



SOLUTIONS  
FOR E-MOBILITY

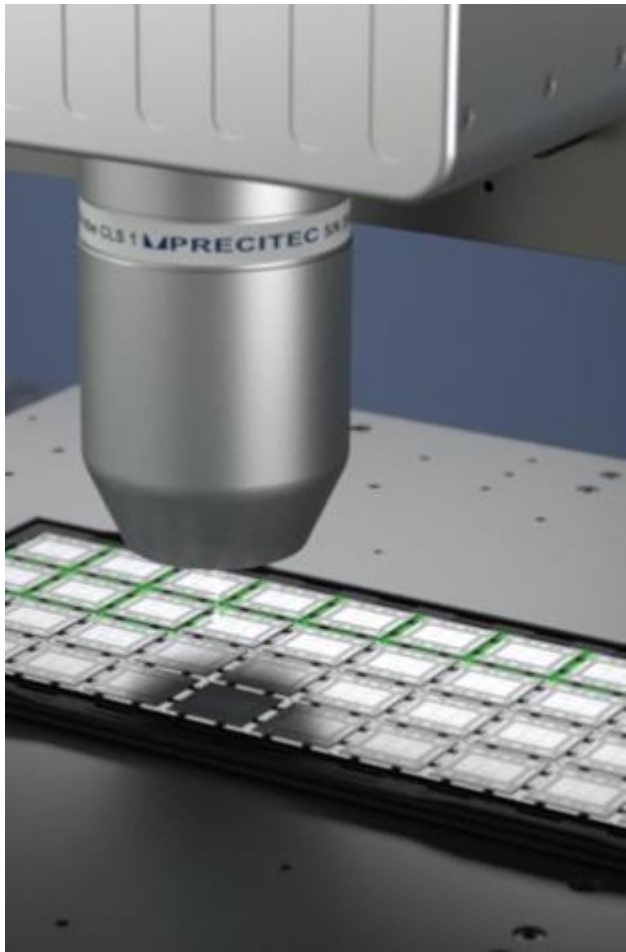
PRECITEC

# Intelligent Laser Welding Systems for Yield Improvement



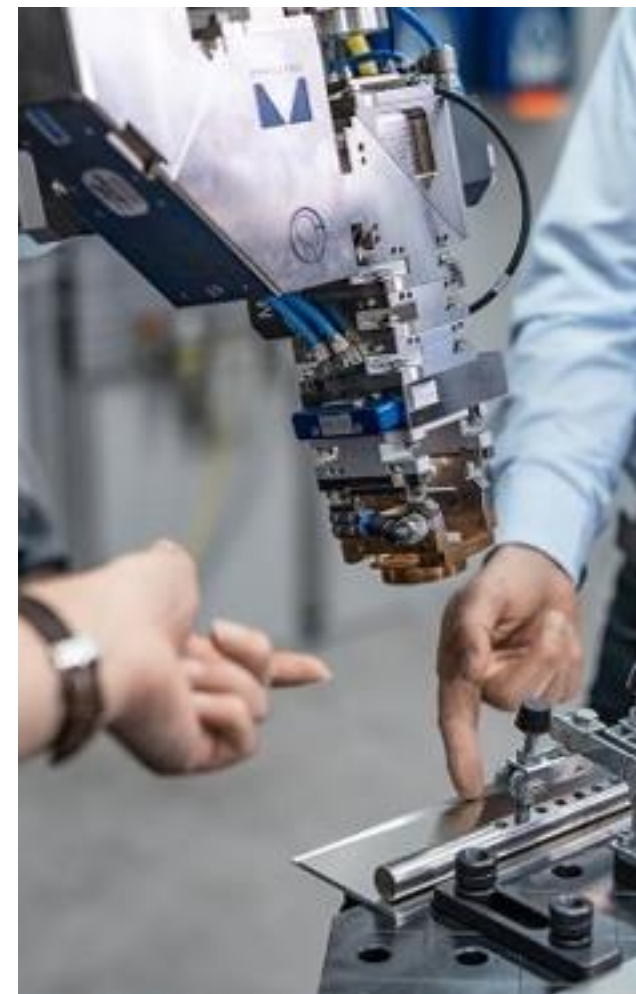
EPIC Meeting @ ARENA2036  
Stuttgart, October 25<sup>th</sup> 2023, Alexis Donke





# M PRECITEC

Your global partner in the development of system solutions and components for laser material processing as well as in the field of 3D metrology.



# HOW TO IMPROVE THE YIELD IN LASER WELDING APPLICATIONS?

SYSTEM AVAILABILITY

PROCESS STABILITY

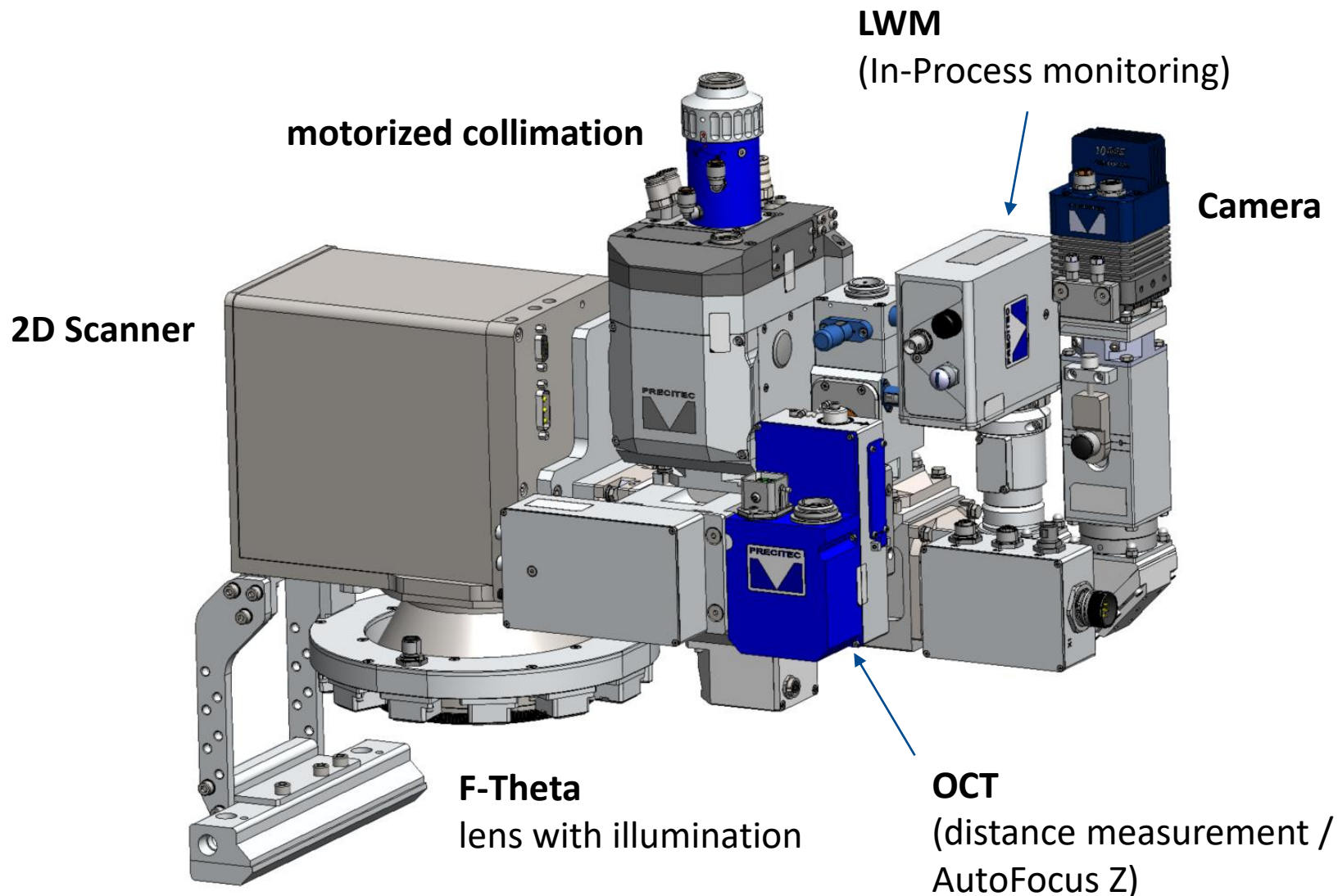
QUALITY MONITORING

CYCLE TIME

REWORK RATE  
& STRATEGY

Figure: Continental

# SCANMASTER: HIGHLY PRODUCTIVE SCANNER WELDING



## Technical specifications

- Laser wavelength: 1030 nm – 1080 nm
- Laser power: up to 8.000 W cw
  - suitable for ring mode lasers etc.
- Various magnifications possible
- Scan area (el.) up to 400 mm x 300 mm
- Integrated Z axis: +/- 35 mm for auto focussing

