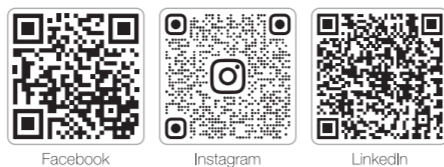




Thank you for purchasing this product! The brushless propulsion system is powerful. Improper use may result in personal injury or equipment damage. Therefore, we strongly recommend that you read this manual carefully before using the equipment and strictly follow the prescribed operating procedures. Under no circumstances shall the manufacturer be liable for damages caused by misuse or unauthorized modifications, including but not limited to compensating for incidental or indirect damages.

The X8 G2 is not designed for EVOTL and cannot be used for manned flights. EVOTL aircraft, please contact Hobbywing to or look for more professional EVOTL motors.



01 Introduction

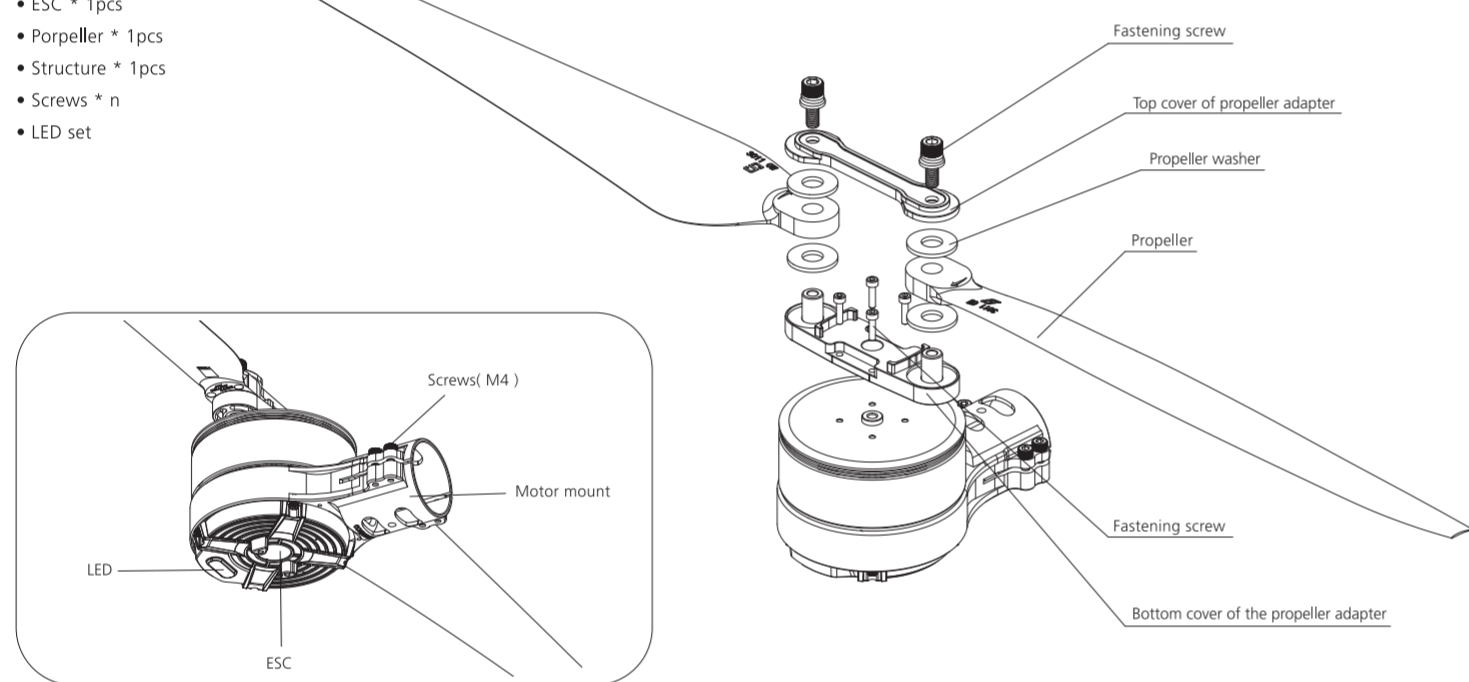
The X8 G2 brushless propulsion system is designed for applications in agriculture, education and training, logistics, fire fighting, surveying, inspection and other fields, with a single-axis rated load of 5-7.5kg and a maximum single-axis thrust of 17.5kg, and is adaptable to 35/40mm carbon fiber tube arms, making it suitable for various small and medium-sized drones. The waterproof rating of IPX6 ensures reliable operation in challenging environments. For heavy-loaded drones, the FOC driven algorithm of ESC based on PMSM system is optimized. This propulsion system supports both digital and analog throttle modes, which are of mutual redundancy and seamless switch. The product features power-on self-check, voltage anomaly protection, overcurrent protection, and stall protection. It utilizes HWCAN and DroneCAN dual communication protocols (i.e., Cyphal (UAVCAN)), making it compatible with most mainstream closed-source and open-source flight controllers, offering real-time data transmission. Additionally, the built-in fault storage and logging feature allows for fault data recording, and the OTA upgrade allows for propulsion system upgrade through the flight controller.

