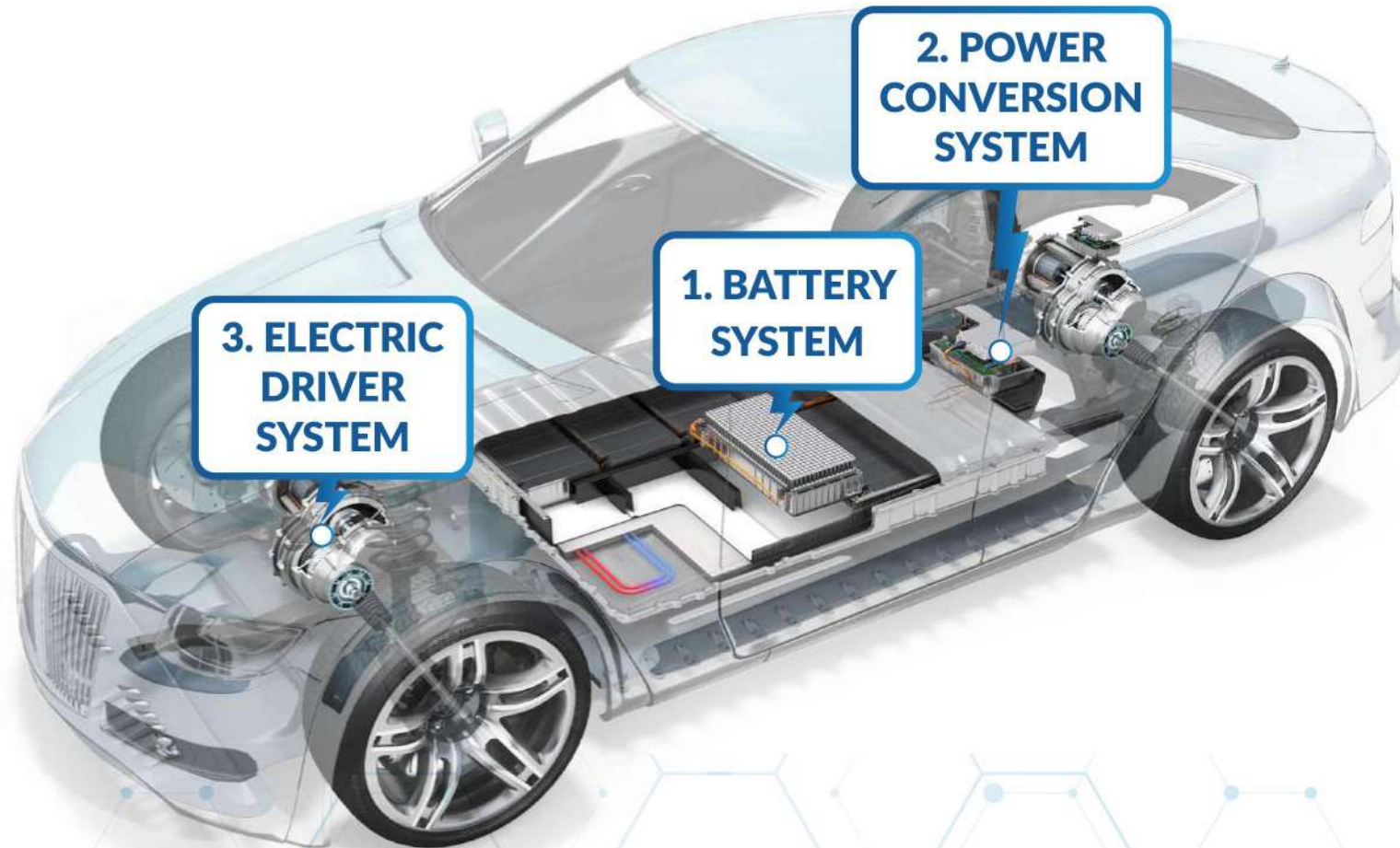




E-VEHICLE POWERTRAIN SOLUTIONS

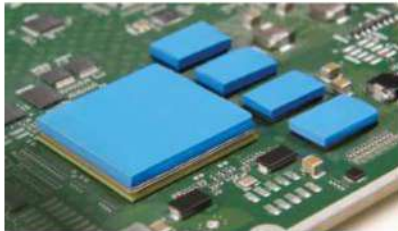
EV BATTERY, ELECTRIC DRIVE SYSTEM AND POWER CONVERSION

