



MARCH 2022

ABB Ultrasonic spot welding quality inspection

Robotic spot welding quality inspection solution based on ultrasonic technology

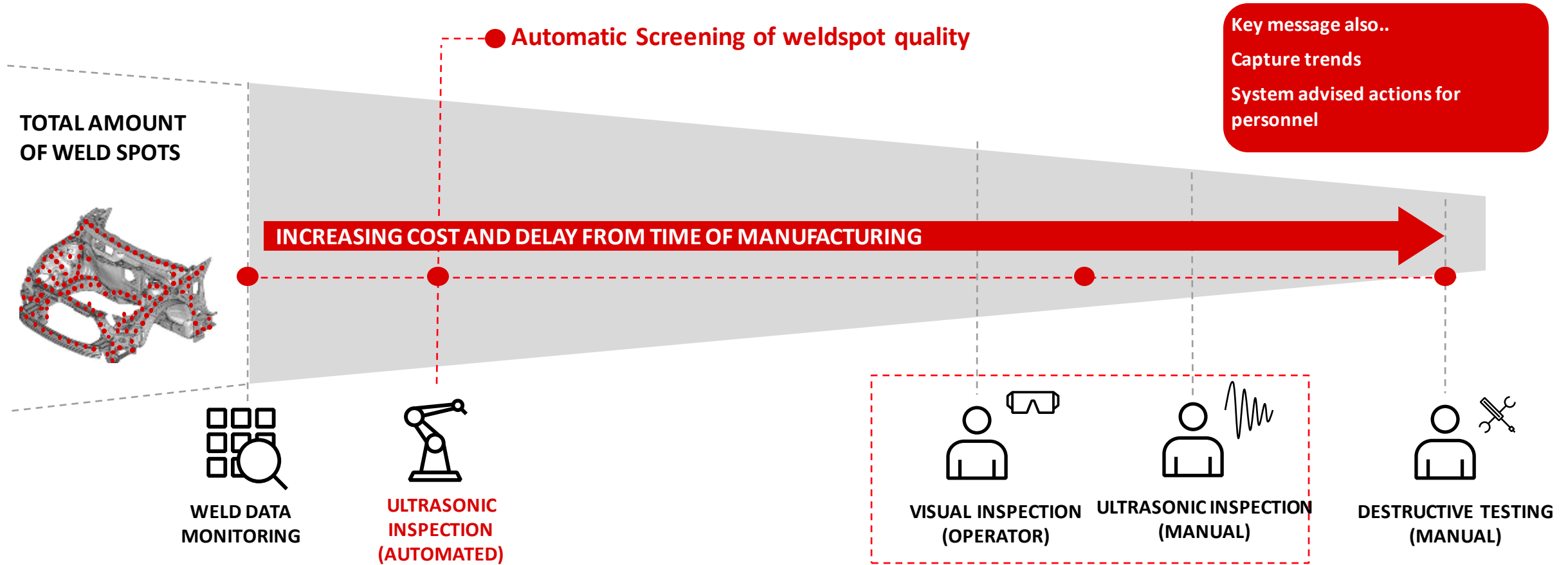
ABB Robotics, Body-in-White Global Solution Center



Introduction

Reducing the amount of manual testing

Effective and efficient screening of weld spots



Ultrasonic spot welding quality inspection

A solution for automotive industry demands

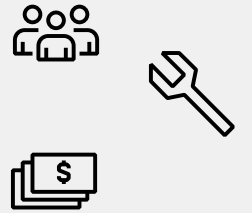
Manual Testing



ABB Ultrasonic spot welding quality inspection



- Low sampling
- Time and resource intensive
- Long response time
- Low repeatability
- No systematic traceability of the workpiece quality



- Reliable process
- Cost reduction
- Fast response time
- Repeatability
- Data analysis

