



Process Inspection Technologies for Arc and Laser Processes

In-Process & Post-Process Capabilities



Process Inspection Technologies for Arc and Laser Processes

Panelists



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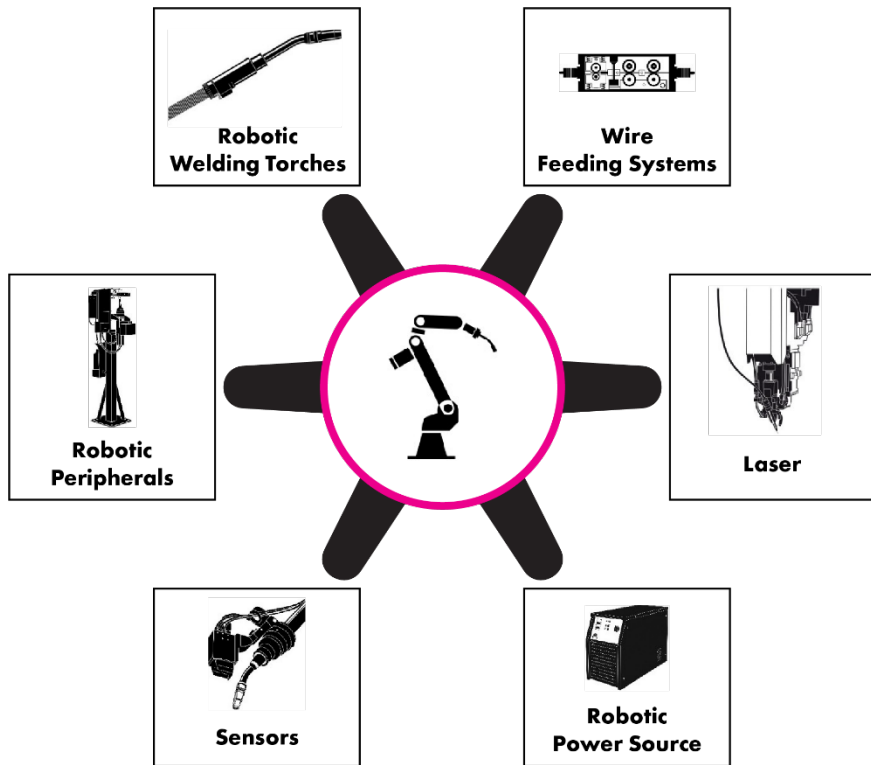
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Process Inspection Technologies for Arc and Laser Processes

ABICOR BINZEL – Solutions Around the Robot



Process Inspection Technologies for Arc and Laser Processes

Our Partners – Laser & Sensor Technologies

IN-PROCESS



4D

Laser Monitoring Packages

POST-PROCESS

FEATURE/WELD INSPECTION

SmartRay



SmartRay

JOSY 3D Weld Inspection

Process Inspection Technologies for Arc and Laser Processes

4D Weld Quality Monitoring – Overview



WeldWatcher® automatically acquires data to indicate typical welding failures such as gaps between sheets, lack of fusion, and porosity.

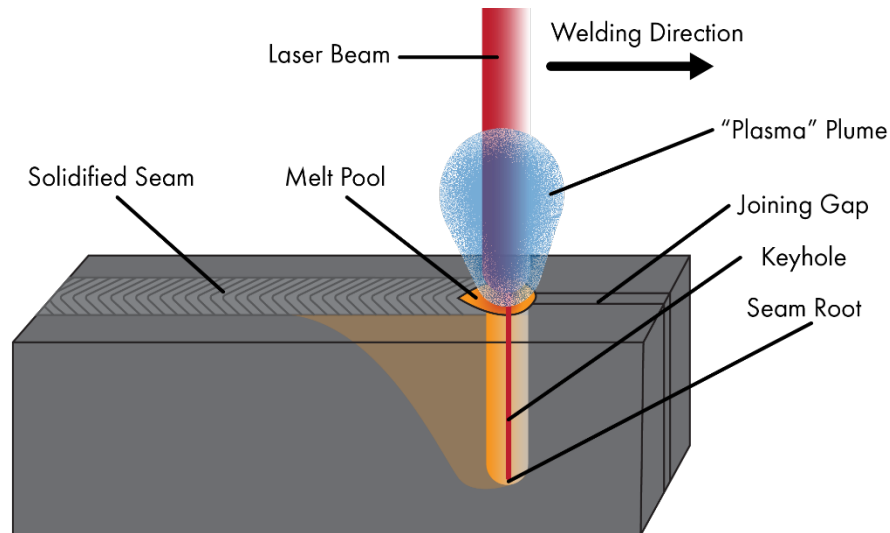
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4D Weld Quality Monitoring – Overview