The heart of any vehicles - Indispensable parts





Electric Vehicle BATTERY SYSTEMS



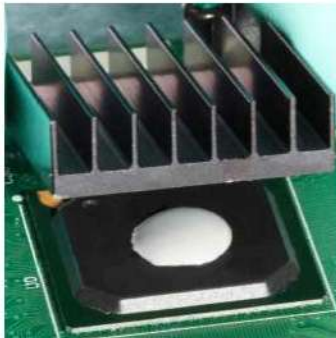
Thermal Pad

eliminating air gaps and reducing interfacial resistance



Structural Adhesive

assembly of prismatic, cylindrical or pouch cells.



Thermal Adhesive/ Gap Filler

offer a unique combination of thermal conductivity and structural strength



Conductive Coating

improve the charging and discharging performance of lithium-ion battery cells by reducing the electrical resistance between active material and aluminum foil.



Challenges

THERMAL MANAGEMENT

Higher energy density and fast charging without increased stress on the battery system.

SAFETY

Mechanical security, as well as shock and vibration stability for optimal performance against any internal and external conditions.

PROSTECH Solutions

- **Thermal management solutions:** help dissipate heat and direct it through precise heat-transfer paths; block temperature extremes, helping moderate operating temperatures in harsh environment.
- **Dielectric solutions:** help manage and regulate heat transfer in batteries designed for direct contact cooling.
- Materials are all designed for **flame and high-temperature resistance**, dielectric strength, flexibility.
- **Bonding solutions:** provides bonding and joining solutions including semi-structural and structural strength, making them ideal for use with, or in place of, mechanical fastenerment.
- **NVH Solutions:** insulation, damping, bonding and cushioning meet unique challenges of managing noise, vibration and harshness.
- **Potting solutions:** High flexibility and crack resistance, high thermal conductivity, excellent thermal endurance, high voltage, chemical resistance and long-lasting reliable sealing.

Suggesting Materials

- **Thermal Pad**
Thermal Adhesive/ Gap Filler
- **Direct Contact Cooling Fluid**
- **Structural Adhesive**
- **Silicone Sealant**
NVH foam, cushion gasket
- **2K PUR potting material**

Challenges

SYSTEM COSTS

Ensure the widespread adoption of electric vehical batteries, innovative battery design and material developments but reducing manufacturing cost.

LIGHT-WEIGHTING

Inextricably tied total vehicle weight.

PROSTECH Solutions

All of our suggested materials are:

- Applied at high dispense rate to significantly reduce processing time
- Reduce long-term wear and tear on dispensing equipment
- Optimizing aluminum structures per crash standards and passenger safety
- Looking for the most appropriate materials which helps to create balance between manufacturing budget and end-product qualification.

Suggesting Materials

- **Structural Adhesive**
- **Silicone Sealant**
- **2K PUR potting material**
- **NVH foam, cushion gasket**
- **Single and 2K Dispensing System**



