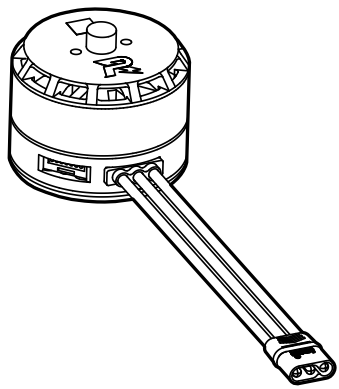
ROBOMASTER

M3508 Brushless DC Motor
M3508 直流无刷电机

User Guide

使用说明

v1.0 2025.10



机甲大师 ROBOMASTER

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Disclaimer

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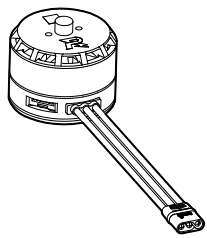
Introduction

RoboMaster M3508 Brushless DC Motor (hereinafter referred to as the "motor") is designed for high-performance robots. When working with RoboMaster C620 Brushless DC Motor Speed Controller (hereinafter referred to as the "MSC"; the MSC is sold separately), it supports sinusoidal (sine-wave) drive, which provides higher efficiency, better dynamic performance, and greater stability than traditional square-wave drive.

In the Box

Motor × 1

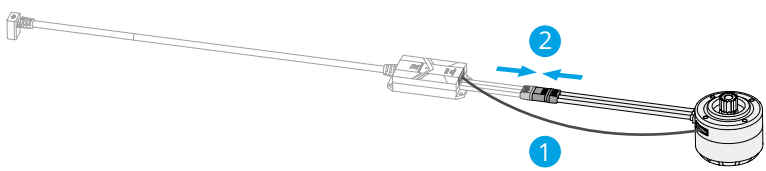


7-Pin Data Cable × 1

Using the Product

Connecting to the MSC

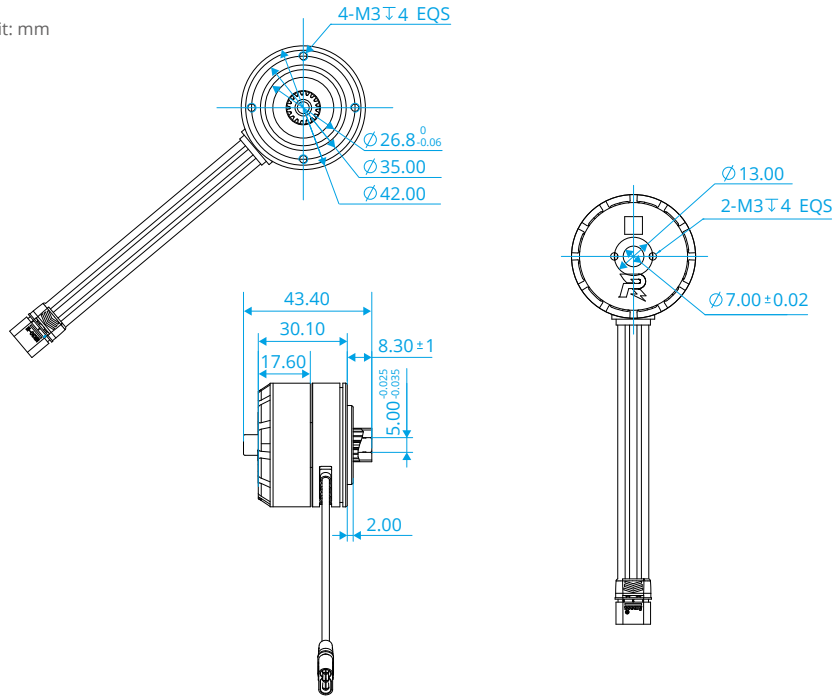
1. Use the included 7-pin data cable to connect the 7-pin ports on the MSC and the motor.
2. Connect the three-phase cable connectors of the MSC and the motor, ensuring that the wire colors match. DO NOT insert the connectors in the wrong direction.



