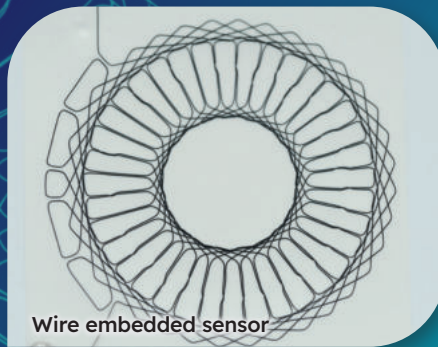


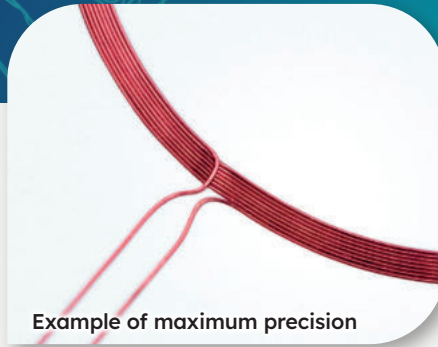
Scalable Wire Embedding Solutions



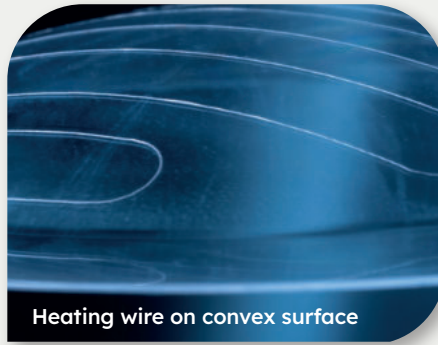
Wire embedded sensor

From Design to Production: Our scalable WCE Solutions

Our Wire Coil Embedding (WCE) technology is built on standardized, modular systems—ensuring a smooth transition from design to full-scale production.



Example of maximum precision



Heating wire on convex surface



Heating wire on textile surface

WCE150 / WCE700 – 2D Wire Embedding

- scalable from lab-scale to full production
- multihead configurations available for enhanced efficiency

WCEvario3D – 3D Wire Embedding

- powered by a 6-axis robot for maximum flexibility
- modular, adaptable systems – scalable from single machines to complete production lines



Lasering



Pick & Place



Wire Embedding



Soldering



TC-Bonding



Cutting



Resistance Measuring



AOI

MackSmaTec®
MACHINES THAT THINK AHEAD.

MACK
GROUP



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Automotive Solutions & Use Cases

**Battery
Management**

**Circuit
Embedding**

**Heating &
Sensing**

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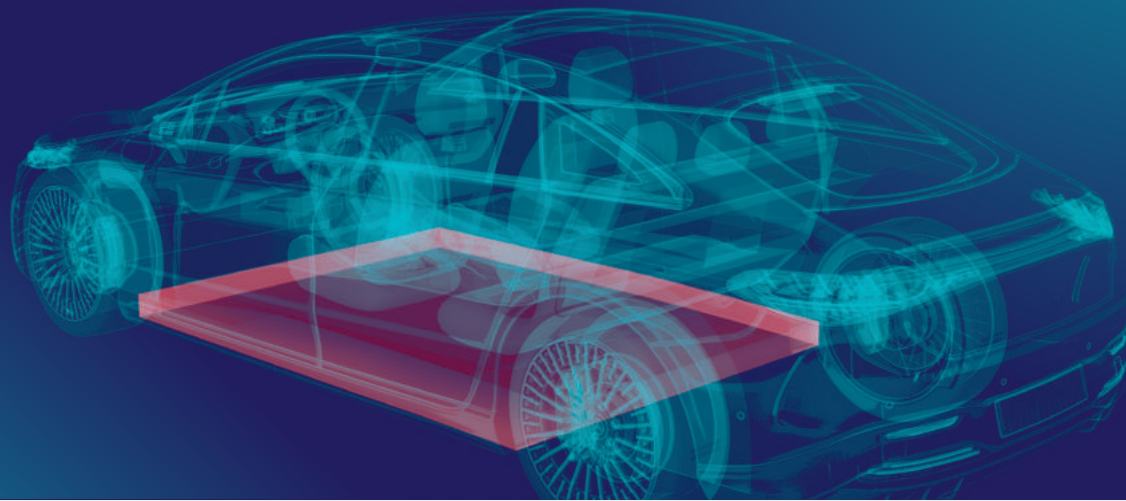
More information
about MackSmaTec
Wire Embedding
Technologies



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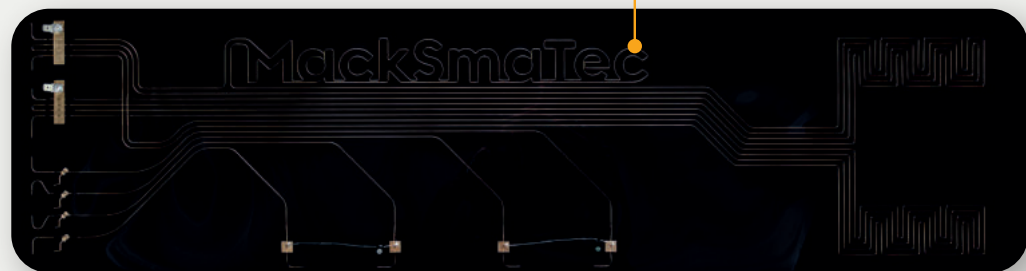
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Circuit Embedding & Battery Management



Flexible, foil based circuits as thinnest solution for electronics, networks and battery management

Sustainable processing paired with high performance: wire embedding technology is a premium solution for electronic networks, power supplies for applications and for battery management packages.