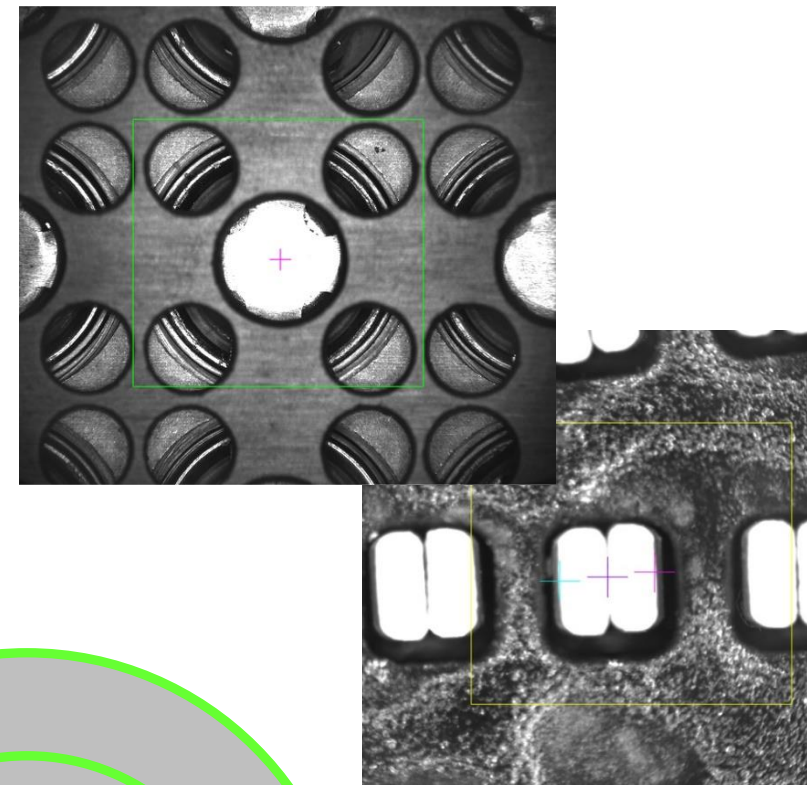
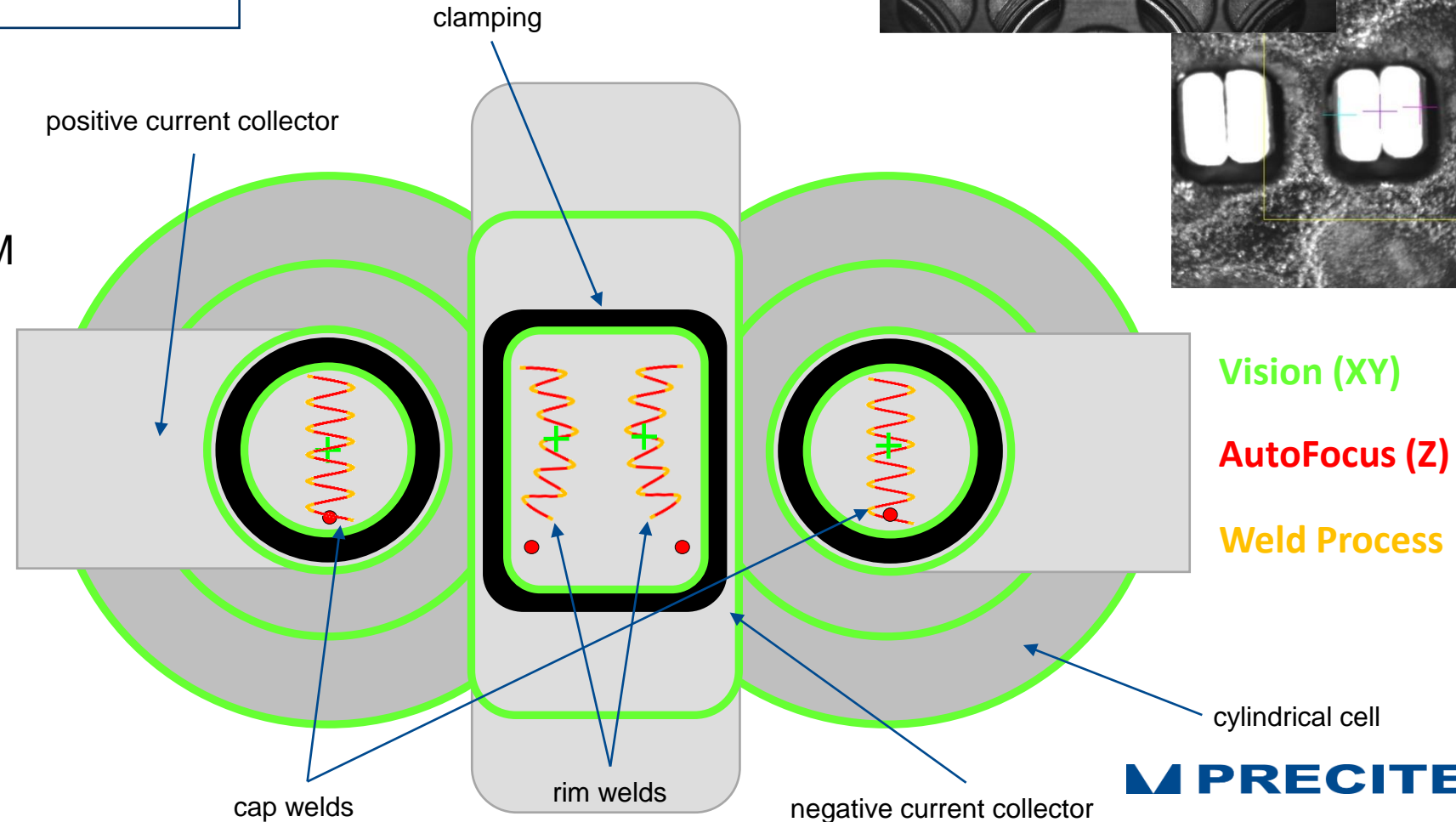
# SCANMASTER: TOTAL QUALITY SOLUTION

## KEY-FEATURES

high-speed image processing  
Feature detection: <10ms

### ▪ Vision for XY

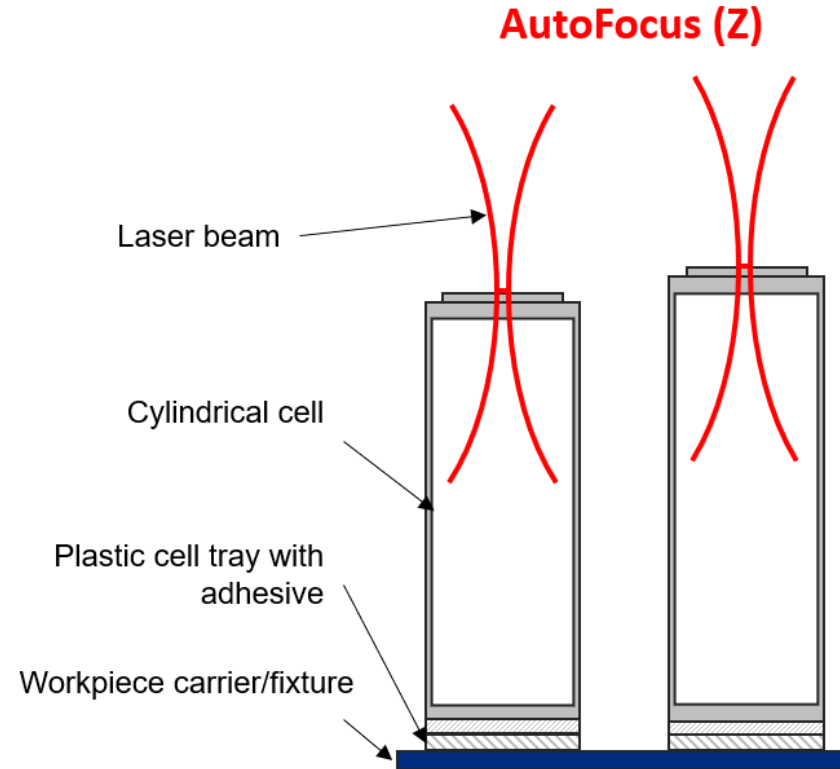
- AutoFocus Z
- Laser power modulation
- In-Process Monitoring LWM
- All-In-One GUI
- Hairpin-extension kit



