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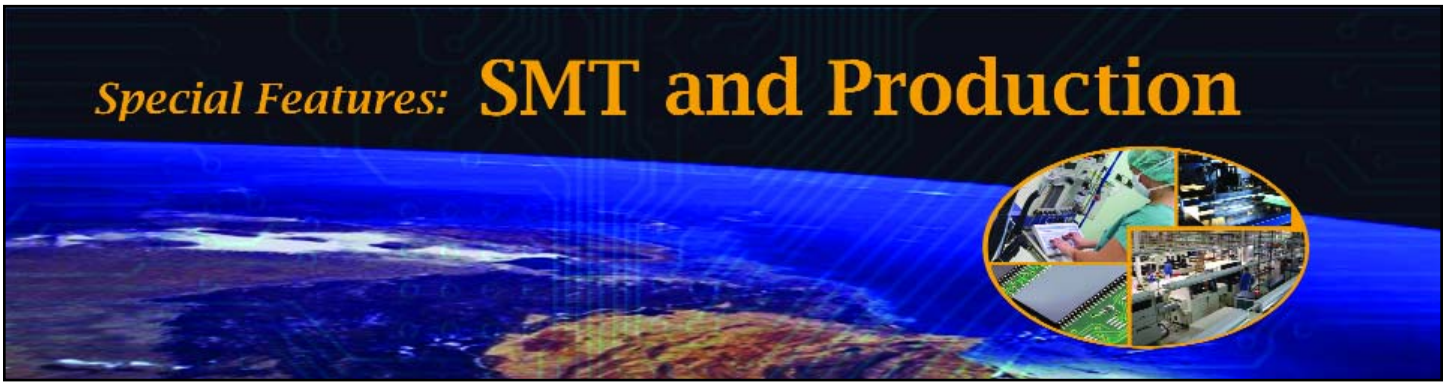


Ultrasonic Welding Meets Needs of Complex Automotive Electronics

By Melissa Alleman, Vice President, Sonobond Ultrasonics

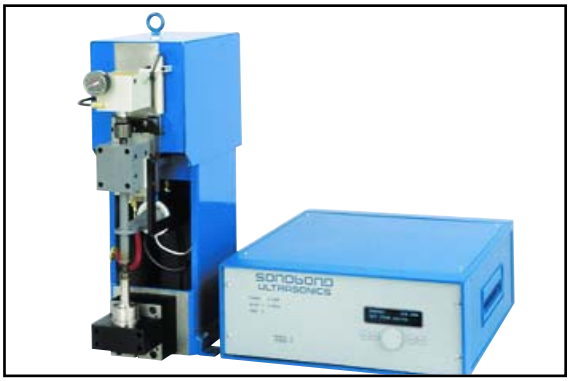
Sonobond Ultrasonic's metal welding technology has been developing alongside the growing number of increasingly complex electronic components, especially those in the automotive industry.

The company offers wire-to-terminal welders that produce single point ground terminals, and can also accommodate a variety of specialty applications through custom tooling capabilities.

Today's automotive circuity is particularly susceptible to electrical noise caused by multiple ground connections. Sonobond's single-point ground welder is a microprocessor-controlled, spot-welding system that can ultrasonically weld as many as 18 wires onto a single terminal with one pulse. It then automatically folds over the terminal arms to provide stress relief for the joint. Ground loops that generate electrical noise are thereby eliminated.

Ultrasonic Welding and Wedge-Reed Bonding

The ultrasonic metal welding technique, as employed by the single point ground welder and other Sonobond equipment, uses a welding tip to direct high-frequency, ultrasonic vibratory energy to the surface between the metals being welded. The vibrations disperse the oxides and surface films between the workpieces and create a true metallurgical bond. No materials are melted, and no heat, current, fluxes, or fillers are used, which makes the process energy-efficient and environmentally safe.



SonoWeld 1600 metal spot welder.

The company's patented Wedge-Reed bonding system takes ultrasonic welding technology a step further to assure precise, ultra-reliable welds. Shear mode vibration parallel to the welding surface is essential for metal welding to occur. The system generates shear mode with high vibratory force and low amplitude while the line of force is directly over the parts to be welded. This creates maximum ultrasonic metal welding effectiveness without bending stress or stalling, and enables most oxidized and tinned metals to be welded.

