

Lithium Iron Phosphate Battery Pack 3KWh

Objective:

- Design a battery pack according to AIS 038 standards, using 50Ahr Lithium Iron Phosphate prismatic cells. Battery packs should be designed and packaged to fit within the existing space of 3-wheeler vehicles, enabling the retrofit of internal combustion engines to electric drivetrains.

Approach:

- My design strategy focused on developing modules that could be arranged to adapt to various configurations, including variations in size, shape, voltage, and amp-hour capacity. To meet the 48V battery pack voltage and peak current requirements, I opted to design a 24V nominal voltage module. These modules could be connected in series and stacked vertically, maximizing space utilization within the vehicle while providing the required power.

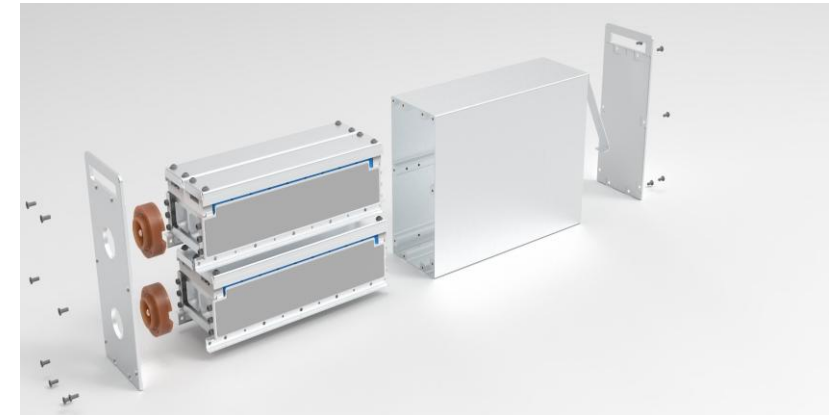
Solution:

- The battery pack was developed using an aluminium extruded body and a door featuring an IP-rated dust and moisture protection seal, fitting optimally within the vehicle's available space.
- Laser-welded aluminum 1060 busbars were designed for electrical connections. To manage the heat generated by the batteries, thermal interface material was applied to enhance heat transfer out of the enclosure.
- Components like the BMS and sensors were efficiently packaged. A modal analysis was also conducted to ensure the design's structural integrity.

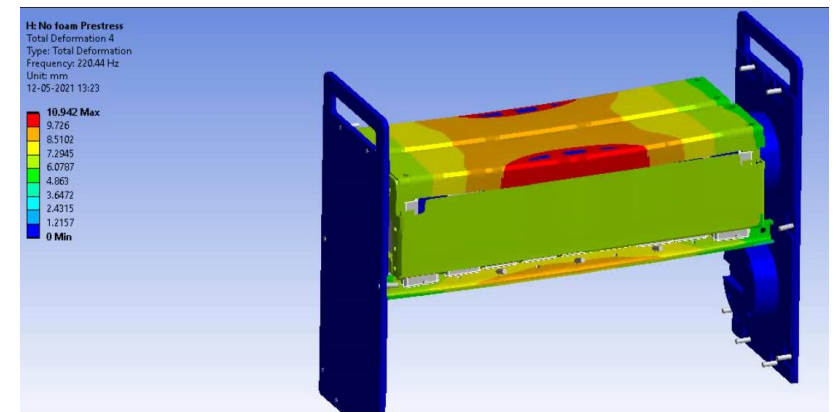
My Role:

- Conceptualized and designed the battery module and pack according to AIS 038 standards. while coordinating closely with the client.
- Developed CAD models and production drawings with GD&T for precise manufacturing.
- Conducted free-free modal analysis to determine natural frequencies and thermal performance.
- Applied Design for Manufacturing & Assembly (DFMA) principles to streamline production.
- Oversaw prototype manufacturing and procurement of off-the-shelf parts.
- Planned, managed, and participated in testing for validation.

Exploded View of battery pack:



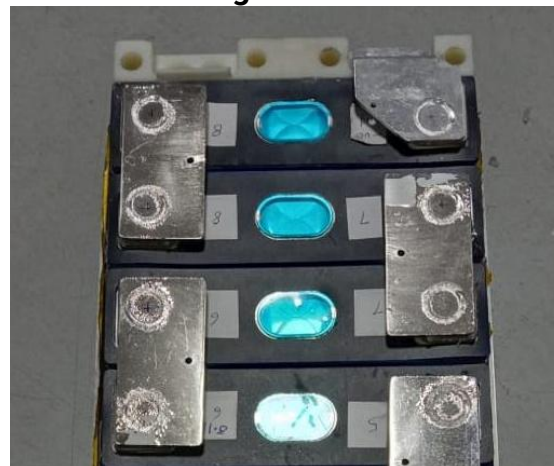
Modal Analysis:



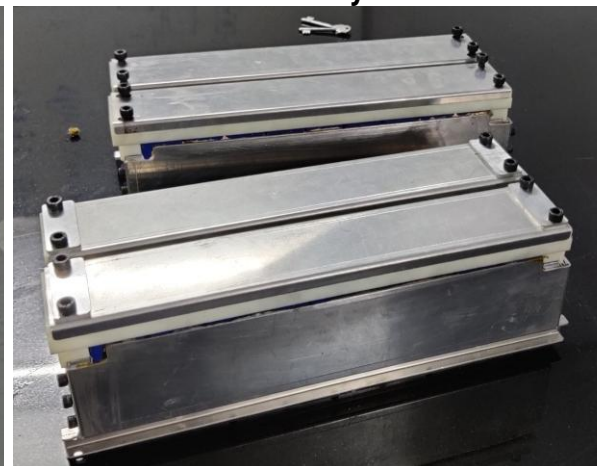
Space available in 3-wheeler vehicle:



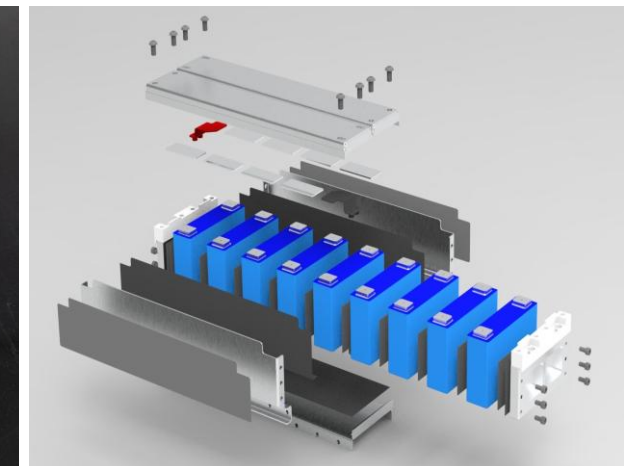
Laser Welding of cells:



Manufactured Battery Modules:



Exploded View of 8S1P Module:



Lithium Iron Phosphate Battery Pack 13KWh

Objective:

- Design a battery pack according to AIS 038 standards, using 135Ahr Lithium Iron Phosphate prismatic cells. Battery packs should be designed and packaged to fit within the existing space of 4-wheeler lightweight commercial vehicles, enabling the retrofit of internal combustion engines to electric drivetrains.

Approach:

- My design strategy focused on developing modules that could be arranged to adapt to various configurations, including variations in size, shape, voltage, and amp-hour capacity. To meet the 98V battery pack voltage and peak current requirements, I chose a 24V nominal voltage module. These modules could be connected in series and mounted side by side, optimizing space utilization within the vehicle while delivering the necessary power.

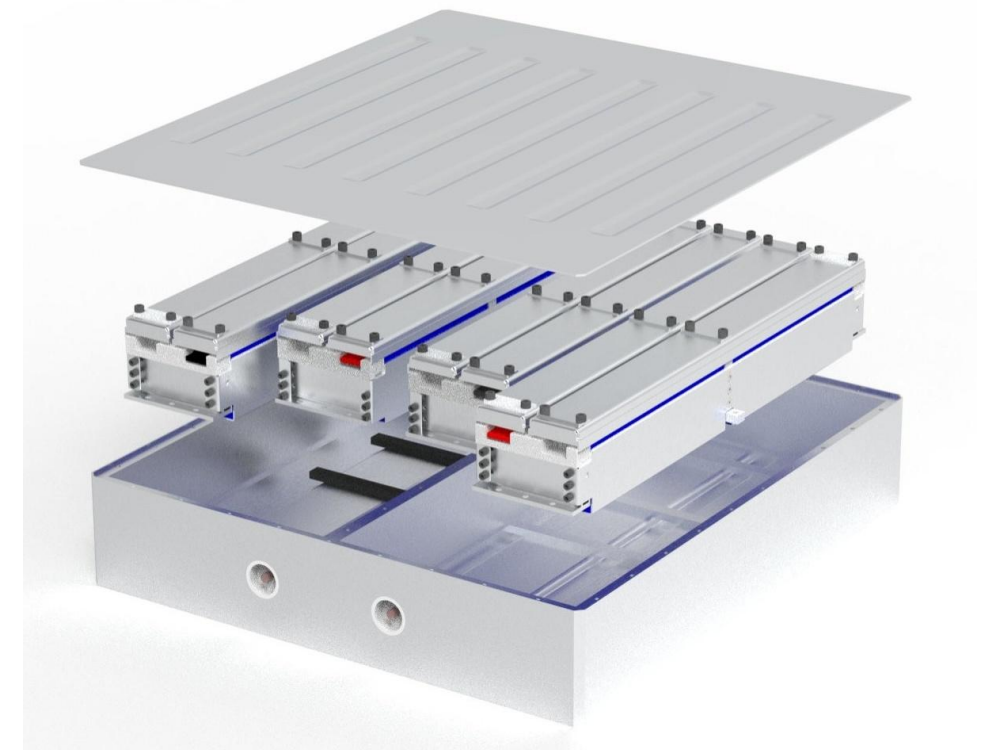
Solution:

- The battery pack was designed from a welded aluminium body and a top lid featuring an IP69-rated dust and moisture protection seal, fitting optimally within the vehicle's available space.
- Laser-welded aluminium busbars were designed for electrical connections. To manage the heat generated by the batteries, thermal interface material was applied to enhance heat transfer out of the enclosure.
- Components like the BMS and sensors were efficiently packaged. A modal analysis was also conducted to ensure the design's structural integrity.

My Role:

- Conceptualized and designed the battery module and pack according to AIS 048 standards, while coordinating closely with the client.
- Developed CAD models and production drawings with GD&T for precise manufacturing.
- Conducted free-free modal analysis to determine natural frequencies.
- Applied Design for Manufacturing & Assembly (DFMA) principles to streamline production.
- Oversaw prototype manufacturing and procurement of off-the-shelf parts.
- Planned, managed, and participated in testing for validation.

• Exploded View of Battery Pack:



• Exploded View of 8S1P Module:

