



ULTRASONIC WELDING TECHNOLOGY

ELECTRONICS

Ultrasonic welding technology. For electronic engineering.

Plastics have been used successfully in the electronics field for many years. The requirements of plastic components, with respect to visual appearance, geometry, function, and material properties are particularly demanding. In automation engineering, a great number of sensors and actuators are used to make processes even more reliable. Component development focuses mainly on joining plastics.

Herrmann Ultrasonics is a world-leading company in the field of ultrasonic welding. For our customers, we assume the role of both consultant and application problem solver with regards to the ultrasonic joining of plastic materials. In addition to leading-technology products, we provide excellent, in-depth application consulting to solve joining tasks and problems, while taking into account the economic aspects.

Batteries
Relays
Circuit boards
Switches
Housings
Sensors



Ultrasonic welding of electronic components. As unique as the product itself.



Sensors + switches

Optimized solutions. For your specific requirements.

Nowadays, the requirements of components for the electronics industry have become increasingly complex. Tightness, strength, accurate dimensions and the impeccable visual appearance of surfaces are typical quality criteria. In order to ensure cost effective manufacturing with low energy requirements, short process cycles and avoidance of rejects are key aspects. The Herrmann Ultrasonics ultrasonic components and systems, along with application laboratories and technical application oriented experts, provide the basis for efficient, high quality production processes.

A high degree of product safety and reproducibility, as well as the selection of correct weld process parameters, ensure the highest component finish quality. Herrmann Ultrasonics provides ideal solutions for maximum flexibility in production – from small volume assembly to fully automated production processes.



Housings

Electrical devices

Typical product requirements. Possible with technology from Herrmann Ultrasonics.

- High strength
- Surfaces free of print marks
- Reliable functionality of components
- 100 % hermetic seal
- Dimensional accuracy

Stable processes – increasing security. Weld design and process optimization.

Experienced technical application-related consulting and development process support by Herrmann Ultrasonics prevents unnecessary expenses and reduces the overall R&D period. In many cases, existing processes can be significantly improved by utilizing generator and controller technology from Herrmann. This often ensures a greater range and flexibility of applications, which saves time and money.



Advantage through efficiency. With competent industrial knowledge and experience.

Herrmann Ultrasonics' long-term experience, with respect to the joining of plastic components in the electronic sector, is an important success factor in component development. Early introduction of Herrmann Ultrasonics specialists in the product design stage reduces experimental processes and costs.

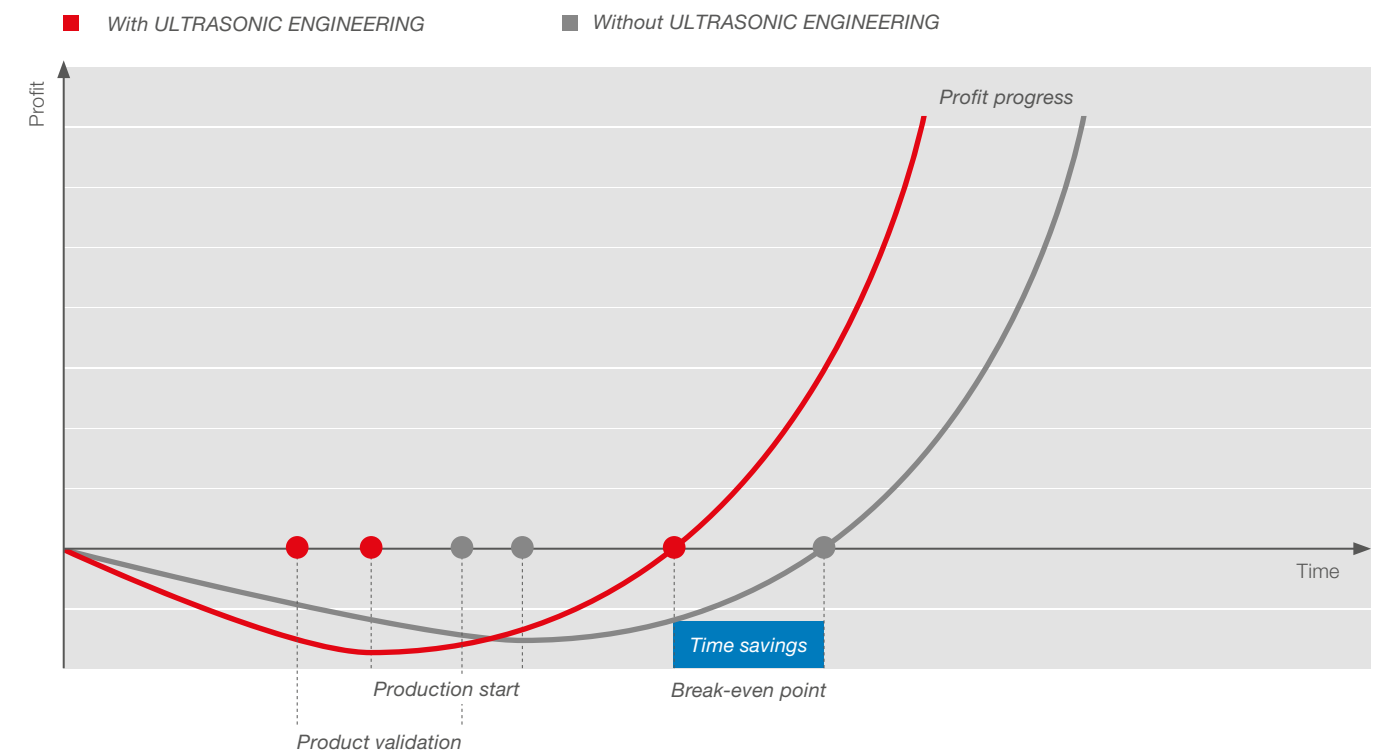
- Data base-supported experience from more than 10,000 successful applications
- Increase of overall product quality through obtaining an optimum component design

