

Telsonic's ultrasonic technology in demand for wearable therapy device manufacture

PLASTIC WELDING

METAL WELDING

CUTTING

CLEANING

SIEVING



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The ongoing COVID-19 pandemic has required an agile response from not only the NHS but also the manufacturers of the personal protection equipment, medical devices and monitoring systems required to treat seriously ill patients.

Achieving the high volumes required, has in turn, generated an increase in demand for the technologies used to produce these essential items, including ultrasonic systems used for performing welding processes.

Telsonic has been pro-active in assisting both end user manufacturers and automation machine builders by providing the modules, systems, tooling and technical support needed to respond quickly to these unprecedented challenges.

In a recent application, Telsonic UK has supplied a complete twin head ultrasonic welding station, integrated as part of the manufacturing process for a wearable therapy device. This battery powered disposable device, similar in size to a small wristwatch, is attached to the patients leg and sends out electrical impulses that reduce the risk of Venous Thromboembolism, a dangerous blood clot condition suffered by almost one third of seriously ill coronavirus patients. As a result, the NHS has ordered thousands of these potential life saving devices.

The device is manufactured by Firstkind medical, a UK based science-led medical devices company who manufacture a range of non-invasive geko™ branded products with an embedded ground-breaking NMES technology platform. Neuromuscular electrical stimulation (NMES) is a treatment using electricity to stimulate muscles and nerves, helping to improve flexibility, strength, and movement.



01 Neuromuscular electrical stimulation device

The ultrasonic welding technology supplied by Telsonic for this application has been integrated as part of a comprehensive pallet line automation system, built in-house by Firstkind. The device casing is manufactured in Polypropylene and the ultrasonic system is used to precisely stake four hollow pins into moulded recesses, effectively attaching the back onto the device, thus enclosing the internal assembly and sealing the battery in place.

Components are presented on twin cavity pallets for processing by Telsonic's twin head installations. Each ultrasonic system comprises of a MAG3512S generator, an air cooled precision adjustable and spring loaded integrated SE3512VF converter module together with a Titanium booster mounted to a Telsonic AC450 pneumatic actuator with a Titanium 4 point single body sonotrode. The sprung loaded head assemblies deliver a controlled staking action, allowing the material to flow at a low part reactive closure force. Weld delivery control is determined by precise weld and hold time from the machine's main PLC.

The challenge presented by the weld specification dictates that the ultrasonic welding process has to produce an aesthetically pleasing result whilst achieving a tight closure gap between the parts. In addition, to ensure patient comfort, the weld must be constrained sub flush within the recesses. The component assembly retention strength has to be fit for purpose whilst in use, offering anti-tamper proofing, yet ultimately allowing disassembly for battery removal after use for recycling and disposal purposes. The application requirement for multiple stake positions welded simultaneously on one tool requires pin/recess moulding design in collaboration with precise sonotrode tool face design and actuator force delivery.

In addition to the technical challenges surrounding the application, timescales were extremely important to get the weld station completed ready for the line installation and in production as quickly as possible. To adhere to COVID rules, the factory acceptance test (FAT) at Telsonic UK was conducted remotely and successfully with Firstkind using PC based visual tools.

Experience of this type of application, underpinning Firstkind's confidence gained in the weld solution proposed, together with Telsonic's pro-active engagement throughout the project, relating to material selection, joint design, and process integration, were contributory factors in Telsonic securing this business.

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02/03 Air cooled precision adjustable and spring loaded integrated converter module together with a Titanium booster mounted to a Telsonic AC450 pneumatic actuator