

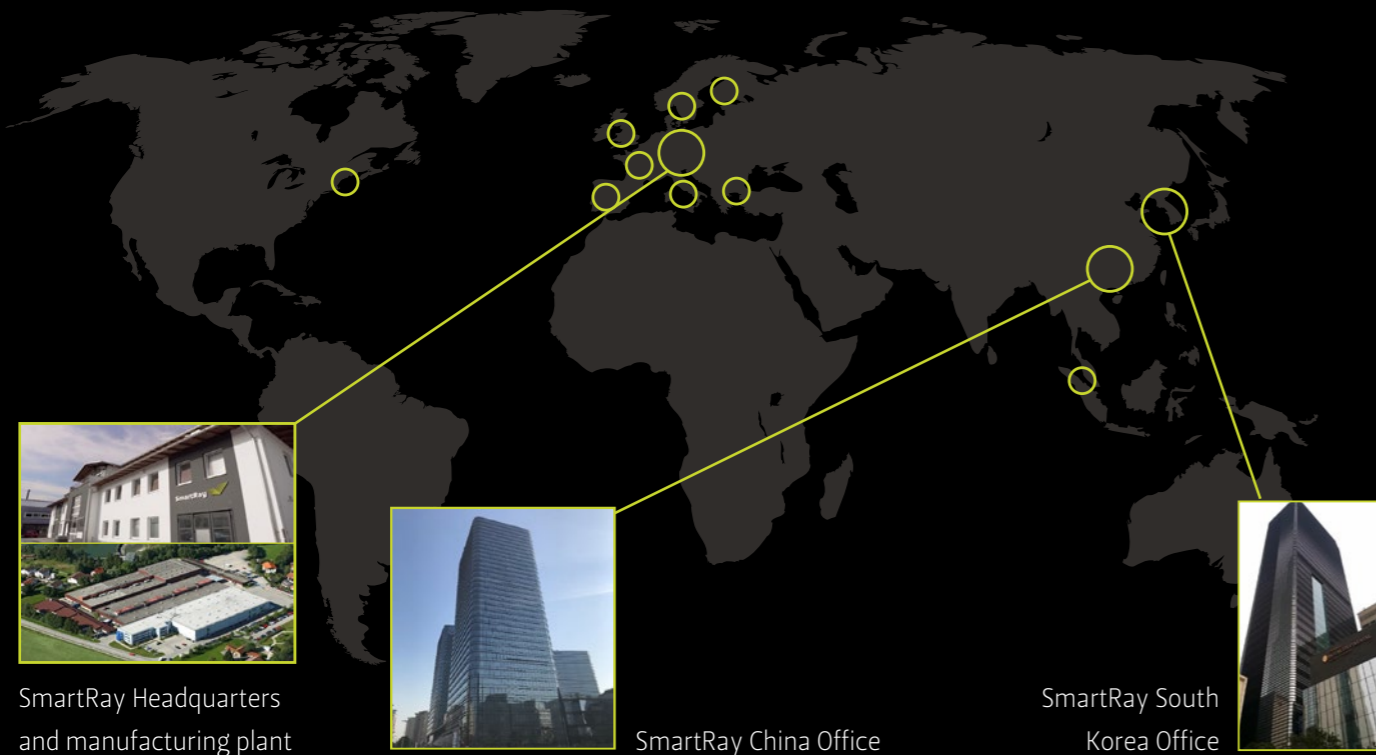
SmartRay 

# JOSY

THE **COMPLETE 3D AUTOMATED**  
WELD INSPECTION SOLUTION

100% INLINE INSPECTION | CONTROL QUALITY  
REDUCE COSTS | OPTIMIZE PROCESSES | FLEXIBLE & SCALABLE

# SmartRay – meeting customer requirements



SmartRay Headquarters and manufacturing plant

SmartRay China Office

SmartRay South Korea Office

SmartRay is a market leader in 3D sensing for challenging, high-precision inspection and metrology, a German company relied upon by global manufacturers to improve product quality and reduce production costs.

Established in 2004, its core focus is on metrology grade inspection delivered through 3D laser triangulation. With a high-end portfolio of more than 20 leading-edge sensor models, SmartRay provides reliable, repeatable inspection data to a wide range of third-party analytical software packages.