Single Point Ground Welder

In addition to welding up to 18 wires, the single point ground welder can also weld wire bundles up to 20mm^2 (0.031in^2) to a single terminal in one pulse. It uses heat-treated, tool-steel taper lock tips that are easy to remove and can be readily redressed. The tips are able to perform up to 100,000 welds before being discarded. The 2,500W unit includes a microprocessor that stores and recalls up to 250 protocols. A digital display allows welding modes to be selected by time or energy and provides automatic frequency control and overload protection. Automatic control monitoring can also detect variations from preset limits. Weld data can also be transferred to or from a computer through the unit's RS232 port.

Wire-to-Terminal and Wire-to-Wire

For other spot and wire-to-terminal welding applications, Sonobond offers its SonoWeld® 1600 metal spot welder. The unit welds foils, foils to tabs for batteries and capacitors, and joins dissimilar metals, such as copper to aluminum. As with the company's single point ground welder, this machine includes a microprocessor that stores

Dual-head ultrasonic spot welder.

and recalls up to 250 weld protocols. The company also offers a dual-head spot welder that can accommodate up to 100 layers of foil for battery and capacitor applications. It is capable of welding non-ferrous sheet metal, including aluminum up to 3mm (0.12in) thick. In addition to machinery for wire-to-terminal and battery welding applications, Sonobond offers its ultrasonic SpliceRite™ series for wire-to-wire welding of bare copper wire up to 100mm^2 (0.16in^2) and tinned wire up to 60mm^2 (0.093in^2). The company manufactures its metal spot and wire welders in the U.S., and can be used to assemble electrical wire harnesses, bus bars, electrical contacts, fuses and circuit breakers, ignition modules, starter motors, assembly boards, circuit analyzers, connectors, terminals, and switches.

Custom Tooling

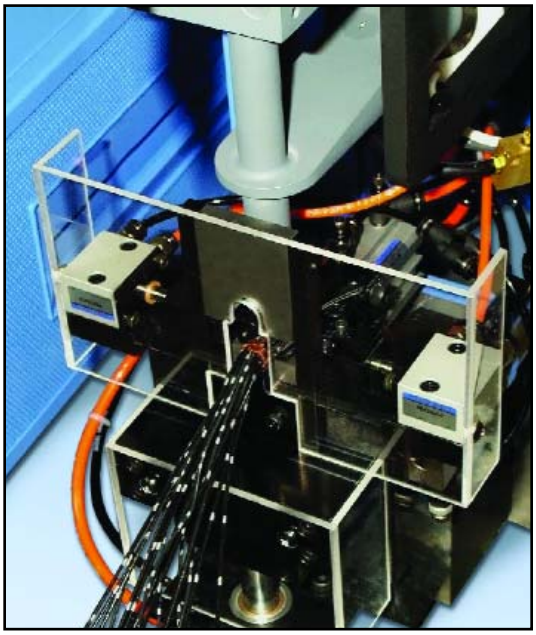
Sonobond takes a step-by-step approach to custom tooling. First, it determines whether its ultrasonic metal welding is appropriate for the customer's application. For example, the company always tests tinned materials to ensure that its equipment can handle an unusual part configuration.

Next, the geometry and specification of the finished part are considered to determine what tooling adjustments are needed. Tooling is designed to hold the various pieces to be welded in the proper configuration while the weld is being completed.

Finally, finished welds are checked to ensure that dimensional tolerances and electrical and mechanical requirements are met. Customers are welcome to review the operation and have parts delivered to their facility so they can run their own tests. The company will also send technicians to the customer's site for final approval.

To ensure that Sonobond equipment meets a customer's welding and assembly needs, the company offers a free, no-obligation ultrasonic welding viability test. The company test welds any supplied materials and give them to the customer to review.

A pioneer in ultrasonic technology, Sonobond holds more than 150 patents, including the first for ultrasonic metal welding in 1960, when the company was known as Aeroprojects. Over the following decades, the company has established and maintained a reputation for innovative and quality-engineered products. Today, the company manufactures a complete line of ultrasonic welding and bonding equipment used by firms in the electrical automotive, appliance, HVAC, solar, aerospace, filtration, medical, body armor, and apparel industries.



SPG 2600 ultrasonic single point ground welder.

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