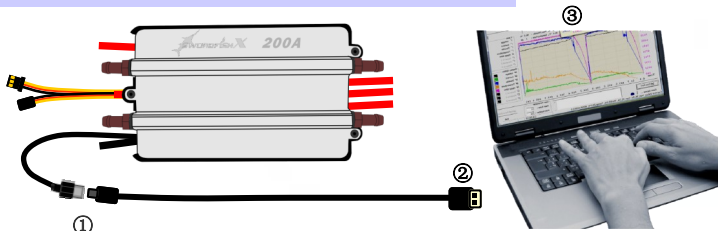
Step①: Correctly connect ESC's Wifi wire/to USB adaptor wire to USB adaptor
Step②: Plug the USB side of USB Linker to one of computer's USB ports.
Step③: Run software "Hifei V6.xx".

Note: 'Please read USB adaptor user manuals for more information.

Install Hifei software

Download the setup software of 'Hifei V6.xx' from website **(Support column)** and finish the installation according to the popped-up window guide.
When installation is finished, 'Hifei V6.xx' software icon is auto saved on computer desktop.
*Note: a. If PC OS is Windows 7,8,10, it is suggested to install V6.xx to administrator.*
b. If you once changed PC font to big size, then it needs to change it to normal size. Because big size font would possibly cause software interface cannot be showed in full.

V6.0 tab 5 Upgrade

In **tab 5,** you can upgrade ESC's firmware if there is a new firmware for the ESC be released.
When upgrade the ESC, it needs to connect the cable to receiver with upgrade cable together. (Pls refer to the below diagram)
Each ESC has specific firmware and be different. You have to make sure the firmware you chose is correct. Otherwise possibly causing ESC damage.
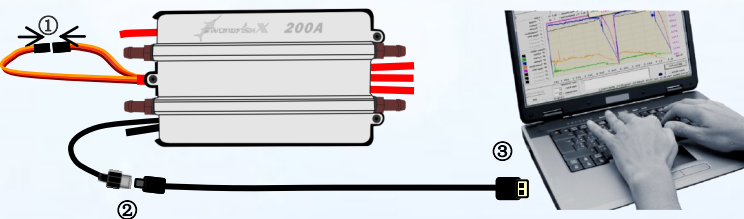
Step①: Short upgrade cable with receiver wire.
Step②: Connect ESC's Wifi wire/to USB adaptor wire to USB adaptor
Step③: Plug the USB Adapter to an USB port of PC.
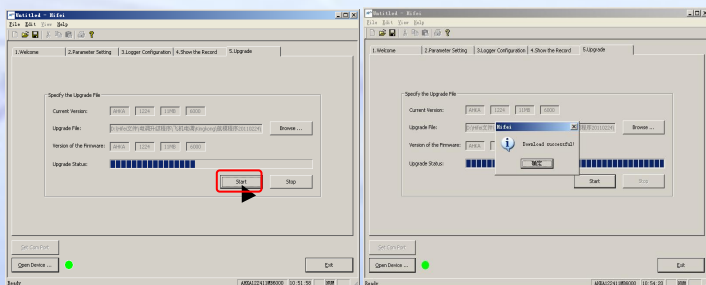
Parameters features

LVC (1)	Auto	5.0V	2s Lipos*	7.2V	8.4V	3s Lipos	4s Lipos	5s Lipos	6s Lipos
Cutoff voltage/ cell	2.5V	2.6V	2.7V	2.8V	2.9V	3.0V*	3.1V	3.2V	3.3V
Brake Type	Close *		Soft brake		Hard brake				
Current limitation	Low		Medium		High		Disabled*		
Timing	Low		Middle		High		Auto *	0~30	
Active Free Wheeling	ON		OFF*						
Cutoff Type	Hard cutoff *		Soft cutoff						
Startup	Soft start		Standard *		Fast start				
PWM Rate	8KHz *		12KHz		16KHz				

*Note: a. The parameters with * behind are the ESC's default settings.*
b. When the 'LVC' of ESC is set at 'Auto' detect, after the two power beeps the ESC will beep the number of Lipo cells which the auto detect feature detects, and the red LED on ESC will blink in accompany with the beeps. '3.0v' is the default cut-off voltage of per Lipo cell when the LVC is set at 'Auto' detect.
Eg: If you connect the ESC to a 4s Lipo battery pack, the motor will firstly emit ♪ ♪ , then detect the Lipo numbers ♪ ♪ ♪ ♪ , and the red LED will blink four times. The low voltage cut-off is calculated as '12.0V'.
c. Please ensure only when the battery packs is fully charged and it can set the LVC at 'Auto', it is recommended to set the LVC at actual Lipo cells once the battery pack is over 4S cells.