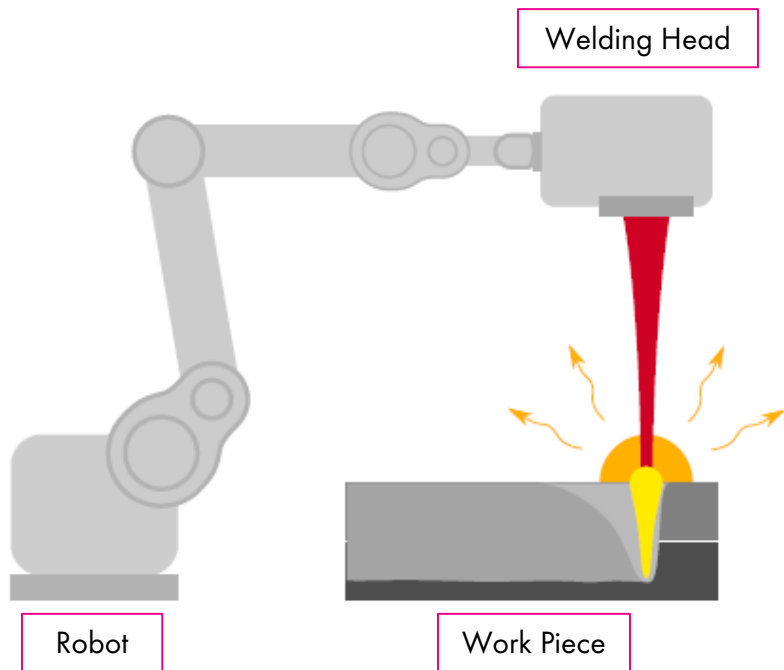
Why control a welding process by means of the WeldWatcher®?

- The laser process is adjusted and monitored by the laser controller
- The control of the laser power is not influenced regardless of whether the laser beam is coupled into the work piece or if the cover glass is contaminated
- Changes to optical parameters and components, as well as process disruptions may lead to deviations
- The WeldWatcher® evaluates the energy entered into the material



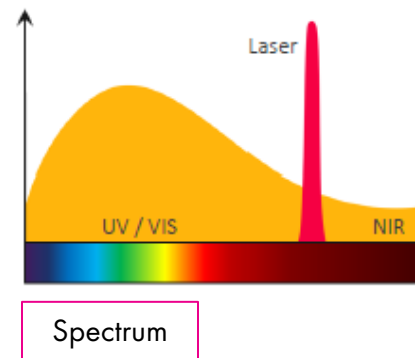
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4D Weld Quality Monitoring – Overview



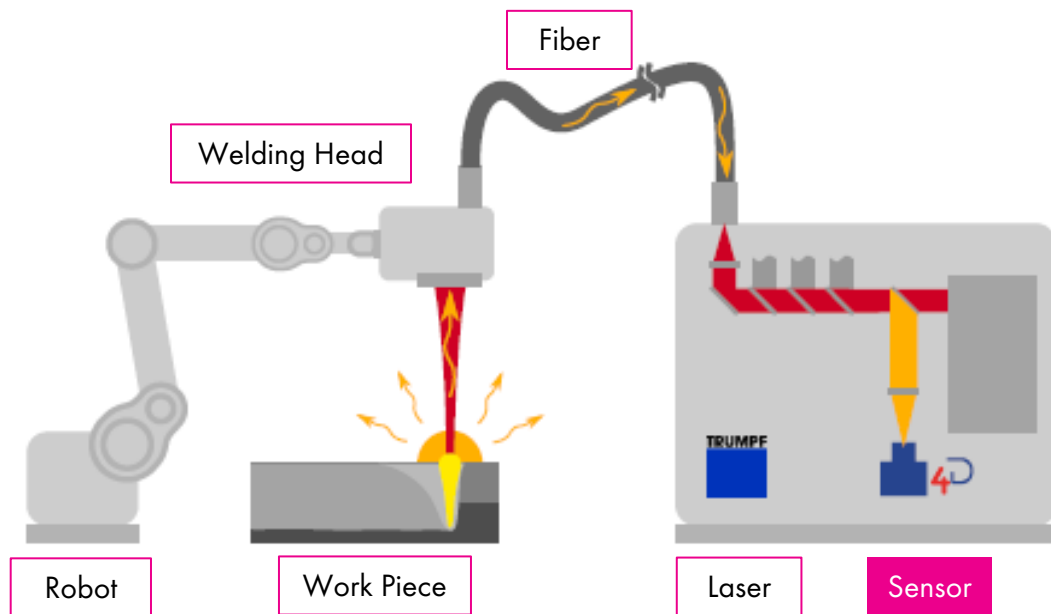
Specific spectrum during the welding process

