

LOCCIONI

From data to value

Outline

Loccioni company introduction

Loccioni for testing and process solutions

Welding process Loccioni experiences

Welding application for battery pack process

Welding critical aspects



LOCCIONI COMPANY INTRODUCTION

LOCCIONI



LOCCIONI

Established

1968 by Enrico e Graziella Loccioni

Ownership

Loccioni Family

Business

140 Millions Euro
Installations in over
45 countries

Locations

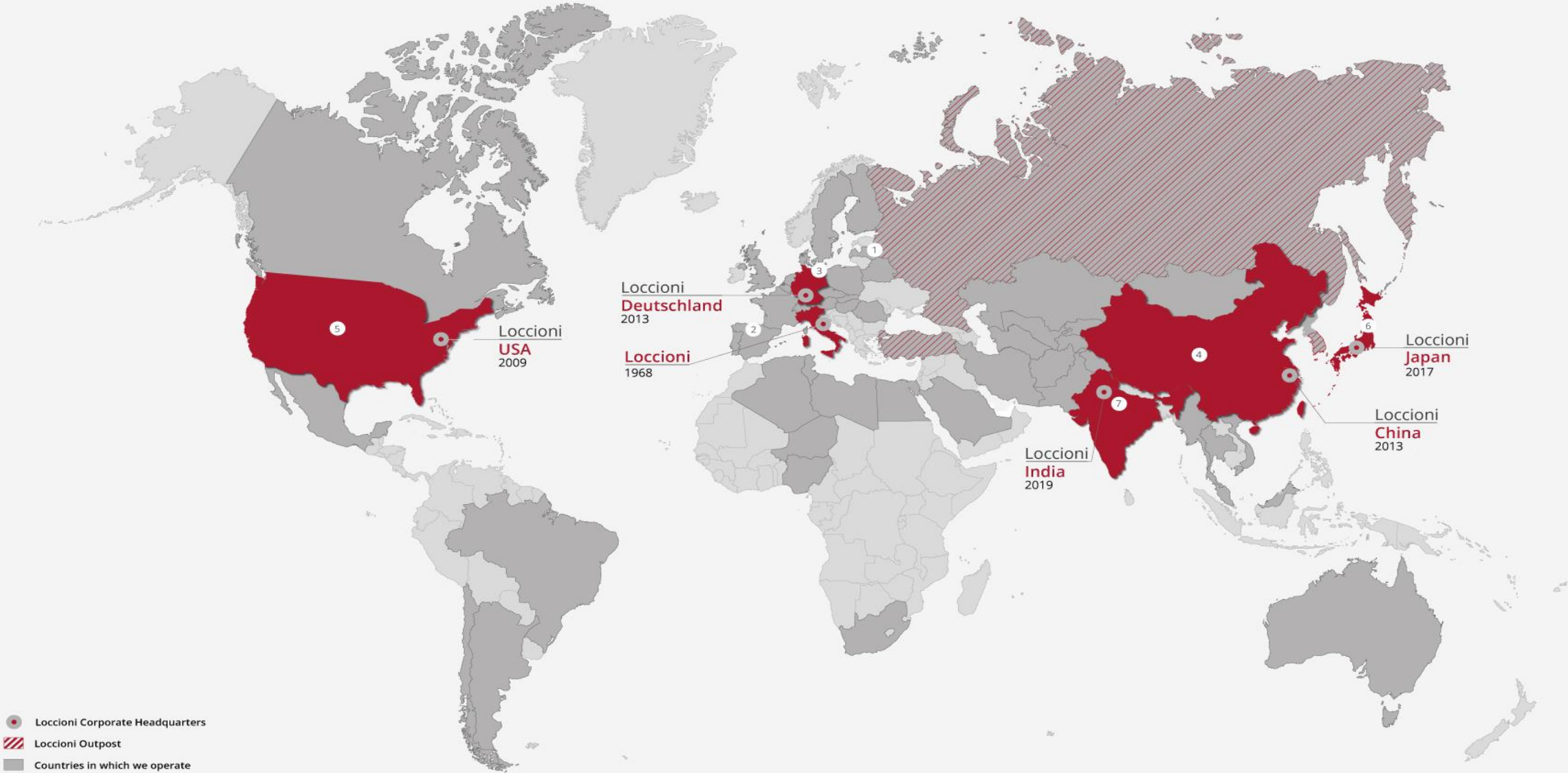
- Angeli di Rosora
AN, IT
- Riverdale MD, USA
- Calw, DE
- Shanghai, CN
- Nagoya, JP
- Delhi, IN

