



## CASE STUDY: COMPANY A COLLABORATION - BUSBAR

In late 2017, an automotive OEM first introduced their Fifth Generation architecture, which will be first applied to the upcoming Electric vehicle. The automotive OEM's latest generation of scalable electric architecture is designed to accommodate all types of electric and hybrid vehicles with more configurations than before.

### CHALLENGE

- Busbar design - no bulging (space constraints)
- Tolerance - installation process critical
- No hydraulic installations systems allowed
- Best suited to screw machine process than cold forming
- High volume-price challenge
- Global manufacturing locations require support
- Cleanliness requirements: VDA 19 part 1

### SOLUTION

- Company A & PennEngineering collaboration
- PEM® screw machine design only solved technical challenges
- PennEngineering developed cold formed primary process with secondary machining operation. Combined process met both technical and commercial targets
- Patented connector design (Company A), reduces space requirements by 80%
- Company A promoting solution

### PEM® SYSTEM SOLUTION

- Force controlled installation
- Servo electromechanical actuation technology using PEMSERTER® Series 3000™ Press
- Tooling package developed-clinch fastener installation after "solder ring" assembly
- PEM® manufacturing expertise met technical and commercial targets

### RECOMMENDATIONS

- Promote successful collaboration with Company A **to all other Company A locations**. OEM's are also pushing other tier 1's into using the Company A design
- Promote PennEngineering's custom solutions and expertise to take a fully machined design and convert to a cold formed design with secondary operations
- Focus on experience of stud designs / plating combinations to suit busbar electrical requirements

**Key customers involved in Battery management / connectors:** Bosch, Denso, Continental, Magna, ZF, Aisin Seiki, Hyundai Mobis, Lear, Valeo, Faurecia, Panasonic, Mahle, Hitachi, Mitsubishi, Delphi, Infineon, Samsung, TE Connectivity.

Patented connector design  
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# 80%

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