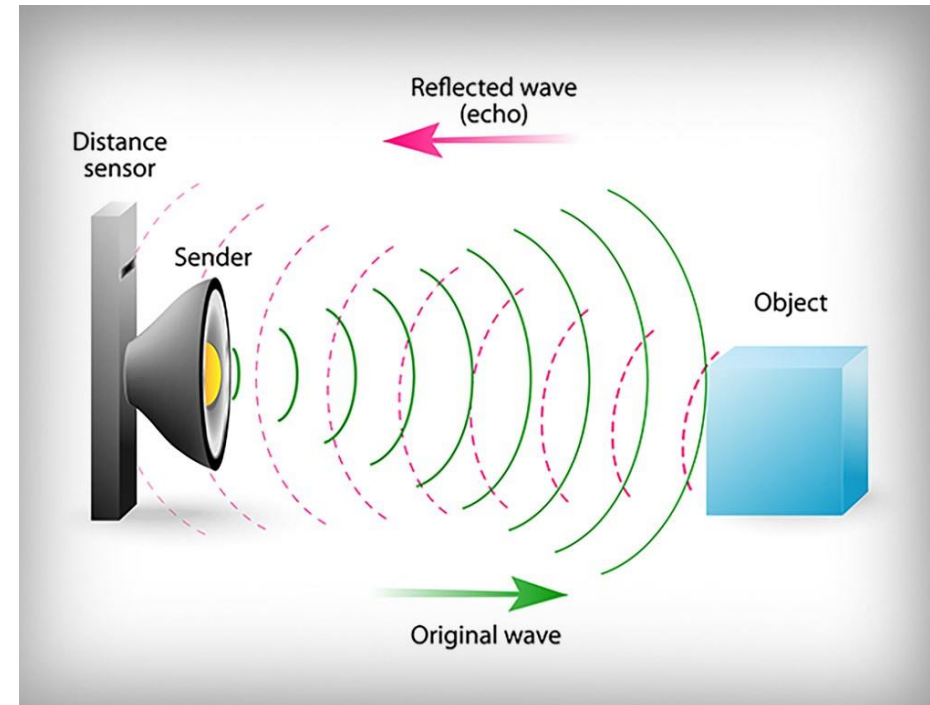
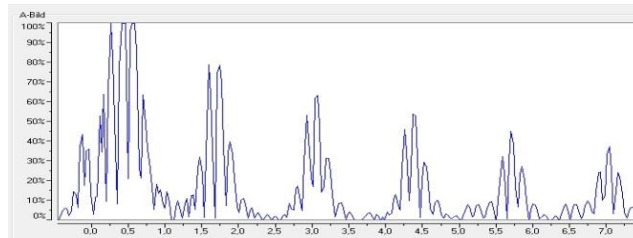


Automated Ultrasonic Inspection of weld spots

Ultrasound technology basics

Automated robot-guided ultrasonic testing:

- Same quality of results as with manual testing
- Additional benefits of automation:
 - Cycle time
 - Accuracy
 - Efficiency
 - Reproducibility