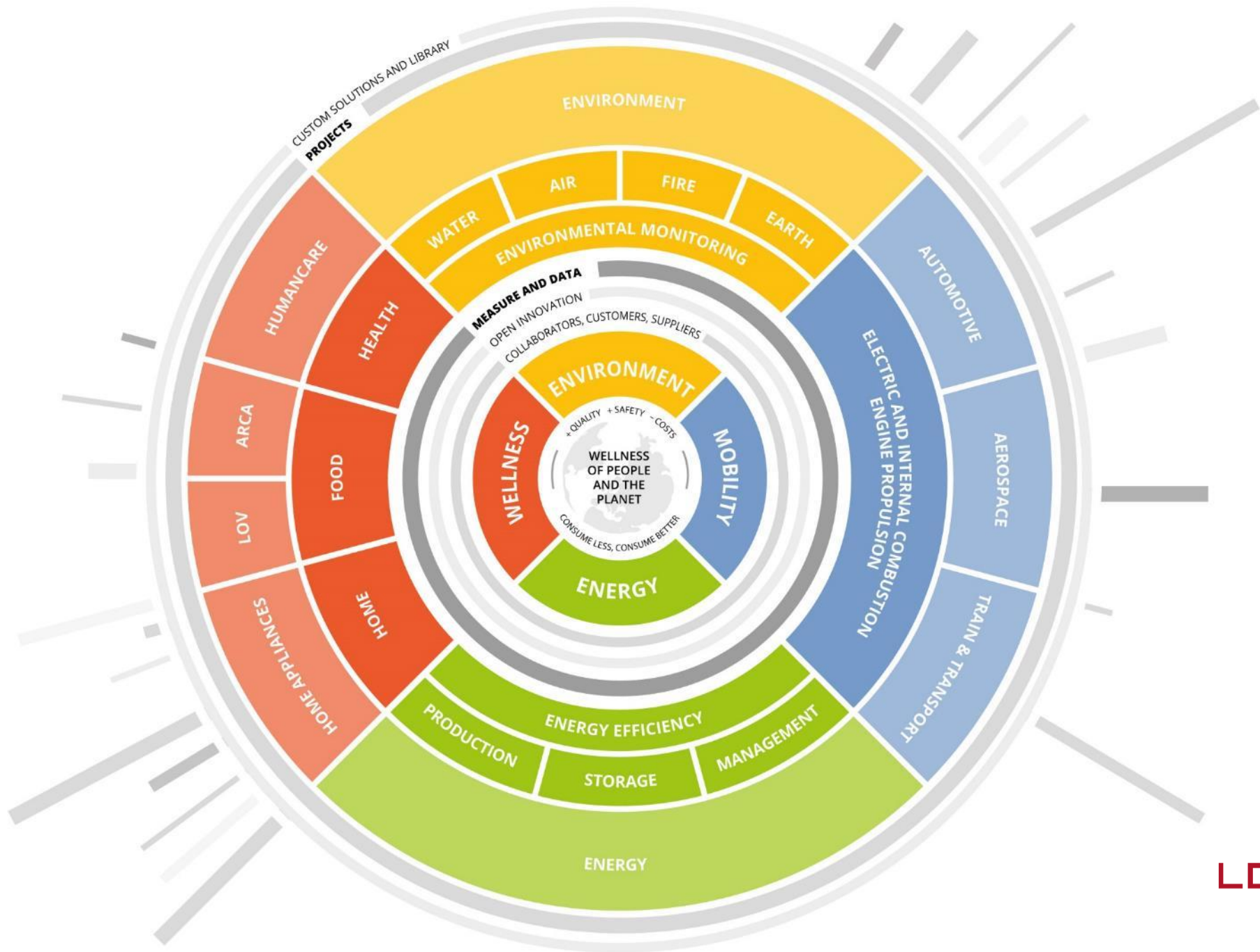
People

550 collaborators
45% university
graduated
34 average age
5% of personnel cost
invested in training

Loccioni in the World

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LOCCIONI FOR TESTING AND PROCESS SOLUTION

LOCCIONI

OUR CORE COMPETENCES

MEASURE
AUTOMATING
ANALYZE

We develop customer-specific assembly and test lines as well as innovative test benches and test instruments.

