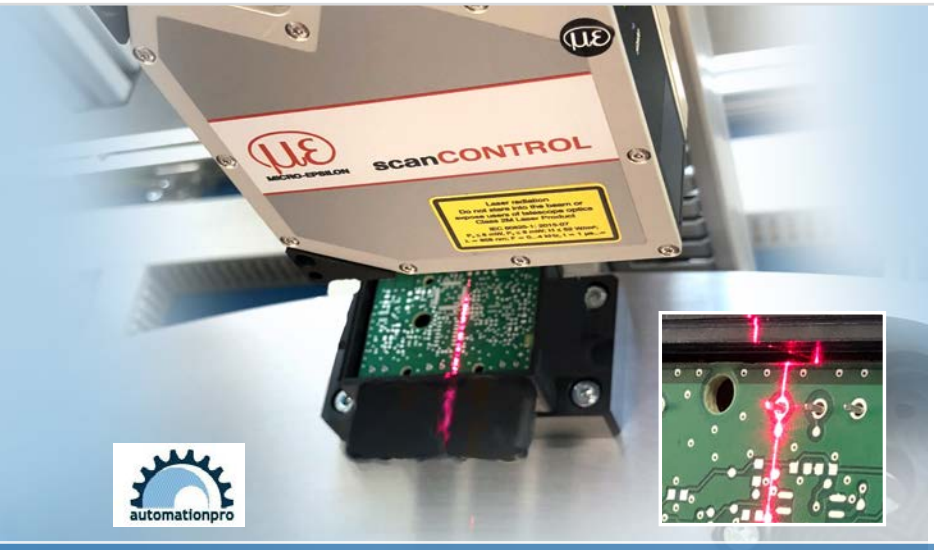
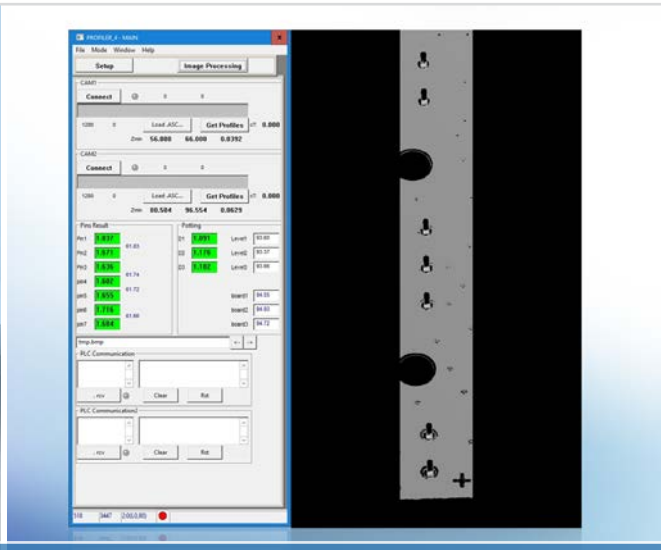
A318

Laser scanners
scanCONTROL





Measuring the height of pressed-in pins

In addition to high accuracy with miniature dimensions, the production of electronic components also requires high speed processes that provide the highest quality. Therefore, many production steps in this area are highly automated. The company Automationpro has developed a machine that inspects the height of pressed-in contact pins on PCBs (Press Fit Technology = PFT) inline immediately after the pressing process. If the pins are not completely pressed through the openings, it is not possible to establish contact with other components, which may cause failure.

Therefore, a scanCONTROL profile sensor scans each PCB in three dimensions. During this pressing process, the PCBs are fixed on a rotary table which moves the assembled module from the press-in position to the scanning position. The scanCONTROL is being moved by an actuator connected to an encoder which is being used for triggering the line scanner to ensure regular profile distances.

Depending on the cycle time of the process, the component undergoes a complete scan within 7 seconds, generating 1,280 points per profile. The recorded measurement values are transmitted to the customer's image processing software as raw data via the Gigabit Ethernet interface for Machine Vision (GigE Vision). For evaluation and processing purposes of the raw data, Automationpro developed specific image processing algorithms. The entire system structure enables this profile data to be transmitted and evaluated at high speeds. Consequently, the entire evaluation process per PCB is carried out in less than one second.
The customer software calculates the pin height relative to the surrounding surface area on the PCB. The result is transmitted to the control system where it is evaluated immediately. This means any faulty PCB can be rejected automatically. For debugging purposes, the result is additionally displayed on a monitor in color which enables the operator to easily analyze the process. Furthermore, the system allows for additional inspections to be carried out, e.g. measuring the height of the potting compound with an additional sensor in the next step.

Requirements for the measurement system
- Measurement on pointed and shiny pins with changing reflections
- Accuracy: ≤ ± 40µm
- Scanning time per PCB: 7 seconds
- Measurement frequency: 2kHz

Ambient conditions
- Normal ambient conditions

System design
- Sensor: scanCONTROL 2950-50 (pin measurement)
- Rotary table
- Linear actuator with encoder
- Customer image processing software

Advantages
- Non-contact, wear-free measurement
- No interfering force on pins
- High precision and repeatability
- High speed evaluation (<1 second)