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
Established
1968 by Enrico e Graziella Loccioni

Ownership
Loccioni Family

Business
140 Milions 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
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.

LOCIONI
LOCCIONI FOR E-MOBILITY
Production Solution

E-Motor

E-Axle

Battery test

R&D Solution

E-Motor

E-Axle

Inverter

Fuell cells

LOCCIONI
WELDING PROCESS AND LOCCIONI EXPERIENCES
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.
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**
  - Flange welding
  - Damper cap welding
  - Inlet fitting welding

- **Material**
  - AISI 304L
  - AISI 430

- **Pressure sensor**
  - Internal welding

- **Components**
  - GDI pump
  - Damper cap
  - Inlet fitting
  - Pressure sensor
Fixed laser head and double spindle to guarantee the correct run-out of the part.
7. – Welding monitoring

Live Check

Off line Check

From etching machine to microscope

Profilometer results

LWM results

Micrograph results
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.
<table>
<thead>
<tr>
<th>Laser source + optical fiber</th>
<th>Battery pack</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galvo laser head</td>
<td>Hairpin</td>
<td>Al</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Al-Cu</td>
</tr>
</tbody>
</table>
5. – Welding process & monitoring 1/3

- **Cell check**
  - Loading
  - Identification
  - Cell Test
  - Plasma Cleaning

- **Module process**
  - Module case sub-assy
  - Epoxy dispensing/Taping
  - Cell stack/positioning
  - Tab welding
  - Module finishing
  - Leak test
  - Electric Test
  - Cell compression and case welding

- **Pack process**
  - Pack pre-assy
  - Bus bar assy
  - Final assy
  - Leak test
  - EOL Test
  - Quality Check and packaging

- **Pack process**
  - Leak test
  - Electric Test
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.
5. – Welding process & monitoring 3/3

3D Vision System

- Profilometer
- Two Cameras, LED pattern projector
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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