- Process & temperature radiation
- Laser emission



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4D Weld Quality Monitoring – Overview



Integration of the sensor into the laser source via Trumpf adapter

- Installation in less than 30 min.
- Monitoring of all optical paths
- Quick trials/tests possible

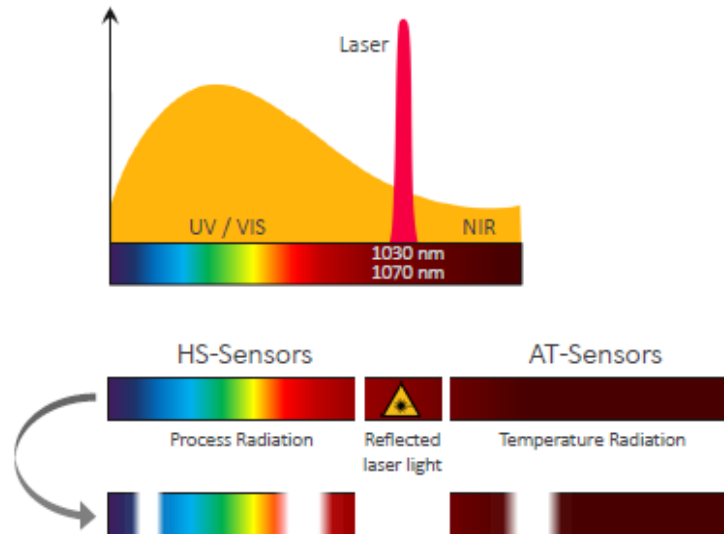
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4D Weld Quality Monitoring – Sensors



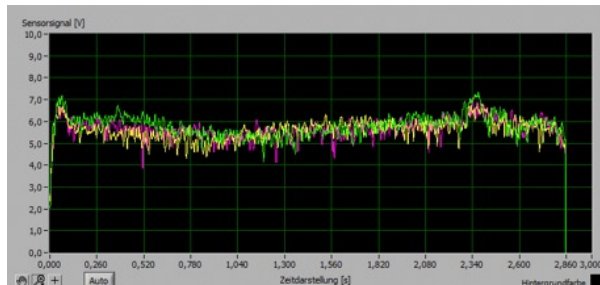
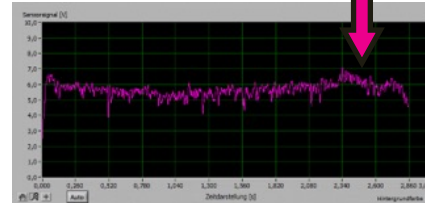
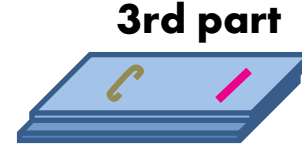
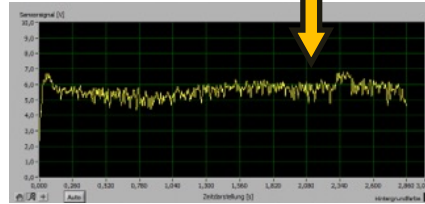
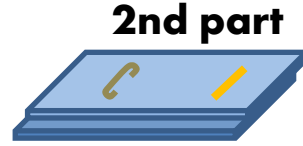
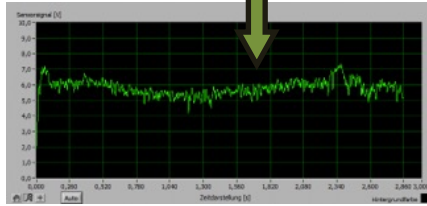
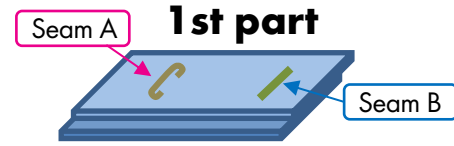
Three sensor types for all circumstances