# SCANMASTER: TOTAL QUALITY SOLUTION

## KEY-FEATURES

- Vision for XY
- **AutoFocus Z**
- Laser power modulation
- In-Process Monitoring LWM
- All-In-One GUI
- Hairpin-extension kit

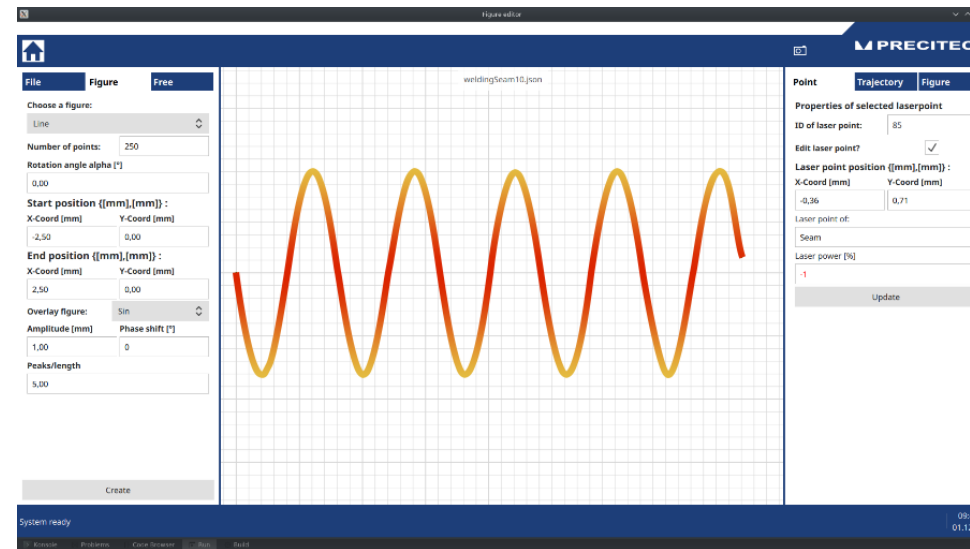


OCT + motorized collimation = **AutoFocus Z**

# SCANMASTER: TOTAL QUALITY SOLUTION

## KEY-FEATURES

- Vision for XY
- AutoFocus Z
- **Laser power modulation**
- In-Process Monitoring LWM
- All-In-One GUI
- Hairpin-extension kit

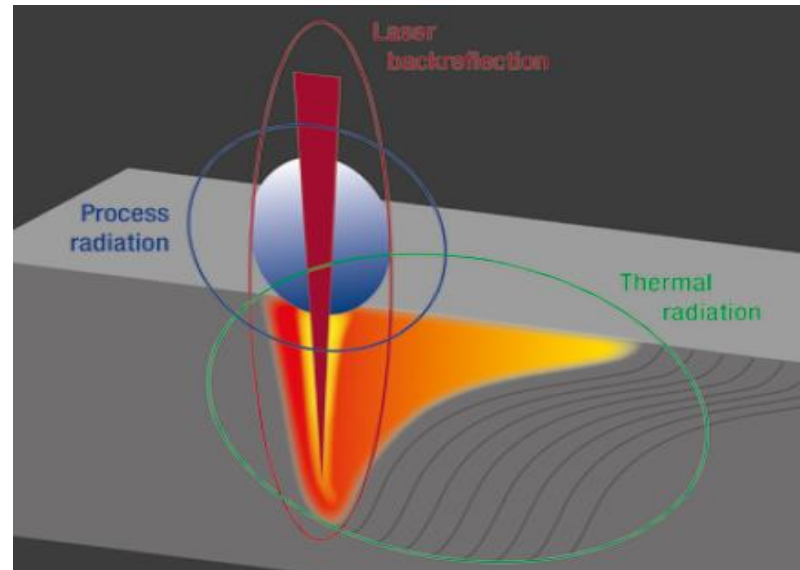


For weld figure and/or wobble shape  
Optional two channel modulation for ring/core laser

# SCANMASTER: TOTAL QUALITY SOLUTION

## KEY-FEATURES

- Vision for XY
- AutoFocus Z
- Laser power modulation
- **In-Process Monitoring LWM**
- All-In-One GUI
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Real-time process monitoring



# SCANMASTER: TOTAL QUALITY SOLUTION

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- Vision for XY
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- **All-In-One GUI**
- Hairpin-extension kit

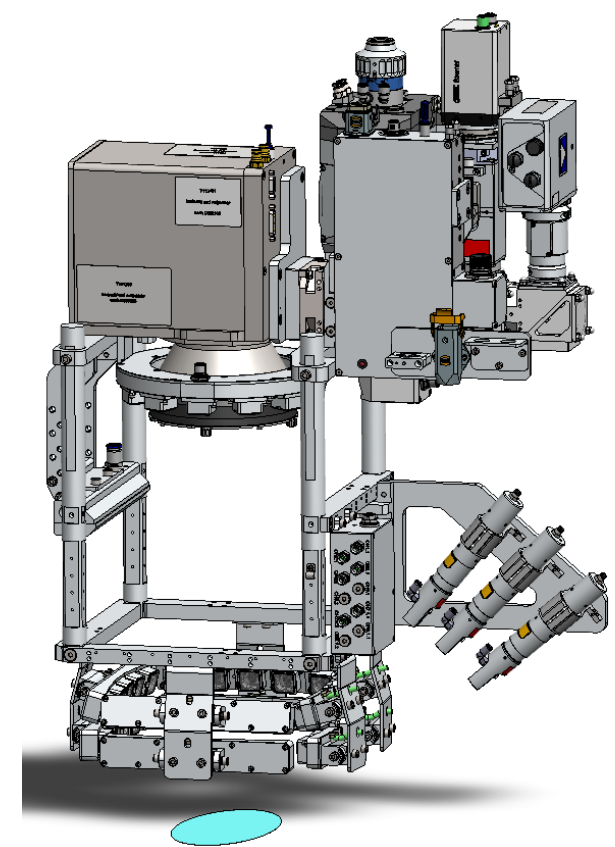
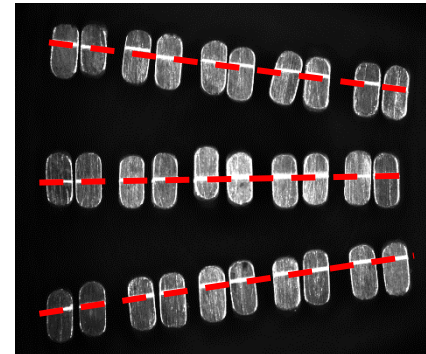
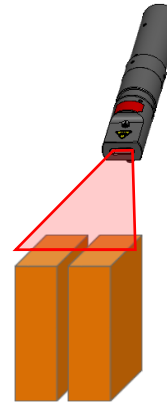
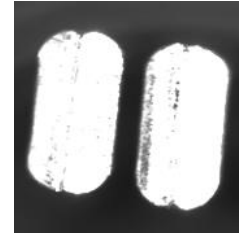
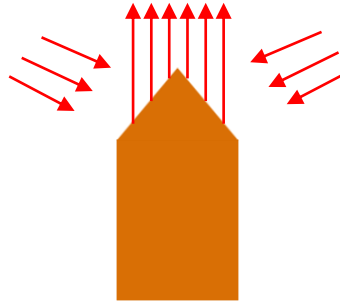


