Ultrasonic Welding

Produces Outstanding Results–Even in Assembling Tinned Wires and Terminals!

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Serving the Electric Wire and Cable Processor
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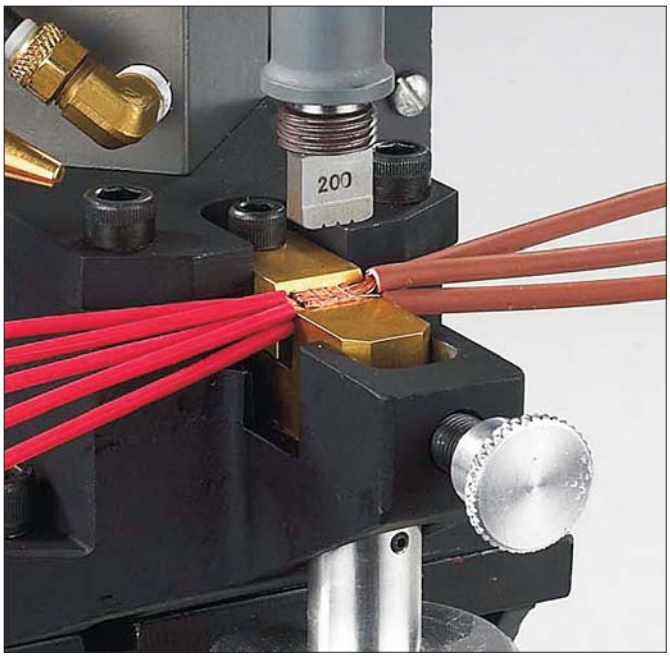
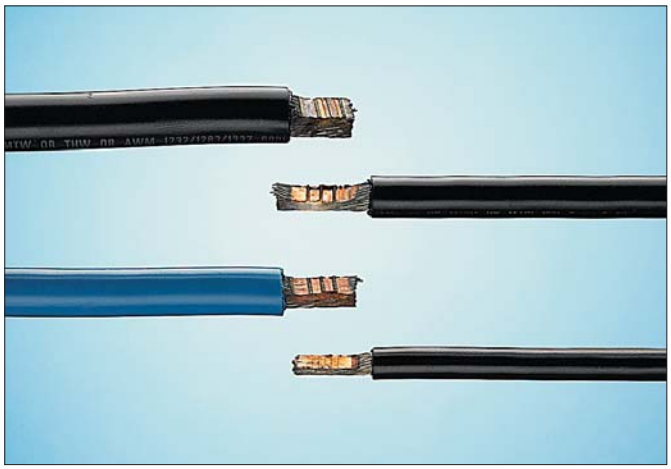
Most wiring harness manufacturers, especially those in the automotive harness industry, have come to recognize the important advantages of ultrasonic welding in the assembly process.

They know that ultrasonic welding is a fast, dependable way of joining wire to wire and wires to terminals. Experience has proven that ultrasonic bonding can create an ultra-reliable metallurgical bond using a single pulse lasting a second or less. Until recently, however, manufactures found this process to be impractical in the assembly of tinned wires or tinned terminals. Because of the difficulty involved in transmitting ultrasonic energy into tinned wires and terminals, such parts were set aside for other processes.



The SpliceRite™ uses high energy transfer throughout the weld cycle; perfect for tinned coated and large wire bundles up to 48mm².



In addition to welding tinned wires together, the Sonobond SonoWeld® and Sonobond SpliceRite™ ultrasonic metal welders are used to weld tinned wire to tinned terminals as well as to bare and coated wires and terminals.

Fortunately, this problem has been solved. Sonobond Ultrasonics has developed unique technology that permits the successful welding of most tinned wire combinations.

