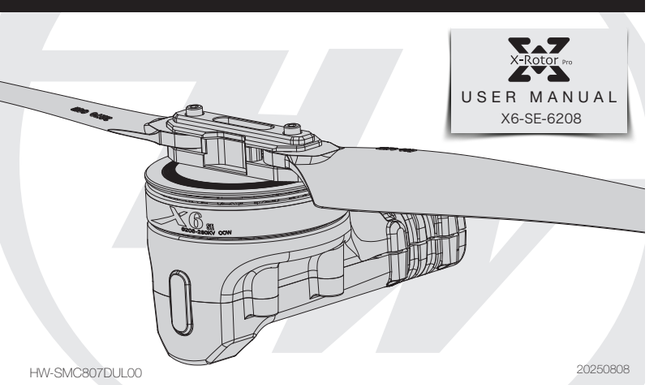
HOBBYWING®



HW-SMC807DUL00 20250808

ATTENTION

CAUTIONS

Thank you for purchasing this product! Please read the following statement carefully before use and, once used, it is considered to be an acceptance of all the contents. Please strictly observe and adhere to the manual installation with this product. Unauthorized modification may result in personal injury and product damage. We reserve the rights to update the design and performance of the product without notice.

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01 Introduction

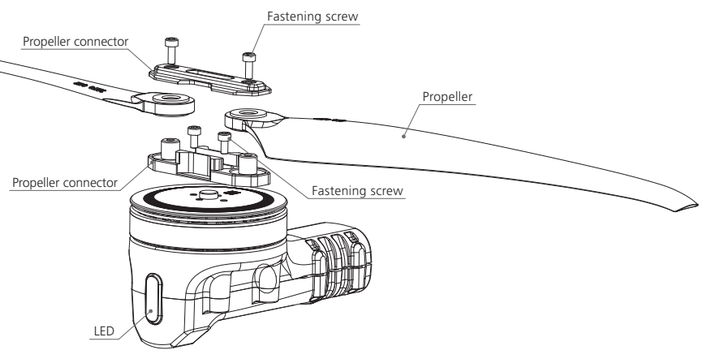
The CM-X6-SE brushless power system is an industrial version power system that adopts a single-axis load of 2.0~2.5 kg. The maximum pulling force of a single axis is 6.2 kg and is suitable for a 25 mm carbon fiber tube arm with an overall waterproof level protection rated at IP43. The efficient heat dissipation provides a one-stop power solution for education and training, aerial photography, flight practice and other fields of small multi-rotor UAV applications. FOC ESC adopts CAN communication, dual redundant design of digital throttle and PWM throttle, with power-on self-test, fault storage, over-current protection, stall protection and other protection functions.

02 Precautions

- Please stay away from crowds, high-voltage lines, obstacles, etc. when using, and be sure to follow safety regulations when using.
- The power system contains BLDC drive ESC. we recommend to use the HF 22*7.0" folding propellers of HOBBYWING, and can also be compatible with 22 inch of third-party manufacturers propellers, too large size may cause excessive load and out of step or other problems.
- The ESC is equipped with CAN function. When using the CAN function, the ESC ID and the throttle channel of the same aircraft cannot be the same, otherwise the multiple ESCs will be recognized as the same.
- Do not bring propellers for ground testing to avoid unnecessary danger.
- Be sure to connect all parts carefully. If the connection is poor, you may not be able to control the aircraft normally, or other unpredictable situations such as equipment damage may occur.
- If you need to weld the input and output wire plugs of the ESC, please ensure that the welding is reliable and use welding equipment with sufficient power.
- Do not use it when the external ambient temperature exceeds 65°C. The high temperature will destroy the ESC and may cause damage to the motor and cause the machine to explode.
- The motor rotation direction of the power system has been set at the factory. Please observe the motor rotation direction mark. It is not supported to change the sequence of the motor phase wires due to the packaging and sealing process.
- It is not recommended to change the motor rotation direction through the transmitter. If modification is absolutely necessary, please refer to the following " Program your ESC with the Transmitter ". After changing the motor rotation direction, please be sure to clearly mark your modification.