Its JOSY inline weld inspection system offers an all-in-one solution for noncontact visual 3D inspections, and is the preferred weld inspection solution for the world's leading automotive brands.

Working alongside its customers, and supported by a strong global partner network, SmartRay unlocks new ways to solve the challenges of inspection and measurement, ensuring high product quality and optimising processes.



# JOSY provides accuracy, reachability, productivity, and certainty

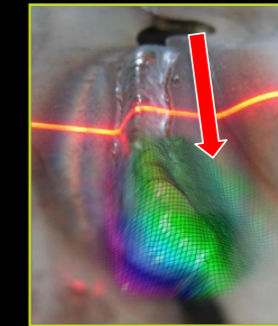
Integrate certainty into your project with JOSY, the complete turnkey solution for automated weld inspection. JOSY offers an all-in-one solution for noncontact visual 3D inspections.

JOSY offers exceptional quality, accuracy, and reliability, is suited to all joining technologies, and meets the precise quality assurance demands of automotive production.

## THE JOSY BENEFITS:

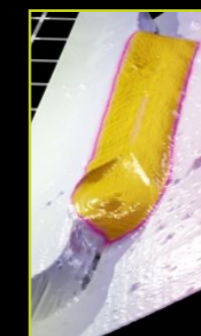
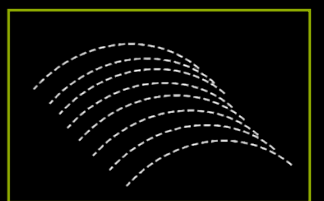
- Detection rate of 99%
- Customer-specific objective inspection to international norms
- 100% stored data for
  - Statistical process monitoring
  - Guided rework process ensures maximum efficiency
  - Security in case of a recall
  - Pareto Charts show points for action
  - Process optimization
- Improved uptime of the line
- Reduced scrap and rework cost
- Less energy-consuming processes and better CO<sub>2</sub> footprint

## HOW DOES JOSY WORK?



1 Sensor captures profiles containing height and position data

2 2D profiles (cuts) are combined into a 3D image by the movement of the sensor or the object