Assembly and Testing solution for Automotive

EV/HEV



- E-Motor
- E-Axle
- Inverter
- E-Transmissions
- Battery Pack
- Fuell cells

Electronic systems

- Front Panels
- Telematic
- Control Unit (Engine, Transmission, Safety)
- Infotainment
- Power Electronic
- Adas
- Radar 77Hz



Powertrain

- Fuel Injectors
- Pumps
- Throttle Bodies/EGR Valve
- Pressure regulators
- Proportional valves
- Nozzles
- Sensors & Actuators
- SCR Dosing Unit



Transmissions

- Solenoid valve for transmission
- Hydraulic Control Modules
- AMT gearbox
- Dual-clutch transmissions (DCT)
- Oil flow control valves
- Cam phasing (VVT)
- Cylinder Deactivation valve

Main Automotive OEM and Tier 1 Customers



With the best in the world.

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LOCCIONI FOR E-MOBILITY

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Production Solution

E-Motor



E-Axle

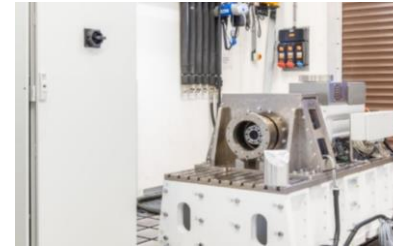


Battery test



R&D Solution

E-Motor



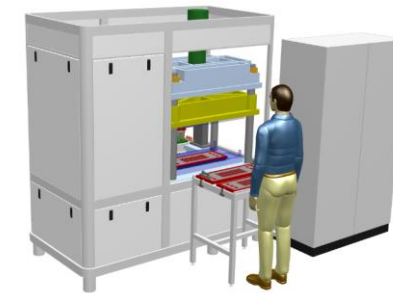
E-Axle



Inverter



Fuell cells



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WELDING PROCESS AND LOCCIONI EXPERIENCES

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GDI and other components welding

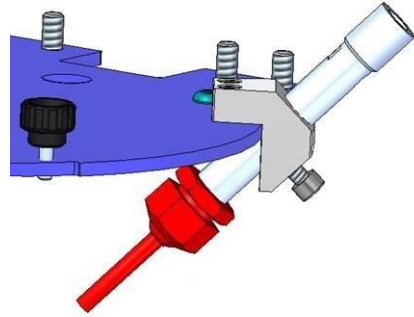
1. **Welding technology:** laser.
2. **HW used:** fix laser head with optical fiber.
3. **GDI components:** flange, damper cup, inlet e outlet fitting, spill valve body, coil.
4. **Other components:** injector pressure sensor.
5. **Components material:** AISI 430, AISI 304L.
6. **Welding process:** spindle device to rotate the components.
7. **Welding monitoring:** LWM in live. Profilometer. Cutting, electrochemical attack and micrograph check off line.