Impregnation Service

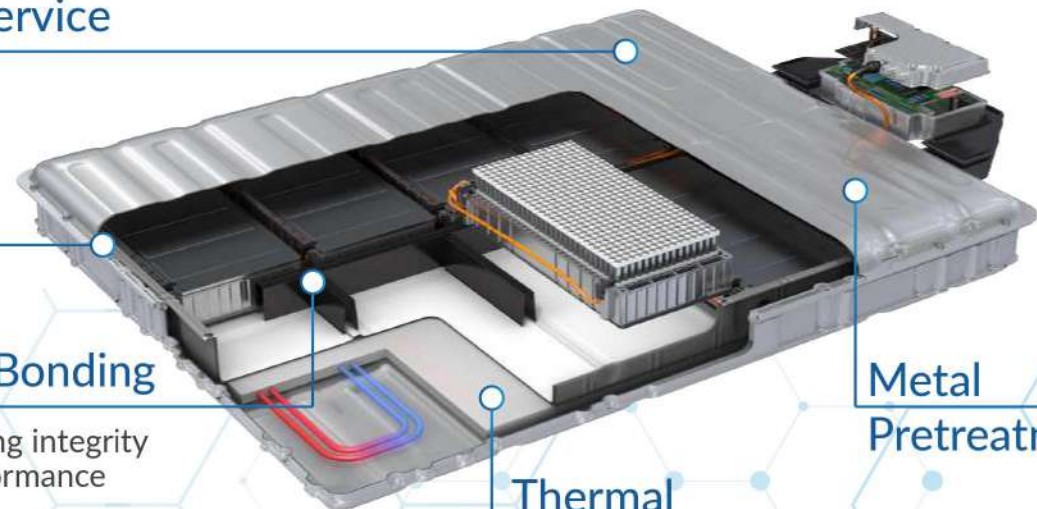


Gasketing



Structural Bonding

optimize housing integrity and crash performance

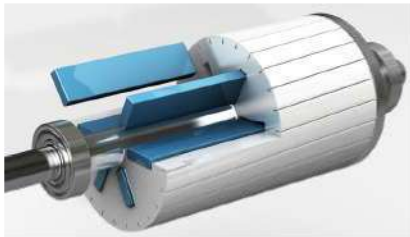


Thermal Pad & Adhesive

Metal Pretreatment

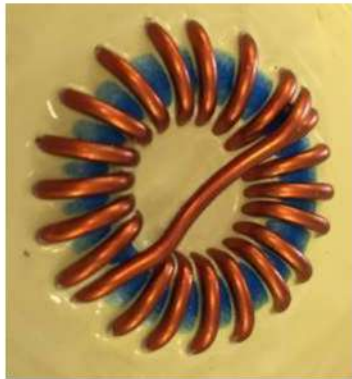
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ELECTRIC DRIVE SYSTEM



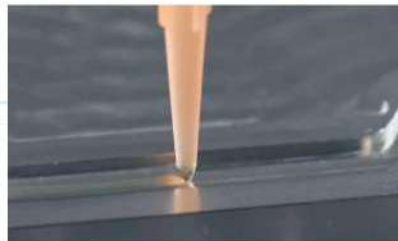
Magnet Bonding

excellent shear strength as well as noise and cost reduction benefits.