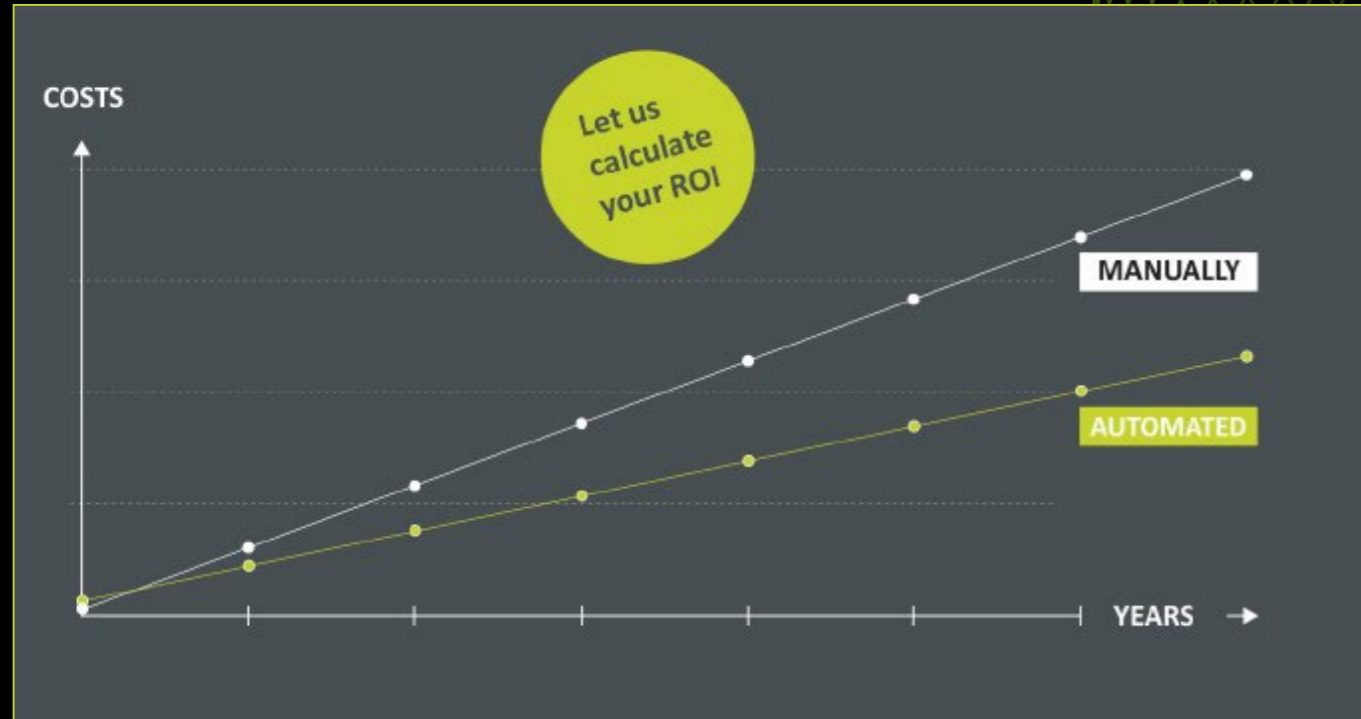


3 3D image is analyzed to detect defects and weld geometry

4 Weld geometry and defects are evaluated according to set tolerances. An OK/NOK decision is made



# Why do you need automated weld inspection?



Manual weld inspection is inconsistent and is affected by issues such as fatigue or personal judgement. It is difficult for human inspectors to remain objective and consistent throughout a lengthy shift. Sometimes, bad welds will be classed as good, while some good welds may be called as bad, leading to unnecessary time and costs being spent on rework.

Allowing defective products to slip through can be costly, with future business lost, reputation damaged, and the possibility of customer fines or lawsuits, huge recalls, and the expenses associated with recalls, warranties and liabilities.

Even when manual inspection works, it is unlikely to be able to identify the root cause of problems, so defects will continue to occur.

Not only does JOSY increase defect detection well beyond what manual inspection can achieve, it also provides a rapid return on investment making it, ultimately, less expensive than inspection by the human eye.

It also generates recorded data that protects manufacturers against warranty claims and helps determine the root cause of quality issues.

**JOSY:**  
can you afford **not**  
to have it?

# Why choose JOSY?

SmartRay's JOSY system uses a 3D weld inspection sensor, typically mounted on a robot directly in the automated production line to inspect 100% of the welds.

High-speed 3D in-line inspection minimises rework and other quality costs. With JOSY's new and updated web-based visualisation software, users get proven quality inspection information in a tailored visual format.

This is reliable, objective data – unlike manual inspection, you have a demonstrable record of what the inspection system has seen.

## GUIDED / TAILORED REWORK



Based on the embedded workflow of JOSY, unnecessary rework can be avoided saving time and money. In addition, JOSY guides the worker to only NOK welds and can be steered with a button box, allowing to wear gloves and heavy duty equipment.

## PROCESS MONITORING AND OPTIMIZATION



The JOSY Management Dashboard supplies a statistical view of all welds in the production line. With this data, the customer can continuously optimize the production process.

In addition: Recorded welding parameters (e.g. voltage, current, wire feed speed) can be directly linked to JOSY inspection data to identify problems in the welding process.

## RECALL PREVENTION



With accurate defect reporting, users have a data record of the defects discovered and repairs made. This allows robust defence against warranty claims and related reputational damage.

**Let us calculate your ROI!**

# The JOSY advantage

JOSY delivers a significantly higher detection rate of major defects compared to the human eye, with a database of stored information for the whole production lifecycle that helps protect you against warranty costs.

