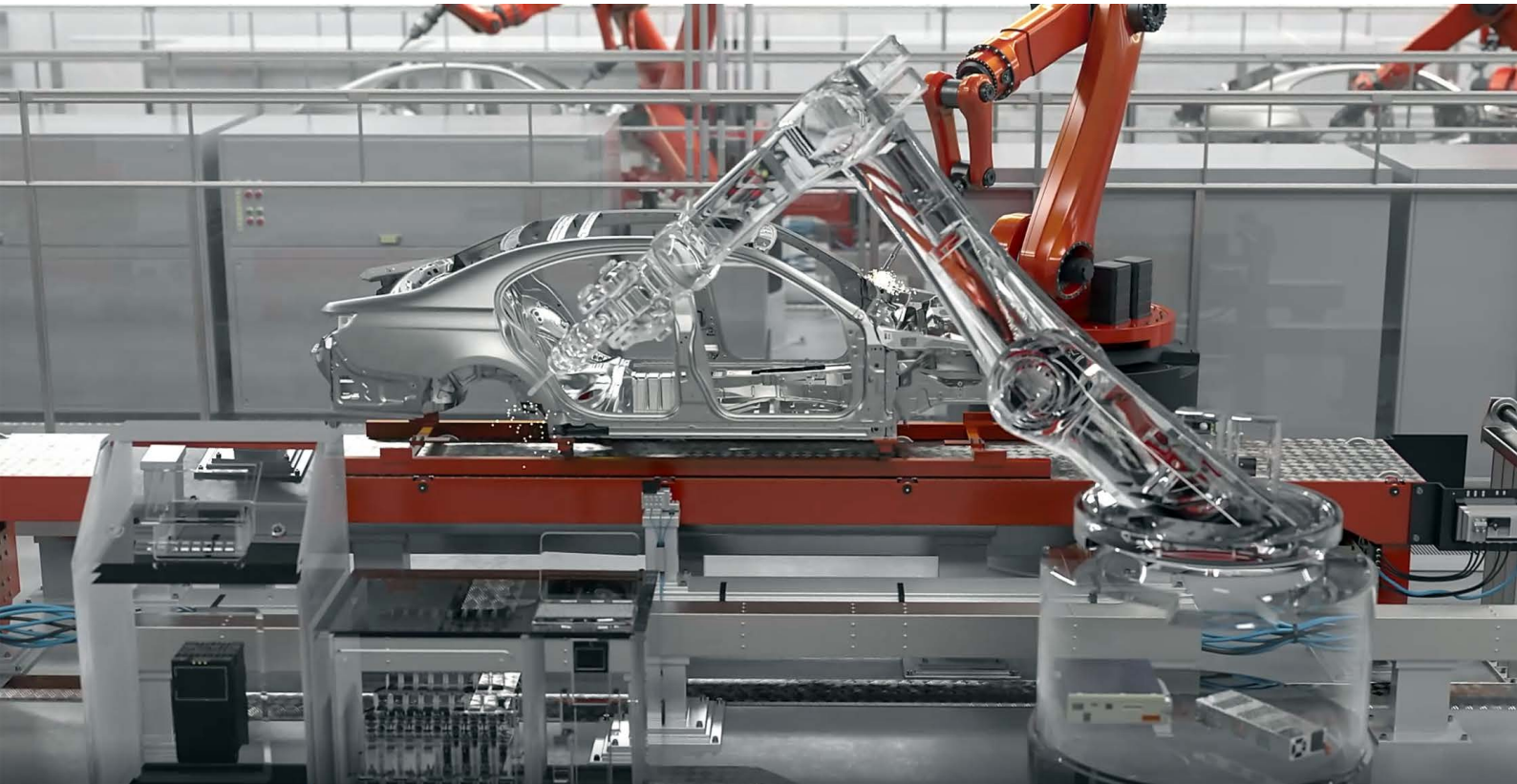
Henkel Adhesive Technologies

THERMAL MANAGEMENT SOLUTIONS FOR *INDUSTRIAL AUTOMATION* & POWER CONVERSION

Today's smart factories are sophisticated and powerful. Advanced communication technologies, motor controls, drives and power converters are delivering more function in smaller form factors, which raises power densities and increases heat generation. With operational expectations for continuous high-reliability performance, thermal conditions must be managed to achieve optimal results.