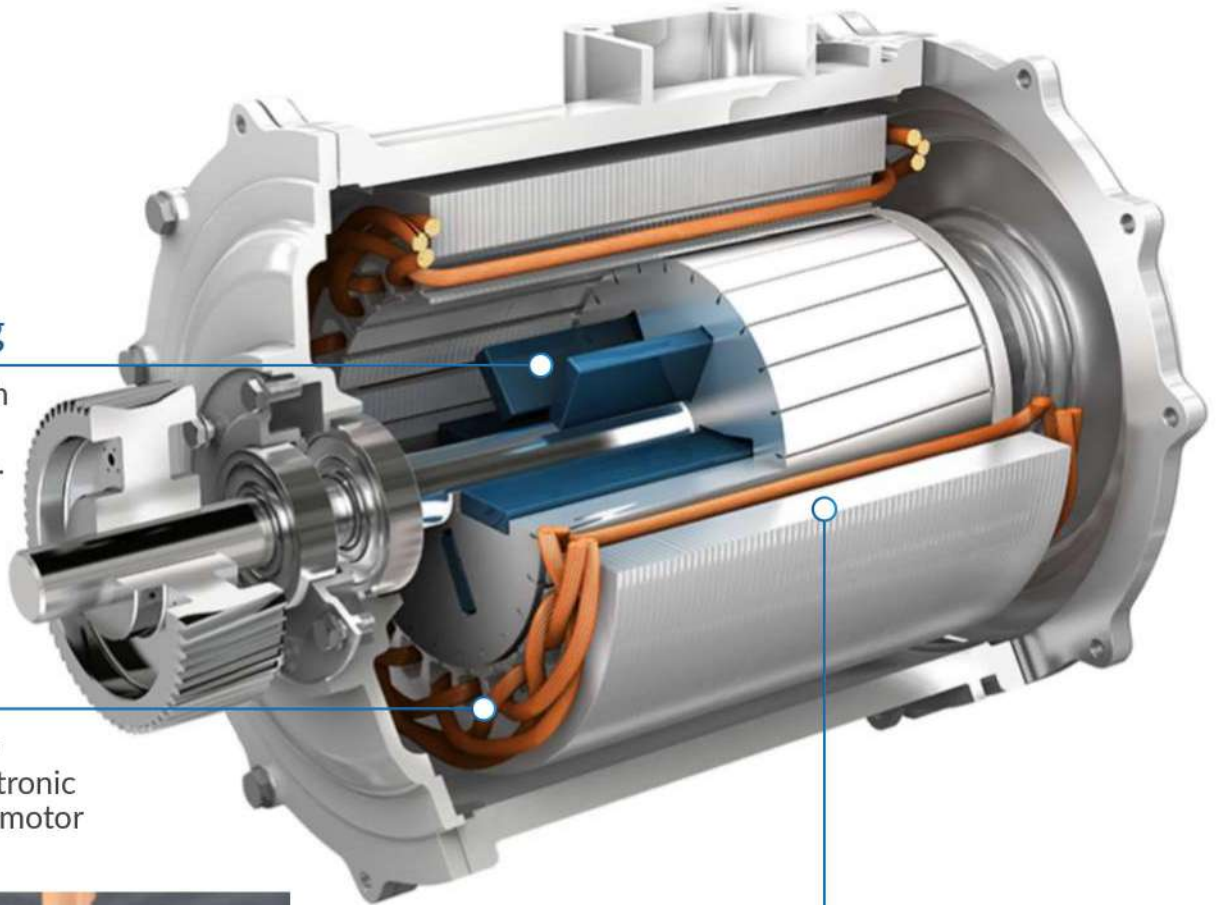
Thermal Potting

thermal potting technology encapsulates sensitive electronic components in the electric motor



Gasketing

reliable sealing against automotive media.



Challenges

THERMAL MANAGEMENT

Miniaturizing components => higher power density and risk of motor failure
=> better thermal management solutions.

SAFETY

Constant motion and trend towards improving power density require higher resistance materials

PROSTECH Solutions

- **Potting solutions:** high thermal conductivity; excellent thermal endurance; excellent impregnation and fast gap filling; High crack resistance; Excellent chemical resistance; tailored for fast processing.
- Bonding adhesive and sealing all meet specific thermal feature requirements.
- **Potting solutions:** High crack resistance, excellent chemical resistance.
- **Bonding solutions:** make it easier and cheaper in assembly magnet segment to housing and rotor/stator.
- **Gasketing solutions**
 - + Formed-in-Place Gasketing: applying the adhesive bead to one flange and mating the parts to create a durable seal
 - + Cured-in-Place Gasketing: High performance compression liquid gasket in seconds to one flange, cures the bead with heat or UV light and compresses the flange against its mating part to create strong seal
 - + Foam Gasketing: made up of UV/moisture-cure silicone that can be mixed with nitrogen to form a soft, flexible, low modulus foam gasket.

Suggesting Materials

- **2K PUR Potting Materials**
- **Structural Bonding Adhesive**
- **2K PUR Potting Materials**
- **Structural Bonding Adhesive**
- **FIP Gasketing Materials/ CIP Gasketing Materials/ Foam Gasketing Materials**

Challenges

EFFICIENT AND PERFORMANCE

Increasing power of EV motors is closely linked with higher energy density levels, requiring thermal management materials in every bonding/ sealing parts.

SYSTEM COST

Build up an innovative new cost-saving e-drive design

PROSTECH Solutions

- **Removing** the need for mechanical fixtures with bolts and springs
- **Replace with adhesive:** magnet bonding structural adhesive which helps to reduce energy consumption and provide weight-saving components:
 - + Fast fixing times
 - + Superior adhesion
- **Sealling and Gasketing product portfolio:**
- Reducing energy costs through room temperature curing capability, better process reliability and consistently high-quality output.
- Saving cost of inventory a number sizes of bolts, rivets used during traditional assembly process

Suggesting Materials

- **Single part epoxy adhesive**
- **Silicone Sealant**
- **Gasketing material**
- **Single and 2K Dispensing System**