One Controller and GUI

# SCANMASTER: TOTAL QUALITY SOLUTION

## KEY-FEATURES

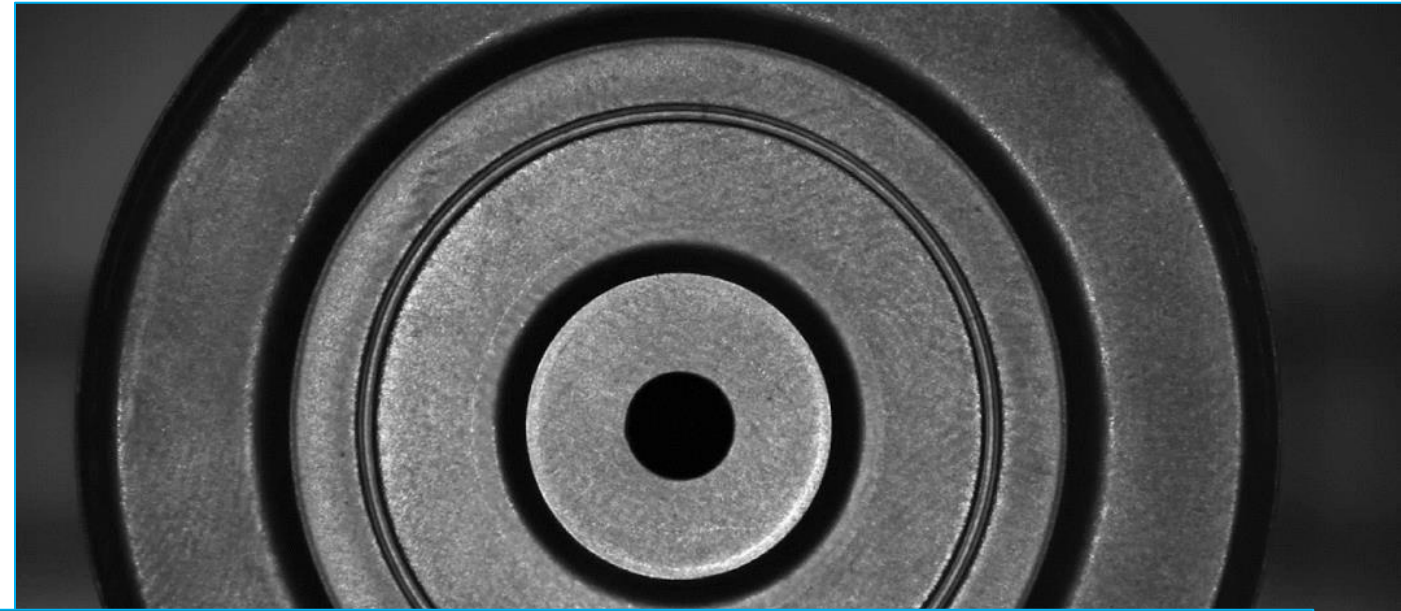
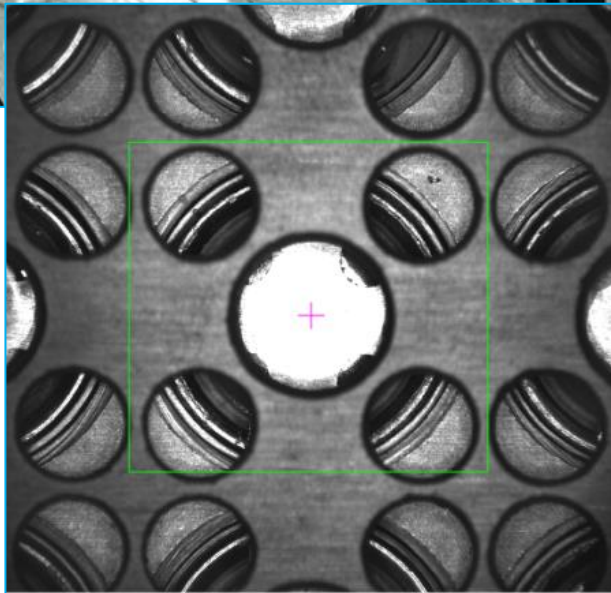
- Vision for XY
- AutoFocus Z
- Laser power modulation
- In-Process Monitoring LWM
- All-In-One GUI
- **Hairpin-extension kit**