- Three sensor types can be combined:
 - Process Radiation (HS)
 - Reflected Laser Light (BR)
 - Temperature Radiation (AT)
- Tailored spectral bandwidths depending on the individual laser/optic configuration and welding application
- Sensitivity can be controlled by software while producing



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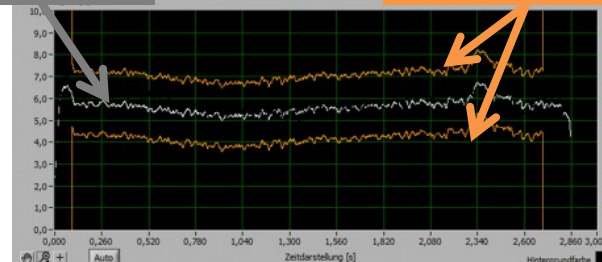
4D Weld Quality Monitoring – Creating References & Envelopes



Averaging
the signals



Automatically
created reference



Limits based on
reference signal

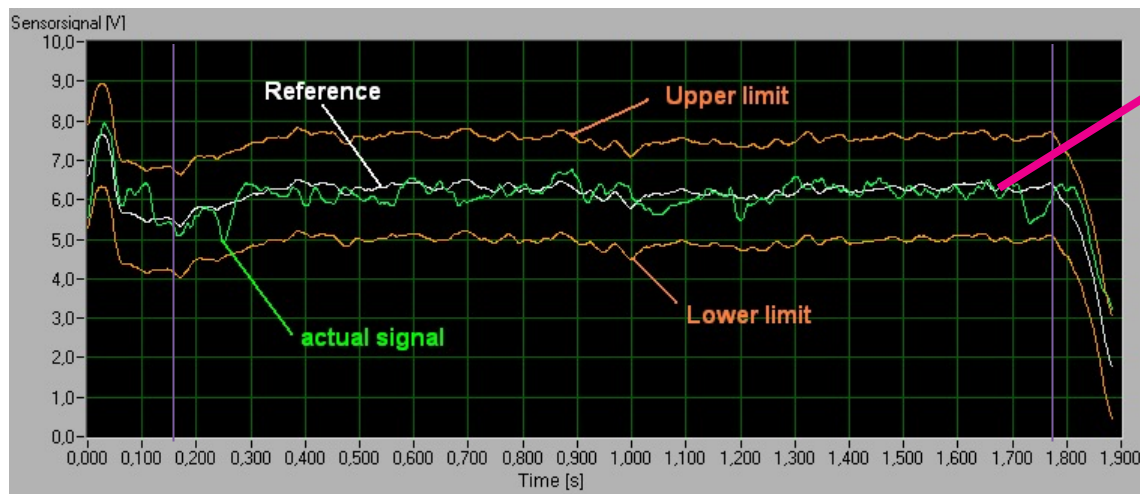


Process Inspection Technologies for Arc and Laser Processes

4D Weld Quality Monitoring – References & Envelopes



- The reference can be generated once or continually
- The envelope (upper/lower limit) can be set statically or dynamically
- References can be divided into segments to apply different algorithms on each segment



