

Zero Emission Vehicles Australia

<http://www.zeva.com.au>



MC600S

Series DC Motor Controller • Owner's Manual (v1.0)

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1 Safety Warning and Disclaimer

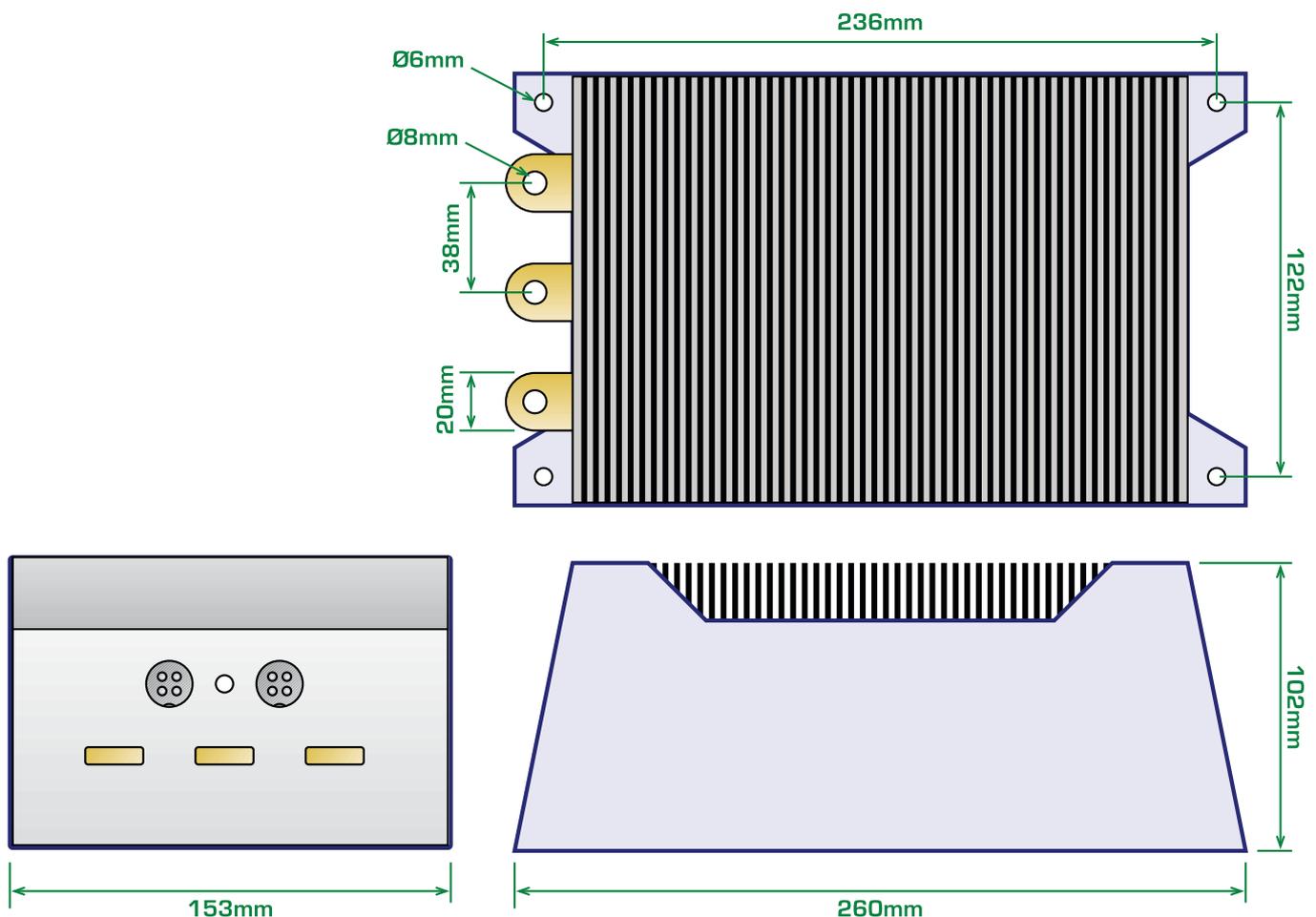
Thank you for purchasing a ZEVA motor controller. We have taken every precaution to ensure this device operates safely and reliably, and hope it provides you years of trouble free operation. However since we have no control over the installation procedures or operation of this device, we can assume no liability for vehicle functionality or safety after third party installation of the controller. It is the responsibility of the installer to verify suitability of this device!

During operation this motor controller carries dangerous and potentially fatal voltages and currents. Installation should only be performed by qualified persons, and ZEVA assumes no liability for damage or injury caused.