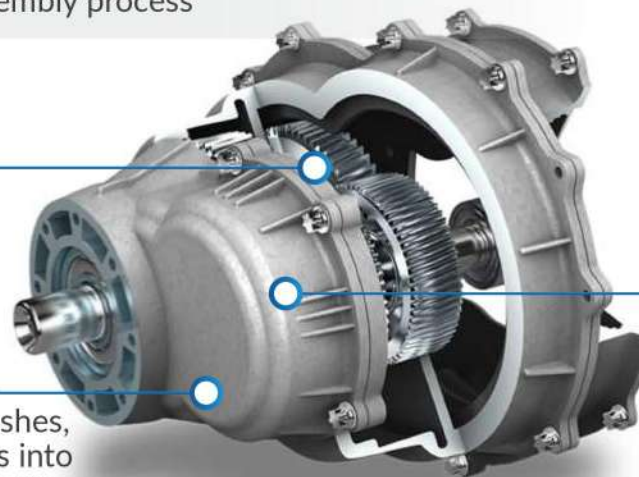
Gasketing

excellent shear strength as well as noise and cost reduction benefits.



Retaining

secure bearings, bushes, and cylindrical parts into housings or onto shafts

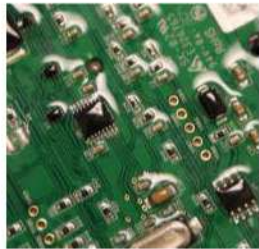
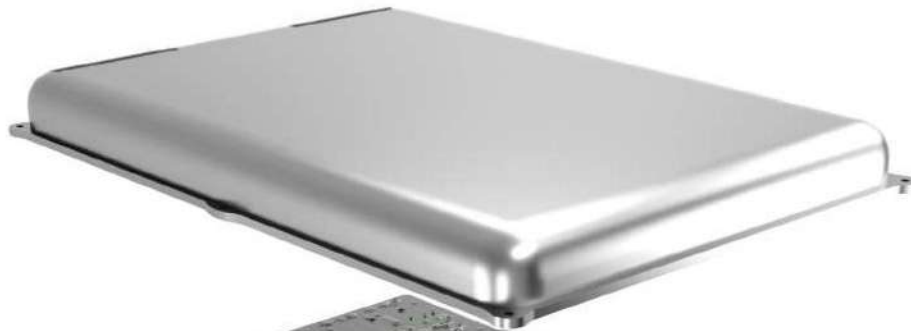


Impregment Service

offer a permanent sealing solution to potential porosities in aluminum casted transmission housings

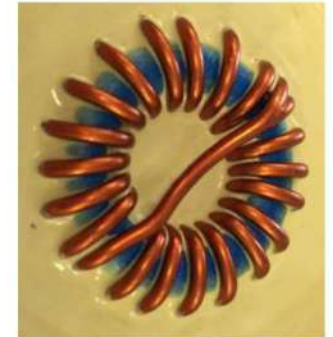
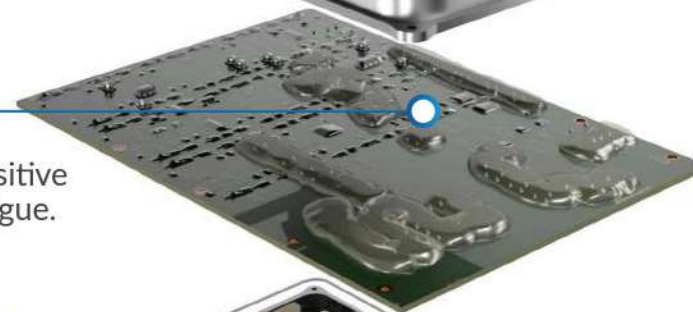
3 POWER CONVERSION SYSTEMS

● On-board Charger



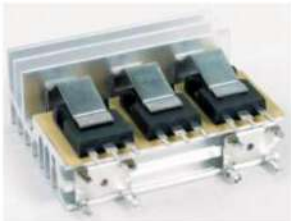
Conformal Coating

helps prevent current leakages or corrosion, and can have a positive influence to the solder joint fatigue.