- Get true dimensional inspection in mm of length, width and height, etc
- Profile-based alignment eliminates effects from robot vibration and heat influence
- High-resolution sensor
- Active reflex filter

## Modular System Concept

### SENSOR



#### JOSY – 3D sensor

- High resolution down to 6 microns
- High speed up to 400 mm / s
- Multiple models for best customer experience

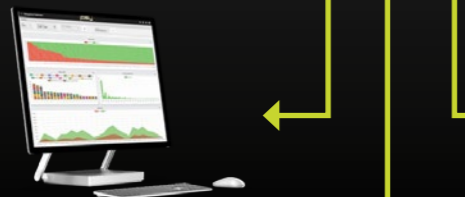
### CONTROLLER



#### JOSY – Controller Unit

- Consistent of:
  - IPC for inspection
  - PLC
  - Flexible field bus interface
- Plug & Play exchangeable
- Active backup

### SOFTWARE



### MANAGEMENT DASHBOARD/ STATISTICS

#### JOSY – Statistics Module

- Integrated database
- Advanced, user configurable statistical analysis
- Offline adjustment/optimization of inspection process
- Visualization of inspection results and trends
- Control of up to 8 inspection stations
- Remote access

#### JOSY – Intelligent Visualization Module (optional)

- Visualization of results
- Advanced visualization
- Size: 21,5", 46" or 55"

TCP/IP Communication Interface for MES/ERP (RestAPI)/ MQTT

## Key features

- Using a compact, robust sensor, JOSY delivers 100% true inline inspection with up to 400mm/sec high-speed scanning
- It is compliant with industrial standards ISO 5817 / ISO 10042 / VDA 5 AWS D1.1 | D8.8 | D8.14 as well as corporate standards like VW 01106\_1 | 01106\_3 BMW GS 96004 | GS 96015 | GS 96021 Daimler R WPT 102 and others
- Providing superior image quality, it offers up to 0.1mm pore detection
- It is quick to install, typically taking less than two hours
- Most projects are possible with laser class 2M



| Features                      | SR 1216 @100 & @60 | ECCO 95.040+ (& ECCO 95.100+) | MICO 40  |
|-------------------------------|--------------------|-------------------------------|----------|
| Embedded Tooling              | -/-                | -/-                           | ✓        |
| Internal Cabling / no γ-Cable | -/-                | -/-                           | ✓        |
| Reachability                  | ++                 | +                             | +++      |
| Min Defect Size               | 0,5mm (0,3mm)      | 0,1mm                         | 0,2mm    |
| Standard Scan Speed           | 130 mm/s           | 130 mm/s                      | 200 mm/s |

## Ultimate reachability with the MICO sensor

- Optimal reachability – form factor identical to weld torch
- Less tooling requirements and cost – combined sensor and flange
- No cable interference – reduced wear and tear – completely internal cable dressing
- Reduced simulation effort due to same form factor of weld torch
- 40% higher lateral resolution
- 50% higher standard scan speed = 200 m/s (former SR sensors 130 mm/s)

## Inspection capabilities

### All joining technologies

- MIG/MAG welding
- Laser welding and brazing
- Friction stir welding
- Resistance welding

### Any material

- Steel
- Aluminium
- Copper

### Inspected weld dimensions

- Length
- Width
- Throat thickness
- Cross-section area
- Weld toe
- Position
- Asymmetry
- Leg length
- Concavity, convexity

