

# 1 Main Characteristics and Specifications

## 1.1 Basic Functions

- 1□ Using high-power MOSFET, highly effective (as high as 98%) electronic communication can be achieved; a powerful, intelligent processor provides complete and precise control.
- 2□ Expanded error checks and protection: errors can be identified by a flashing LED signal.
- 3□ Real-time control of battery voltage: if battery voltage is too high or too low, the device can reduce the output and even stop working.
- 4□ Built-in starting current, running current and enhanced output (BOOST) current controls provide good acceleration and climbing capabilities and extend battery life.
- 5□ The function of temperature sensing and protection warning: if the temperature goes above 85C, the controller will signal that the temperature is too high and limit current output. If the temperature is above 110C, the controller will also signal that the temperature is too high and cut off output. It can ensure the controller is not damaged. Functions will be automatically restored once temperature returns to normal.
- 6□ Over current Protection: over current will be cut off until the power supply is disconnected. If over current is unexpected, the controller will internally cut off. Should an overcurrent error occur in the controller, the power supply will be immediately cut off to ensure that no serious damage occur.
- 7□ Configuration of the controller can be done by connecting to the programming unit. The controller can be continually updated.
- 8□ The controller is able to provide pull-up power for input from the 3-phase hall position sensor.

## 1.2 Specifications

- 1□ Nominal Voltage: 48V
- 2□ Maximum Voltage: 60V
- 3□ Nominal Current: 45A
- 4□ Enhanced Output Current: 80A (1 minute)
- 5□ Maximum Impact Current Allowed: 120A

**Warning:** Under nominal conditions, the controller can operate stably for an extended period of time. Under extreme conditions, the reliability of the controller may be compromised and may result in irreversible damage. Factory settings of the controller have been set at 120° Hall mode.

## 1.3 Application

This should be used with a Hall sensor equipped brushless DC motor at a nominal voltage of 48V and nominal power of 2KW (Maximum power is 4KW), including electric mopeds, scooters and small electric four-wheelers. Performance will be enhanced if used with our brushless DC motors. There may be some differences in Hall modules installed on brushless DC motors from other companies. If you want to use for motors produced by other companies, we suggest you make appropriate adjustments to the orientation of the Hall sensor on your motor.

## 2. Installation and Use

### 2.1 Controller Installation

The controller can be installed in a position of your choice, but should be fixed with six screws on a clean, flat metal panel that allows for heat to be released. Good airflow and heat sink will help the controller last longer. Figure 1 is an external diagram of the controller.

- Warning:**
1. Under some circumstances, the vehicle may lose control. When working on the electrical control system, the vehicle should be propped on a stand with the wheels off the ground.
  2. The batteries of electric vehicles can output very powerful current. Power must be cut off before installing the controller.
  3. Use insulated tools to prevent short circuits.

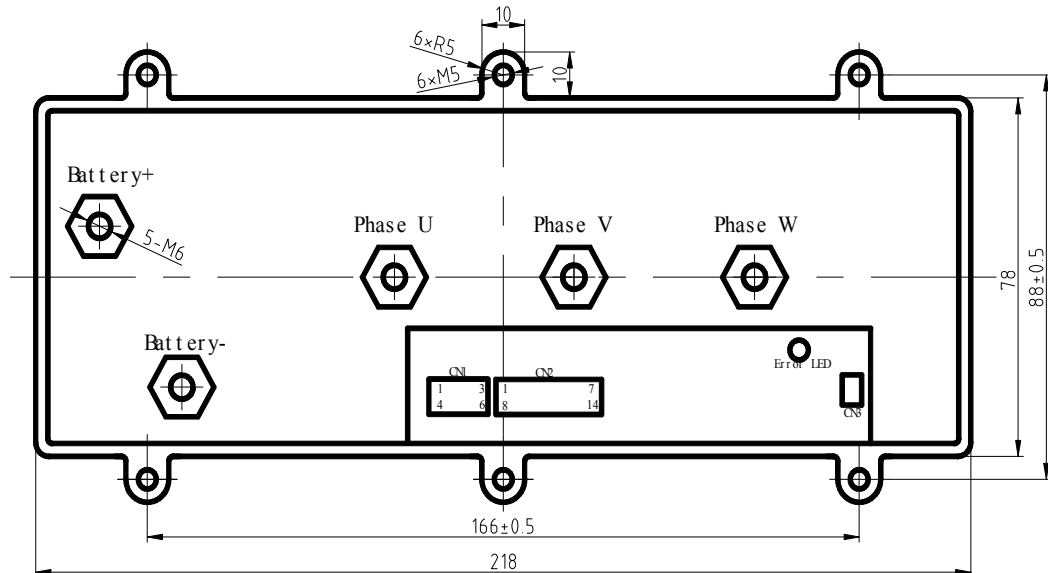


Figure 1: External diagram of the controller. (Unit: mm)

### 2.2 Wiring

Five hexagonal cylinders and two MOLEX connectors (CN1, CN2) complete the connection between the battery, the motor and the controller.

□1□ Connector Terminal Definitions:

| Cylinders |                                                                               | CN2         |                                                |
|-----------|-------------------------------------------------------------------------------|-------------|------------------------------------------------|
| Code      | Function Description                                                          | Code        | Function Description                           |
| Battery+  | Positive Anode of Storage Battery                                             | 1 Out(+48V) | 48V Output (maximum internal draw 1.5A)        |
| Battery-  | Negative Anode of Storage Battery                                             | 2 In□+48V□  | 48V Input (from power source lock)             |
| Phase U   | Motor Phase line U (or A), to be used with the wide yellow wire on our motors | 3 Reverse   | Reverse Switch                                 |
| Phase V   | Motor phase line V (or B), to be used with the wide blue wire on our motors   | 4 Error     | Error Message Output (can be connected to LED) |
| Phase W   | Motor phase line W (or C), to be used                                         | 5 Disable   | Disable Switch                                 |



- 1□ Ensure that all connections are correct.
- 2□ While connecting the power, the LED light will flash briefly, but will remain unlit the controller is operating normally. If the LED light continues flashing and the motor does not work, please check the LED error code reference table and find the solution.
- 3□ When restarting, the vehicle will automatically check error codes.
- 4□ The motor works stably, when key on and adhere stick throttle. If the motor does not function normally, check the LED code reference table and follow the solutions provided.
- 5□ Keep your vehicle in an open, flat place. When operating, the vehicle should start up smoothly and be able to reach full speed.

**Warning:** 1. Before inspection, the vehicle should be propped on a stand with the wheels off the ground.  
2. During inspection, no one should stand in front or behind the vehicle.  
3. Make sure that the power source is turned off.  
4. Use insulated tools.