2 Specifications In Brief

- Max motor current: 600A
- Maximum battery current: 600A
- Nominal battery voltage range: 96V-144V
- Absolute maximum voltage range (self-limiting): 72V-180V
- Convection cooled, with optional cooling fan for higher sustained power (recommended)
- High pedal lockout on startup (safety measure in case of faulty throttle)
- Protection against overvoltage, undervoltage, overheating, internal sensor faults, and microprocessor faults.
- Dimensions (mm): 260L x 153W x 102H
- Weight: 3.0kg without fan

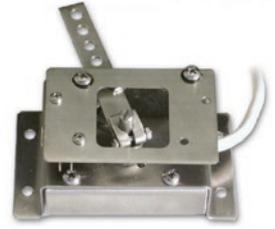
3 Physical Dimensions



4 Throttle Interface

We have chosen to use a 4-wire throttle interface for the MC600S. It is compatible with any standard 3-wire throttle plus microswitch. For the sake of reliability we highly recommend hall effect based throttles instead of legacy potentiometer-based throttles. The pins are +5V out, Ground, Throttle and Enable (see also Controller Connections section).

The Throttle pin requires a 0-5V input, with 0V being off/idle. For redundant safety, the Enable pin needs to be connected to 5V for the controller to function. We recommend using the microswitch on your potbox (if you have one) to switch this Enable pin such that in the event of a throttle failure (e.g faulty hall sensor or potentiometer) the vehicle will still stop when you take your foot off the pedal.



5 Thermal cutback

It is normal for the controller to get warm during operation, but if worked hard it is possible for the unit to get too hot, so the controller will protect itself by reducing the available power. Thermal cutback commences at about 60°C, tapering off to about zero power at 90°C.

The status LED will flash red and green if the unit is performing thermal cutback, and will turn red if it reaches overheat temperature (rare).

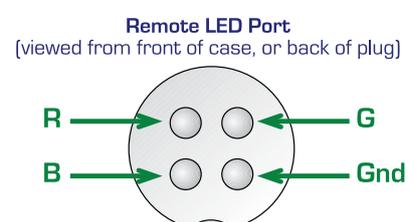
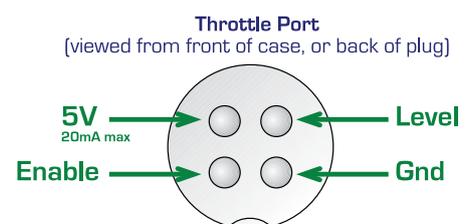
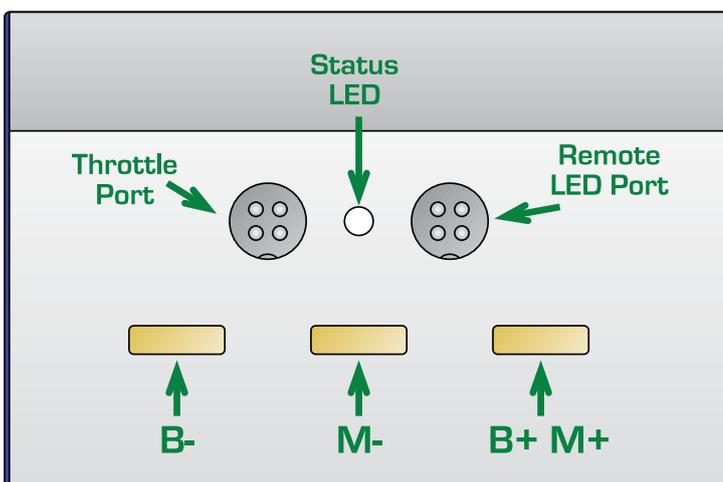
Increasing airflow to the unit via an optional cooling fan fastened to the heatsink will increase continuous power rating considerably and is recommended for most vehicles.

6 Installation Advice

- **Orientation:** The controller will happily operate in any orientation, though its cooling ability may be compromised if the unit is inverted.
- **Proximity to motor:** Current flow between the controller and motor can be high, so it is best to keep the controller reasonably close to the motor (within ~0.5m) in order to keep resistive losses in the wiring to a minimum, as well as EMF noise to a minimum.
- **Water:** The controller should be installed in a location where it will stay dry, as the cases are not guaranteed to be water-tight. Somewhere high in the vehicle's engine bay is usually safe.
- **Precharging:** The MC600S's input capacitors have a very low resistance, so be sure to include a precharger across your main contactor to prevent inrush current to the controller from spot welding your contactor closed!

