

Ultrasonic welding is a marathon, not a sprint

User requirements for cable connection systems are consistently implemented

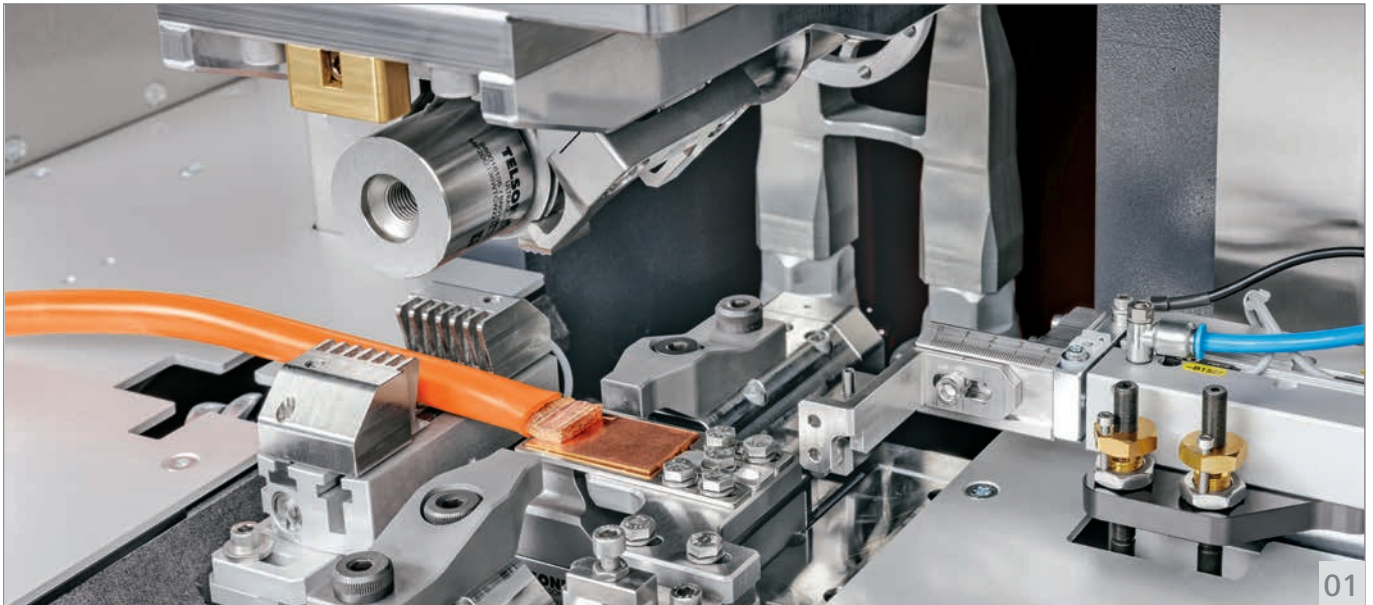
PLASTIC WELDING

METAL WELDING

CUTTING

CLEANING

SIEVING



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Ultrasonic welding has proven its worth in many applications, such as in cable and plug connections for electromobility. However, the technology is continuously developing. Nowadays, users are increasingly demanding flexible systems that can be quickly adapted to different tasks and integrated well into Industry 4.0 concepts. However, the market also requires monitoring of the production process with the aim of preventing production errors. With the Telso®Terminal TT7, Telsonic has a metal ultrasonic welding system that consistently implements these market requirements, as demonstrated by its use at Nexans.

Nexans – a global specialist in electrical connectivity – now has five of these ultrasonic welding systems in operation at various locations: four systems in the production of connection systems for cables and cell connectors in electromobility and another for training and process development. Andreas Pedimonte (Fig. 1), AEE Process Development sums up the experience with the systems: "We believe that the TT7 is currently the best and most modern ultrasonic welding system on the market." In this context, he emphasizes that the ultrasonic welding systems are impressive not just due to their performance. "We also particularly appreciate the excellent cooperation and support from the manufacturer. Telsonic takes all customer feedback seriously and also uses complaints to make optimizations and adjustments."

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- 01 Welding chamber of the Telso®Terminal TT7 with very good accessibility
- 02 Andreas Pedimonte, AEE Process Development at Nexans (Copyright: Nexans)

Reliable in three-shift operation

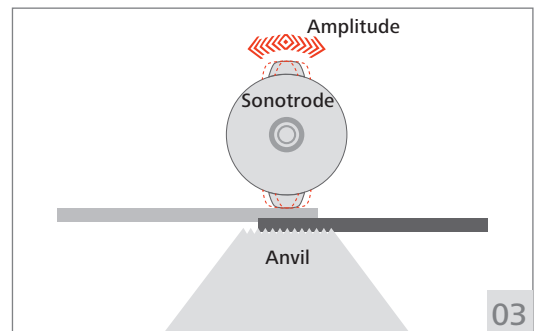
The ultrasonic welding systems have now all been successfully put into operation and handle around 15,000 welded joints per week with quite a few batch changes. Cables with large cross-sections between 35 and 50 mm² or 70 and 95 mm² are welded. "It's loads like this that separate the wheat from the chaff," says Andreas Pedimonte with a smile. "A system demonstrates its true reliability and robustness only after several tens of thousands of welds." At any rate, the TT7 is designed for such work performance.

Several factors contribute to this, such as Telsonic's patented PowerWheel® welding technology (Fig. 2). The torsional method not only ensures strong and narrow connections even with thicker cable cross-sections, but is also significantly more robust than systems that use one large converter due to the use of several smaller converters that are harmonized with each other. In addition, the temperature of the sonotrode (Fig. 4) and the tools is regulated so that it always remains in the optimum temperature range. This can reduce or even prevent cooling times and ensure greater machine availability. A particle extraction system (Fig. 5) has been added to extend cleaning intervals and reduce the amount of maintenance required. Furthermore, it also prevents production losses due to contamination.

Fit for the future

Additional benefits include the quick-change system with self-centering sonotrode, which enables tool changes in just a few minutes. The cooling concept, which reduces the use of energy-intensive compressed air, is also impressive in practical use: The converter is cooled electrically by a fan; the welding tools are cooled via an operated liquid cooling and heating circuit. Since sustainability is closely linked to production quality, the welding system detects trends during operation, allowing potential production errors to be identified and prevented early on. All welding results, machine events, parameters and data are saved for traceability and analysis purposes. This data can then be exported via USB and Ethernet. As such, the welding system can communicate with any MES (Manufacturing Execution System). "The Telso®Con interface also provides a flexible solution for connecting via the Open Platform Communications Unified Architecture, which also makes us well-positioned for the future," concludes Andreas Pedimonte.

By Rick Steinbach, Key Account Manager Metal Welding at Telsonic GmbH and Ellen-Christine Reiff, Stutensee Editorial Office



- 03 Torsional Welding Process (PowerWheel®)
- 04 Temperature-controlled welding tools
- 05 The particle extractor can be easily installed and removed with a magnetic bracket.