LEAPER Visual Inspection Solutions for Li-ion Battery

Platform software, full process section inspection coverage

In the raw material, to realize the detection of diaphragm, aluminum-plastic film, etc; In the front section, responding to inspection needs such as coating and die-cutting; In the middle section, responding to visual inspection of laminated winding; In the back section, to complete the battery module components welding quality inspection and finished product appearance inspection.

Multiple core technologies, focus on visual inspection

With rich experience in measurement and positioning as well as defect detection cases, the self-developed traditional general vision platform with AI can solve the inspection problems and achieve accurate positioning and measurement while improving inspection accuracy.

LEAPER's configurable vision systems are widely used in all process stages of lithium battery production. At present, we can provide customized vision inspection solutions for the raw material section-defect detection of copper, aluminum foil and diaphragm; the production section-defect detection and width measurement of coating and slitting process; the core section-die-cutting machine, stacker, cut-and-stack machine; and the pack section-vision-guided welding, The core section-die cutter, laminator, cut and stack machine; pack section-vision guided welding, etc., we can provide customized vision inspection solutions for customers.
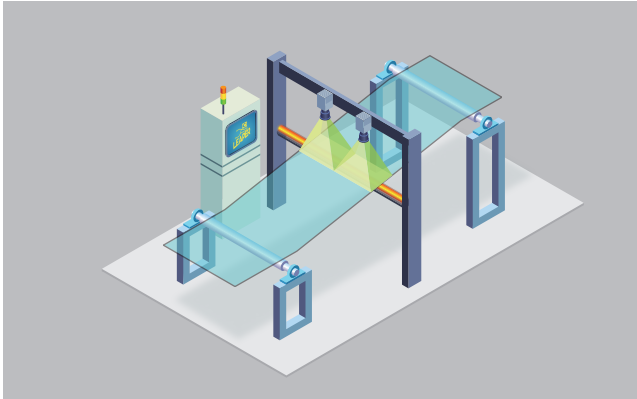
Visual Inspection Process for Li-ion Battery Intelligent Manufacturing Industry
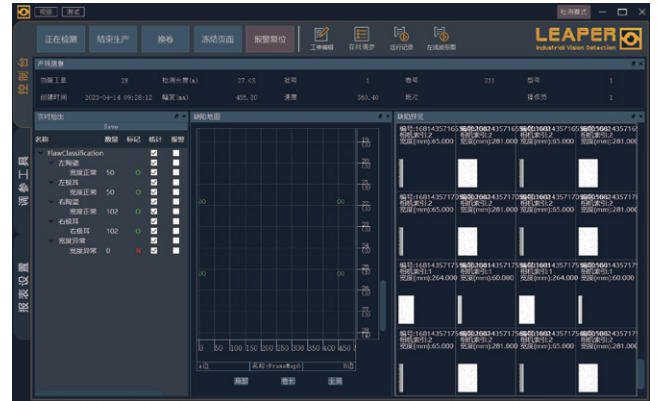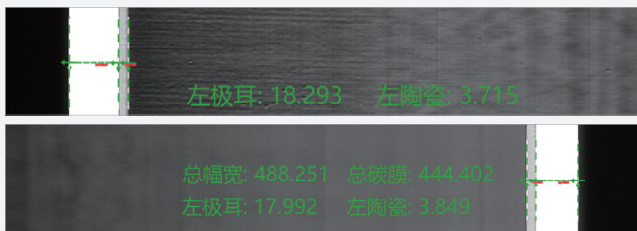
2D Inspection   3D Inspection
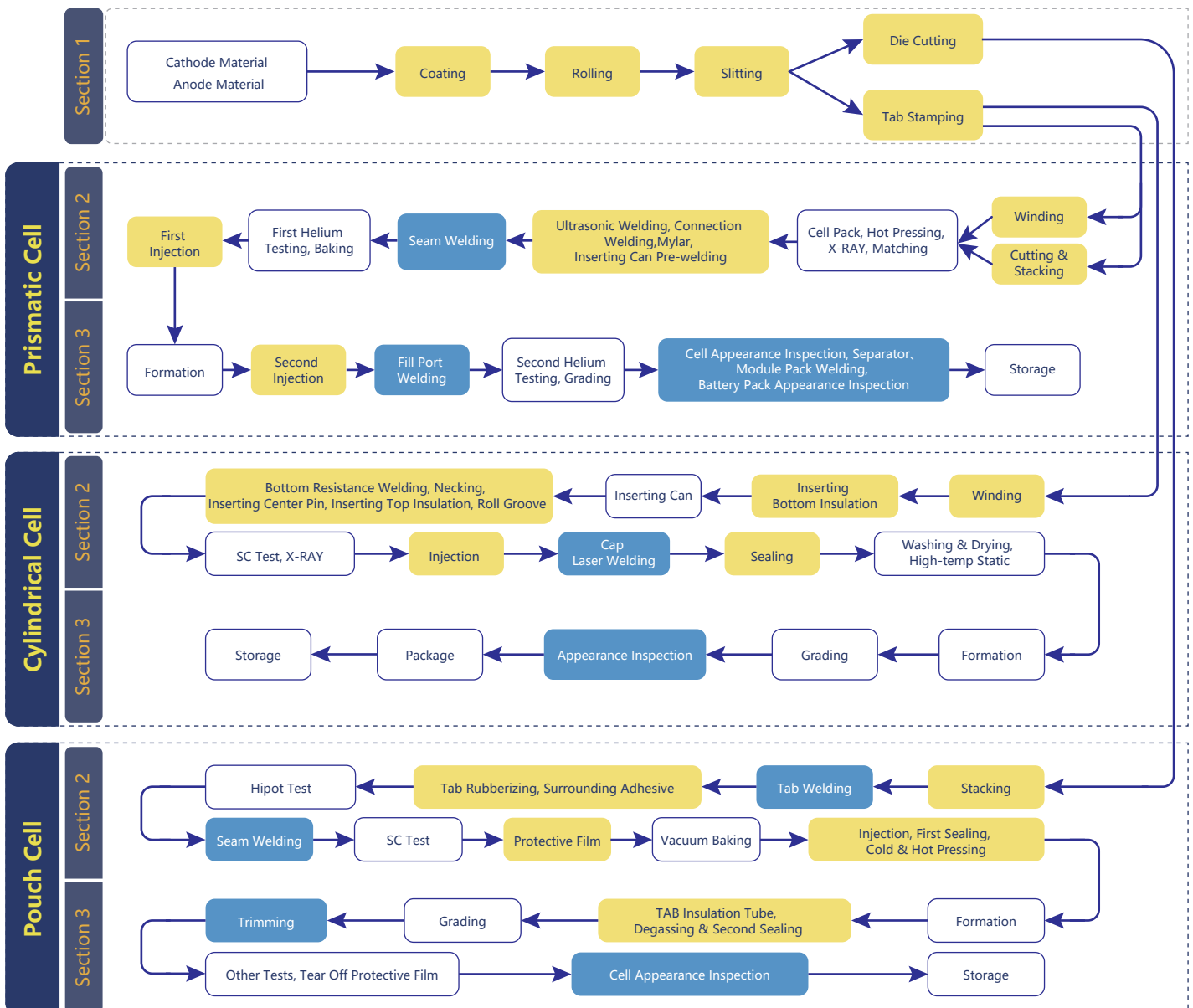
## Coating Process   Roll measurement and surface defect detection