Modular Illumination Kit + Laser Line Generator

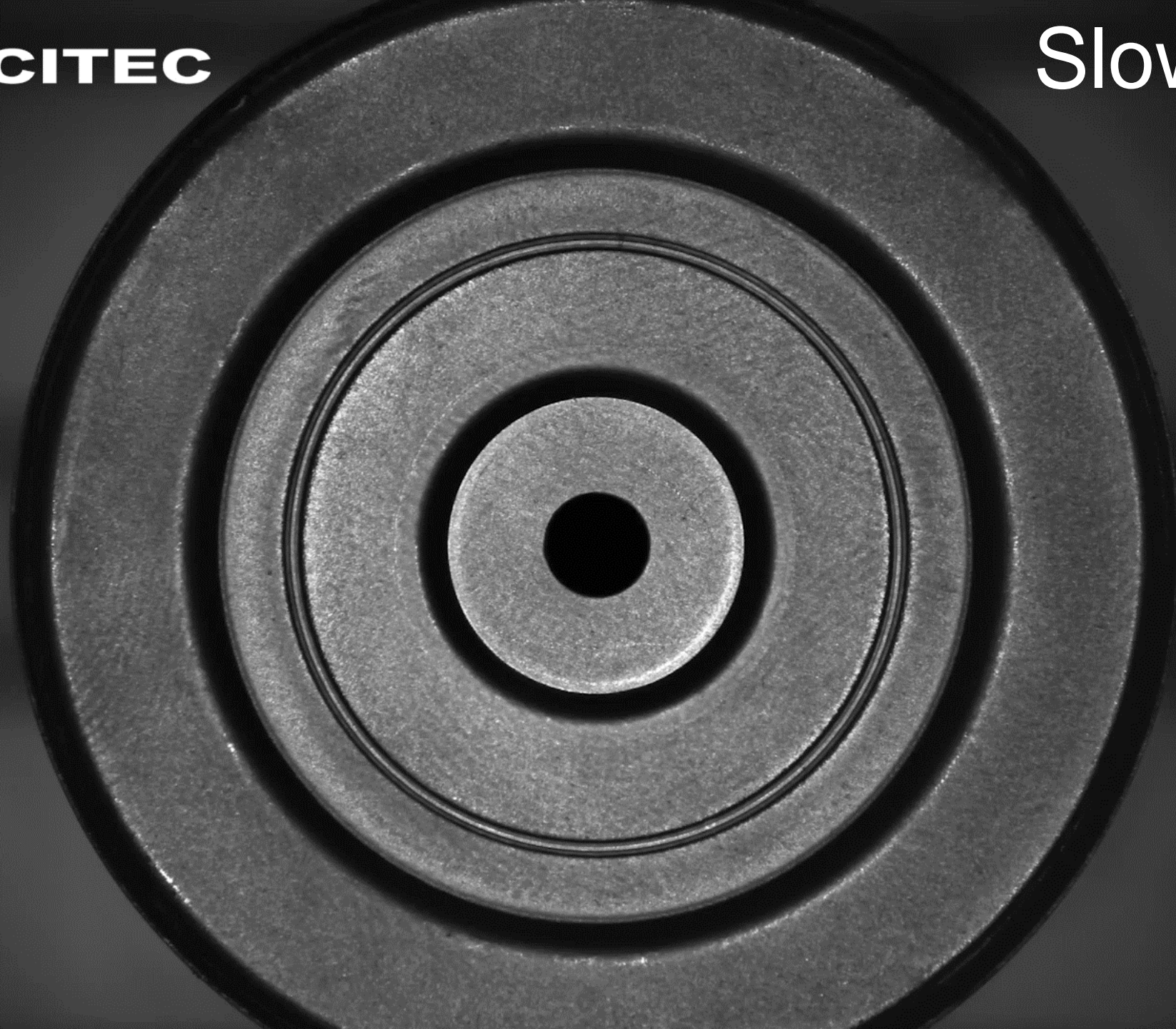
# APPLICATION EXAMPLES

## BATTERY MANUFACTURING



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Slow motion



# SCANMASTER: CAP-TO-CAN WELDING, 46XX



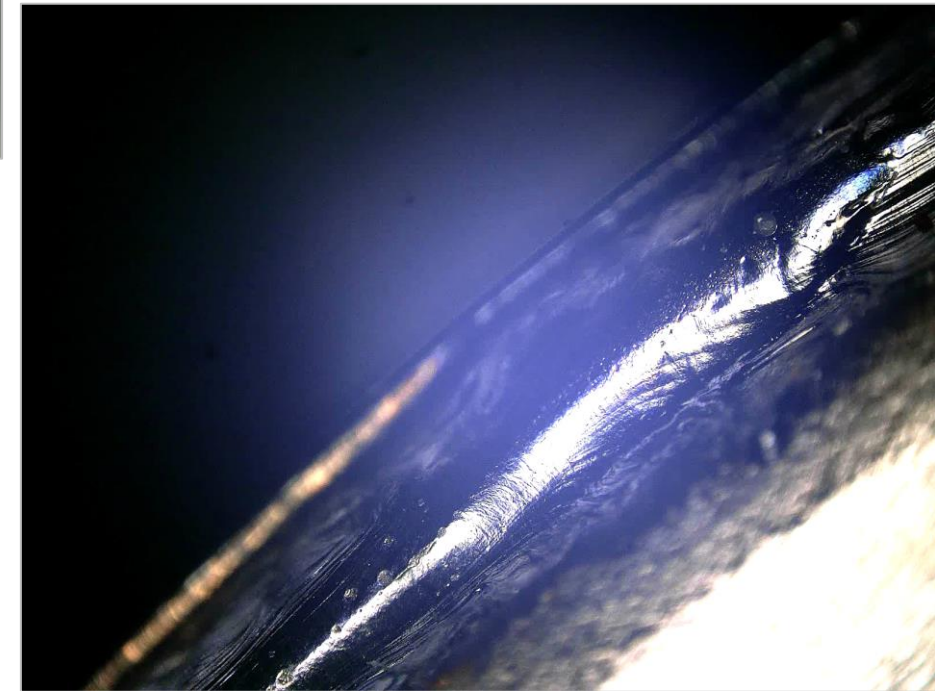
## PRODUCT CHALLENGES

- Thin materials, small gaps
- Large cells (4680/4690/...)
- Cans may be deformed

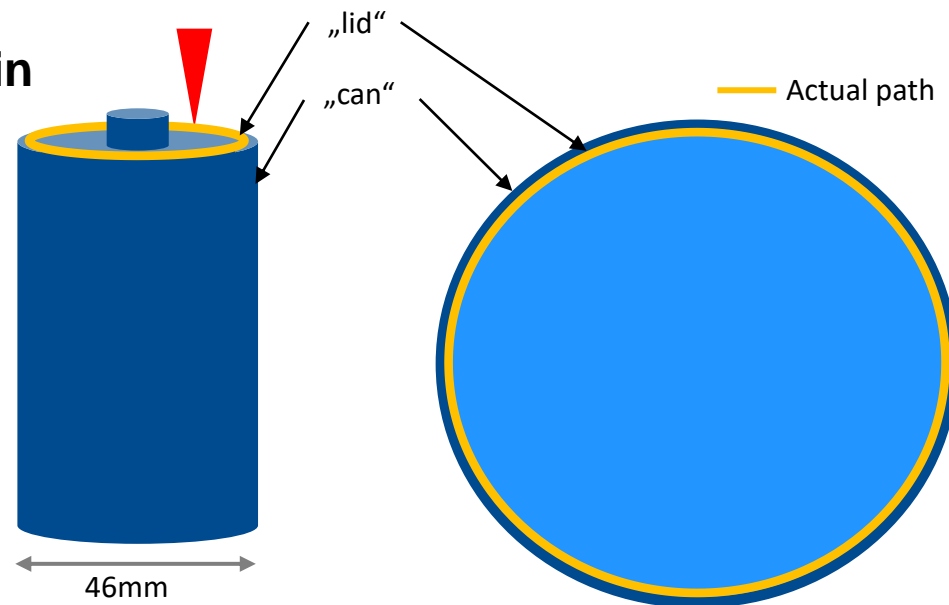


## OUR SOLUTION

- Field of view: 400mm x 300mm @ FF = 460mm
- Algorithm to detect seam position
- Ramp-in / Ramp-out
- Two channel modulation possible

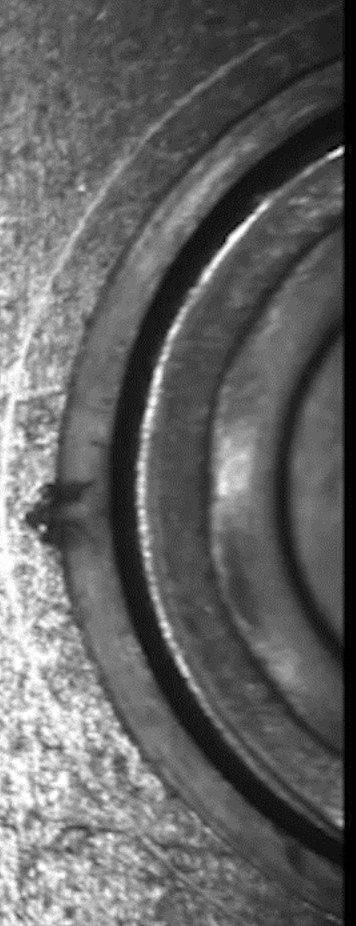
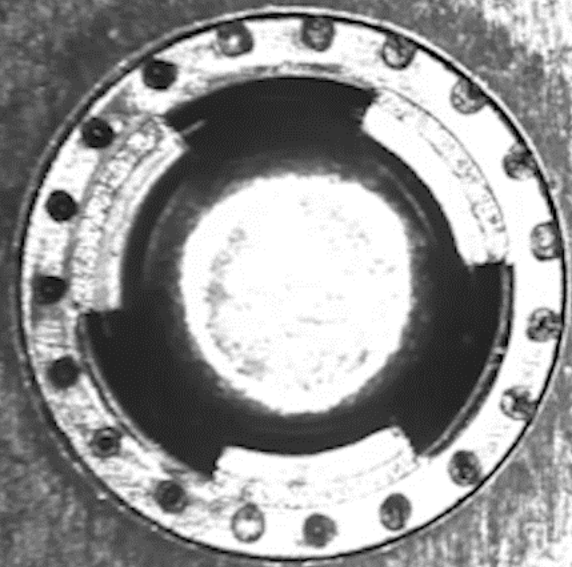


- **Welding speed: 18 m/min**
- **Welding time: 0.48 s**
- **Ring/core technology**