Patented Bonding System

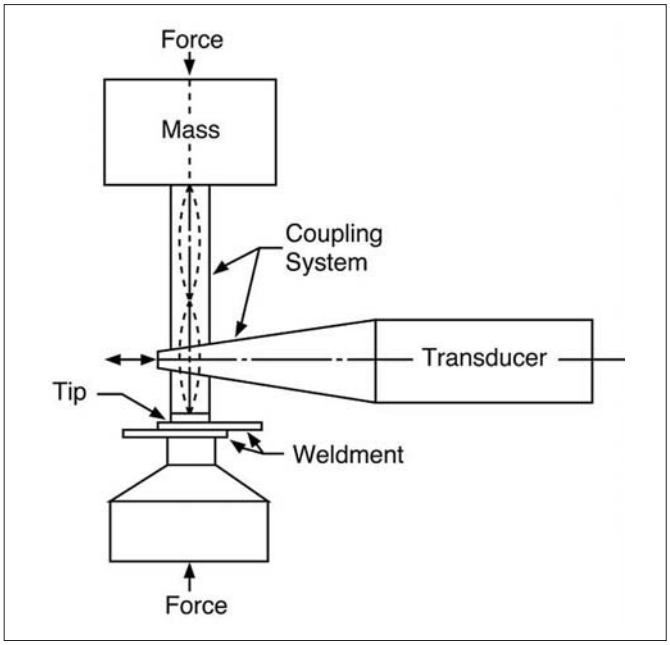
Sonobond's technology combines a patented Wedge-Reed style welding head with a microprocessor-controlled 2500 watt power supply.

This highly effective combination is used in Sonobond's SonoWeld® and the Sonobond SpliceRite™ ultrasonic metal welders. These machines successfully weld tinned parts to meet or exceed required strength and electrical specifications. In addition to welding tinned wires together, they are used to weld tinned wire to tinned terminals, as well as to bare and coated wires and terminals. All this is accomplished with the same tooling used to weld bare to bare wire or to terminals.

Case History

The following example demonstrates how this metal welding technology can effectively handle applications involving tinned wire assembly.

A major electronics supplier now uses Sonobond ultrasonic welders to bond together the tips of wire bundles that may be tinned or untinned. These range from 2AWG to 10 AWG and form a rectangular, semi-solidified bundle. Before Sonobond welders were incorporated into the company's assembly process, wire ends were formed by crimping a metal sleeve around the wires. However, the introduction of Sonobond units permits the welded wire to be directly inserted in the terminal for use in electrical power distribution/control cabinets. This eliminates the need for a metal crimping sleeve.



The patented Wedge-Reed System utilizes low, variable amplitude and high vibratory force, producing precise welds with less joules.

The Ultrasonic Welding Process

Ultrasonic welds are produced by introducing high frequency vibratory energy to overlapping metals under pressure.

The material is clamped between a shaped tip and anvil. When the ultrasonic energy is introduced the tip vibrates, creating an oscillating shear force that joins the materials without melting them. This creates a true metallurgical bond that can be as strong as the parent materials. There are no arcs, sparks, or molten materials produced in this process, and no electrical current passes through the weldment. No consumables are used and most welds are completed in a second or less.

Ultrasonic Equipment

The heart of an ultrasonic system is the transducer (or converter).

The transducer transforms high frequency electrical energy to vibratory energy. The vibratory energy is then transmitted by waveguides to the weld tooling which consists of a welding tip and an anvil tip. This assembly is incorporated in the welding press. A separate power supply converts line power to the required high frequency for the transducer. Depending on the application, tooling can last for up to several hundred thousand welds with occasional redressing

Sonobond ultrasonic welders use the highly effective wedge-reed design that utilizes low amplitude, high vibratory force.

This patented design is a major reason why the Sonobond SonoWeld® and SpliceRite™ units are so effective in welding tinned or oxidized parts, when combined with the microprocessor-controlled power supply.

Over 250 Protocols

Both the SonoWeld® and the SpliceRite™ can store and recall up to 250 weld protocols from a digital display located on the front panel of the controller/power supply.

The operator selects the appropriate welding mode by time, energy, or height. Should the variables exceed pre-selected power or time limits, or if the height of a part is different from that set, the unit alerts the operator. In addition, both the SonoWeld® and the SpliceRite™ feature automatic frequency control and overload protection.

Despite this sophistication, both units can be operated with only a minimal amount of training.

In summary, ultrasonic welding represents the most economical and effective assembly choice for many types of electrical connections. The ability to extend this technology to processes involving tinned wires and tinned terminals provides an even greater advantage to wiring harness manufacturers everywhere.

For further information contact Sonobond Ultrasonics. Phone 800-323-1269 or 610-696-4710. Visit www.SonobondUltrasonics.com or email Sales@SonobondUltrasonics.com.

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