Coating Process

Software Interface

左极耳: 18.293   左陶瓷: 3.715
总幅宽: 488.251   总碳膜: 444.402
左极耳: 17.992   左陶瓷: 3.849

Inspection Content: Roll surface detection, Film width measurement, Tab width measurement, Ceramics width measurement.
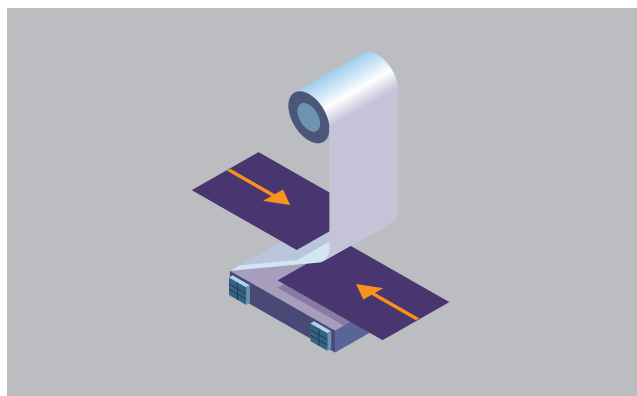
Defect detection accuracy: 0.3mm

Measurement accuracy: 0.05mm/pixel

Particle group defects — 颗粒群
Breaking hole defects — 破孔
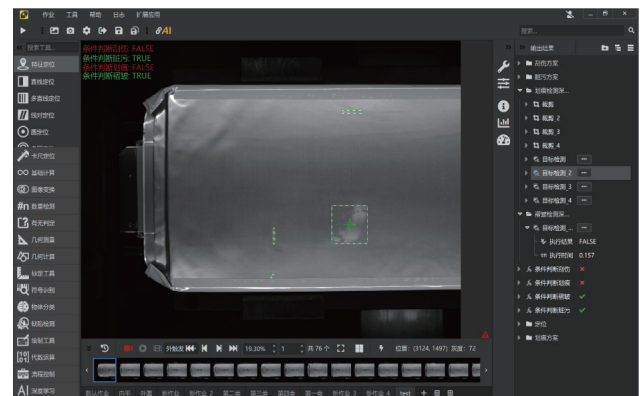Scratches — 划痕
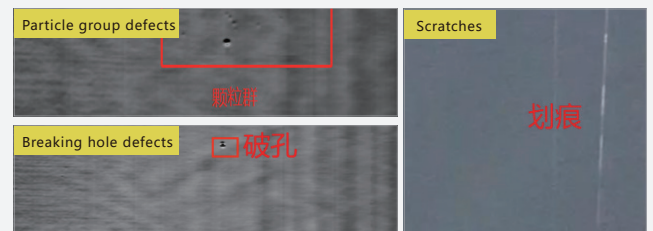
Algorithm Execution Time: ≤0.5s/pcs

Major Components: Line scan camera, Industrial lens, High intensity line scan lights, Industrial intelligent processing center.
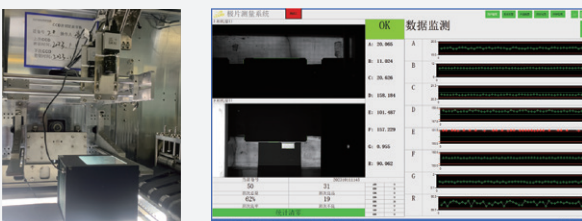
Cell Production Process

Cell Production Process

Software Interface

Full-size Inspection of Electrode after Die Cutting

Installation Process: Tab welding machine

Installation Position: after slitting

Inspection Width: 250mm*250mm

Camera Model: 890W

Number of Cameras: 3

Accuracy: 50μm/pixel

Inspection Requirements: size ± 0.1mm, angle ± 0.15°

Inspection Type: Measurement

Surface Inspection of Stacking

Installation Process: Slitting & stacking integrated machine

Installation Position: after slitting

Inspection Width: 289mm*100mm

Camera Model: 4K

Number of Cameras: 2

Accuracy: 28μm/pixel

Inspection Content: (1) Appearance detection: R-corner trimming, dog-ear judgment, nick detection, etc. (2) Defect detection: hole, smudge, scratch, burr, etc.
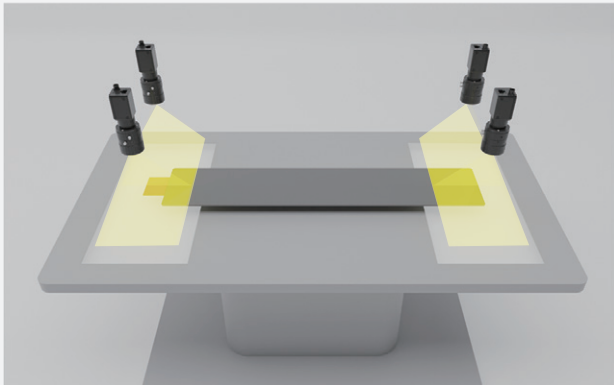
Detection Accuracy: ≥0.3mm