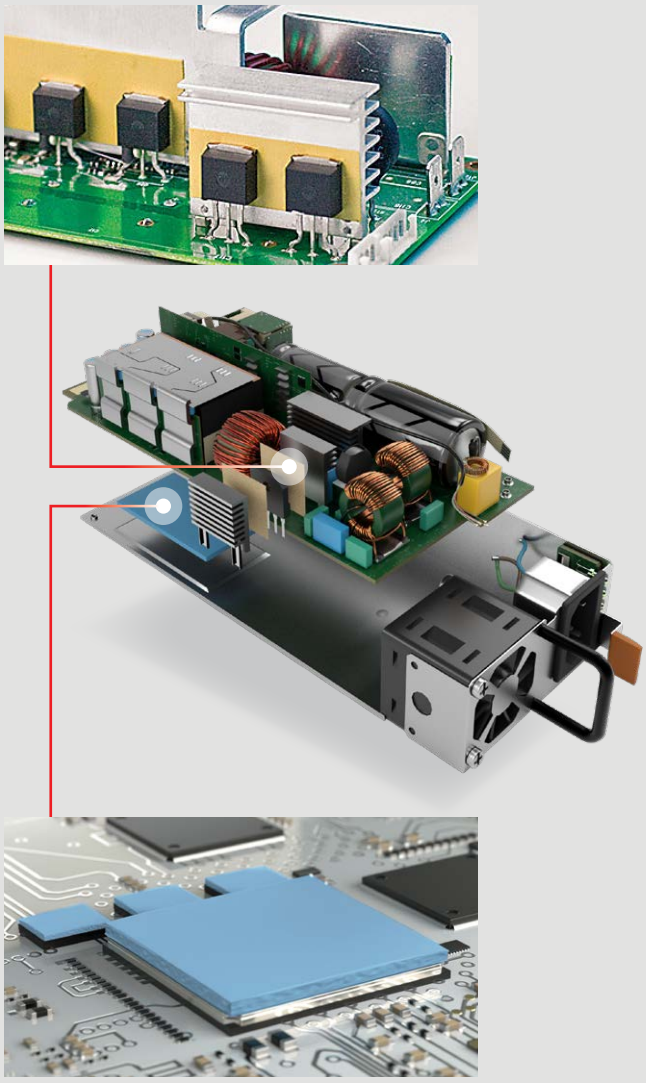
These requirements of intelligent manufacturing automation systems are why leading companies in this sector partner with Henkel for their thermal management needs. No matter the thermal challenge, Henkel has a solution.



Power Conversion Applications

For power conversion systems, heat is an adversary and too much of it can damage semiconductors, pushing components past recommended safe operating temperatures and reducing their working life. Or worse, can cause catastrophic failure.

Thermal interface materials like Henkel's BERGQUIST GAP PADs help protect against the effects of heat, providing a low thermal resistance dielectric interface between power-generating components and their riding heat sinks. Uniquely, GAP PADs have been engineered with high conformability, allowing thorough gap filling for uneven surfaces, air gaps and rough textures to ensure low interface resistance. These customized pads, world renowned for their effectiveness, also have shock dampening abilities for minimal pressure between components.