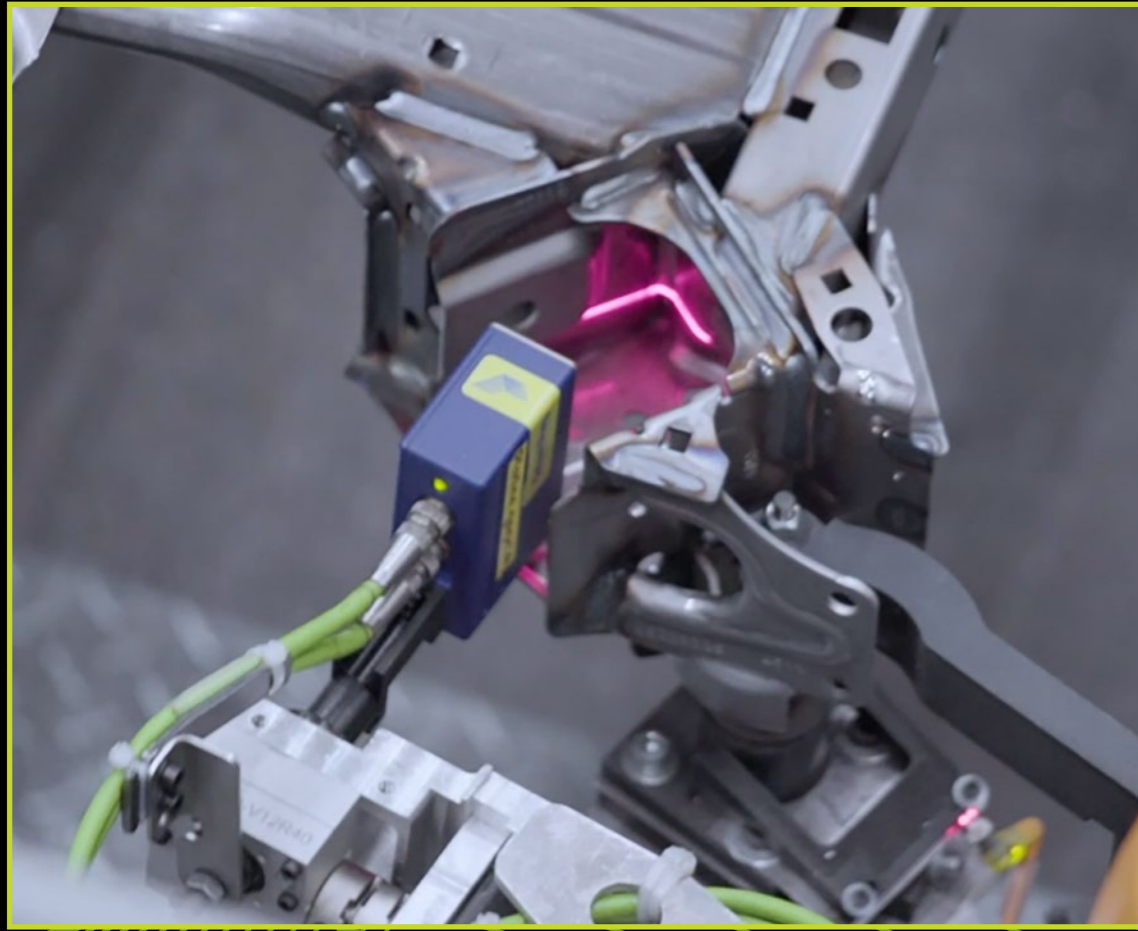
### Inspected weld defects

- Pores
- Macro-pores
- Micro-pores
- Porosity (pore nests)
- Holes/burn-throughs
- Undercuts
- Incompletely filled groove
- Incomplete welds
- Spatters



## KEY APPLICATION

### Cradle Inspection



**A primary concern for automobile manufacturing plants, cradle weld integrity is critical to connecting engine, axles and steering.**

Close inspection of every single weld is required to ensure the cradles meet the very highest levels of safety and quality. Any defects or weaknesses pose a potentially dangerous threat to the structural integrity of the car.

A typical cradle requires an average of around 200 seams/welds to be inspected, with any cradles failing inspection sent to rework stations for manual rework of the defective weld.

The short cycle-time to meet production targets necessitates the use of an automated inspection system, which typically combines a highly accurate, repeatable visual measurement with an integrated system capable of analysing and classifying welds across multiple inspection stations.

The JOSY weld inspection system helps manufacturers meet top-level requirements, evaluating complex weld requirements within critical production cycle time. Its intuitive system architecture and software enable operators to optimise the process more efficiently, identifying welding stations where maintenance may be required and resulting in the ongoing reduction of manual rework requirements.

