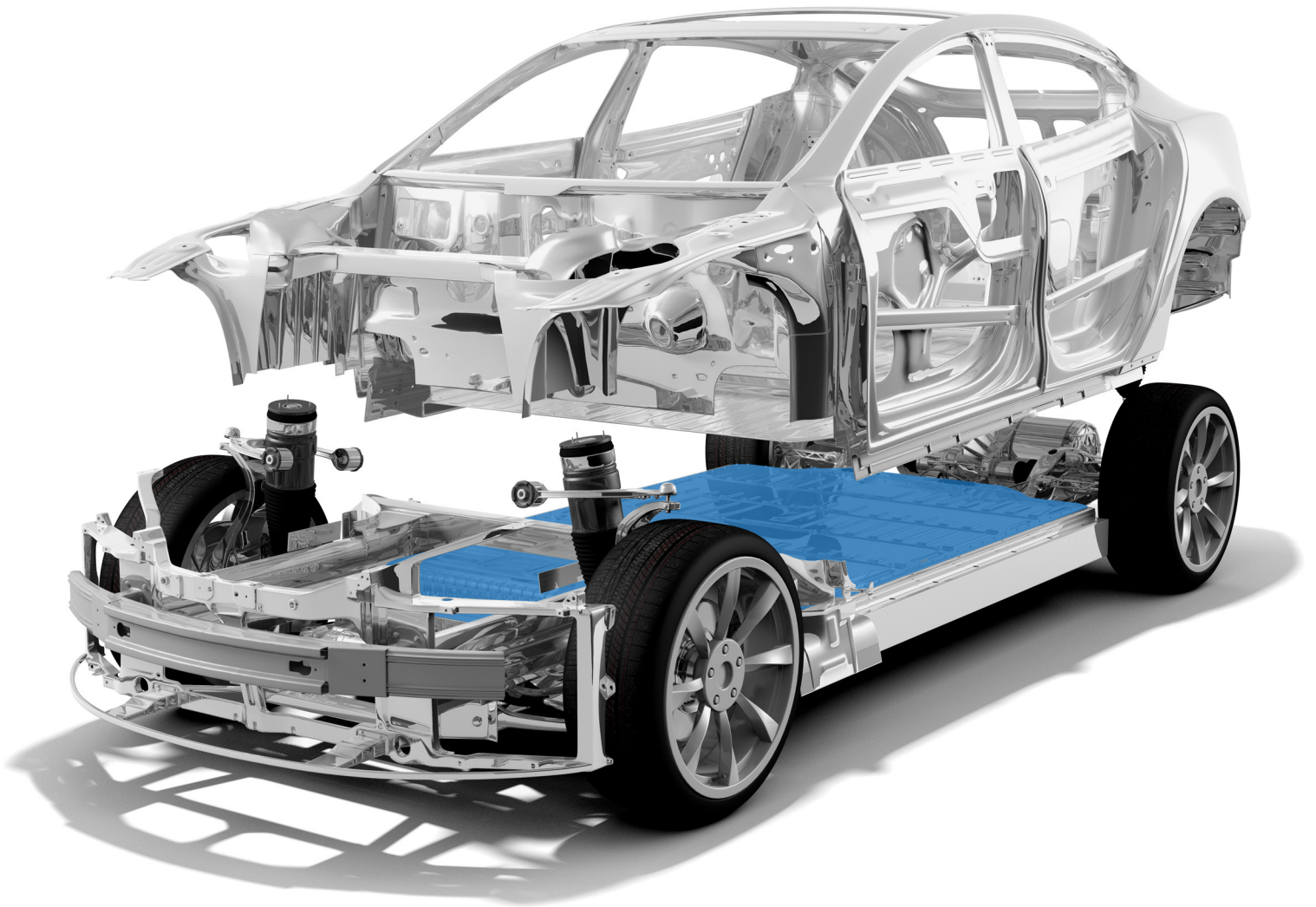


eMobility by
PennEngineering®

Innovation in eMobility

Total Fastening Solutions

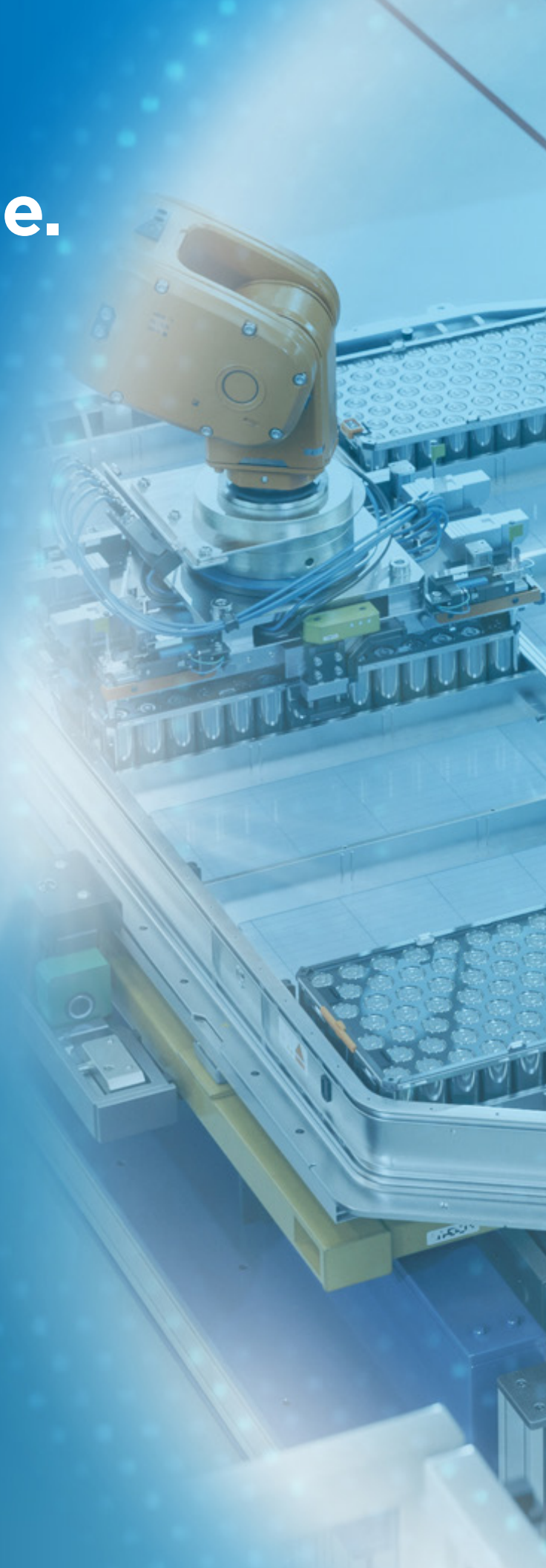


Fasten forward. Accelerate your electric future.

Lead the Charge.

The future is electric – are you ready for it?

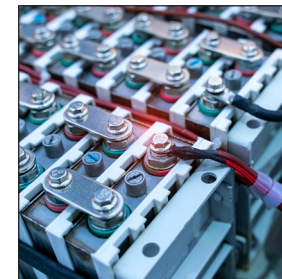
- + Automotive Electronics
- + EV Battery Tray
- + EV Charging
- + Battery Energy Storage Systems
- + 2 & 3 Wheel Vehicles



Total Fastening Solutions for eMobility Innovation.

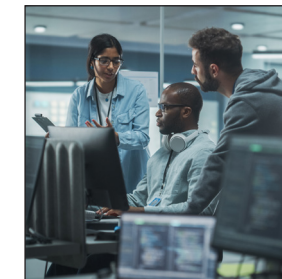
Seize opportunities and overcome challenges in eMobility with every fastening solution you need, curated in one place.

eMobility is reshaping the automotive industry in unprecedented ways. Once dominated by mechanical engineers, the automotive sector now demands expertise in electrical engineering as vehicles transform into data-rich, smart machines. Explore the intricacies of eMobility, with a focus on the critical role of battery technology, the evolution of vehicle design, and the challenges and opportunities it presents.