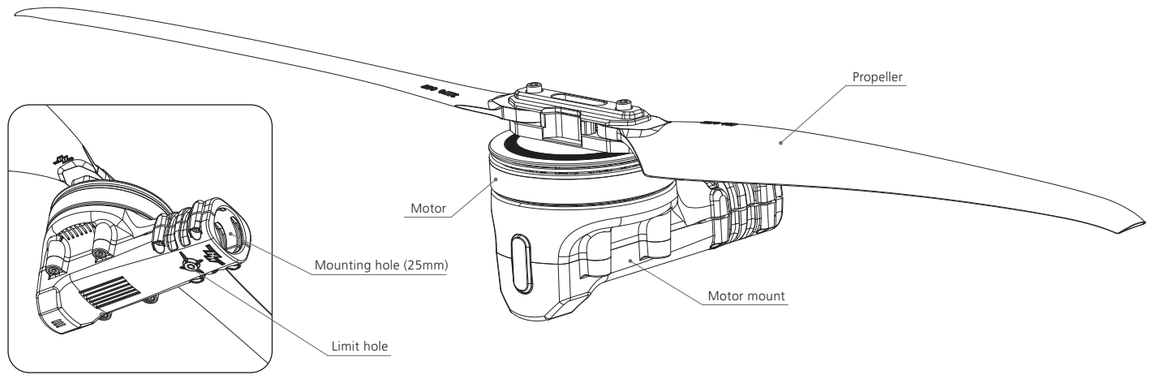
03 Power system composition

- Motor x 1pcs
- ESC x 1pcs
- Propeller x 1pcs
- Motor mount x 1pcs
- Fastening screw x 2pcs
- LED light set



04 Power system installation

- The entire power system has been assembled at the factory and can be taken out directly from the package to install on the UAV frame according to the rotation of the motor.
- The red and gray color cable is the data output and upgrade signal cable (the system can be upgraded for the ESC), the red wire is CAN-High (hereinafter referred to as CH); the gray wire is CAN-Low (hereinafter referred to as CL);The black and white cable is the ESC throttle signal wires, the black wire is the ground wire, and the white wire is the throttle signal wire.
- The data signal line outputs throttle, motor speed, bus current, bus voltage, capacitor temperature, MOS tube temperature and other data in real time.
- The ESC accelerator is solidified at 1100~1940μs.



05 Specifications

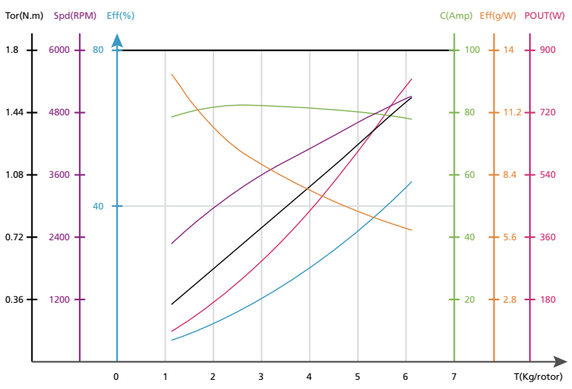
Recommended uniaxial load: 2.2kg
Max.Torque: 6.2 kg
Lithium compatible: 6 S (LiPo) (MAX27V)
Ambient temperature: -20℃-50℃
Applicable carbon tube: 25mm (diameter)
Total weight (excluding propellers): 373±15g
Protection level: IP43
Support throttle frequency: 50-500Hz

ESC
Continuous current: 30A (Unconfined ambient temperature ≤60℃)
Lithium compatible: 6S
Instantaneous current: 60A (3 seconds - good heat dissipation)
Throttle solidified: 1100-1940us

