



Power Requirements:

- **Peak Potential:** Up to 3.5kW at full motor utilization across 48V, 24V, 19V, 12V, and 5V supplies.
- **Operational Limit:** System draw capped at 30A to align with battery cable capacity.



Safety Features:

- **Surge Protection:** TVS Diodes safeguard critical components like the NVIDIA computer.
- **Overcurrent Defense:** Fuses on all circuit boards for additional safety.
- **Emergency Response:** E-stop halts motor function while keeping core systems active.
- **Wiring Safety:** Circuit breaker designed to trip at 30A to protect against current overdraw.
- **Connector Design:** Keyed interfaces prevent from reverse polarity.

Design Hurdles and Solutions:

- **Current Management:** PCB designs refined to handle high current scenarios.
- **Component Selection:** Sourced safety elements compatible with system's demands in a compact form factor.
- **Spatial Efficiency:** Components and layouts crafted to optimize the limited space within the robot.
- **Energy Efficiency:** Achieved a high power efficiency rating of 93%.