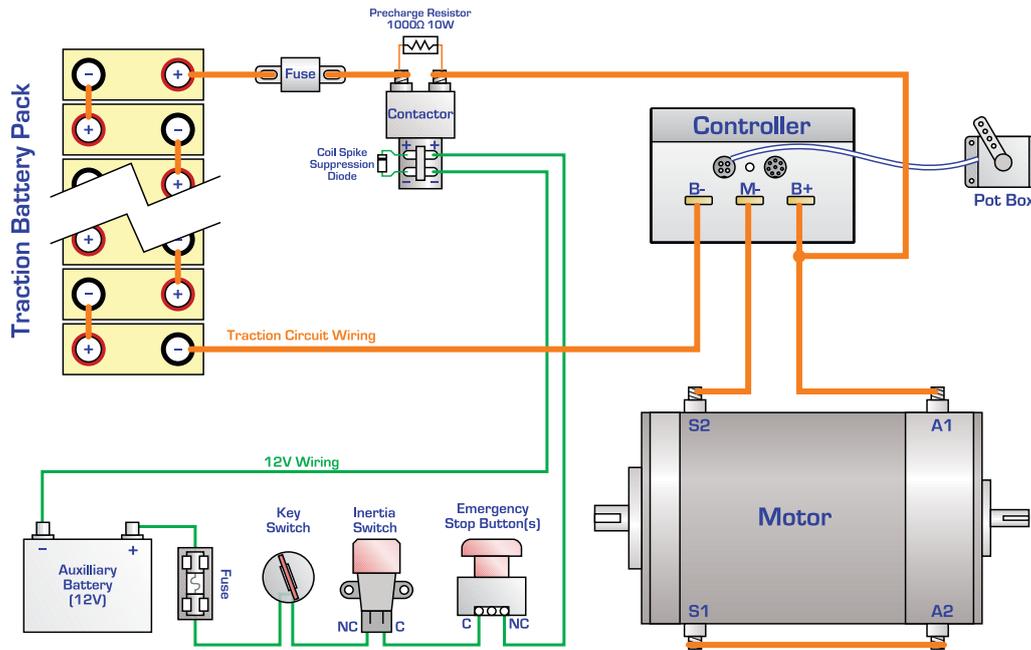
7 Controller Connections

The MC600S has three power terminals, two 4-pin ports. The righthand power terminal is for both the B+ line and the M+ line (see also the section 8: Wiring Diagram for clarification). The controller is powered entirely from the traction circuit and should have no connections to the vehicle's 12V system. The 5V pin on the Throttle port is an *output*, for supplying power to the throttle box.



8 Wiring Diagram

The following diagram shows a basic installation of the motor controller:

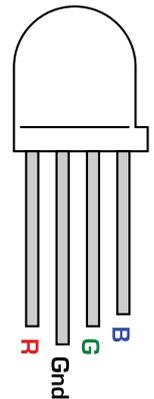


9 Status Codes

The MC600S uses a full colour (RGB) LED to display a variety of status codes. You can optionally add a remote LED using pins on the Remote LED port, to monitor the controller status from within the cabin (for example). The controller may display the following status codes:

- Green All OK
- Green, Flashing Full throttle
- Flashing Green/Red Thermal Cutback
- Red Overheat
- Blue Undervoltage
- Blue/Red/Green High pedal lockout (throttle fault detected on startup)
- Flashing Blue/Red Internal error (current sensor fault, temp sensor fault, overvoltage, etc)

Remote LED Pins



10 Warranty Information

Zero Emission Vehicles Australia (ZEVA) warrants to the original purchaser of this product, under normal use and conditions, against defective materials or workmanship for a period of 12 months from the date of original purchase. Defects will be repaired or replaced at the discretion of ZEVA without charge for parts or repair labour.

Prior to returning a controller for a warranty claim, please contact us via our website (<http://www.zeva.com.au>), so we can discuss the fault then provide RMA information.

The warranty does not apply to any controller which, in the opinion of the manufacturer, has suffered or been damaged through: alteration, improper installation, failure to install in accordance with this manual, mishandling, neglect, specifically including but not limited to: improper fusing, disassembly, exposure to moisture, operation outside electrical specifications.

Under no circumstances shall the manufacturer's liability exceed the original purchase price of the product.

11 Technical Support

If after reading this owner's manual you have any unanswered questions, you are welcome to contact us. Please use the form on our website as the first point of contact:

<http://www.zeva.com.au/contact.php>