Installation

Refer to the following dimensions to select the mounting holes and install the motor based on your needs.

Unit: mm



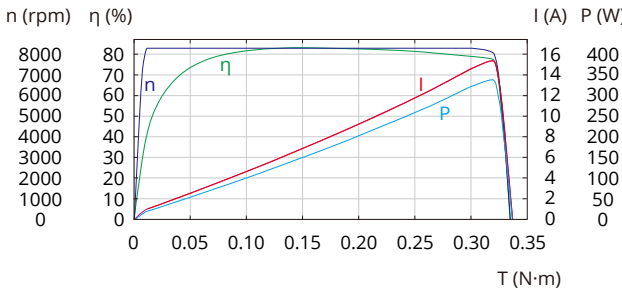
Precautions

⚠
- The motor has M3 threaded holes with a depth of 4 mm. DO NOT use excessively long screws. Otherwise, the printed circuit board (PCB) may be damaged.
- Make sure that the motor is securely installed.
- Use the motor under the maximum winding temperature. Prolonged overheating can permanently damage the motor.
- Avoid damage to the cables and wires. Otherwise, the motor may work improperly.
- DO NOT touch the rotors to avoid injury.
- DO NOT allow any foreign materials to come into contact with the rotors, as this may affect performance.
- The motor will heat during high-power operation. Avoid direct contact to prevent burns.

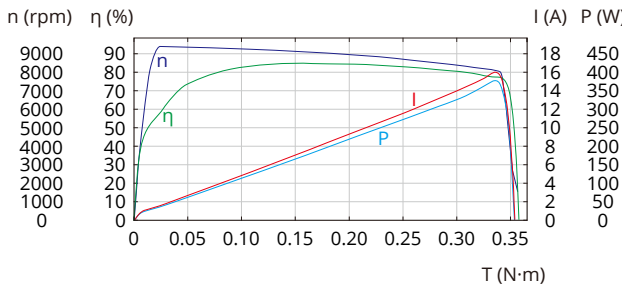
Performance and Parameters

Payload Characteristic Curves

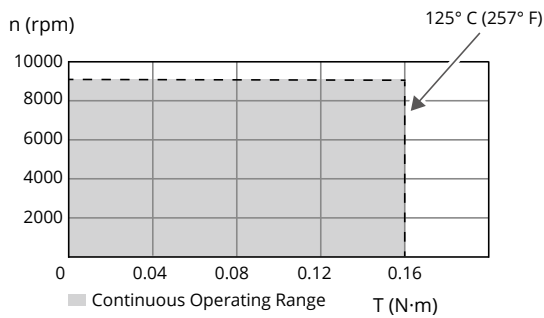
Closed-Loop Speed Control Using C620 MSC



Closed-Loop Current Control Using C620 MSC



Operating Range Diagram



n-Rotational Speed, η-Efficiency, I-Current, P-Output Power, T-Torque

The above data were measured under laboratory conditions at an input voltage of 24 V, an ambient temperature of 25 °C (77 °F), and under normal cooling. They are provided for reference only. Adjust the motor running time based on the actual conditions such as operating temperature and cooling conditions.

Characteristic Parameters

Motor	
Rated Voltage	24 V
Torque Constant	0.02 N·m/A
Rotational Speed Constant	390 rpm/V
Speed-Torque Gradient	260 rpm/N·m
Mechanical Time Constant	49 ms
Phase Resistance	0.194 Ω
Phase Inductance	0.097 mH
Operating Temperature	0° to 50° C (32° to 122° F)
Maximum Winding Temperature	125° C (257° F)
Number of Pole Pairs	7
Rated Dynamic Load	276 N
Motor Weight	120 g
Motor and C620 MSC at Rated Voltage*	
No-Load Speed	9400 rpm
No-Load Current	0.6 A
Rated Rotational Speed	9085 rpm
Rated Torque (Maximum Continuous Torque)	0.16 N·m
Rated Current	10 A
Maximum Efficiency	83%
Peak Torque	0.33 N·m
Peak Current	2.5 A

* All data in this table were measured under laboratory conditions. All current values represent the input current of the MSC, and the efficiency refers to the overall efficiency of the motor-MSC drive system.