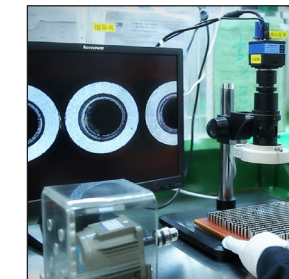
One Solution

Centralized resource for electrical and mechanical fastening solutions



Speed to Market

Application engineering expertise provided at the local level



In-House Testing

Validated performance for your safety-critical applications



Reduced Labor

Solutions that deliver efficiency for high-volume production

Gain a Competitive Edge with PEMedge® Services.

Optimize application performance, better determine safety and compliance, and explore opportunities for innovation with PennEngineering®'s value added services.



Application Engineering Support

- Application review
- Custom design/product development
- Customer Drawings
- Catalog Samples
- 3D Models
- Prototype Development Center



Teardown Service

- Complete Product Disassembly
- Assembly Structure Assessment
- Identify Alternative Fastening Solutions
- Alternative Fastener Replacement/Testing
- Teardown Report
- Identify Efficiencies/Implementation Plan



PEMedge® Testing Services

- Electrical testing capabilities
- FEA analysis
- Mechanical testing
- Tensile and Compression Strength
- Micro Hardness
- Ingress Protection/Vacuum Leak Testing
- Fastener Joint Cross-Sectioning
- Corrosion and Plating Testing



FastenerClass® Training

- Free Customized Training Sessions from Global Experts
- Live, Web-based, and Pre-recorded Training Options Available
- Standard Classes Include:
 - Theory, Best Practices, Application Exploration
 - Intro to Self Clinch Theory
 - Proper Fasteners for Stainless Steel Panels
 - Surface Mount Fastener Technology (SMT) vs. Broach

Next Level Performance.

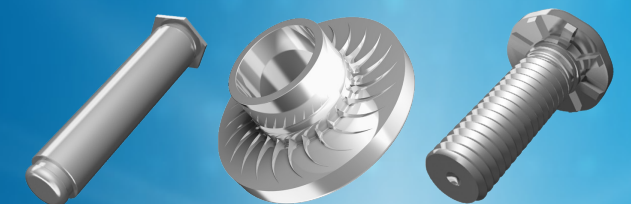
Get smart fastening solutions for every e-mobility application imaginable.

Scan QR Code to Learn More



Current Carrying Fasteners

- Superior electrical connections
- No hot spots or poor conductivity
- Available in self-clinching and broaching mounting styles
- Fully automated installation systems for cost savings



Chassis & Castings

- Ensures strong structural assembly
- Safety-critical performance
- Vibration-proof
- Corrosion protection



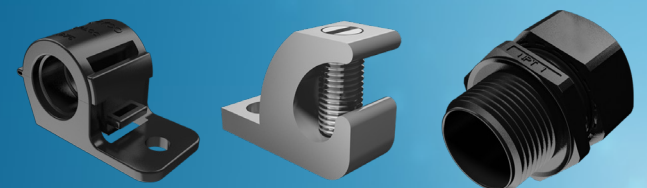
PC Boards & Plastic Assemblies

- For limited space & thinner applications
- No need to tap or use threaded inserts
- Reduced installation time vs. screws
- Micro-sized parts available off the shelf



Wire Management

- Heavy-duty construction
- Quick, easy installation
- Reliable performance in harsh environments
- Designed for ease of serviceability



Lead the Charge.

Automotive Electronics.

Explore stronger, cleaner, more reliable solutions for automotive electronics.

