



# LBMC HJ5AE

## Product Introduction

- The product is a newly developed PMSM (Permanent Magnet Synchronous Motor) controller made by Wuxi Lingbo Electronic Technology Co., Ltd., which can output 2000~3000W power. It uses FOC (Field Oriented Control) algorithm in which SVPWM modulation is used to drive the power device so that it injects sinusoidal current to the three-phase motor. Meanwhile, we use a 32-bit microprocessor that integrates the latest ARM core, it exhibits excellent computational capability and task processing ability. The system can handle several close loops which include torque, flux, speed loop, and other high demands of real-time task operations at the same time. Through these control methods, the system can achieve the following performance: maximum torque control, constant power control, speed closed-loop control and braking energy feedback control. Compared with the traditional DC motor (BLDC) controller, it has significant advantages as follows:

## Comfortable Driving

- Direct torque control, smooth start-up, excellent acceleration performance, especially in the middle and high speed stages, which approximates to the performance of fuel motorcycle.

## Smooth & Silent

- Vector control type sine wave current output, motor output torque is smooth, and low frequency noise caused by motor torque fluctuation is fully suppressed.

## Flexible Configuration

- Provide PC software (GUI), by which can configure hundreds of parameters, so will improve the flexibility of on-site application.
- Monitor the operating status in real-time.
- Make the function interfaces of different types of products compatible.

## Perfect Protection Function

- Have Signal integrity detection (e.g., motor interface signal, control signal, etc.).
- With Over-current, over or under voltage, over temperature protection.
- Provide motor temperature-control interface.

## Key Features

- Self-checking function after power on.
- Energy feedback braking.
- Brake, cruise, 3-modes speed selection port.
- Integral waterproof terminal port.
- PWM output port.
- Dashboard port.
- LED indication for operation and fault status.
- Ultra-thin shape design, convenient for vehicle installation.

## Scope of Application

- Electric motorcycle
- Small electric vehicles
- Electric golf vehicle
- Electric Sightseeing vehicle





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## Main Technical Parameters and Working Conditions

Main Parameters	
Rated Input Voltage	48V/60V/72VDC
Rated Input Current	80A
Max Output Current	240A
Rated Output Power	2000~3000W
Operating Temperature Range	-20°C~90°C
Storage Temperature Range	-10°C~40°C
Motor Control Mode	Field Oriented Control (FOC)
Standby Power Consumption	20~40mA
Max Motor Speed Limitation	Depend on Motor and Configuration
Driving Method	Torque Loop + Speed Loop Control
Controller Net Weight	(1200±30) g

System Protection Characteristics		LED Blinking Times
Over-voltage protection	Battery voltage is higher than default value	1
Under-voltage protection	Battery voltage is lower than default value	2
Motor over-current protection	Motor phase or phase wire to ground is short-circuit	3
Blocked protection	Motor blocked time exceeds default value	4
GMR protection	GMR input is abnormal.	5
MOSFET protection	MOSFET self-checking is abnormal	6
Phase winding disconnection protection	One of the motor phase wire is disconnected	7
Stall protection	Motor stall	8
Brake state	Controller is in the braking state	9
Self-checking error protection	Internal self-checking is abnormal when power-on	10
Controller over-temperature protection	Controller operation temperature is higher than default value	11