1.2. – Welding technology and HW used



Laser source +
optical fiber



Nitrogen tool



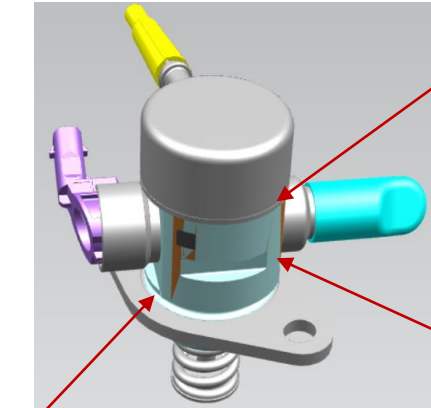
Fixed laser
head



Power meter

3.4.5. - GDI, other components and components material

GDI pump



Damper cap welding

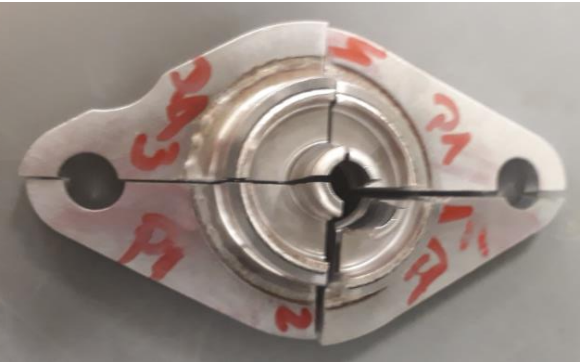
Inlet fitting welding

Flange welding

Material

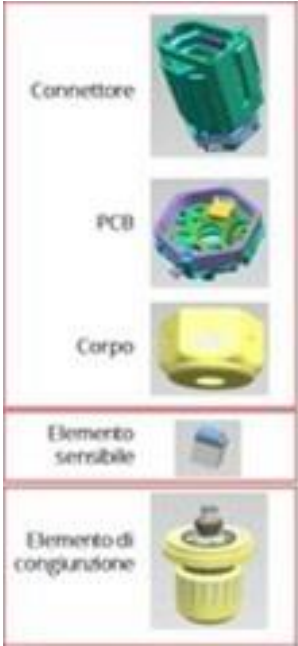


AISI 304L



AISI 430

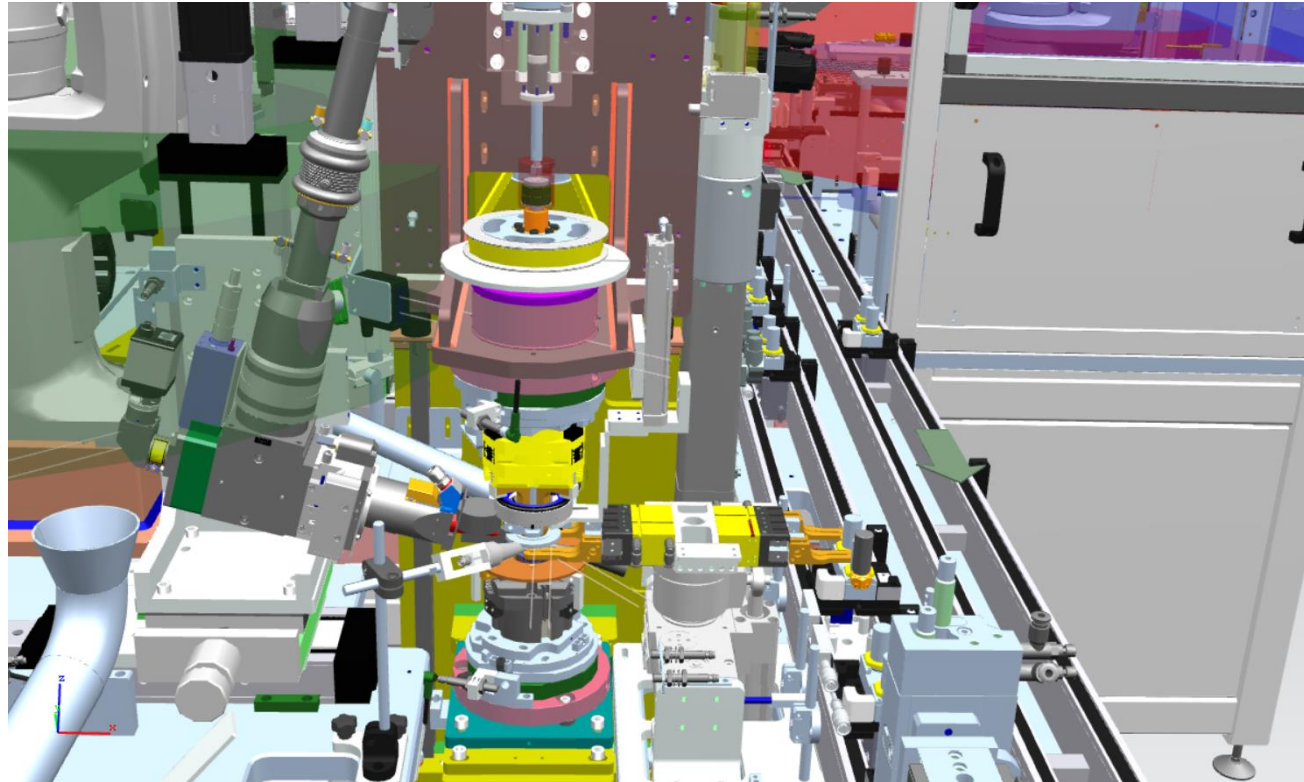
Pressure sensor



Internal welding

6. – Welding process

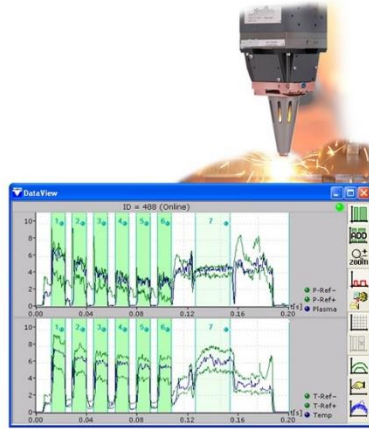
Fixed laser head and double spindle to guarantee the correct run-out of the part.



7. - Welding monitoring