With our WCE 2D NC controlled wire embedding systems, we apply heating wires to foils and substrates to enable free designable circuits.

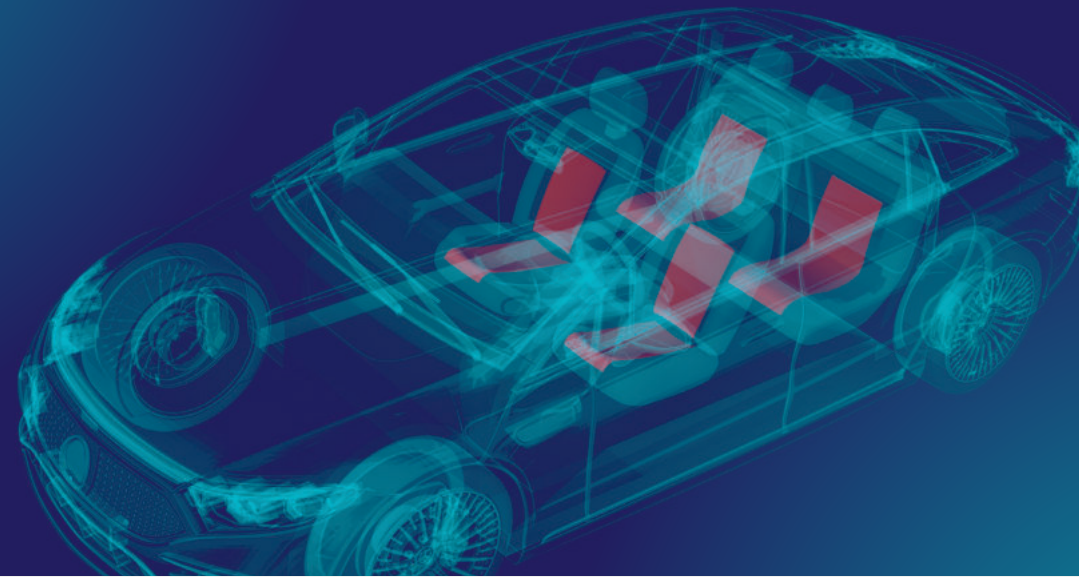
Process advantages

- Excellent accuracy in wire positioning
- Seamless wire routing design
- Individual parameter settings taking into account the component and material mix within the circuit board

Production advantages

- Fastest possible changeover
- Additional elements and process steps possible
- Scalable, flexible, sustainable