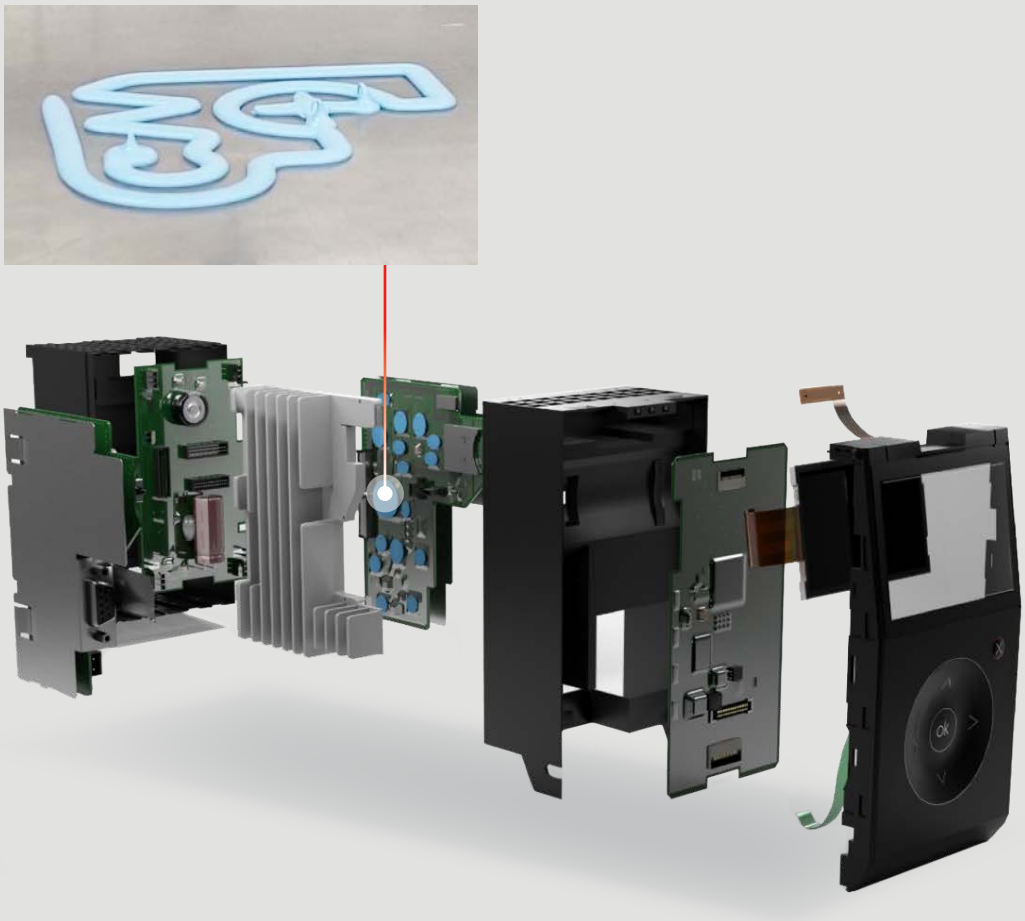
AC/DC Power Supplier with GAP PAD and SIL PAD/BOND PLY Materials

When a thinner thermal interface is required – between a power semiconductor and a heat sink, for example – solutions such as Henkel's SIL PAD and BOND PLY minimize thermal resistance while simultaneously delivering enough dielectric strength to cope with high voltages.

Process Control Applications

Programmable Logic Controllers, or PLCs, are also integral to the proper function of automated systems, providing operator-free oversight of industrial electromechanical processes. Similar to other communication and processing technologies, PLC functionality has significantly increased and the need for efficient heat dissipation has become critical to meet performance expectations.

With more complex PLC electronic designs, Henkel liquid Gap Filler thermal interface materials offer an ideal solution for effective thermal management. Delivering high throughput automated dispensing, the ability to fill intricate, multi-level features, and excellent thermal and mechanical properties, liquid Gap Fillers address the performance and production objectives of PLC manufacturers.