Motor
Model: 6208
Outer diameter: Φ68.7*25.8mm
KV rating: 280KV

Propeller
Dimension: 22*7.0"
Weight (straight propeller): 66g

06 Power system parameters



Voltage(V)	Propeller	Throttle(%)	Thrust(g)	Current(A)	Power Input(W)	Speed(RPM)	Efficiency(g/W)	Torque(N·m)	Power Output(W)	Temperature(℃)
23V (6S LiPo)	HF22*7.0"	33%	1195	4.1	93.9	2252	12.7	0.31	79.8	72℃
		35%	1327	4.7	107.9	2369	12.3	0.35	91.7	
		37%	1460	5.3	123.0	2484	11.9	0.38	104.5	
		39%	1596	6.0	139.1	2596	11.5	0.41	118.2	
		42%	1802	7.1	165.2	2760	10.9	0.46	140.4	
		45%	2013	8.4	193.5	2919	10.4	0.52	164.5	
		48%	2229	9.7	223.9	3072	10.0	0.57	190.3	
		51%	2449	11.1	256.3	3220	9.6	0.62	217.9	
		54%	2673	12.6	290.9	3363	9.2	0.68	247.2	
		57%	2901	14.2	327.6	3502	8.9	0.73	278.5	
		60%	3132	15.9	366.6	3636	8.5	0.79	311.6	
		63%	3365	17.6	407.9	3767	8.2	0.85	346.7	
		66%	3600	19.5	451.7	3895	8.0	0.91	383.9	
		69%	3836	21.5	498.0	4021	7.7	0.96	423.3	
		72%	4071	23.7	546.8	4145	7.4	1.02	464.7	
		75%	4306	25.9	597.9	4267	7.2	1.08	508.2	
		78%	4538	28.2	651.3	4387	7.0	1.14	553.6	
		81%	4768	30.6	706.5	4505	6.7	1.20	600.5	
		84%	4993	33.0	763.0	4619	6.5	1.26	648.6	
		87%	5213	35.5	820.3	4730	6.4	1.32	697.3	
		90%	5427	38.0	877.8	4835	6.2	1.37	746.1	
		100%	6058	45.6	1051.6	5115	5.8	1.53	893.9	

The above data are measured by Hobbywing Lab at the ambient temperature of 25℃ and sea level by changing the throttle input adjustment. The motor temperature is measured by running the throttle at the rated point for 10 minutes, for reference only.

07 ESC protection function

This ESC is specially designed for industrial drones, without low-voltage protection and over-heat protection.

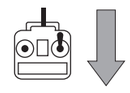
- **Stall protection**
  When the ESC detects that the motor is locked, the ESC will completely turn off the output and repeatedly try to restart the motor. Please land the aircraft as soon as possible if the motor is unable to be restarted. The power output can only be resumed after the power is turned off and restarted, and the fault is eliminated.
- **Current protection**
  When the instantaneous phase current abnormality reaches 202A, the ESC will turn off the output and keep trying to restart the motor. If the motor does not restart, it will return to normal after power on again.
- **Over-heat warning**
  A fault message will be sent out through the data interface when the MOS is higher than 110°C or capacitor temperature is higher than 100°C. Please land the aircraft in time or reduce the throttle output when the ESC reports an over-heat fault, if the temperature continues to rise, electronic components may be damaged.
- **Low voltage protection**
  This ESC has no low-voltage protection. Some electronic components of the ESC will work abnormally when the voltage falls below 9V . Please land the aircraft in time.
- **Throttle signal loss protection**
  When the ESC detects that the throttle signal is lost, the output will be turned off immediately to avoid greater losses caused by the continued high-speed rotation of the propeller. After the signal is restored, the ESC will resume normal operation immediately.

08 Program your ESC with the Transmitter

The motor rotation direction and LED color can be programmed by moving throttle stick on the transmitter.
It consists of 4 steps: Enter the programming mode→ Select parameter items → Select parameter values → Exit the programming mode

I. Enter the Programming mode

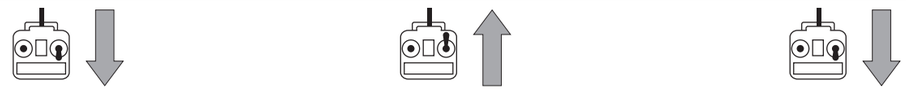
Turn on the transmitter, move the throttle stick to the top position, and connect a battery to the ESC, 2 seconds later, the motor will beep "1113" first, then emit "1113" again 5 seconds later to indicate that you are in the ESC programming mode.



II. Select Parameter Items

After entering the programming, you'll hear the following 3 kinds of beeps circularly. Move the throttle stick to the bottom position within 3 seconds after you hear some kind of beeps, you'll enter the corresponding parameter item and hear "3331", or choose "Exit the Programming mode".