Detection Speed: ≤0.3s

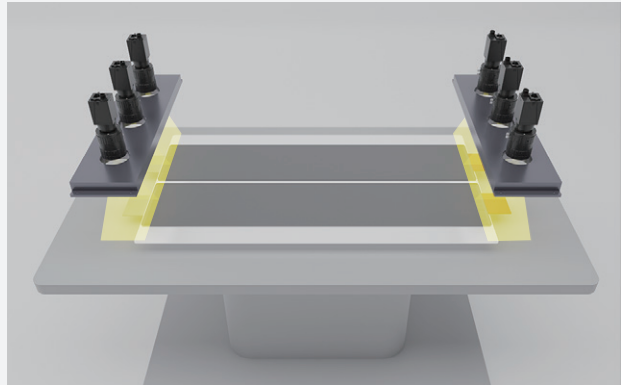**Core Components:** line scan camera, Industrial lens, High performance line light source

| Notch Judgement | Dog-ear Judgement | Hole Detection |
| Defect Detection | Burr Detection | Edge Defect Detection |
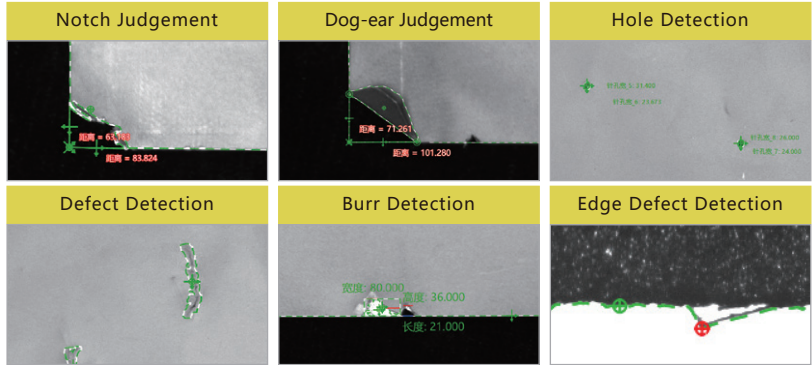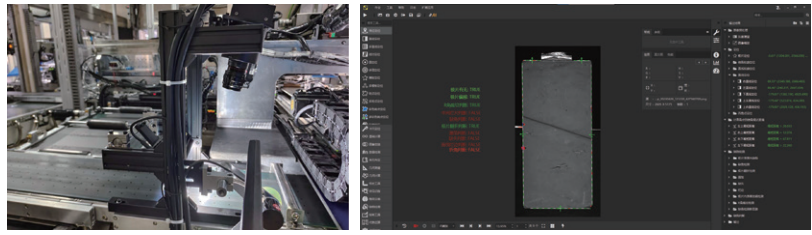
Positioning & Correction Detection

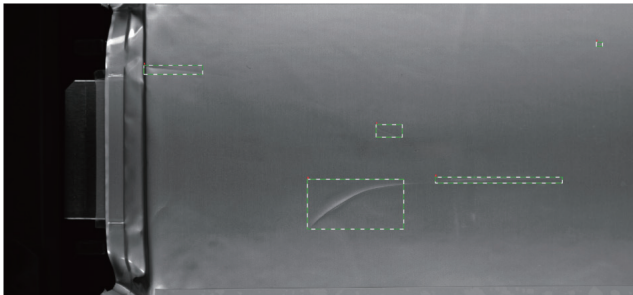**Accuracy Requirements:** ±0.05mm

Beat: ≤0.15s

Overhang Detection

Accuracy Requirements: ±0.1mm

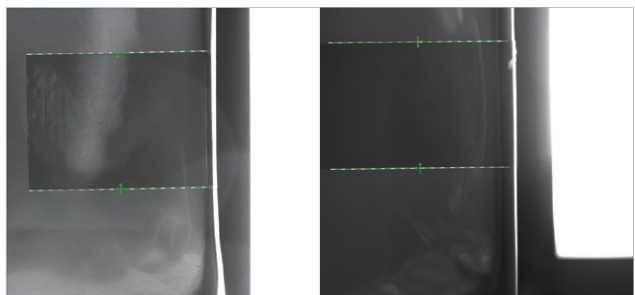**Beat:** ≤0.15s

Pouch Cell Surface Defect Detection

Inspection Content: Smudge, scratch (strips), creases, swollen, crack, wound(face)