+ Safety & ADAS

+ Powertrain

+ Infotainment & Connectivity

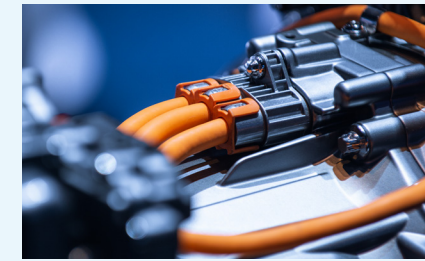
+ Body electronics

Scan QR Code to Learn More



Safety & ADAS

Find the fasteners you need to build a comprehensive system of sensors, cameras, radars, lidars, and more to ensure driver safety.



Powertrain

Search through our fastener solutions designed for your EV, PHEV, and ICE powertrain components.



Body Electronics

Explore fastener solutions designed for all your body electronics components, including HVAC, seat comfort and controls, window controls, and more.



Infotainment & Connectivity

Discover the right fastener components like heads-up displays, GPUs, voice recognition sensors and more.

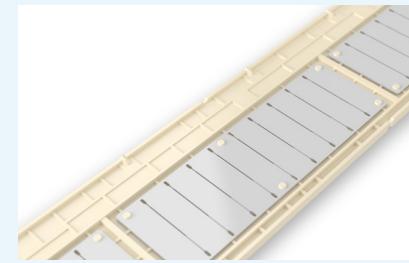
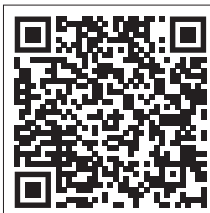
Lead the Charge.

Electric Vehicle Battery Tray.

Get power to the motor efficiently,
safety, and cost-effectively.

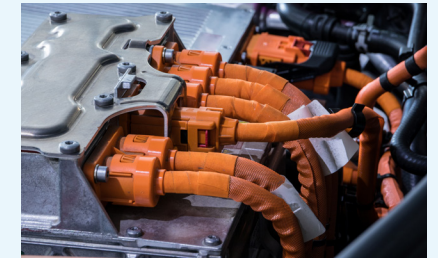
- + **Battery Modules**
- + **Battery Tray Fixing**
- + **Busbar Solutions**
- + **High Voltage Harness & Connections**
- + **Intercell Connect Board**

Scan QR Code
to Learn More



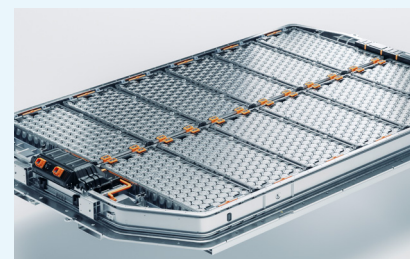
Intercell Connect Board

Explore our range of fastening solutions for the intercell connect boards in your EV battery modules.



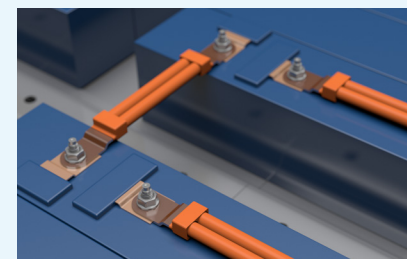
High Voltage Harness & Connections

See which custom fasteners and eConnect solutions might be the right fit for your EV batteries with high voltage connection harnesses.



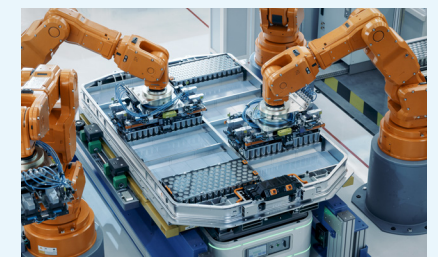
Battery Modules

Explore high-quality fastener solutions for your modular EV battery design, helping keep the battery safe and securely attached.



Busbar Solutions

All EV batteries require a significant amount of busbar connections varying based on designs. Find a busbar solution for your specific needs.