- Reduction of repetitive and expensive modifications and optimization loops for injection molding tools and dies
- Reliable feasibility studies using test tools, including process documentation
- Early definition of process parameters and implementation into series production
- Support for validation of the weld process
- Pre-series production by means of contract welding
- Consistent weld processes can be reproduced across multiple production facilities worldwide



Highly efficient. With technical application-related consulting.

Short R&D periods are a crucial competitive advantage. By utilizing ultrasonic welding technologies from Herrmann Ultrasonics, break-even points can be met earlier and the required profit range can be reached sooner.



Environmentally friendly and energy efficient



Ultrasonic welding technology is considered environmentally friendly. In comparison with thermal joining processes, its overall energy footprint is reduced by 75%. This is due to power only being drawn during the actual weld time.

Properties and advantages

- Very low energy required due to optimum efficiency
- Energy is focused specifically in the area to be joined and only during the actual weld process
- Efficient use of energy due to ultrasonics not requiring preheating or stand-by cycles
- No power dissipation through heat radiation as with typical thermal processes

BLUECOMPETENCE
Alliance Member

Partner of the Engineering Industry
Sustainability Initiative

Highest welding quality. Sensors and switches.

Welding of optoelectronic sensors

Optoelectronic sensors are utilized for all kinds of automation solutions that rely on contact-free object detection. The wide variety of designs, sizes, and specifications can all be welded using ultrasonics. Different weld processes can be realized for every component, for example inserting of display plates, welding of connectors, or joining of housing parts. Typical requirements: perfect visual appearance, scratch-free display plate, tightness. The spectrum ranges from single-part production to millions of series production parts. Typical examples: light barriers and various sensors, including light conductor, distance and safety, distance measuring systems/rangefinders and non-standard special sensors.



Welding of inductive/capacitive sensors

In all areas of automation, inductive and capacitive sensors are used in millions of applications. The possible combinations of shapes and electrical performance features are nearly infinite. Welding processes include connector and plug welding and joining of top and bottom housing parts. Typical requirements: tightness, reliable functionality of electronic components, realization of high counts.

Welding and staking of circuit breakers and relays

The reliability of industrial automation equipment becomes more and more important with increasing utilization of electronic systems. Circuit breakers and relays are particularly suitable for ultrasonic welding. Metal riveting is being replaced more and more by plastic staking with ultrasonics. Typical requirements: strength, dimensional accuracy, and guaranteed functionality with high counts.



Welding of electronic switches

In addition to industrial applications, electronic switches are also used in power tools, household appliances, cleaning technology, and drive engineering, as well as in heating and air conditioning technology. The integrated components must fulfill the highest requirements with regards to quality, performance, service life, robustness, as well as dust and vibration protection. The ultrasonic technology is ideal for meeting these requirements.

Highest welding quality. Housings.



Batteries

The use of electrical and electronic devices without a permanent connection to the power supply system is common nowadays. Batteries are not only used for mobile phones or as starter batteries in the automotive industry, but also in critical applications such as emergency power supply in data processing centers and hospitals. In addition to impeccable visual appearance, the main focus is on reliable functionality and tightness of the housings.

Welding of lamps and signal lamps

Highest quality and specific design requirements particularly apply for lamp housings. These include strength and tightness, absolute dimensional accuracy, high-quality and scratch-free surface finishing as well as clear welds and absolute absence of particulate. Typical applications are lamp housings and covers, signal lamps and aquarium lamps.