Individual intensity
sequence for each seam

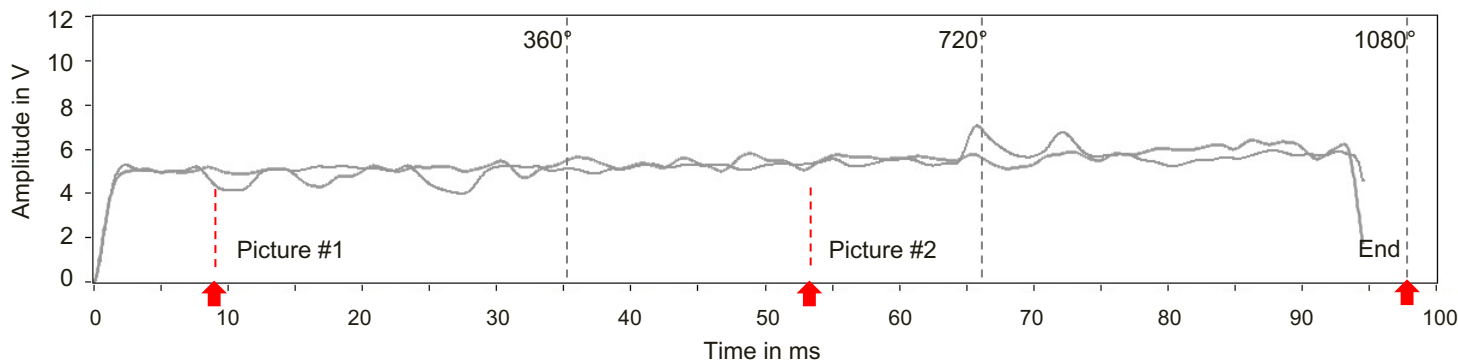
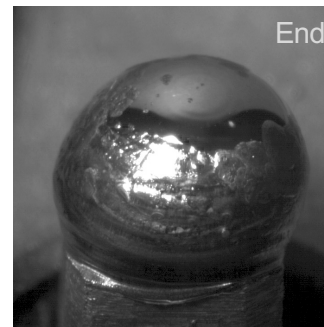
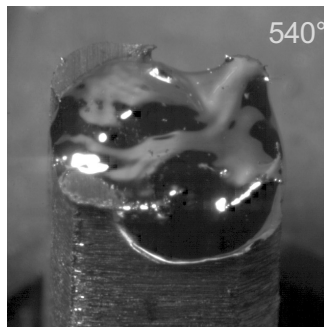
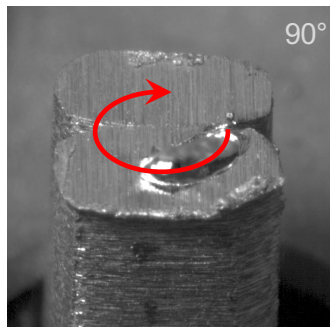
Segment 1

Segment 2

Segment 3

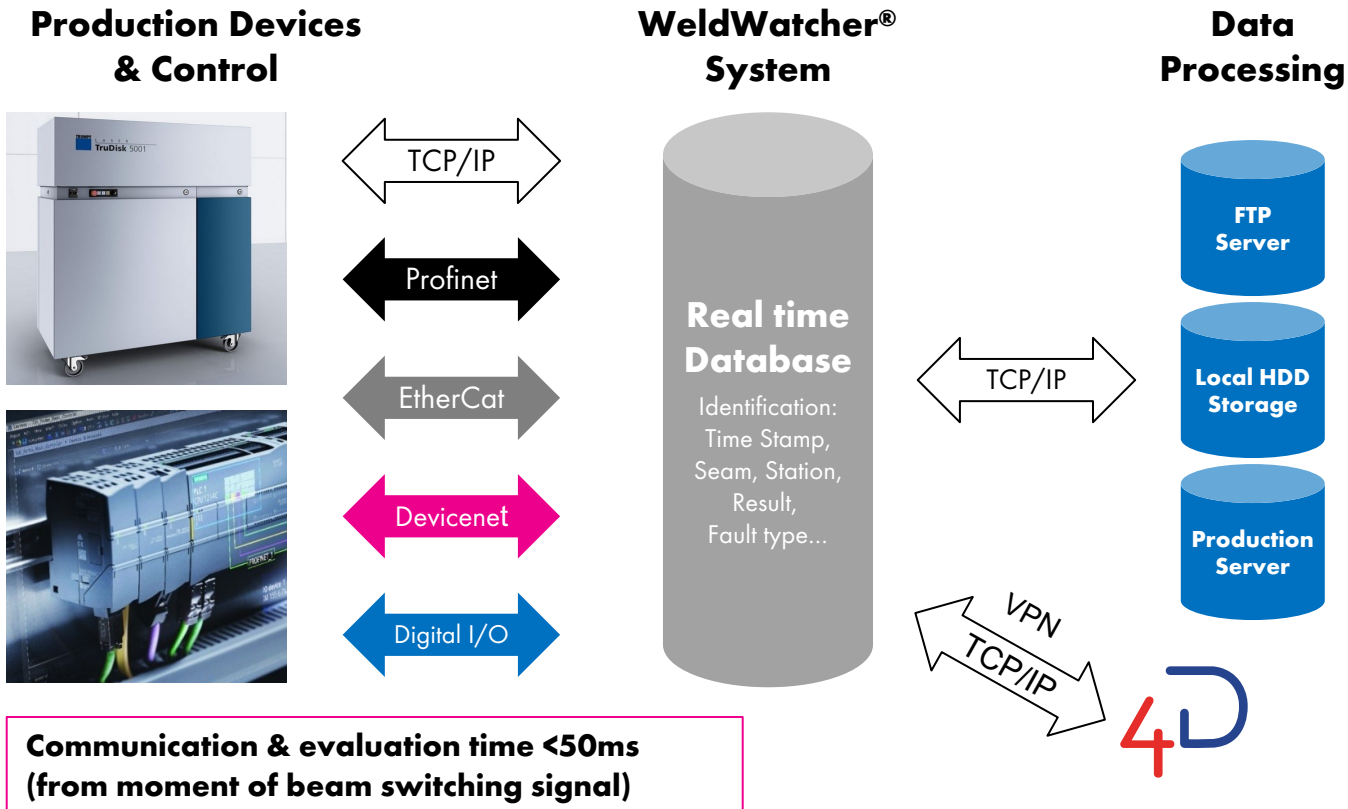
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4D Weld Quality Monitoring – Hairpin Welding References