02 Precautions

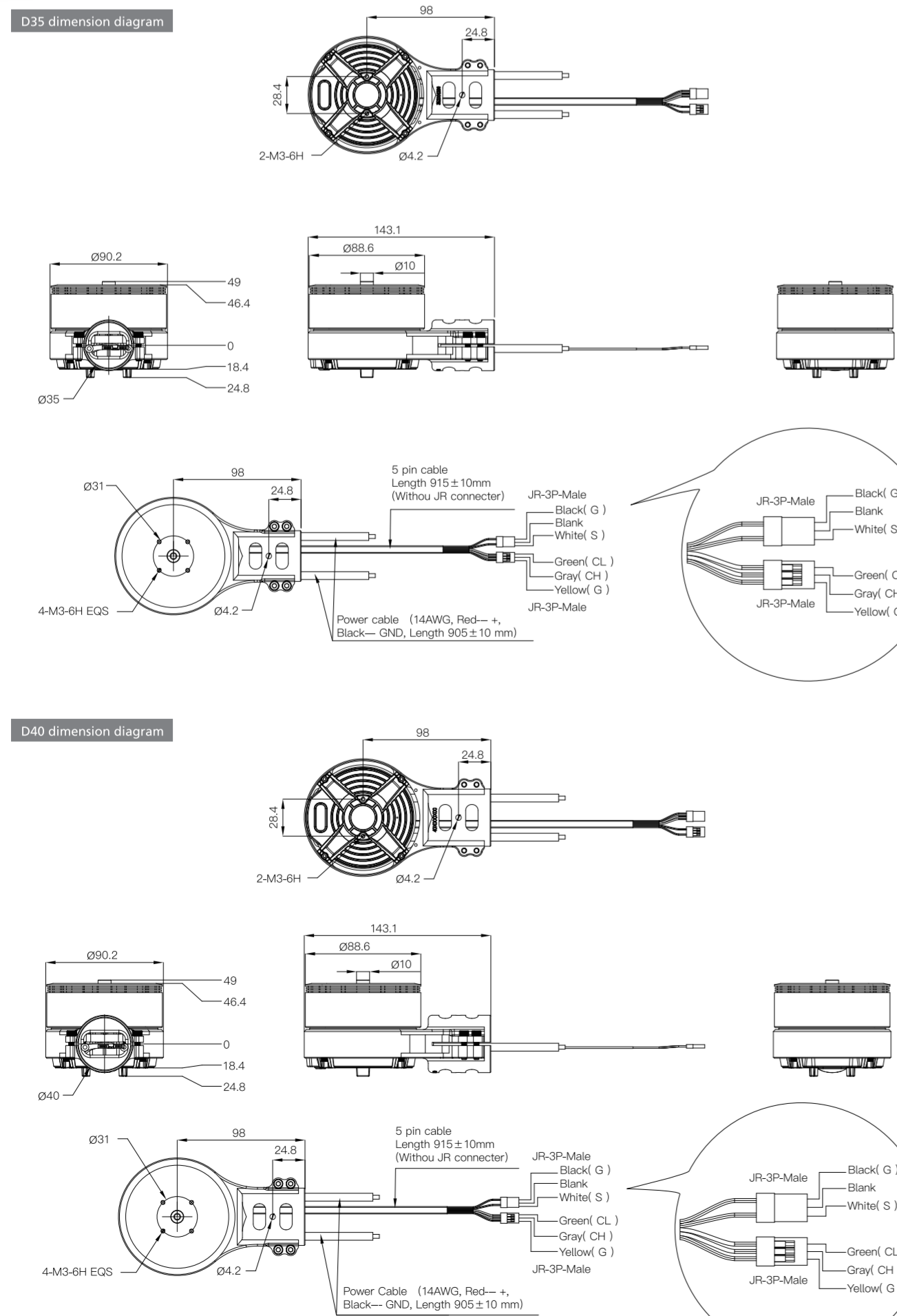
- During usage, keep away from crowds, power lines, obstacles, etc. Make sure to comply with local laws and regulations, as well as safe flight standards.
- The propellers are designed for flat terrains, and are not suitable for plateaus. The normal operating altitude is below 2,000 meters. When above this altitude, use the corresponding high-altitude propellers or reduce the flight load. In hot summer weather, especially at noon, adjust the flight load appropriately based on the actual temperature.
- The propeller is made of carbon fiber reinforced nylon composite material, and is not suitable for coaxial use. Do not use this propeller for coaxial purposes.
- This product has two types of propellers. The propellers for agricultural plant protection drones (MFP 30x11) are only for agricultural plant protection use, with a maximum flight speed of 13.8 m/s (at sea level). The high-speed propellers (MFP 30x11S) support a maximum flight speed of 20 m/s (at sea level).
- Avoid flying in extreme weather conditions such as strong winds, heavy rain, snow, fog, thunderstorms, sandstorms, or ice.
- Do not approach high-speed rotating propellers and motors to avoid injury.
- Do not perform indoor testing or flight with the propellers attached. For indoor testing, make sure to remove the propellers.
- Before trial use, check if all parts are in good condition. If any damage is found, contact the after-sales service for replacements.
- Before flight, check if the screws on the connecting structures are tightened and whether the motor is level. If necessary, fix the reserved holes on the motor mounting seat with rivets.