Functional housings

Housings must ensure complete compliance of the respective components with their intended function. Often, further functions are added, for example gearboxes that also support bearings and shafts or implementation of mounting points for assembly. Every housing is as unique as the components inside, regardless of its type (technical housing, visible part, or multi-component housing). Ultrasonic technology provides ideal solutions for most varied visual and technical requirements.



Displays

Display plates are used in almost all areas of everyday life. Be it washing machines or oven panels, telephones or remote controls, the display must ensure safe status indication of a device. It must be scratch-proof and tight, provide a perfect, mark-free visual appearance and maintain absolute dimensional accuracy. These are typical requirements that can be routinely met by using ultrasonics.



Domestic engineering

Predominant application in visible areas makes a perfect visual appearance and ease of use the most important requirements for these components.

Highest welding quality. Electrical devices.



Measuring instruments

Electronic measuring instruments provide a number of opportunities for utilization of ultrasonic welding. In addition to housing and display components, it is possible to integrate the electronic components by means of welding or staking. Typical applications are multimeters, temperature measuring devices, radiation protection detectors.



Circuit boards

Circuit boards, in their function as carrier elements for electronic components, are highly sensitive products. The introduction of directed ultrasonic energy into the joining area, during the actual weld process, ensures secure and reliable connections of carrier plates and housing components without putting sensitive electronic components at risk.

Highest welding quality. Cable and quick disconnect systems.



Connection cables

Cables and cable connectors can be combined in a vast number of possibilities. Strong and secure contact connections ensure trouble-free fit and safe current flow. Bonding of contacts by means of ultrasonic technology allows for connection of different types of materials.



Welding of connectors and terminal strips

Male connectors and terminal strips are high-quality safety components that are used in electrical devices, electronics, and in electrical installations. In contrast to screw connections, ultrasonic welding guarantees a tamper-proof connection of components. It provides for shorter cycle times, lower material consumption, and easier recycling.



Versatile product portfolio. Leading in technology and precision.



Manual work station

HiQ product line for plastic weld applications

The HiQ generation welding machines provide an appropriate platform for virtually any application, any market and any budget. The machine series allows for complex joining methods, is user-friendly and provides for easy handling. Adjustable force profiles, a wide range of process parameters, and intelligent system software can be used to individually customize weld applications.

- Precision
- Diversity
- Efficiency



Punch & seal machine

Punch and seal systems MPW for membrane materials

The MPW does not require pre-punched membranes on carrier tape since punching and welding is performed in one process step. This saves material and periphery costs and reduces cycle times. Quality control through assessment of weld process parameters and process monitoring is possible. For integration in automation lines, we provide a number of modular systems in different variants.

- Continuous process monitoring
- Punching and welding in one step
- Short cycle times



Ultrasonic welding systems

Systems and components for automation

Herrmann Ultrasonics provides standard actuators that offer a high level of flexibility that can be easily adapted to individual customer requirements. The Herrmann Ultrasonics modular system offers complete integration solutions for machine builders and Original Equipment Manufacturers. The offering can be individual ultrasonic components or complex ultrasonic systems: Every module is a functional unit and allows easy integration and start-up.

- Robust components
- Wide selection
- Adapt to meet customer requirements

Continuous support from the beginning. ULTRASONIC ENGINEERING.

The expert teams at Herrmann Ultrasonics will support during every phase of a project. This includes joint design discussion, component design, pre-production prototype welding in application laboratories, weld parameter definition for verification of the required component properties, training/instruction services and after-sales services. Close cooperation with the customer and efficient product development is the primary focus.



Ultrasonic laboratory

Application consulting

- Early support for component design
- Support and direction for designing the geometry of the weld joint area.
- Principle testing for feasibility

Application optimization

- Common trials and tests with the customer
- Determination and optimization of tooling profiles and process limits
- Verification of research results with the help of microscopy, tensile tests, sealing tests, burst tests, high-speed cameras, and microtome cuts
- Complete documentation of the feasibility test results

Trainings and seminars

- Beginner and expert seminars
- Hands-on user training
- Trainings on site or at our local facilities
- Customer-specific trainings

Technical project management

- Consistent implementation of customer requirements and test results in design concepts.
- 3-D supported collision analysis
- FEM-assisted tool design
- Mechanical and electrical interface definition
- Guidance on integrating the weld process into the machine sequence

Tech-Center on site

- Customer-oriented support for feasibility analyses
- Ultrasonic laboratories are strategically located in the major markets worldwide
- Experienced and native-speaking application specialists

After-Sales Service

- Optional 24-hour service hotline
- On-site service in the respective languages through our Tech-Center network
- Preventative maintenance and service measures



FIRST CLASS TECHNOLOGY. WORLDWIDE.



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