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4D Weld Quality Monitoring – Data Storage & Analysis

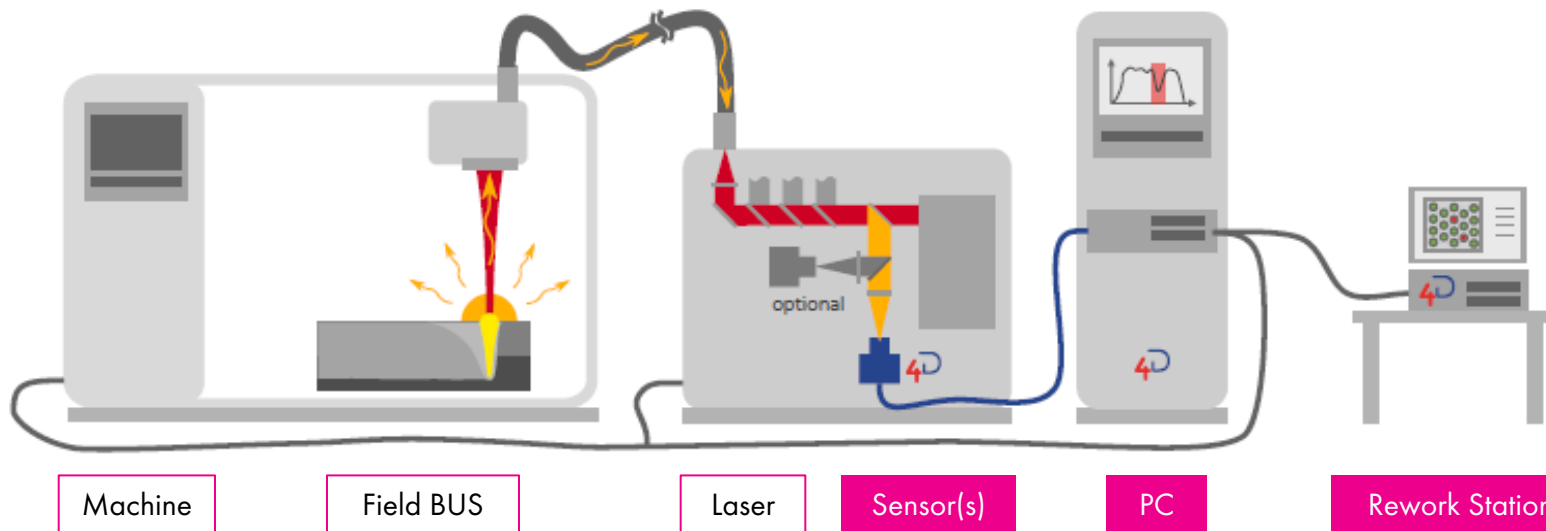


Process Inspection Technologies for Arc and Laser Processes

4D Weld Quality Monitoring – System Overview



System Overview



Process Inspection Technologies for Arc and Laser Processes



SmartRay JOSY 3D Weld Inspection – Overview



SmartRay's JOSY uses combined hardware and software packages that utilize 3D sensors with an advanced algorithmic process to quickly and reliably inspect weld dimensions for compliance and weld defects for rework.

