



USER MANUAL
P50M



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.

This propulsion system is an industrial-grade component for unmanned aircraft. If you have more specialized application requirements, please contact us.



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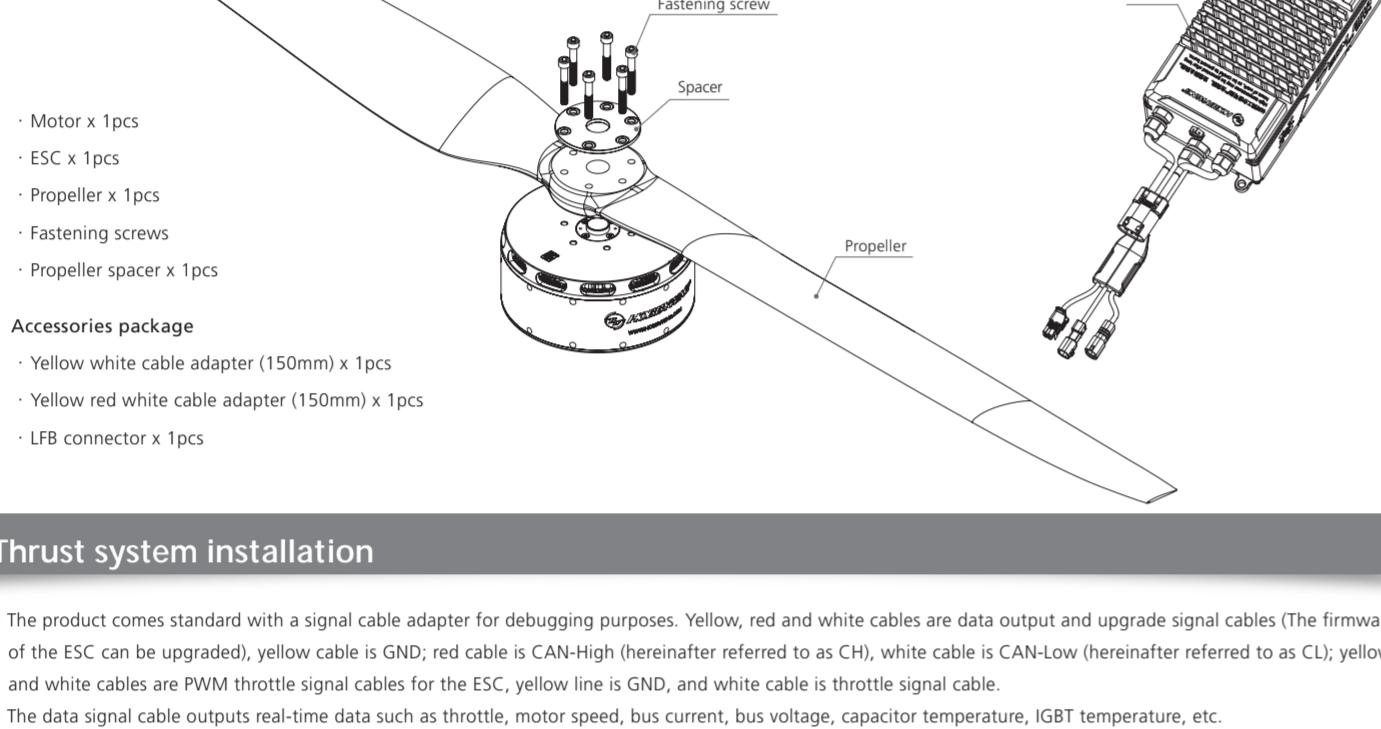
01 Introduction

The P50M is an industrial-grade brushless thrust system designed for multi-rotor aircraft, supporting a rated single-axis load of 50 kg with a maximum thrust of 116 kg/axis. It supports carbon fiber tubes with a 60mm diameter for installation. Featuring IP35 protection and high-efficiency thermal dissipation, it delivers a one-step power solution for heavy-load multi-rotor drone applications across logistics, emergency rescue, construction lifting, and other critical domains. The FOC ESC employs CAN communication protocol and dual-redundant throttle control (digital/PWM), integrating power-on self-diagnostics, fault logging, over-current protection, and stall protection to ensure operational safety.