Detection Accuracy: 0.5mm/pixel

Detection Speed: ≤0.5s

Core Components: 20MP area scan cameras
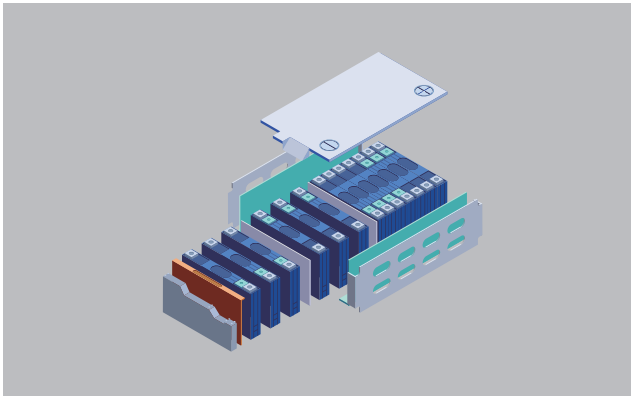
Stick Detection of Pouch Cell

Inspection Content: Tape position, whether glued

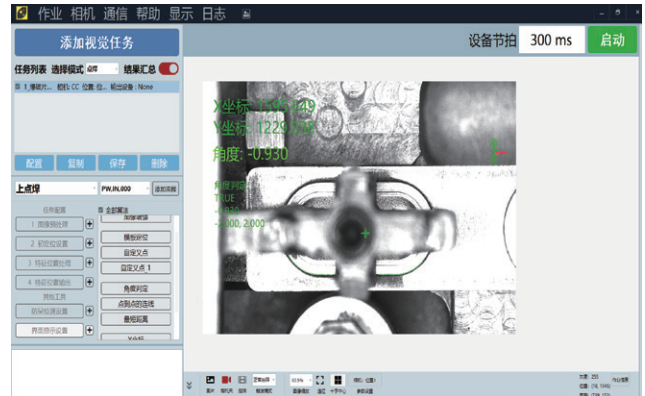**Detection Accuracy:** 0.05mm/pixel

Detection Speed: ≤0.2s

Core Components: 5MP area scan cameras

Li-ion Battery Module/PACK

Li-ion Battery Module/PACK

Software Interface

## Welding Guidance Plans for Cap Plate of Square Shell Battery Module

Inspection Content: Visual guide for cathode&anode laser welding, explosion-proof valve laser pre-welding and full welding, lead tag laser welding

Visual Detection Accuracy: 0.05mm/pixel

Detection Speed: ≤0.2s (excluding laser processing time)

Core Components: Area scan cameras, Red ring light

Defect Detection of Battery Cap
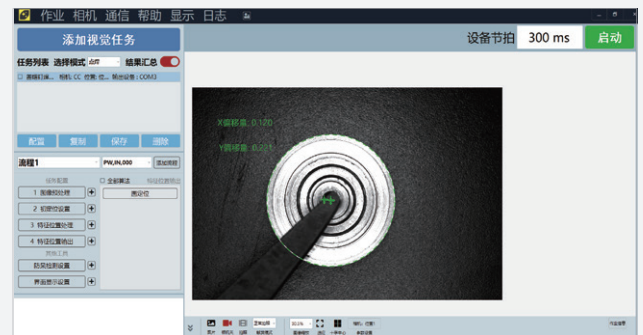
Inspection Content: Coordinate positioning of cap nails to guide laser welding

Visual Detection Accuracy: Static repetitive positioning precision＜0.5pixels, dynamic repetitive positioning precision ＜2pixels

Detection Speed: ≤0.2s (excluding laser processing time)

Core Components: Area scan cameras, Ring light