Interior Heating & Sensing

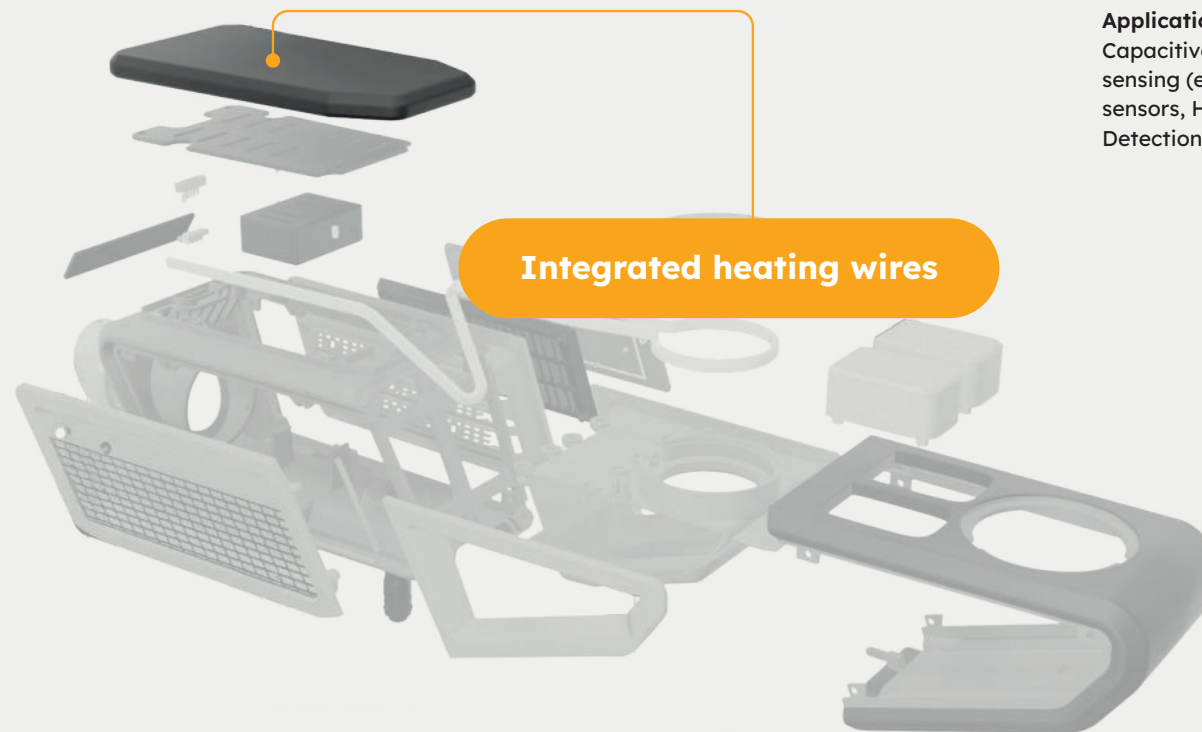


Heating wire technology for noticeable driving comfort

Our machines enable heating wires to be integrated invisibly and precisely into interior components. This results in intelligent solutions that combine comfort, design freedom, and energy efficiency.



Application example: smart center console

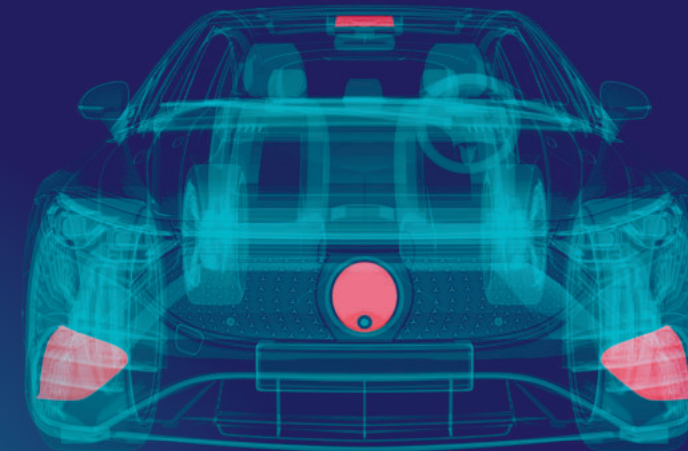


Integrated heating wires

- + **Multi-material compatibility**
works with a range of surfaces
- + **2D & 3D Integration**
tailored to diverse product designs
- + **Scalable production**
from prototypes to mass manufacturing

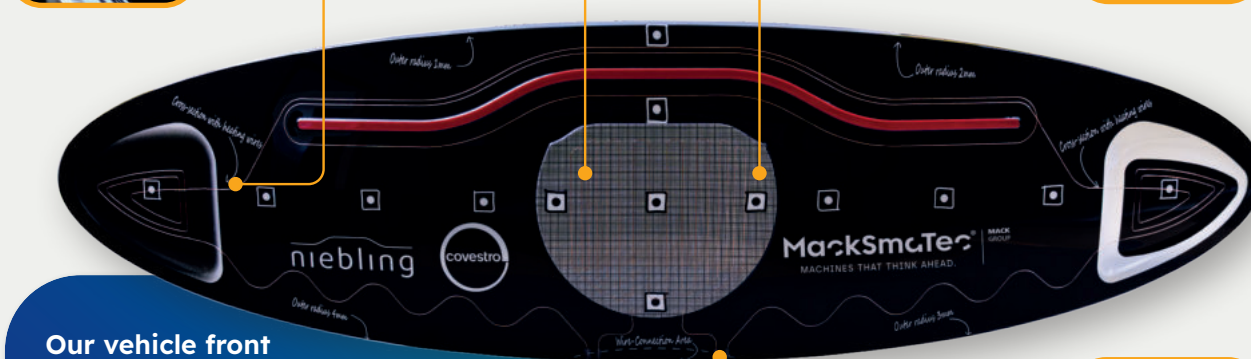
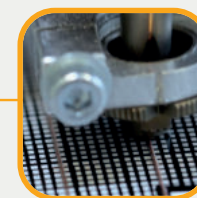
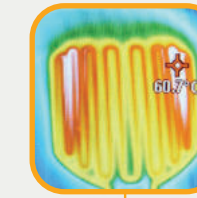
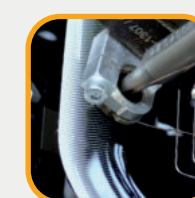
Applications include:
Capacitive & conductive sensing (e.g. touch sensors, Hands-On Detection - HOD)

Exterior Heating & Sensing



Reliable Sensor Performance with Anti-Icing & De-Icing

Using ultra-thin, wire-embedded heating structures integrated into foils or injection-molded components, sensors can be quickly and efficiently cleared of ice and snow, ensuring uninterrupted functionality.



Our vehicle front demonstrator shows the wire laying options available with our machine solutions:

- Wire embedding on concave and convex surfaces
- Heating of vehicle sensors using heating wire
- Precise wire laying in all geometric shapes
- Wire laying over edges using 6-axis robots



Our Demonstrator highlights our expertise in precision, reliability and system competence. It is more than just a sample – it's a gateway to innovative wire embedding applications.

Dimensions:

Length: 805mm Width: 205 mm Height: 145mm