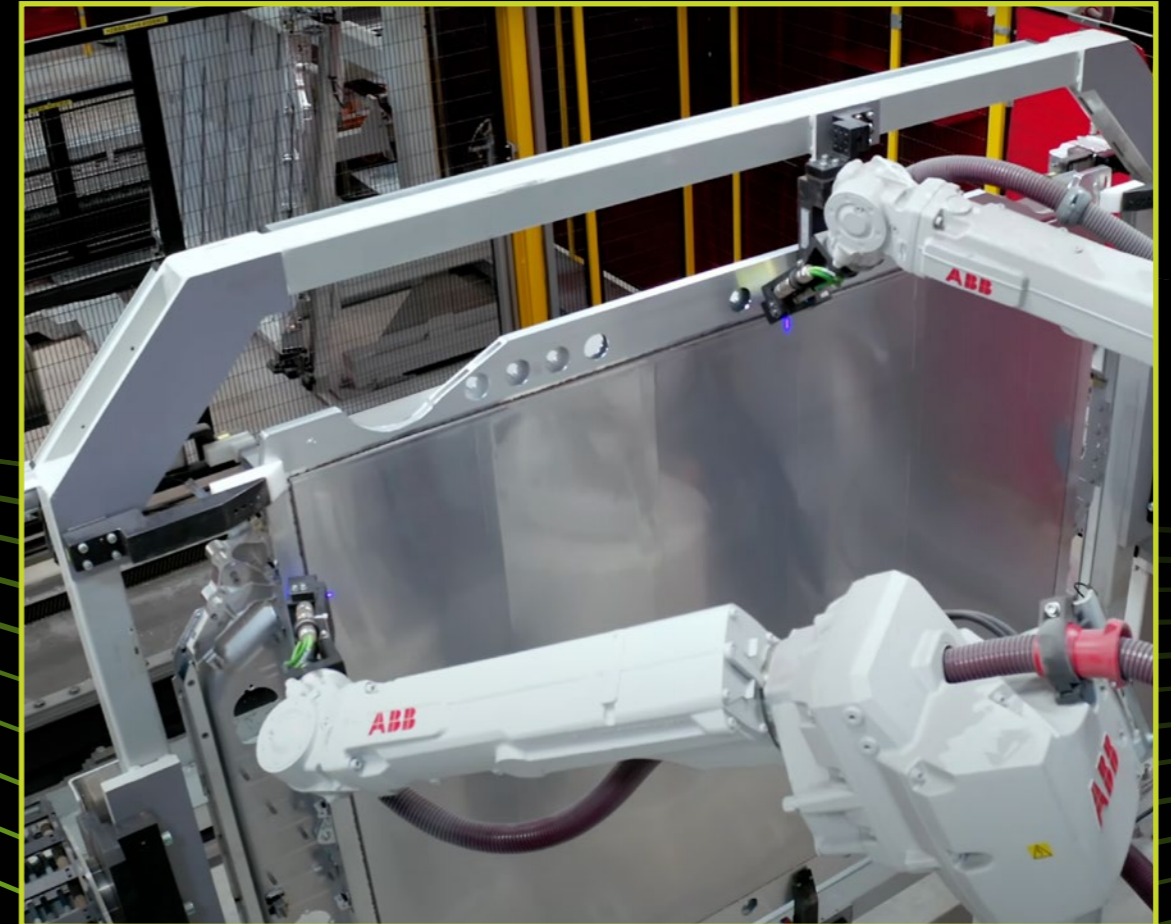
**FIND OUT MORE**

[download the application note](#)



## KEY APPLICATION

### EV Battery Boxes



**Battery box inspection has evolved with the production of electric-powered cars and other electric vehicles. There are, typically, more than 200 welds on an installed battery box, made up of a mix of different materials including high-alloy aluminium (EN AW 6000).**

To achieve the required level of inspection, it is necessary to inspect several different types of welds with a single sensor. These typically include MIG/MAG and laser welds.

In addition, the floor plate and geometry of the battery box can make some areas difficult to reach by an inspection system, while high-alloy aluminium often presents an additional challenge due to its reflective surface.

Backed by SmartRay's high level of experience in electric vehicle applications, the JOSY weld inspection system has the capability to inspect any weld and surface, generating advanced statistics and overviews, making it an ideal solution for this application.

It ensures less risk for customer claims against quality, and supports increased efficiency for the manufacturing process through continuous improvement, rapid feedback on the welding process, and by identifying preventative maintenance opportunities.