- The X8 G2 propulsion system has two versions with different tube diameters, compatible with circular tubes with an outer diameter of 35/40 mm, respectively.
- Use the recommended batteries. Do not use non-conforming batteries, such as those exceeding standard range or those with a low discharge rate. The product operates across a wide voltage range. The 12-14S lithium-ion polymer battery is recommended, with an optimal voltage range of 44.4V-60.9V. If a 6S battery is used, the motor will rotate, but the lift will not meet actual requirements. It is only recommended for empty-load debugging.
- After each operation, flush the motor with water to keep it clean and tidy.
- The digital throttle must be used with a flight controller with a CAN throttle output. For related usage methods, contact the flight controller manufacturer.
- Do not modify this product (including changing it to a coaxial structure) without authorization. The manufacturer is not liable for damages caused by unauthorized modifications.
- Before takeoff, ensure that the single-axis hover thrust is within the rated load range. Overloading may cause the motor and ESC temperature to rise rapidly, which may lead to a crash.
- Do not disassemble the ESC or motor without authorization to avoid damaging the motor or affecting the ESC's protective capabilities.
- Use original parts for repairs and replacements. If any blade or propeller adapter is damaged, replace it immediately. The unique codes of the two blades are consistent. If one blade is damaged, replace both. For any damage to other parts, contact technical support or the drone manufacturer immediately.
- When using CAN digital throttle, it is recommended to set the idle throttle of the flight controller to 6%.