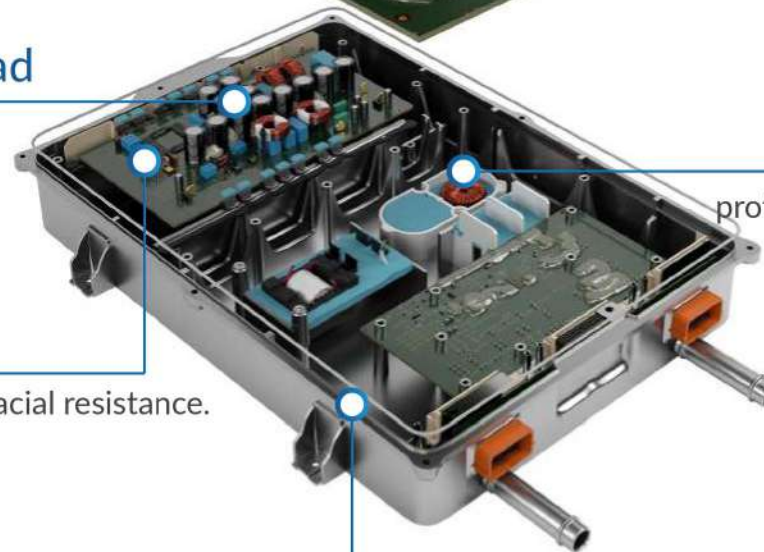
Thermal Potting

protecting them against vibration, thermal shock, humidity, dust and corrosion, while securing a proper heat dissipation in the application



Silicone & Phase Change Pad

excellent thermal performance, are resistant to electrical shorting.



Thermal Pad

eliminating air gaps and reducing interfacial resistance.



Gap Filler

filling the smallest gaps and air voids

Challenges

THERMAL MANAGEMENT

Miniaturizing components + integrating them with other EV systems + fast charging => higher power density and pressure on OBC => better thermal management solutions.

EFFICIENCY AND PERFORMANCE

Wide band gap semiconductor devices (SiC, GaN) => materials must operate at higher temperature and durability.

SAFETY AND RELIABILITY

AC/DC inverters, DC/DC converters and OBC are all required to withstand harsh conditions and mechanical strain.

SYSTEM COST

Build up an innovative new cost-saving e-drive design

PROSTECH Solutions

- **PCB Protecting Method:** high thermal conductivity potting materials.
- **PCB Assembly:** soldering materials to connect surface mount and through-hole component to printed circuit board which can improve solder joint integrity after thermal aging or thermal shock stress up to 150C.
- **Thermal Management Materials:** thin bond-line operating as efficient interface between hot components and heat sink, which offer excellent thermal performance, are resistant to electrical shorting, and are suitable for automated assembly process.
- **PCB protecting method:**
 - + Shock resistance and vibration stability
 - + Chemical and environment resistance
- **PCB assembly:** die attach connector to withstand the very high temperature in Inverters
- **Gasketing:** reliable sealing
- Automated processed for liquid materials and gasketing ensures manufacturer can reduce energy costs through RT curing solution, labor cost through more automation

Suggesting Materials

- **Potting material**
- **Solder Paste, Solder Materials**
- **Silicone Pad, Phase Change Materials, Thermal Pad, Thermal Filler**
- **Potting material, Conformal Coating material.**
- **Red Glue/ 1K Epoxy Adhesive**
- **Gasketing adhesive, sealing adhesive**
- **Single and 2K Dispensing System customized under user's manufacturing process**

● Inverter



Thermal Gap Filling Pad

improve thermal performance and reliability by eliminating air gaps and reducing interfacial resistance

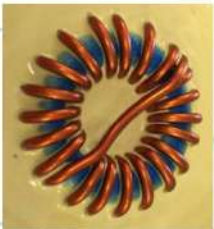
Red Glue

high performance die attach connector.

