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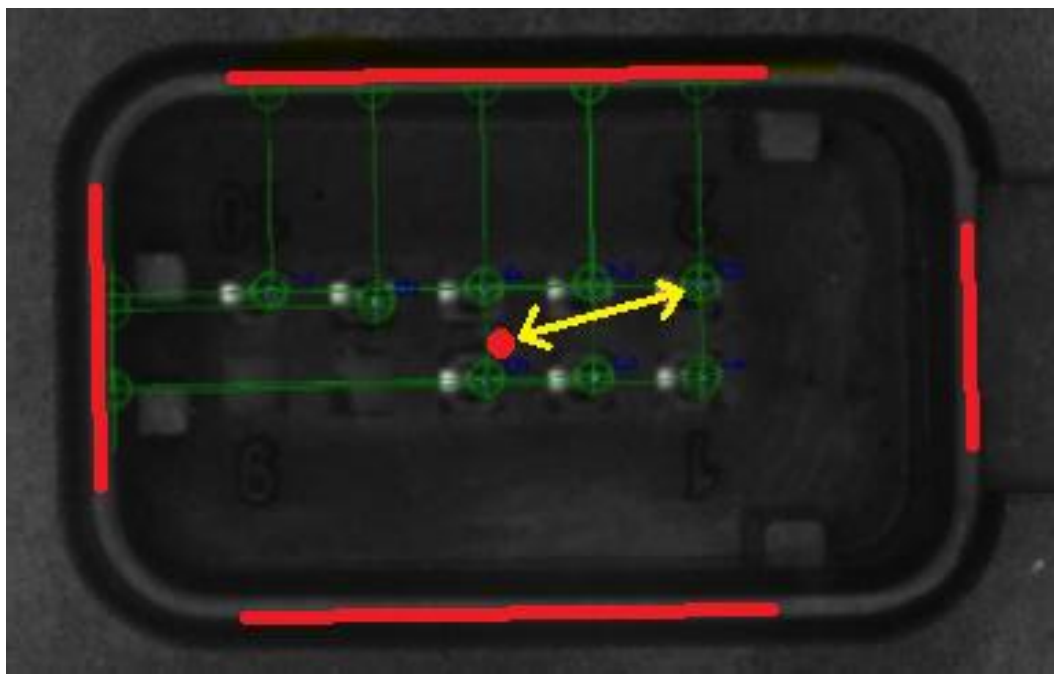
Fundamentals of Industrial Measurement Technology

Geometric Optical Measurement Systems



ProDSP Post Series Nr.18.

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Key Elements and Selection Criteria

The core tasks of machine vision — size measurement, position determination, and shape inspection — are only reliable if the **six fundamental system components are properly selected** and aligned

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Illumination

- The direction and type of light fundamentally determine which edges and surface details are visible.
- **Good contrast = good measurement.**

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Lens

- Distortion, sharpness, and field of view.
- One of the most critical parameters for achieving accuracy.

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Camera

- Resolution and sensitivity determine how detailed the captured data will be.

Calibration

- The foundation of geometric accuracy.
- Without distortion compensation and scaling, precise values cannot be obtained.

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Mounting / Mechanical fixture

- A stable mechanical position is just as important as a good camera.
- If anything moves, the entire measurement becomes inaccurate.

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Software

- Algorithms analyze the image — contours, edges, patterns, defects.
- Often the most expensive but also the most important part of the system.

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