03 Propulsion Composition

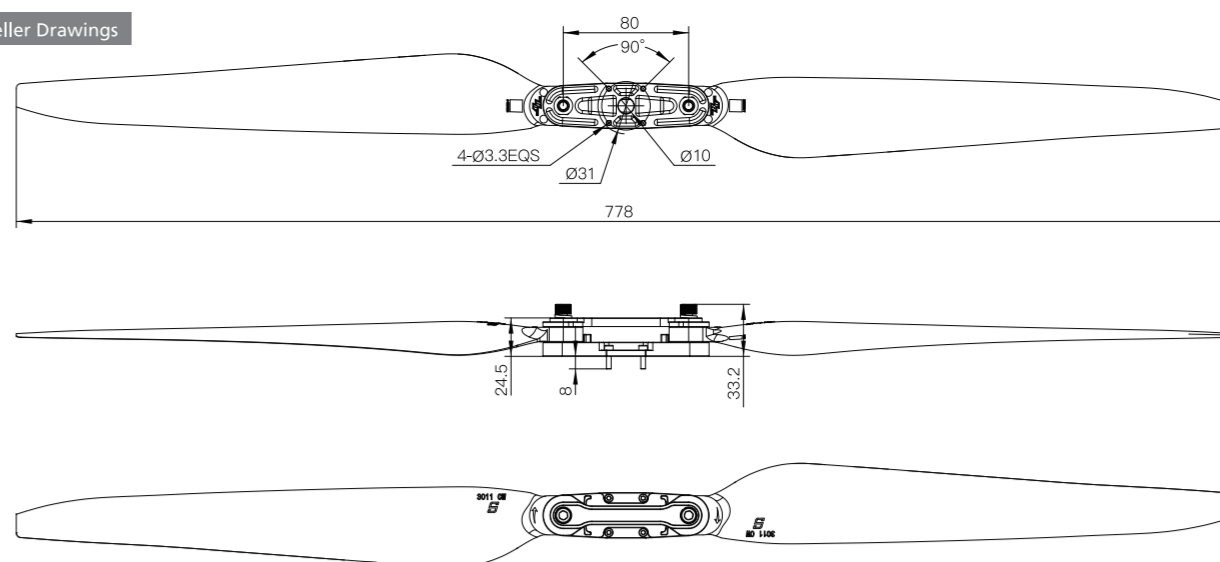
- Motor * 1pcs
- ESC * 1pcs
- Propeller * 1pcs
- Structure * 1pcs
- Screws * n
- LED set



04 Dimensions



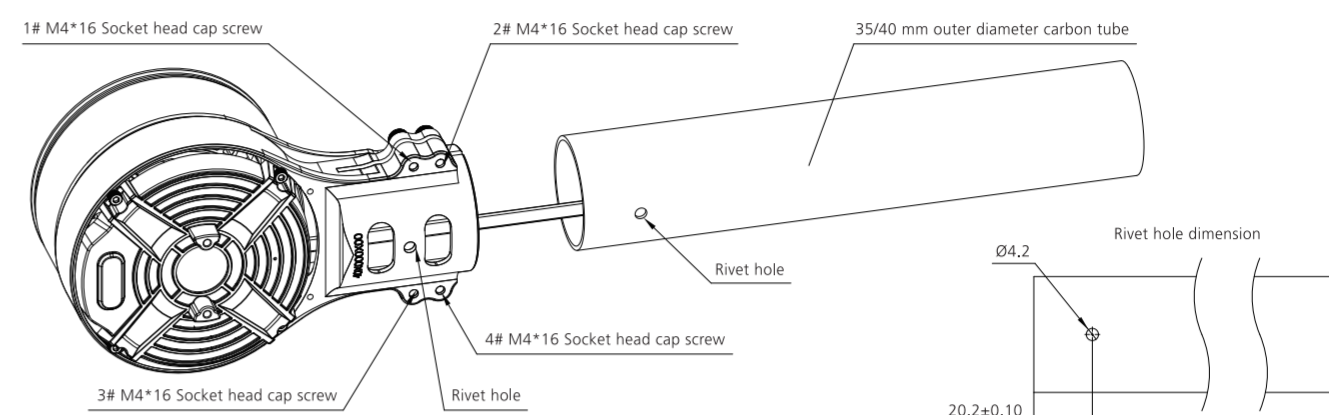
Propeller Drawings



05 Propulsion Installation

Installation steps:

- First, loosen the four screws (#1-#4) on the tube clip holder for fixing the carbon tubes, then pass the propulsion system cable bundle through the carbon tubes, insert the carbon tubes into the tube clip holder, and push them to the bottom. Make sure that the propulsion system is horizontally positioned after installation.
- Tighten #1 screw first, then #3 screw, followed by #2 screw, and finally #4 screw. Follow this order, and lock the screws to the pre-tightening state. Do not tighten all at once.
- The tightening torque for #1-#4 should be 2.5±10%N·m.
- If necessary, holes can be drilled on the carbon tube, and holes reserved above or below the tube clip holder are for adding rivets to secure the propulsion system.



Note:

- Yellow, gray, and green wires are for data output, firmware upgrade (can upgrade the ESC system), and digital throttle wire, respectively, using the CAN protocol. Yellow, gray, and green. Yellow—GND, Gray—CH, Green—CL.
- The black and white wires are for PWM throttle, black for the ground wire, and white for the PWM signal wire. The throttle cable must be connected to the corresponding motor control interface on the flight controller.

06 Specifications

X8 G2

Rated single-axis load: 5-7.5kg (at sea level)
Maximum thrust: 17.5kg (at sea level)
Rated voltage: 12S-46V/14S-54V
Lithium battery: 12-14S (maximum 65V)
Ambient temperature: -20~50°C
Compatible carbon tubes: 35/40mm
Total weight: 1095g (including 30°11°S propeller)
Protection rating: IPX6
Recommended thrust range efficiency: 9.7~8.4g/W
Throttle source: PWM+CAN
Rated output power (Max continuous): 810W
Rated current: 20A
Parameter adjustment function: Via software or transmitter
Power cable: Black and red 14AWG-905 mm±10mm
Signal cable: 915mm±10mm

ESC

Recommended lithium battery: 12-14S (LiPo)
Voltage range: 18-63V
Continuous current: 20A (non-confined ambient temperature < 35/40°C)
Instantaneous current: 80A (non-confined ambient temperature < 35/40°C)
PWM fixed throttle: 1,050-1,950µs
PWM throttle frequency: 50-500Hz
Throttle range calibration: Not supported
BEC: None
Fault storage: Supported
Logging time: Default 1h (Max 24h by changing Storage Interval)
Communication protocol: HWCAN + DroneCAN (i.e., Cyphal (UAVCAN))
CAN terminal resistor: None
CAN default baud rate: 500kbps
CAN sampling point: 83.3%
Pinout: Black—GND, White—Signal, Yellow—GND, Gray—CAN High, Green—CAN Low

Motor

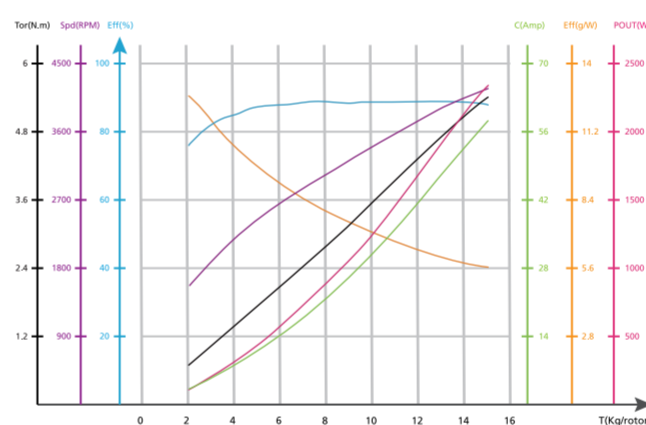
Stator size: 81*20mm
Size: Ø88.6*38.9mm
KV value: 100KV

Propeller

Model: MFP 30x11S (Folding propeller)
Length: 778mm
Weight (including propeller adapter): 193g
Single blade: 54.5g
Blade Material: Carbon fibre-reinforced nylon composite material