Battery Tray Fixing

Fastening joints with the car body.

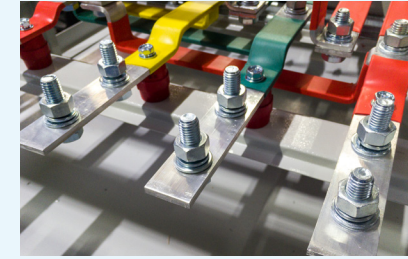
Lead the Charge.

Electric Vehicle Charging.

Explore a range of durable fastening solutions for both residential and commercial charging stations.

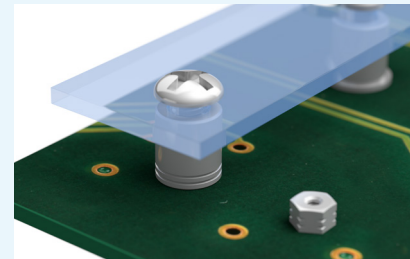
- + Frames
- + Busbars
- + PC Boards
- + IP 6X Rated

Scan QR Code to Learn More



Busbars

See which fastener solutions are a fit for the busbars in your EV charging infrastructure.



PC Boards

Make sure you have the right fasteners to support the PC board in any of your EV charging stations.



Frames

Search our extensive portfolio of fasteners designed to help you build durable frames for both residential and commercial EV charging stations



IP 6X Rated

Keep your EV charging station safe and secure from the elements with any of our IP 6X rated mechanically attached fasteners.



Lead the Charge.

Battery Energy Storage Systems.

Find the right fasteners for every component of the battery energy storage system (BESS).

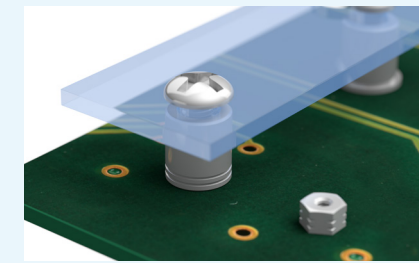
- + Frames
- + Busbars
- + PC Boards
- + IP 6X Rated