**M PRECITEC**

Slow motion



# SCANMASTER: CAP-TO-CAN WELDING, PRISMATIC CELL



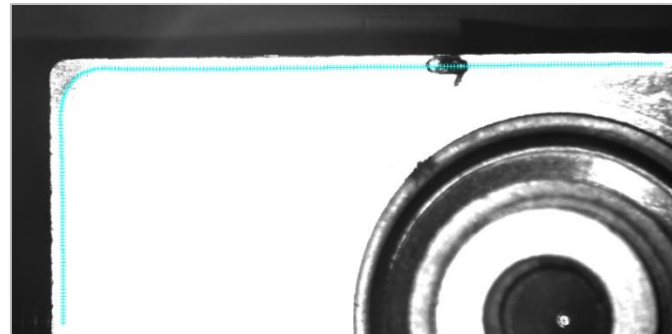
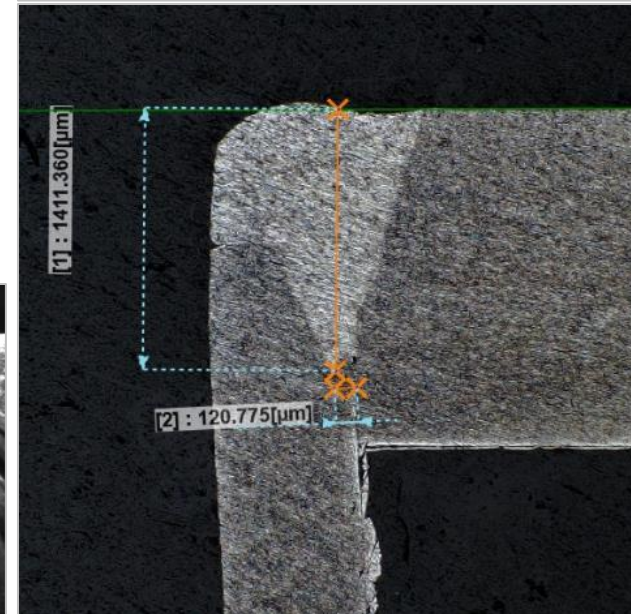
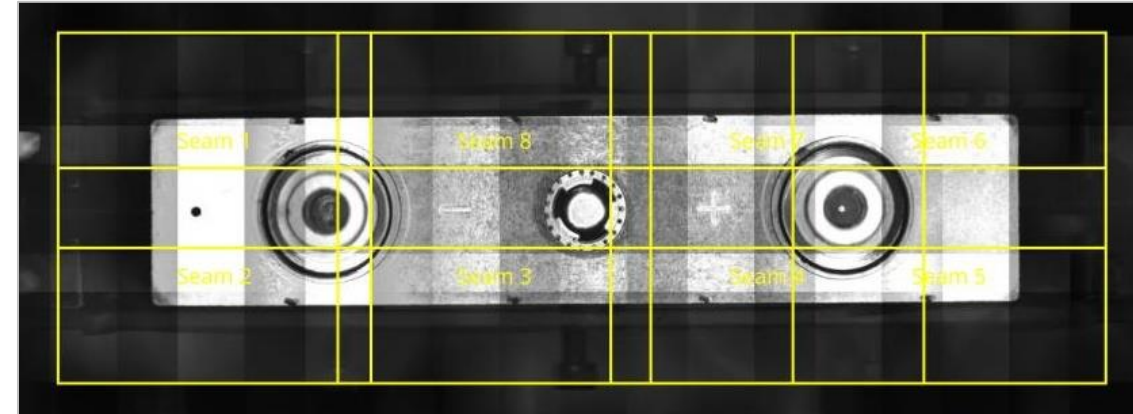
## PRODUCT CHALLENGES

- Thin materials, small gaps
- Long prismatic cells require multi-image stitching, cans may be deformed
- Create hermetic seal of lid to can



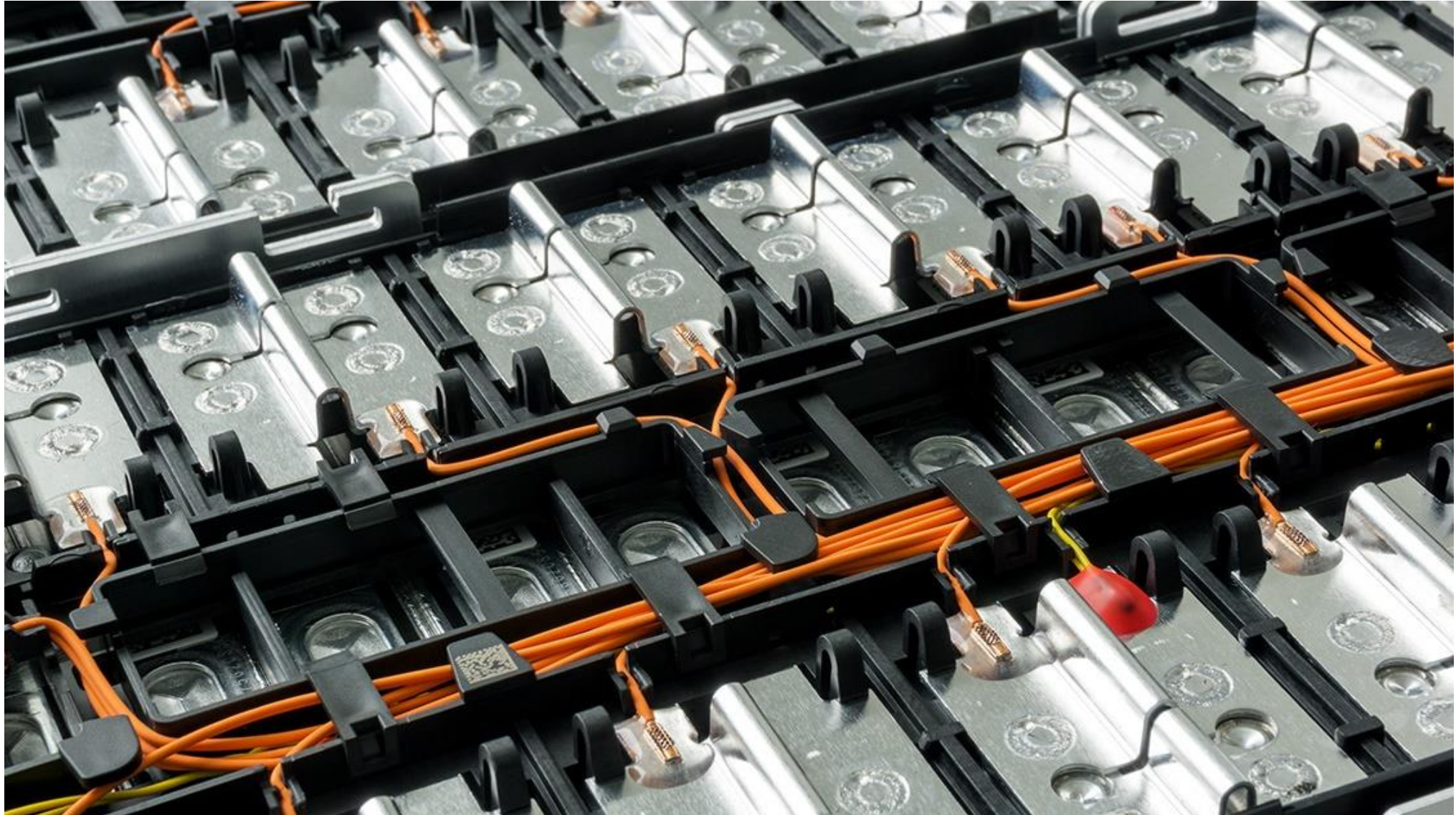
## OUR SOLUTION

- Field of view: 220mm x 110mm @ FF = 340mm
- Algorithm to detect seam position
- Ramp-in / Ramp-out
- Two channel modulation possible



- **Welding speed: 24 m/min**
- **Welding time: 0.9 s**
- **Ring/core technology**