**Find our other webinars on
3D weld inspection here:**

www.binzel-abicor.com/US/eng/media/webinars



www.binzel-abicor.com

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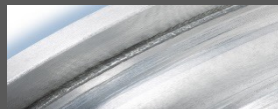


SmartRay JOSY 3D Weld Inspection – Applications

MIG/MAG



LASER
WELDING



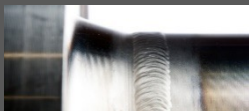
LASER
BRAZING



ELECTRONIC
BEAM
WELDING



RESISTANCE
WELDING



SPOT
WELDING



PVC SEALING



GLUE BEAD



Process Inspection Technologies for Arc and Laser Processes

SmartRay JOSY 3D Weld Inspection – Key Highlights



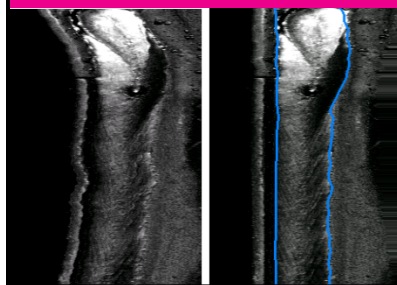
High-speed inspection

- Up to 400mm/s

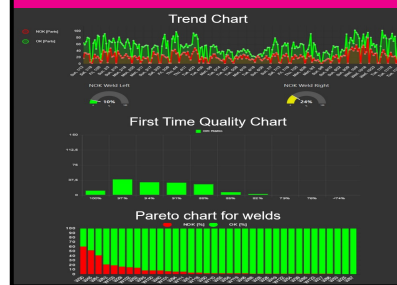


Profile-based alignment

- Vibration elimination

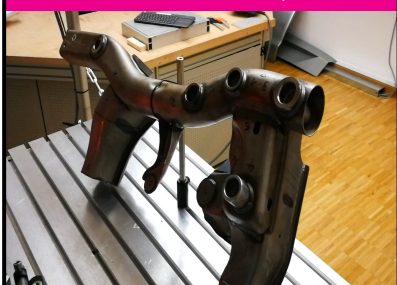


Advanced statistics and process monitoring



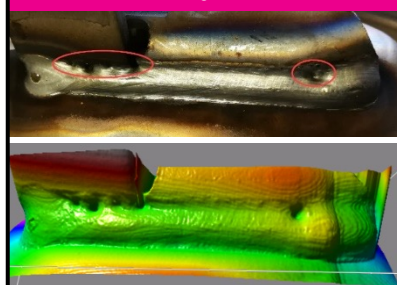
Ultra-compact sensor

- Best reachability

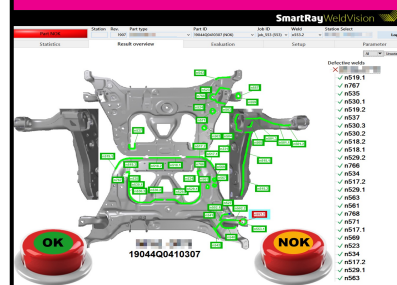


Robot track speed calibration

- Accurate length measurement



Easy to operate 1 button **rework** control

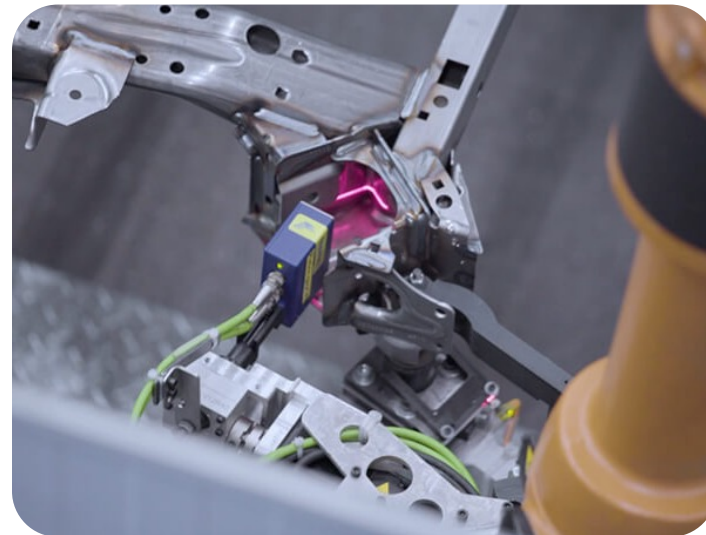


Process Inspection Technologies for Arc and Laser Processes



SmartRay JOSY 3D Weld Inspection – Benefits

- Full control of inspection process
 - 100% inspection of defects and dimensions
 - Faster inspection time
 - Reduce other additional checks (microsections)
- Reduce risks (e.g. liability issues / product recalls)
- Data acquisition / retention
- Minimize quality and rework costs
- Optimized joining processes for a fast ROI

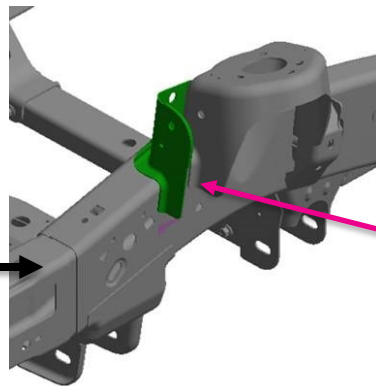
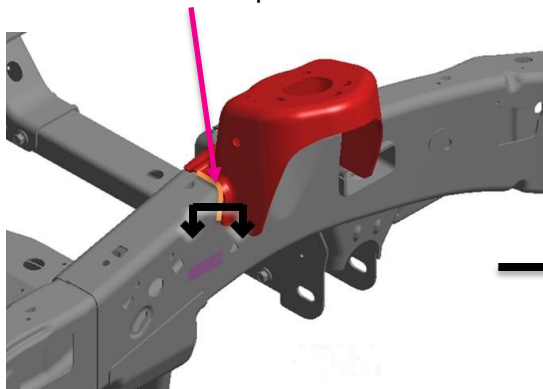


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SmartRay JOSY 3D Weld Inspection – Close-out Welds