02 Precautions

- Please stay away from crowds, high-voltage lines, obstacles, etc. when using, and be sure to follow safety regulations when using.
- The thrust system contains FOC driven ESC, which needs to strictly match the motor parameters. The program is unique. It is only suitable for one combination of propellers and is not compatible with multiple combinations at the same time. If you need to change it, please contact the manufacturer. Unreasonable combinations will trigger ESC protection and make it unusable.
- The ESC is equipped with CAN485 function. This manual only introduces the CAN communication version. When using the CAN function, the ESC ID and the throttle channel of the same aircraft will be the same, otherwise the multiple ESCs will be recognized as one ESC.
- Do not install 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 connectors of the ESC, please ensure that the welding is reliable and use welding equipment with sufficient power.
- Do not use this thrust system when the external ambient temperature exceeds 55°C. The high temperature will destroy the ESC and may cause damage to the motor and cause your drone to crash.
- This product adopts a fully isolated design between the protective earth (PE), high-power circuits, and low-power signal circuits, ensuring a low-impedance connection (common grounding) between the motor base and the ESC housing.
- When the sensor cable connector is connected, calibration is required to use sensorless drive mode. Without calibration, the motor will still operate in sensorless drive mode. The motor temperature measurement (NTC) function works normally with or without calibration.
- This product adopts a fully isolated design between protective earth (PE), power circuits, and low-voltage signal circuits, ensuring low-impedance connection (common grounding) between the motor base and the ESC housing.
- When connecting the sensor-enabled cable, if sensor-assisted startup is used, calibration via the upper computer is required first. Without calibration, the motor will remain in sensorless startup mode. The motor temperature measurement (NTC) function works normally with or without calibration. The ESC program defaults to not requiring sensor-assisted startup; this logic is added solely to pursue stability during rapid motor startup and is not mandatory.
- The sensor cable and fixed-Props functionality cable share the same wiring. If either function is used, calibration is required for it to take effect.

03 Thrust system composition



04 Thrust system installation

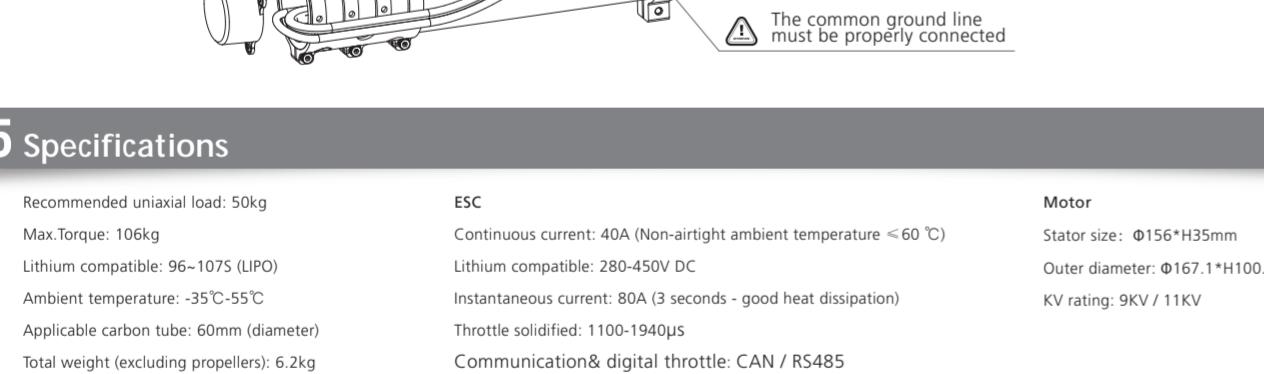
- The product comes standard with a signal cable adapter for debugging purposes. Yellow, red and white cables are data output and upgrade signal cables (The firmware of the ESC can be upgraded); yellow cable is GND; red cable is CAN-High (hereinafter referred to as CH), white cable is CAN-Low (hereinafter referred to as CL); yellow and white cables are PWM throttle signal cables for the ESC, yellow line is GND, and white cable is throttle signal cable.
- The data signal cable outputs real-time data such as throttle, motor speed, bus current, bus voltage, capacitor temperature, IGBT temperature, etc.
- The phase connection correspondence between the motor and ESC is: A-Blue, B-Yellow, C-Orange. When connected this way, the actual motor rotation direction is CW (Clockwise). To change the rotation direction, it should be configured via software.
- The standard sensor cable connector includes the motor temperature measurement (NTC) function via Pin7 and Pin8, which provide real-time feedback on motor temperature. The remaining pins are for the sensor cable, which also serve as the fixed-Props control cable.
- ESC PWM throttle range is fixed to 1100-1940us, no need to do calibration.

Communication cable	M200325-1*3-5R-B-male
CH	1
CL	2

PWM cable	M200335-1*3-5R-B-female
S	1
-	3

LED	M200335-2*2-B-female
+	1
R	2
G	3
B	4

Sensor connector	Wire color	Connector model number
A	white	1
B	yellow	2
Z	green	3
PWM	purple	4
+5V	blue	5
GND	brown	6
GND	/	/
NTC	red	7
GND	black	8



05 Specifications

Recommended uniaxial load: 50kg	ESC	Motor
Max.Torque: 106kg	Continuous current: 40A (Non-airtight ambient temperature <= 60 °C)	Stator size: Ø156*H35mm
Lithium compatible: 96-1075 (LiPO)	Lithium compatible: 280-450V DC	Outer diameter: Ø167.1*H100.5mm
Ambient temperature: -35°C-55°C	Instantaneous current: 80A (3 seconds - good heat dissipation)	KV rating: 9KV / 11KV
Applicable carbon tube: 60mm (diameter)	Throttle solidified: 1100-1940us	
Total weight (excluding propellers): 6.2kg	Communication& digital throttle: CAN / RS485	
Protection level: IP35	Firmware upgrade: supported	
Support throttle frequency: 50-500Hz	Propeller	
*Normal flight operating voltage range: 280V DC to 450V DC.	Model: MSC 64x20 / USC 54x23	
Hovering thrust operating voltage range: 315V DC to 450V DC.	Weight (straight propeller): 860g / 707g	
Maximum thrust operating voltage range: 336V DC to 450V DC.		

*Normal flight operating voltage range: 280V DC to 450V DC.
Hovering thrust operating voltage range: 315V DC to 450V DC.
Maximum thrust operating voltage range: 336V DC to 450V DC.

06 Thrust system parameters

MSC 64x20-9KV Load performance parameters

Voltage(V)	Propeller	Throttle(%)	Thrust(g)	Current(A)	Power Input(W)	Speed(RPM)	Efficiency(g/W)	Torque(N·m)	Power Output(W)	Temperature(°C)
33%	22233	6.4	2577.3	1487	9.6	12,930	2013.1			
35%	25510	6.0	2608.3	1520	9.4	13,220	2056.6			
37%	30242	8.4	3373.8	1383	9.0	19,48	2821.7			
39%	33078	9.3	3925.7	1458	8.6	21,70	3313.6			
42%	38982	12.1	4635.3	1566	8.1	25,14	4122.0			
45%	44941	14.8	5304.4	1589	7.6	26,50	5030.1			
48%	49494	17.3	6917.7	1767	7.2	32,27	5091.9			
51%	55603	20.2	8073.6	1860	6.9	35,90	6992.1			
54%	61046	23.2	9294.3	1948	6.6	39,54	8006.1			
57%	66625	26.4	10570.6	2022	6.3	43,71	9184.7			
60%	69939	29.7	11712.0	2112	6.0	46,74	10303.1			
63%	77113	33.1	13246.1	2198	5.8	50,23	11949.3			
66%	82140	36.5	14618.8	2256	5.6	53,61	12964.0			
69%	86939	40.0	15993.9	2320	5.4	56,85	13810.8			
72%	91241	43.7	17376.2	2376	5.3	59,90	14022.0			
75%	95740	7.7	18681.4	2431	5.1	62,82	15990.3			
78%	99698	49.9	19958.8	2478	5.0	65,50	16995.8			
81%	103342	52.9	21170.8	2519	4.9	67,97	17027.1			
84%	106601	55.8	22305.4	2556	4.8	70,21	18790.0			
87%	110065	58.7	23430.8	2589	4.7	72,36	19717.8			
90%	112380	60.8	24312.0	2615	4.6	74,02	20268.7			
100%	116272	64.3	25714.1	2653	4.5	76,59	21275.6			

The above data was measured by HOBBYWING Laboratory at room temperature 25°C, at sea level, with varying throttle input. The motor temperature is measured after running for 10 minutes at rated thrust, for reference only.

USC 54x23-11KV Load performance parameters

Voltage(V)	Propeller	Throttle(%)	Thrust(g)	Current(A)	Power Input(W)	Speed(RPM)	Efficiency(g/W)	Torque(N·m)	Power Output(W)	Temperature(°C)
33%	22233	6.4	2577.3	1487	8.6	12,930	2013.1			
35%	25510	6.0	2608.3	1520	8.2	14,84	2470.4			
37%	29343	9.2	3684.7	1691	7.9	16,86	2986.1			
39%	33078	9.3	3925.7	1690	7.8	17,20	3086.0			
42%	38982	12.1	4635.3	1766	6.0	25,72	5571.5			
45%	44941	14.8	5304.4	1821	6.0	26,50	5413.3			
48%	49494	17.3	6917.7	1919	6.3	29,20	7616.5			
51%	55612	23.2	9276.3	2198	6.0	32,70	7937.3			