Output Gear Parameters

Number of Teeth	17
Module	0.6
Pressure Angle	20°
Pitch Diameter	10.2
Addendum Diameter	11.38
Dedendum Diameter	8.68
Profile Shift Coefficient	-0.01
Tooth Span	2
Common Normal	$2.79^{-0.02}_{-0.04}$

免责声明

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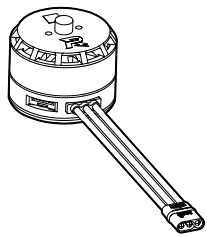
简介

RoboMaster M3508 直流无刷电机（以下简称为“电机”）专为高性能机器人设计，搭配 RoboMaster C620 无刷电机调速器（以下简称为“电调”，电调需另外购买）可以实现正弦驱动，相比传统方波驱动具有更高的效率、机动性和稳定性。

物品清单

电机 × 1

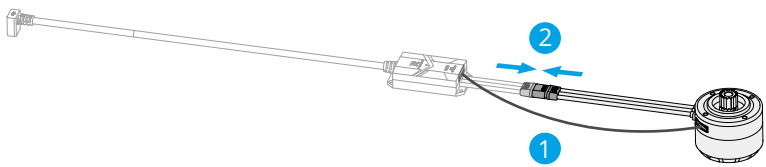


7-Pin 数据线 × 1

产品使用

连接电调

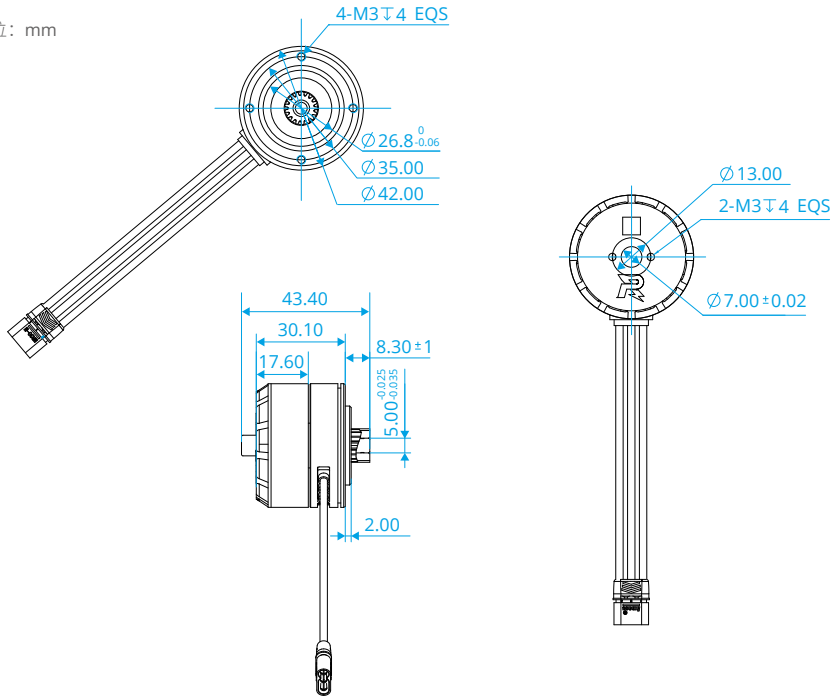
1. 使用包装内的 7-Pin 数据线连接电调和电机的 7-Pin 数据端口。
2. 连接电机的三相输入接头与电调的三相动力线接头，确保相同颜色的线对应连接。请勿强行反插接头。