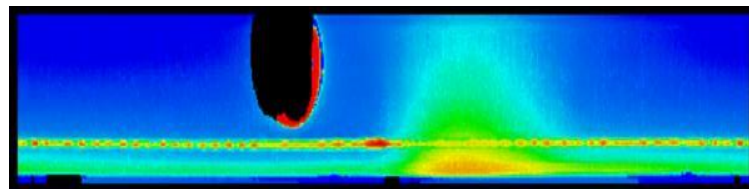
Live Check

Off line Check

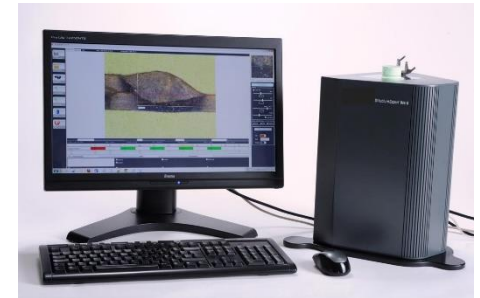


LWM results

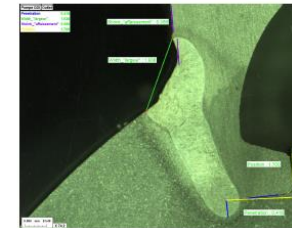
Profilometer results



From etching machine to microscope



Micrograph results





WELDING APPLICATION FOR BATTERY PACK PROCESS

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E-mobility components welding

1. **Welding technology:** laser.
2. **HW used:** Galvo laser head with optical fiber.
3. **E-mobility components:** tab, hair pins, cooling plate and external case.
4. **Components material:** Al and Cu.
5. **Welding process & monitoring:** 6-axes robot to hold the laser head and fixed components.



