Mini Baja Electrical System

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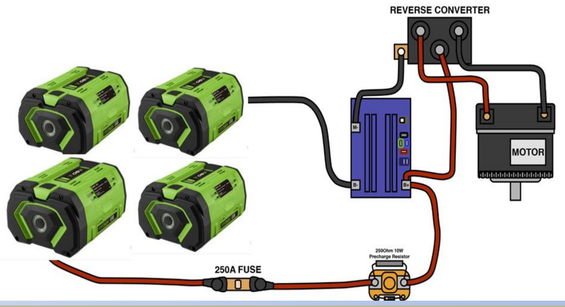
Problem Statement

Create and maintain an electrical system that will provide 52 Volts and 2.5kWh power to a drivetrain and all additional electrical accessories on the Mini Baja.

Background – Process Flow



Nominal Voltage:

56 V

Total Energy:

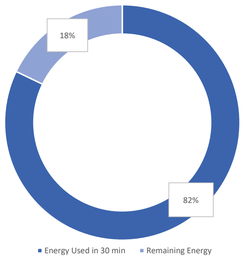
56 V x 4 batteries x 12 Ah/battery = 2.69 kWh

Max Cont. Output:

~13.44 kW

Design Requirements

Energy Use During 30-Minute Operation

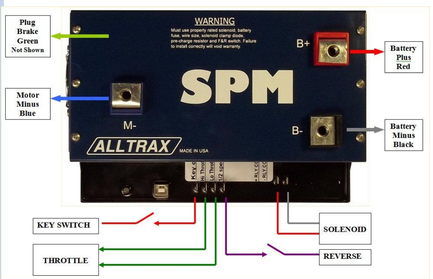


- EGO 56V batteries (4 × 12Ah in parallel)
- AllTrax SPM4800 MCU
- Maintain safe and serviceable electrical connection to drivetrain.
- Protect power supply from 10 g's of impact force

Existing Hardware

EGO 56 V Batteries, 12 Ah

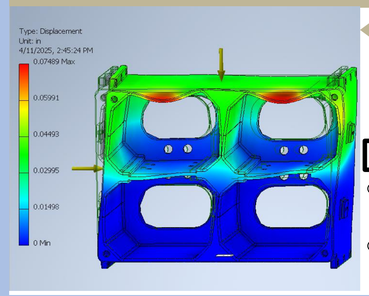
- Shock resistant design
- Intelligent power management
- Overheating prevention

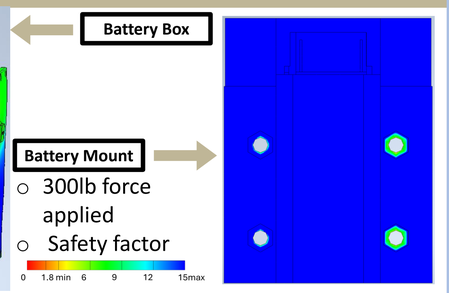


ALLTRAX SPM48300 Motor Controller

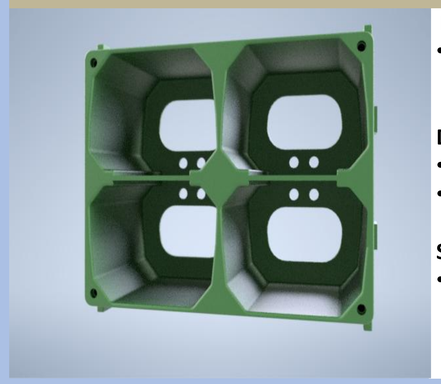
- Flexible USB programming
- Solenoid control output
- Auto throttle calibration

Inventor FEM





Design – Battery Box



Design Software Used:

- Utilized AutoDesk Inventor to design the battery mount system.

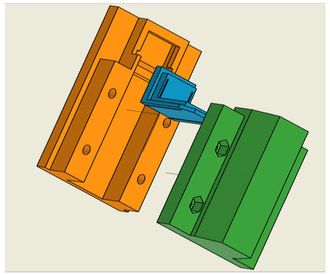
Durability:

- Withstand 10 g's of force.
- A friction fit seal ensures secure battery placement.

Serviceable:

- A corresponding cap was designed for protection against the elements.

Design – Battery & MCU Mount



Design Software Used:

- Utilized AutoDesk Inventor to design the battery mount system.

Durability:

- Engineered to withstand 10 g's of force.

Modular & Serviceable:

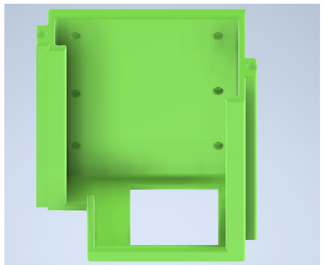
- Design allows for easy disassembly to service wires or implement future revisions.

Durability:

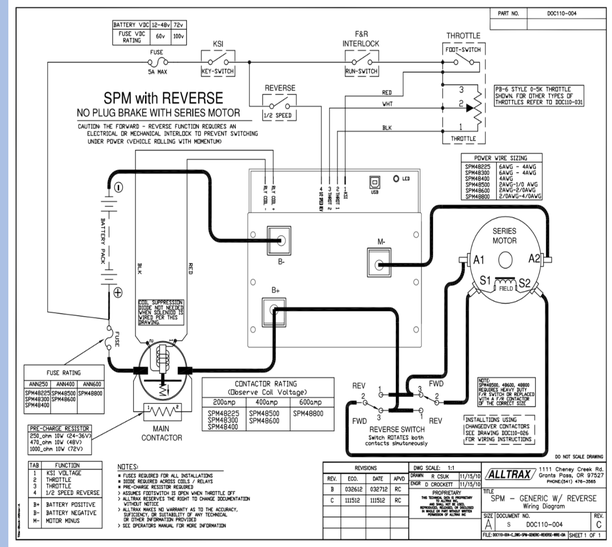
- The mount securely houses the controller.
- Through bolts apply pressure across the layer lines.

Modular & Serviceable

- The design provides protection for the MCU.
- Accessibility is maintained for future modifications or maintenance.



Additions



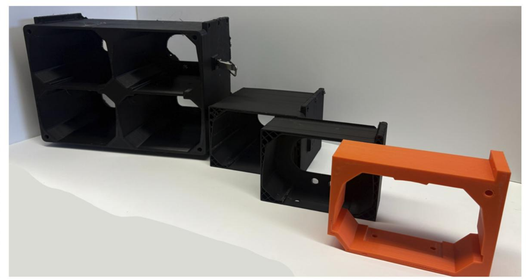
Wiring Schematic:

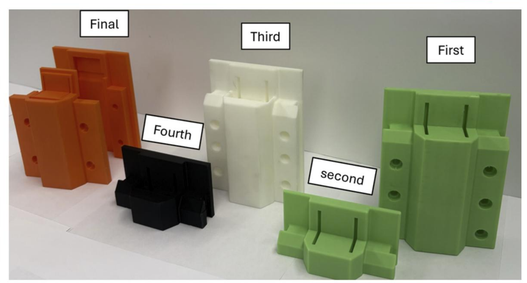
- Illustrates the entire buggy's electrical system.
- It connects the motor, batteries, and MCU.
- The design ensures safe power delivery.

Field Additions:

- LED Headlights & Brake Lights
- Turn/Reverse signals
- Horn
- E-stop

Results





Acknowledgements

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