Low voltage cut-off

The setting of LVC can protect battery from discharging too low and causing permanent damage to battery, especially for Lithium polymer cells. It is strongly recommended to set the LVC carefully before running.

Cutoff voltage/ cell

The setting is to set the low voltage cut-off of each Lipo cell.

e.g. If set the LVC of per Lipo cell at '2.8v', the LVC is set at '2s cells', then the cut-off voltage of the whole battery pack is "2.8*2"=5.6v.

Brake type

'Brake disabled' setting will close the brake function;
'Soft brake' will provide 20% of full braking power.
'Hard brake' will provide 100% of full braking power.

Timing advance

'Low timing' setting adjusts the timing at the range of 0º~15º, recommended for more lower pole count brushless motors (such as 2 poles, or 4 poles). It gives more power and slightly less efficient;
'Middle timing' adjusts the timing at the range of 5º~20º, recommended for most brushless motors. It gives a good balance of power and efficiency;
'High timing' adjusts the timing at the range of 15º~30º, recommended for higher pole count motors. (such as 8, 10, 12, 14 poles or higher brushless

'Auto timing' setting is automatically adjust the timing degree according to motor's rotating demand. 0º; 2º; 4º; 6º; 8º; 10º; 12º; 14º; 16º; 18º; 20º; 22º; 24º; 26º; 28º; 30º. (This setting can be only set via software 'Hifei V4.xx . If you want to upgrade your old software .please download Hifei software from

Cutoff type

Cutoff type settings decide the way in which the ESC cutoff output to brushless motor when the LVC works, or temperature/ signal-lost protection works.
'Hard cutoff' : when the battery volts discharges to the set LVC value or soft protection works, the motor will shut down immediately. Motor can be restarted by closing the throttle to the lowest position and re-move the throttle as normal.
'Soft cutoff': when the battery volts discharges to the set LVC value or soft protection works, the ESC will slowly reduce motor power to zero, you will notice a decrease in power and it is time to dock.

Startup type

'Soft start': very soft and smoothly start the motor, it will take more time.
'Standard start': start the motor at normal speed, it depends on the motor's quality and dynamic response.
'Fast start': start the motor fast, it is recommended for racing.

PWM rate

8KHz is recommended for most brushless motors.
12KHz is recommended for low inductance motors. (e.g. 8,10,12,14 poles brushless outrunner motors)
16KHz is recommended for very low inductance motors. (e.g. 16,18,20,24 poles brushless outrunner motors)

Note: a. The poles mentioned above is the magnetic poles of brushless motor, but not the stator numbers of motor.
b. High PWM rate is easier to make motor produce more heat. Cooling jacket for motor is very important, and please be more carefully to choose high PWM rate.
c. It is strongly RECOMMENDED to have bench testing and choose appreciate parameters for your configuration before assembling the ESC to hull for running.

V6.0 tab 3 Logger Configuration

Cycle Record 1) Not Reverse indicates when data logger memory space is filled up, it will stop logging.
2) Reverse indicates when data logger memory space is filled up, it continue logging data indefinitely by overlapping the former data and do a cycle. *Default setting is Not Reverse.*

Sampling rate means the times that data logger samples per second. *Default setting is 3ps. **

* *Higher sampling rate will fill up the memory space quickly and thus reduce the logging time when in 'not reverse' record type.*

	Sampling Rate	Max logging Time	Mini running Time
Not Reverse Record	Once/ second	Approx. 68.1 minutes	> 60 seconds
	Twice/second	Approx. 34.05 minutes	> 30 seconds
	3 times/second	**Approx. 22.7 min-**	**> 20 seconds**
	4 times/second	Approx. 13.62 minutes	> 10 seconds
	10 times/second	Approx. 6.81 minutes	> 5 seconds
	15 times/second	Approx. 3.405 minutes	> 3 seconds
	30 times/second	Approx. 2.27 minutes	> 2 seconds

Minimum running Time means the minimum time that ESC is requested to run. The time MUST be longer than reference in above form. Too short running will cause ESC logs little data that cannot be displayed in PC windows.