1.2.3.4. – Welding technology, HW used, E-mobility components and material



Laser source + optical fiber



Galvo laser head



Battery pack



Hairpin

Material

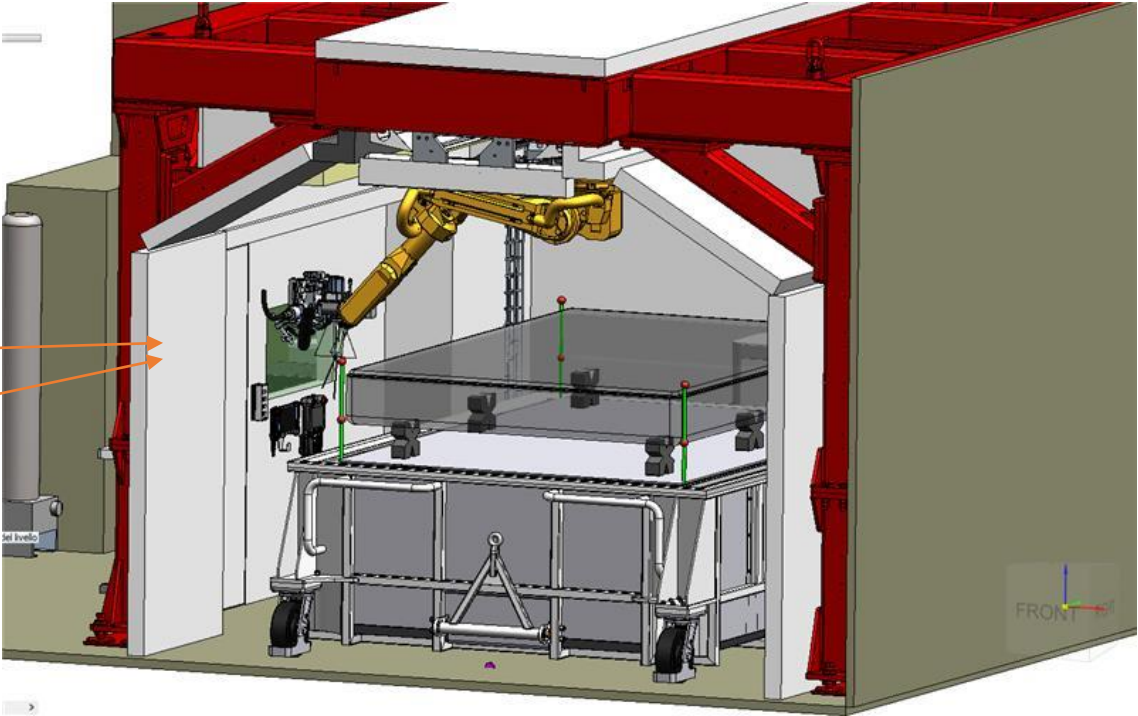
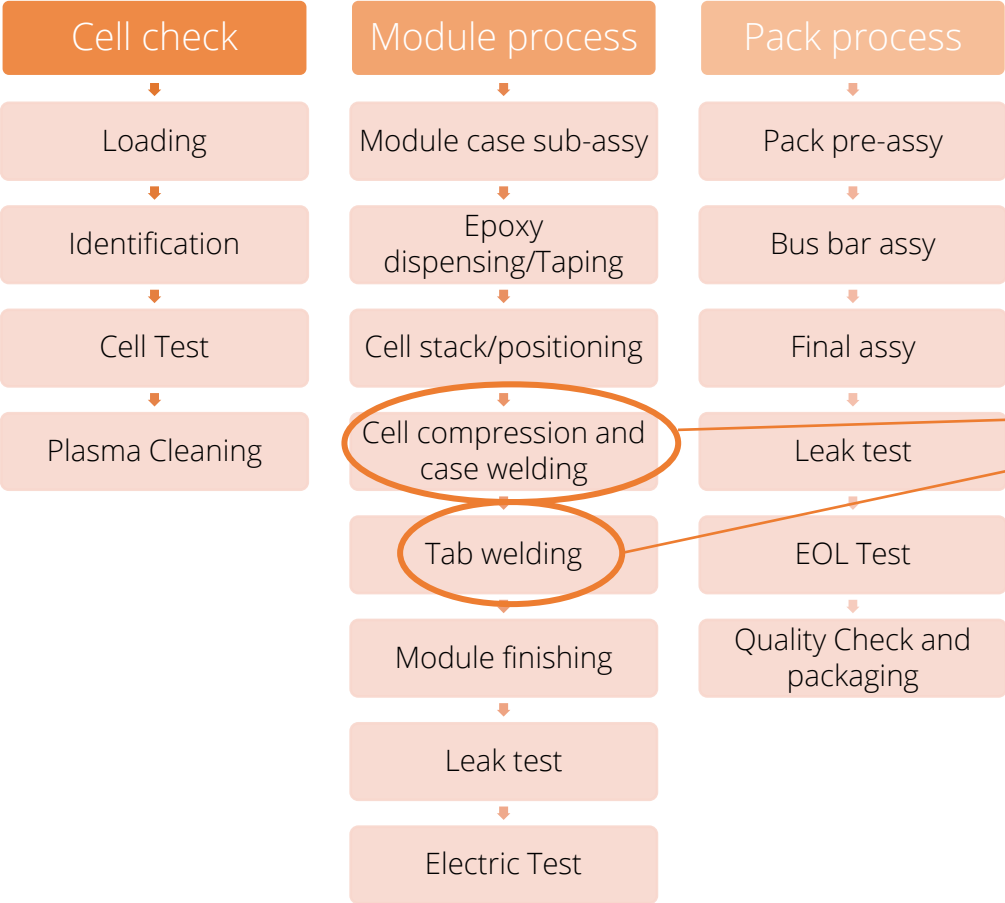