Automation does not influence the physical principles of ultrasound

— Ultrasonic spot welding quality inspection

Ultrasonic spot welding quality inspection

Video



Ultrasonic spot welding quality inspection

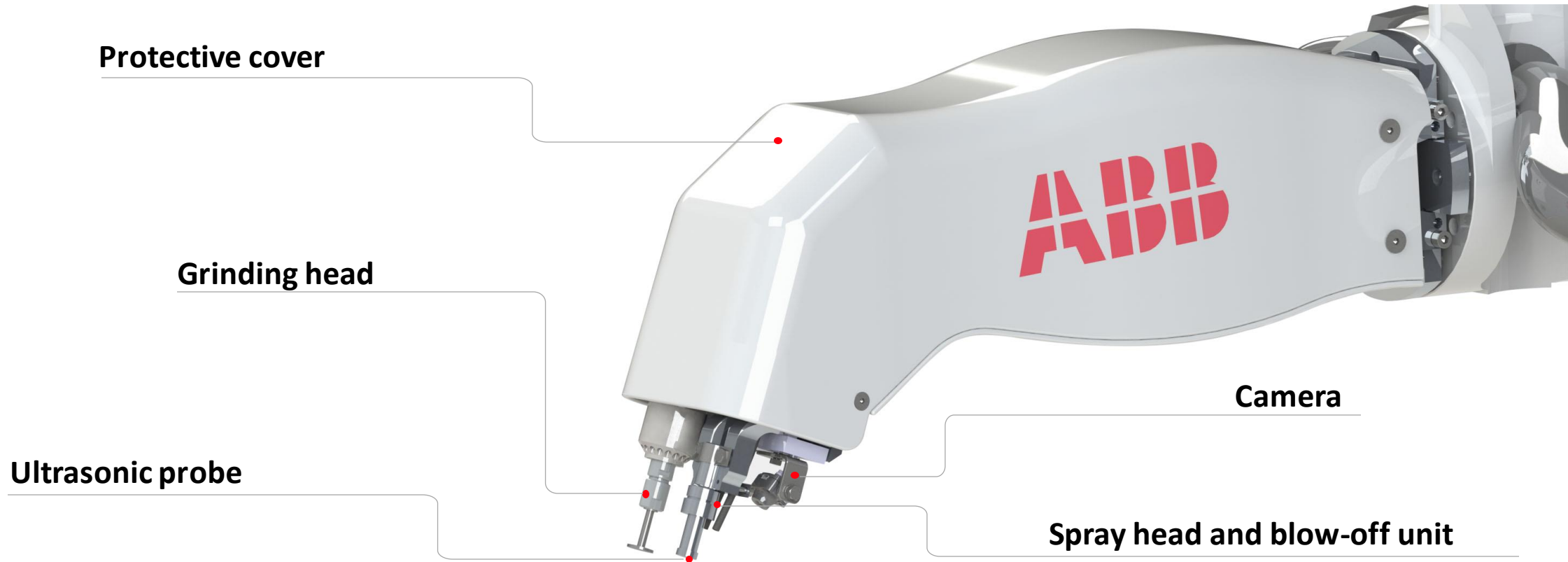
Complete Functional Module ready-to-use

- Complete robotic solution based on ultrasonic technology, for quality inspection of spot welds
- A ready-to-use integrated solution that includes all the components and functionalities required for a fast and accurate inspection:
 - Hardware and Software (Equipment/ Dresspack/ Controller)
 - PHAsisBLU* (from VOGT) ready to go ultrasonic instrument for spot weld and short stick weld inspection, real phased array ultrasonic technology, for quality inspection of spot welds
 - Complete Programming-Wizard for easy and simplified programming and system tuning
 - ABB UltraReporter for reliable data and quality assurance



A complete solution for fast and accurate spot welding quality inspection

Ultrasonic spot welding quality inspection



Ultrasonic spot welding quality inspection

One combined tool – fully integrated solution

Functionality

- Recognition of weld spot position
- Automatic removal of weld spatter
- Automatic ultrasonic weld spot inspection



Design

- Compact
- Few disturbed contours
- Collision protection housing

Specification

- Typical cycle time to inspect*: **3-6 sec**
- High accessibility of the welding points

PHAsisBLU* (VOGT equipment)

Ultrasonic measurement device with probe

- PHAsisBLU*, ready to go ultrasonic instrument for spot weld and short stick weld inspection, real phased array ultrasonic technology, for quality inspection of spot welds
- An instrument built for Ultrasonics applications with robotics as an integrated solution with best technical data:
 - 16/128 Ultrasonic PHASED ARRAY Hardware (16 parallel channels and up to 128 multiplex channels)
 - PHAsis* Spotweld and short stick welds software with inspection plans and a robot interface for bidirectional communication
 - Highest frequency of up to 20 MHz supports spot weld and short stick weld testing
 - Fast pulse repetition rate of 20.000 Hz for effective cycle times

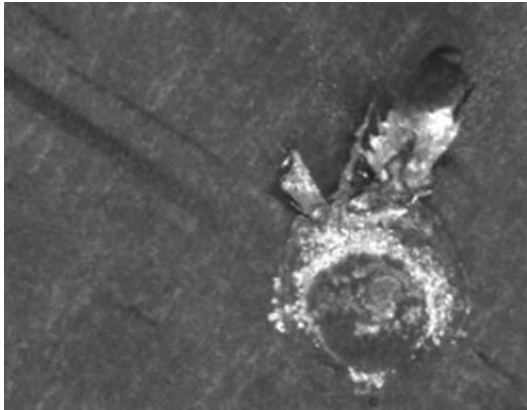


Ultrasonic spot welding quality inspection

Functionality and process flow



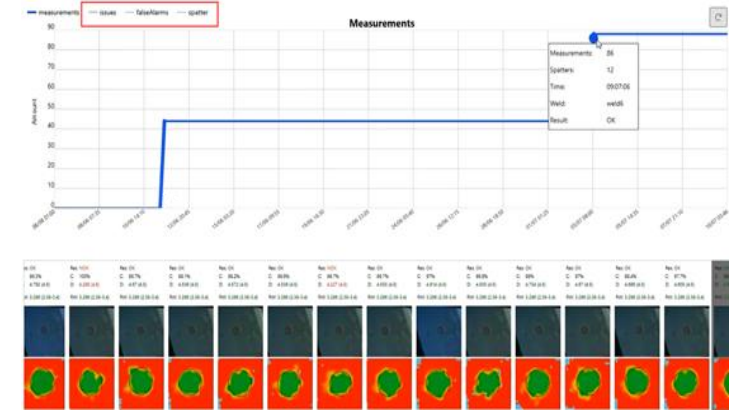
Recognition of spot weld position



Automatic removal of weld spatter



Ultrasonic weld spot measurement



Capture and visualization of the result

Automated ultrasonic inspection of weld spots

From component to system integration – Modular standard solutions

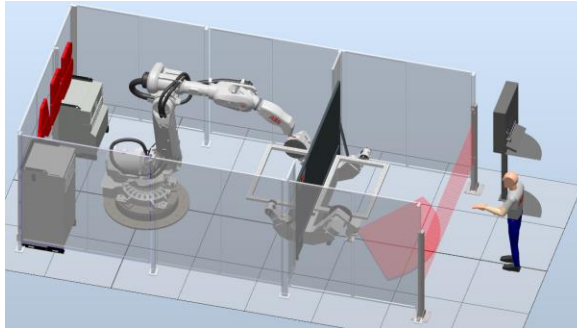
SpotInspect Functional Module



Complete Functional Module Ready-to-Use

- Hardware and Software (Equipment/ Dresspack/ Controller)
- Complete Programming-Wizard for easy and simplified programming and system tuning
- Reliable data and quality assurance