Scan QR Code to Learn More



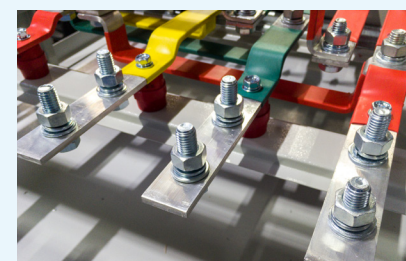
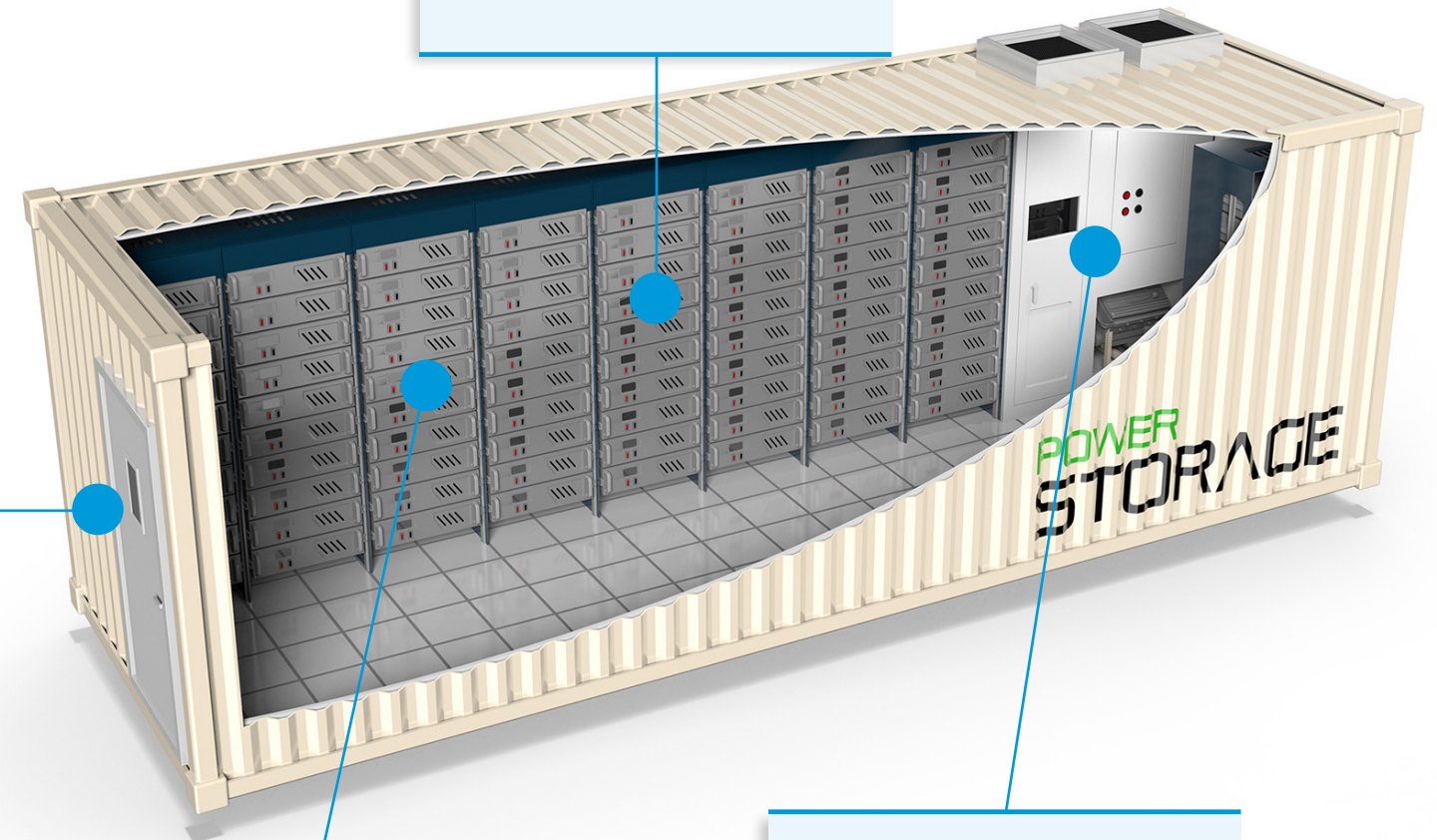
Frames

Get the fasteners you need for the frames of your commercial or residential commercial battery storage system.



PC Boards

Ensure you have the right fasteners designed to support the PC board in your battery energy storage system.



Busbars + BMS

Explore our fasteners to see which ones are a fit for your busbar + Battery Management System (BMS) components



IP 6X Rated

Discover our IP 6X Rated mechanically attached fasteners that will keep your BESS watertight and safe from the elements.

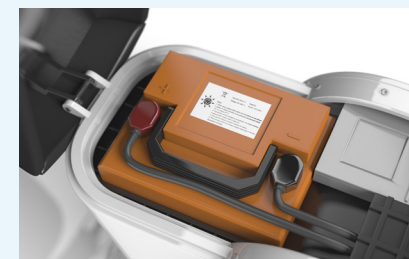
Lead the Charge.

2 & 3 Wheel Vehicles.

Overcome the unique challenges that come with two- and three-wheeled vehicles.

- + Battery & Charging
- + Body & Frames
- + Display and PCB
- + Motor & Electronics

Scan QR Code to Learn More



Battery & Charging

Explore reliable components to help protect batteries and chargers in two- and three-wheeled vehicles.



Motor & Electronics

Get the right combination of inserts, pins, standoffs, and more for your vehicle's motor and electronics.



Body & Frame

Find the right combination of parts for all aspects of the vehicle's exposed body and frame.