安装

参考以下尺寸，按需选择孔位进行安装。

单位：mm



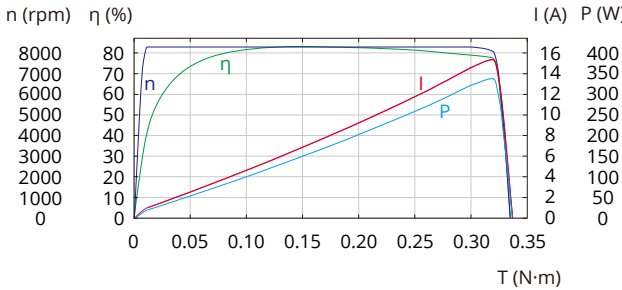
注意事项

⚠
- 电机安装孔为 M3 螺纹孔，深度 4mm，请勿使用过长的螺丝，否则可能会顶到电机的 PCB 板从而损坏电机。
- 确保电机安装稳固。
- 请在绕组最大允许温度范围内使用电机，避免长时间过热而损坏电机。
- 请避免损伤线材，以防电机运行异常。
- 使用时请勿触摸电机转子部分，避免割伤。
- 避免杂物进入转子内部，以免导致转子运行异常。
- 电机大功率运行时表面温度较高，请勿直接触碰以免烫伤。

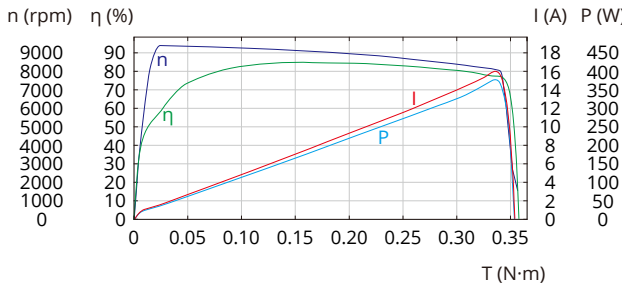
性能与参数

负载特性曲线

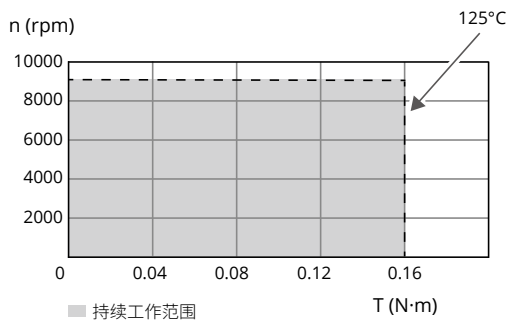
使用 C620 电调做速度闭环控制



使用 C620 电调做电流闭环控制



工作范围图



n-转速，η-效率，I-电流，P-输出功率，T-扭矩

以上数据均在输入电压 24V、25°C 室温、正常散热的实验环境下测得，仅供参考。实际使用时，请根据工作环境温度、散热条件等实际情况来控制电机运行时间。

特征参数

电机	
额定电压	24 V
转矩常数	0.02 N·m/A
转速常数	390 rpm/V
转速转矩梯度	260 rpm/N·m
机械时间常数	49 ms
相电阻	0.194 Ω
相电感	0.097 mH
使用环境温度	0℃至 50℃
绕组最高允许温度	125 ℃
极对数	7
额定动载荷	276 N
电机重量	120 g
电机搭配 C620 电调在额定电压下使用 *	
空载转速	9400 rpm
空载电流	0.6 A
额定转速	9085 rpm
额定转矩（最大连续转矩）	0.16 N·m
额定电流	10 A
最大效率	83%
峰转矩	0.33 N·m
峰转电流	2.5 A

* 本表格中的数据均在实验环境下测得。电流均为电调的输入端电流，效率为电机与电调组成的驱动系统整体效率。

输出齿参数

齿数	17
模数	0.6
压力角	20°
分度圆直径	10.2
齿顶圆直径	11.38
齿根圆直径	8.68
变位系数	-0.01
跨齿数	2
公法线长度	$2.79^{-0.02}_{-0.04}$

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