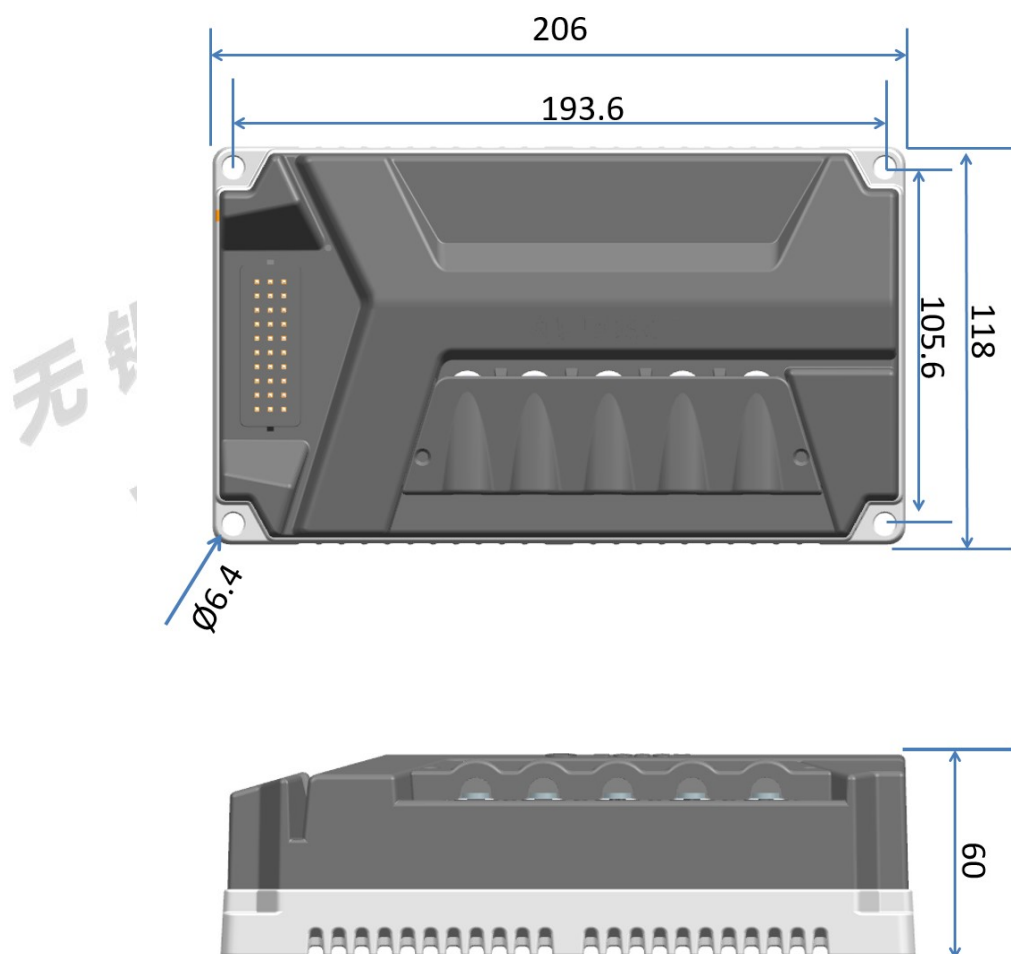


# LBMC HJ5AE

Throttle protection	Controller input is abnormal	14
GUI parameter failure	GUI parameter setting is incorrect	15
Self-learning failure	Self-learning failure	16
Crystal oscillator	External crystal oscillator setting is incorrect	17

Communication Characteristics	
GUI Tools	RS485 interface: parameter configuration or working status monitoring (optional)
RS485 Communication	RS485 interface (optional)
CAN Communication	CAN interface (optional)
LED Indicator	Indicate current working or fault state