Al

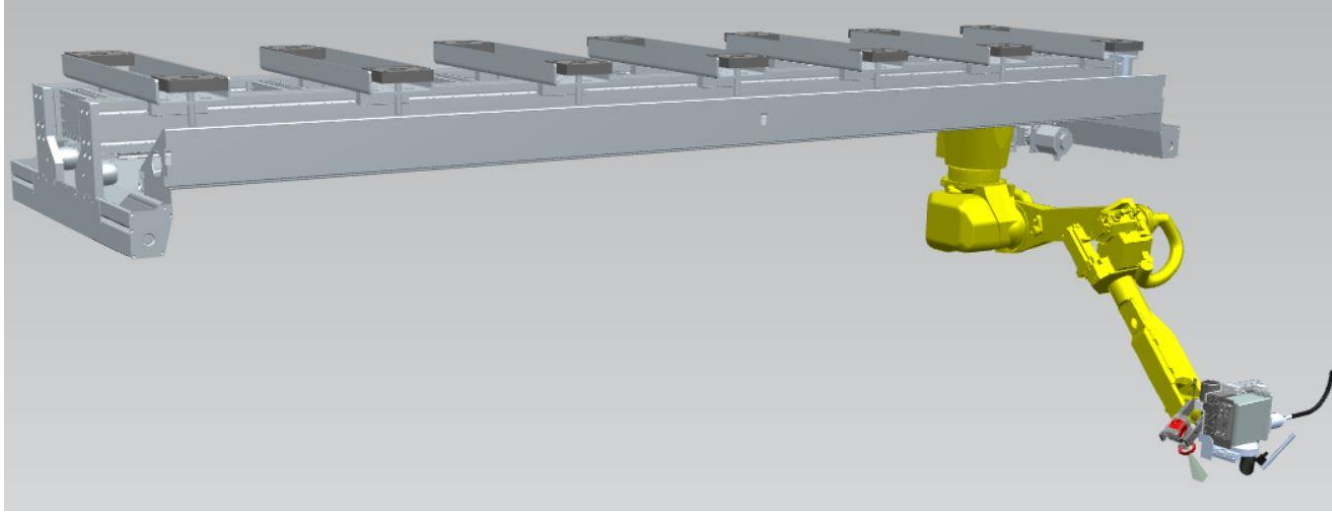


Al-Cu

5. - Welding process & monitoring 1/3

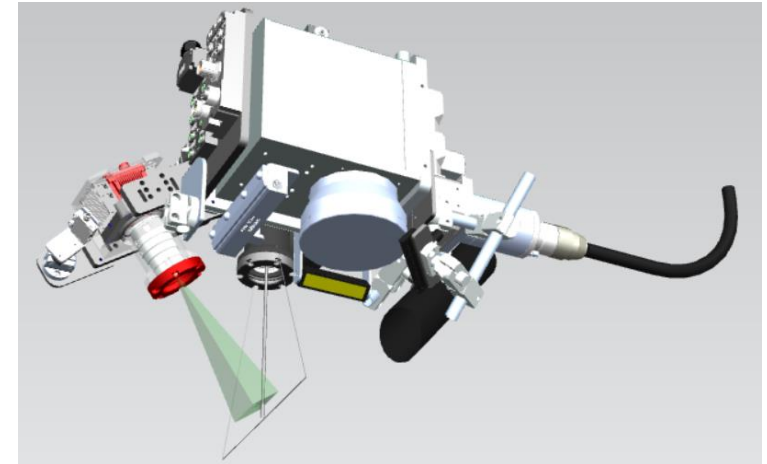


5. – Welding process & monitoring 2/3



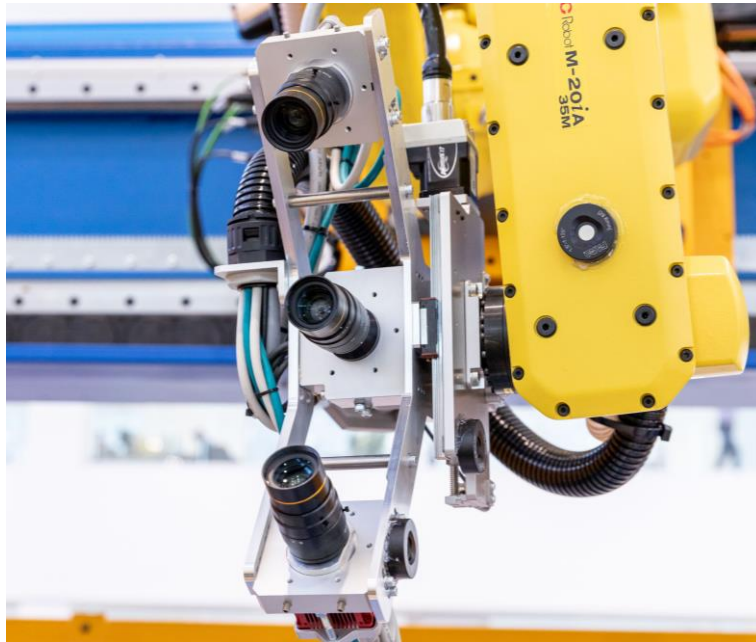
6-axes robot on linear axis.
The laser head has 7 dgf.

Our internal profilometer to auto-self centering the laser head and make the welding in automatic way. The part is fixed on base plate.



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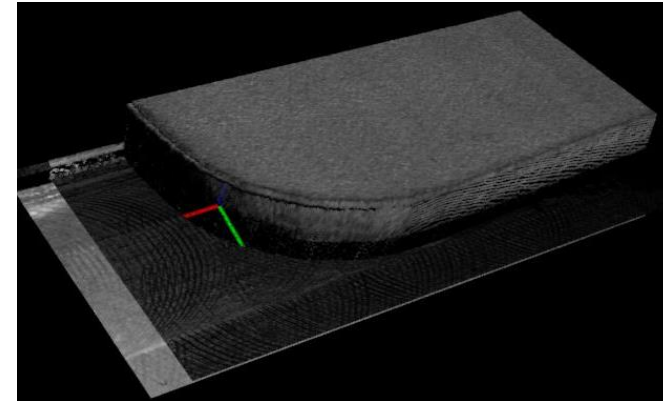
5. – Welding process & monitoring 3/3



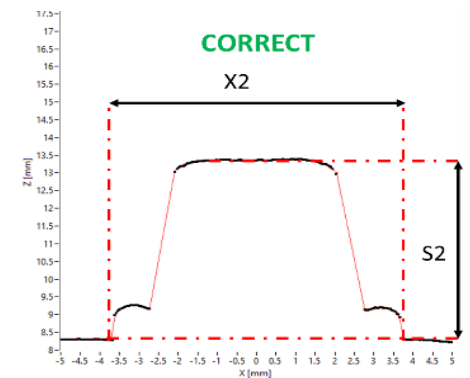
3D Vision System

- Profilometer