Display & PCB

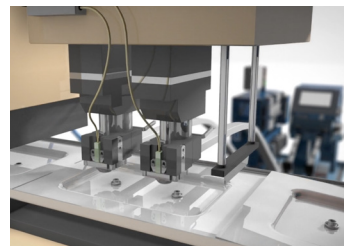
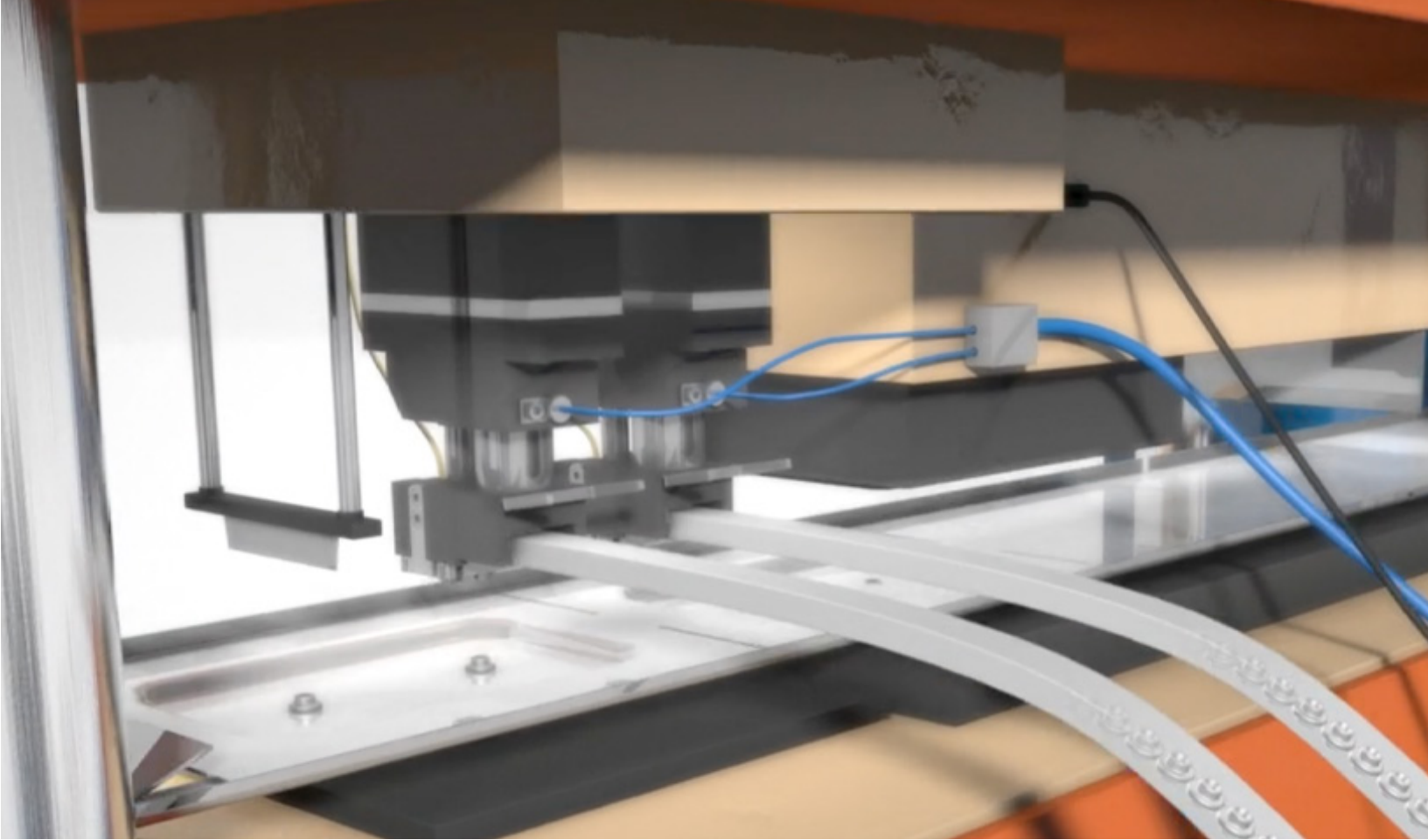
Make sure you have the fasteners, nuts, spacers, and other components needed for your two- and three-wheeled vehicle display and PCB.