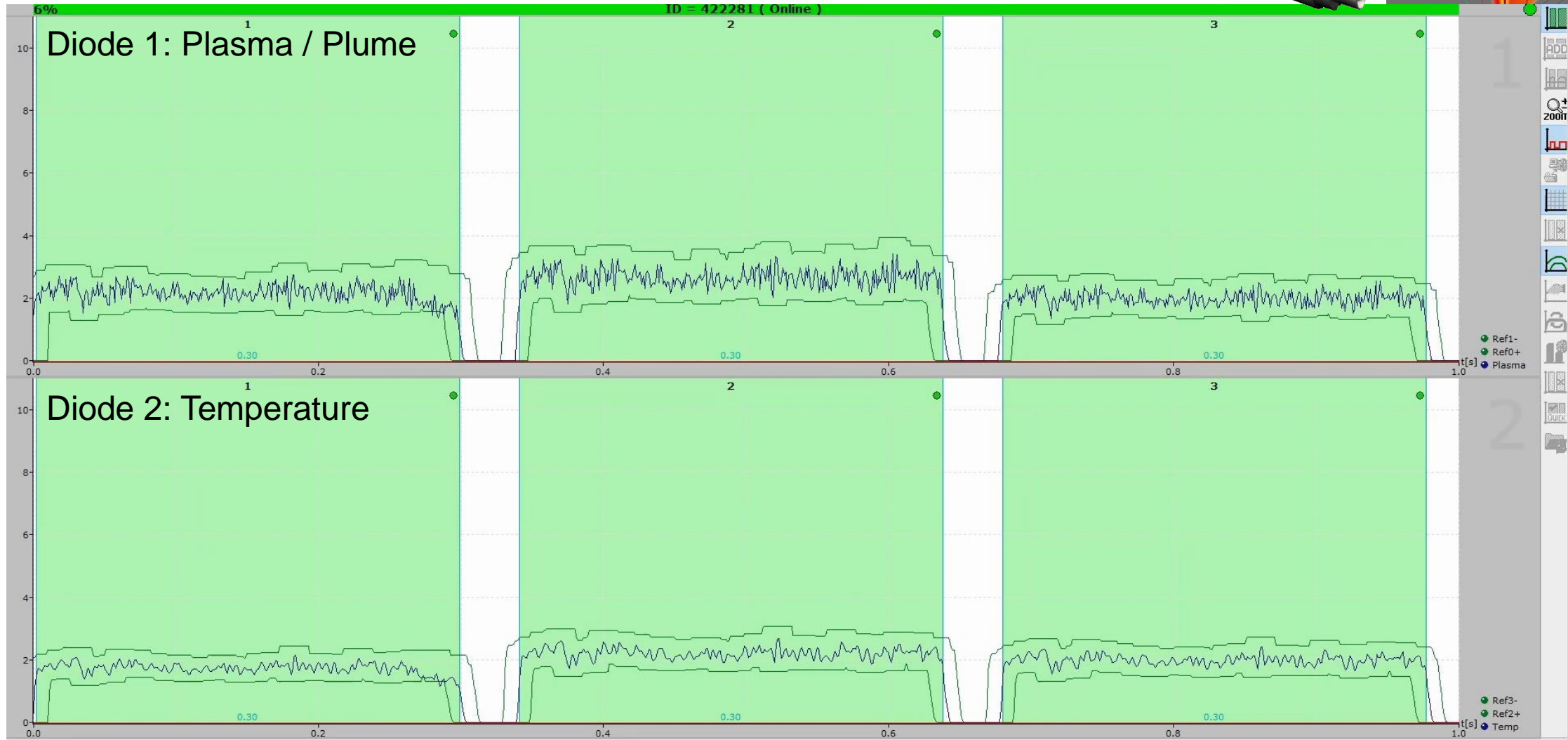
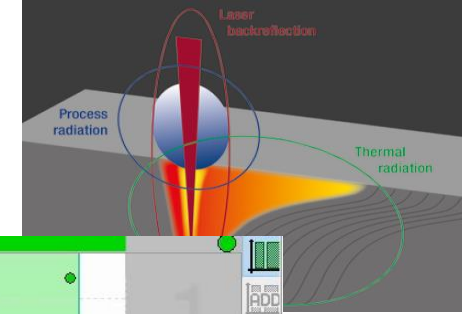
# SCANMASTER: CONTACTING





# LASER WELDING MONITOR LWM

LWM4.0

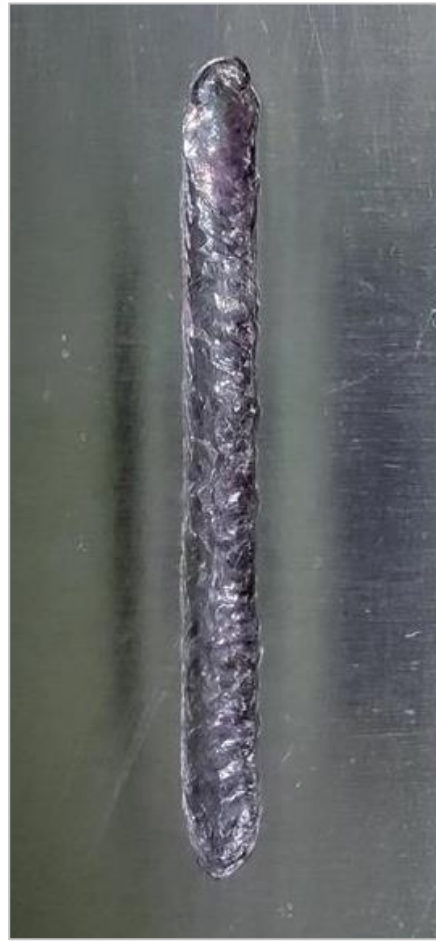
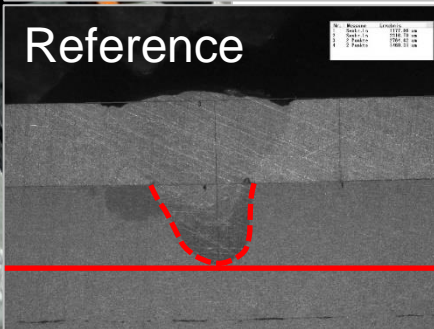


