

## Ultrasonic welding for secure electrical connection

Stability control in the new SUV from Ferrari

PLASTIC WELDING

METAL WELDING

CUTTING

CLEANING

SIEVING



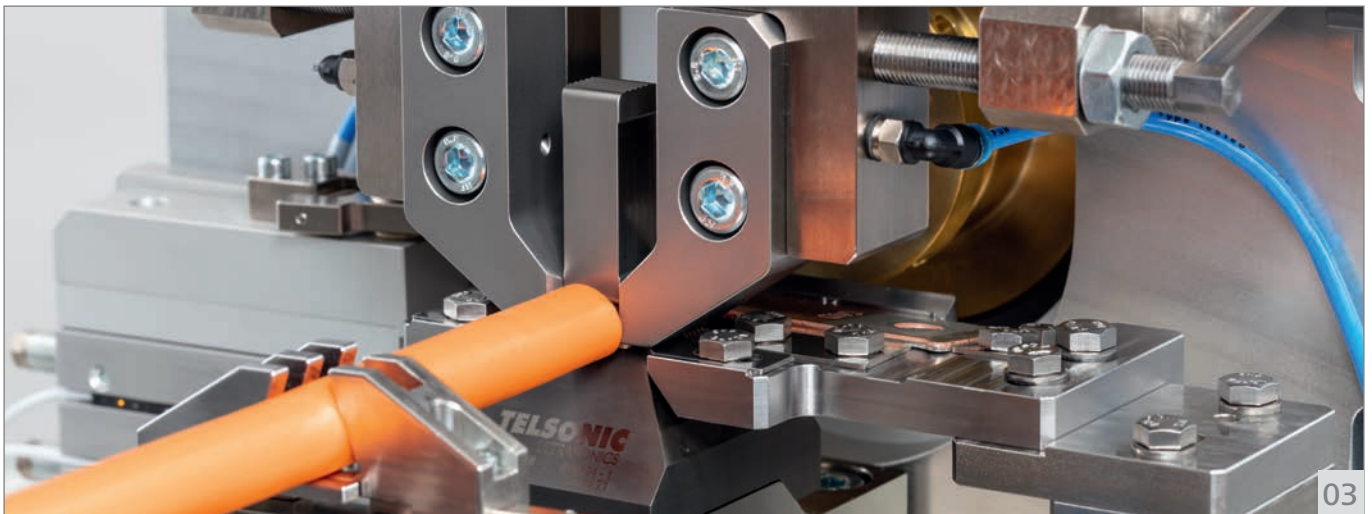
Bronschhofen (CH), 01/2023

Ride comfort and safety are important issues in the development of new motor vehicles. Many sensors and actuators contribute to this. In the new Ferrari Purosangue (Fig. 1), for example, which will be launched in 2023, small linear motors are fitted to each wheel suspension. They can be used to raise or lower the frame of the racing car and to regulate the stiffness when cornering. The linear motors from Swiss drive specialist Maxon Motors are controlled via small inverters whose electronic core is fitted with electrical connections at Italian Ferrari supplier La Punta Srl.

Like all driver assistance systems or electrical vehicle components, the inverters of the motors in the wheel suspension only function reliably if they are correctly connected to the control and regulating units. This means that all cable connections must be robust and resistant to tension in mobile use. Ultrasonic welding was therefore the only possible joining technology for the automotive cable manufacturer. The high-strength metallic connection is not subject to aging or fatigue, the firm bond ensures very low contact resistance, can withstand high tensile loads, and no additives are required. In addition, there are short process times and low thermal

- 01 Ferrari Purosangue (Source: Ferrari Auto)
- 02 Ultrasonically welded wire terminal connections of a servomotor, for the Ferrari Purosangue wheel suspension





stress on the joining partners. The material properties do not change as a result of the welding process and adjacent materials, e.g. insulation, remain intact. In addition, continuous process control can be easily implemented and the ultrasonic systems are designed to prevent expensive rejects in advance.

### Reliable contacting

When production of the Purosangue starts, La Punta will weld around 80,000 to 100,000 contacts a year using a Telsonic ultrasonic system. Each inverter has five connections: Three copper cables for the motor phases and two for the power supply are attached to small, rectangular copper terminals (Fig. 2). The same ultrasonic tool can be used for the different cable diameters of 8 mm<sup>2</sup> for the phases and 10 mm<sup>2</sup> for the current. The integrated wire stopper ensures a correct insertion position.

The MPX metal welding system (Fig. 3) has already proven itself in many similar applications for cable assembly. The variant used at La Punta is installed in a Plexiglas housing. It operates with a pressing pressure of up to 5000 N and a stroke between 1 and 50 mm. The welding space is illuminated and the generator provides a frequency of 20 kHz. Touchscreen operation is convenient and can also be done with gloves. The on-site commissioning went smoothly and Telsonic was once again able to impress with expert advice, training and good support.

by Jochen Branscheid, Sales Manager for Italy and Spain, TELSONIC AG, and Ellen-Christine Reiff, Redaktionsbüro Stutensee



03 Welding space of the MPX TC metal welding press

04 Jochen Branscheid, Sales Manager Italy and Spain