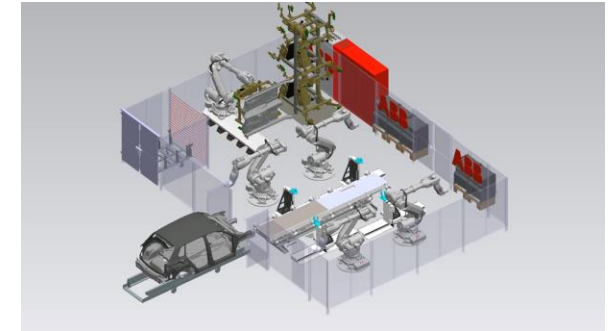
Modular Standard System



Application Cells Easy-to-integrate

- Standardized cell concepts “ready-to-use”
- Capacities up to 8.000 WSPs per day
- Considerable cost saving potential through reduction of manual inspection workstations

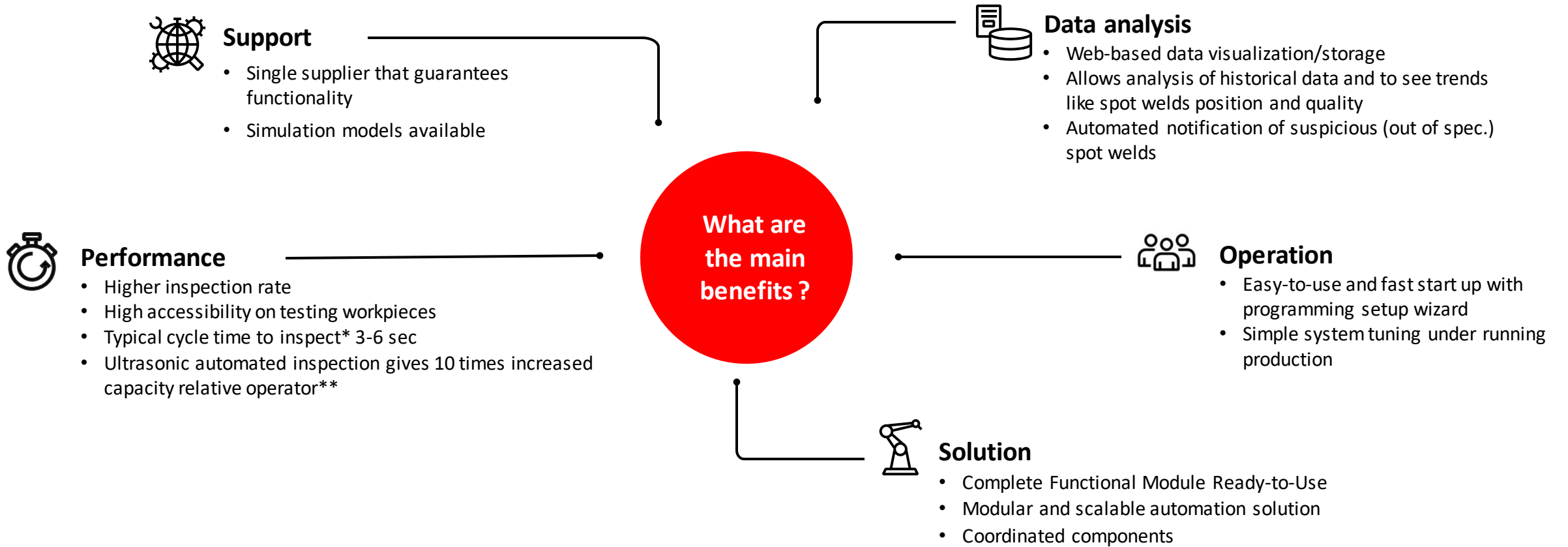
Smart Solutions



Smart system solutions for high volumes

- Modular and scalable automation solution based on ABB products
- Capacities from 8.000 up to 22.000 WSPs per day
- Considerable cost saving potential through reduction of manual inspection workstations

Benefits in all areas



Increase in productivity, scalability and flexibility

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Customer value proposition



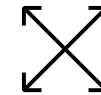
Worker requirements

-85% Reduction of the labor-intensive testing activities



High efficiency*

Automated inspection gives 10 times increased capacity relative operator



Reproducibility

100% Reproducible measurement results through process automation



Industry 4.0 pioneer

100% Data provision for further optimizations / analyzes

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