Gap Filler

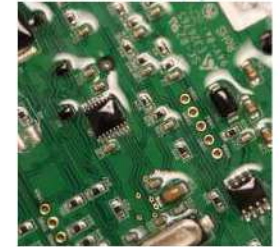
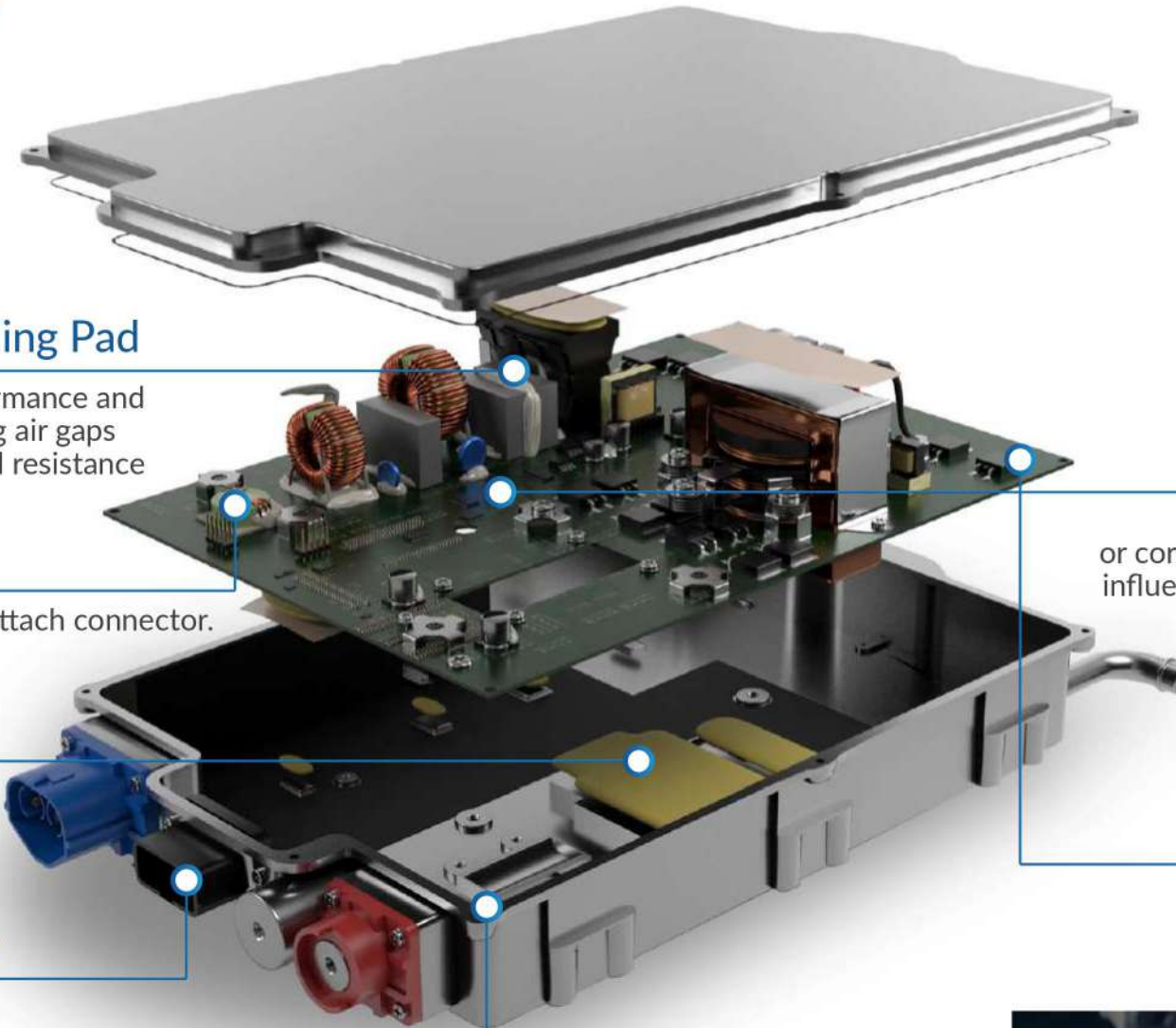
filling the smallest gaps and air voids

Thermal Potting



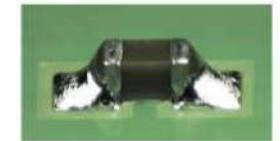
Gasketing

excellent shear strength as well as noise and cost reduction benefits.



Conformal Coating

helps prevent current leakages or corrosion, and can have a positive influence to the solder joint fatigue.



Solder Paste

connects surface mount and through-hole components to printed circuit boards