07 Thrust Data Table

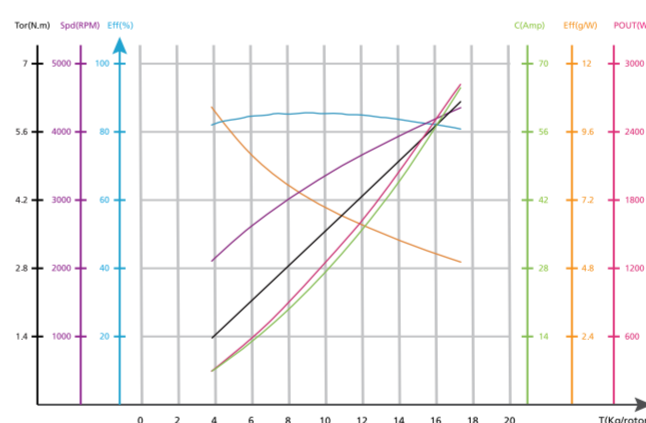
X8 G2-12S Thrust Load Curve



X8 G2-12S Lithium-ion Polymer Battery Thrust Data Table

Voltage(V)	Propeller	Throttle(%)	Thrust(kg)	Current(A)	Power Input(W)	Speed(RPM)	Efficiency(g/W)	Torque(N·m)	Power Output(W)	Temperature(°C)
48V (12S LiPo)	MFP 30x11S / MFP 30x11	35%	2021	3.5	161.2	1571	12.5	0.74	121.7	
		39%	2472	4.4	204.0	1721	12.1	0.89	160.4	
		42%	2968	5.6	256.5	1877	11.8	1.06	206.3	
		45%	3493	6.9	317.3	2032	11.0	1.24	253.8	
		48%	3999	8.3	380.4	2171	10.5	1.41	320.5	
		51%	4476	9.6	443.5	2294	10.1	1.58	379.5	
		54%	4994	11.2	515.9	2419	9.7	1.76	445.8	
		57%	5456	12.7	593.9	2524	9.3	1.92	507.4	
		60%	6043	14.6	674.2	2650	9.0	2.12	588.3	
		63%	6452	16.1	740.0	2733	8.7	2.28	646.8	
		69%	6977	18.0	826.9	2836	8.4	2.45	727.6	
		69%	7951	21.8	1004.4	3077	7.9	2.79	981.4	
72%	8500	24.1	1110.3	3115	7.7	2.99	975.3			
75%	9050	26.5	1221.7	3212	7.4	3.18	1069.5			
78%	10034	31.2	1434.5	3384	7.0	3.55	1257.9			
81%	10487	33.3	1533.5	3459	6.8	3.71	1343.8			
84%	11007	36.1	1660.6	3553	6.6	3.92	1458.4			
87%	11548	38.9	1792.3	3646	6.4	4.13	1576.8			
90%	12542	44.4	2042.8	3813	6.1	4.51	1800.7			
93%	13004	46.9	2161.6	3886	6.0	4.68	1904.3			
100%	15006	57.7	2568.5	4132	5.6	5.35	2314.8			

X8 G2-14S Thrust Load Curve



X8 G2-14S Lithium-ion Polymer Battery Thrust Data Table

Voltage(V)	Propeller	Throttle(%)	Thrust(kg)	Current(A)	Power Input(W)	Speed(RPM)	Efficiency(g/W)	Torque(N·m)	Power Output(W)	Temperature(°C)
54V (14S LiPo)	MFP 30x11S / MFP 30x11	35%	4459	5.4	451.4	2250	9.9	1.58	372.3	
		39%	4965	9.7	524.4	2371	9.5	1.75	434.5	
		42%	6007	12.7	688.6	2602	8.7	2.12	577.8	
		45%	6450	14.1	763.2	2694	8.5	2.28	643.2	
		48%	7031	16.0	864.8	2810	8.1	2.48	720.7	
		51%	8026	19.4	1048.4	2995	7.7	2.83	887.5	
		54%	8552	21.3	1149.4	3088	7.4	3.02	976.5	
		57%	9509	24.8	1342.4	3248	7.1	3.35	1139.4	
		60%	10485	28.7	1552.8	3403	6.8	3.70	1318.4	
		63%	11062	31.3	1680.3	3489	6.6	3.89	1421.2	
		69%	12045	35.4	1912.8	3633	6.3	4.24	1613.0	
		69%	12992	39.9	2152.8	3768	6.0	4.57	1802.2	
72%	13506	42.4	2290.0	3836	5.9	4.76	1912.0			
75%	14486	47.3	2559.3	3962	5.7	5.10	2118.8			
78%	14984	50.2	2710.3	4031	5.5	5.29	2232.9			
81%	15544	53.3	2879.3	4101	5.4	5.49	2357.5			
84%	16017	56.0	3025.6	4160	5.3	5.67	2469.9			
87%	16518	59.0	3164.3	4219	5.2	5.85	2584.4			
90%	17005	61.9	3340.3	4278	5.1	6.02	2696.4			
100%	17464	64.7	3489.8	4326	5.0	6.18	2799.4			

