TELSONIC
ULTRASONICS

Ultrasound instead of heat: How PowerWheel® supports connection technology in electric mobility

PLASTIC WELDING | METAL WELDING | CUTTING | CLEANING | SIEVING

01 Click to watch the video.
PowerWheel® – Ultrasonic welding for high-performance e-mobility applications: Limited space. High currents. Zero tolerance for failures.

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In electromobility, the quality of the electrical connection determines range, safety and durability. Robust, material-friendly and process-reliable joining methods are particularly important for cell connectors, high-voltage cables and conductor rails. One technology that is becoming increasingly popular is torsional ultrasonic welding with PowerWheel® from Telsonic.

Torsional ultrasonic vibration – explained in a nutshell

Unlike conventional linear ultrasonic welding, PowerWheel® uses a torsional movement around the longitudinal axis of the sonotrode. This rocking motion concentrates the amplitude in the centre of the welding zone and enables uniform energy input.
This reduces the risk of strand damage and protects adjacent components – particularly important in confined installation spaces or with sensitive electronics. The vertical feed also simplifies integration into automated production lines.

Why use PowerWheel® in high-voltage manufacturing?

PowerWheel® demonstrates its advantages in typical EV applications such as cable lugs, cell connectors and busbars:

- High process stability and repeatability, even with changing cross-sections
- Material protection through reduced heat input
- Compact installation space requirements, e.g. for 3D contacts or HV connectors
- Welding time less than 2 seconds depending on the application (e.g. 1.6 s for 120 mm² cables)

Note: Information on strength advantages may vary depending on geometry and material and must be verified individually.

Intelligent digitisation with Telso®Assist

Optional extension for process reliability and traceability

With the modular Telso®Assist platform, Telsonic offers a digital addition that further enhances PowerWheel®-based systems.

Features at a glance:

- **Real-time monitoring** of force, displacement, amplitude
- **Guided operating processes** with checklists and visualisations
- **Digital identities** for all components and tools
- **Data connection to MES systems** via OPC UA
- **Self-check and maintenance wizards** to prevent downtime

Telso®Assist is designed as an optional software and diagnostic system and is used in particular for integrative customer solutions.

Modular and practical – Telso®Terminal TT7

The TT7 machine platform is optimised for medium to large cross-sections. Typical applications range from 25 mm² to 150 mm², realised with powerful generators up to 14.4 kW. Tool changes can be completed in minutes. Options such as particle extraction, liquid cooling, damping or automatic cable positioning increase efficiency and system availability.

Application examples

Typical PowerWheel® connections in the automotive sector:

- HV cable lugs 70–160 mm²
- Al/Cu cell connectors
- Aluminium busbars on nickel-plated contacts
- 3D terminals on class 5 HV cables

Conclusion

PowerWheel® is a convincing, future-oriented technology for EV connections with high process reliability, reduced installation space requirements and efficient implementation in specialist article design V2 series production. In combination with Telso®Assist, the result is a complete system that sets new standards both technically and economically – modular, digital and industry-oriented.

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02 Click to watch the video. Video sequence and link to TT7 product page.