LWM – part of the ScanMaster or Stand-Alone solution



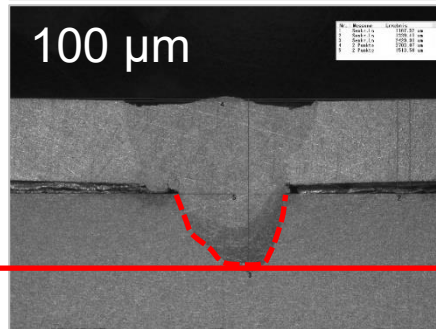
Reference

Item	Quantity
Cell	1
Cap	1
Tab	1
Case	1



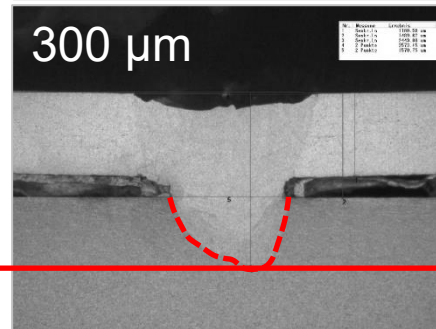
100 µm

Item	Quantity
Cell	1
Cap	1
Tab	1
Case	1



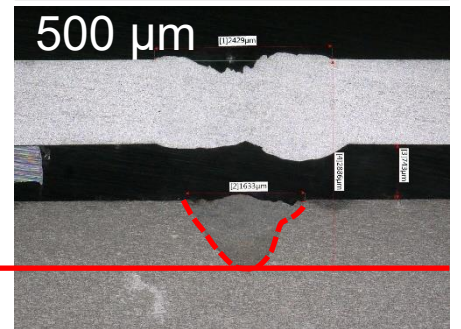
300 µm

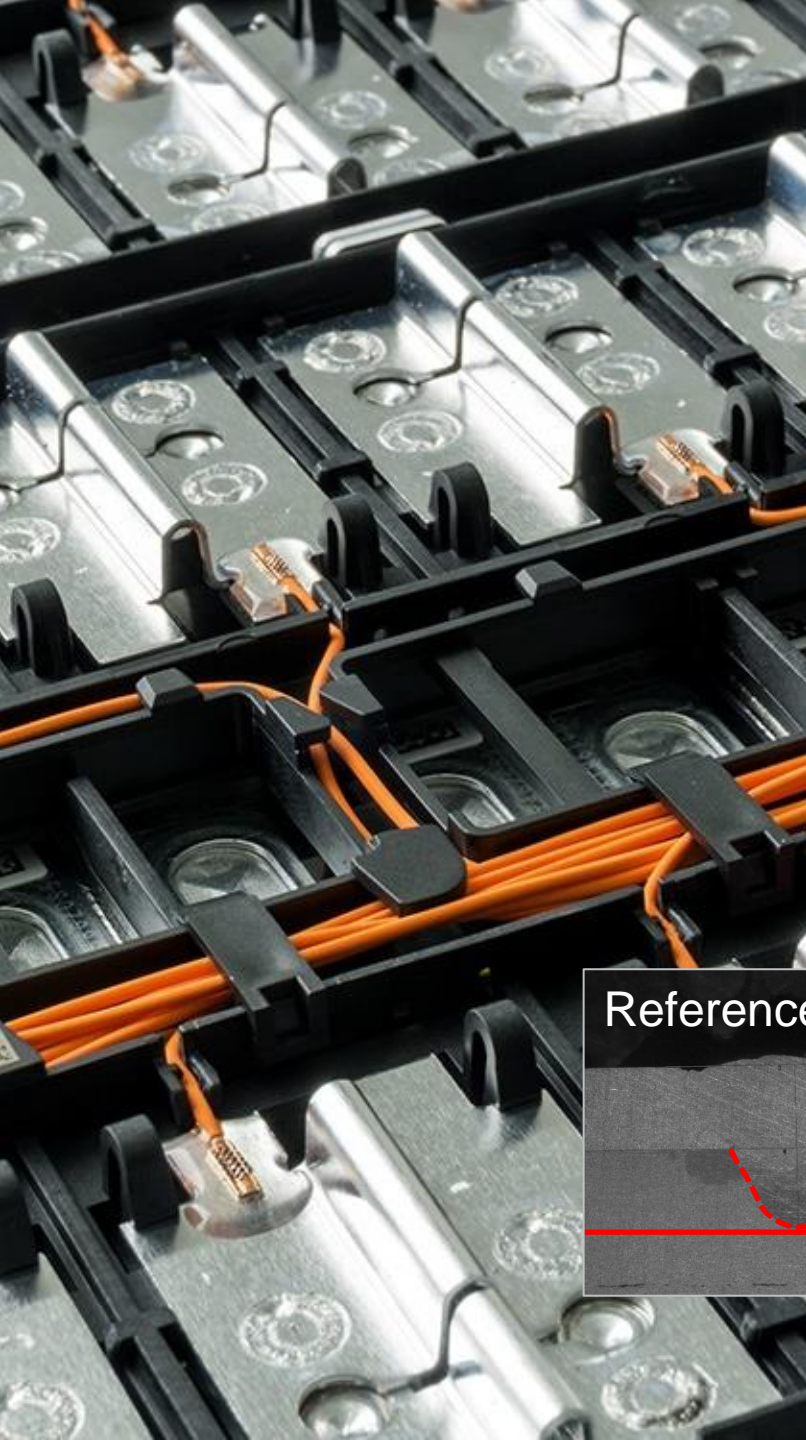
Item	Quantity
Cell	1
Cap	1
Tab	1
Case	1



5 mm

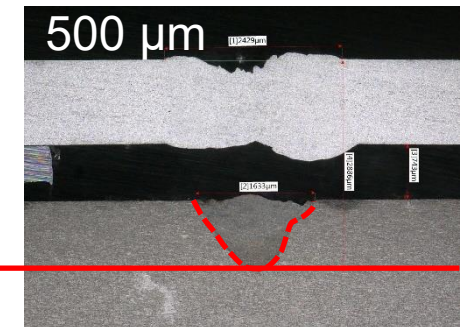
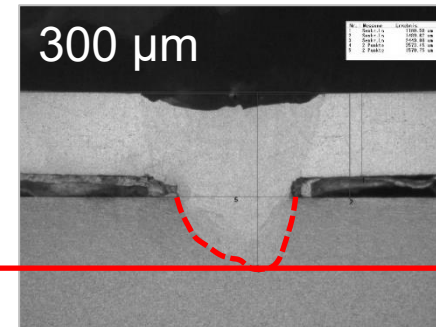
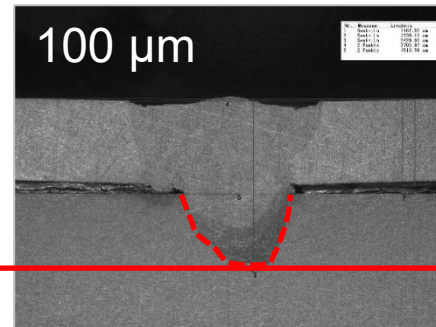
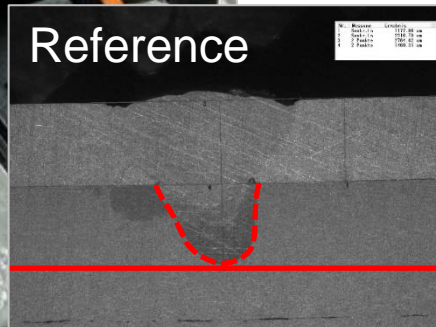
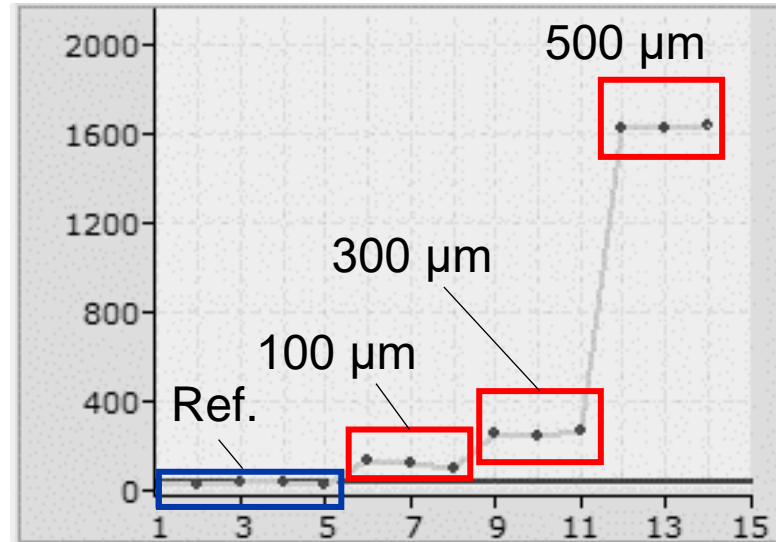
500 µm





# LASER WELDING MONITOR LWM

- Detection of gaps: with / without electrical contact



# THE EXPERT FOR YOUR WELDING PROCESS



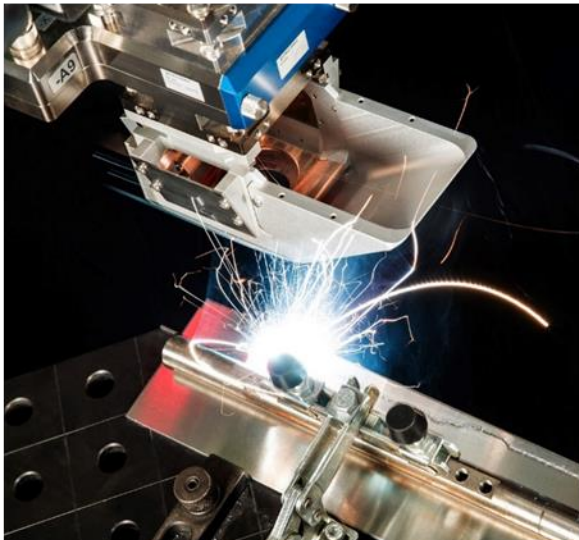
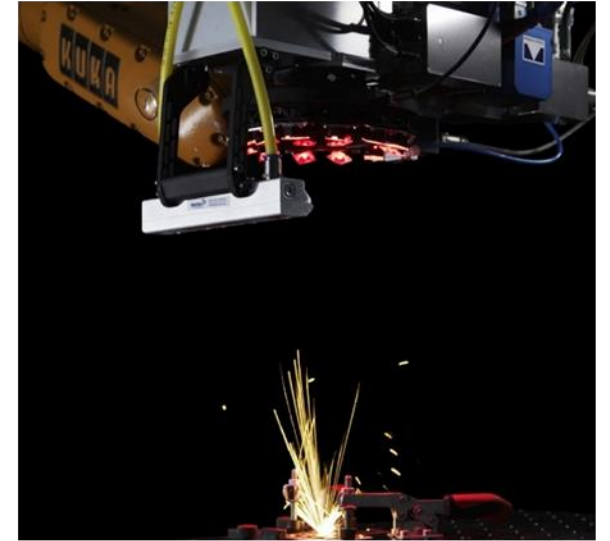
**>100 COUNTRIES**  
where welding systems are implemented



**>10.000 QUALITY MONITORING SYSTEM**  
in operation worldwide



**>10.000 WELDING OPTICS**  
in operation worldwide



**E-Mobility**



**Mechanical Engineering**



**Consumer Electronics**



**Automotive**



**SOLUTIONS  
FOR E-MOBILITY**

**PRECITEC**

**THANK YOU FOR YOUR KIND ATTENTION**

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