* The above data was measured by HOBBYWING Laboratory at room temperature 25°C, at sea level, with varying throttle input adjustments.

08 Protection Functions

- Startup protection:** After the propulsion system is powered on, it enters self-check mode. If the check is successful, it will emit a string of beeping sound before operation. If the check fails, the motor cannot be driven with a flashlight warning.
- Stall protection:** When a motor stall is detected by the ESC, the motor will attempt to output for 1 second. If the stall continues during this time, the ESC will completely shut off output and will not attempt to restart the motor. At this point, re-power the propulsion system to clear the fault light and restore propulsion output.
- Overcurrent protection:** When the instantaneous current is abnormal and exceeds 147A for about 0.6ms, the ESC will turn off the output and continuously attempt to restart the motor. If multiple restart attempts fail, re-powering the propulsion system is required to restore normal operation.
- Throttle signal lost protection:** When the ESC detects a loss of throttle signal for more than 0.3 seconds, the throttle signal lost alarm will be triggered. After 1s loss, the output will shut down to prevent greater loss due to the propeller continuing to rotate at high speed. After the signal is restored, the ESC will restore power output accordingly.
- Startup delay protection:** The first time the motor starts, there will be a delay of approx. 400ms. During this period, the motor will rotate at low speed until the folded propellers are thrown off. Then, the motor will operate at full speed. During the delay startup period, the motor speed will not change, regardless of how much throttle is applied. When used with a flight controller, the automatic delay of the flight controller needs to be adjusted. Otherwise, it may lead to issues such as catapult takeoff of the UAV. For example, for the open-source Ardupilot, modify the MOT_SPOOL_TIME and TKOFF_SLEW_TIME to 2s. For closed-source flight controllers, please contact the manufacturer.
- Overtemperature warning:** The motor ESC has no temperature protection. When the ESC temperature exceeds 110°C or the capacitor temperature exceeds 100°C, the ESC LED will blink rapidly, and the CAN data will report an overtemperature warning externally, but the motor will not stop or reduce output. When the motor and ESC continue to overheat, there is a risk of burning.
- Back EMF (Back Electromotive Force) protection:** During throttle reduction, the motor ESC will generate back electromotive force. The ESC will perform corresponding logic processing to prevent high-voltage back electromotive force from damaging internal components. The back EMF voltage threshold is limited to 63V.

09 Warning Sound Description

The abnormal warning sound after the motor is powered on is related to the throttle signal and voltage anomalies. Check the input voltage and throttle.

Fault	Warning Sound	Possible Cause	Solution
The motor fails to start after power-on.	Rapid and single sound "Beep beep beep..."	The throttle is not reset to zero.	Set the throttle to the minimum.
The motor fails to start after power-on.	"Beep, beep, beep, ..." (Each 1-second interval)	The receiver throttle channel has no throttle signal output.	Check if the transmitter and receiver are properly paired. Check if the throttle control channel wiring is normal.
The power voltage is below 18V.	"Beep beep", "beep beep"(Each 1-second interval)	The battery voltage is too low.	Replace with a compatible fully charged battery.
The power-on voltage is above 63V.	"Beep beep", "beep beep"(Each 1-second interval)	The battery voltage is too high.	Replace with a compatible fully charged battery.