1	"Beep"	Motor Rotation Direction	(1 Short Beep)
2	"Beep-beep"	LED Color	(2 Short Beeps)
3	"Beep-beep-beep"	Save settings and Exit (entering step 4)	(3 Short Beeps)



III. Select Parameter Values

The motor will beep different kinds of beeps circularly. After hearing some kind of beeps, move the throttle stick to the top position and you will have the corresponding parameter value set, then you'll hear the motor emit "1113" to indicate the value is temporary saved , then get back to "Select Parameter Items" and continue to select other parameter items or choose "Exit the Programming mode".

Items \ Values (Beeps)		1 Beep-	2 Beep-Beep-	3 Beep-Beep-Beep-	4 Beep-Beep-Beep-Beep-	5 Beep--
1	Motor Rotation Direction	CCW	CW			
2	LED Color	Red	*Green(default)	White	Blue	LED OFF

The default motor rotation direction is CW or CCW, as indicated by the motor rotation direction marking on the motor.

VI. Exit the Programming mode

In step 2, when the motor emit 3 short beeps "Beep-beep-beep" (indicating item 3), move the throttle stick to the bottom position within 3 seconds to select the "Save settings and Exit" item. Then the motor will emit "33112", indicating that all parameter modifications are saved, the programming process is complete, then self test will be proceed. The power system will be ready for operation upon the successful completion of self test.

09 ID setting

If there is no requirement, the default factory ID of the ESC is 1, the throttle channel is 1, and the bus speed is 500KHz.
This function requires the additional purchase of DataLink data box.
Before using this function, ensure that the computer system has installed Micosoft Visual C++ 2013 software in advance, otherwise it cannot operate normally.

1) Connection

ESC---->DataLink data box "red gray" ----> " CH1 CL1";
Connect the data box to the computer via USB.
When changing the ID, please remove the propeller to avoid danger.
For the same aircraft, different ESC IDs and throttles cannot be the same to avoid same ID recognizing as one ESC when using CAN function.

2) Operating diagram

The ESC CAN cable is connected to the DataLink data box, and the data box is connected to the computer. → Run DataLink host computer software. → Enter the software page, confirm the software version of DataLink in the type "DataLink", and ensure that the program version is LINK-01.2.15-C.

Enter the CAN parameter adjustment page. → Wait for the bus rate to be automatically set, and the ESC is connected to the power supply. → Set ID and Throttle. → Click "Set ID and Throttle Channel" and wait for the data to be saved.

Check the page prompt to confirm whether the setting is successful. → The equipment is powered off, there is no sequence of power outages, and the equipment will not be burned.

10 Fault data read

The ESC has its own fault storage function to store the times upon powering-on, flight time, and fault times information. It is convenient for flight fault analysis. This function needs to use DataLink data box, serial port assistant, and DataLink host computer software.
Note: DataLink software can be obtained from Hobbywing official website, dealers, Hobbywing sales, and Hobbywing after-sales.
DataLink data box firmware version requirements: LINK-01.2.15-C or later; serial port assistant requirements: USB to TTL protocol; DataLink host computer software requirements: fault storage version. It can be obtained on the official website, WeChat official account or after-sales service.
The DataLink box has three power supply methods (+5V), USB data cable, serial port assistant, and external power supply cable. You can choose one of the power supply methods, and you don't need to repeat the power supply.
Note: For detailed steps, please refer to the DataLink user manual.

1) Connection

Serial port assistant ----> DataLink data box "GND 5V TX RX" ----> "— + RX2 TX2" (please click here for the corresponding line sequence);
ESC---->DataLink data box "red gray" ----> " CH1 CL1", multiple ESCs can be used in parallel.

2) Software operation

Run the DataLink software. → Click the "USB-serial port" button in the upper right corner to enter the serial port page. → Click "Fault Analysis" to enter the page. → ESC connection and power on.

Select the serial port number, the default baud rate, click "Open Serial Port" to connect the ESC to the computer. → Select a channel, click "Read Fault Information" to view flight faults. → After viewing the fault, save the data as needed; then please clear the data in the ESC. → The equipment is powered off, there is no sequence of power outages, and the equipment will not be burned.

