



## Joining Technologies for Plastics



The perfect solution for every application





## The World's Major Resource for Plastics Joining Technologies.

Emerson is everywhere you need us to be for plastics joining. With technical facilities and sales/support offices throughout the Americas, Europe and Asia, our global perspective and local presence set us apart from the competition. We offer more plastics joining technologies than anyone and can provide the process best suited for each application. Our unsurpassed industry experience helps you get to market quickly, with quality products manufactured with the highest efficiencies.

Manufacture in a single location? Design in Europe or the Americas with production in Asia? Emerson works closely with you through every stage of a project, including consultation, design, material feasibility, prototype development, product testing and final production. We team with integrators and manufacturers, developing OEM equipment that can be installed seamlessly and integrated into automated systems. Our support services include employee training, engineering assistance, creating new/modified parts, troubleshooting, preventative maintenance and repair.

Emerson can successfully meet your plastics joining challenge with our Branson plastics joining technology, application experience, technical expertise and responsive service.

## The Widest Range of Plastics Joining Solutions

Emerson offers several joining technologies through its Branson brand without favoring one technique over another. In each application, we review all parameters of the project with you to find the solution that provides the best performance. Deciding factors include product specifications, functional demands, materials used, part size/geometry, production quantities, automation and overall costs. With our technical expertise, experience with numerous polymers, and advanced Branson plastics joining equipment, you can be confident in making the right choice.

**Following are the processes we offer to meet a wide variety of plastics joining applications.**

### Ultrasonic Welding

In ultrasonic welding, high-frequency vibrations generate heat at the interface of the parts to be joined, melting the plastic and creating a strong bond. The technique is fast, efficient, non-contaminating and requires no consumables. It produces a clean weld site with highly uniform joint quality, providing exceptional performance, consistency, and reliability. Easily integrated into automated systems, our equipment can be readily customized to fit exact specifications of welded parts.

Ultrasonic welding is well suited for assembling parts with delicate internal electronic components and can be used to insert, stake, stud weld, degate, or spot weld thermoplastics, and slit or laminate thermoplastic films and fabrics.



## Vibration Welding

Vibration welding creates high-strength, leakproof hermetic seals with most thermoplastics and is useful for assembling irregularly shaped parts. The solid weld flash makes this technique attractive for industrial parts assembly. It is economical and fast for high-volume production, and flexible for multiple tool changeouts in the same machine.

The process creates friction/heat at the joint interface of the parts to be mated, until the right molten state is reached. The plastic then solidifies under clamping pressure and forms a permanent bond. In addition to linear vibration welding, only Emerson offers Branson orbital vibration technology, increasing joint welding opportunities to meet a wider range of requirements.

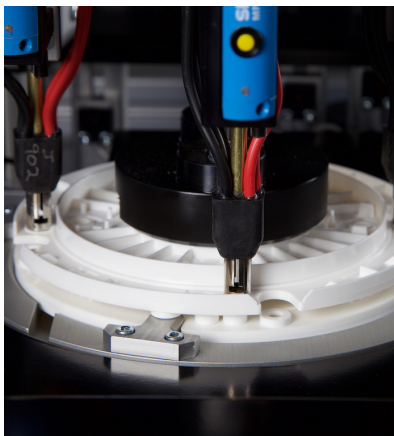
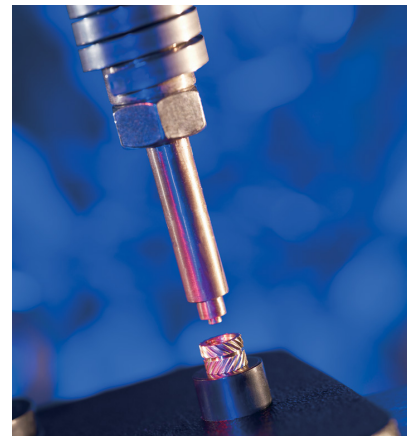


### Hybrid Process for Clean Vibration Joints

Hybrid welding combines infrared and vibration processes, offering more options and applications for smart molding joint design. Emerson's innovative Branson technology incorporates localized broadband infrared preheating into the vibration weld tooling. Proprietary metal foil emitters melt the joint area's surface before the vibration process starts, minimizing particles generated during the vibration weld phases and producing clean, high-strength joints, with reduced residual stresses, material-specific friction and welding time.

## Thermal Welding

Fully controlling plastic's ability to melt and flow into an extended shape, thermal welding enables molten plastic to capture another component, imbed an insert into a part, and connect a plastic part to other parts such as metal or glass-filled resins. This process is gentle and won't damage fragile components. Its uses include heat staking, insertion, swaging, degating, and date stamping.

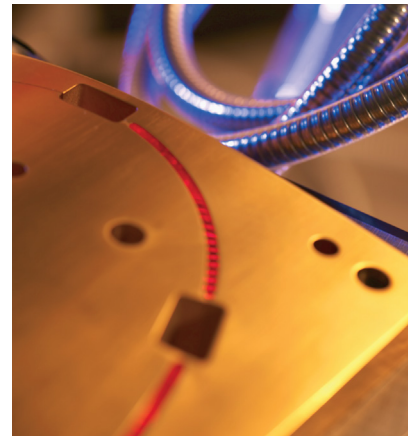


## Heat Staking

The Emerson GPX platform is designed to give manufacturers greater design freedom by enabling them to join more complex, delicate and sensitive components to plastic moldings. Unique pulse staking technology optimizes the heat staking process to produce high-quality joints, superior product aesthetics and energy savings in increasingly challenging applications. These include parts made of dissimilar materials with complex 3D geometries, closely aligned features and fragile or heat-sensitive components, such as soldered components or sensors, and using a greater number of blended, glass-reinforced, chromed and metallicized plastics.