- Two Cameras, LED pattern projector

REFERENCE



MEASURE



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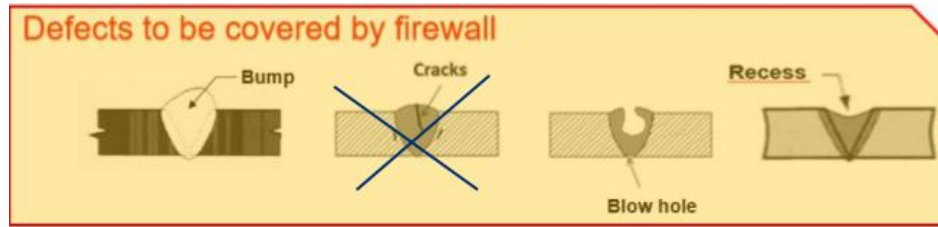
WELDING CRITICAL ASPECTS

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Welding critical aspects

Feedback from our customers on the main critical points for the welding process:

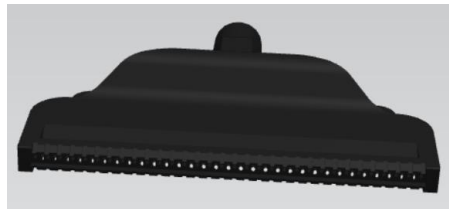
- Welding seam defects: blow hole, recess, interruption and overlap.



- Cleanliness of the part nest: aspiration has a key role in the process.



- Gas protection distribution: Nitrogen, Argon or Helium.



THANK YOU

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