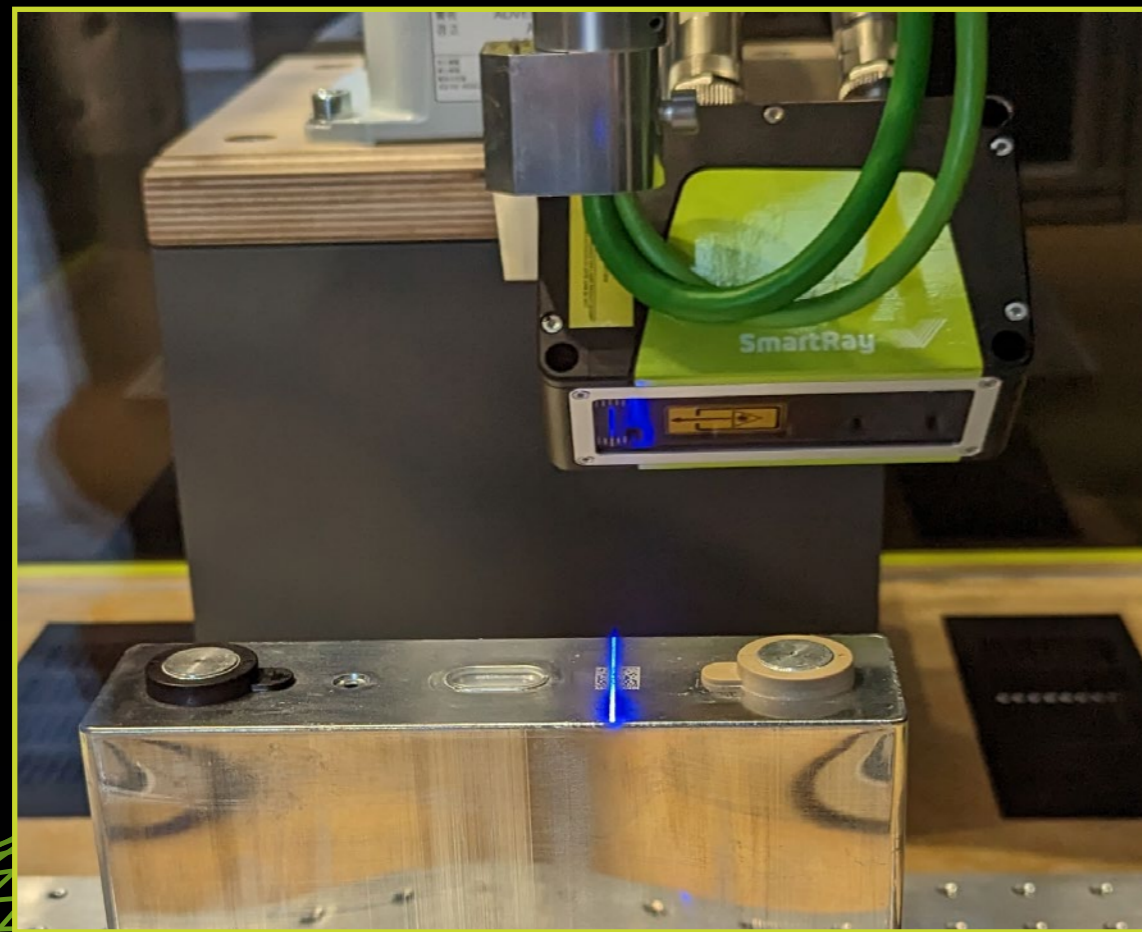
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# KEY APPLICATION

## Square EV Battery Cell Weld Inspection



The inspection of square batteries for electric vehicles mainly focuses on the following factors: size, exterior defects (pits, dirt, scratches, etc.), and weld detection. The weld quality of the battery will directly affect its safe use.

The most crucial process of the welding process for the square battery is the packaging of the shell cover, which can be divided into top and bottom cover welding based on different positions.

During the welding, the pole or connection piece is susceptible to contamination. Due to the decomposition of pollutants, welding explosion points can be easily formed, resulting in holes.

In the case of burn-through, explosion points will be formed. If there are pores, it is difficult to weld firmly. With thin and narrow weld bead, 0.8mm in the thinnest, and some bottom surfaces made of highly reflective metal, it is a great challenge to detect the welding quality.

The JOSY weld inspection system provides customers with a complete solution for this application, combining hardware, software, and debugging services to detect appearance defects in EV battery welds.