## Infrared Welding

Infrared welding, a non-contact assembly method, uses localized radiant heat from contour-adopted, broadband metal foil emitters to melt the mating surfaces of the parts to be assembled. This permits greater freedom in designing parts such as complex curved joints and internal walls. The technique produces strong, airtight welds with a solid, homogeneous bead and very good flash quality. Compatible with most thermoplastics, infrared welding is particularly appropriate for higher-temperatures processing, and is effective on semi-crystalline resins such as polyethylene and polypropylene. In addition, the infrared heat source is precisely controlled, important when dealing with heat-sensitive parts.



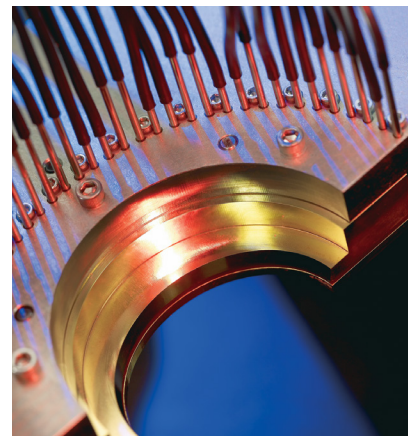
## Hot Plate Welding

Hot plate welding utilizes a heated platen that directly contacts the mating surfaces of the parts to be joined. This technique is cost-effective and compatible with most thermoplastics. Greater latitude in parts design is possible, since the hot plate method can weld parts and internal walls, and assemble thin-wall parts, complex geometries, large/multiple small parts and parts with loose internal components.

## Laser Welding

Laser welding joins materials not easily welded by other thermal assembly methods. This innovative technique is based on the STTir™ (Simultaneous Through Transmission Infrared) principle, where laser energy passes through one plastic component and is absorbed by the second component. This results in heating/melting of the interface, where controlled clamp force is applied and the parts are joined.

The technique heats the entire weld surface simultaneously and has a rapid cycle time, making it well suited to high-volume applications. Minimal flash and no particulate produce parts with excellent cosmetic properties. Laser welding also permits preassembled parts to be joined without affecting internal components, allowing for 3-D joint configurations and more flexible part design.



## Markets and Applications

Branson's plastics joining technologies from Emerson meet the specialized requirements of a range of applications in a variety of business sectors, delivering product integrity, superior part performance, excellent value and, ultimately, customer satisfaction. Emerson offers customers an eco-friendly outcome – energy efficient, free from consumables, and recyclable, without chemical adhesives and solvents.



### Automotive

Interior dashboards, touch screens, climate controls, and driver-assist systems, exterior panels and fascia, sensors, and under-the-hood and within the battery box components.



### Medical

Surgical tools, diagnostic cassettes, fluidic devices, cardiometry reservoirs, blood and gas filters, IV spikes, drug delivery systems, face masks, implantable devices, insulin pumps, surgical gowns, blood donation kits, dialysis tubes, disposable clothing, pump cylinders, blood basins, sensor components, dialysis systems.



### Electronics

Electronic modules, devices and housings, inkjet and toner cartridges, digital cameras, cell phones, media storage devices, battery packs (battery cells), connectors, sensors, portable memory devices, micro disks, navigation systems.

## Markets and Applications (cont'd)



### Packaging

Condiment dispensers, blister packages, stand-up pouches, juice/milk cartons and spouts, pantyhose packages, plastic coated paper cups, flexible plastic and laminate tubes, yogurt cups, coffee capsules, flexible pouches, plastic containers, valve/sleeping bags.



### Textiles and Nonwovens

Quilted and laminated fabrics, bedspreads, mattress pads, climate mats, diapers/nappies, hook-and-loop materials, filters and filter bags, belts, sanitary pads, blinds, films, tarpaulins, curtains, labels.



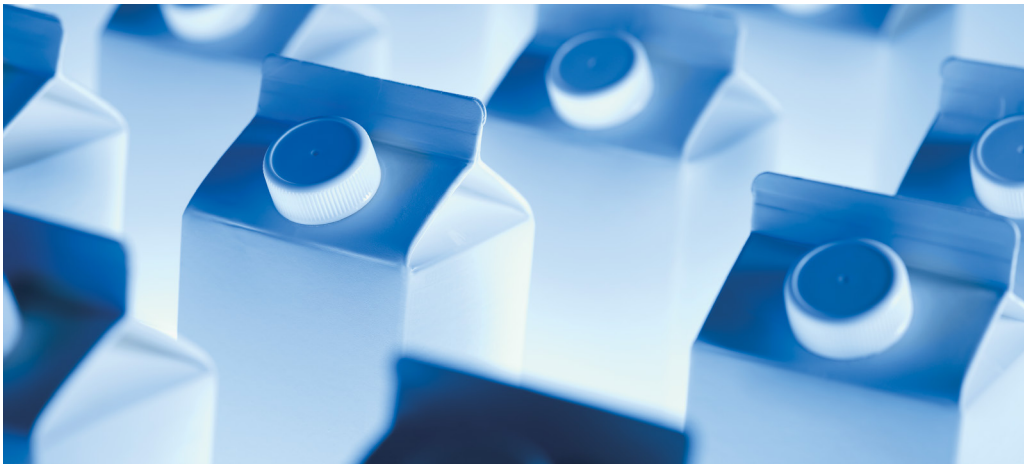
### Appliances

Steam irons, pump housings, vacuum cleaner subassemblies, front panels, dishwasher spray arms, water flow systems, dryer cabinets, ventilation systems, refrigerator components.

### And more –

The applications above represent just a sampling of products created with Branson joining equipment. Today, we are also working with new energy products such as batteries, solar components, green film, and fuel cells.

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