11 Firmware upgrade

Firmware upgrade is divided into two ways: computer online upgrade and flight controller remote upgrade. It supports online upgrade of multiple ESCs at the same time, and the upgrade port is CAN-ESC (Fast).
The upgrade of the flight control needs to cooperate with the flight control(not explained here).
This function needs to use DataLink data box, special DataLink software for upgrade package, and USB data cable.
DataLink data box version requirements, LINK-01.2.15-C or later; DataLink software can be obtained from Hobbywing official website, distributors, Hobbywing sales, and Hobbywing after-sales.
Note: Please ensure that the computer system has installed Microsoft Visual C++ 2013 software before using this function, otherwise it cannot be used. An upgrade package usually only contains one program for one type of ESC. For other ESCs, please re-obtain the upgrade package for the corresponding ESC model.

1) Connection

Connect the computer and the DataLink data box with the USB data cable;
ESC---->DataLink data box "red gray" ----> " CH1 CL1".

2) Firmware acquisition

It can be obtained at the place of purchase, Hobbywing official website, dealers, Hobbywing sales and Hobbywing after-sales offices.
Note: It can only be upgraded from the existing program, and software and hardware cannot be upgraded together.

3) Operating diagram

Run the DataLink software. → The USB cable is connected to the data box, and the ESC is connected to the DataLink data box. → Click "DataLink" of the software, View data box firmware, firmware version LINK-01.2.15-C or later. → Click "CAN->ESC(FAST)", ESC firmware upgrade page, click "ESC communication settings".

Select the "Scan" button first, and then power on the ESC. → After the channel on the page is ticked, select the "Stop" button. → After the hardware and firmware information appears on the page. → In "Available Version", select the desired firmware and click "Update".

Wait for the upgrade to complete, if the upgrade fails, please repeat the previous part of the operation. → After the upgrade is complete, please scan again to confirm that the program is upgraded successfully. → The equipment is powered off, there is no sequence of power outages, and the equipment will not be burned.

12 Common Faults and Prompt Sound Description

Warning tone description

Symptoms	Alarm tone	Possible causes	Solutions
Motor fails to start after power on	"Beep beep beep..." rapid monophonic	Throttle not reset to zero	Push the throttle to the lowest point or recalibrate the throttle point
Motor fails to start after power on	"Beep, beep, beep,..." (1 second for each interval)	Receiver throttle channel has no throttle signal output	1. Check whether the transmitter and receiver operates normally 2. Check whether the throttle control channel wiring is normal
The power-on voltage is lower than 9V	"Beep, beep" (interval 1 second)	Battery voltage is too low	Replace with a suitable fully charged battery
The power-on voltage is higher than 27V	"Beep, beep" (interval 1 second)	Battery voltage too high	Replace with a suitable fully charged battery
The motor stops or restarts		The motor is not compatible with the ESC	Replace the motor, or replace the propeller
There is no sound during the self-test of the motor, but the motor can rotate	There is no prompt sound during self-test, and the motor rotates	Driver exception	1. Replace ESC 2. Return to factory for repair
The motor cannot start normally, accompanied by "click"click" jitter	There is no prompt sound during the self-test, and the motor is unable to rotate	Motor phase loss	1. Check phase connection 2. Check motor 3. If there is no problem with the motor and connection, return the ESC to the factory for repair

13 The blinking of the light

Condition	normal	Full of throttle	Over voltage	Low voltage	Over current	Throttle lost	The input throttle signal is not at the 0% position	MOS overheat	Capacitor over heat	Motor block
Number of blinking of the light	The light is always on	Continuous short blinking	1 short	2 short	3 short	1 long	1 long and 1short	1 long and 2 short	1 long and 3 short	1 long and 4 short

Others			
Condition	The input throttle signal is not at the 0% position	Shorted circuit of signal line	Open circuit of motor
Sound & blinking	Continus short loudly beep & LED continuous short blinking	Continuous short with blinking & LED off with LED off	Continus short blinking without beep

Resources & Specifications

Visit www.hobbywing.com/en/products/cmx6se for more details about HOBBYWING X6-SE Drone Propulsion System