### FIND OUT MORE

[download the application note](#)



# WORKING WITH SMARTRAY

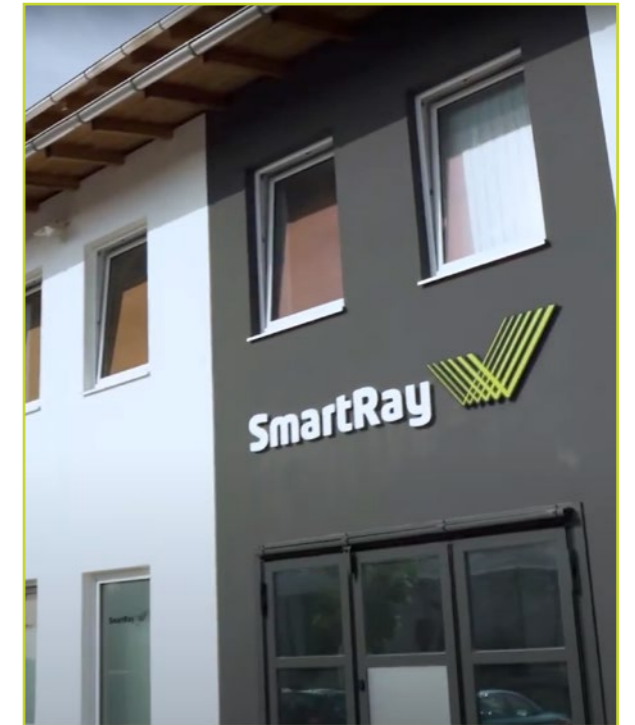
With the experience of over 400 installed systems worldwide, SmartRay understands that not all requirements or future demands are known during the project planning phase. That's why partnering with SmartRay not only helps ensure you can meet the requirements specified at project inception, but also provides access to the tools and services our experience indicates are necessary to run the system efficiently over many years.

Our reliable and planned installation process includes pre-commissioning, with technical and organisational coordination, and commissioning with pre-configured and tested hardware.

We deliver a full, customised after-sales service that ensures your staff are trained to the appropriate level, and your JOSY system remains optimised and maintained. This ensures JOSY continues to provide the accurate, repeatable results your process demands, year by year.

Using our flexibility and agility to determine the right solution with our customers, we transform results together, building a long-lasting partnership for productivity.

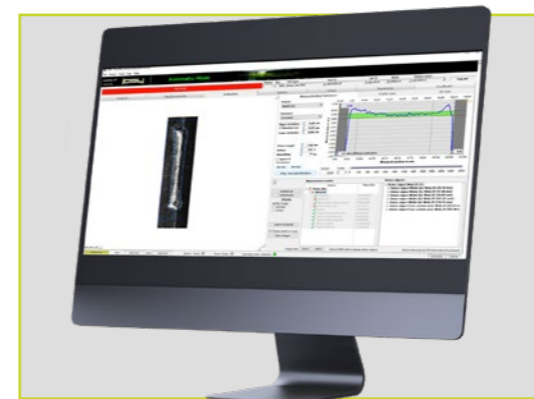
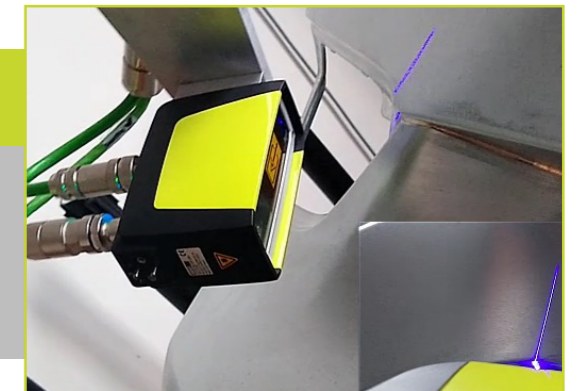
Our complete turnkey solution combines sensors, software, and support to ensure 100% weld inspection with a rapid return on investment, from initial evaluation through to project handover.



## SENSOR

### Performance

- Cutting-edge 3D sensor technology
- Optimized for precise inspection
- Broad product portfolio



## SOFTWARE

### Flexibility – Versatile solution

- Scalable performance
- Perfectly synchronized with our hardware
- Compliant with multiple engineering standards

## SERVICE

### Assistance – always at your disposal

- Excellent project planning
- Easy commissioning
- Professional after-sales support
- Comprehensive training programs



# JOSY

## THE COMPLETE 3D AUTOMATED WELD INSPECTION SOLUTION

### FOR MORE INFORMATION PLEASE CONTACT US:

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