Intuitive Installation That Has a Big Impact on the Bottom Line.

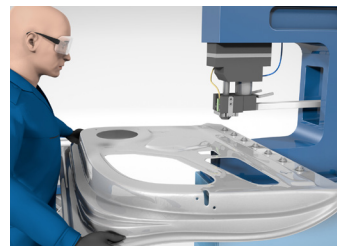
Get smart fastening solutions for every e-mobility application imaginable.

Fasteners may represent a small portion of your component costs, but they can make major in-roads to your total build costs because of how quick and easy they are to install. Whether you need installation systems for in-die, robot cell, or manual, you can expect best-in-class equipment with low-complexity.



In-Die

PennEngineering®'s in-die fastener installation system enables you to install a high volume of fasteners automatically, efficiently, and accurately directly in the stamping process. This eliminates secondary operations, which means shorter lead times and fewer labor and application costs.



Manual

For lower volumes, you may need a manual fastener installation process. In this case, a person takes the place of the robot and carefully feeds the panel into the user-friendly c-frame press to install the mechanically attached fasteners.



Robot Cell

Our installation system for medium volumes consists of robot-handling software integrated with the stamping press. This allows our system to integrate with robot assembly equipment which seamlessly performs the fastener installation, providing the efficiency and accuracy needed for quality production.



Haeger®

Our Haeger® semi-automated fastener installation equipment was designed to install PEM® fasteners – a total system solution that gets installation right, the first time. Reach optimal production performance and reduce the risk of human error with precise, consistent, and repeatable installations.

The road to Sustainability in eMobility.

At PennEngineering®, we're taking an aggressive and proactive approach to reduce and eliminate the impact of our business on the environment – and create a better world for future generations.

Reduce the amount of power compared to welding

Welding fasteners into sheet metal requires vast amounts of energy and can result in weak joints. Our mechanical attachment technology inserts fasteners directly into the sheet metal in a single press, creating a stronger joint and vastly reducing the amount of electricity during installation.

Improve assembly and disassembly for easier recycling

Our fastening products not only make assembly quick and easy, but they streamline disassembly too. This way, parts – including batteries – can be recycled and reused much more easily. For example, metals like nickel, lithium, cobalt, and other high-energy, intensive extracted metals can be reused rather than thrown away to contaminate the environment as compared to welded and sealed battery assemblies.

Reduce carbon footprint with locally made parts

If you work with PennEngineering®, you can further reduce your carbon footprint, as all our products are manufactured local to your plant. We have facilities located near every main automotive production center across the globe, cutting down the total air miles your components travel – actively reducing your carbon footprint.

Connect to Something Bigger.

Since our founding in 1942, PennEngineering® has grown to become the premier engineered fastening, installation, and wire protection resource worldwide. Our global footprint enables us to manufacture our products in the regions where they're consumed with a network of in-house technical engineering experts at every location. Our global presence and support enable us to deliver highly technical solutions wherever and whenever you need them.



AMERICAS

Danboro, PA (HQ)
Modesto, CA
San Jose, CA
Shelby, MI
Toms River, NJ
Waterford, MI
Winston-Salem, NC
Querétaro, Mexico

EUROPE

Galway, Ireland (EU-HQ)
Fulda, Germany
Friedrichsdorf, Germany
Oldenzaal, The Netherlands

ASIA

Kunshan, China (ASIA-HQ)
Jingjiang, China
Shanghai China
Tokyo, Japan
Malaysia
Singapore

eMobility by
PennEngineering®

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