Accessible mid-process



Closed out at End of Line

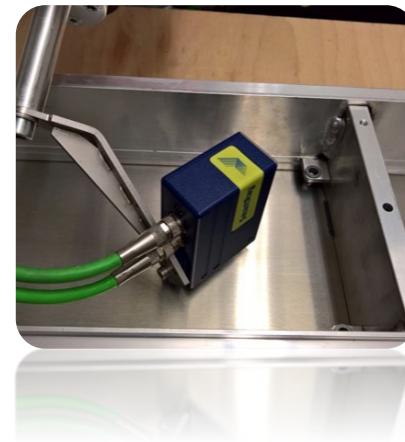
- Product design sometimes creates a need for in process inspection
- Welds can not be accessed at the End of Line inspection and repair process
- Cuts down cycle time needed for inspection
- Avoid costly rework or scrap by repairing welds before they are closed out



Process Inspection Technologies for Arc and Laser Processes



SmartRay JOSY 3D Weld Inspection – EV Battery Boxes



- Almost all Automotive OEMs are now building electric vehicles
- The need arises for 100% quality inspection
 - Laser and MIG welds are Safety Critical in these assemblies
 - Welds must be Water Tight to ensure safety and reliability
- Automated weld inspection can help guarantee quality to the customer and reduce costly recalls



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SmartRay JOSY 3D Weld Inspection – In Action



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SmartRay JOSY 3D Weld Inspection – Conclusion

- Quality spills and the labor to support is very expensive
 - Containment
 - 3rd Party inspection
- Automated weld inspection can help reduce Cut and Etch expenses
 - Reduced sections
 - Reduced frequency
- Automated weld inspection can optimize your rework system
 - Manual inspection reduced
 - Pinpoint weld defects for repair
- Automated weld inspection can reduce risk
 - Weld Quality Insurance
 - Data collection gives traceability to every assembly
 - Also makes you compliant to CQI 15
 - Warranty Claims/Recalls



Process Inspection Technologies for Arc and Laser Processes

Questions

QUESTIONS?

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Contact Info



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