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ROBOTICS

Ultrasonic Spot Welding Quality Inspection
A complete functional module solution

ABB offers a complete robotic solution based on ultrasound, for quality inspection of spot welds. The Ultrasonic Spot Welding Quality Inspection is a functional module ready-to-use: an integrated solution optimized for a fast and accurate inspection.

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01 Ultrasonic
Spot Welding
Quality Inspection
functional module

Automotive is a highly demanding field with a focus on quality, production reliability and high process speed. Current vehicles frames consist of thousands of spot welds and quality is ensured by manual inspection. Manual inspection is labor intensive and creates long measuring times.

ABB has listened to your needs and developed a spot welding quality inspection functional module.

The system is an automated "inspector of quality", meaning that the objective of the functional module to inspect the quality of the spots welds. In short, the system is able to identify and notify any suspicious spot welds. This gives you control of the spot welds quality.

Machine learning capabilities are used in the analysis of spatter and weld position. The data captured allows you to see trends of the weld spot positions and the presence of spatter. Good for analyzing your production processes.

A fast, accurate and reliable robotic solution based on ultrasonic technology, which has already been proven in production.

ABB Ultrasonic Spot Welding Quality Inspection functional module is a reliable solution that allows for high sampling, costs reduction and results you can rely on. A solution that will make a difference in your production process.

All functional module components have been integrated to achieve a high performing solution.

Key features and benefits
• Easy-to-use and fast start up with programming setup wizard.
• Web-based data visualization/storage.
• Allows analysis of historical data and to see trends like spot welds position and quality.
• Higher inspection rate.
• High accessibility on testing workpieces.
• Proven correlation with current test methods.
• Automated notification of suspicious (out of spec.) spot welds.
• Simulation models available.
• Reduction of manual work.
• Single supplier that guarantees functionality.

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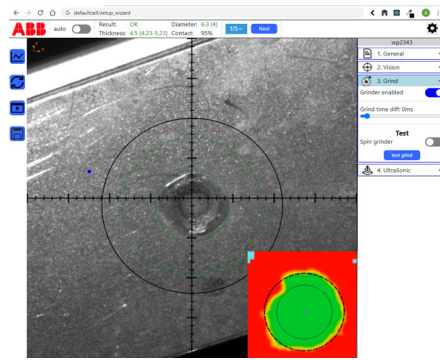
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02

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01 Measurement tool

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02 Programming
setup Wizard

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Technical data

Basic data (Typical)

Cycle time to inspect*	3-6 sec
Repositioning capability to relocated weld spot	> 5 mm
Grinder exchange (20 sec to exchange)	> 5k grinds
Water refill (10-liter barrel)	200k spots
Membrane adjust (TCP check notify when)	≈ 6k meas.
Membrane water re-fill	per / 2-4 adj
Membrane exchange	≈ 12k meas.
Auto TCP check (as often as possible)	per / < 3 hrs
Programming time per spot (ABB wizard) **	1-5 min

*Depending on spot weld quality and according to lab tests

**Depending on the difficulty of the weld (typical approx. 2 min)

Hardware components
• Ultrasonic measurement device with probe.
• ABB Robot including controller.
• Computer for application software.
• Measurement tool including all needed equipment:
  - Machine vision camera.
  - Grinder for spatter removal.
  - Coupling dispense system.
  - Pneumatic force equalizing.
  - System for self-inspection.
• Laptop for visualization (provided by customer or optional).***

***Laptop requires an operating system with internet browser

Vision and self-inspection system
A vision system for detection of visual deviations is incorporated, as well as a tool inspection device to ensure optimum tool functionality. The system collects information such as spot weld position, presence of spatter and distance to spot weld, which allows future analysis of spot weld positions and spatter detection.

Software
ABB Ultrasonic Spot Welding Quality Inspection functional module incorporates an impressive data processing software coupled with machine learning capabilities that will detect and report suspicious spot welds, as well as, provides access to historical data through statistics.
The system supports correct measurements and diagnoses. Data is stored in a database allowing for a comprehensive spot weld data analysis and visualization. Online/offline access can be achieved at anytime from anywhere through a web-based app.

Software components
• Software for all the specific functional features.
• Setup Wizard, web-based, for interactive programming and parameter setting.
• UltraReporter app, web-based, for visualization, reporting and statistics.

Software key features
• Process monitoring.
• Statistics.
• Ai based vision and ultrasonic spot localization.
• Ai based spatter detection.
• Spray and blow fluid function.
• Tool force equalizing.
• Perspective transformation of camera.

Programming setup Wizard
An easy-to-use configuration interface allows for an effortless start to the inspection process without programming knowledge or previous experience. The setup wizard will allow you to program and adjust the correct parameters of each spot weld in a simple and fast way.

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