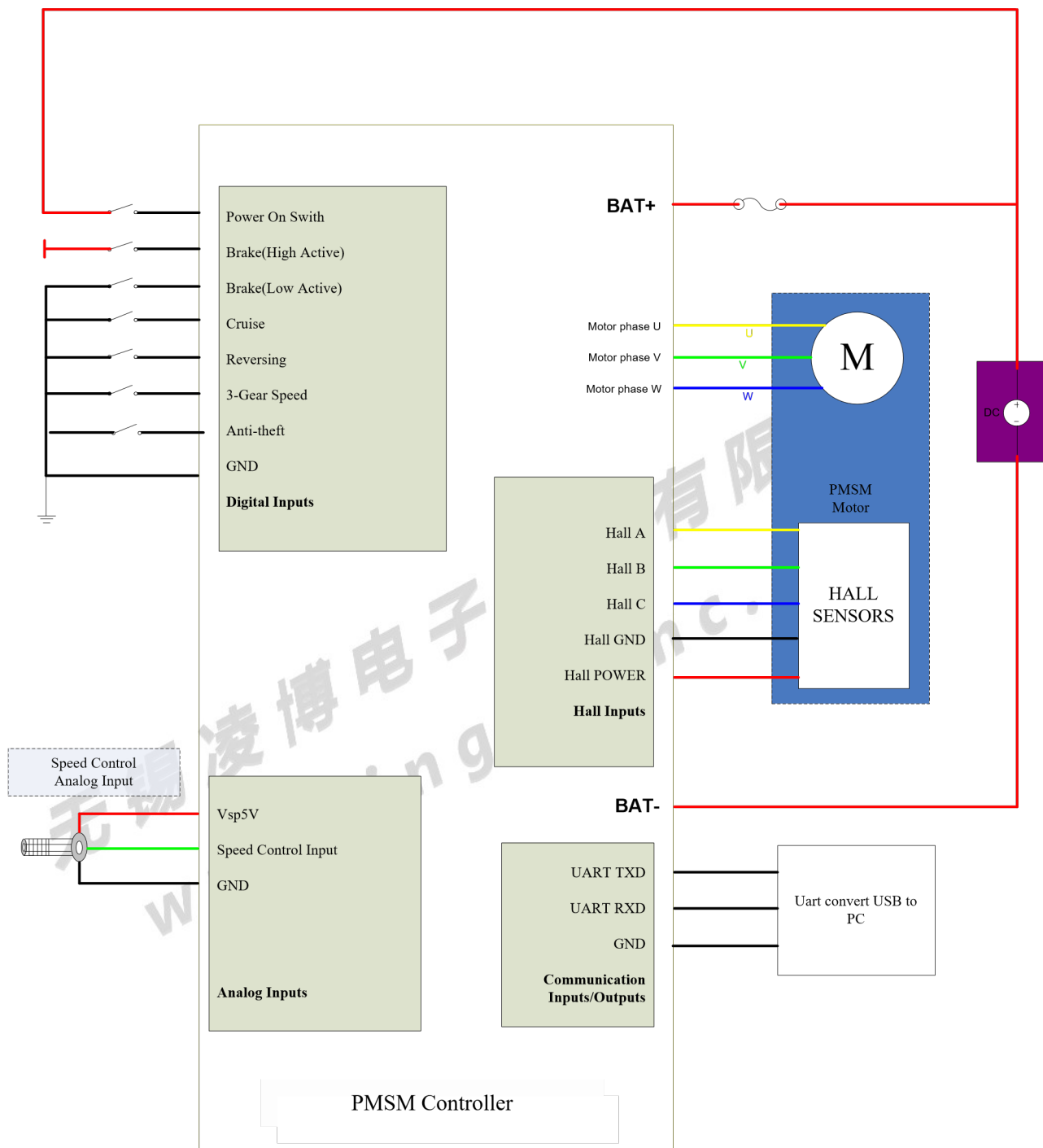
## LBMC HJ5AE Dimension





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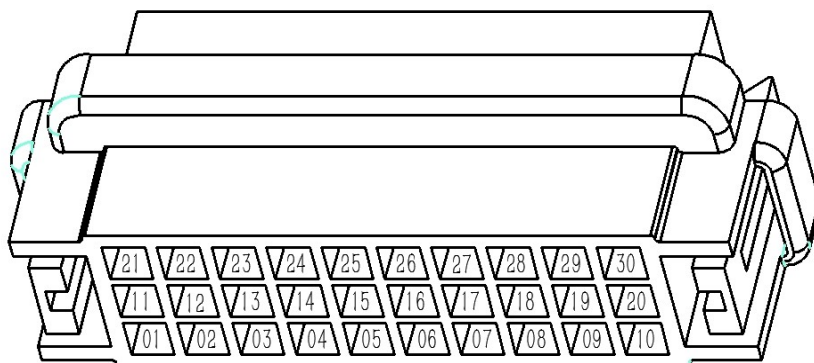
## Typical Electrical Wiring





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## Connector Wiring



Pin	Function	Voltage range	Pin	
1	HALL Sensor A	0~3.3V	16	GND
2	Low Gear Input	0~5V	17	Reser
3	High Gear Input	0~5V	18	Cruise
4	HALL Sensor 5V	5V	19	Whee
5	Single-Stand 5V or CANL <sup>1</sup>	5V 0~5V	20	Anti th
6	HALL Sensor GND	0V	21	Brake
7	Anti theft Device GND	0V	22	HALL
8	Reverse Input	0~5V	23	RX/48
9	Wheel Sensor Output	0~B+		
	or Motor Temperature <sup>2</sup>	0~3.3V	24	Reser
10			25	