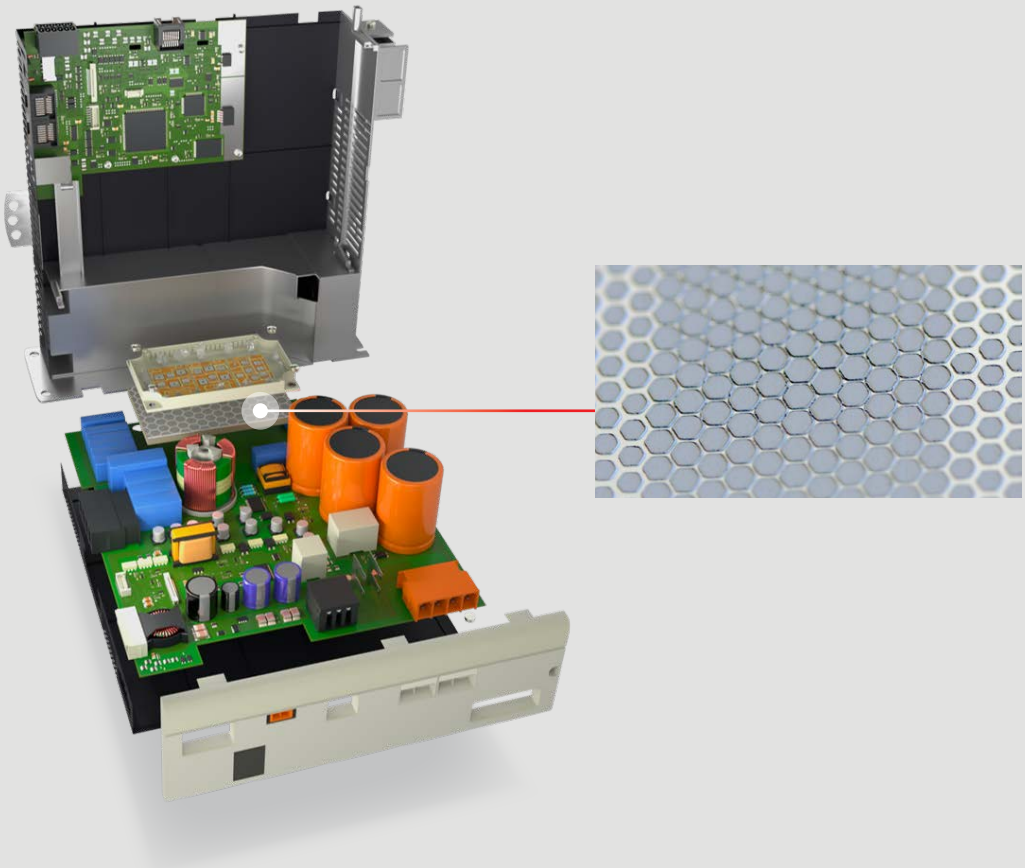


Programable Logic Controller (PLC)
with Liquid Gap Filler Material

Motor Drive & Control Applications

Whereas PLCs are the brains, motor drives are the brawn in an industrial automation environment. Designed to manage speed and torque while increasing the life and efficiency of motors, drives – like most components in today's smart factory ecosystem – are more powerful than ever and expected to maintain very high reliability standards. Reducing operational heat helps achieve these goals.

As compared to other formats, Henkel phase change thermal interface materials are often the preferred choice for heat management in drives – particularly in the inverter between powerful IGBT components and heat sinks. Printable and dispensable phase change thermal compounds allow controlled bondline thicknesses, while thixotropic properties keep materials from flowing out of the interface for maximum thermal performance.



Servo Drive – Power Module with Phase Change Material

Henkel Material Solutions for Industrial Automation & Power Conversion

These are just a few examples of the numerous thermal solutions Henkel provides to top industrial automation innovators around the world. Our BERGQUIST Thermal Management Products have been trusted for decades and our process and technical expertise are unmatched. With broad global resources, Innovation Centers in key geographic regions and a team of thermal materials specialists passionate about engineering the best thermal solutions for your system's performance objectives, Henkel is the smart choice for smart factories.

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